CHAPTER

71

POWER PLANT

MD-80
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 71
POWER PLANT

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GENERAL - DESCRIPTION AND OPERATION

1. Description

A. The MD-80 is powerd by two Pratt & Whitney JT8D axial flow turbofan engines. Each engine in the installed configuration is a demountable power plant.

B. The power plant is connected to a short, horizontal pylon by a three-point mounting system which utilizes engine-mounted cone bolts, and pylon-mounted vibration isolators. This mounting system minimizes the transfer of engine vibration to the main airplane structure.

C. The power plant cowling sections join together around the engine and accessories providing smooth fairing with the pylon.

This provides complete power plant protection and unrestricted airflow during flight.

D. Each power plant, after installation on the airplane, is protected by a fire detection system and a fire extinguishing system.

E. The demountable power plants are interchangeable left to right, except for component changes which are outlined in POWER PLANT CONVERSION, SUBJECT 71-01-00, Page 201.

F. The demountable power plant, less pylon apron, upper and lower cowl doors, has the following approximate weights.

(1) Total demountable power plant weight, fully serviced, including nose cowl, and thrust reverser/exhaust nozzle is approximately 5900 lbs (2631 KG).

G. Individual major components of the power plant have the following approximate weights.

Table 1

(1) Nose cowl	182 lbs (83 KG)
(2) Pylon apron	81 lbs (37 KG)
(3) Forward lower cowl door	99 lbs (45 KG)
(4) Aft lower cowl door	65 lbs (30 KG)
(5) Upper cowl door	150 lbs (68 KG)
(6) Thrust reverser/exhaust nozzle	547 lbs (248 KG)

H. The power plant when installed has the following approximate heights from the ground.

Table 2

(1) Height from ground to power plant horizontal centerline	11 FT. 3 IN. (3.43 M)
(2) Height from ground to power plant lowest point	8 FT. 7 IN. (2.62 M)

I. The engine oil tank has the following approximate capacities.

Table 3

(1) Oil tank capacity	5.5 US gallons (4.6 Imperial gallons or 20.8 liters)
(2) Usable oil	4.0 US gallons (3.33 Imperial gallons or 15.14 liters)

2. Engine

A. The JT8D axial flow turbofan engine utilizes a 14-stage split compressor, a 4-stage split turbine, a 9-can combustion chamber, two integral accessory drive cases, and a full length integral fan annular discharge duct.

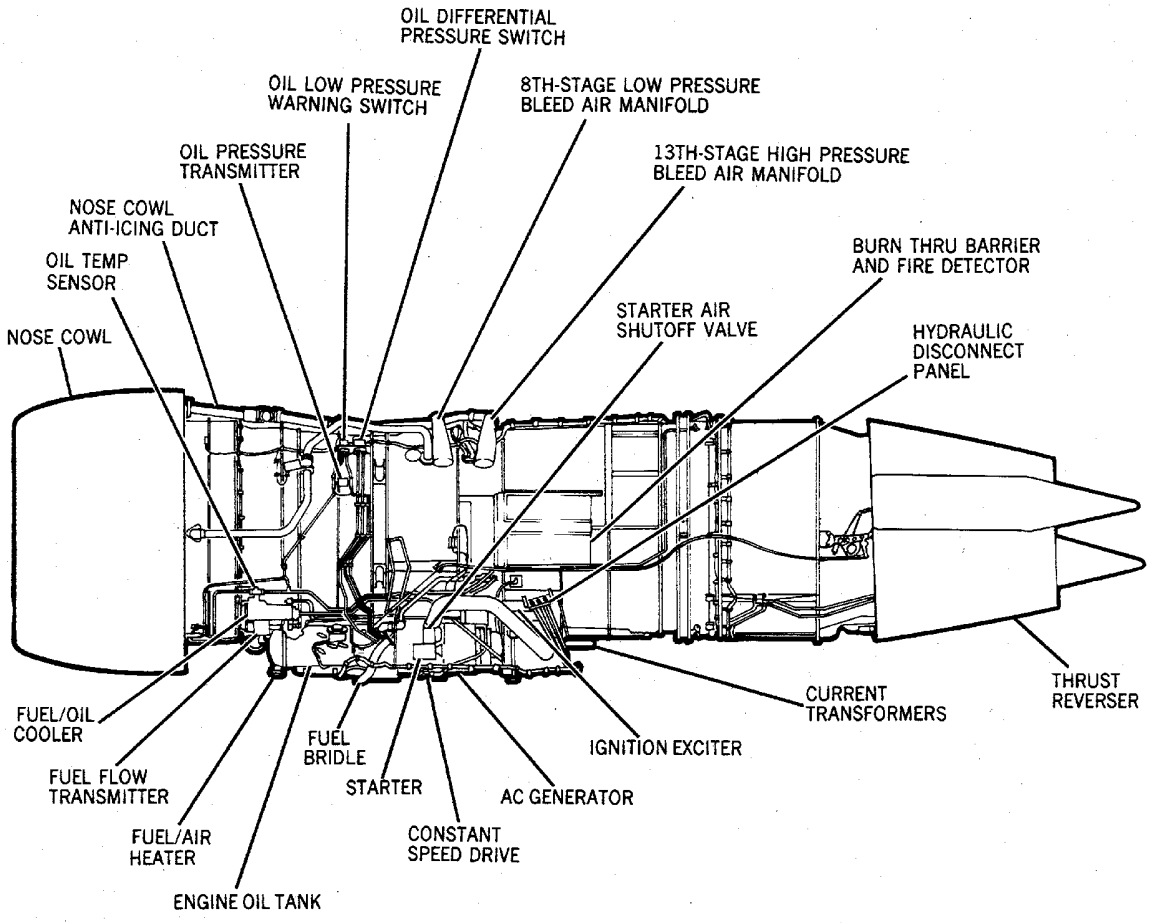
B. The 14-stage split compressor is divided into two mechanically independent sections. The low-pressure compressor section consists of the first seven stages of the compressor. The first stage is the fan stage and is much larger in diameter than the remaining six. This section of the compressor is driven by the final three stages of the turbine. The high-pressure compressor section consists of the final seven stages of the compressor and is driven by the first stage of the turbine. This section of the compressor also drives the main accessory drive case.

