CHAPTER

74

IGNITION

MD-80
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 74
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A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

74-EFFECTIVE PAGES

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GENERAL - DESCRIPTION AND OPERATION

1. General

A. The ignition system consists of an ignition selector switch, engine start switch, fuel shutoff lever ignition switch, dual section ignition exciter, two shielded high-tension igniter plug leads, and two igniter plugs.

2. Switching

A. The ignition selector switch is located on the overhead switch panel in the flight compartment. The switch provides the desired ignition selection (GRD START & CONTIN, OFF, or OVRD), for both engines.

B. The engine start switch is located on the overhead switch panel in the flight compartment. The switch is a guarded, momentary switch, which controls the starter air shutoff valve and the 28-volt dc supply to the ignition exciter.

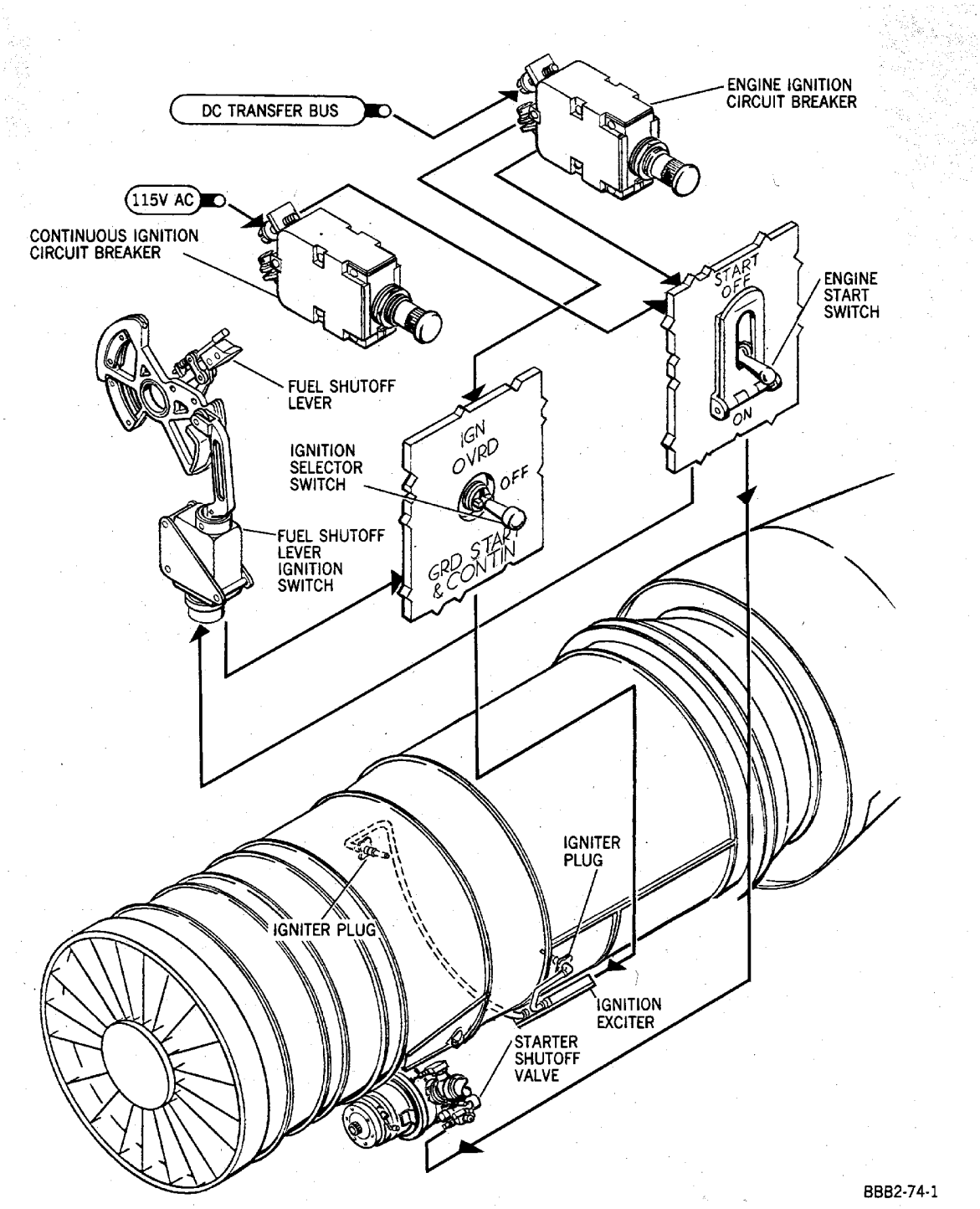
C. The fuel shutoff lever ignition switch is located in the control pedestal directly below the fuel shutoff lever. Forward movement of the fuel shutoff lever closes the switch contacts.

3. Electrical Power Supply

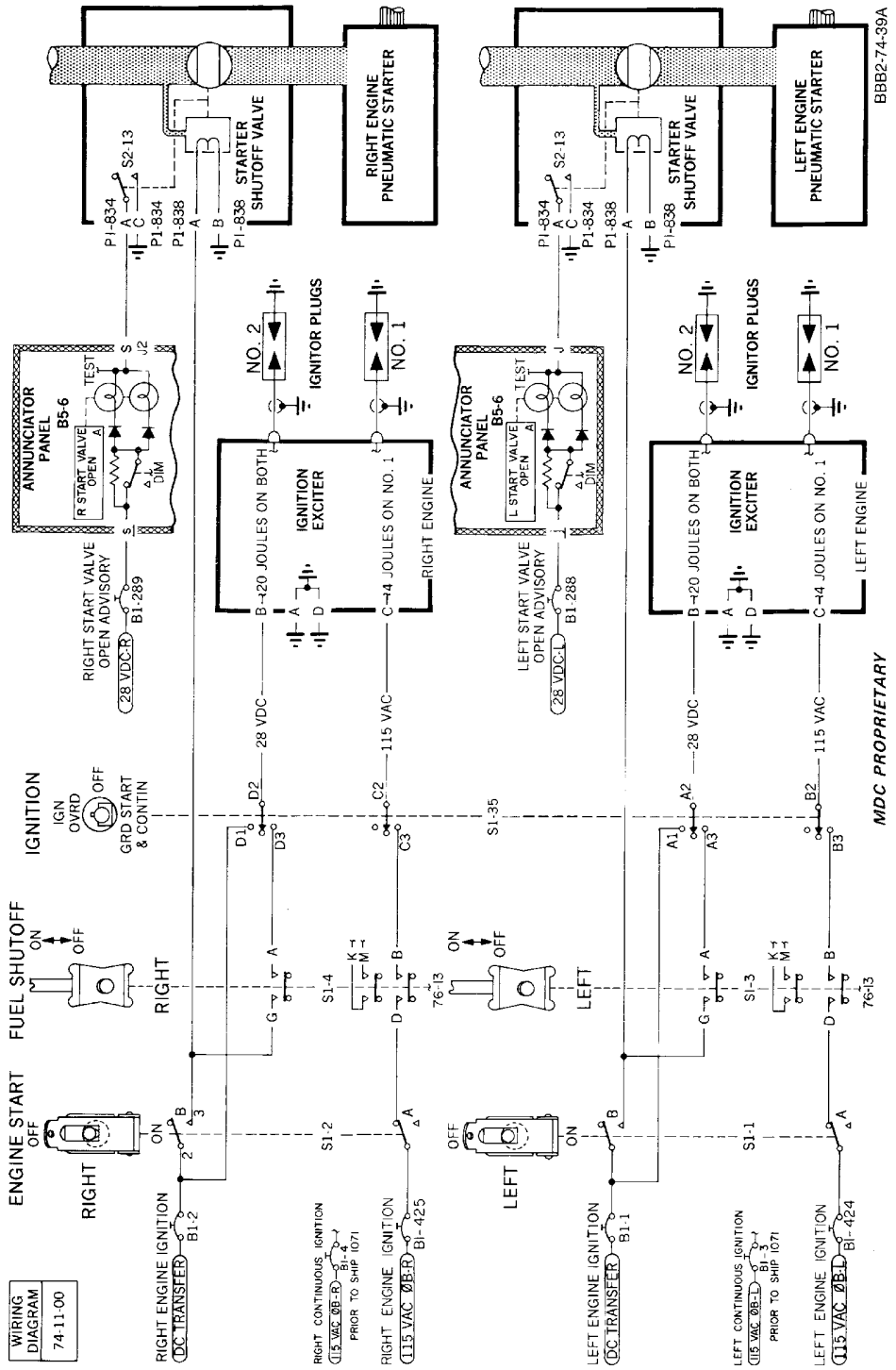
A. The ignition exciter is located on the left rear side of the engine. The exciter is a dual section capacitor discharge type which provides high-energy (20-joule) ignition for intermittent operation and low-energy (4-joule) ignition for continuous operation. The 20-joule ignition section uses 28-volt dc supplied through a circuit breaker on the dc transfer bus. The 4-joule ignition section uses 115-volt, 400-Hz AC supplied through a circuit breaker located on the upper main circuit breaker panel. The high-energy ignition is used for ground and in-flight starting. The low-energy ignition supplies a continuous ignition source, available for use when desired. A dual unit is available (see P&W Service Bulletin (SB) 5880) which has two exciters with one power input connection for each exciter. The two output connectors supply high tension voltage through the exciter cables to the igniter plugs.

4. Igniter Plug Leads

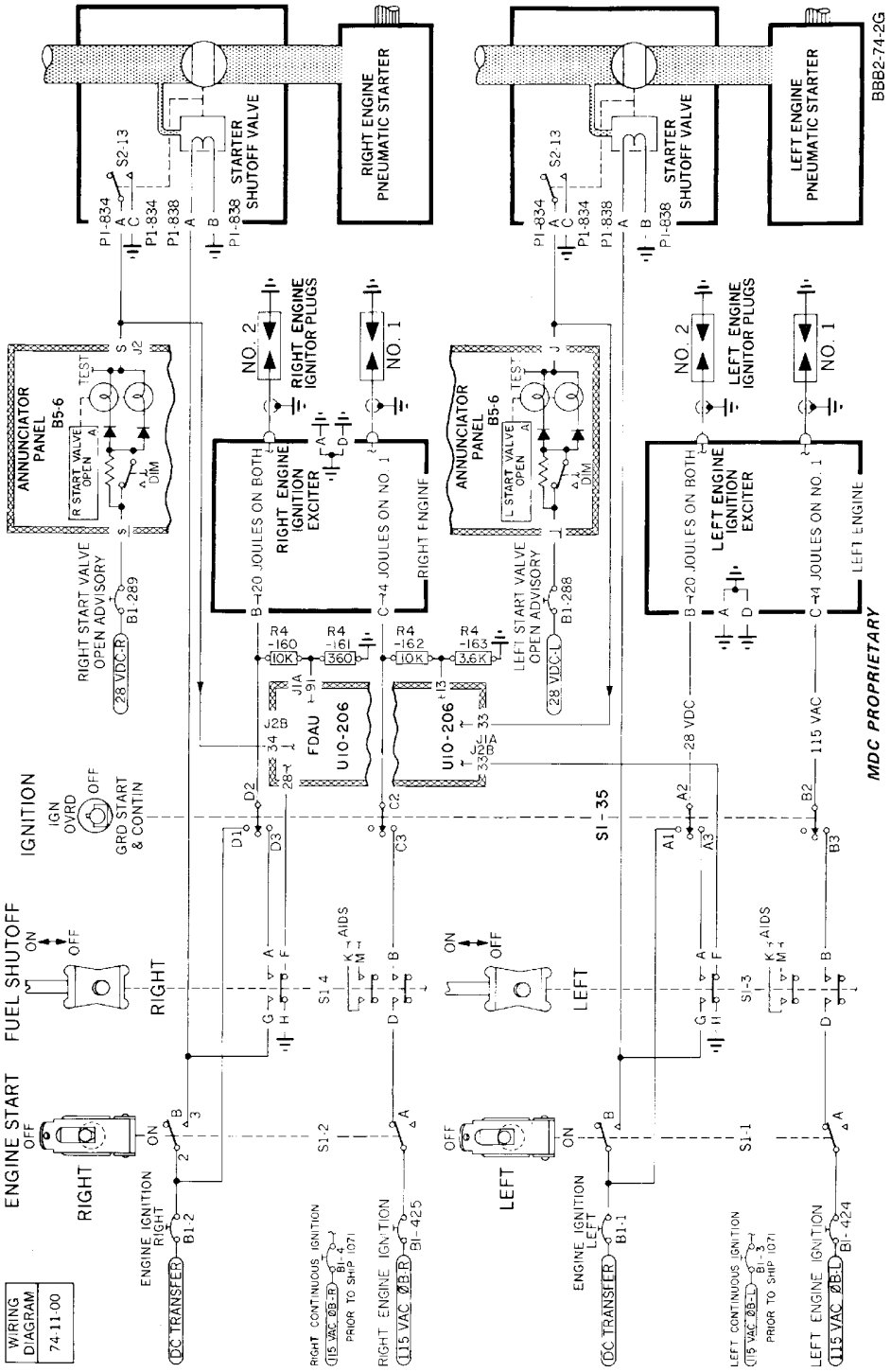
A. Two shielded high tension igniter plug leads are connected between the exciter output connectors and igniter plugs. One lead is connected to igniter plug in combustion chamber No. 4, the other lead to the igniter plug in combustion chamber No. 7.



Ignition System - Schematic
Figure 1/74-00-00-990-807 (Sheet 1 of 4)

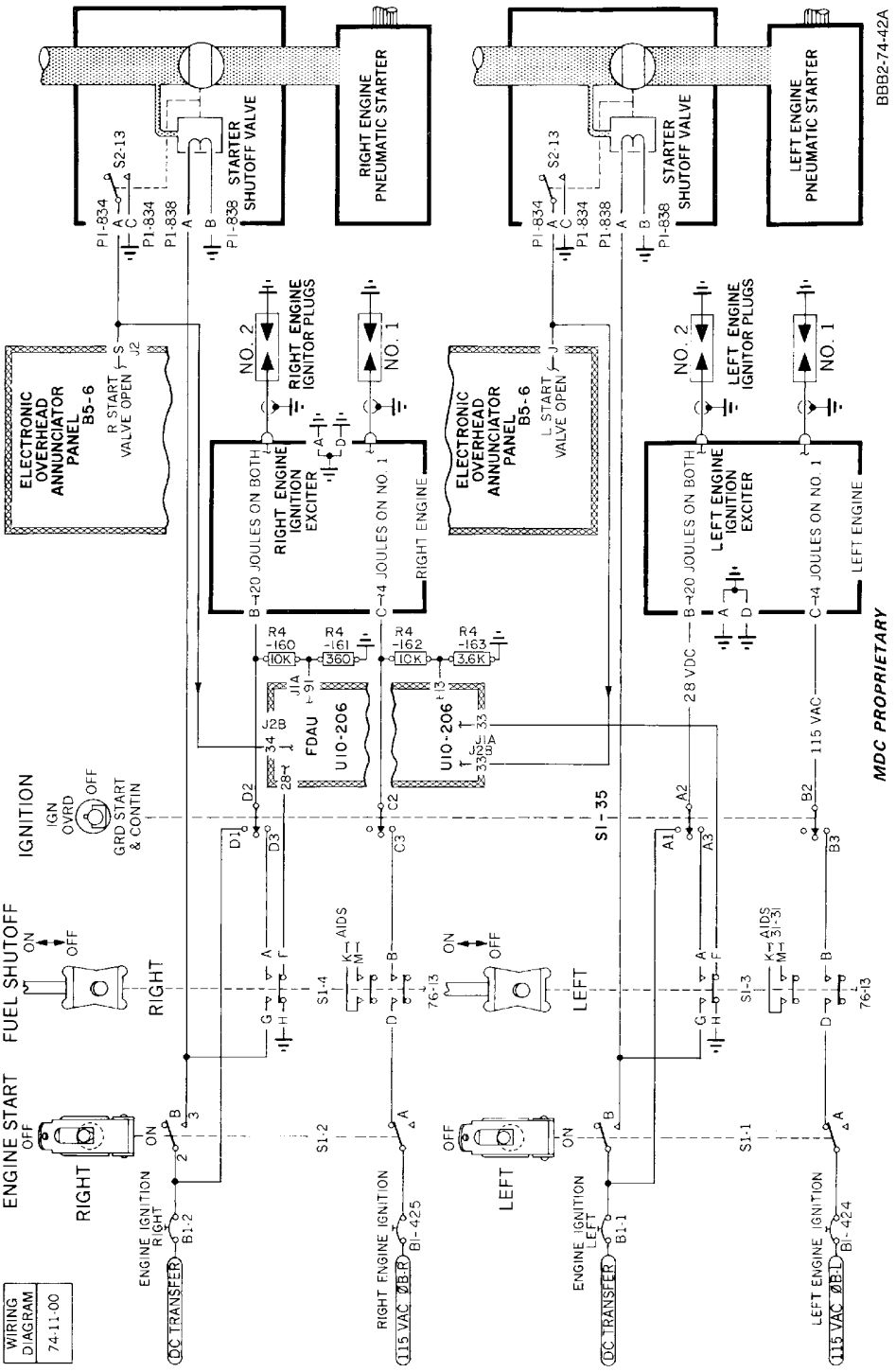


Ignition System - Schematic
Figure 1/74-00-00-990-807 (Sheet 2 of 4)



Ignition System - Schematic
Figure 1/74-00-00-990-807 (Sheet 3 of 4)

EFFECTIVITY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 891



Ignition System - Schematic
Figure 1/74-00-00-990-807 (Sheet 4 of 4)

EFFECTIVITY
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872

5. Operation

A. Normal Starting

(1) For normal starting, the ignition selector switch is placed in the GRD START & CONTIN position, and the engine start switch is held in the ON position.

(2) Power flows from the 28-volt dc transfer bus to the fuel shutoff lever ignition switch through the engine ignition circuit breaker and engine start switch. Power is also supplied to the starter shutoff valve through the engine start switch.

(3) As the fuel shutoff lever is moved toward the ON position, the contacts of the fuel shutoff lever ignition switch close to complete the circuit (through the ignition selector switch) to the 20-joule, high energy section of the ignition exciter causing both igniter plugs to fire.

(4) When engine ignition occurs, the engine start switch is released; the circuitry then switches to the continuous 4-joule, low energy system which supplies power to fire the right igniter plug only. The 4-joule system is turned OFF (by placing ignition selector switch in OFF position) during normal flight conditions when engine operation is stable.

(5) For the 20-joule DC system, all ground starts or in-flight air starts should be made with the use of the 20-joule DC exciter (firing both igniter plugs). For optimum life of ignition system components, the operating duty cycle is 2 minutes ON, 3 minutes OFF, 1, 2 minutes ON, 23 minutes OFF.

NOTE: P&W SB 5880 makes available a dual unit continuous duty exciter with no duty cycle limits.

(6) For the continuous 4-joule system, the 4-joule system should be used in lieu of the 20-joule DC system for protection against flameout during takeoff and prior to activating the engine inlet anti-icing system. The 4-joule system, which can be operated continuously may also be used for protection against flameout or at any other time deemed advisable, such as during periods of moderate or severe turbulence. To conserve the life of the ignition system components, the 4-joule ignition system should be turned OFF during normal flight conditions whenever engine operation is stable.

B. Emergency Starting

(1) For in-flight flameout or other emergency conditions, moving the ignition selector switch to the IGN OVRD position supplies 20-joule, high energy power to both igniters, bypassing the fuel shutoff lever ignition switch.

GENERAL - DESCRIPTION AND OPERATION

1. General

A. The ignition system consists of an ignition selector switch, engine start switch, fuel shutoff lever ignition switch, twin-pack, 20-joule AC ignition exciters, two shielded high-tension igniter plug leads, and two igniter plugs.

2. Switching

A. The ignition selector switch is located on the overhead switch panel in the flight compartment. The switch provides the desired ignition selection (SYS A, OFF, SYS B, BOTH, OVRD) for both engines.

B. The engine start switch is located on the overhead switch panel in the flight compartment. The switch is a guarded, momentary switch, which controls the starter air shutoff valve.

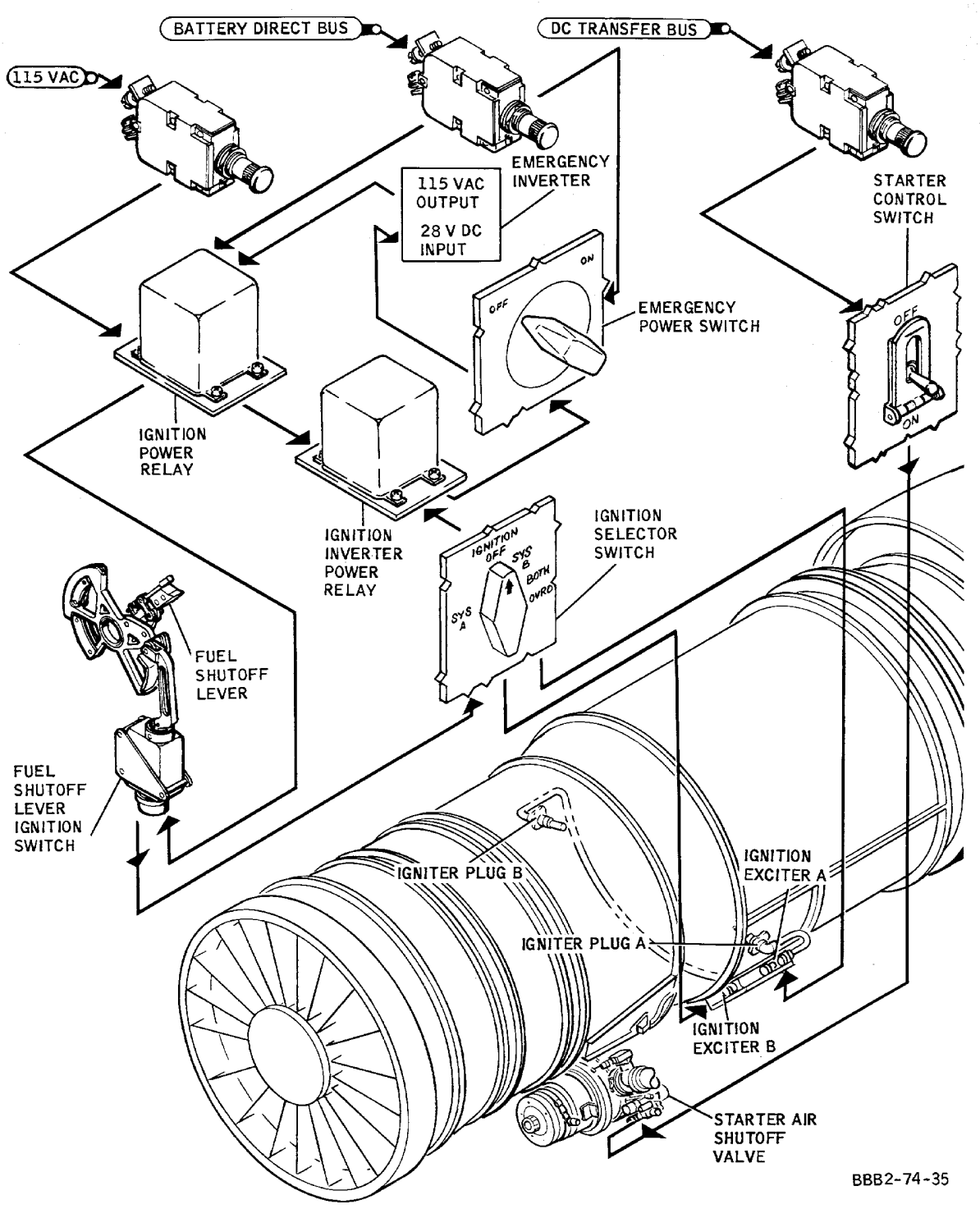
C. The fuel shutoff lever ignition switch is located in the control pedestal directly below the fuel shutoff lever. Forward movement of the fuel shutoff lever closes the switch contacts.

3. Electrical Power Supply

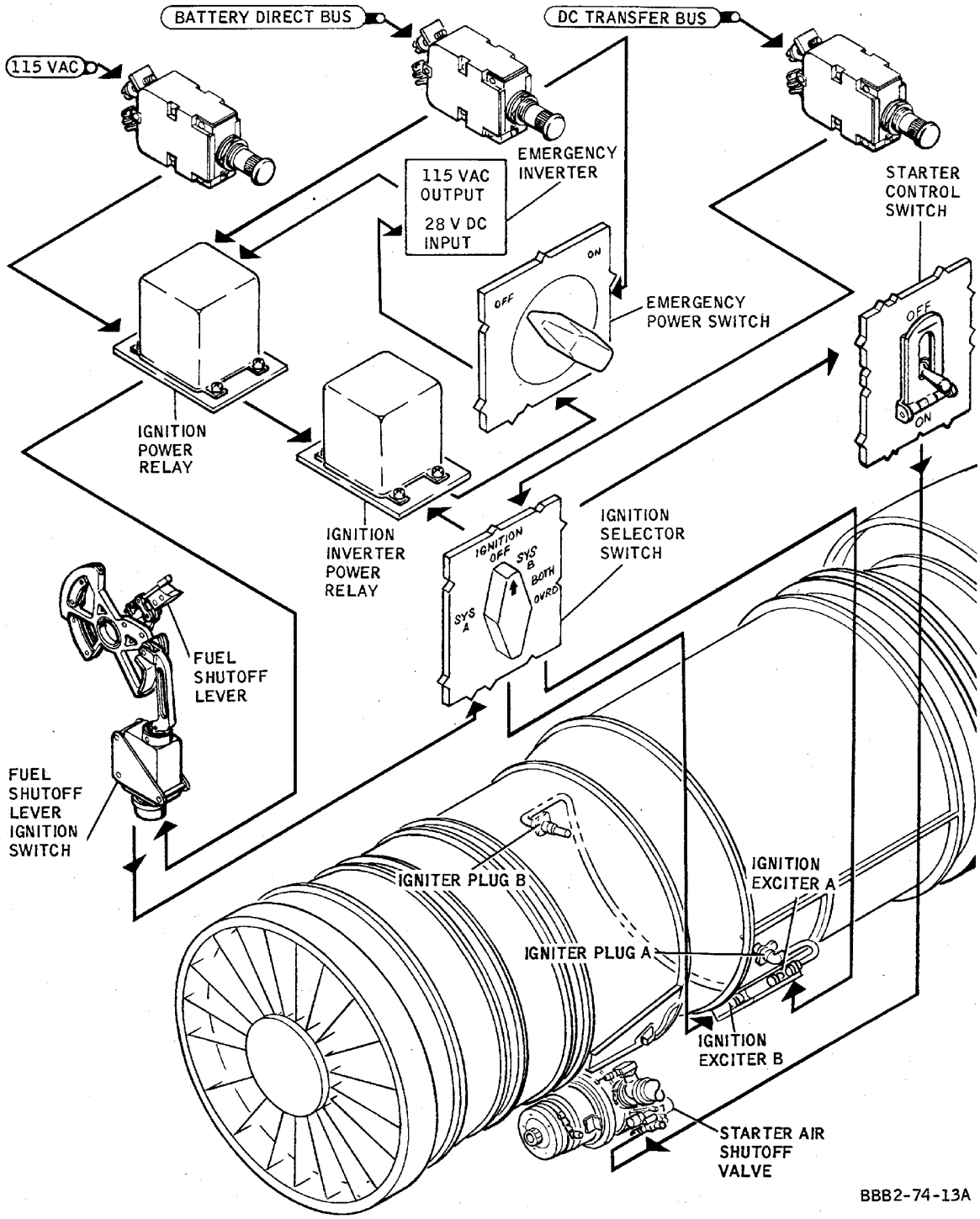
A. The two 20-joule ignition exciters are located on the left rear side of the engine. The exciters provide electrical energy for engine starting. Power is applied to the input connector of the exciter from the 115 VAC bus through the LEFT or RIGHT ENGINE IGNITION CIRCUIT BREAKER, ENGINE IGNITION POWER RELAY, FUEL SHUTOFF LEVER IGNITION SWITCH and IGNITION SELECTOR SWITCH. Basically each circuit converts the input AC power into high voltage DC for storage as a charge on the tank capacitor. This stored energy is delivered to the igniter plug at the specified spark rate by means of an ignition lead. Provisions in the exciter circuitry enable a high voltage pulse to be delivered to the igniter to provide positive breakdown of the igniter gap under all conditions.

4. Igniter Plug Leads

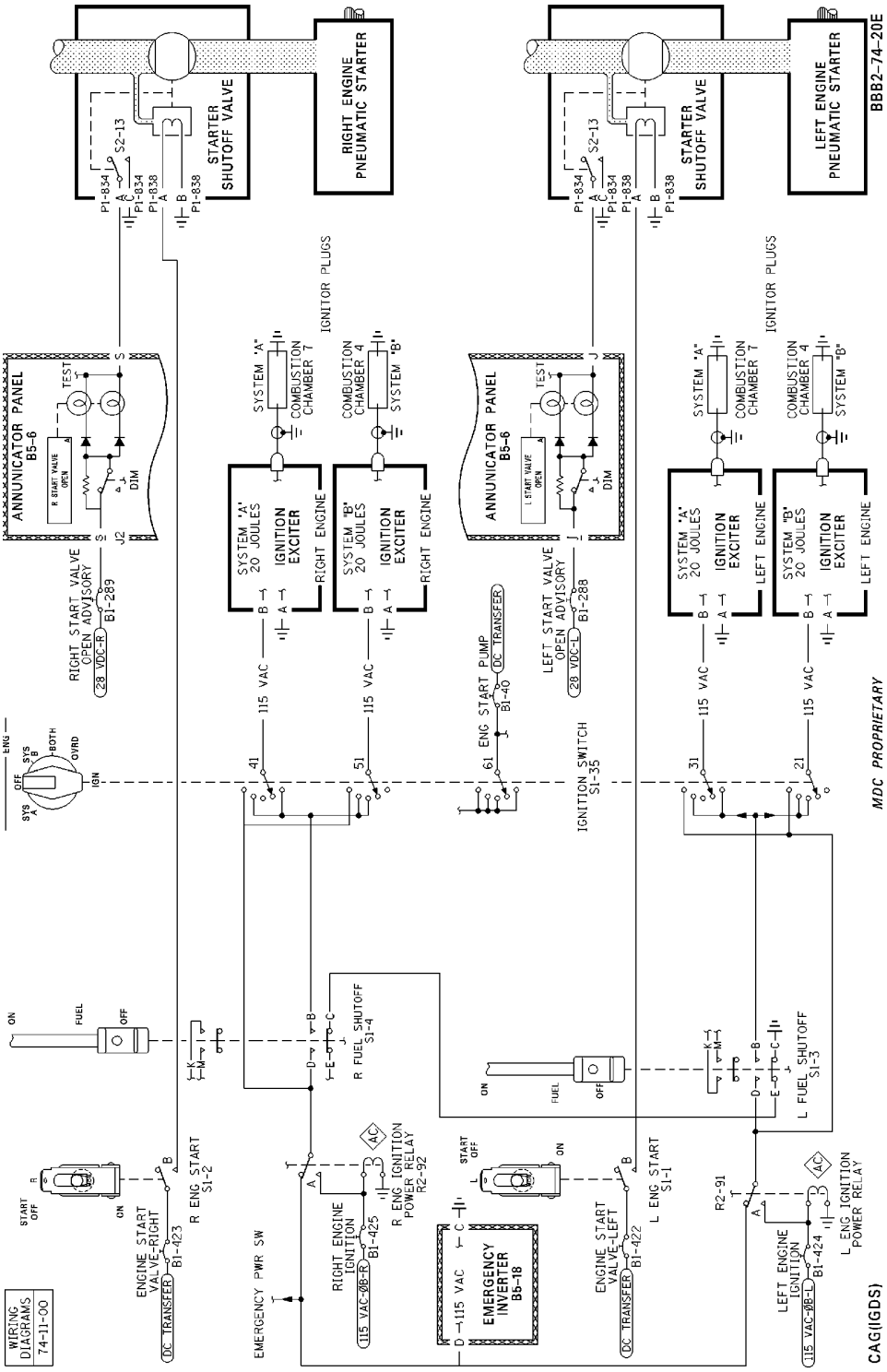
A. Two shielded high tension igniter plug leads are connected between the exciter output connectors and igniter plugs. One lead is connected to the igniter plug in combustion chamber No. 4, the other lead to the igniter plug in combustion chamber No. 7.



Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 1 of 8)

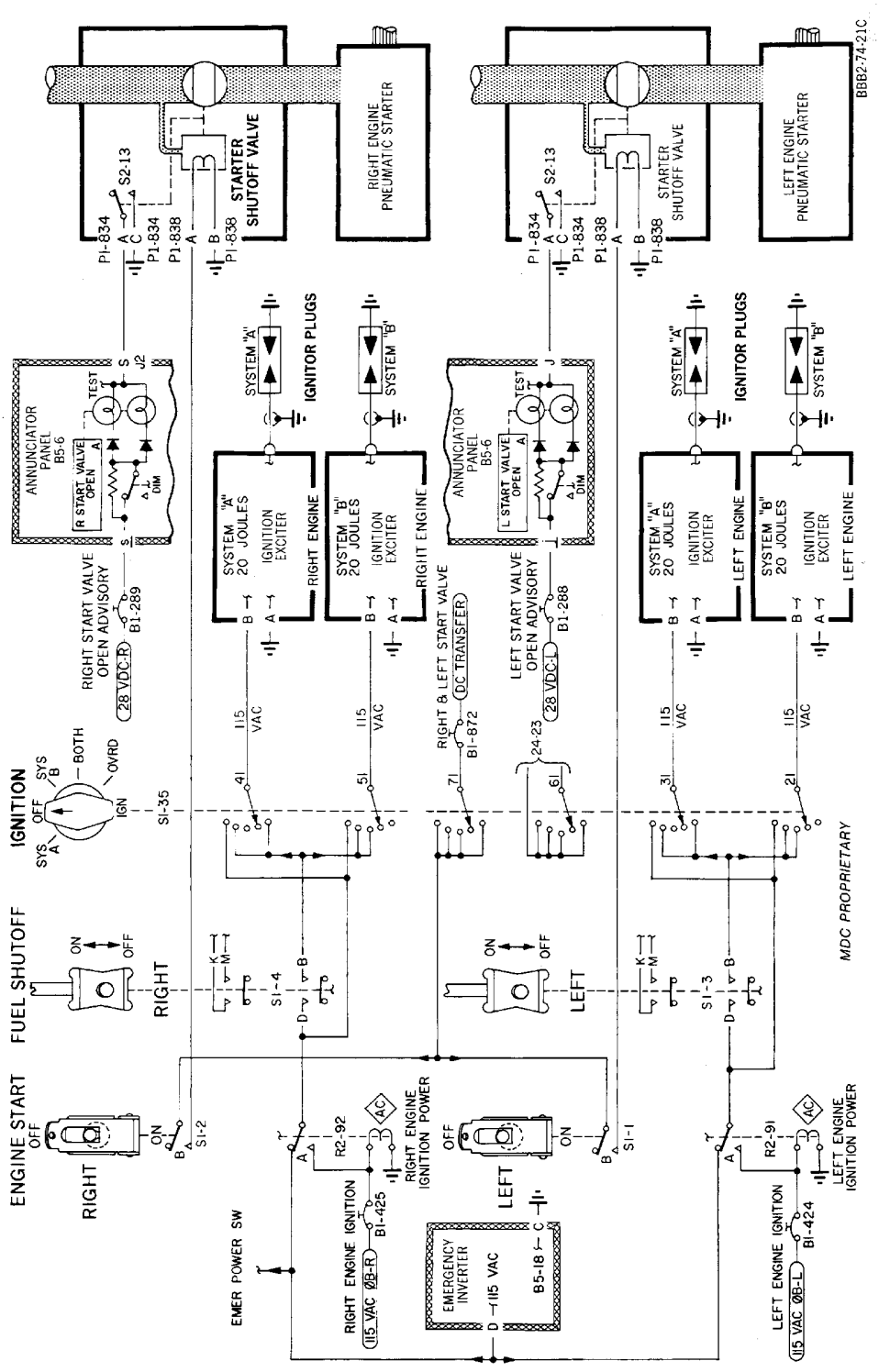


Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 2 of 8)

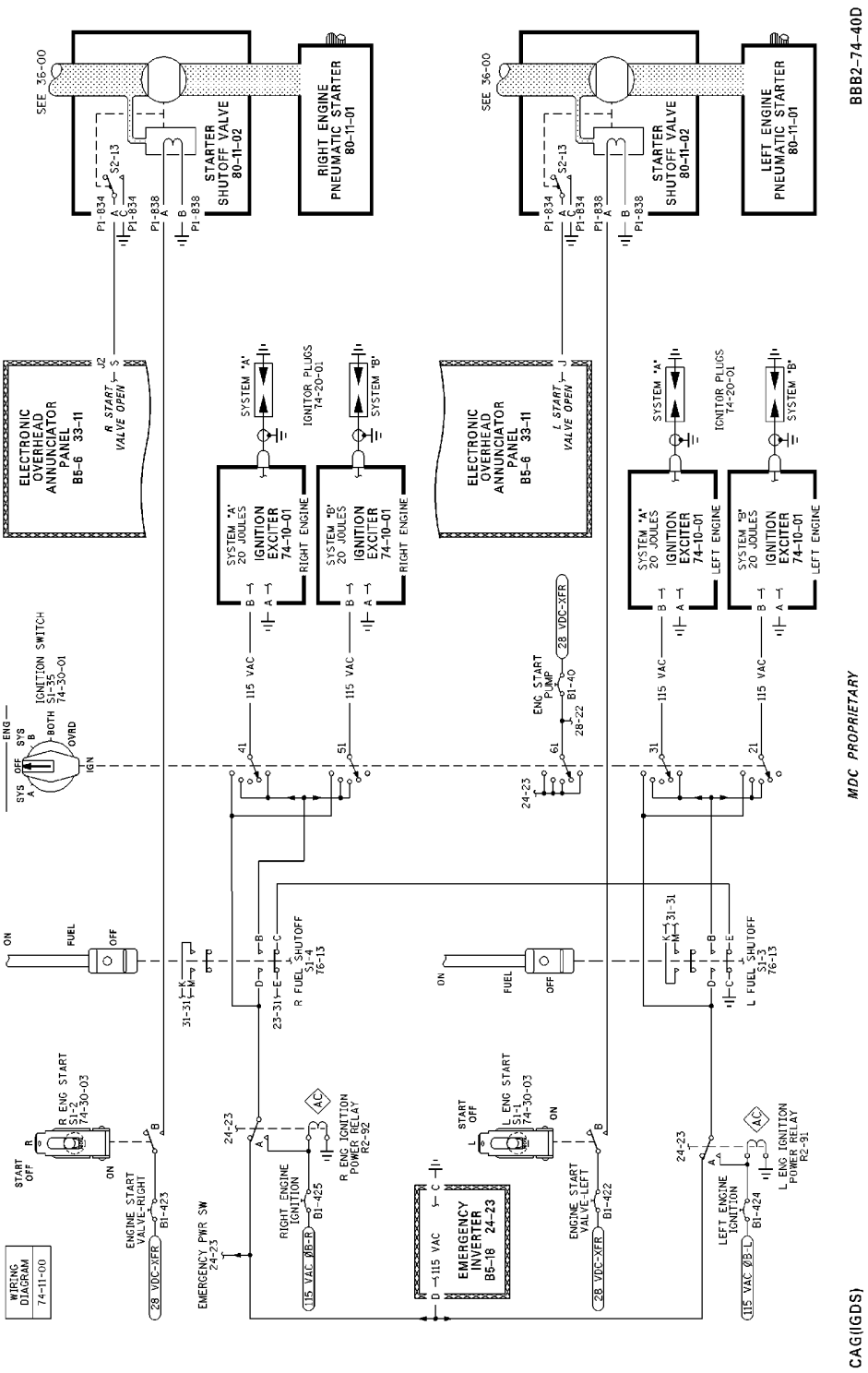


Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 3 of 8)

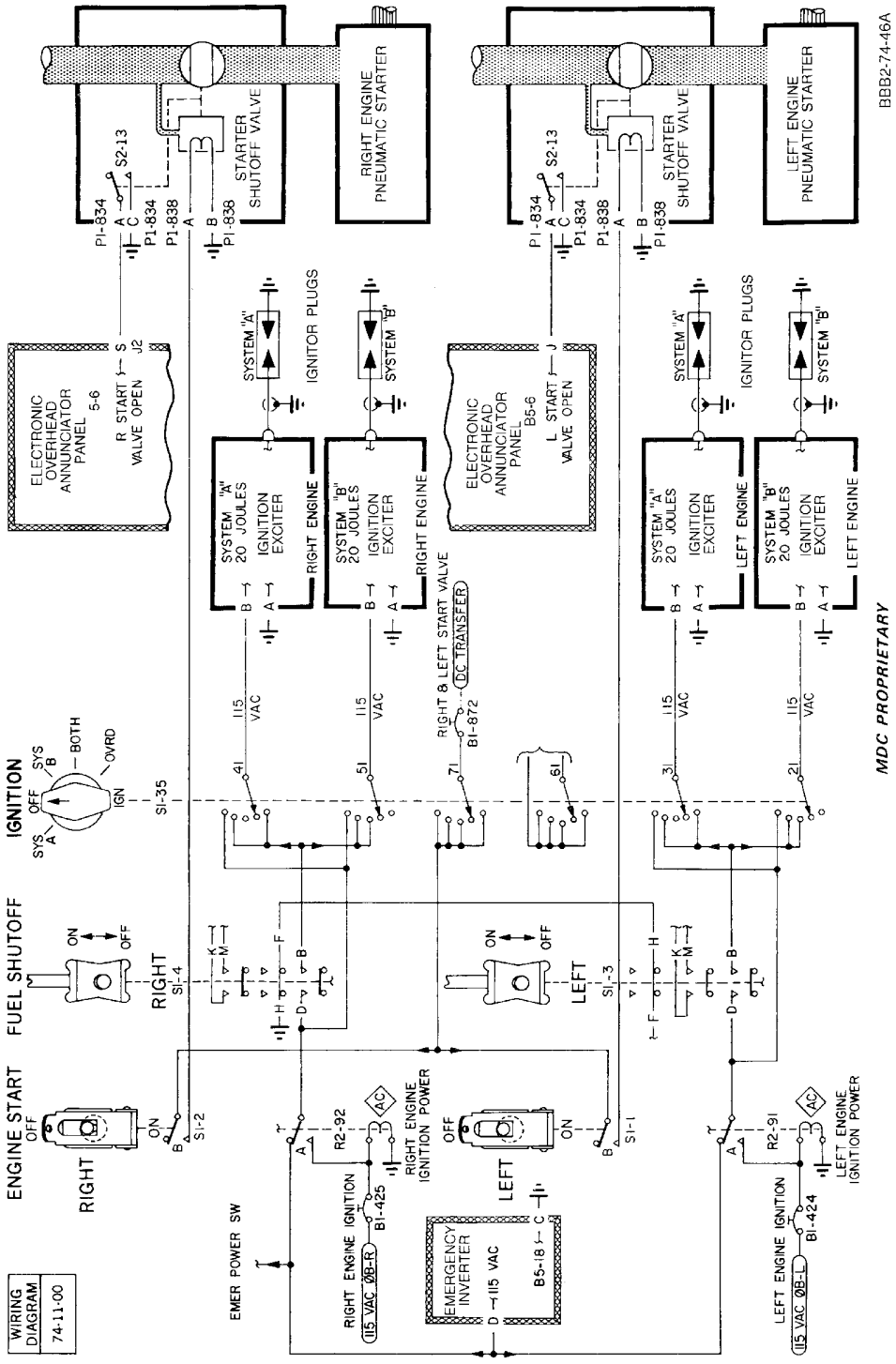
EFFECTIVITY
WJE 405, 409, 410, 880, 881, 883, 884, 893



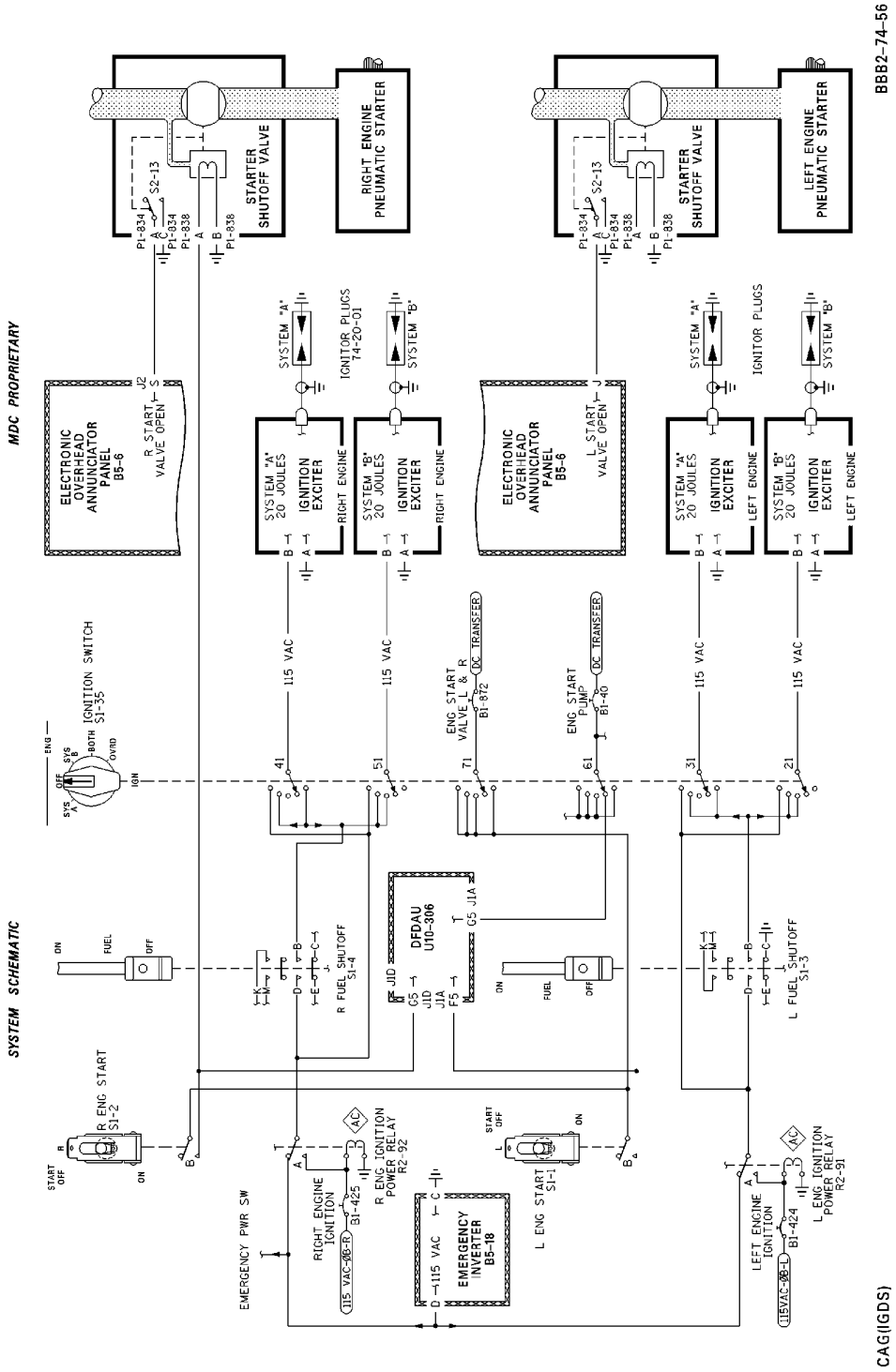
Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 4 of 8)



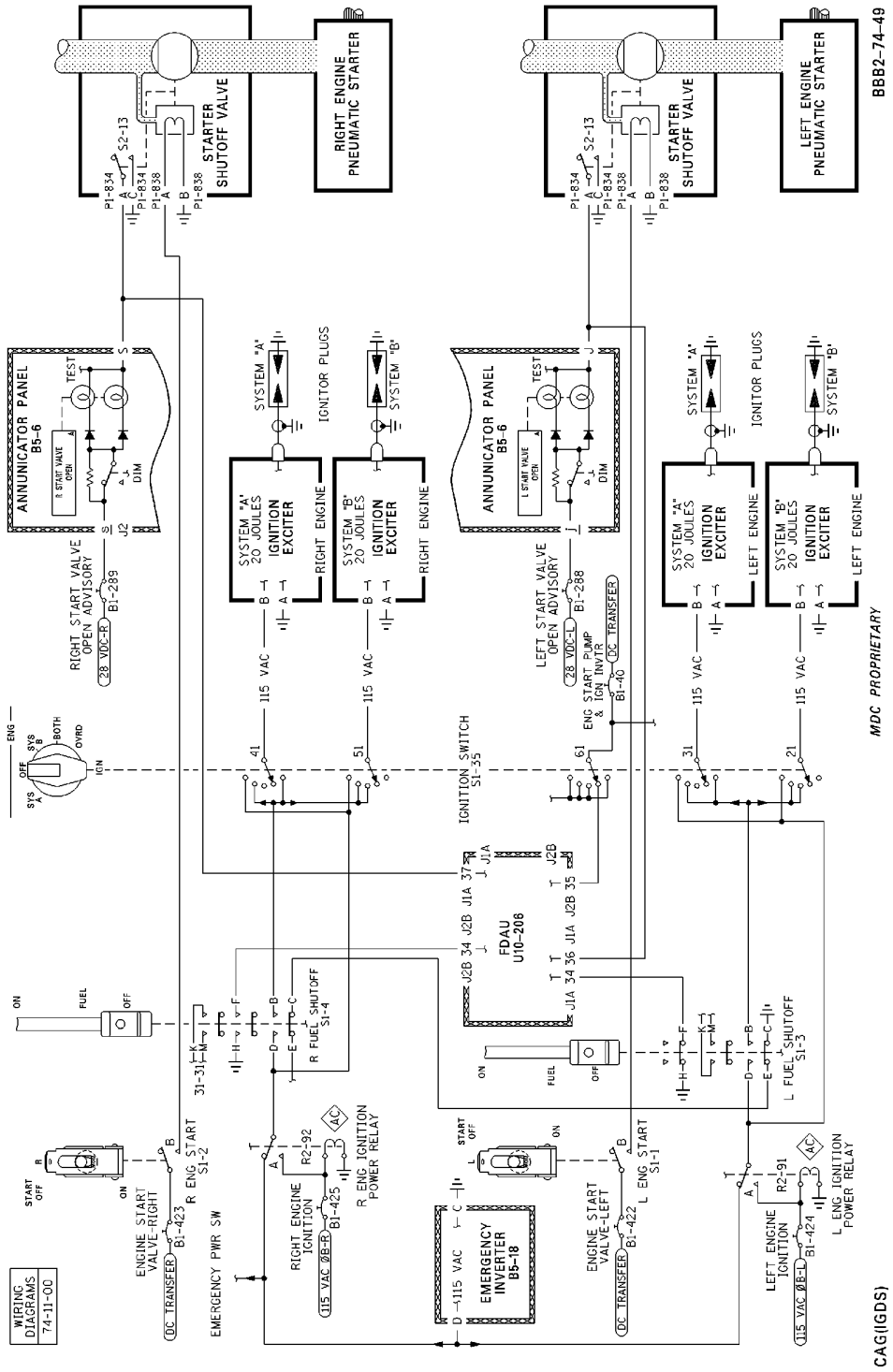
Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 5 of 8)



Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 6 of 8)



Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 7 of 8)



Ignition System - Schematic
Figure 1/74-00-00-990-805 (Sheet 8 of 8)

5. Operation

A. Normal Starting

(1) For normal starting, the ignition selector switch is placed in the SYS A, SYS B, or BOTH position, and the engine start switch is held in the ON position.

(2) As the fuel shutoff lever is moved toward the ON position, the contacts of the fuel shutoff lever ignition switch close to complete the circuit (through the ignition selector switch) to the 20-joule ignition exciter causing SYS A, SYS B, or BOTH igniter plugs to fire.

(3) For engines equipped with the twin-pack 20-joule AC system, ground starts can be made with the use of only one of the two ignition systems. However, Pratt and Whitney recommends that both ignition systems be used for ground starts and air starts. Using both ignition systems during a start ensures better flame propagation which in turn, results in rapid, dependable starting. For optimum life of ignition system components, the operating duty cycle is 10 minutes ON, 20 minutes OFF.

WJE 405-411, 880, 881, 883, 884

NOTE: P&W SB 5803 makes available a continuous duty dual unit exciter with no duty cycle limits.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

B. Emergency Starting

(1) For in-flight flameout or other emergency conditions, moving the ignition selector switch to the IGN OVRD position applies 20-joule high energy power to both igniters, bypassing the fuel shutoff lever ignition switch.

GENERAL - TROUBLE SHOOTING

1. General

A. Use of each ignition system separately and alternately during starting will provide a continuing assurance of operational integrity. In the event starting problems are encountered with one particular ignition system, the following sequence of operations should be followed. If shortage of time prevents full sequential use of these procedures, it should be remembered that the least reliable ignition system component is the igniter plug, and the most reliable is the lead.

B. Trouble shooting procedures for the left and right engine ignition systems are identical.

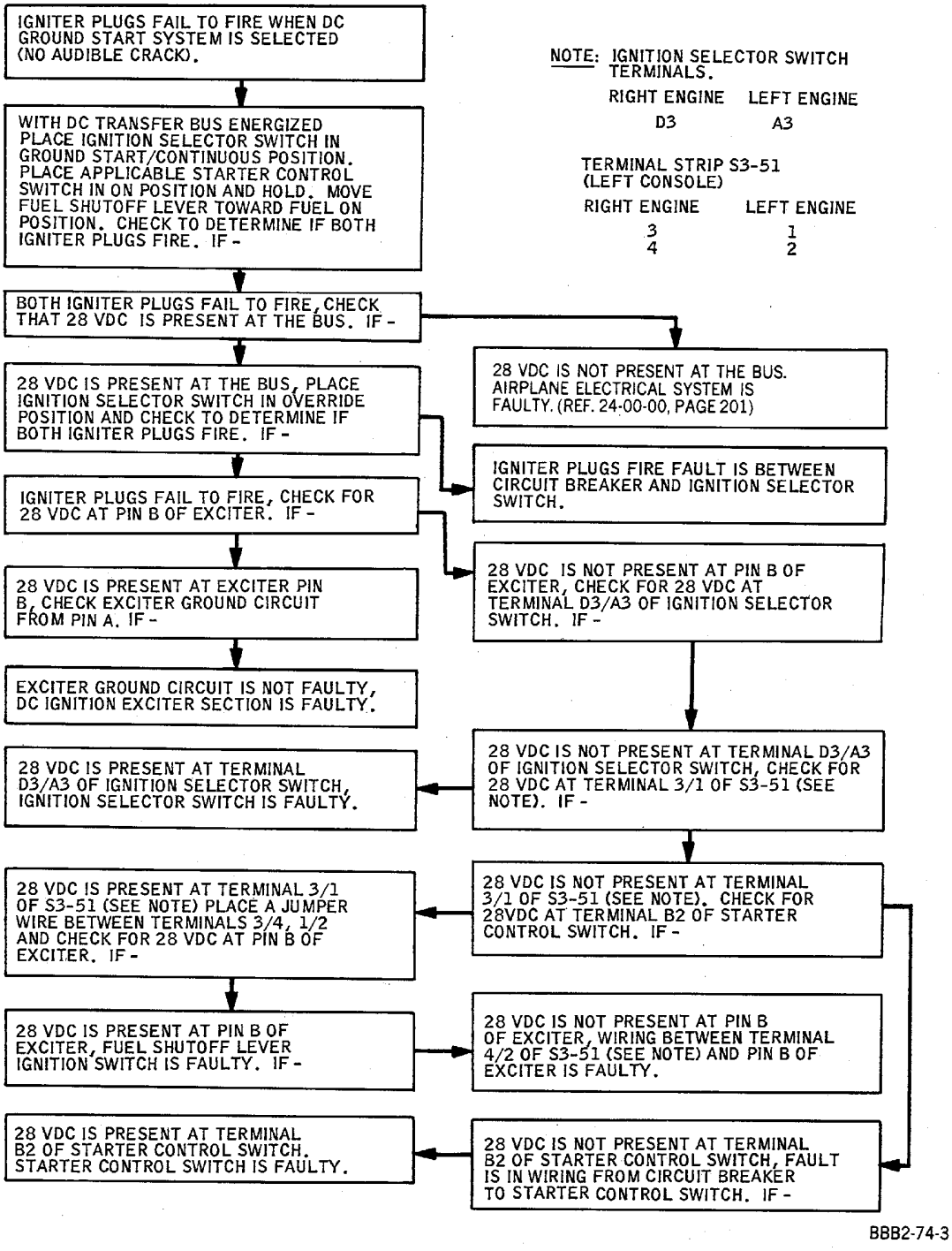
WARNING: VOLTAGE AT IGNITER PLUGS IS DANGEROUSLY HIGH. TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM, MAKE CERTAIN THAT ENGINE START SWITCH IS IN "OFF" POSITION AND SUFFICIENT PERIOD OF TIME (AT LEAST 6 MINUTES) HAS ELAPSED BETWEEN OPERATION OF IGNITION SYSTEM AND HANDLING OR REMOVAL OF COMPONENTS.

WARNING: FOR ADDITIONAL PROTECTION AGAINST ELECTRICAL SHOCK, GROUND IGNITER PLUG CABLE TERMINAL IMMEDIATELY UPON DISCONNECTING FROM IGNITER PLUG.

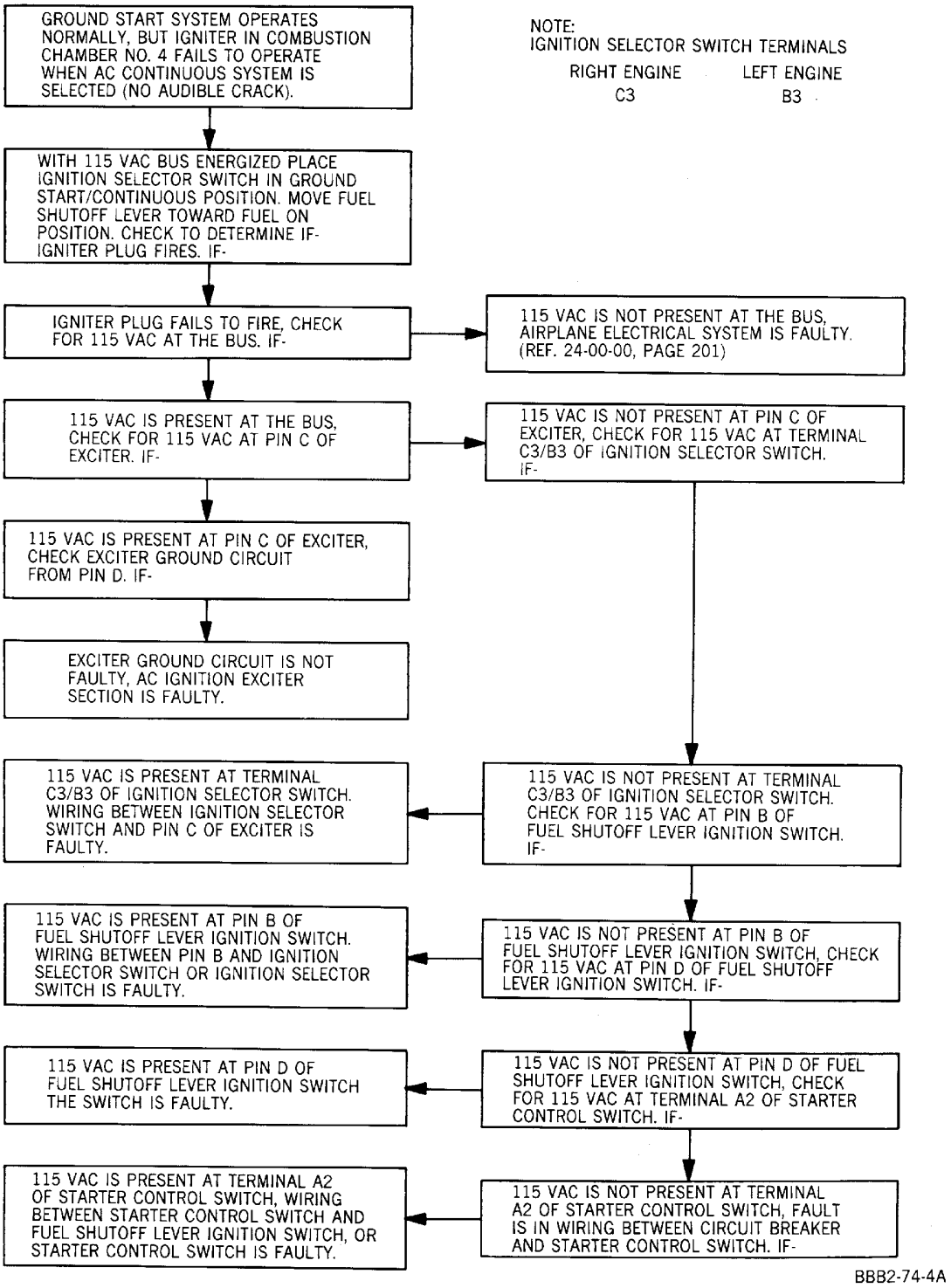
CAUTION: IF 20-4 JOULE SINGLE PACK EXCITER UNIT HAS BEEN OPERATED BEYOND RECOMMENDED DUTY CYCLE, UNIT MUST BE REMOVED AND CHECKED PER OVERHAUL INSTRUCTIONS. INTEGRITY OF COMPONENTS WITHIN EXCITER MAY HAVE BEEN COMPROMISED DUE TO OVERHEATING.

C. The ignition system should be tested in accordance with Adjustment/Test procedures after fault has been corrected.

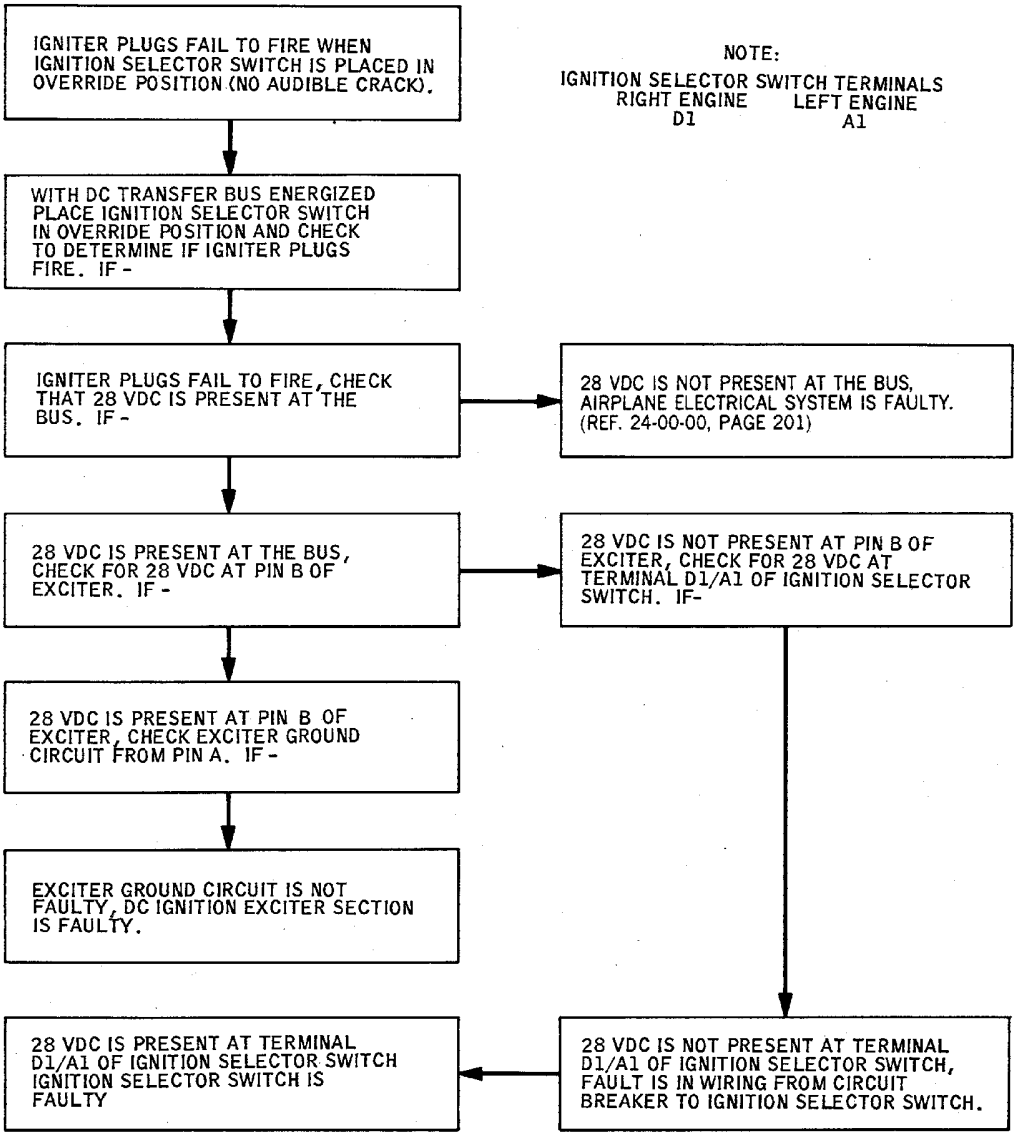
(PAGEBLOCK 74-00-00/501 Config 1)



Ignition System - Trouble Shooting
Figure 101/74-00-00-990-801 (Sheet 1 of 3)



Ignition System - Trouble Shooting
Figure 101/74-00-00-990-801 (Sheet 2 of 3)



Ignition System - Trouble Shooting
Figure 101/74-00-00-990-801 (Sheet 3 of 3)

GENERAL - TROUBLE SHOOTING

1. General

A. Use of each ignition system separately and alternately during starting will provide a continuing assurance of operational integrity. In the event starting problems are encountered with one particular ignition system, the following sequence of operations should be followed. If shortage of time prevents full sequential use of these procedures, it should be remembered that the least reliable ignition system component is the igniter plug, and the most reliable is the lead.