C. The 4-stage split turbine is also divided into two mechanically independent sections: the low-pressure section consists of the final three stages, and the high-pressure section consists of the first stage.

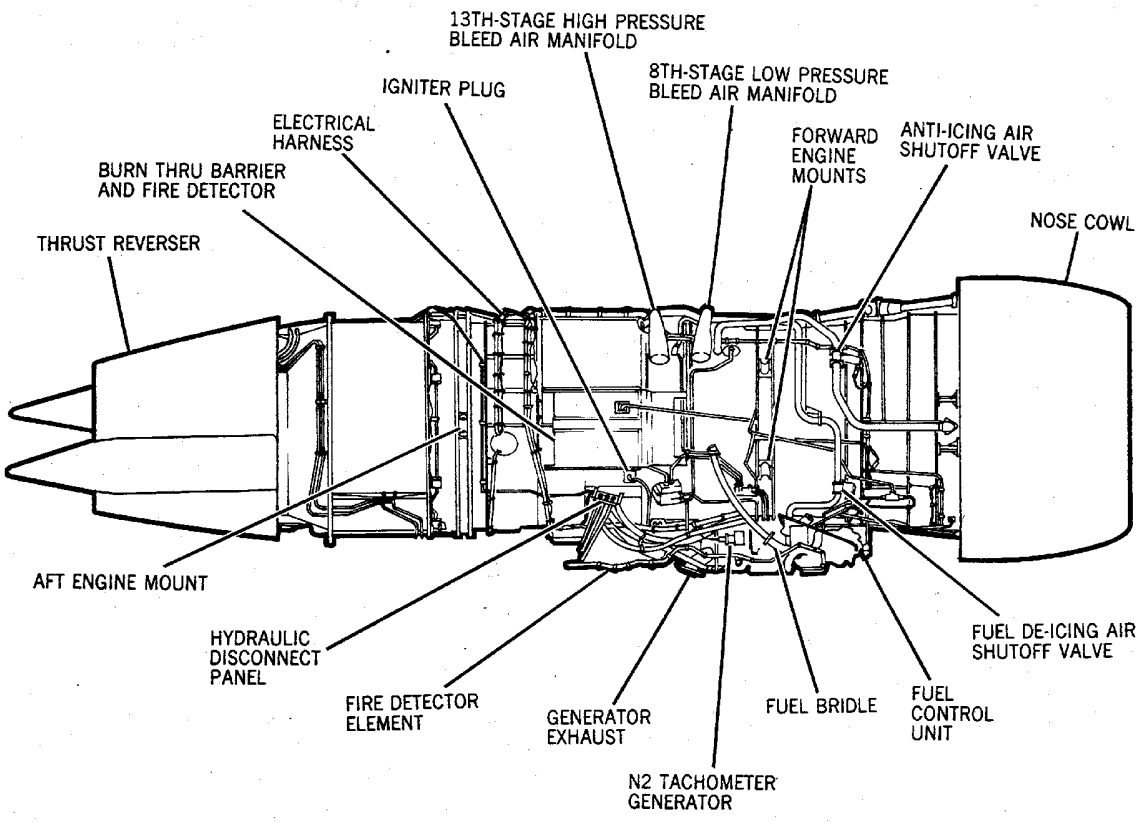
D. The nine cans of the combustion chamber are numbered in a clockwise direction viewed from the aft end of the engine, with one can located at the top center.

E. The two integral accessory drive cases provided on the engine are the inlet and main accessory drive cases. Both cases are internally driven and lubricated by the engine oil system.

F. The full length integral fan annular discharge duct channels fan discharge air into the primary exhaust nozzle. The fan discharge air provides additional engine thrust and also cools the hot sections of the engine.



Demountable Power Plant -- Left Side
Figure 1/71-00-00-990-802



Demountable Power Plant -- Right Side
Figure 2/71-00-00-990-803

3. **Engine Fuel and Control**

   A. The fuel and control system functions to pump, filter, distribute, and meter fuel consumed during engine operation, and drain during shutdown.

   B. A fuel deicing system, using engine bleed air, eliminates ice formed in the engine fuel system.

   C. For a complete, detailed description and operation of the fuel and control system, refer to ENGINE FUEL AND CONTROL, CHAPTER 73.

4. **Ignition**

   A. Ignition is supplied by a dual ignition exciter, through two shielded high-tension leads, to the igniter plugs located in engine combustion chambers No. 4 and No. 7.

   B. The ignition system is controlled from the flight compartment.

   C. For a complete, detailed description and operation of the ignition system, refer to IGNITION, CHAPTER 74.

5. **Air**

   A. The air system consists of engine anti-icing, accessory cooling, and compressor bleed.

   B. Engine anti-icing is supplied from the 8th-stage and 13th-stage bleed air manifolds through valves which are controlled from the flight compartment overhead switch panel.

   C. Accessory cooling is provided through ram air openings in the nacelle compartment and by air extracted from the engine integral fan annular discharge duct.

   D. The compressor bleed system provides operational flexibility during engine starting and operation at low thrust settings.

   E. For a complete, detailed description and operation of the air system, refer to AIR, CHAPTER 75 .

6. **Engine Controls**

   A. Each engine is controlled remotely from the flight compartment by two major levers: throttle/thrust reverser, and fuel shut-off. The throttle and fuel shutoff levers are located on the control pedestal.

   B. The throttle controls fuel flow regulating the thrust output produced by the engine. An engine synchronizer is installed which automatically matches the RPM of the N_1 or N_2 of the left engine to that of the right engine. The thrust reverser lever, mounted on top of the throttle, controls the operation of the thrust reverser, and controls fuel flow for variable thrust requirements.

   C. The fuel shutoff lever controls the fuel supplied to the engine fuel control.

   D. For a complete, detailed description and operation of the engine controls, refer to ENGINE CONTROLS, CHAPTER 76.

7. **Engine Indicating**

   A. The indicating system utilizes inlet and exhaust duct air pressures, exhaust gas temperatures, compressor rotor speeds, and engine vibration as a means of monitoring operation.

   B. The pressure ratio system senses total inlet and exhaust duct air pressure. The ratio between pressures is displayed on an indictor in the flight compartment.

   C. Several thermocouples installed in the exhaust duct provide an average temperature which is dislayed on an indicator in the flight compartment.

   D. High-and low-pressure compressor rotor speeds are displayed on percentage-type indicators in the flight compartment. Each system indicator derives its power from an engine-driven tachometer generator.

E. For a complete, detailed description and operation of the indicating system, refer to ENGINE INDICATING, CHAPTER 77.

8. Exhaust

A. Engine exhaust is ducted overboard through the exhaust nozzle, which is an integral part of the thrust reverser. The exhaust nozzle is not removable at field maintenance level.

B. The thrust reverser is a target-type, mechanically controlled hydraulically powered reverser used to divert engine exhaust gas flow when the airplane is on the ground.

C. For a complete, detailed description and operation of the thrust reverser/exhaust system, refer to EXHAUST, CHAPTER 78.

9. Oil

A. Each engine is equipped with a self-contained, high-pressure oil system, which supplies both lubrication and cooling for the engine bearings and accessory drives. The oil system pressure, flow, and temperature are automatically maintained within specified limits.

B. Indicating systems are provided which permit flight compartment observation of oil system parameters during engine operation.

C. For a complete, detailed description and operation of the oil system, refer to OIL, CHAPTER 79.

10. Starting

A. The starting system functions to rotatae the engine high-pressure compressor rotor until self-sustained rotation is achieved by internal combustion.

B. Pneumatic pressure, controlled by a solenoid-actuated pressure regulating starter air shutoff valve, supplies force to power the air turbine starter. A remote sensing line provides pres-sure indiction and an in-line filter prevents contamination of the pneumatic starter valve.

C. The starting system is controlled from the flight compartment.

D. For a complete, detailed description and operation of the starting system, refer to STARTING, CHAPTER 80.

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 engine pylons.