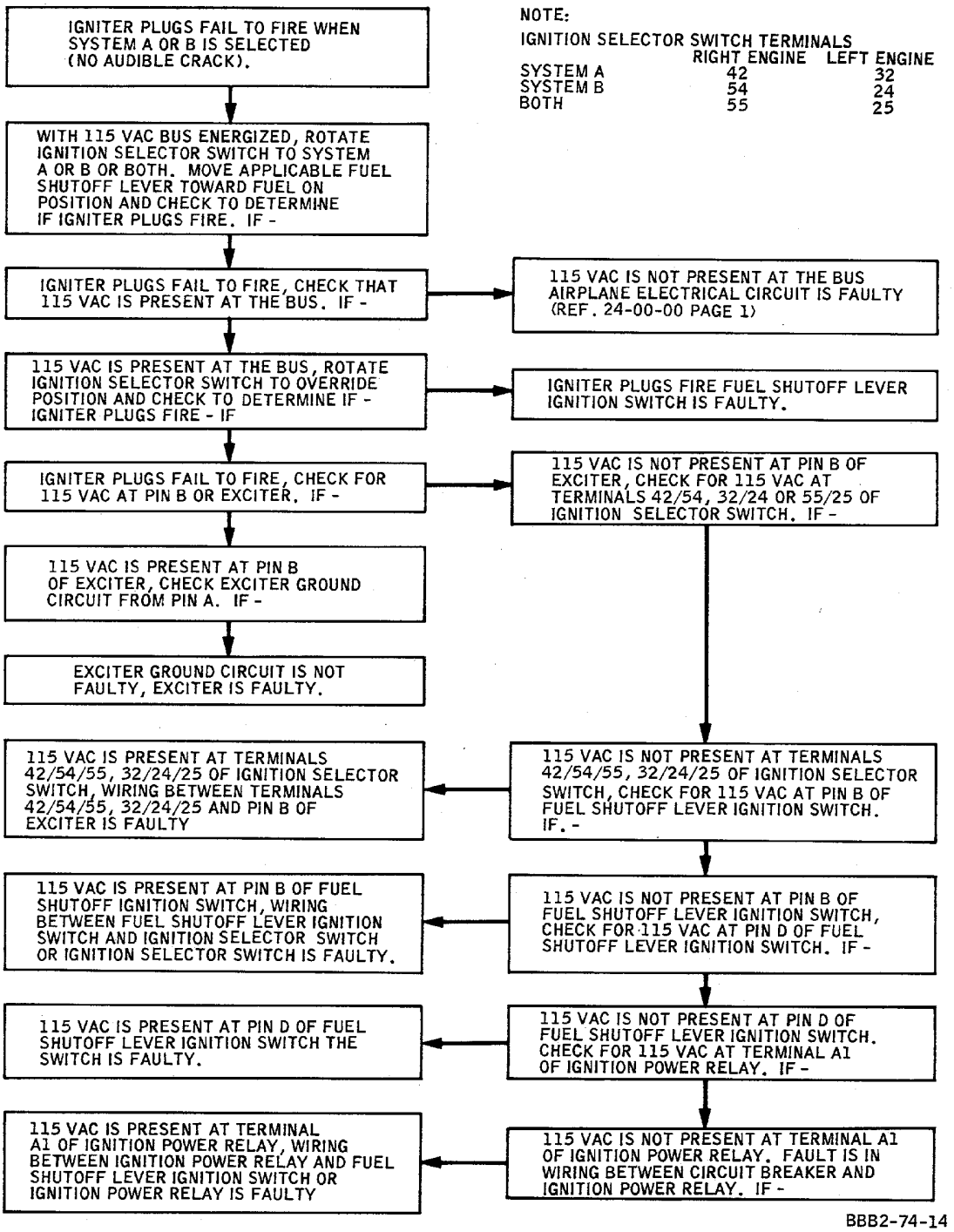
B. Trouble shooting procedures for the left and right engine ignition systems are identical.

WARNING: VOLTAGE AT IGNITER PLUGS IS DANGEROUSLY HIGH. TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM, MAKE CERTAIN THAT ENGINE IGNITION SELECTOR SWITCH IS IN "OFF" POSITION AND A SUFFICIENT PERIOD OF TIME (AT LEAST 6 MINUTES) HAS ELAPSED BETWEEN OPERATION OF IGNITION SYSTEM AND HANDLING OR REMOVAL OF COMPONENTS.

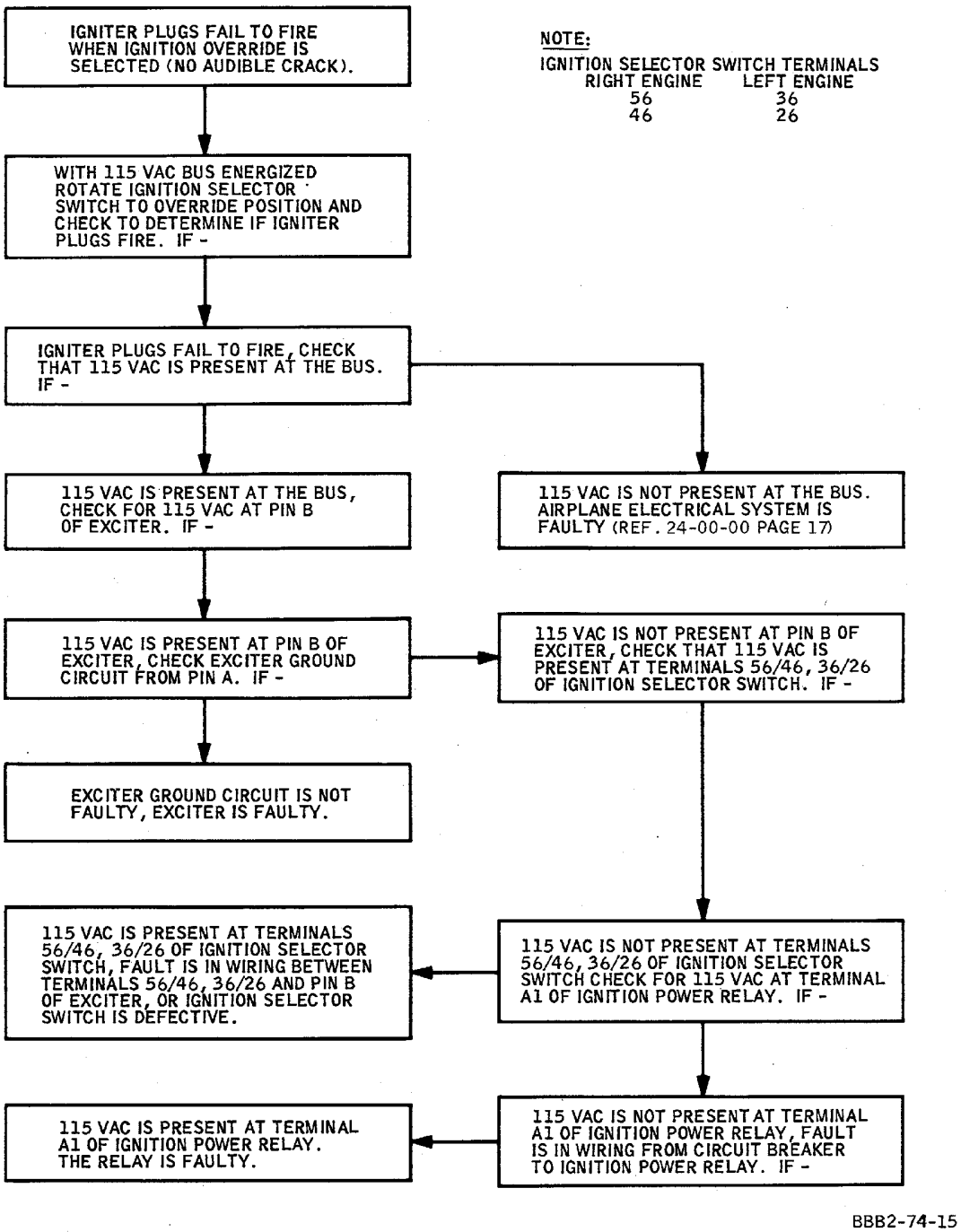
WARNING: FOR ADDITIONAL PROTECTION AGAINST ELECTRICAL SHOCK, GROUND IGNITER PLUG CABLE TERMINAL IMMEDIATELY UPON DISCONNECTING FROM IGNITER PLUG.

CAUTION: BEFORE PERFORMING IGNITION SYSTEM TROUBLE SHOOTING, ENGINE SHOULD BE CLEARED. OPEN ALL FUEL BOOST PUMP CIRCUIT BREAKERS LOCATED ON AC BUS FUEL SECTION OF UPPER EPC CIRCUIT BREAKER PANEL. MAKE CERTAIN NO PNEUMATIC PRESSURE IS SUPPLIED TO AIRCRAFT AND THAT ENGINE IS NOT TURNING OVER.

C. The ignition system should be tested in accordance with Adjustment/Test PAGEBLOCK 74-00-00/501 Config 2 procedures after fault has been corrected.



Ignition System - Trouble Shooting
Figure 101/74-00-00-990-802 (Sheet 1 of 2)



Ignition System - Trouble Shooting
Figure 101/74-00-00-990-802 (Sheet 2 of 2)

1. General Maintenance Features

A. Maintenance Interphone System

(1) The maintenance interphone system provides a means of communication between the flight compartment and maintenance personnel working in the other areas of the aircraft. A maintenance interphone switch, located on the overhead switch panel, is utilized to actuate the system.

(2) Two interphone jacks are accessible to personnel working in the engine areas; one each on the left and right side of fuselage adjacent to the engines.

B. Engine Accessibility

WARNING: TO PREVENT INJURY TO PERSONNEL, EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: OPEN UPPER COWL DOOR ONLY AS MUCH AS NECESSARY TO ALLOW HOLD-OPEN RODS TO BE CONNECTED TO ENGINE. OPENING DOOR TOO FAR MAY CAUSE DAMAGE TO PYLON HINGE POINTS.

CAUTION: MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

(1) Accessibility is provided to all systems and components within the engine installation and nacelle. Engine cowl doors provide access to all parts of the engine and accessories that require check, maintenance, or servicing. (PAGEBLOCK 71-00-00/201)

C. Component Interchangeability

(1) Identical accessories are installed on all engines.

2. Safety and Operating Procedures

A. Circuit Breakers

WARNING: MAKE CERTAIN APPLICABLE CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

(1) All circuit breakers opened during maintenance should be tagged to prevent inadvertent operation of affected system.

B. High Voltage System and Components

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW AT LEAST 6 MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

(1) Prior to performing maintenance on high voltage system or components, make certain power to system or component has been shut off and all affected circuit breakers are open and tagged.

C. Application of External Power

WARNING: INADVERTENT OPERATION OF AN AIRCRAFT SYSTEM COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

WARNING: BEFORE ACTIVATING ANY FUEL, ELECTRICAL, HYDRAULIC, OR PNEUMATIC SYSTEM FOR MAINTENANCE PURPOSES, MAKE CERTAIN THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF AIRCRAFT.

D. Throttle/Thrust Reverser Lever

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF THRUST REVERSER. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(1) Make certain that thrust reverser control valve is in dump position and lockpin is installed. Tag throttle/thrust reverser lever.

E. Cleanup and Cleaning Solvents

WARNING: CLEANING OPERATIONS USING SOLVENTS SHOULD BE PER-FORMED IN A WELL VENTILATED AREA. EXERCISE NORMAL SAFETY PRECAUTIONS DURING USE.

(1) Spilled oil, fuel, or hydraulic fluid should be cleaned up immediately to prevent damage to wiring or other components and to prevent raise leak reports.

F. Engine Cowling Wind Restrictions

CAUTION: COWL DOORS, ALL ENGINE LOCATIONS, IN OPEN POSITION SUPPORTED BY HOLD-OPEN RODS WILL SAFELY WITHSTAND GROUND WINDS UP TO 30 KNOTS.

G. Cowl Doors

3. General Maintenance Practices

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: OPEN UPPER COWL DOOR ONLY AS MUCH AS NECESSARY TO ALLOW HOLD-OPEN RODS TO BE CONNECTED TO ENGINE. OPENING DOOR TOO FAR MAY CAUSE DAMAGE TO PYLON HINGE POINTS.

CAUTION: MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

CAUTION: BEFORE WORKING IN NOSE COWL PROTECTIVE BLANKET SHOULD BE SPREAD INSIDE NOSE COWL. VACUUM INSIDE NOSE COWL TO REMOVE PARTICLES WHICH MAY CAUSE DAMAGE TO PERFORATED SKIN. ANY DAMAGE TO PERFORATED SKIN MAY CAUSE DISSIMILAR METAL REACTION WHICH COULD SPREAD TO SURROUNDING AREA.

A. Engine Access

(1) For procedures to gain access to engine, refer to PAGEBLOCK 71-10-03/201 Config 1 .

B. External Electrical Power

(1) For procedures to connect external electrical power to aircraft, refer to PAGEBLOCK 24-40-00/101 .

C. Engine Motoring

CAUTION: FUEL PUMP AND MAIN ENGINE CONTROL ARE FUEL-LUBRICATED. DO NOT MOTOR ENGINE UNLESS POSITIVE FUEL INLET PRESSURE IS INDICATED.

(1) For engine motoring procedures, refer to GENERAL, SUBJECT 71-00-00, Page 501 .

D. Remove/Replace Electrical Connectors

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT OR CONNECT PLUG. WHEN CONNECTING PLUG, DO NOT OVERTIGHTEN.

(1) When electrical connectors are disconnected, caps or other protective materials should be used to prevent entry of oil, fuel, hydraulic fluid, moisture, and other foreign material.

E. Igniter Plug Wrench

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING REMOVAL/INSTALLATION OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

F. Seals, O-rings and Gaskets

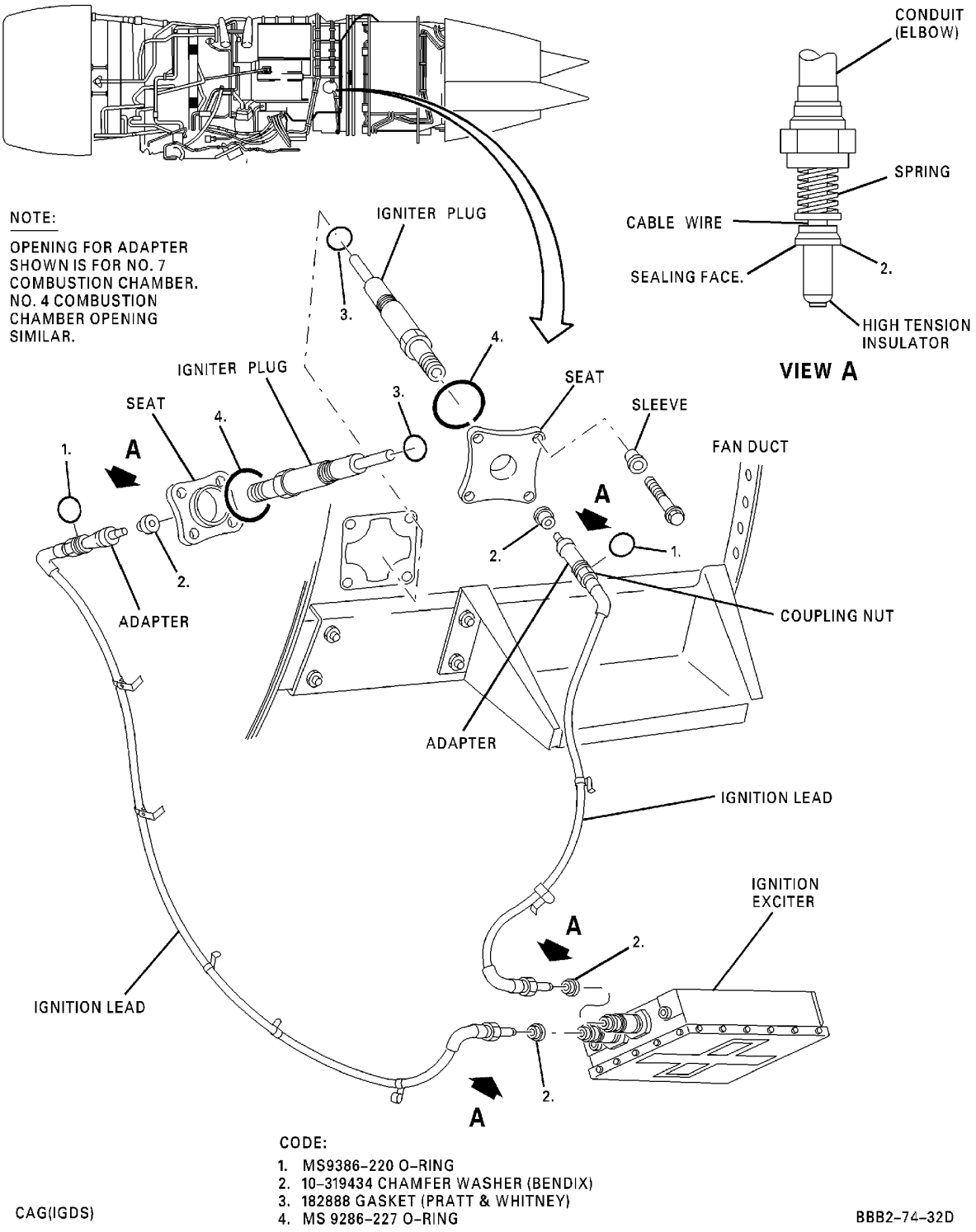
(1) Seals, O-rings, and gaskets are identified and shown in Figure 201.

G. Used O-rings

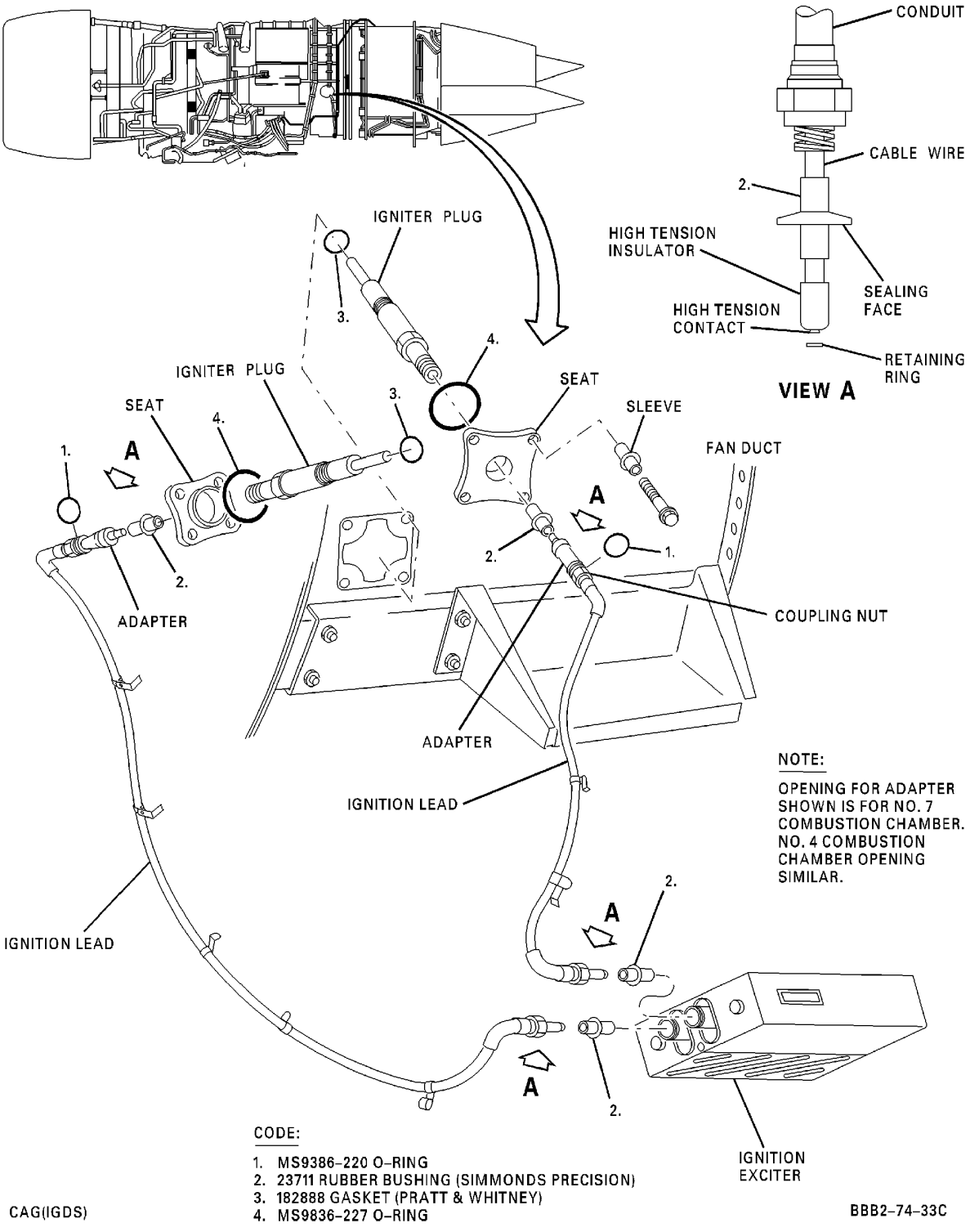
(1) Discard all used seals, O-rings and gaskets.

CAUTION: REMOVE ALL TOOLS, EQUIPMENT, LOOSE HARDWARE, DEBRIS, AND FOREIGN MATERIAL FROM MAINTENANCE AREA.

H. Maintenance Area



Seals, O-rings, and Gaskets
Figure 201/74-00-00-990-803 (Sheet 1 of 2)



Seals, O-rings, and Gaskets
Figure 201/74-00-00-990-803 (Sheet 2 of 2)

GENERAL - ADJUSTMENT/TEST

1. General

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

A. The Adjustment/Test procedure for the left and right engine ignition systems are identical.

CAUTION: IF 4-20 JOULE SINGLE PACK EXCITER UNIT HAS BEEN OPERATED BEYOND THE RECOMMENDED DUTY CYCLE, UNIT MUST BE FUNCTIONALLY CHECKED. THE MD80 TECH DESK MUST BE NOTIFIED TO SCHEDULE THE REMOVAL AND REPLACEMENT OF THE AFFECTED EXCITER AT THE NEXT LAYOVER AT A CLASS 1 OR CLASS 2 STATION. THE REASON FOR THIS MAINTENANCE ACTION IS THE INTEGRITY OF EXCITER COMPONENTS MAY HAVE BEEN COMPROMISED DUE TO OVERHEATING.

B. If 4-20 joule single pack exciter unit has been operated beyond the recommended duty cycle (PNEUMATIC STARTER - MAINTENANCE PRACTICES, PAGEBLOCK 80-10-01/201 Config 1), unit must be functionally checked (IGNITION EXCITER - MAINTENANCE PRACTICES, PAGEBLOCK 74-10-01/201).

CAUTION: PRIOR TO TEST, MOTOR ENGINE IF UNBURNED FUEL IN ENGINE IS SUSPECTED. UNBURNED FUEL COULD RESULT IN ENGINE INTERNAL OR TAILPIPE FIRE.

CAUTION: DO NOT ALLOW ENGINE N2 ROTATION DURING TEST SINCE FUEL COULD ENTER COMBUSTION CHAMBER WHEN FUEL SHUTOFF LEVER IS ADVANCED TO IDLE CAUSING INADVERTENT LIGHTUP.

C. To prolong igniter plug life, ignition system test operating time should be held at a minimum.

D. Engine must be clear of fuel or fuel vapor prior to performing any test. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8)

NOTE: Fuel shutoff lever must be in OFF position and rotors stopped before starting test.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed item:

Table 501

Name and Number	Manufacturer
Shorting Plug, PWA 11-8789	Bendix Corp. Sidney, N.Y.

3. Adjustment/Test Ignition System

A. Test Ground Start Ignition Circuit

(1) Open these circuit breakers and install safety tags:

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	19	B1-918	FWD RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C

(Continued)

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	21	B1-922	FWD CENTER FUEL TANK BOOST PUMP PHASE A, B, & C
H	23	B1-921	AFT LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, FUEL - RIGHT AC BUS

Row	Col	Number	Name
J	21	B1-923	AFT CENTER FUEL TANK BOOST PUMP PHASE A,B, & C
J	23	B1-920	FWD LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, GND SERV

Row	Col	Number	Name
J	19	B1-919	AFT RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C

(2) Place ignition selector switch in GRD START & CONTIN position.

(3) Lift engine start switch guard, and move switch to, and hold in ON position.

(4) Move applicable fuel shutoff lever toward FUEL ON position to actuate fuel shutoff lever ignition switch. Intermittent crack of both igniter plugs will be clearly heard.

NOTE: If firing of both igniter plugs is synchronized, it may be necessary to disconnect one igniter plug lead and install Bendix P/N 11-8789 shorting plug to verify operation of both.

(5) Release engine start switch.

(6) Place fuel shutoff lever in fuel OFF position. Igniter plugs will stop firing.

(7) Place ignition selector switch in OFF position.

B. Test Continuous Ignition Circuit

(1) Place ignition selector switch in GRD START & CONTIN position.

(2) Move applicable fuel shutoff lever toward FUEL ON position to actuate fuel shutoff lever ignition switch. Intermittent crack of igniter plug located in combustion chamber No. 4 on lower right side of engine, looking forward, should be clearly heard.

(3) Place fuel shutoff lever in FUEL OFF position. Igniter plug will stop firing.

(4) Place ignition selector switch in OFF position.

C. Test Ignition Override Circuit

(1) Place ignition selector switch in IGN OVRD position. Intermittent crack of both igniter plugs will be clearly heard.

NOTE: If firing of both igniter plugs is synchronized, it may be necessary to disconnect one igniter plug lead and install Bendix P/N 11-8789 shorting plug to verify operation of both.

(2) Place ignition selector switch in OFF position. Igniter plugs will stop firing.

(3) Remove the safety tags and close these circuit breakers:

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	19	B1-918	FWD RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C
H	21	B1-922	FWD CENTER FUEL TANK BOOST PUMP PHASE A, B, & C
H	23	B1-921	AFT LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, FUEL - RIGHT AC BUS

Row	Col	Number	Name
J	21	B1-923	AFT CENTER FUEL TANK BOOST PUMP PHASE A,B, & C
J	23	B1-920	FWD LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, GND SERV

Row	Col	Number	Name
J	19	B1-919	AFT RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C

GENERAL - ADJUSTMENT/TEST

1. General

A. The Adjustment/Test procedure for the left and right engine ignition systems are identical.

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

B. To prolong igniter plug life, ignition system test operating time should be held at a minimum.

CAUTION: PRIOR TO TEST, MOTOR ENGINE IF UNBURNED FUEL IN ENGINE IS SUSPECTED. UNBURNED FUEL COULD RESULT IN ENGINE INTERNAL OR TAILPIPE FIRE.

CAUTION: DO NOT ALLOW ENGINE N2 ROTATION DURING TEST SINCE FUEL COULD ENTER COMBUSTION CHAMBER WHEN FUEL SHUTOFF LEVER IS ADVANCED TO IDLE CAUSING INADVERTENT LIGHTUP.

C. Engine must be clear of fuel or fuel vapor prior to performing any test. (GENERAL, SUBJECT 71-00-00, Page 501)

NOTE: Fuel shutoff lever must be in OFF position and rotors stopped before starting test.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed item:

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 501

Name and Number	Manufacturer
Shorting Plug, PWA 11-8789	Bendix Corp. Sidney, N.Y.

3. Adjustment/Test Ignition System

A. Test Ground Start Ignition Circuit

(1) Open these circuit breakers and install safety tags:

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	19	B1-918	FWD RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C
H	21	B1-922	FWD CENTER FUEL TANK BOOST PUMP PHASE A, B, & C
H	23	B1-921	AFT LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, FUEL - RIGHT AC BUS

Row	Col	Number	Name
J	21	B1-923	AFT CENTER FUEL TANK BOOST PUMP PHASE A,B, & C
J	23	B1-920	FWD LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, GND SERV

Row	Col	Number	Name
J	19	B1-919	AFT RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C

(2) With electrical buses energized, rotate ignition selector switch to SYS A position.

(3) Move applicable fuel shutoff lever toward fuel ON position to actuate fuel shutoff lever ignition switch. Actuation occurs 13/16 (±1/8) inch from fuel OFF position. Intermittent crack of igniter plug located in combustion chamber No. 7, on lower left side of engine, should be clearly heard.

(4) Move fuel shutoff lever to fuel OFF position. Igniter plug should cease firing.

(5) Rotate ignition selector switch to SYS B position.

(6) Move fuel shutoff lever toward fuel ON position to actuate fuel shutoff lever ignition switch. Actuation occurs 13/16 (±1/8) inch from fuel OFF position. Intermittent crack of igniter plug located in combustion chamber No. 4 on lower right side of engine should be clearly heard.

(7) Rotate ignition selector switch to OFF position.

(8) Rotate ignition selector switch to BOTH position. Intermittent crack of both igniter plugs should be clearly heard.

(9) Rotate ignition selector switch to OFF position.

(10) Move fuel shutoff lever to fuel OFF position.

B. Test Ignition Override Circuit

(1) Place ignition selector switch in OVRD position. Intermittent crack of both igniter plugs will be clearly heard.

NOTE: If firing of both igniter plugs is synchronized, it may be necessary to disconnect one igniter plug lead and install Bendix P/N 11-8789 shorting plug to verify operation of both.

(2) Place ignition selector switch in OFF position. Igniter plugs will cease firing.

(3) Remove the safety tags and close these circuit breakers:

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	19	B1-918	FWD RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C
H	21	B1-922	FWD CENTER FUEL TANK BOOST PUMP PHASE A, B, & C
H	23	B1-921	AFT LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, FUEL - RIGHT AC BUS

Row	Col	Number	Name
J	21	B1-923	AFT CENTER FUEL TANK BOOST PUMP PHASE A,B, & C
J	23	B1-920	FWD LEFT FUEL TANK BOOST PUMP PHASE A, B, & C

UPPER EPC, GND SERV

Row	Col	Number	Name
J	19	B1-919	AFT RIGHT FUEL TANK BOOST PUMP PHASE A, B, & C

C. Test Emergency Ignition Circuit

(1) With electrical buses energized, rotate ignition selector switch to either SYSTEM A or SYSTEM B position.

(2) Move applicable fuel shutoff lever toward fuel ON position to actuate fuel shutoff lever ignition switch. Intermittent crack of igniter plug will be heard in applicable combustion chamber.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Open these circuit breakers and install safety tags:

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

Emergency inverter should begin operating and igniter plug will continue operation.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Open this circuit breaker and install safety tag:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

Igniter plug will cease operation.

(5) Rotate emergency power switch, located on electrical power control portion of forward overhead switch panel, to ON position. The emergency power in use light should come on and igniter plug will be heard in applicable combustion chamber.

(6) Rotate emergency power switch to OFF position. Emergency power in use light will go off.

(7) Rotate ignition selector switch to OFF position. Move fuel shutoff lever to fuel OFF position.

(8) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

ELECTRICAL POWER SUPPLY - DESCRIPTION AND OPERATION

1. General

A. The ignition exciter, is a capacitor discharge type designed to provide ignition for engine starting. The exciter serves the dual purpose of providing intermittent duty starting ignition and continuous duty ignition which is used, as required, after the engine is started.

2. Ignition Exciter

A. Description

(1) The ignition exciter is supplied with an input of 28 vdc and 115 vac from the aircraft electrical buses. The 28 vdc is used to produce a high-energy (20-joule) intermittent duty output from the exciter. The 115 vac is used to produce low-energy (4-joule) continuous duty output from the exciter. The intermittent duty starting circuit discharges through both outlets of the exciter, firing two igniter plugs. The continuous duty circuit discharges through the CONTINUOUS DUTY OUTLET, firing one igniter plug. Spark gaps prevent current from flowing in (20-joule) circuit when the (4-joule) circuit is operating.

Table 1

ITEM	INTERMITTENT DUTY CIRCUIT	CONTINUOUS DUTY CIRCUIT
Input connector pins	B-positive, A-ground	C-positive, D-ground
Input voltage	14 to 30 vdc	90 to 124 vac 350 to 440 cps
Input current	5.1 Amperes dc Maximum	2.5 Amperes rms Maximum
Duty cycle	Intermittent	Continuous
Number of igniter plugs fired	2	1
Accumulated energy	20 Joules	4 Joules
Spark repetition rate	0.5 Per Second Minimum	0.7 Per Second Minimum
Ionizing voltage	22-26 KV	22-26 KV
Ambient temperature	-18.3° to 135°C (-65° to 275°F)	
Operating altitude	70,000 ft. Maximum	

B. Operation

(1) Power, 28 vdc, for the intermittent ignition system is supplied to the exciter and is converted to pulsating AC by the vibrator. The pulsating AC flows to the power transformer, is increased in potential, and rectified. When this voltage reaches the predetermined level for which the spark gap in the discharge has been calibrated, the gap breaks down. A portion of the charge accumulated on the storage capacitors flows through the primary of the high tension transformer and trigger capacitor to ground. This flow of current induces in the transformer secondary a voltage high enough to ionize the air gap of the igniter plug. With this gap made conductive, the remaining charge on the storage capacitors is delivered to the igniter plug as a spark across the gap to ignite the fuel/air mixture.

(2) In the event of a plug failure, the high energy supplied to the plug is automatically applied to ground.

(3) Power, 115 vac, for the continuous ignition system is supplied to the exciter and is increased to a higher potential by a transformer. This voltage is discharged through the CONTINUOUS DUTY OUTLET to fire one plug only. Spark gaps in the exciter circuitry prevent current from flowing in (20-joule) circuit when the (4-joule) circuit is in operation.

(4) P&W SB 5880 makes a continuous duty ignition exciter available as a dual unit ("twin pack"). This dual unit operates in the same way as the single unit but has two input connections (one for each unit). A one-into-two cable is provided to connect this dual unit to existing electrical supplies.

ELECTRICAL POWER SUPPLY - DESCRIPTION AND OPERATION

1. General

A. The ignition exciter, is a capacitor discharge type designed to provide ignition for engine starting. The exciter operates on 115-VAC from the AC bus. Two twin pack, 20-joule exciters are used for each engine. System A exciter fires the igniter plug in combustion chamber No. 7; system B exciter fires the igniter plug in combustion chamber No. 4.