B. Engine Accessibility

(1) Accessibility is provided to all system and components within the engine installation. The forward lower cowl door provides access to the accessory gearbox area and the aft lower cowl door provides access to the aft lower portion of the engine. The upper cowl door provides access to the upper portion of the engine. Small access doors are provided in the cowl doors for access to areas requiring frequent servicing.

C. Component Interchangeability

(1) Identical accessories are installed on both engines.

D. Hydraulic System Pressurization

WARNING: WHEN PERSONNEL ARE WORKING IN AREA OF THRUST REVERSER DOORS, THRUST REVERSER HYDRAULIC SYSTEM MUST BE DEPRESSURIZED.

(1) The system is depressurized by manually placing the thrust reverser control valve arm in dump position and installing the safety pin (PAGEBLOCK 78-00-00/201). After all maintenance has been completed, the reverser accumulator must be pressurized. This requires the aircraft hydraulic system to be pressurized. Remove safety pin from control valve arm and place arm in open position until 3000 psi (20,700 kPa) is observed on accumulator gage then release arm. (GENERAL - MAINTENANCE PRACTICES, PAGEBLOCK 29-00-00/201)

2. Safety and Operating Precautions

A. Circuit Breakers

CAUTION: EXTRA CAUTION MUST BE OBSERVED TO MAKE CERTAIN ELECTRICAL CIRCUITS TO ALL FIRE EXTINGUISHER CONTAINER CARTRIDGES ARE ISOLATED WHEN TEST PROCEDURES REQUIRE OPERATION OF FIRE EXTINGUISHER OR EMERGENCY SHUTDOWN SYSTEMS.

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

B. High-Voltage System and Components

WARNING: BEFORE ACTIVATING ANY FUEL, ELECTRICAL, HYDRAULIC, OR PNEUMATIC SYSTEM FOR MAINTENANCE PURPOSES, MAKE CERTAIN THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF OPERATING PORTIONS OF THE AIRCRAFT. INADVERTENT OPERATION OF AN AIRCRAFT SYSTEM COULD RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL.

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

C. Application of External Power and Pressurization of Fluid Systems

WARNING: INADVERTENT OPERATION OF AN AIRCRAFT SYSTEM COULD RESULT IN DEATH OR 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 OPERATING PORTIONS OF AIRCRAFT.

D. Engine Motoring

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

E. Clear Thrust Reverser Doors

WARNING: ENSURE ALL PERSONNEL ARE CLEAR OF REVERSER DOORS BEFORE DEPLOYING OR STOWING DOORS. WHEN THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE AND WILL MOVE REVERSER DOORS IN RESPONSE TO THRUST REVERSER LEVER MOVEMENT REGARDLESS OF ANY ELECTRICAL OR HYDRAULIC POWER SUPPLIED TO AIRCRAFT.

F. Cowl Doors

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: DO NOT OPEN COWL DOORS IF GROUND WIND VELOCITY EXCEED 30 KNOTS.

CAUTION: ENSURE 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 A 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.

G. Follow the above warning and cautions.

3. **General Maintenance Practices**

A. Protective Covers - When lines and electrical connectors are disconnected or components are removed, caps, covers, or other suitable means should be provided to prevent damage or foreign material from contaminating any component.

B. External Electrical Power

(1) For procedures to connect external electrical power to aircraft: (EXTERNAL POWER - TROUBLE SHOOTING, PAGEBLOCK 24-40-00/101)

C. External Pneumatic Power

(1) Connect external pneumatic source to aircraft.

D. Remove/Replace Electrical Connections

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. Cable Lubrication

CAUTION: USE EXTREME CARE WHEN WORKING WITH ENGINE-MOUNTED CONTROL CABLES. EACH CABLE FRICTION LIMIT IS DEPENDENT ON MANUFACTURED CONTOUR OF CABLE CONDUIT. DO NOT CLEAN CONTROL CABLE CONDUITS WITH PAINT STRIPPING SOLVENTS.

(1) Throttle and fuel shutoff fuselage control cable conduits are lubricated with Dow Corning Silicone Grease (DC-33). All other control cable conduits are internally dry lubricated and require no additional lubrication.

F. Cleanup

WARNING: CLEANING OPERATIONS USING SOLVENTS SHOULD BE PERFORMED IN WELL-VENTILATED ATMOSPHERE. EXERCISE NORMAL SAFETY PRECAUTIONS DURING USE.

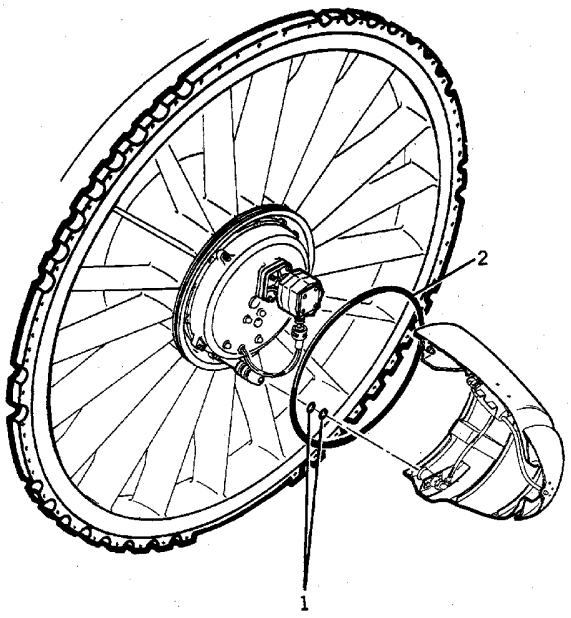
(1) Spilled oil, fuel, or hydraulic fluid should be cleaned up immediately to prevent damage to wiring or other components and to prevent raise leak reports.

G. Seals, O-Rings, and Gaskets

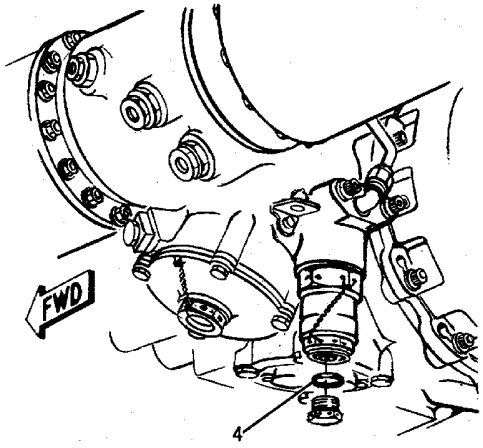
(1) Seals, O-rings, and gaskets are identified in Figure 201.

H. Used O-Rings

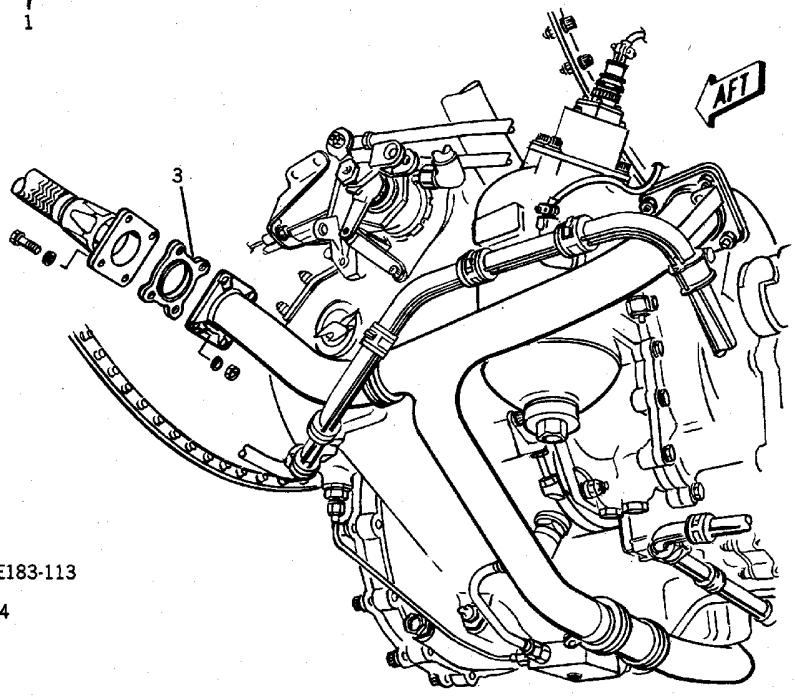
(1) Discard all used O-rings.



INLET BULLET



ENGINE OIL PRESSURE RELIEF VALVE



FUEL SUPPLY FLEX LINE

CODE:
1. STILLMAN RUBBER CO. S7E183-113
2. PRATT & WHITNEY 528174
3. PARKER CO. 011157-015-24
4. MS9387-10

BBB2-71-28

Seals, O-Rings, and Gaskets
Figure 201/71-00-00-990-801

GENERAL - REMOVAL/INSTALLATION

1. General

A. The removal and installation procedures for left and right power plants are identical unless otherwise stated.

B. The following procedures cover installation of a power plant in the correct configuration.

C. If conversion of a power plant is required before installation, follow conversion procedures outlined in (SUBJECT 71-01-00).