2. Ignition Exciter

A. Description

(1) Power is applied to the input connector of the exciter from the 115 VAC bus through the LEFT or RIGHT ENGINE IGNITION circuit breaker, engine ignition power relay, fuel shutoff lever ignition switch and ignition selector switch. Basically each circuit converts the input AC power into high voltage DC for storage as a charge on the tank capacitor. This stored energy is delivered to the igniter plug at the specified spark rate by means of an ignition lead. Provisions in the exciter circuitry enable a high voltage pulse to be delivered to the igniter to provide positive breakdown of the igniter gap under all conditions.

B. Operation

(1) Power, 115-VAC, passes into exciter, through radio noise filter, and is applied to primary winding of power transformer. Alternating current flowing through primary winding of power transformer induces high voltage in secondary winding. High AC voltage is rectified into high dc voltage by action of voltage doubler components and passed through current limiting resistors. Output of rectifier section charges tank capacitor until stored voltage reaches ionization potential of control tube. A portion of charge accumulated on tank capacitor flows through primary winding of high-tension transformer to trigger capacitor. This current flow induces high voltage in secondary winding of transformer. Voltage is of sufficient potential to ionize gap of igniter plug and main discharge tube which are connected in series with exciter output. Ionization of spark gap and main discharge tube allows remaining charge on tank capacitor to be delivered to igniter plug as a high-current, low-voltage spark across tip of igniter plug.

Table 1

ITEM	INTERMITTENT DUTY CIRCUIT
Input connector pins	B-positive, A-ground
Input voltage	115 VAC, 400 Hz Normal
Duty cycle	10 minutes on, 10 minutes off
Number of igniter plugs fired	1
Accumulated energy	20 Joules
Spark repetition rate	0.5 Per Second Minimum
Ionizing voltage	22-26 KV
Operating altitude	70,000 ft. Maximum

IGNITION EXCITER - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation, adjustment/test, check, and cleaning/painting instructions for the ignition exciter. The exciter for each engine is mounted on the lower left, rear section of the engine.

B. Maintenance of the exciters is limited to removal/installation, adjustment/test, check, and cleaning/painting. Access to the exciter is through the lower cowl door.

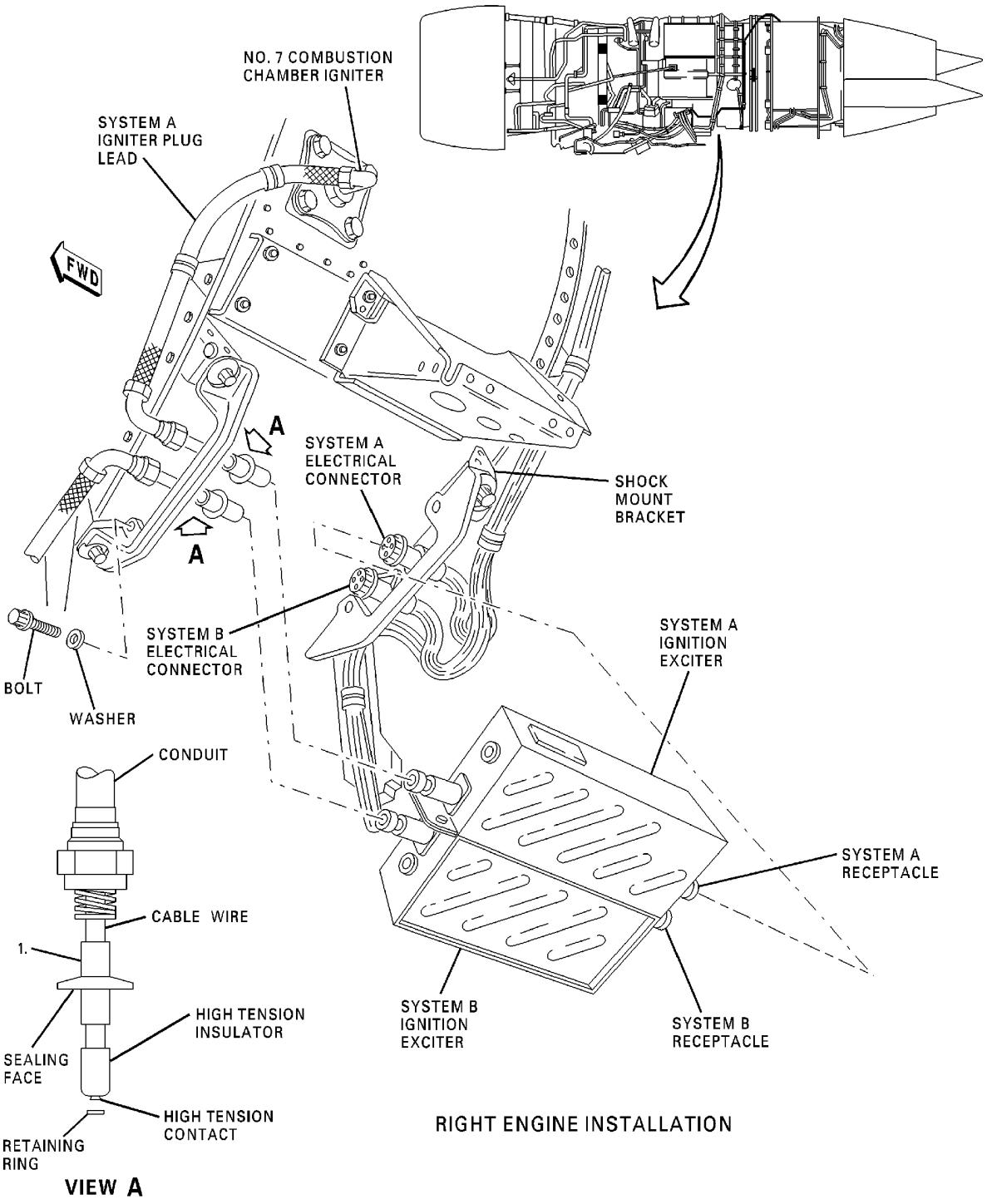
2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

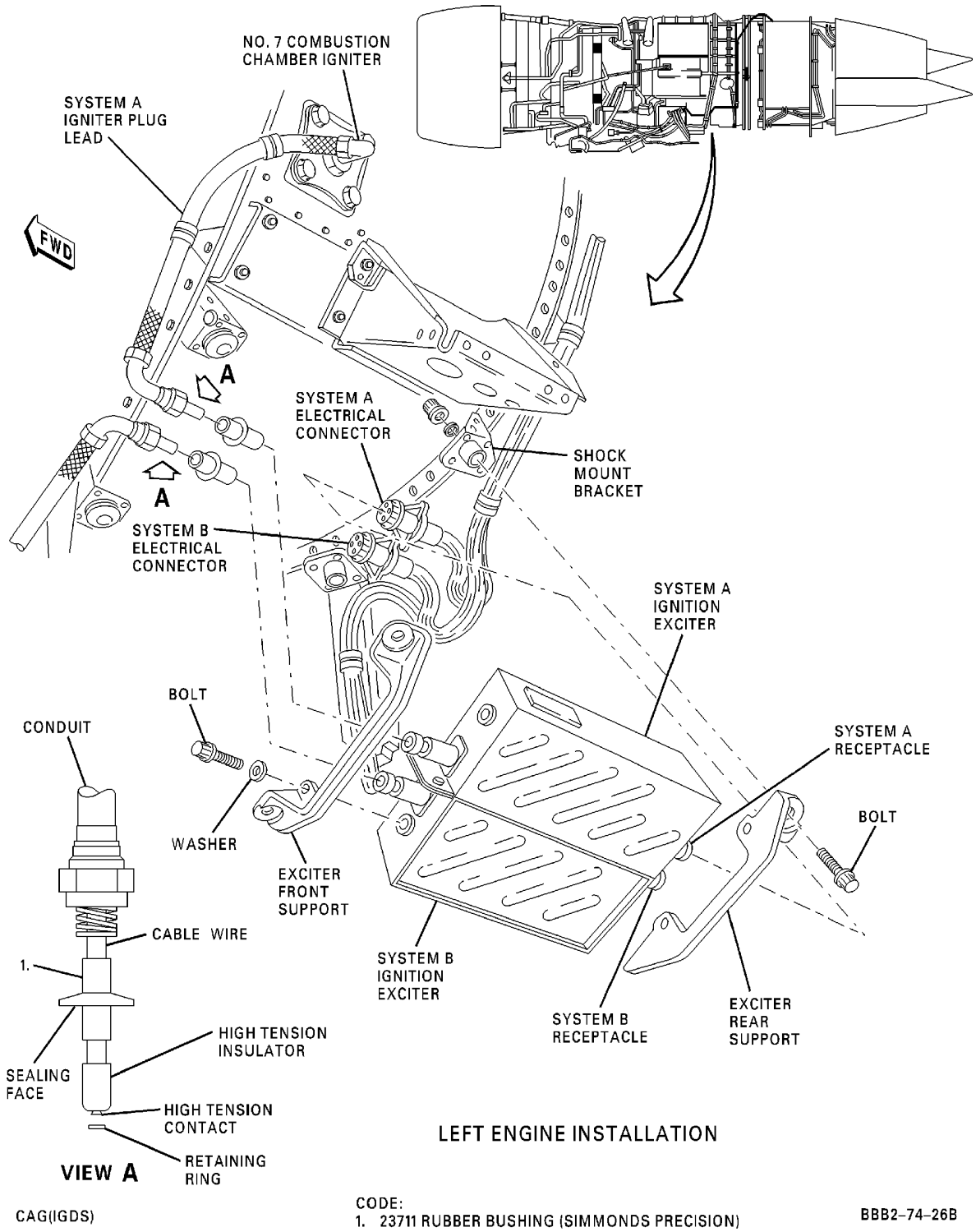
NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

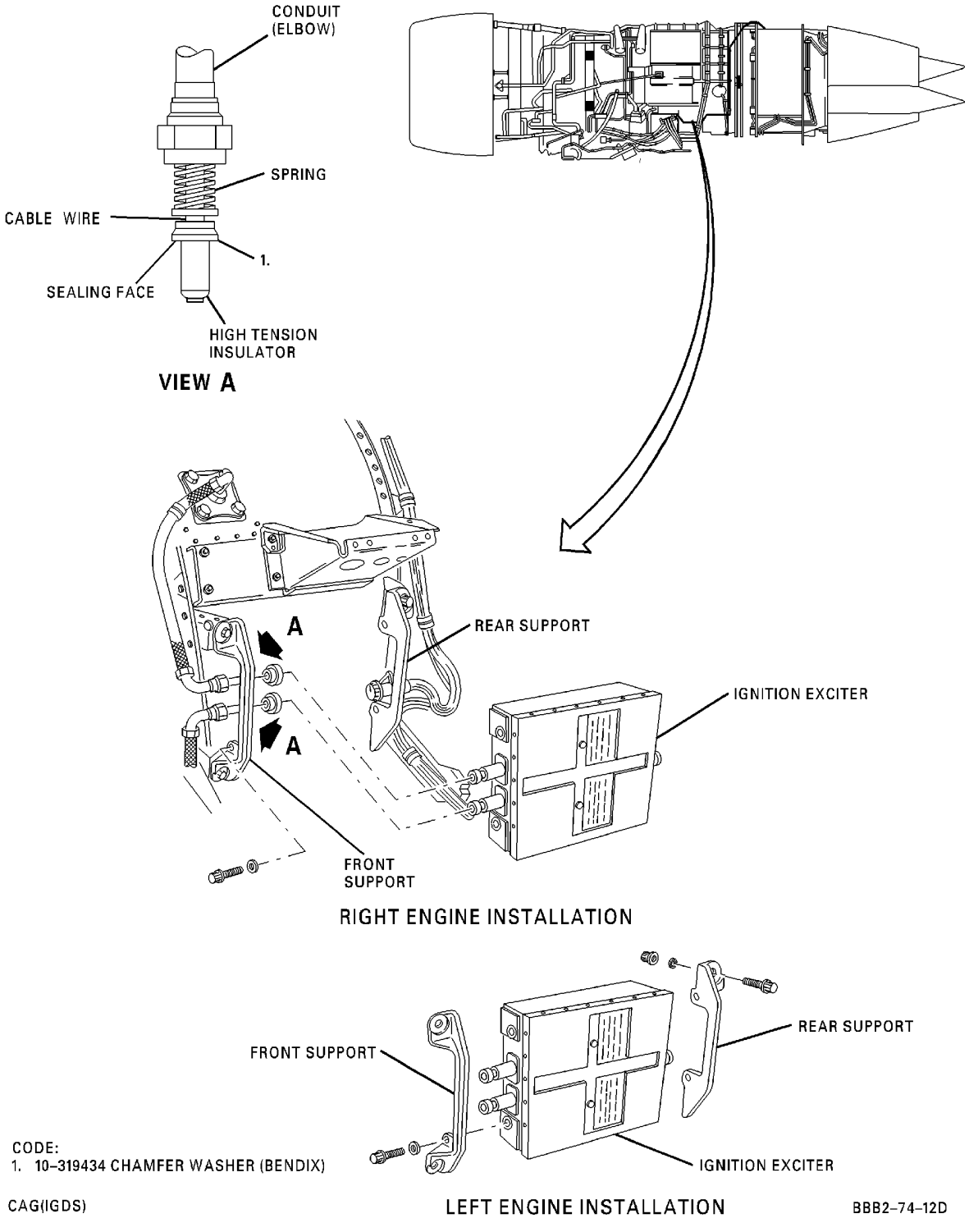
Name and Number	Manufacturer
Lockwire, .032 corrosion resistant steel, P05-289	
Lockwire, .020 corrosion resistant steel, P05-288	
Solvent, 1,1,1, Trichloroethane, stabilized, vapor degreasing MIL-T-81533	
Source of clean dry, compressed air (30 psig (207 kPa) maximum discharge pressure)	



Ignition Exciter - Installation
Figure 201/74-10-01-990-801 (Sheet 1 of 3)



Ignition Exciter - Installation
Figure 201/74-10-01-990-801 (Sheet 2 of 3)



Ignition Exciter - Installation
Figure 201/74-10-01-990-801 (Sheet 3 of 3)

3. **Removal/Installation Right Engine Ignition Exciter**

A. Remove Exciter

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: IF APU IS USED, MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

(Figure 201)

(1) Tag throttle/thrust reverser levers.

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(3) Open access door (5902C) for right engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(4) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(5) Open engine lower cowl door.

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT PLUG.

(6) Disconnect (input) electrical connectors from exciter. Install protective caps on connectors and mating receptacles on exciter.

(7) Disconnect (output) ignition lead coupling nuts from exciter. Install protective caps on coupling nuts and mating connectors on exciter.

(8) Remove bolts and washers securing exciter to supports. Spread supports and remove exciter, input (rear) end first.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(9) Remove bolts attaching system A exciter to system B exciter.

NOTE: System A and system B exciters can be removed as a unit or bolts removed from forward and aft ends of exciters, allowing exciters to be removed separately.

WJE ALL

B. Install Exciter

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: IF APU IS USED, MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

(Figure 201)

(1) Make sure that throttle/thrust reverser levers ate tagged.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(3) Make certain thrust reverser control valve is in dump position and lockpin is installed.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(4) Position exciters on bench with larger threaded (output) connectors at operator's right.

NOTE: If only one exciter system A or B was removed, Paragraph 3.B.(4) need not be performed.

(5) Align tab bolt holes located at ends of both exciters and install attaching hardware. Torque nuts 85 to 95 inch-pounds.

NOTE: Boltheads should be located against upper exciter, away from operator.

WJE ALL

(6) Spread front and rear supports and insert exciter between supports, output (front) end first.

CAUTION: USE OF BOLTS LONGER THAN THOSE SPECIFIED FOR IGNITION EXCITER MOUNTING WILL RESULT IN DAMAGE TO IGNITION EXCITER HOUSING WITH SUBSEQUENT LOSS OF HERMETIC SEALING AND RISK OF ELECTRICAL GROUNDING.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(7) Install bolts attaching exciter to supports. Safety bolts with P05-289 0.032 inch lockwire.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

Install exciter onto supports. Safety bolts with P05-289 0.032 inch lockwire.

WJE ALL

(8) Remove protective caps from (output) ignition leads and exciter.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(9) Remove retaining ring from high-tension contact and discard.

(10) Slide high-tension insulator and rubber bushing off cable wire at exciter end of leads. Retain high-tension insulator for installation. Discard rubber bushings.

NOTE: Ignition leads are fitted with a rubber bushing at both ends which must be replaced at every removal and installation.

NOTE: Rubber bushing replacement procedure is not applicable for new ignition leads.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(11) Slide chamfer washer off high-tension insulator at both exciter (output) leads. Discard chamfer washers.

NOTE: Ignition leads are fitted with a chamfer washer at both ends which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

WJE ALL

(12) Check lead. (IGNITION LEADS - MAINTENANCE PRACTICES, PAGEBLOCK 74-20-01/201)

WARNING: IGNITION CABLE RUBBER BUSHINGS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(13) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

Slide new chamfer washer on high-tension insulator.

WJE ALL

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(14) Connect ignition lead from combustion chamber No. 7 to system A (upper) exciter. Torque coupling nut 140-160 inch-pounds (15.82 to 18.08 N·m).

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(15) Connect (output) ignition lead coupling nuts to exciter. Torque nuts 140-160 inch-pounds (15.82 to 18.08 N·m).

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(16) Connect ignition plug lead from combustion chamber No. 4 to system B (lower) exciter. Torque coupling nut 140-160 inch-pounds (15.82 to 18.08 N·m).

WJE ALL

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT OR CONNECT PLUG. WHEN CONNECTING PLUG, DO NOT OVERTIGHTEN.

(17) Remove protective caps and connect (input) electrical connectors to exciter. Safety connectors with P05-288 0.020 inch lockwire.

NOTE: Connector plug is properly installed when no relative motion exists between plug backshell and coupling ring.

(18) Close engine lower cowl door.

(19) Remove tags from throttle/thrust reverser levers.

(20) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(21) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(22) Close access door (5902C) for right engine.

(23) Perform adjustment/test of ignition system. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 2)

4. Removal/Installation Left Engine Ignition Exciter

A. Remove Exciter

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

(Figure 201)

(1) Tag throttle/thrust reverser levers.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893 (Continued)

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

(3) Open access door (5901C) for left engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(4) Place thrust reverser control valves in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(5) Open engine lower cowl door.

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT OR CONNECT PLUG. WHEN CONNECTING PLUG, DO NOT OVERTIGHTEN.

(6) Disconnect (input) electrical connectors from exciter. Install protective caps on connectors and mating receptacles on exciter.

(7) Disconnect (output) ignition lead coupling nuts from exciter. Install protective caps on coupling nuts and mating connectors on exciter.

(8) Remove bolts attaching exciter front and rear supports to shock mounts on engine case and move exciter aft to remove.

(9) Remove front and rear supports from exciter.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(10) Remove bolts attaching system A exciter to system B exciter.

NOTE: System A and system B exciters can be removed as a unit or bolts removed from forward and aft ends of exciters, allowing exciters to be removed separately.

WJE ALL

B. Install Exciter

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

(Figure 201)

(1) Make sure that throttle/thrust reverser levers are tagged.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(3) Make certain thrust reverser control valve is in dump position and lockpin is installed.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(4) Position exciters on bench with larger threaded (output) connectors at operator's right.

NOTE: If only one exciter system A or B was removed, Paragraph 4.B.(4) need not be performed.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893 (Continued)

(5) Align tab bolt holes located at ends of both exciters and install attaching hardware. Torque nuts 85 to 95 inch-pounds.

NOTE: Boltheads should be located against upper exciter, away from operator.

WJE ALL

CAUTION: USE OF BOLTS LONGER THAN THOSE SPECIFIED FOR IGNITION EXCITER MOUNTING WILL RESULT IN DAMAGE TO IGNITION EXCITER HOUSING WITH SUBSEQUENT LOSS OF HERMETIC SEALING AND RISK OF ELECTRICAL GROUNDING.

(6) Install washer under head of each bolt and secure front and rear supports to exciter. Safety bolts with P05-289 0.032 inch lockwire.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(7) Move exciter forward into position and align supports with shock mounts on engine. Install washer under each bolt and secure exciter to shock mount brackets.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(8) Move exciter into position and align supports with shock mounts on engine. Install washer under each bolt head and secure exciter to shock mount brackets.

(9) Remove protective caps from exciter (output) ignition leads.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(10) Remove protective caps from ignition leads and exciter.

(11) Remove retaining ring from high-tension contact and discard.

(12) Slide high-tension insulator and rubber bushing off cable wire at exciter end of leads. Retain high-tension insulator for installation. Discard rubber bushings.

NOTE: Ignition leads are fitted with a rubber bushing at both ends which must be replaced at every removal and installation.

NOTE: Rubber bushing replacement procedure is not applicable for new ignition leads.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(13) Slide chamfer washer off high-tension insulator at both exciter (output) leads. Discard chamfer washers.

NOTE: Ignition leads are fitted with a chamfer washer at both ends which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

WJE ALL

(14) Check lead. (IGNITION LEADS - MAINTENANCE PRACTICES, PAGEBLOCK 74-20-01/201)

WARNING: IGNITION CABLE RUBBER BUSHINGS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240AC GREASE.

WARNING: IGNITION CABLE RUBBER BUSHINGS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(15) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

Slide new chamfer washer on high-tension insulator.

WJE ALL

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(16) Connect (output) ignition lead coupling nuts to exciter. Torque nuts 140-160 inch-pounds (15.82 to 18.08 N·m).

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(17) Connect ignition lead from combustion chamber No. 7 to system A (upper) exciter. Torque coupling nut 140-160 inch-pounds (15.82 to 18.08 N·m).

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(18) Connect ignition lead from combustion chamber No. 4 to system B (lower) exciter. Torque coupling nut 140-160 inch-pounds (15.82 to 18.08 N·m).

WJE ALL

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT OR CONNECT PLUG. WHEN CONNECTING PLUG, DO NOT OVERTIGHTEN.

(19) Remove protective caps and connect (input) electrical connectors to exciter. Safety connectors with P05-288 0.020 inch lockwire.

NOTE: Connector plug is properly installed when no relative motion exists between plug backshell and coupling ring.

(20) Close engine lower cowl door.

(21) Remove tags from throttle/thrust reverser levers.

(22) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(23) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(24) Close access door (5901C) for left engine.

(25) Perform adjustment/test of ignition system. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 2)

5. Adjustment/Test Ignition Exciter

A. Test Exciter

NOTE: Maintenance testing of ignition exciter is not available. Send malfunctioning exciter to overhaul facility for complete overhaul check.

6. **Check Ignition Exciter**

A. Check Exciter

(1) Check housing and mounting brackets for cracks and other defects.

(2) Check threads of each outlet.

NOTE: Minor repair to threads can be made by chasing with proper die. If threads are damaged beyond minor repair, exciter will require overhaul.

(3) Check ignition lead terminal wells in output receptacles for damaged condition or signs of carbon track (flashover) on ceramic.

NOTE: If well in output receptacles is damaged, or signs of carbon track (flashover) appear on ceramic, exciter will require overhaul.

7. **Cleaning/Painting Ignition Exciter**

A. Clean Exciter

WARNING: 1,1,1-TRICHLOROETHANE IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN 1,1,1-TRICHLOROETHANE IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET 1,1,1-TRICHLOROETHANE IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

(1) Clean exciter outlet contact well with long bristle, nonmetallic brush moistened with cleaning solvent, 1,1,1 trichloroethane. Dry with clean, dry compressed air (30 psig (207 kPa) maximum discharge pressure).

(2) Clean inner ceramic walls using circular felt bob, 1/2-inch (12.7 mm) in diameter and approximately 1-3/4 inches (44.4 mm) long, suitable for use with hand chuck. Use cleaning solvent per Paragraph 7.A.(1) and clean with circular movement. Dry with clean, dry compressed air (30 psig (207 kPa) maximum discharge pressure).

(3) Clean end surface of ceramic at seat of grommet face using short bristle, nonmetallic brush moistened with cleaning solvent per Paragraph 7.A.(1). Dry with clean, dry compressed air (30 psig (207 kPa) maximum discharge pressure).

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

8. **Approved Repairs Ignition Exciter**

A. Remove Exciter Spark Gap Unit

(Figure 202)

(1) Remove exciter from right engine (Paragraph 3.A.) or left engine (Paragraph 4.A.) and place on suitable work bench.

NOTE: If desired, spark gap unit replacement can be accomplished with exciter installed on engine.

(2) Remove threaded cap with packing, 10-387969 shim ring (if one is installed), cover, and spark gap from housing.

(3) Remove 10-187984 contacts and 10-371532 insulator from old gap.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892 (Continued)

(4) Install 10-187984 contacts to each end of 10-374105-5 spark gap. Torque contacts 4 to 6 inch-pounds (0.45 to 0.68 N·m). Install 10-371532 insulator over spark gap.

(5) Position 10-371534 cover over evacuation tip end of spark gap unit. Press parts together to engage contact of gap with cover.

B. Install Exciter Spark Gap Unit

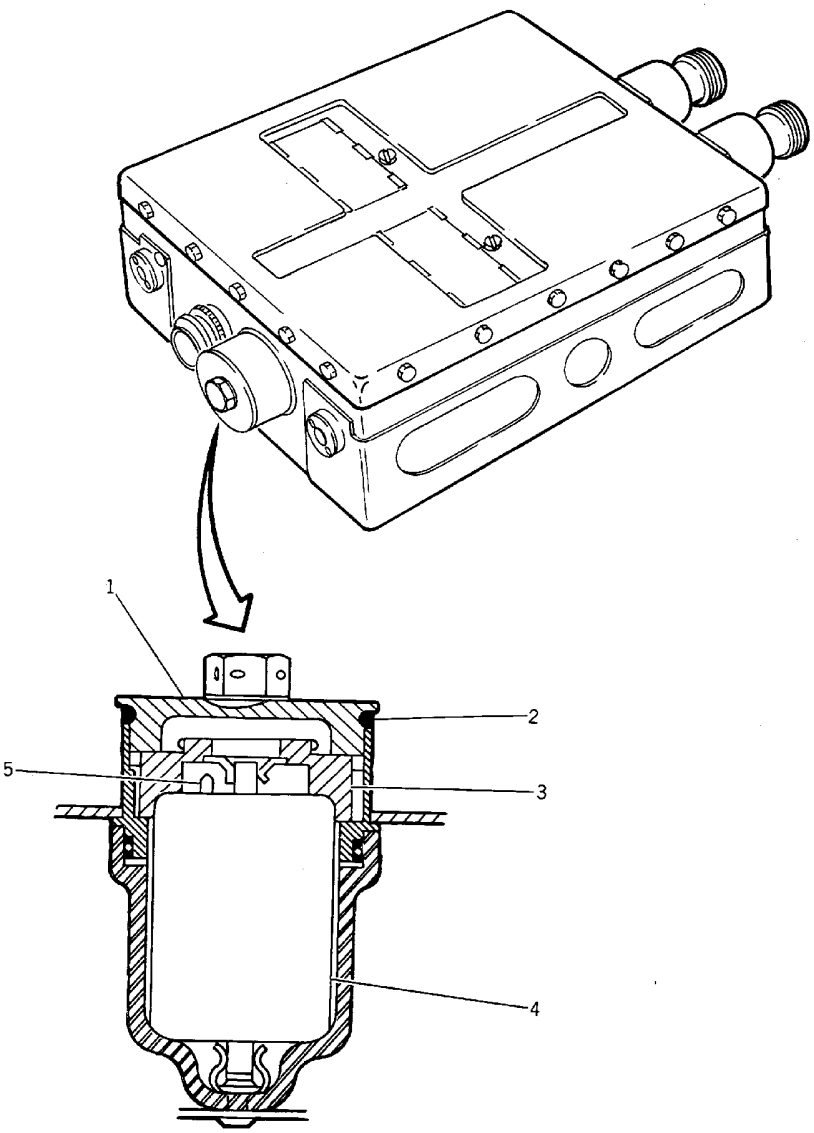
(Figure 202)

(1) Position assembled cover and gap unit into well of exciter. Align slot on side of cover with locating pin in gap well and seat the unit. Install 10-387969 shim ring if one was removed in step (1).

(2) Screw threaded cap, previously removed from exciter, into gap well.

(3) Torque cap 90 to 100 inch-pounds (10.17 to 11.30 N·m). Safety cap to filter nut with P05-289 0.032 inch lockwire.

(4) Install exciter on right engine (Paragraph 3.B.) or left engine. (Paragraph 4.B.)



1. CAP 10-378142
2. PREFORMED PACKING 10-378141
3. COVER 10-371534
4. SPARK GAP UNIT 10-371535
5. EVACUATION TIP

L-36821

BBB2-74-31

Ignition Exciter Spark Gap Unit - Installation (10-353875-4 Ignition Exciters)
Figure 202/74-10-01-990-804

DUAL UNIT IGNITION EXCITER - REMOVAL/INSTALLATION

1. General

A. This removal/installation procedures provides instructions for the dual unit ignition exciter made available by Pratt & Whitney SB 5880. The exciter for each engine is mounted on the left, rear section of the engine.

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

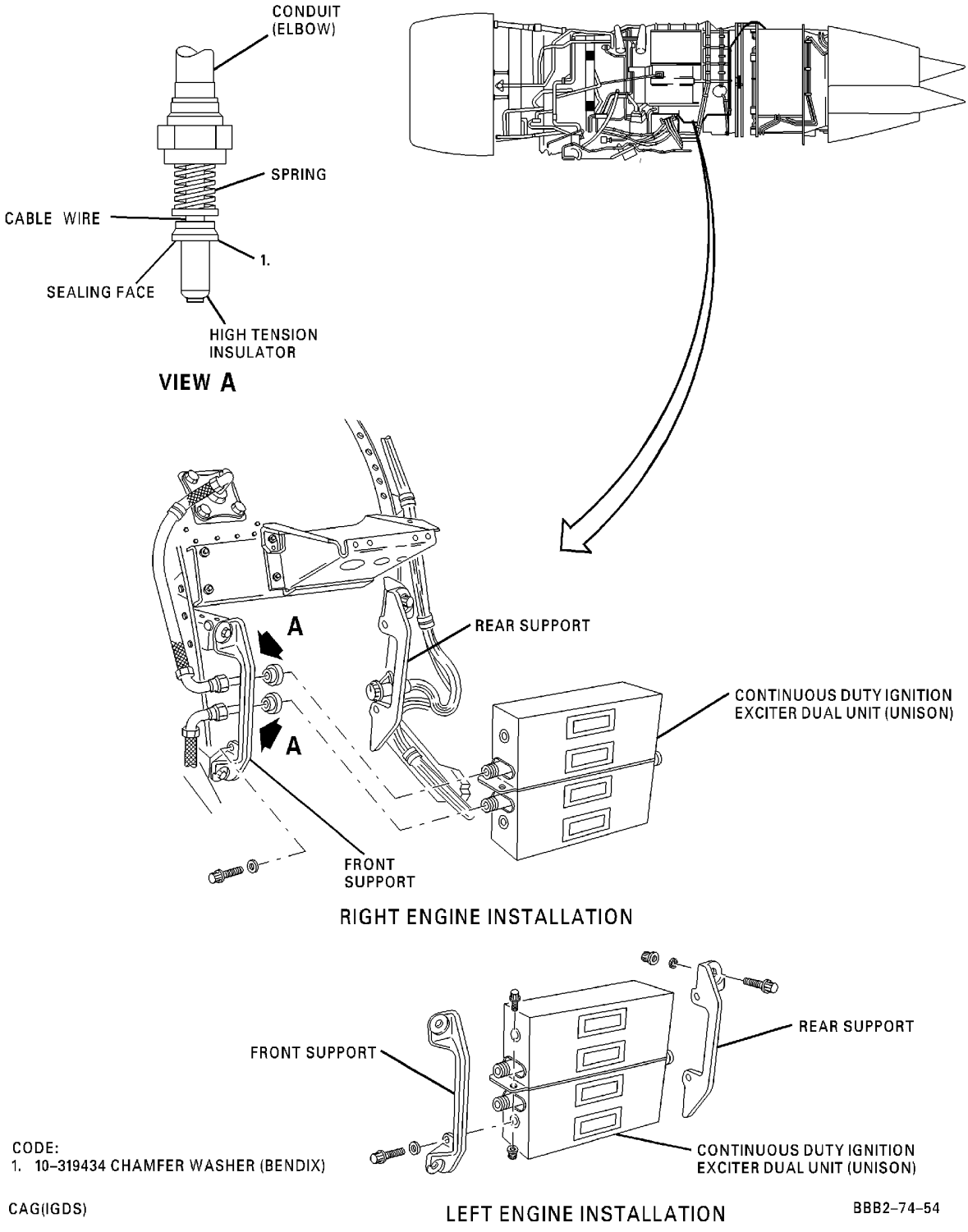
B. Access to the exciter is through the lower cowl door.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

Table 401

Name and Number	Manufacturer
Lockwire, .032 corrosion resistant steel, P05-289	
Lockwire, .020 corrosion resistant steel, P05-288	



Dual Unit Ignition Exciter - Removal/Installation
Figure 401/74-10-02-990-801

3. **Removal/Installation Right Engine Dual Unit Ignition Exciter**

A. Remove Dual Unit Exciter (Figure 401)

(1) Tag throttle/thrust reverser levers.

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 892			
U	41	B1-423	ENGINE START VALVE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
L	26	B1-425	RIGHT ENGINE IGNITION

(3) Open access door (5902C) for right engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(4) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(5) Open engine lower cowl door.

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTORS, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT PLUGS.

(6) Disconnect (input) electrical connectors from the two exciter units. Install protective caps on connectors and mating receptacle on exciters.