2. Equipment and Materials

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

Table 401

Name and Number	Manufacturer
Sling, JT8D handling 5916777-501	The Boeing Company
Portable hoisting boom 5936850-501	The Boeing Company
Chain fall, 4 ton capacity	
Hoist, 1 ton capacity	
Shipping stand JT8D	
Trailer, engine handling JT8D	
Thread protector, engine cone bolt 4916744-503 and 4916744-505 (2 required)	The Boeing Company
Sling, upper cowl 5952168-1	The Boeing Company
Cover, intake 510-1235	Texstar Plastics
Cover, exhaust 510-1236	Texstar Plastics
Torque wrench (100-700 foot- pounds range)	
Socket 1 3/16 12 point	
Socket 15/16 12 point	
Socket 1 1/8 12 point	
Antiseize compound MIL-L-25681	
Stainless steel brush	
Lockwire .032 corrosion-resistant steel P05-289	
Lockwire .020 corrosion-resistant steel P05-288	
Guide, pylon apron bolt 4953893-1	The Boeing Company
Primer, fluid resistant (FR) base product 463-12-8 catalyst product CA-116	AKZO Coatings, Inc.
Torque wrench (0-600 inch pound range) (0-67.2N·m)	
Tag “Do Not Operate”	

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.

3. Removal/Installation Power Plant

A. Remove Power Plant

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) Tag throttle/thrust reverser lever, and open and tag following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
U	34	B1-140	OIL PRESSURE LOW CAUTION RIGHT
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
U	35	B1-967	ANN PANEL
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
U	35	B1-139	OIL PRESSURE LOW CAUTION LEFT
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
U	40	B1-40	ENGINE START PUMP
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 877, 880, 892, 893			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 877, 880, 892, 893			
U	42	B1-422	ENGINE START VALVE LEFT
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	27	B1-51	LEFT HYD PUMP CONTROL
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION
S	34	B1-181	LEFT FUEL TEMP
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
S	34	B1-969	LEFT SYSTEMS DISPLAY PANEL
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	21	B1-10	RIGHT OIL QUANTITY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	22	B1-12	RIGHT OIL TEMP
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
T	24	B1-972	ANN PANEL
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	27	B1-52	RIGHT HYD PUMP CONTROL
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
T	34	B1-970	RIGHT SYSTEMS DISPLAY PANEL
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 891			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

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

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

(2) Make certain that following listed levers are in indicated positions.

Table 402

(a) Throttle	Idle
(b) Thrust reverser lever	Forward thrust
(c) Fuel shutoff lever	Off
(d) Fire control handle	Pulled.

(3) Open fuselage 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 arm in dump position and install safety pin.

(5) Make certain the applicable Pneumatic Crossfeed Lever is in the CLOSED position.

(a) Attach a “Do Not Operate” tag to the applicable Pneumatic Crossfeed Lever. Write on the tag: PNEUMATIC CROSSFEED LEVER TO REMAIN IN THE CLOSED POSITION - ENGINE MAINTENANCE IN PROGRESS.

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

(6) Remove cowl doors as follows Figure 401Figure 405

(a) Open forward lower cowl door latches and stow fully open with all hooks visible.

(b) Support forward lower cowl door, release ground safety latch and allow door to hang vertically.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(c) Disconnect snubber reel cable(s) from engine bracket(s).

(d) Open pylon apron forward lower pin latches.

NOTE: With pin latches opened, door will remain engaged on apron frame bosses.

WARNING: FORWARD LOWER COWL DOOR WEIGHS APPROXIMATELY 99 POUNDS (45KG).

(e) Lift door up and inboard to disengage door latch eyes from apron.

(f) Remove door and place in suitable protective rack.

(g) Open aft lower cowl door bolts.

(h) Support aft lower cowl door, release ground safety latch and allow door to hang vertically.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(i)

Disconnect aft snubber reel cable from engine bracket.

(j) Open pylon apron lower aft pin latches.

NOTE: With pin latches opened, door will remain engaged on apron from bosses.

(k) Lift door up and inboard to disengage door latch eyes from apron.

WARNING: AFT LOWER COWL DOOR WEIGHS APPROXIMATELY 65 POUNDS (30KG).

(l) Remove door and place in suitable protective rack.

(m) Position all upper cowl door tension latch handles and triggers flush with door surface.

(n) Remove screws from door sling attach points and install sling.

(o) Open all apron upper pin latches, making certain each latch is fully open.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

(p) With upper cowl door in closed position, hoist door to remove, taking care to prevent damage to latch eyes, pylon apron, and engine components.

(q) Carefully lower door, remove sling, and install screws in door sling attach points.

(r) Place door in suitable protective rack.

(7) Open pylon access doors.

(8) Disconnect all clamps from engine wiring two feet behind electrical connectors.

CAUTION: TO PREVENT ELECTRICAL CONNECTOR DAMAGE DO NOT USE AN UP, DOWN OR SIDE MOTION ON ELECTRICAL CONNECTORS DURING REMOVAL.

CAUTION: MAKE CERTAIN THAT ALL ELECTRICAL CONNECTORS HAVE BEEN PULLED THROUGH PYLON APRON LIGHTENING HOLE TO PREVENT DAMAGE DURING ENGINE REMOVAL.

(9) Disconnect electrical connectors (Ref. Figure 402).

NOTE: Use a strap wrench to loosen electrical connector then plug pliers to remove.

NOTE: Electrical connectors for left and right engine installations are identical.

Table 403 Engine Electrical connectors

Connector Name	Engine Plug		Pylon Receptacle		
			Item		
	Item	Number	Left	Right	Number
Generator power	P1-802	FW42851	R5-9	R5-10	FW42850
Miscellaneous electrical No. 1	P1-800	DC63E36K-8PN	R5-5	R5-6	DC60E36M8SN
Fire detector Engine Loop A	P1-822	DC63E14SK-7PN	R5-19	R5-20	DC60E14SM7SN
Fire detector Engine Loop B	P1-823	DC63E14SK-7PW	R5-21	R5-22	DC60E14SM7SW
Generator control	P1-803	DC62E16SK-1SN	R5-7	R5-8	DC61E16SM1PN
Exhaust gas temperature	P1-804	DC63E12SBK 51PN	R5-11	R5-12	DC60E12SBM51SN
Fire detector Burn-through barrier Loop A	P1-824	DC63E12SK-3PN	R5-27	R5-28	DC60E12SM3SN
ART and Idle Solenoids	P1-855	DC63E20K-27PN	R5-433	R5-434	DC60E20M27SN
Miscellaneous electrical No. 2	P1-801	DC63E28K-21PN	R5-3	R5-4	DC60E28M21SN
Fire detector Burn-through barrier Loop B	P1-825	DC63E12SK-3PW	R5-29	R5-30	DC60E12SM3SW

(10) Disconnect engine synchronizer electrical connector at synchronizer actuator.

(11) Disconnect following hydraulic flex lines from engine hydraulic bridle support bracket.

NOTE: A five gallon container should be provided to catch hydraulic fluid.

CAUTION: MAKE CERTAIN THAT ANY SPILLED HYDRAULIC FLUID IS CLEANED UP IMMEDIATELY.

(a) Hydraulic supply

(b) Hydraulic pressure

(c) Hydraulic drain.

(12) Disconnect Pt_7 flex line from fitting at side of engine hydraulic bridle support bracket.

(13) Disconnect Pt_2 flex line from fitting on engine bracket.

(14) Disconnect fuel vapor vent flex line from engine fitting.

(15) Remove fuel bridle drain plug, located at bottom of fuel bridle, and drain fuel into suitable container.

NOTE: Fuel bridle and line contain approximately 1 gallon (3.8 liters).

(16) Install drain plug using new gasket and safety with P05-289 lockwire.

(17) Disconnect fuel supply flex line from engine fuel bridle and remove gasket.

CAUTION: SUPPORT OR REMOVE SHORT SECTION OF DUCT.

(18) Remove clamps from 8th-stage bleed air manifold duct.

CAUTION: SUPPORT OR REMOVE SHORT SECTION OF DUCT.

(19) Remove clamps from 13th-stage bleed air manifold duct.

(20) Disconnect thrust reverser flex hydraulic stow line from support bracket fitting.

NOTE: A two gallon (7.6 liters) container should be provided to catch hydraulic fluid.

(21) Disconnect thrust reverser flex hydraulic deploy line from support bracket fitting.

(22) On right engine disconnect power control rod end from engine cross shaft.

(23) On left engine disconnect engine synchronizer rod end trimmer from engine cross shaft.

(24) Disconnect fuel shutoff control rod end from engine cross shaft crank.

CAUTION: USE EXTREME CARE WHEN WORKING WITH ENGINE PUSH-PULL CABLES. DO NOT BEND CABLE IN RADIUS SMALLER THAN 7-INCHES (177.8MM) MINIMUM OR DAMAGE TO CABLE WILL RESULT.

(25) Remove fuel shutoff and power control cable support from side of right engine.

NOTE: Cable has a flat internal sliding ribbon and will bend in one direction only.

(26) Remove fuel shutoff and power control cable support and guide from side of left engine.

NOTE: Bolts, washers, and spacers used to attach support to engine mounted bracket should be retained with support to ensure installation when engine is installed.

(27) Install engine removal/installation support equipment as follows (Figure 409).

(a) Move engine removal/installation sling into place over engine.

(b) Carefully lower engine sling in place.

(c) Install sling on engine (Figure 409).

(28) Install portable hoisting boom if required as follows (Figure 408).

(a) Install forward and aft beam adapters at pylon attach points on opposite side of aircraft from engine being removed.

(b) Install beam on adapters making certain it is positioned as marked on beam.

(c) Attach strap to beam and carefully pass over fuselage.

NOTE: Place strap swivel on foam to protect fuselage from damage.