(7) Disconnect (output) ignition lead coupling nuts from exciter. Install protective caps on coupling nuts and mating connectors on exciter.

(8) Remove bolts and washers securing exciter to support, spread front and rear support and remove exciter, input (rear) end first.

(9) Remove bolts and nuts that attach the two exciter units and remove one unit from the other.

B. Install Dual Unit Exciter (Figure 401)

(1) Make certain throttle/thrust reverser lever is tagged.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 892			
U	41	B1-423	ENGINE START VALVE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(3) Make certain thrust reverser control valve is in dump position and lockpin is installed.

(4) Position exciter units on bench with larger threaded (output) connectors at operator's right.

(5) Attach units with bolts and nuts at each end (put bolt heads against the upper exciter as shown in Figure 401. Torque bolts 85 to 95 inch-pounds (9.60 to 10.74 N·m).

(6) Spread front and rear supports and insert exciter between supports, output (front) end first.

CAUTION: USE OF BOLTS LONGER THAN THOSE SPECIFIED FOR IGNITION EXCITER MOUNTING WILL RESULT IN DAMAGE TO IGNITION EXCITER HOUSING WITH SUBSEQUENT LOSS OF HERMETIC SEALING AND RISK OF ELECTRICAL GROUNDING.

(7) Install exciter onto supports. Safety bolts with P05-289 0.032 inch lockwire.

(8) Remove protective caps from exciter (output) ignition leads.

(9) Slide chamfer washer off high-tension insulator at both exciter (output) leads. Discard chamfer washers.

NOTE: Ignition leads are fitted with a chamfer washer at both ends which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

(10) Check lead. (PAGEBLOCK 74-20-01/201)

WARNING: IGNITION CABLE CHAMFER WASHERS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

(11) Slide new chamfer washer on high-tension insulator.

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

CAUTION: MAKE SURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE OR LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(12) Connect (output) ignition lead coupling nuts to exciter. Torque nuts 140-160 inch pounds (15.82 to 18.08 N·m).

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTORS, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO CONNECT PLUGS. WHEN CONNECTING PLUGS, DO NOT OVERTIGHTEN.

(13) Remove protective caps and connect (input) electrical connectors to exciter. Safety connectors with P05-288 0.020 inch lockwire.

NOTE: Connector plug is properly installed when no relative motion exists between plug backshell and coupling ring.

NOTE: Make sure (input) connector is attached to exciter connector at the Flange J1 bracket.

(14) Close engine lower cowl door.

(15) Remove tag from throttle/thrust reverser levers.

(16) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891 (Continued)

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 892			
U	41	B1-423	ENGINE START VALVE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(17) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(18) Close access door (5902C) for right engine.

(19) Perform adjustment/test of ignition system. (PAGEBLOCK 74-00-00/501 Config 1)

4. Removal/Installation Left Engine Dual Unit Ignition Exciter

A. Remove Dual Unit Exciter (Figure 401)

(1) ag throttle/thrust reverser levers.

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 892			
U	42	B1-422	ENGINE START VALVE LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
K	26	B1-424	LEFT ENGINE IGNITION

(3) Open access door (5901C) for left engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(4) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(5) Open engine lower cowl door.

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTORS, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO CONNECT PLUGS. WHEN CONNECTING PLUGS, DO NOT OVERTIGHTEN.

(6) Disconnect (input) electrical connectors from the two exciter units. Install protective caps on connectors and mating receptacle on exciters.

(7) Disconnect (output) ignition lead coupling nuts from exciter. Install protective caps on coupling nuts and mating connectors on exciter.

(8) Remove bolts attaching exciter front and rear supports to shock mounts on engine case and remove exciter from engine.

(9) Remove front and rear supports from exciter.

(10) Remove bolts and nuts that attach the two exciter units and remove one unit from the other.

B. Install Dual Unit Exciter (Figure 401)

(1) Make certain throttle/thrust reverser lever is tagged.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 892

U	42	B1-422	ENGINE START VALVE LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

K	26	B1-424	LEFT ENGINE IGNITION

(3) Make certain thrust reverser control valve is in dump position and lockpin is installed.

(4) Position exciter units on bench with larger threaded (output) connectors at operator's right.

(5) Attach units with bolts and nuts at each end (put bolt heads against the upper exciter as shown in Figure 401). Torque nuts 85 to 95 inch-pounds (9.60 to 10.74 N·m).

CAUTION: USE OF BOLTS LONGER THAN THOSE SPECIFIED FOR IGNITION EXCITER MOUNTING WILL RESULT IN DAMAGE TO IGNITION EXCITER HOUSING WITH SUBSEQUENT LOSS OF HERMETIC SEALING AND RISK OF ELECTRICAL GROUNDING.

(6) Install washer under head of each bolt and secure front and rear supports to exciter. Safety bolts with P05-289 0.032 inch lockwire.

(7) Move exciter into position and align supports with shock mounts on engine. Install washer under each bolt head and secure exciter to shock mount brackets.

(8) Remove protective caps from exciter (output) ignition leads.

(9) Slide chamfer washer off high-tension insulator at both exciter (output) leads. Discard chamfer washers.

NOTE: Ignition leads are fitted with a chamfer washer at both ends which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

(10) Check lead. (PAGEBLOCK 74-20-01/201)

WARNING: IGNITION CABLE CHAMFER WASHERS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

(11) Slide new chamfer washer on high-tension insulator.

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

CAUTION: MAKE SURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE OR LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(12) Connect (output) ignition lead coupling nuts to exciter. Torque nuts 140-160 inch pounds (15.82 to 18.08 N·m).

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT OR CONNECT PLUG. WHEN CONNECTING PLUG, DO NOT OVERTIGHTEN.

(13) Remove protective caps and connect (input) electrical connectors to exciter. Safety connectors with P05-288 0.020 inch lockwire.

NOTE: Connector plug is properly installed when no relative motion exists between plug backshell and coupling ring.

NOTE: Make sure the (input) connector is attached to the exciter connector at the Flange J1 bracket.

(14) Close engine lower cowl door.

(15) Remove tag from throttle/thrust reverser levers.

(16) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 892			
U	42	B1-422	ENGINE START VALVE LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
K	26	B1-424	LEFT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(17) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(18) Close access door (5901C) for left engine.

(19) Perform adjustment/test of ignition system. (PAGEBLOCK 74-00-00/501 Config 1)

DISTRIBUTION - DESCRIPTION AND OPERATION

1. General

A. The engine ignition distribution system conducts electrical energy from the ignition exciter to the igniter plugs. The system consists of two shielded high-tension cables and two igniter plugs for each engine.

2. High-Voltage Distribution System

A. Description

(1) Exciter-to-Igniter Plug Cable - The two exciter-to-igniter plug cables consist of electrical cables encased in braided conduits with an electrical connector at each end. The cables and connectors are shielded to prevent radio interference. The cables are installed between the exciter and igniter plugs. The left cable is approximately 30 inches (762mm) long, and the right, approximately 51 inches (1295.4mm) long.

(2) Igniter Plug - The two igniter plugs are mounted on the lower front of the combustion chamber outer case. One plug projects into combustion chamber No. 4, and the other projects into combustion chamber No. 7. The igniter plug provides the gap across which the electrical spark passes to ignite the fuel/air mixture in the combustion chamber.

B. Operation

(1) A high tension voltage, developed in the ignition exciter, is applied through the ignition cables across the gap of the igniter plug causing the air between the igniter plug electrodes to ionize. When ionization occurs, the current discharges between the electrodes resulting in a spark of very high energy which ignites the fuel/air mixture in the combustion chamber.

DISTRIBUTION - DESCRIPTION AND OPERATION

1. General

A. The engine ignition distribution system conducts electrical energy from the ignition exciter to the igniter plugs. The system consists of two igniter plug leads and two igniter plugs for each engine.

2. High-Voltage Distribution System

A. Description

(1) Exciter-to-Igniter Plug Lead - The two exciter-to-igniter plug leads consist of electrical cables encased in braided conduits with an electrical connector at each end. The leads and connectors are shielded to prevent radio interference. The leads are installed between the exciter and igniter plugs. The left lead is approximately 30 inches (762mm) long, and the right, approximately 51 inches (1295.4mm) long.

(2) Igniter Plug - The two igniter plugs are mounted on the lower front of the combustion chamber outer case. One plug projects into combustion chamber No. 4, and the other projects into combustion chamber No. 7. The igniter plug provides the gap across which the electrical spark passes to ignite the fuel/air mixture in the combustion chamber.

B. Operation

(1) A high tension voltage, developed in the ignition exciter, is applied through the ignition leads across the gap of the igniter plug causing the air between the igniter plug electrodes to ionize. When ionization occurs, the current discharges between the electrodes resulting in a spark of very high energy which ignites the fuel/air mixture in the combustion chamber.

IGNITION LEADS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation, adjustment/test, check, and cleaning/painting instructions for the ignition leads. The leads are connected between the ignition exciter and igniter plugs.

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

B. Removal/Installation, adjustment/test, check, and cleaning/painting procedures for ignition leads on left and right engines are identical. Access to leads is through the lower cowl door.

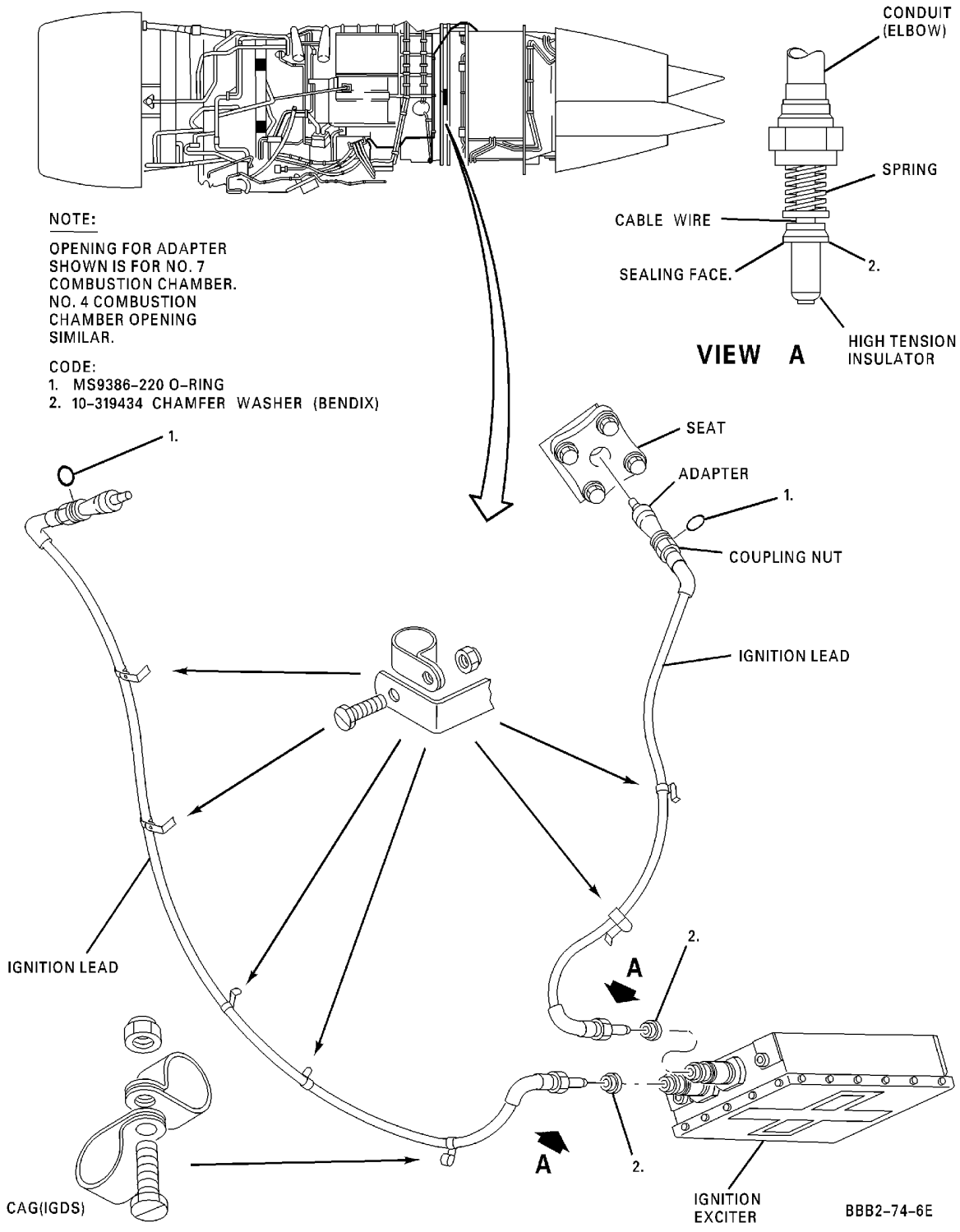
2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following items:

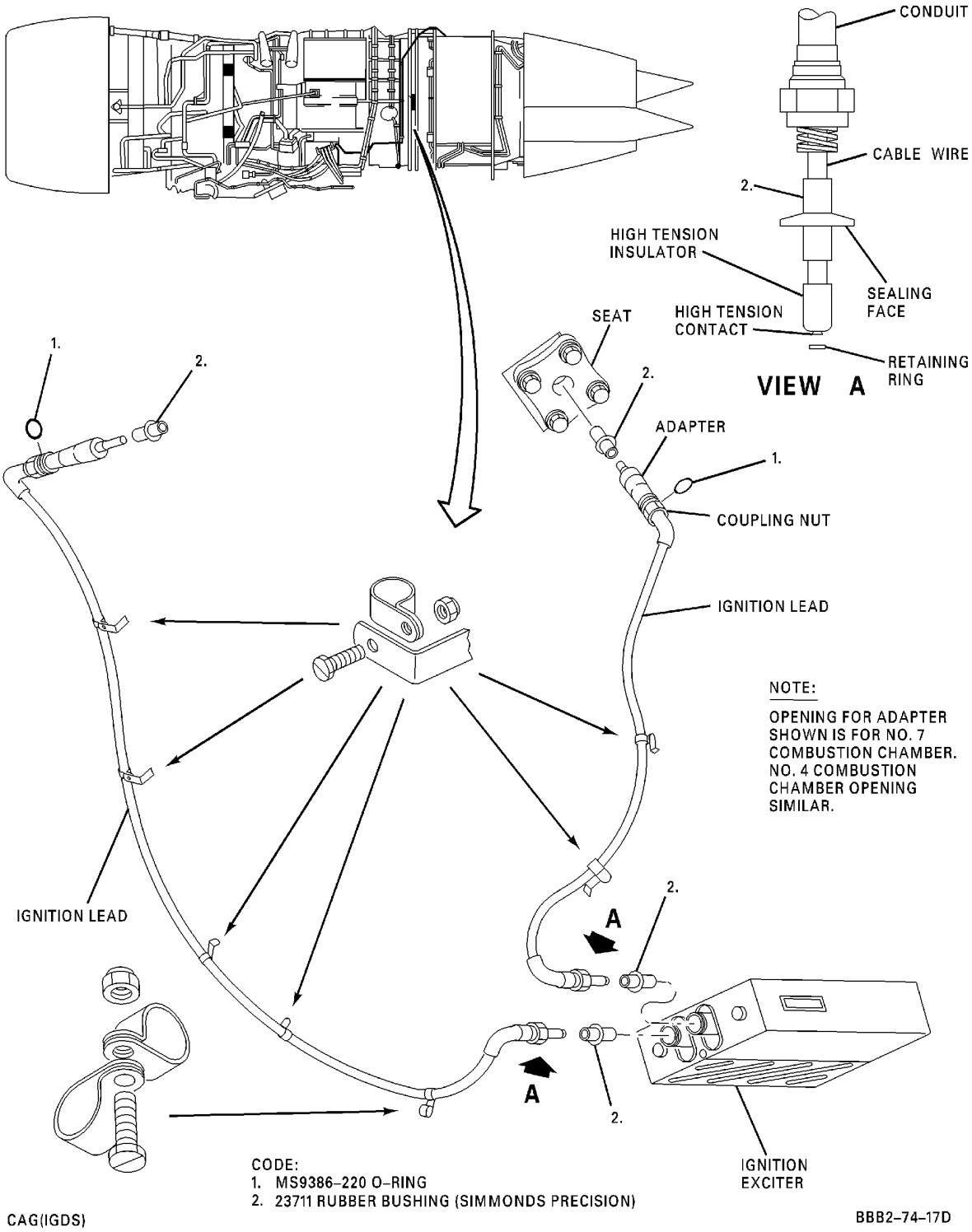
NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 201

Name and Number	Manufacturer
Molykote Type Z	Alpha Molykote Corp. Stanford, Conn.
Solvent, Cleaning P-D-680, Type 1	
Torque wrench (0 - 200 inch pounds range) (0 - 2.26 N·m)	
Source of dry, clean compressed air (30 psig (207 kPa) maximum discharge pressure)	
Dust caps, electrical connector MS90376	



Ignition Leads - Installation (Bendix)
Figure 201/74-20-01-990-813 (Sheet 1 of 2)



Ignition Leads - Installation (Bendix)
Figure 201/74-20-01-990-813 (Sheet 2 of 2)

3. **Removal/Installation Ignition Leads**

A. Remove Leads (Figure 201)

(1) Tag throttle/thrust reverser levers.

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893			
U	42	B1-422	ENGINE START VALVE LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
WJE ALL			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(3) Open access door (5901C) for left engine or (5902C) for right engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(4) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(5) Open engine lower cowl door.

(6) Disconnect leads from ignition exciter. Install protective caps on lead ends and on ignition exciter connectors.

(7) Disconnect leads from igniter plugs. Install protective caps on lead ends and cover opening in fan discharge duct.

(8) Remove bolts securing lead attaching clips to engine flange.

NOTE: Mark location of lead attaching clips to facilitate installation

(9) Remove leads.

B. Install Leads (Figure 201)

(1) Make sure throttle/thrust reverser levers are tagged.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893			
U	42	B1-422	ENGINE START VALVE LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
WJE ALL			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(3) Make certain thrust reverser control valve is in dump position and lockpin is installed.

(4) Remove protective caps from exciter connector and ends of ignition lead.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(5) Slide chamfer washers off high-tension insulator at both ends of lead. Discard chamfer washers.

NOTE: Ignition leads are fitted with a chamfer washer at both ends which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(6) Remove retaining ring from high-tension contact and discard.

(7) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings.

NOTE: Ignition leads are fitted with a rubber bushing at both ends which must be replaced at every removal and installation.

NOTE: Rubber bushing replacement procedure is not applicable for new ignition leads.

WJE ALL

(8) Check lead. (Paragraph 3.A.(6))

WARNING: IGNITION CABLE CHAMFER WASHERS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(9) Slide new chamfer washer on high-tension insulator.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact.

WJE ALL

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

(10) Install new O-ring in OD groove of igniter plug coupling nut.

WARNING: P-D-680 TYPE 1 SOLVENT IS AN AGENT THAT IS FLAMMABLE AND POISONOUS. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN P-D-680 TYPE 1 SOLVENT IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET P-D-680 TYPE 1 SOLVENT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIERS MSDS FOR:

- MORE PRECAUTIONARY DATA.
- APPROVED SAFETY EQUIPMENT.
- EMERGENCY MEDICAL AID.
- TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(11) Clean threads of coupling nut with cleaning solvent, P-D-680, Type 1.

(12) Apply light coat of Molykote, Type Z, on threads of coupling nut.

(13) Remove cover from opening in fan discharge duct.

CAUTION: TO PREVENT DAMAGE TO LEAD, DO NOT TWIST PLUG END OF LEAD WHEN TIGHTENING COUPLING NUT.

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(14) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(15) Carefully insert exciter end of lead into ignition exciter, torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(16) Secure ignition lead attaching clips to engine flange. Torque bolts 36 to 40 inch-pounds (4.07 to 4.52 N·m).

WJE ALL

(17) Close engine lower cowl door.

(18) Remove tag from throttle/thrust reverser levers.

(19) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name

WJE ALL

K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(20) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(21) Close access door (5901C) for left engine or (5902C) for right engine.

4. Adjustment/Test Ignition Leads

A. Test Lead

(1) Perform functional test of ignition system. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 2)

5. Check Ignition Lead

A. Check Lead

NOTE: Any item found damaged or not in good working condition should be replaced.

CAUTION: DO NOT BEND OR PULL THE HIGH TENSION CABLE. THIS WILL PREVENT DAMAGE TO THE INSULATION.

(1) Visually check ignition lead for torn or frayed strands, cuts, abrasion, or other damage.

(2) Check for following at igniter plug end of lead.

(a) Damage to high-tension insulator.

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

(b) Damage to chamfer washer.

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

(c) Missing or damaged retainer ring.

(d) Damage to rubber bushing.

WJE ALL

(e) Damage to high-tension contact.

(3) Check for excessive soot/carbon in connector at igniter plug end of lead.

NOTE: Excessive soot/carbon at igniter plug end of lead is an indication of faulty igniter plug, and plug should be replaced.

(4) Check connector coupling nuts for worn or stripped threads.

(5) When replacing chamfer washer check for following:

(a) Check for evidence of arcing or flashover on high tension electrical contact.

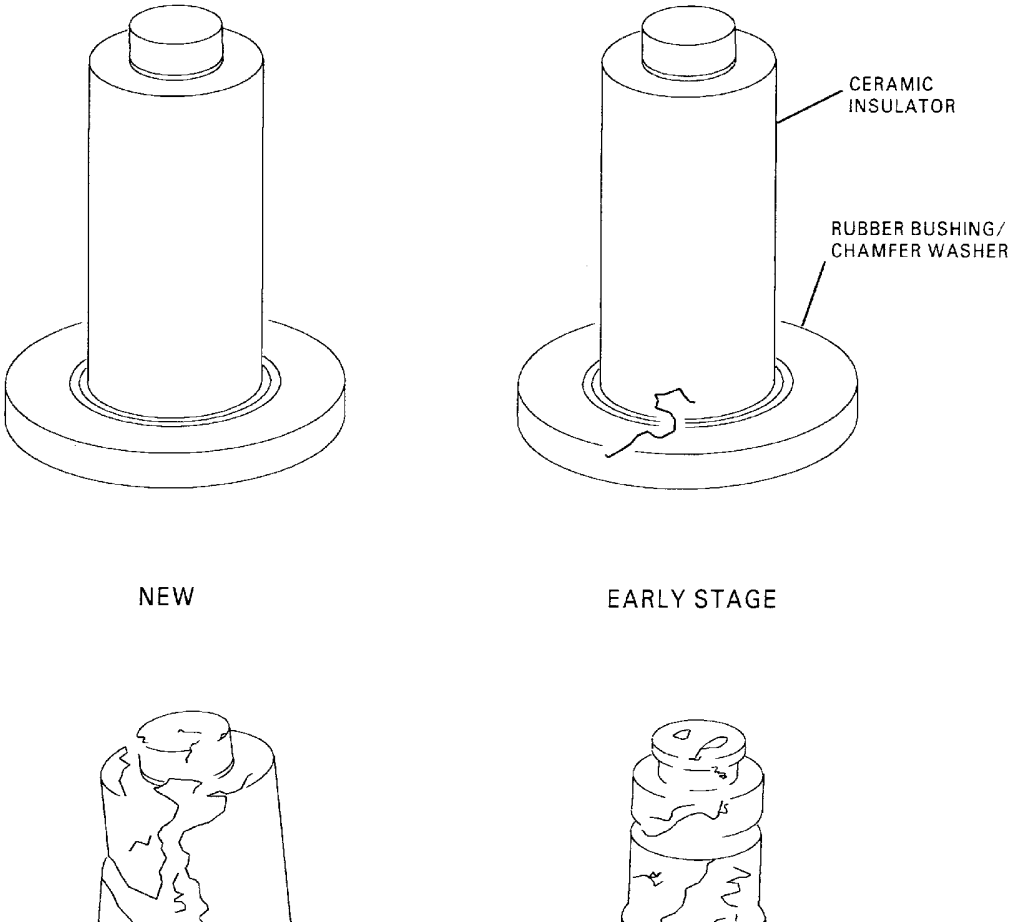
(b) Check exciter-to-igniter plug lead to ensure that excessive temperature has not affected insulation and grommets. (Figure 201)

(c) Check for arcing identified by pitting and discoloration. (Figure 203)

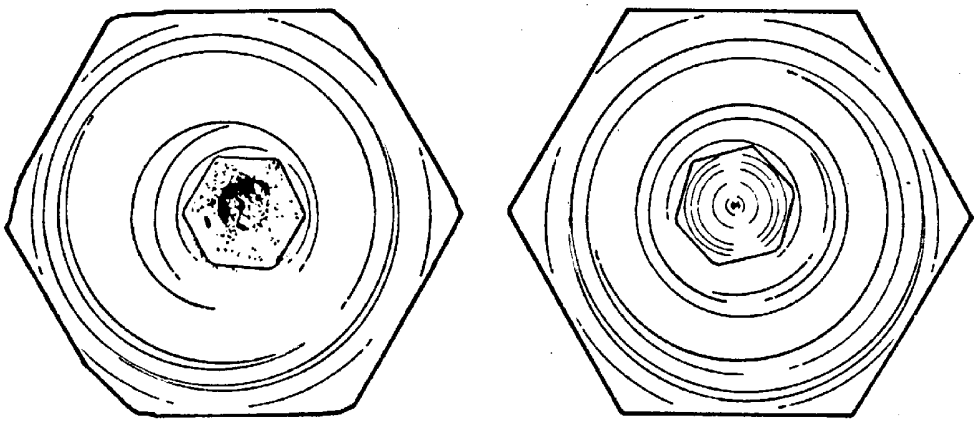
(d) Check for flashover, identified by carbon tracking. (Figure 204)

(6) Replace lead if conductor insulation is hard, brittle, or cracked.

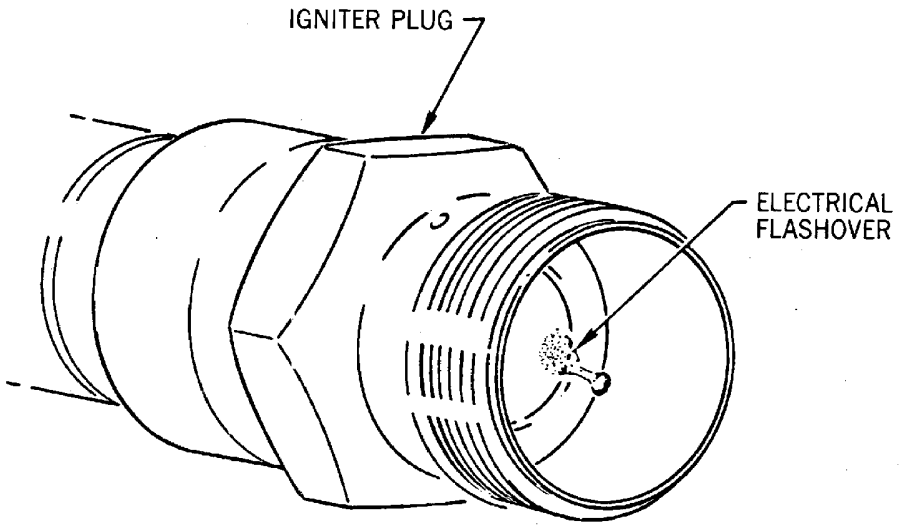
(7) Check for presence of oil, dirt, or conductive contaminants on exposed parts. Clean lead. (Paragraph 6.)

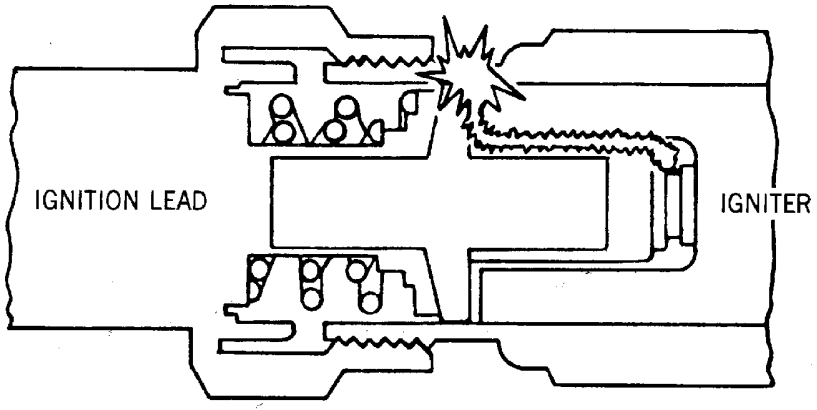


Distressed Ignition Lead Grommets
Figure 202/74-20-01-990-814



Electrical Arcing Condition
Figure 203/74-20-01-990-815





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Electrical Flashover Condition
Figure 204/74-20-01-990-816

6. Cleaning/Painting

A. Clean Leads

WARNING: P-D-680 TYPE 1 SOLVENT IS AN AGENT THAT IS FLAMMABLE AND POISONOUS. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN P-D-680 TYPE 1 SOLVENT IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET P-D-680 TYPE 1 SOLVENT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIERS MSDS FOR:

- MORE PRECAUTIONARY DATA.
- APPROVED SAFETY EQUIPMENT.
- EMERGENCY MEDICAL AID.
- TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(1) Wipe ceramic insulator with lint-free cloth moistened with cleaning solvent, P-D-680, Type 1. Dry with clean, dry compressed air (30 psig (207 kPa) maximum discharge pressure).

(2) Wipe leads with a clean lint-free cloth dampened with solvent, per Paragraph 6.A.(1). Dry with clean, dry compressed air (30 psig (207 kPa) maximum discharge pressure).

(3) Clean high-tension contact with lint-free cloth dampened with solvent, per Paragraph 6.A.(1). Dry with clean, dry compressed air (30 psig (207 kPa) maximum discharge pressure).

IGNITER PLUGS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation, adjustment/test, check, cleaning/painting, and approved repair instructions for the igniter plugs. The igniter plugs are installed in engine combustion chambers No. 4 and No. 7.

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

B. Removal/installation, adjustment/test, check, cleaning/painting, and approved repair procedures for igniter plugs on the left and right engines are identical. Access to the plugs is through the lower cowl door.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following items:

NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 201

Name and Number	Manufacturer
High temperature anti-seize compound, BG Mica Lube A-768	The BG Corp. Ridgefield, N.J.
Anti-galling compound, PMC 9936	
Anti-seize compound, (Silver Goop), PMC 9940	
Molykote, Type Z	Alpha Molykote Corp. Stanford, Conn.
Alcohol, Isopropyl (DPM 530)	
Solvent, Cleaning P-D-680, Type 1	
Source of clean dry, compressed air (30 psig (207 kPa) maximum discharge pressure)	
Tap, P&W 33647	Pratt & Whitney East Hartford, Conn.
Torque wrench, 0 in-lb (0.00 N·m) to 600 in-lb (67.79 N·m)	
Wrench, P&W 45470	Pratt & Whitney East Hartford, Conn.
Pin, P&W 45577	Pratt & Whitney East Hartford, Conn.

3. **Removal/Installation Igniter Plugs**

A. Remove Plug

(Figure 201)

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

(1) Tag throttle/thrust reverser lever, and open and tag following circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 892

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 892

U	42	B1-422	ENGINE START VALVE LEFT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(2) Open access door (5901C) for left engine or (5902C) for right engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6555 TO 7245 KPA) (PRECHARGE PRESSURE).

(3) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(4) Open engine lower cowl door.

WARNING: FOR ADDITIONAL PROTECTION AGAINST ELECTRICAL SHOCK, GROUND IGNITER PLUG LEAD TERMINAL IMMEDIATELY UPON DISCONNECTING FROM IGNITER PLUG.

(5) Disconnect lead from igniter plug and wrap end of lead in protective paper.

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING REMOVAL OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

CAUTION: DO NOT ATTEMPT TO REMOVE THE FOUR NUTS (PRE-P&W SB 6030) WHICH RETAIN THE SPARK IGNITER PACKING HOLDER ON THE RIGHT SIDE OF ENGINE AS BOLTS ARE NOT RETAINED ON THE INNER SIDE OF THE FAN DUCT (P&W SB 6030 CHANGES THE BOLTS AND NUTS TO A RIVET PIN AND COLLAR CONFIGURATION).

(6) Using P&W wrench 45470, remove igniter plug.

(7) Remove igniter plug from combustion chamber outer case. Cover opening in fan discharge case.

(8) Wrap igniter plug in protective paper.

B. Install Plug

(Figure 201)

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

(1) Make certain throttle/thrust reverser lever is tagged and following circuit breakers are open and tagged.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 892			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	42	B1-1	ENGINE IGNITION LEFT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891 (Continued)

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 892			
U	42	B1-422	ENGINE START VALVE LEFT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(2) Make certain thrust reverser control valve is in dump position and lockpin is installed.

(3) Remove cover from opening in fan discharge case.

(4) Check condition of igniter plug boss threads. If necessary, clean threads using tap, P&W 33647.

WARNING: USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

Hazardous Material Warnings

HAZMAT 1030, ISOPROPYL ALCOHOL (DPM 530)

HAZMAT 1000, REFER TO MSDS

CAUTION: IGNITER PLUG MUST BE REPLACED IF DROPPED.

(5) Remove protective paper from igniter plugs. Clear threads of igniter plugs and combustion chamber case bosses with isopropyl alcohol.

WARNING: ANTI-GALLING COMPOUND IS AN AGENT THAT IS POISONOUS. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN ANTI-GALLING COMPOUND IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET ANTI-GALLING COMPOUND IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: SILVER GOOP LUBRICANT IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILVER GOOP LUBRICANT IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET SILVER GOOP LUBRICANT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: ANTISEIZE COMPOUND IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN ANTISEIZE COMPOUND IS USED.

- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT EAT ANTISEIZE COMPOUND.

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIERS'S MSDS FOR:

- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THESE HAZARDOUS AGENTS.

CAUTION: DO NOT USE PMC 9940 ANTISEIZE COMPOUND (SILVER GOOP) ON IGNITER PLUG OR BOSS THREADS IF A DIFFERENT COMPOUND WAS USED BEFORE. IF PMC 9940 (SILVER GOOP) IS USED WHERE OTHER COMPOUNDS HAVE BEEN USED BEFORE, IT CAN BECOME HARD AFTER ENGINE OPERATION.

(6) Lightly coat plug threads, case bosses and gasket faces with anti-seize compound. Use one of these anti-seize compounds as follows:

(a) Anti-Galling compound, PMC 9936.

(b) Anti-seize compound (Silver Goop), PMC 9940.

(c) Anti-seize compound, BG Mica Lube, A-768.

CAUTION: DAMAGE TO IGNITER PLUG OR BURNER CAN FLAME TUBE COULD RESULT IF FLAME TUBE SWIVEL GUIDE IS MISALIGNED DURING PLUG INSTALLATION. ALIGN SWIVEL GUIDE IF NECESSARY. ENSURE THAT PLUG TO OUTER FAN DUCT DIMENSION IS CORRECT.

(7) Align combustion chamber guide with P&W 45577 pin. Insert tapered end of pin through igniter boss and into combustion chamber outer front case. Carefully push guide into position until pin shoulder contacts threaded boss on combustion chamber case. (Figure 202)

(8) Remove P&W 45577 pin.

(9) Install new gasket on igniter plug.

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING INSTALLATION OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

(10) Using P&W 45470 wrench insert plugs through holes in fan duct igniter bosses and into mating threaded holes in combustion chamber case. Bottom plug by hand.

NOTE: Prevent excessive galling of igniter plug tip and lower shell by bottoming each plug by hand before torquing. This will ensure that igniter plug and burner and igniter plug guide are properly aligned.

(11) Torque the igniter plug to 300 in-lb (33.90 N·m) - 360 in-lb (40.67 N·m).

(12) Remove protective paper from end of ignition lead.

(13) Slide chamfer washer off high-tension insulator at igniter plug end of lead. Discard chamfer washer.

NOTE: Ignition leads are fitted with a chamfer washer at plug end which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

(14) Check lead: (PAGEBLOCK 74-20-01/201)

WARNING: IGNITION CABLE CHAMFER WASHERS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

(15) Slide new chamfer washer on high-tension insulator.

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

(16) Install new O-ring in OD groove of igniter plug coupling nut.

WARNING: USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

Hazardous Material Warnings

HAZMAT 1097, SOLVENT/MIL-PRF-680 TYPE 1 (DPM 518)

HAZMAT 1000, REFER TO MSDS

(WARNING PRECEDES)

(17) Clean threads of coupling nut with cleaning solvent, P D 680, Type 1.

(18) Apply light coat of Molykote, Type Z, on threads of coupling nut.

CAUTION: TO PREVENT DAMAGE TO LEAD, DO NOT TWIST PLUG END OF LEAD WHEN TIGHTENING COUPLING NUT.

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(19) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 in-lb (15.82 N·m)140 to 160 in-lb (18.08 N·m).

(20) Close engine lower cowl door.

(21) Remove tag from throttle/thrust reverser lever, and remove tags and close following circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 892

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 892

U	42	B1-422	ENGINE START VALVE LEFT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

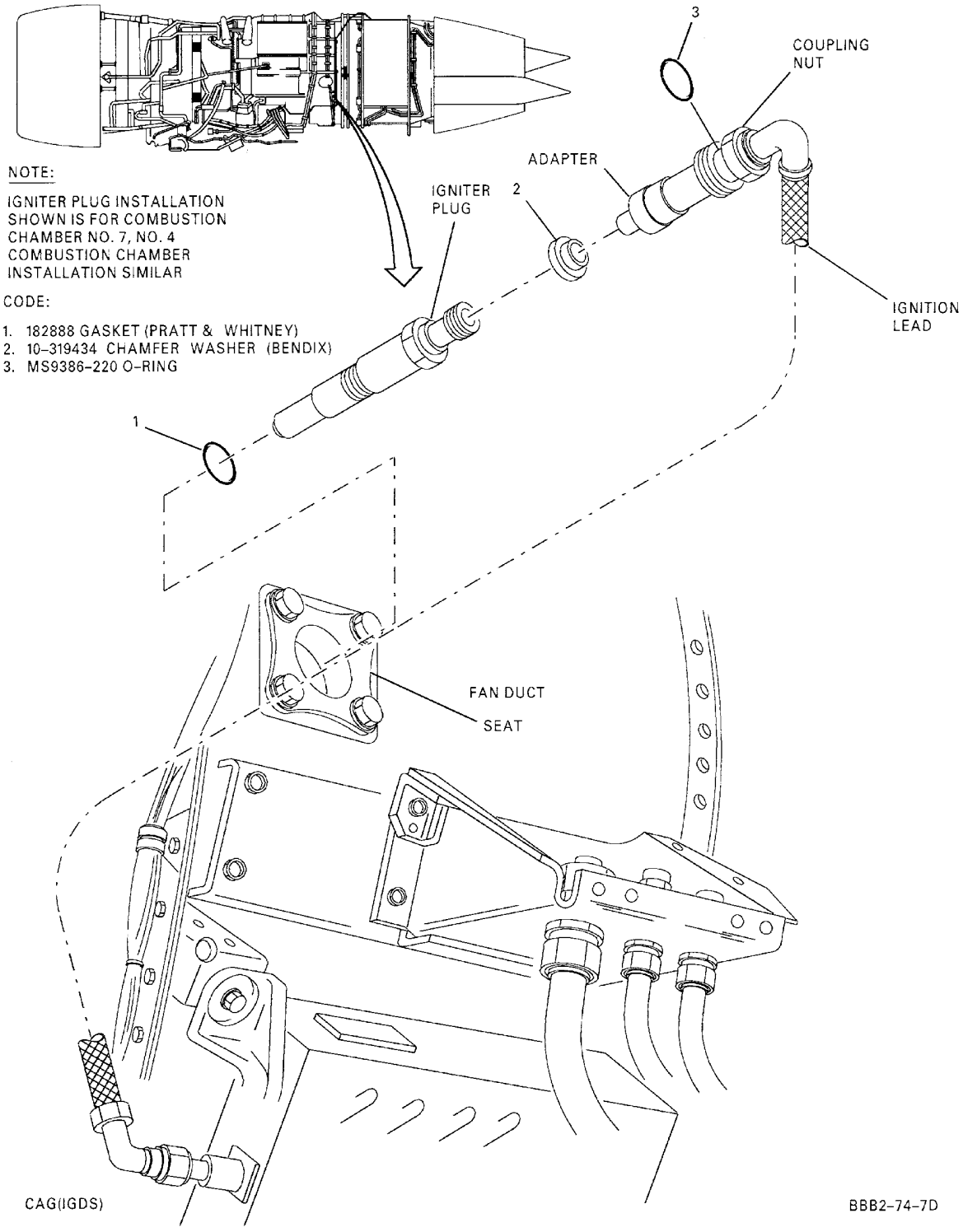
UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(22) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(23) Close access door (5901C) for left engines or (5902C) for right engine.



Igniter Plug - Installation
Figure 201/74-20-02-990-813

4. Adjustment/Test Igniter Plugs

A. Test Plug

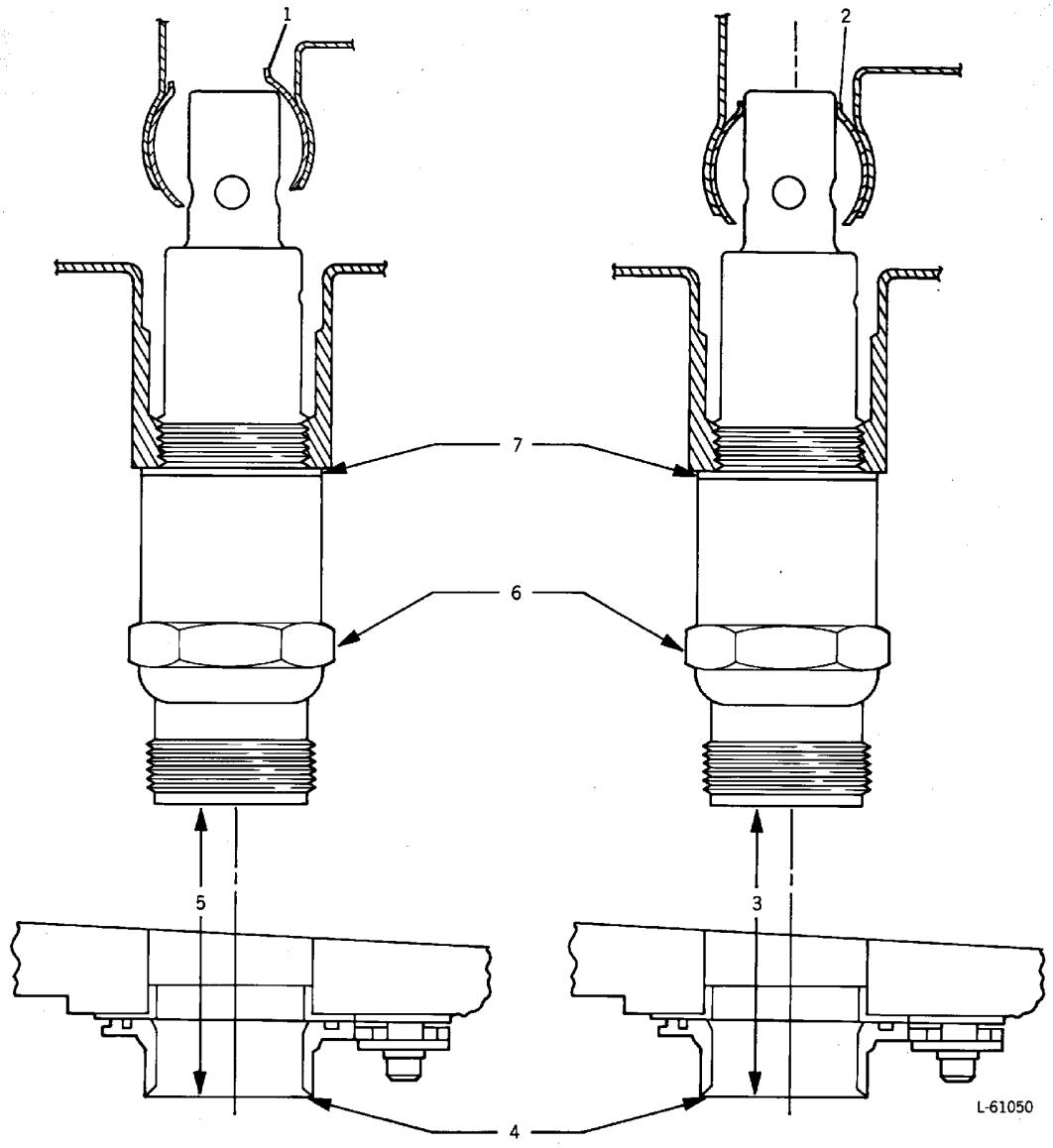
CAUTION: PRIOR TO TEST, MOTOR ENGINE IF UNBURNED FUEL IN ENGINE IS SUSPECTED. UNBURNED FUEL COULD RESULT IN ENGINE INTERNAL OR TAILPIPE FIRE.

CAUTION: DO NOT ALLOW ENGINE N2 ROTATION DURING TEST SINCE FUEL COULD ENTER COMBUSTION CHAMBER WHEN FUEL SHUTOFF LEVER IS ADVANCED TO IDLE CAUSING INADVERTENT LIGHTUP.

(1) Perform functional test of ignition system. (PAGEBLOCK 74-00-00/501 Config 1)

(2) Check each igniter plug to confirm that it is operating. Check each system individually by applying power one side at time.

NOTE: Audible check is not 100 percent positive; snapping may be spark jumping in area other than igniter tip.



1. COMBUSTION CHAMBER GUIDE INCORRECTLY POSITIONED
2. COMBUSTION CHAMBER GUIDE CORRECTION POSITIONED
3. APPROXIMATELY 6.65 INCHES (168.910 MM)
4. FAN DUCT PACKING HOLDER (REFERENCE)
5. APPROXIMATELY 6.40 INCHES (162.560 MM)
6. IGNITER PLUG
7. GASKET

BBB2-74-8B

Igniter Plug Combustion Chamber Guide Position
Figure 202/74-20-02-990-814

5. Check Igniter Plugs

A. Check Plug

(1) Visually check connector threads and shell threads of plug. If damaged, repair threads. (Refer to Paragraph 7.)

(2) Check ceramic section of plug for cracks. Any crack in ceramic section is cause for rejection of plug.

(3) Check wear of plug by using lighted magnifying glass looking through shell end annulus to determine if insulator supporting shoulder is worn through. Wear of Champion plug may be measured using service wear measuring tool CT-468. (Figure 203)

NOTE: Visual determination of excessive wear is presently only practical means of evaluating plug wear. Maximum outer shell ID erosion is a physical limit to prevent possible loss of ceramic support by the ground shell which can result in ceramic cracking and internal firing. When excessively eroded, the ceramic can be ingested by the turbine. Center electrode depth may be used to determine plug serviceability limit when preferred by individual operators.

NOTE: Service wear measuring tool CT-468 may be purchased from: Champion Spark Plug Co., 900 Upton, Toledo, Ohio 43601 U.S.A.

NOTE: Although igniter plugs will continue to fire after exceeding erosion limits, the voltage required to discharge across spark gap increases with increasing erosion and can stress other components, particularly high tension parts.

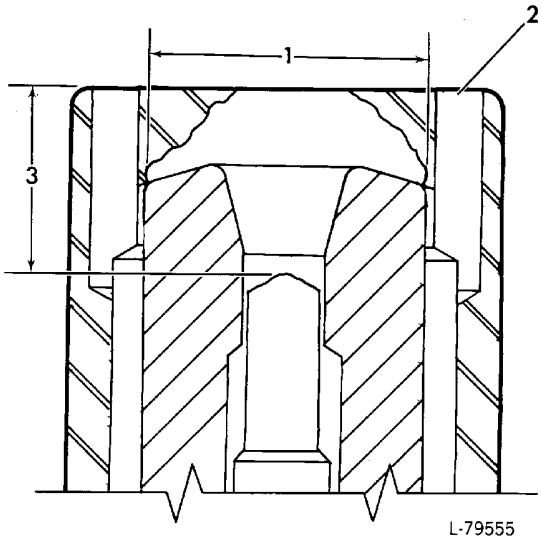
(4) Check igniter plugs in areas shown for erosion and for abrasion caused by combustion chamber igniter plug guide. Reject plugs not meeting required erosion and abrasion wear limits. (Figure 203) (Figure 204)

(5) Whenever high tension lead is removed from igniter plug terminal, check igniter plug terminal well.

(a) Check igniter plug terminal for evidence of arcing and flashover. Arcing is identified by pitting or discoloration on contact. Flashover is identified by carbon tracking. If any of these indications are evident, replace igniter plug. (Figure 205) (Figure 206)

B. Plug Audible Check

(1) Perform audible check on each plug to confirm that plug is operating.
(PAGEBLOCK 74-00-00/501 Config 1)

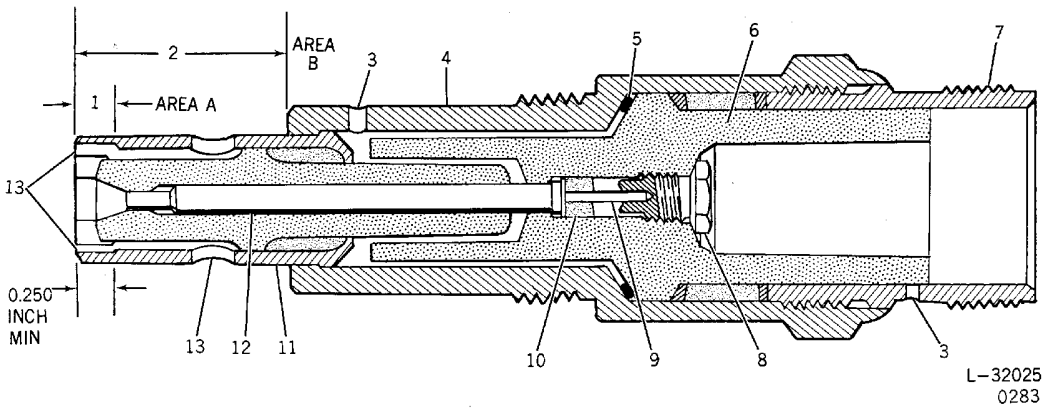


1. 0.325 INCH (8.255 MM) ID MAXIMUM OUTER SHELL EROSION.
2. AIR COOLING HOLES.
3. CENTER ELECTRODE DEPTH FOR NEW IGNITER PLUGS ONLY. 0.221 (± 0.005) INCH (5.6 (± 0.1) MM) FOR SLG AUBURN IGNITER PLUG. 0.240 (± 0.015 INCH (6.1 (±0.4) MM) FOR CHAMPION IGNITER PLUG.

NOTE:
WHEN PREFERRED BY OPERATORS, DEPTH MAY BE USED TO DETERMINE SERVICEABLE LIMIT BASED ON INDIVIDUAL OPERATOR EXPERIENCE.

BBB2-74-9B

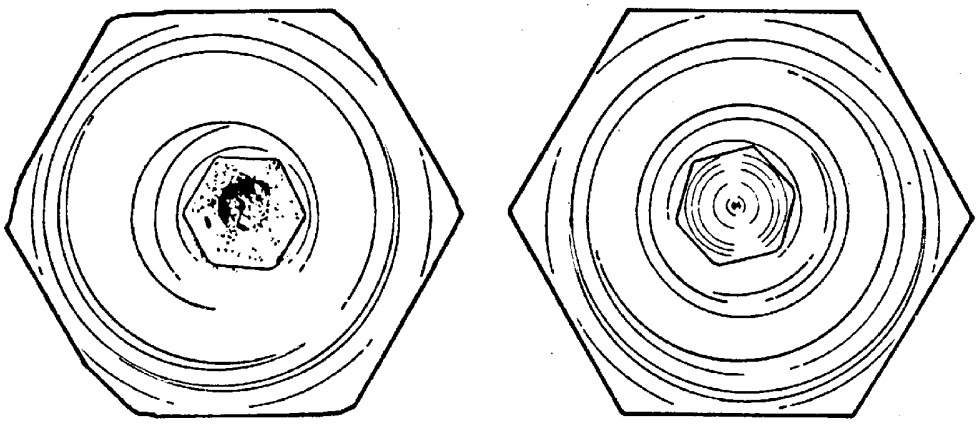
Igniter Plug - Erosion Limits
Figure 203/74-20-02-990-815



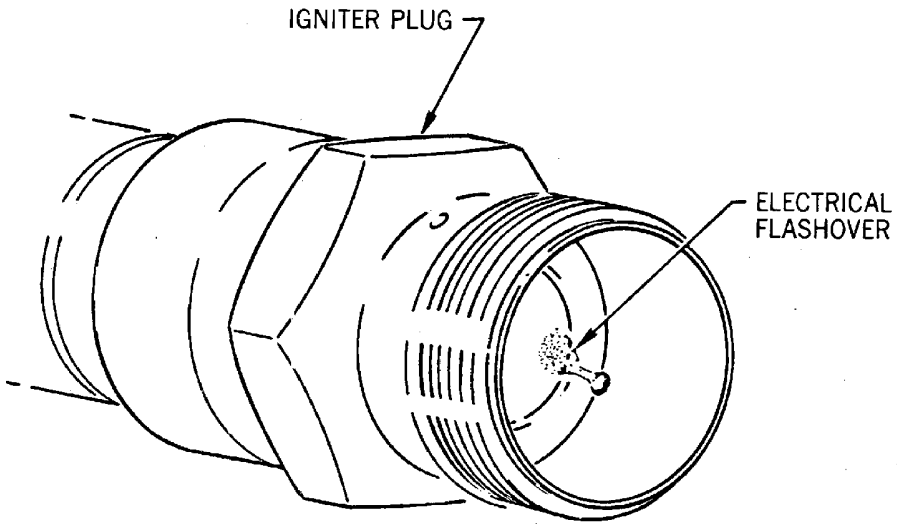
1. AREA A, EXPOSURE OF ONE AIR COOLING PASSAGE OR 0.030 INCH (0.762 MM) WEAR DEPTH.
2. AREA B, 0.030 INCH (0.762 MM) MAXIMUM WEAR DEPTH.
3. CONDENSATION DRAIN HOLE
4. UPPER SHELL
5. GASKET
6. INSULATOR
7. COUPLING THREAD
8. TERMINAL SCREW
9. SEALING WIRE
10. CEMENT
11. LOWER SHELL
12. CENTER ELECTRODE
13. AIR COOLING HOLES, 0.250 INCH (6.350 MM) MINIMUM DEPTH

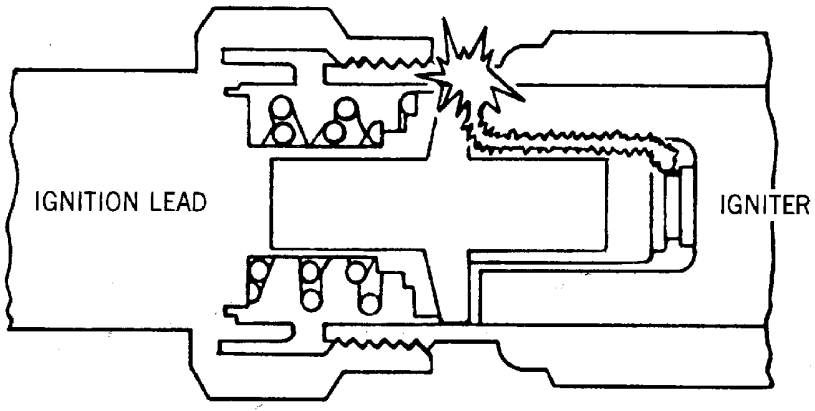
BBB2-74-10B

Igniter Plug - Abrasion Wear Limits
Figure 204/74-20-02-990-816



Igniter Plug Electrical Arcing Condition
Figure 205/74-20-02-990-817





L-70851
3-80

BBB2-74-29

Igniter Plug Electrical Flashover Condition
Figure 206/74-20-02-990-818

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892

6. Cleaning/Painting Igniter Plugs

A. Clean Igniter Plug

WARNING: USE THE HAZARDOUS MATERIAL WARNINGS GIVEN BELOW FOR THE STEPS THAT FOLLOW.

THE HAZARDOUS MATERIAL WARNINGS ARE LISTED AFTER THE INTRODUCTION SECTION IN THE FRONT OF THE AMM.

Hazardous Material Warnings

HAZMAT 1030, ISOPROPYL ALCOHOL (DPM 530)

HAZMAT 1000, REFER TO MSDS

(1) Degrease igniter plug with isopropyl alcohol.

(2) Clean outer shell of plug with wire brush.

(3) Remove deposits from external surface of firing end of igniter plug using isopropyl alcohol, and nonmetallic brush.

NOTE: It is not necessary to restore ceramic to cleanliness of new ceramic surface.

CAUTION: DO NOT USE ABRASIVE CLEANER.

(4) Clean igniter plug contact well as follows:

NOTE: Cleaning of recessed center electrode cavity is not recommended.

(a) Clean plug contact well with long bristle, nonmetallic brush moistened with isopropyl alcohol. Dry with clean, dry compressed air (30 psig (206.84 kPa) maximum discharge pressure).

(b) Clean inner ceramic walls using circular felt bob, ½ in. (12.70 mm) diameter and approximately 1¾ in. (44.45 mm) long, suitable for use with hand chuck. Moisten felt bob with isopropyl alcohol, and clean with a circular movement.

(c) Clean end surface of ceramic at seat of grommet face using short-bristle, nonmetallic brush moistened with isopropyl alcohol. Dry with clean, dry compressed air (30 psig (206.84 kPa) maximum discharge pressure).

7. Approved Repairs Igniter Plugs

A. Repair Igniter Plugs

(1) Repair damaged threads of igniter plug by chasing threads using 1.000-20NS-3A die for connector threads, and 0.9375-16NS die for shell threads.

IGNITER PLUGS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation, adjustment/test, check, cleaning/painting, and approved repair instructions for the igniter plugs. The igniter plugs are installed in engine combustion chambers No. 4 and No. 7.

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

CAUTION: TO PREVENT STRUCTURAL DAMAGE, USE HOLD OPEN RODS ON EACH COWL DOOR.

CAUTION: IF APU IS USED, MAKE CERTAIN RIGHT ENGINE UPPER COWL DOOR IS CLOSED BEFORE OPERATING APU, OR APU EXHAUST WILL IMPINGE DIRECTLY ON COWL DOOR CAUSING EXTENSIVE DAMAGE.

B. Removal/installation, adjustment/test, check, cleaning/painting, and approved repair procedures for igniter plugs on the left and right engines are identical. Access to the plugs is through the lower cowl door.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following items:

NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Table 201

Name and Number	Manufacturer
High temperature anti-seize compound, BG Mica Lube A-768	The BG Corp. Ridgefield, N.J.
Anti-galling Compound PMC 9936	
Anti-seize Compound (Silver Goop) PMC 9940	
Molykote, Type Z	Alpha Molykote Corp. Stanford, Conn.
Alcohol, Isopropyl (DPM 530)	
Solvent, Cleaning P-D-680, Type 1	
Source of clean dry, compressed air (30 psig (207 kPa) maximum discharge pressure)	
Tap, P&W 33647	Pratt & Whitney East Hartford, Conn.
Torque wrench (0 - 600 inch-pounds (0 - 67.8 N·m) range)	
Wrench, P&W 45470	Pratt & Whitney East Hartford, Conn.
Pin, P&W 45577	Pratt & Whitney East Hartford, Conn.

3. Removal/Installation Igniter Plugs

A. Remove Plug
(Figure 201)

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

(1) Tag throttle/thrust reverser lever, and open and tag following circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 893

U	41	B1-423	ENGINE START VALVE RIGHT
U	42	B1-422	ENGINE START VALVE LEFT

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(2) Open access door (5901C) for left engine or (5902C) for right engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(3) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(4) Open engine lower cowl door.

WARNING: FOR ADDITIONAL PROTECTION AGAINST ELECTRICAL SHOCK, GROUND IGNITER PLUG CABLE TERMINAL IMMEDIATELY UPON DISCONNECTING FROM IGNITER PLUG.

(5) Disconnect lead from igniter plug and wrap end of lead in protective paper.

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING REMOVAL OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

CAUTION: DO NOT ATTEMPT TO REMOVE THE FOUR NUTS (PRE-PW SB 6030) WHICH RETAIN THE SPARK IGNITER PACKING HOLDER ON THE RIGHT SIDE OF ENGINE AS BOLTS ARE NOT RETAINED ON THE INNER SIDE OF THE FAN DUCT (PW SB 6030 CHANGES THE BOLTS AND NUTS TO A RIVET PIN AND COLLAR CONFIGURATION).

(6) Using P&W wrench 45470, remove igniter plug.

(7) Remove igniter plug from combustion chamber outer case. Cover opening in fan discharge case.

(8) Wrap igniter plug in protective paper.

B. Install Plug

(Figure 201)

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

(1) Make certain throttle/thrust reverser lever is tagged and following circuit breakers are open and tagged.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 893

U	41	B1-423	ENGINE START VALVE RIGHT
U	42	B1-422	ENGINE START VALVE LEFT

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6550 TO 7239 KPA) (PRECHARGE PRESSURE).

(2) Make certain thrust reverser control valve is in dump position and lockpin is installed.

(3) Remove cover from opening in fan discharge case.

(4) Check condition of igniter plug boss threads. If necessary, clean threads using tap, P&W 33647.

WARNING: ISOPROPYL ALCOHOL IS AN AGENT THAT IS FLAMMABLE, EXPLOSIVE, AND POISONOUS. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN ISOPROPYL ALCOHOL IS USED.

- GAS/AIR MIXTURES MORE THAN THE LOWER EXPLOSIVE LIMIT (LEL) CAN CAUSE AN EXPLOSION IF HIGH HEAT, SPARKS, OR FLAMES SUPPLY IGNITION.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET ISOPROPYL ALCOHOL IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR:

- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

CAUTION: IGNITER PLUG MUST BE REPLACED IF DROPPED.

(5) Remove protective paper from igniter plugs. Clear threads of igniter plugs and combustion chamber case bosses with alcohol.

WARNING: ANTI-GALLING COMPOUND IS AN AGENT THAT IS POISONOUS. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN ANTI-GALLING COMPOUND IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET ANTI-GALLING COMPOUND IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

(WARNING PRECEDES)

WARNING: SILVER GOOP LUBRICANT IS AN AGENT THAT IS POISONOUS AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILVER GOOP LUBRICANT IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET SILVER GOOP LUBRICANT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: ANTISEIZE COMPOUND IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN ANTISEIZE COMPOUND IS USED.

- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT EAT ANTISEIZE COMPOUND.

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIERS'S MSDS FOR:

- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THESE HAZARDOUS AGENTS.

CAUTION: DO NOT USE PMC 9940 ANTISEIZE COMPOUND (SILVER GOOP) ON IGNITER PLUG OR BOSS THREADS IF A DIFFERENT COMPOUND WAS USED BEFORE. IF PMC 9940 (SILVER GOOP) IS USED WHERE OTHER COMPOUNDS HAVE BEEN USED BEFORE, IT CAN BECOME HARD AFTER ENGINE OPERATION.

(6) Lightly coat plug threads, case bosses and gasket faces with anti-seize compound. Use one of these anti-seize compounds as follows:

(a) PMC 9936 Anti-galling Compound.

(b) PMC 9940 Anti-seize Compound (Silver Goop).

(c) BG Mica Lube A 768 Anti-seize Compound.

CAUTION: DAMAGE TO IGNITER PLUG OR BURNER CAN FLAME TUBE COULD RESULT IF FLAME TUBE SWIVEL GUIDE IS MISALIGNED DURING PLUG INSTALLATION. ALIGN SWIVEL GUIDE IF NECESSARY. ENSURE THAT PLUG TO OUTER FAN DUCT DIMENSION IS CORRECT.

(7) Align combustion chamber guide with P&W 45577 pin. Insert tapered end of pin through igniter boss and into combustion chamber outer front case. Carefully push guide into position until pin shoulder contacts threaded boss on combustion chamber case. (Figure 202)

(8) Remove P&W 45577 pin.

(9) Install new gasket on igniter plug.

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING REMOVAL OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

(10) Using P&W 45470 wrench insert plugs through holes in fan duct igniter bosses and into mating threaded holes in combustion chamber case. Bottom plug by hand.

NOTE: Prevent excessive galling of igniter plug tip and lower shell by bottoming each plug by hand before torquing. This will ensure that igniter plug and burner and igniter plug guide are properly aligned.

(11) Torque plug 300 to 360 inch pounds (33.9 - 40.68 N·m).

(12) Remove protective paper from end of ignition lead.

(13) Remove retaining ring from high-tension contact and discard.

(14) Slide high-tension insulator and rubber bushing off cable wire at igniter plug end of lead. Retain high-tension insulator for installation. Discard rubber bushing.

NOTE: Ignition leads are fitted with a rubber bushing at plug end which must be replaced at every removal and installation.

NOTE: Rubber bushing replacement procedure is not applicable for new ignition leads.

(15) Check lead. (IGNITION LEAD, SUBJECT 74-20-01, Page 201)

WARNING: IGNITION CABLE RUBBER BUSHINGS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

(16) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact.

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

(17) Install new O-ring in OD groove of igniter plug coupling nut.

WARNING: P-D-680 TYPE 1 SOLVENT IS AN AGENT THAT IS FLAMMABLE AND POISONOUS. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN P-D-680 TYPE 1 SOLVENT IS USED.

- DO NOT USE IN AREAS WHERE THERE IS HIGH HEAT, SPARKS, OR FLAMES.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET P-D-680 TYPE 1 SOLVENT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

(18) Clean threads of coupling nut with cleaning solvent, P-D-680, Type 1.

(19) Apply light coat of Molykote, Type Z, on threads of coupling nut.

CAUTION: DO NOT TWIST THE IGNITION LEAD WHEN YOU TURN THE NUT. THIS WILL PREVENT DAMAGE TO THE IGNITION LEAD.

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(20) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(21) Close engine lower cowl door.

(22) Remove tag from throttle/thrust reverser lever, and remove tags and close following circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 893

U	41	B1-423	ENGINE START VALVE RIGHT
U	42	B1-422	ENGINE START VALVE LEFT

WJE 401-412, 414, 875-881, 883, 884, 886, 887, 893

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

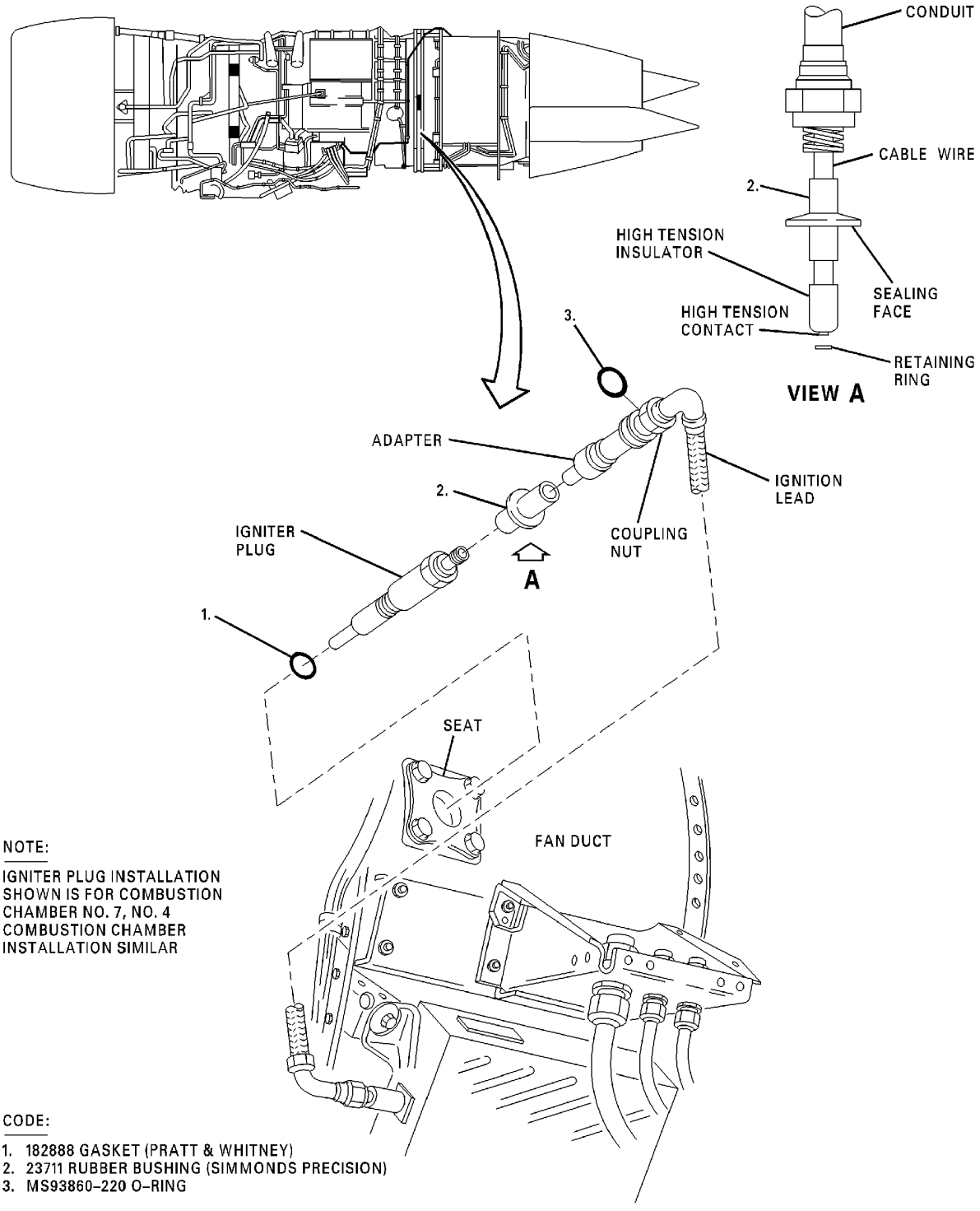
UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

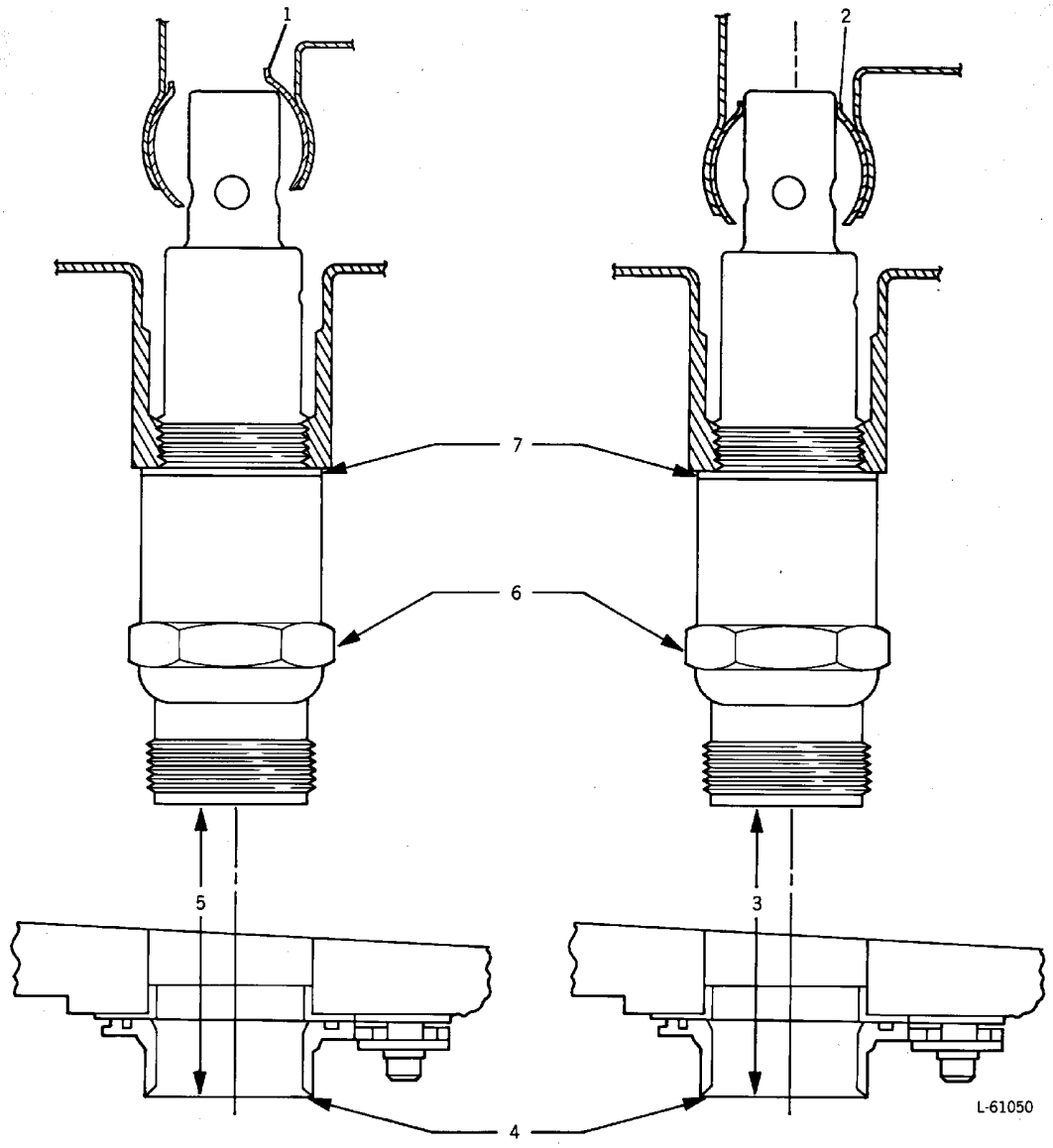
WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(23) Remove lockpin from thrust reverser control valve. Stow lockpin. (PAGEBLOCK 78-00-00/201)

(24) Close access door (5901C) for left engines or (5902C) for right engine.



Igniter Plug - Installation
Figure 201/74-20-02-990-801



1. COMBUSTION CHAMBER GUIDE INCORRECTLY POSITIONED
2. COMBUSTION CHAMBER GUIDE CORRECTION POSITIONED
3. APPROXIMATELY 6.65 INCHES (168.910 MM)
4. FAN DUCT PACKING HOLDER (REFERENCE)
5. APPROXIMATELY 6.40 INCHES (162.560 MM)
6. IGNITER PLUG
7. GASKET

BBB2-74-8B

Igniter Plug Combustion Chamber Guide Position
Figure 202/74-20-02-990-802

4. Adjustment/Test Igniter Plugs

A. Test Plug

CAUTION: PRIOR TO TEST, MOTOR ENGINE IF UNBURNED FUEL IN ENGINE IS SUSPECTED. UNBURNED FUEL COULD RESULT IN ENGINE INTERNAL OR TAILPIPE FIRE.

CAUTION: DO NOT ALLOW ENGINE N2 ROTATION DURING TEST SINCE FUEL COULD ENTER COMBUSTION CHAMBER WHEN FUEL SHUTOFF LEVER IS ADVANCED TO IDLE CAUSING INADVERTENT LIGHTUP.

(1) Perform functional test of ignition system. (GENERAL, SUBJECT 74-00-00, Page 501)

(2) Check each igniter plug to confirm that it is operating. Check each system individually by applying power one side at time.

NOTE: Audible check is not 100 percent positive; snapping may be spark jumping in area other than igniter tip.

5. Check Igniter Plugs

A. Check Plug

(1) Visually check connector threads and shell threads of plug. If damaged, repair threads. (Refer to Paragraph 7.)

(2) Check ceramic section of plug for cracks. Any crack in ceramic section is cause for rejection of plug.

(3) Check wear of plug by using lighted magnifying glass looking through shell end annulus to determine if insulator supporting shoulder is worn through. Wear of Champion plug may be measured using service wear measuring tool CT-468. (Figure 203)

NOTE: Visual determination of excessive wear is presently only practical means of evaluating plug wear. Maximum outer shell ID erosion is a physical limit to prevent possible loss of ceramic support by the ground shell which can result in ceramic cracking and internal firing. When excessively eroded, the ceramic can be ingested by the turbine. Center electrode depth may be used to determine plug serviceability limit when preferred by individual operators.

NOTE: Service wear measuring tool CT-468 may be purchased from: Champion Spark Plug Co., 900 Upton, Toledo, Ohio 43601 U.S.A.

NOTE: Although igniter plugs will continue to fire after exceeding erosion limits, the voltage required to discharge across spark gap increases with increasing erosion and can stress other components, particularly high tension parts.

(4) Check igniter plugs in areas shown for erosion and for abrasion caused by combustion chamber igniter plug guide. Reject plugs not meeting required erosion and abrasion wear limits.

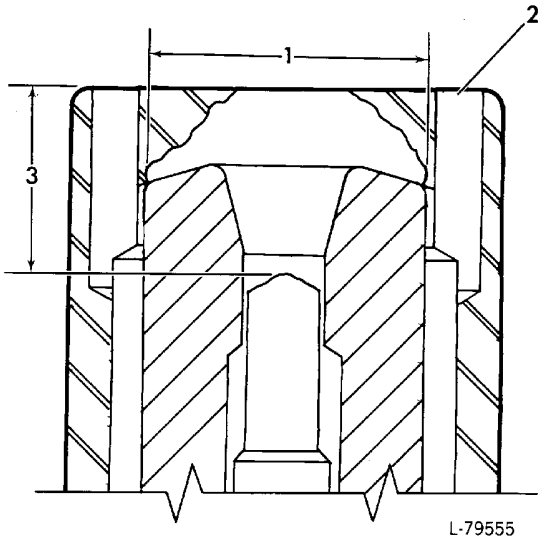
(Figure 203) (Figure 204)

(5) Whenever high tension lead is removed from igniter plug terminal, check igniter plug terminal well.

(a) Check igniter plug terminal for evidence of arcing and flashover. Arcing is identified by pitting or discoloration on contact. Flashover is identified by carbon tracking. If any of these indications are evident, replace igniter plug. (Figure 205) (Figure 206)

B. Plug Audible Check

(1) Perform audible check on each plug to confirm that plug is operating. (PAGEBLOCK 74-00-00/501 Config 2)

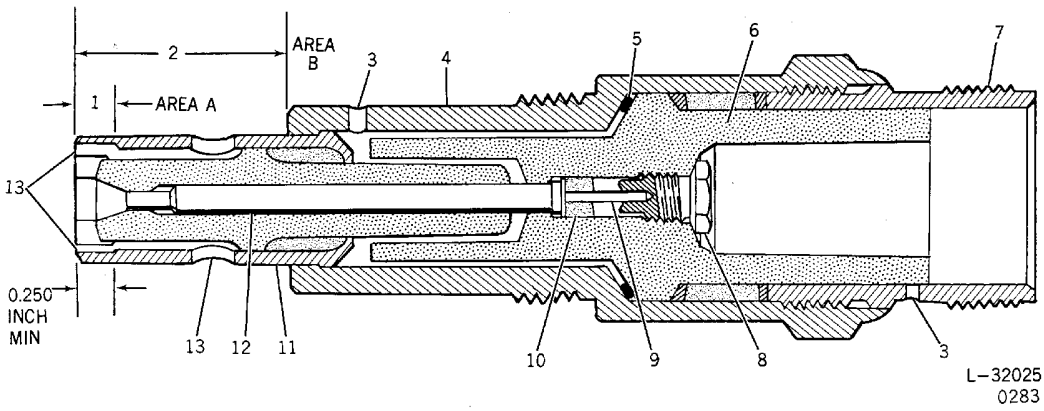


1. 0.325 INCH (8.255 MM) ID MAXIMUM OUTER SHELL EROSION.
2. AIR COOLING HOLES.
3. CENTER ELECTRODE DEPTH FOR NEW IGNITER PLUGS ONLY. 0.221 (± 0.005) INCH (5.6 (± 0.1) MM) FOR SLG AUBURN IGNITER PLUG. 0.240 (± 0.015 INCH (6.1 (±0.4) MM) FOR CHAMPION IGNITER PLUG.

NOTE:
WHEN PREFERRED BY OPERATORS, DEPTH MAY BE USED TO DETERMINE SERVICEABLE LIMIT BASED ON INDIVIDUAL OPERATOR EXPERIENCE.

BBB2-74-9B

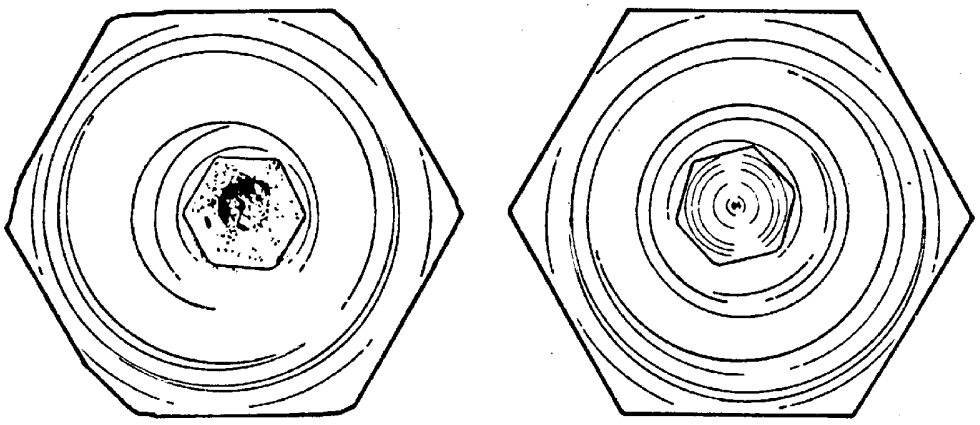
Igniter Plug - Erosion Limits
Figure 203/74-20-02-990-803



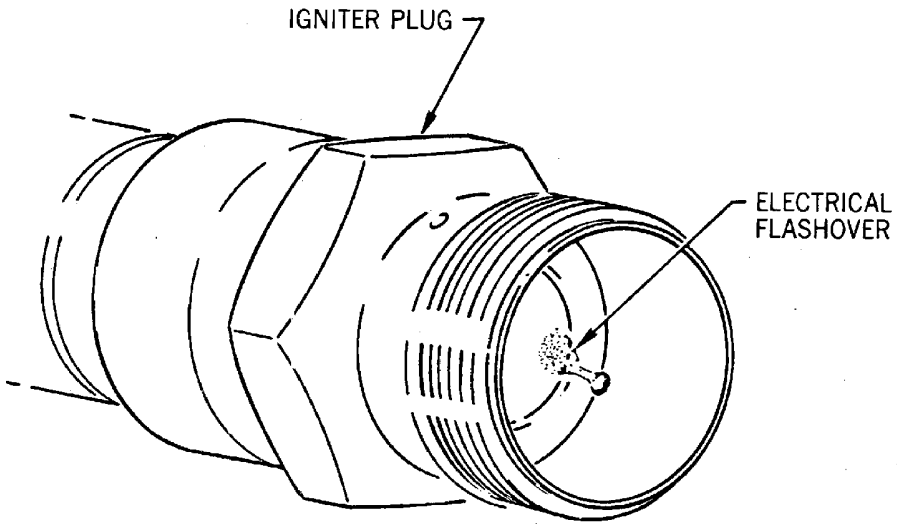
1. AREA A, EXPOSURE OF ONE AIR COOLING PASSAGE OR 0.030 INCH (0.762 MM) WEAR DEPTH.
2. AREA B, 0.030 INCH (0.762 MM) MAXIMUM WEAR DEPTH.
3. CONDENSATION DRAIN HOLE
4. UPPER SHELL
5. GASKET
6. INSULATOR
7. COUPLING THREAD
8. TERMINAL SCREW
9. SEALING WIRE
10. CEMENT
11. LOWER SHELL
12. CENTER ELECTRODE
13. AIR COOLING HOLES, 0.250 INCH (6.350 MM) MINIMUM DEPTH

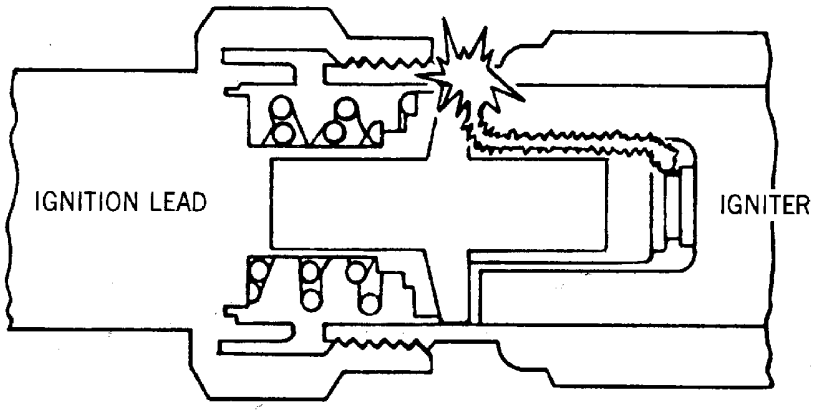
BBB2-74-10B

Igniter Plug - Abrasion Wear Limits
Figure 204/74-20-02-990-804



Igniter Plug Electrical Arcing Condition
Figure 205/74-20-02-990-805





L-70851
3-80

BBB2-74-29

Igniter Plug Electrical Flashover Condition
Figure 206/74-20-02-990-806

6. Cleaning/Painting Igniter Plugs

A. Clean Igniter Plug

WARNING: ISOPROPYL ALCOHOL IS AN AGENT THAT IS FLAMMABLE, EXPLOSIVE, AND POISONOUS. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN ISOPROPYL ALCOHOL IS USED.

- GAS/AIR MIXTURES MORE THAN THE LOWER EXPLOSIVE LIMIT (LEL) CAN CAUSE AN EXPLOSION IF HIGH HEAT, SPARKS, OR FLAMES SUPPLY IGNITION.
- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET ISOPROPYL ALCOHOL IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

WARNING: REFER TO THE APPLICABLE MANUFACTURER'S OR SUPPLIER'S MSDS FOR:

- MORE PRECAUTIONARY DATA
- APPROVED SAFETY EQUIPMENT
- EMERGENCY MEDICAL AID.

TALK WITH THE LOCAL SAFETY DEPARTMENT OR AUTHORITIES FOR THE PROCEDURES TO DISCARD THIS HAZARDOUS AGENT.

(1) Degrease igniter plug with alcohol.

(2) Clean outer shell of plug with wire brush.

(3) Remove deposits from external surface of firing end of igniter plug using alcohol, and non-metallic brush.

NOTE: It is not necessary to restore ceramic to cleanliness of new ceramic surface.

CAUTION: DO NOT USE ABRASIVE CLEANER.

(4) Clean igniter plug contact well as follows:

NOTE: Cleaning of recessed center electrode cavity is not recommended.

(a) Clean plug contact well with long bristle, nonmetallic brush moistened with alcohol. Dry with clean, dry compressed air (30 psig (207 KPa) maximum discharge pressure).

(b) Clean inner ceramic walls using circular felt bob, 1/2-inch (12.7mm) diameter and approximately 1-3/4 inches (44.45mm) long, suitable for use with hand chuck. Moisten felt bob with alcohol, and clean with a circular movement.

(c) Clean end surface of ceramic at seat of grommet face using short-bristle, nonmetallic brush moistened with alcohol. Dry with clean, dry compressed air (30 psig (207 KPa) maximum discharge pressure).

7. Approved Repairs Igniter Plugs

A. Repair Igniter Plugs

(1) Repair damaged threads of igniter plug by chasing threads using 1.000-20NS-3A die for connector threads, and 0.9375-16NS die for shell threads.

IGNITER PLUGS - REMOVAL/INSTALLATION

1. General

A. This procedure contains MSG-3 task card data.

TASK 74-20-02-901-801

2. Discard the Igniter Plugs

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
74-20-01 P/B 201	IGNITION LEADS - MAINTENANCE PRACTICES
78-00-00 P/B 201	GENERAL - MAINTENANCE PRACTICES

B. Tools/Equipment

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

Reference	Description
SPL-5604	Pin - Aligning **MD80-81, -82, -83, -88** Part #: PWA45577 Supplier: 77445
SPL-5606	Tap **MD80-81, -82, -83, -88** Part #: PWA33647 Supplier: 77445
SPL-12630	Wrench - Igniter Plug, Removal/Installation, JT8D **MD80-81, -82, -83, -88** Part #: PWA45470 Supplier: 77445

C. Consumable Materials

NOTE: Equivalent replacements are permitted for the items that follow.

NOTE: It is possible that some materials in the Consumable Materials chart cannot be used for some or all of the necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must obey all applicable federal, state, local, and provincial laws and regulations when it is necessary to work with these materials.

Reference	Description	Specification
B60095	Solvent - Isopropyl Alcohol	DPM 530 (TT-I-735, Grade A)
B60101	Solvent, Degreasing (Type 2)	DPM 518 (MIL-PRF-680, Type 2)
D60096	Compound - Molykote, Type Z	Moly Kote 321-R (DPM 334)
D60097	Compound - Anti-Seize (Silver Goop)	PWA 36001/PMC 9940
D60098	Compound - Anti-galling	PMC9936
D60099	Compound - Anti-seize, High Temperature, BG Mica Lube A-768	
G60826	Gasket (Pratt & Whitney)	182888
G60827	Washer - Chamfer (Bendix)	10-319434

(Continued)

Reference	Description	Specification
G60828	O-Ring	MS9386-220

D. Prepare for Discard of the Igniter Plugs

SUBTASK 74-20-02-865-001

WARNING: IGNITION SYSTEM VOLTAGE IS DANGEROUSLY HIGH. IGNITION SWITCH MUST BE IN "OFF" POSITION BEFORE REMOVAL OF ANY IGNITION COMPONENTS. ALLOW SEVERAL MINUTES TO ELAPSE BETWEEN OPERATION OF IGNITION SYSTEM AND REMOVAL OF IGNITION COMPONENTS. IMMEDIATELY UPON DETACHING IGNITER CABLE FROM IGNITER PLUG, DISCHARGE CURRENT BY GROUNDING IGNITER CABLE TERMINAL TO ENSURE COMPLETE DISSIPATION OF ENERGY FROM IGNITION SYSTEM. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN SEVERE INJURY TO PERSONNEL.

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR REVERSER OPERATION COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

(1) Tag throttle/thrust reverser lever, and open and tag following circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

SUBTASK 74-20-02-040-001

(2) Place thrust reverser control valve in dump position and install lockpin. (PAGEBLOCK 78-00-00/201)

SUBTASK 74-20-02-010-002

WARNING: EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN OR INJURY TO PERSONNEL COULD RESULT.

(3) Open engine lower cowl doors.

(4) Open access panels.

E. Igniter Plug Discard

SUBTASK 74-20-02-020-001

(1) Remove the igniter plug for discard as follows:

WARNING: FOR ADDITIONAL PROTECTION AGAINST ELECTRICAL SHOCK, GROUND IGNITER PLUG CABLE TERMINAL IMMEDIATELY UPON DISCONNECTING FROM IGNITER PLUG.

(a) Disconnect lead from igniter plugs and wrap end of lead in protective paper.

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING REMOVAL OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

(b) Using igniter wrench, SPL-12630, remove the igniter plugs.

(c) Cover the opening in fan discharge case.

(d) Wrap igniter plug in protective paper.

SUBTASK 74-20-02-901-003

(2) Discard the igniter plugs.

SUBTASK 74-20-02-010-003

(3) Prepare for igniter plug installation as follows:

(a) Remove cover from openings in fan discharge case.

(b) Check condition of igniter plug boss threads. If necessary, clean threads using tap, SPL-5606.

CAUTION: IGNITER PLUG MUST BE REPLACED IF DROPPED.

(c) Remove protective paper from igniter plugs. Clean threads of igniter plugs and combustion chamber case bosses with isopropyl alcohol solvent, B60095.

CAUTION: DO NOT USE PMC 9940 ANTISEIZE COMPOUND (SILVER GOOP) ON IGNITER PLUG OR BOSS THREADS IF A DIFFERENT COMPOUND WAS USED BEFORE. IF PMC 9940 (SILVER GOOP) IS USED WHERE OTHER COMPOUNDS HAVE BEEN USED BEFORE, IT CAN BECOME HARD AFTER ENGINE OPERATION.

(d) Lightly coat plug threads, case bosses and gasket faces with anti-seize compound, anti-seize compound, D60097, anti-seize compound, D60099, or anti-galling compound, D60098.

(e) Align combustion chamber guide with pin, SPL-5604. Insert tapered end of pin through igniter boss and into combustion chamber outer front case. Carefully push guide into position until pin shoulder contacts threaded boss on combustion chamber case. (Figure 401 or Figure 402)

(f) Remove pin, SPL-5604

.

(g) Install a new Gasket, G60826 (1) on igniter plug.

CAUTION: TO AVOID POSSIBILITY OF DISENGAGEMENT OF SOCKET FROM WRENCH EXTENSION DURING REMOVAL OF IGNITER PLUG, (WHICH COULD RESULT IN LOSS OF SOCKET BETWEEN FAN DUCT AND OUTER CASE) PERMANENTLY SECURE SOCKET TO EXTENSION BEFORE USING.

(h) Using igniter wrench, SPL-12630, insert plugs through holes in fan duct igniter bosses and into mating threaded holes in combustion chamber case. Bottom plug by hand.

NOTE: Prevent excessive galling of igniter plug tip and lower shell by bottoming each plug by hand before torquing. This will ensure that igniter plug and burner and igniter plug guide are properly aligned.

(i) Torque the igniter plug to 300 in-lb (33.90 N·m) - 360 in-lb (40.67 N·m).

(j) Remove protective paper from end of ignition lead.

(k) Slide Washer, G60827 (2) off high-tension insulator at igniter plug end of lead. Discard chamfer washer.

NOTE: Ignition leads are fitted with a chamfer washer at plug end which must be replaced at every removal and installation.

NOTE: Chamfer washer replacement procedure is not applicable for new ignition leads.

(l) Check the igniter lead. (PAGEBLOCK 74-20-01/201)

WARNING: IGNITION CABLE CHAMFER WASHERS AND ADJACENT PARTS MAY CONTAIN RESIDUE OF KRYTOX 240 AC GREASE. DO NOT CONTAMINATE SMOKING MATERIALS (CIGARETTES, CIGARS, ETC.) WITH KRYTOX 240 AC GREASE. COMBUSTION PRODUCTS OF KRYTOX 240 AC GREASE COULD BE HARMFUL IF INHALED. AVOID SKIN CONTACT. WASH HANDS IMMEDIATELY AFTER CONTACT WITH KRYTOX 240 AC GREASE. THIS GREASE IS NO LONGER USED ON IGNITION CABLES.

(m) Slide new Washer, G60827 (2) on high-tension insulator.

NOTE: No grease is allowed on external surface of insulator or other parts of cable.

(n) Install new O-Ring, G60828 (3) in OD groove of igniter plug coupling nut.

(o) Clean threads of coupling nut with Degreasing Solvent, B60101.

(p) Apply light coat of molykote type Z compound, D60096, on threads of coupling nut.

CAUTION: TO PREVENT DAMAGE TO LEAD, DO NOT TWIST PLUG END OF LEAD WHEN TIGHTENING COUPLING NUT.

CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

(q) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 150 ±10 in-lb (17 ±1 N·m).

F. Job Close-up

SUBTASK 74-20-02-440-001

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(1) Remove the lockpin from the control valve and place the arm in the open position. Stow lockpin. (PAGEBLOCK 78-00-00/201)

SUBTASK 74-20-02-410-001

(2) Close access panel.

(3) Close the lower engine cowls.

SUBTASK 74-20-02-440-002

(4) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

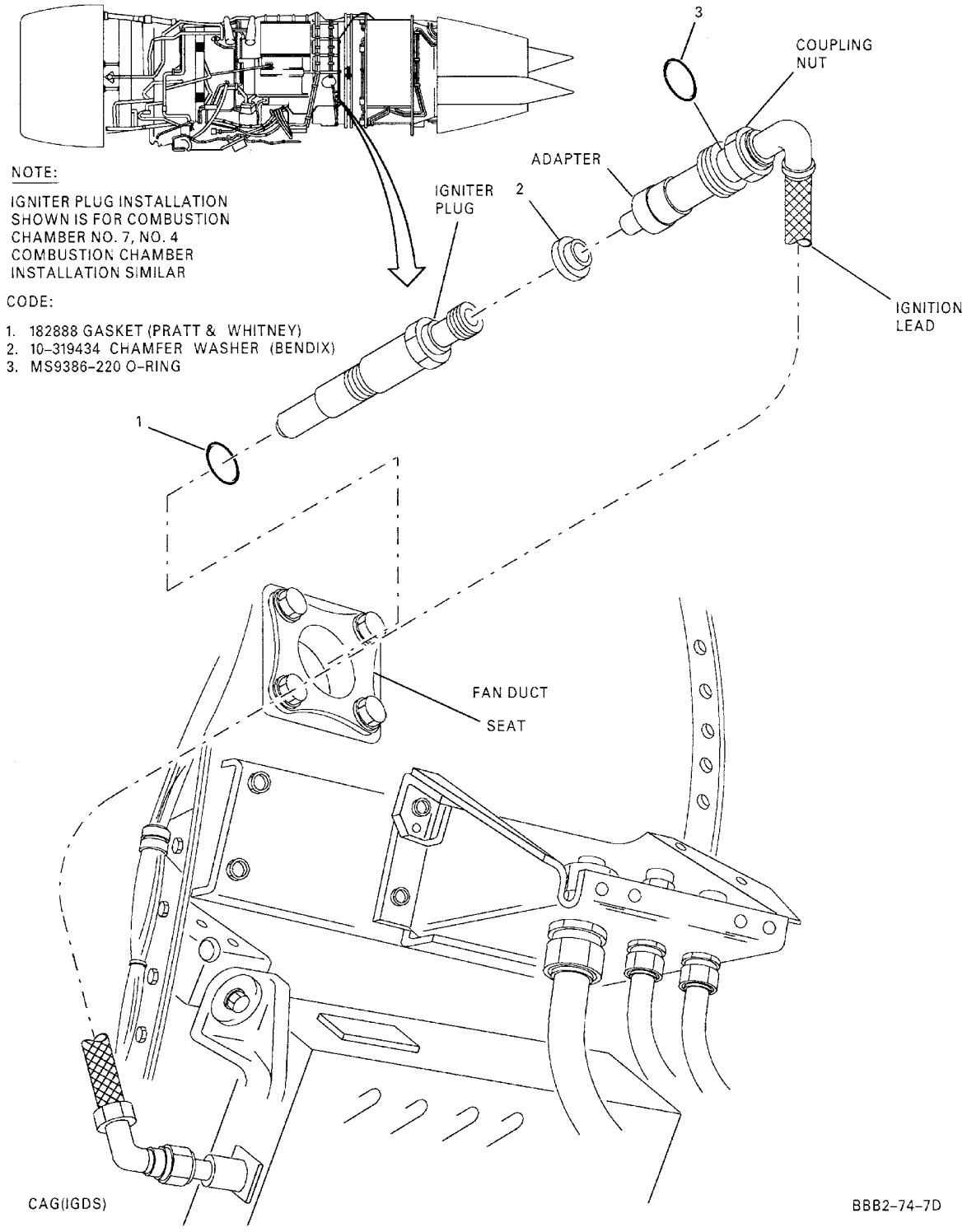
SUBTASK 74-20-02-710-002

(5) Do an operational test of the igniter plugs.

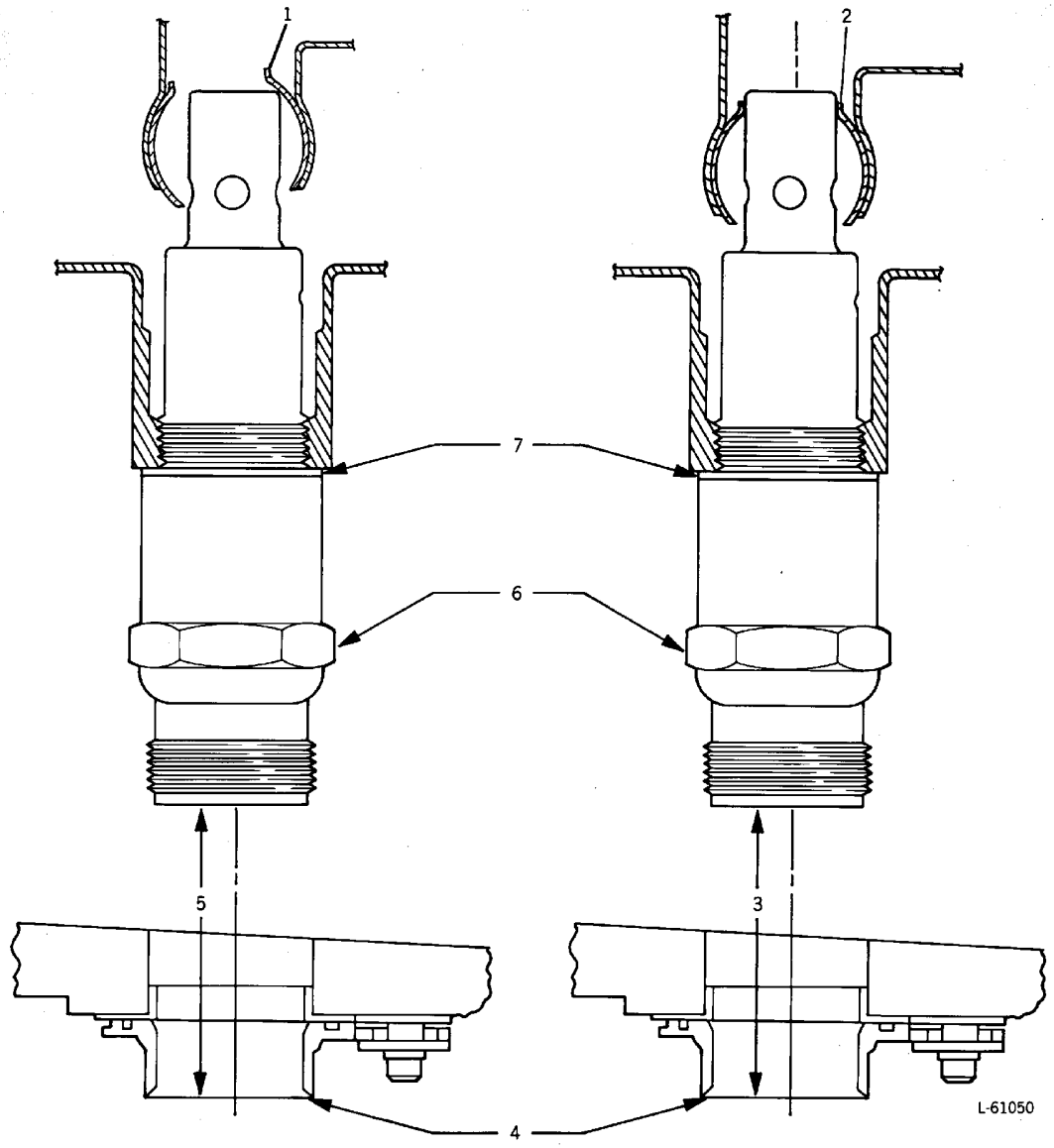
SUBTASK 74-20-02-942-001

(6) Remove all the tools and equipment from the work area. Make sure the area is clean.

——— END OF TASK ———



IGNITER PLUG - DISCARD
Figure 401/74-20-02-990-820



1. COMBUSTION CHAMBER GUIDE INCORRECTLY POSITIONED
2. COMBUSTION CHAMBER GUIDE CORRECTION POSITIONED
3. APPROXIMATELY 6.65 INCHES (168.910 MM)
4. FAN DUCT PACKING HOLDER (REFERENCE)
5. APPROXIMATELY 6.40 INCHES (162.560 MM)
6. IGNITER PLUG
7. GASKET

BBB2-74-88

IGNITER PLUG COMBUSTION CHAMBER GUIDE POSITION
Figure 402/74-20-02-990-821

SWITCHING - DESCRIPTION AND OPERATION

1. General

A. Control of the engine ignition system is provided by an ignition selector switch, engine start switch, and fuel shutoff lever ignition switch. The switches are located in the flight compartment and control the supply of power from the aircraft electrical buses to the ignition exciter.

2. Switching System Components

A. Description

(1) Engine Start Switch - The engine start switch is located on the forward overhead switch panel. The switch controls the starter air shutoff valve and provides 28 vdc and 115 vac to the fuel shutoff lever ignition switch. The switch is a double-pole, single throw, momentary toggle switch. A switch guard is incorporated to prevent accidental actuation of the switch. Switch positions are, OFF and ON (MOM).

(2) Fuel Shutoff Lever Ignition Switch - The fuel shutoff lever ignition switches, one for each engine, are located in the control pedestal and are connected to the fuel control lever by mechanical linkage. The switch is a double-pole, double-throw switch actuated by movement of the fuel control lever.

(3) Ignition Selector Switch - The ignition selector switch is located on the forward overhead switch panel and provides ignition selection for both engines. The switch is a three-position, four-pole toggle switch. Switch positions are, GRD START & CONTIN, OFF, and IGN OVRD. The IGN OVRD position is a lever-locked position. The toggle lever must be pulled out and lifted over the integral lock before lever can be moved to IGN OVRD position.

B. Operation

(1) For normal starting, the ignition selector switch is placed in the GRD START & CONTIN position, and the engine start switch is placed and held in the ON position.

(2) Power flows from the 28-volt dc transfer bus to the fuel shutoff lever ignition switch through the engine ignition circuit breaker and closed contacts of the engine start switch. Power is also supplied to the starter air shutoff valve through the closed contacts of the engine start switch.

(3) As the fuel shutoff lever is moved toward the ON position, the contacts of the fuel shutoff lever ignition switch close to complete the circuit (through closed contacts of the ignition selector switch) to the 20-joule high energy section of the ignition exciter. High voltage electrical energy, developed by the exciter, is supplied to the igniter plugs causing both plugs to fire and igniter the fuel/air mixture.

(4) When engine ignition occurs, the engine start switch is released (switch returns to OFF position) the circuitry switches to the continuous ignition low energy system. Power, 115 vac, 400-Hz, is supplied directly to the 4-joule low energy section of the ignition exciter which in turn supplies power to fire the left igniter plug only. The 4-joule, low energy system is turned OFF by placing the ignition selector switch in the OFF position when engine operation is stable.

(5) For in-flight or other emergency conditions, moving the ignition selector switch to the IGN OVRD position supplies 28 vdc directly to the 20-joule, high energy section of the ignition exciter which supplies power to fire both igniter plugs. The fuel shutoff lever ignition switch is bypassed when the ignition selector switch is placed in the IGN OVRD position.

SWITCHING - DESCRIPTION AND OPERATION

1. General

A. Control of the engine ignition system is provided by an ignition selector switch, engine start switch, and fuel shutoff lever ignition switch. The switches are located in the flight compartment and control the supply of power from the aircraft electrical buses to the ignition exciter.

2. Switching System Components

A. Description

(1) Engine Start Switch - The engine start switch is located on the forward overhead switch panel. The switch controls the starter air shutoff valve. The switch is a double-pole, single throw, momentary toggle switch. A switch guard is incorporated to prevent accidental actuation of the switch. Switch positions are, OFF and ON (MOM).

(2) Fuel Shutoff Lever Ignition Switch - The fuel shutoff lever ignition switches, one for each engine, are located in the control pedestal and are connected to the fuel control lever by mechanical linkage. The switch is a double-pole, double-throw switch actuated by movement of the fuel control lever.

(3) Ignition Selector Switch - The ignition selector switch is located on the forward overhead switch panel and provides ignition selection for both engines. The switch is a rotary five-position switch with positive detent in ALL positions. The switch positions are: SYSTEM A, OFF, SYSTEM B, BOTH, and OVERRIDE.

B. Operation

(1) For normal starting, the ignition selector switch is placed in the SYS A or SYS B or BOTH position, and the engine start switch is placed and held in the ON position.

(2) As the fuel shutoff lever is moved toward the ON position, the contacts of the fuel shutoff lever ignition switch close to complete the circuit (through closed contacts of the ignition selector switch) to the 20-joule high energy ignition exciter. High voltage electrical energy, developed by the exciter, is supplied to the igniter plugs causing both plugs to fire and ignite the fuel/air mixture.

(3) For in-flight or other emergency conditions, moving the ignition selector switch to the OVRD position energizes both exciters in both engines independent of fuel shutoff lever positions.

FUEL SHUTOFF LEVER IGNITION SWITCHES - MAINTENANCE PRACTICES

1. General

A. The fuel shutoff lever ignition switches are mounted on the control pedestal directly below the fuel shutoff levers. Access to the switches is through the side panel of the pedestal. Removal/installation procedures for the left and right switches are identical.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed items:

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Lockwire .020 corrosion resistant steel, P05-288	

3. Removal/Installation Fuel Shutoff Lever Ignition Switch

A. Remove Switch

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

(1) Tag throttle/thrust reverser lever, and open and tag following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(2) Open access door (5901C) for left engine or (5902C) for right engine.

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6555 TO 7245 KPA) (PRECHARGE PRESSURE).

(3) Place thrust reverser control valve in dump position and install lockpin.

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT PLUG.

(4) Disconnect switch electrical connector.

(5) Check position of switch actuating lever to facilitate installation.

(6) Remove switch from mounting bracket.

B. Install Switch

WARNING: MAKE CERTAIN CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES. INADVERTENT ENGINE START OR THRUST REVERSER OPERATION COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

(1) Make certain throttle/thrust reverser lever is tagged and following circuit breakers are open and tagged.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THAT THRUST REVERSER HYDRAULIC SYSTEM HAS DEPRESSURIZED BY CHECKING THRUST REVERSER ACCUMULATOR PRESSURE GAGE AFTER CONTROL VALVE ARM HAS BEEN LOCKPINNED IN DUMP POSITION. GAGE SHOULD READ 950 TO 1050 PSI (6555 TO 7245 KPA) (PRECHARGE PRESSURE).

(2) Make certain thrust reverser control valve is in dump position and lockpin is installed.

(3) Position switch and secure to mounting bracket.

CAUTION: TO PREVENT DAMAGE TO ELECTRICAL CONNECTOR, DO NOT USE ANY TOOL OTHER THAN PLUG PLIERS TO DISCONNECT OR CONNECT PLUG. WHEN CONNECTING PLUG, DO NOT OVERTIGHTEN.

(4) Connect switch electrical connector. Safety connector with P05-288 lockwire.

NOTE: Connector plug is properly installed when no relative motion exists between plug backshell and coupling ring.

(5) Check adjustment and operation of switch. (PAGEBLOCK 76-12-00/501)

(6) Remove tag from throttle/thrust reverser lever, and remove tags and close following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	41	B1-2	ENGINE IGNITION RIGHT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	41	B1-423	ENGINE START VALVE RIGHT

WJE 415-427, 429, 861-866, 868, 869, 871-874, 891

U	42	B1-1	ENGINE IGNITION LEFT

WJE 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893

U	42	B1-422	ENGINE START VALVE LEFT

WJE ALL

OVERHEAD BATT DIR BUS

Row	Col	Number	Name
C	18	B1-184	EMERGENCY INVERTER

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

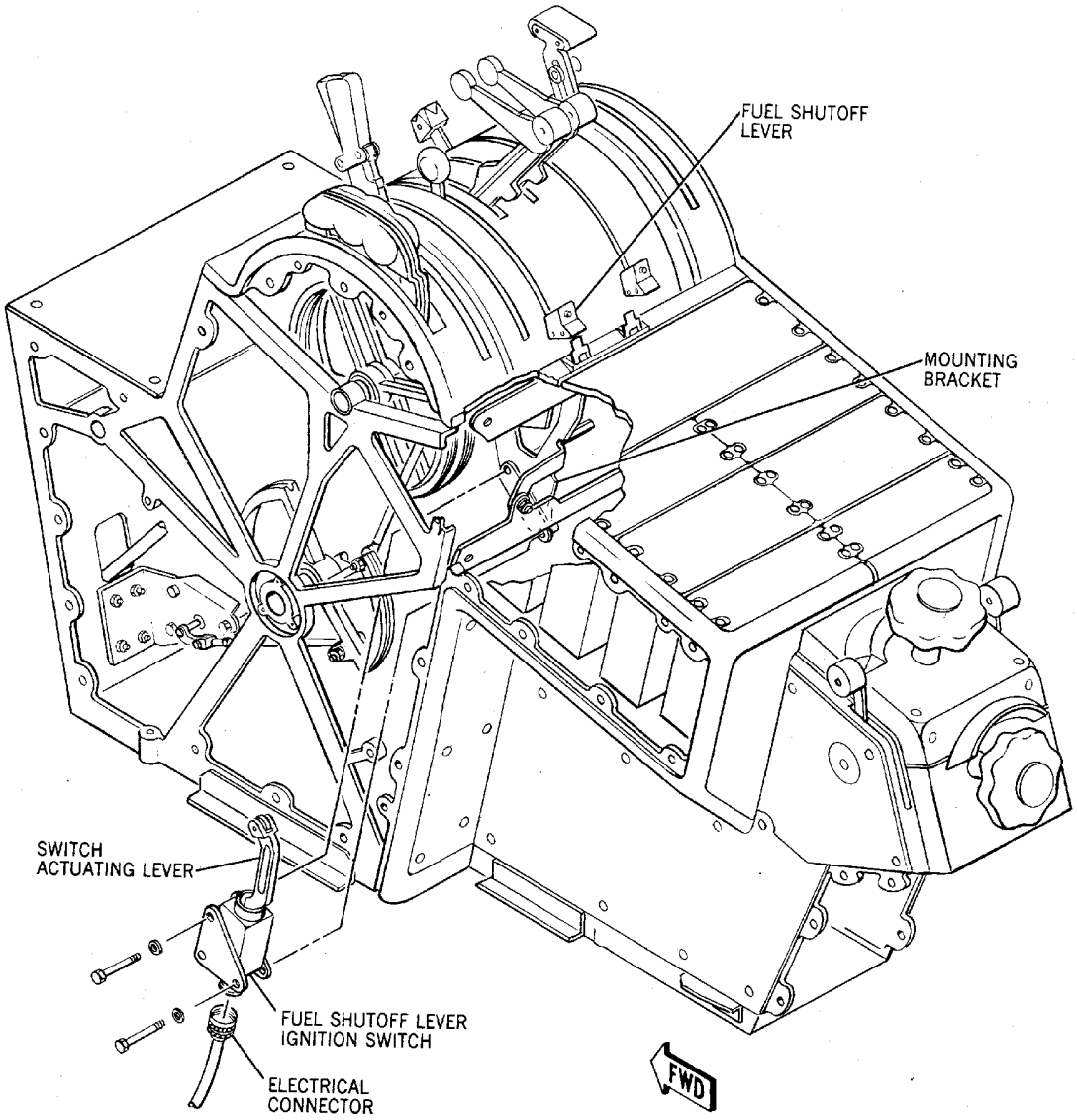
UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THROTTLE/THRUST REVERSER LEVER MOVEMENT REGARDLESS OF WHETHER ANY ELECTRICAL OR HYDRAULIC POWER IS SUPPLIED TO AIRCRAFT.

(7) Remove lockpin from thrust reverser control valve. Stow lockpin.

(8) Close access door (5901C) for left engine or (5902C) for right engine.



Fuel Shutoff Lever Ignition Switch - Installation
Figure 201/74-30-01-990-801

IGNITION SELECTOR SWITCH - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation procedures for the ignition selector switch mounted in the flight compartment on the forward overhead switch panel.

B. Access to the ignition selector switch is by lowering forward overhead switch panel.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following items:

NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Sealant, silicone rubber, white #RTV-738 DPM 5811	Dow Corning Corp.

3. Removal/Installation Ignition Selector Switch (Toggle Type)

A. Remove Switch

(Figure 201)

WARNING: MAKE SURE ADEQUATE PRECAUTIONS ARE TAKEN WHILE PERFORMING ANY WORK IF ELECTRICAL POWER IS APPLIED TO THE AIRCRAFT.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: ELECTRICALLY GROUND THE AIRCRAFT.

(1) Open and tag following circuit breakers as applicable:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
U	42	B1-1	ENGINE IGNITION LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(2) Remove light panel.

(3) Lower forward overhead switch panel. (PAGEBLOCK 31-00-03/201)

(4) Remove ignition selector switch. (Figure 201)

(5) Remove attachment screws from termination wire.

B. Install Switch

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure that these circuit breakers are open and have safety tags:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
U	42	B1-1	ENGINE IGNITION LEFT

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

CAUTION: TERMINATION LUGS SHOULD BE INSTALLED BARREL UP TO AVOID THE POSSIBILITY OF AN ELECTRICAL SHORT ON THE IGNITION SELECTOR SWITCH.

(2) Install wire terminations with barrel up, and encapsulate terminal lugs A1, B1, C1, D1, A3, B3, C3, D3, and attachment screws with RTV-738 sealant. (Figure 201)

(3) Install ignition selector switch. (Figure 201)

(4) Raise and secure forward overhead switch panel. (PAGEBLOCK 31-00-03/201)

(5) Install light panel.

(6) Remove the safety tags and close these circuit breakers:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
U	42	B1-1	ENGINE IGNITION LEFT

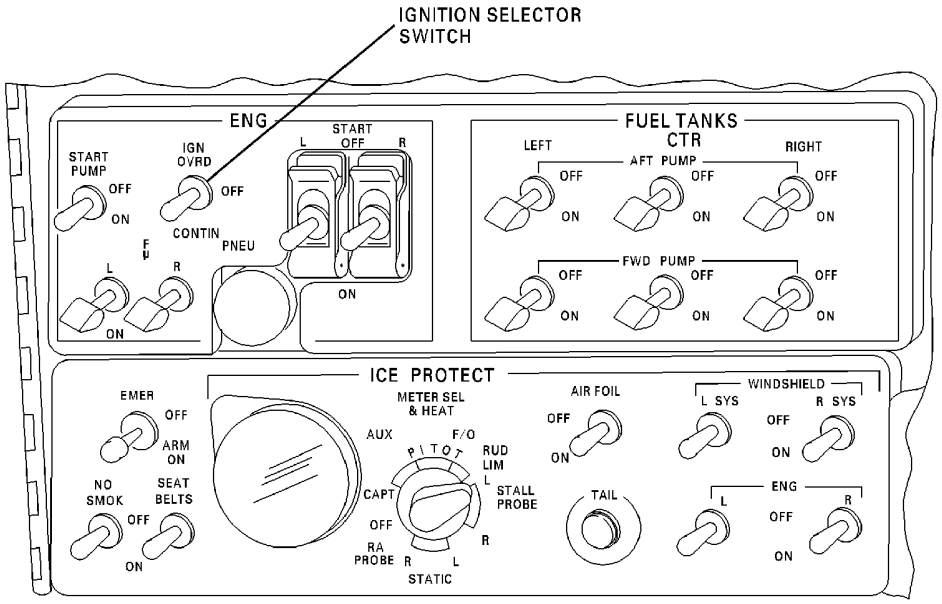
UPPER EPC, ENGINE - LEFT AC BUS

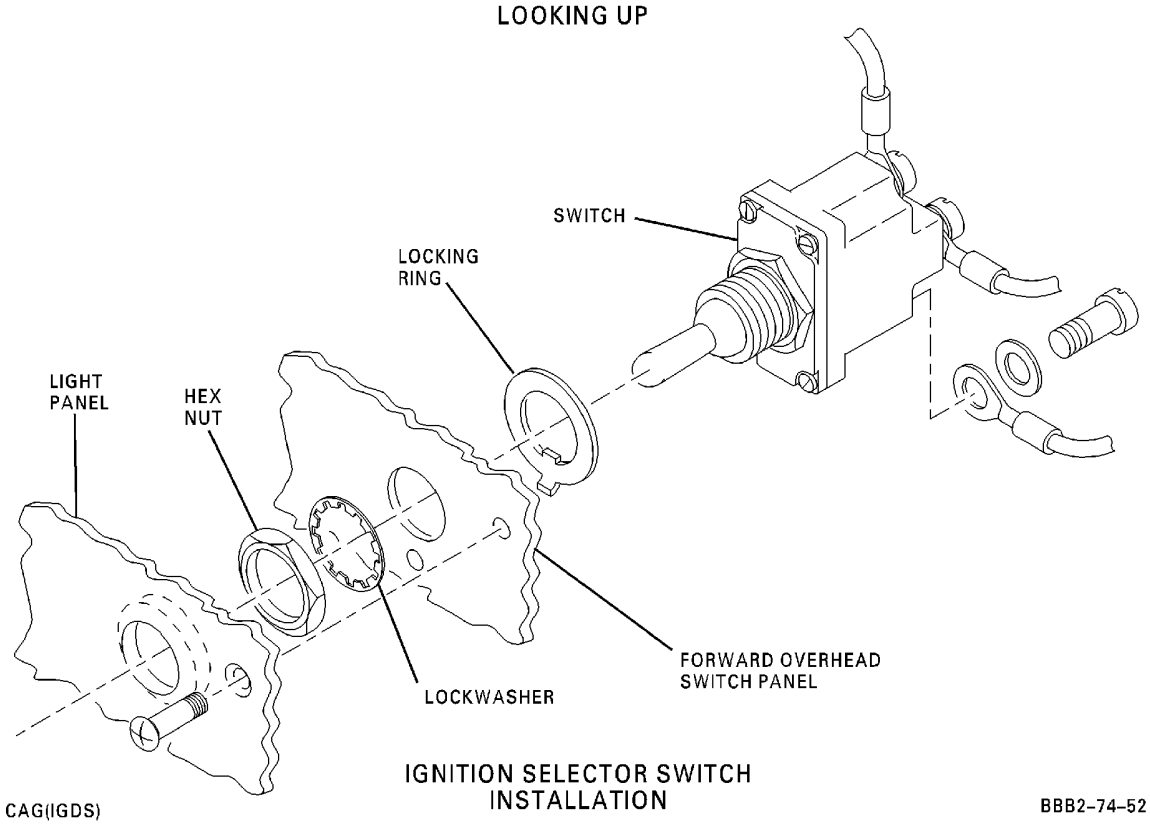
Row	Col	Number	Name
WJE 415-427, 429, 861-866, 868, 869, 871-874, 891, 892			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

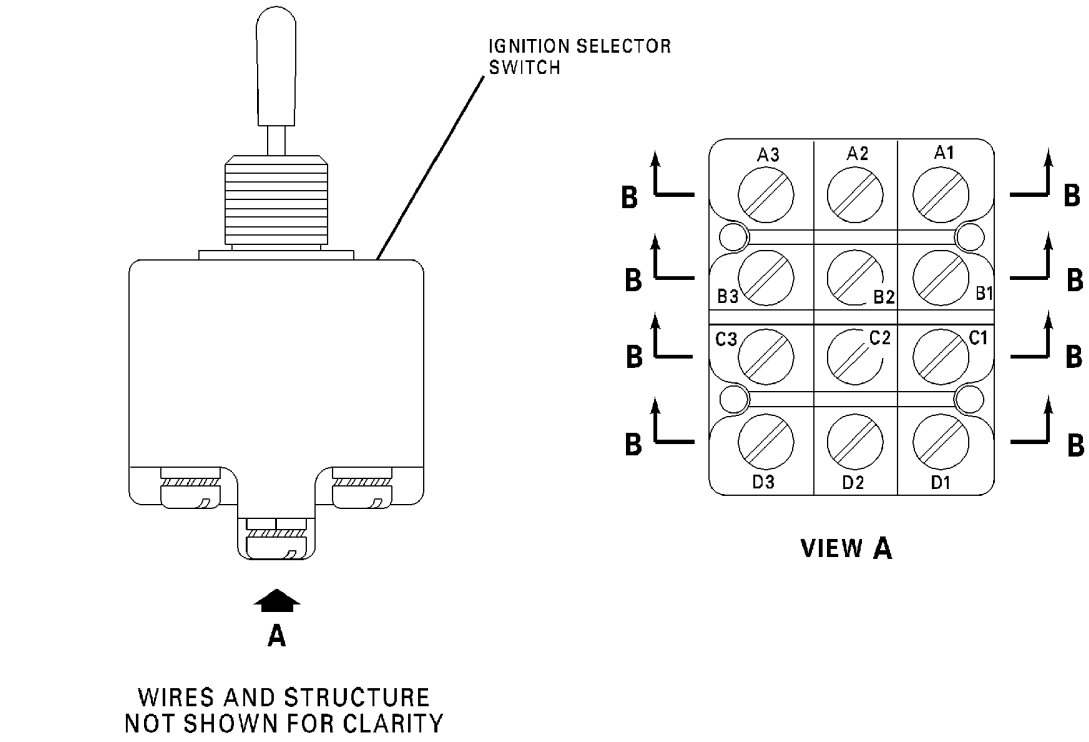
Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(7) Perform functional test on ignition system. (PAGEBLOCK 74-00-00/501 Config 1)





Ignition Selector Switch - Removal/Installation
Figure 201/74-30-02-990-802 (Sheet 1 of 2)



Ignition Selector Switch - Removal/Installation
Figure 201/74-30-02-990-802 (Sheet 2 of 2)

IGNITION SELECTOR SWITCH - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation procedures for the ignition selector switch mounted in the flight compartment on the forward overhead switch panel.

B. Access to the ignition selector switch is by lowering forward overhead switch panel.

2. Removal/Installation Ignition Selector Switch (Rotary Type)

NOTE: Rotary ignition switches can be a four or a five position type switch.

A. Remove Switch

(Figure 201)

WARNING: MAKE SURE ADEQUATE PRECAUTIONS ARE TAKEN WHILE PERFORMING ANY WORK IF ELECTRICAL POWER IS APPLIED TO THE AIRCRAFT.

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: ELECTRICALLY GROUND THE AIRCRAFT.

(1) Open and tag following circuit breakers as applicable:

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(2) Lower forward overhead switch panel. (PAGEBLOCK 31-00-03/201)

(3) Disconnect electrical wiring from rotary ignition switch.

NOTE: Tag and identify wires removed from ignition switch post. Wires are to be installed at same post location on new ignition switch.

(4) Remove and retain switch selector knob.

(5) Remove and retain light panel and attaching hardware.

(6) Remove ignition switch.

B. Install Switch

WARNING: TAG AND USE SAFETY CLIPS TO SAFETY THE CIRCUIT BREAKERS. IF THE CIRCUIT BREAKERS ARE NOT OPENED, TAGGED, AND SAFETIED, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure that these circuit breakers are open and have safety tags:

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(2) Install ignition switch using retained attaching hardware. (Figure 201)

(3) Connect electrical wires on ignition switch.

(a) Make certain wires are on the correct ignition switch posts.

(4) Install light panel with retained attaching hardware.

(5) Install switch selector knob.

(6) Raise and secure forward overhead switch panel. (PAGEBLOCK 31-00-03/201)

(7) Remove the safety tags and close these circuit breakers:

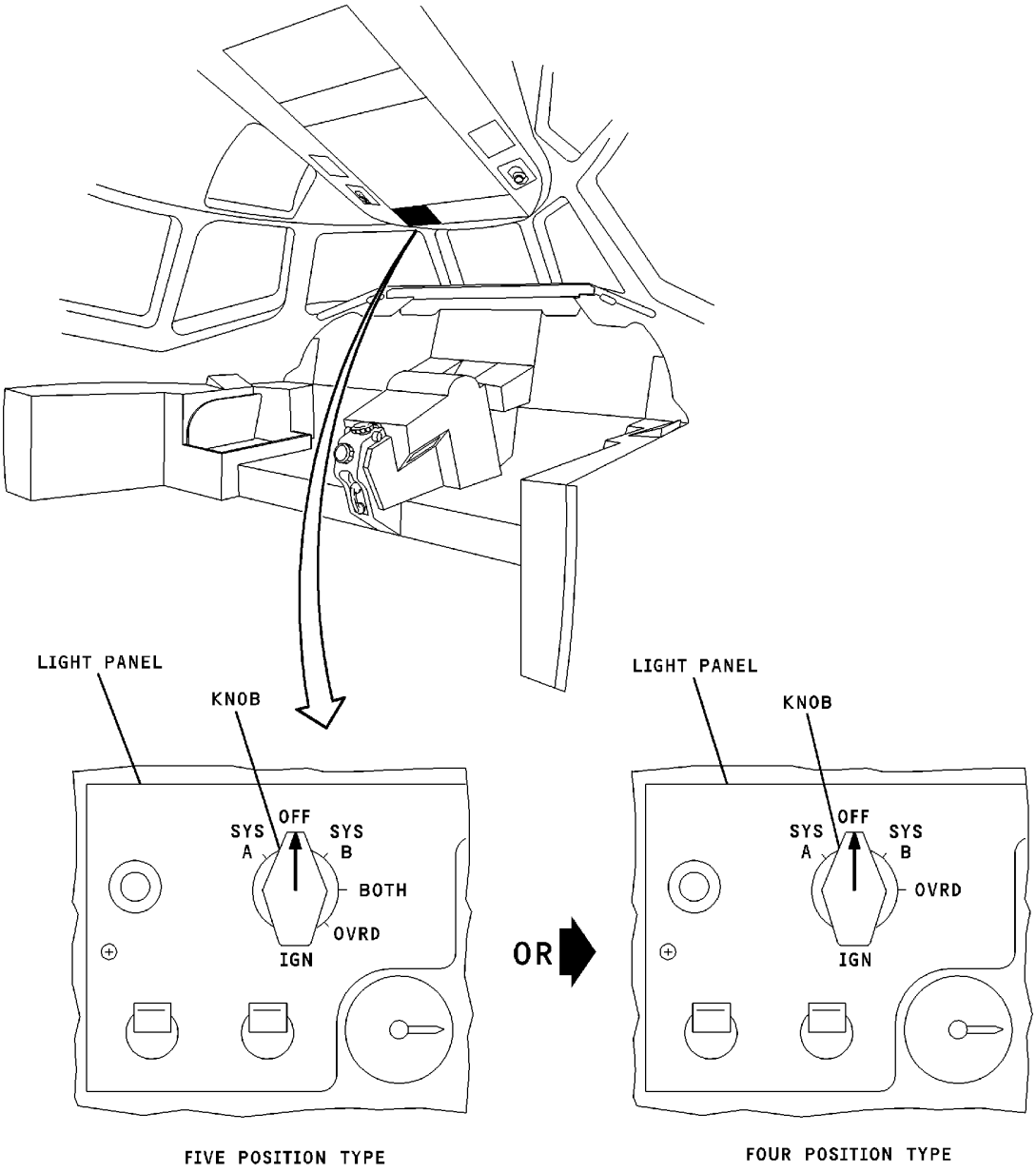
UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION

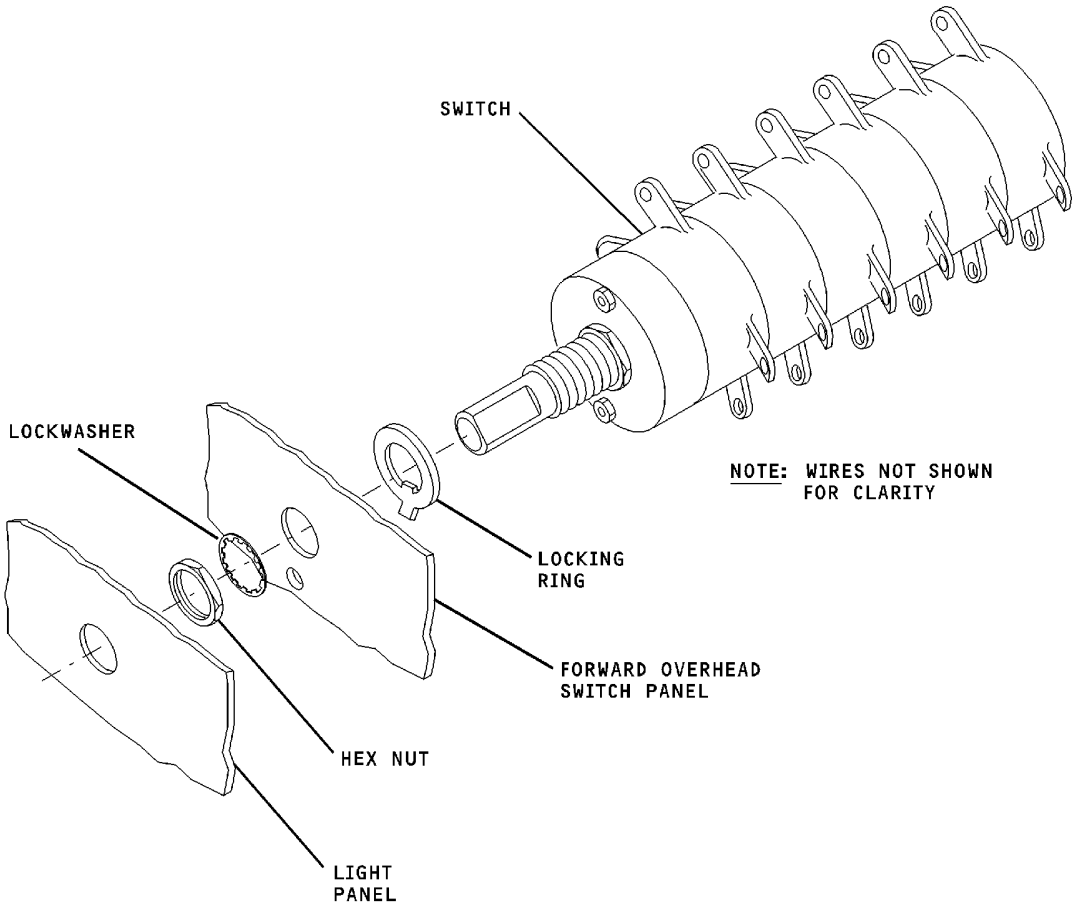
UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

(8) Perform functional test on ignition system. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 74-00-00/501 Config 2)



Ignition Selector Switch (Rotary Type) - Removal/Installation
Figure 201/74-30-02-990-801 (Sheet 1 of 2)



Ignition Selector Switch (Rotary Type) - Removal/Installation
Figure 201/74-30-02-990-801 (Sheet 2 of 2)