(d) Install bracket on upper fuselage at attach point and connect cable to bracket.

CAUTION: DO NOT INSTALL BOOM LEG BOLTS FIRST. DAMAGE TO AIRCRAFT COULD OCCUR IF BOOM LEANS OUTBOARD TOO FAR.

(e) Position boom legs at pylon attach points. First connect cable at upper end boom then install bolt attaching legs to pylon.

NOTE: Short leg of boom hoist is always in forward position.

(f) Raise chain fall and connect chain fall to boom hanger.

(g) Connect hoist to cable.

(h) Install engine sling on engine.

(i) Connect chain fall and hoist to engine sling.

WARNING: ENGINE WEIGHS APPROXIMATELY 5900 POUNDS (2676KG). MAKE CERTAIN ENGINE REMOVAL/INSTALLATION SUPPORT EQUIPMENT IS ADJUSTED TO GIVE EVEN FORE AND AFT SUPPORT TO ENGINE. UNEVEN SUPPORT CAN CAUSE SHIFT OF ENGINE WEIGHT AND RESULT IN INJURY TO PERSONNEL OR DAMAGE TO ENGINE.

(29) Take up weight of engine until sag is removed from vibration isolators.

NOTE: If available, a dynamometer (load cell) may be used to help maintain proper engine support.

(30) Untorque forward cone bolts but do not back off.

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTORS BE INSTALLED ON EACH CONE BOLT PRIOR TO EACH ENGINE REMOVAL AND INSTALLATION. CONE BOLTS WITH DAMAGED THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

(31) Remove aft cone bolt nut and washer, and install thread protector, discard nut.

NOTE: Make certain thread protector is fully engaged approximately 15 to 18 turns.

(32) Remove forward bolts which connect pylon apron to engine.

(33) Remove bolts which connect apron lower structure to engine aft engine mount flange.

(34) Remove bolts which connect apron upper structure to engine aft engine mount flange.

NOTE: On installations using double shouldered bolts, bushings should be removed and retained with bolts to ensure installation when engine is installed.

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTORS BE INSTALLED ON EACH CONE BOLT PRIOR TO EACH ENGINE REMOVAL AND INSTALLATION. CONE BOLTS WITH DAMAGED THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

CAUTION: FAILURE TO BACK OFF ATTACH BOLT NUT COULD CAUSE CONE BOLT GALLING AND OR DAMAGE TO VIBRATION ISOLATOR.

(35) Remove cotter pins from the upper and lower forward cone bolt attach bolt and back off nut until a gap exists between nut and washer.

(36) Remove forward lower cone bolt nut and washer, and install thread protector, discard nut.

(37) Remove forward upper cone bolt nut and washer, and install thread protector, discard nut.

(38) Carefully move engine away from pylon to disengage cone bolts from vibration isolators. Guide electrical harness during engine removal.

CAUTION: MAKE CERTAIN ALL LINES, DUCTS, ELECTRICAL CONNECTORS, AND CONTROL CABLES ARE CLEAR BEFORE LOWERING ENGINE. BE ESPECIALLY CAREFUL NOT TO DAMAGE FIRE DETECTOR UNITS OR KINK CONTROL CABLES AT PYLON BULKHEAD SWIVEL PLATES.

(39) Make certain cone bolts are fully disengaged from vibration isolators and lower engine.

(40) Remove lower cone bolt and attaching hardware from engine, discard nut. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

NOTE: Lower cone bolt must be removed before lowering engine into dolly.

(41) Lower engine onto an approved transportation dolly.

(42) Remove engine removal/installation support equipment from engine.

(43) Remove upper forward cone bolt and attaching hardware from engine, discard nut. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

(44) Remove aft cone bolt and attaching hardware from engine. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

(45) Check condition of cone bolts and attach through bolts. (CONE BOLTS, SUBJECT 71-20-01, page 201)

NOTE: After each engine removal, it is recommended that both a visual and magnetic particle inspection be performed on cone bolts, and cone bolt through bolts. Refer to Barry Controls Component Maintenance Manual. (VIBRATION ISOLATORS, SUBJECT 71-20-02, page 601)

(46) Clean and check vibration isolators for general security condition, with particular attention to conical surface of inner cone assembly for scratches, nicks, burrs, galling, corrosion or wear.

NOTE: For inspection, repair or rework refer to Barry Controls Component Maintenance Manual. (VIBRATION ISOLATORS, SUBJECT 71-20-02).

(47) Make certain forward vibration isolator alignment marks are within limits. (VIBRATION ISOLATORS, SUBJECT 71-20-02, Page 201)

(48) Examine the fireseal boot as follows:Figure 410

(a) Examine the fireseal boot around the engine fuel vapor removal duct assembly for cuts, cracks or holes.

1) If the total area of the above damages that are found in the fireseal boot and are not more than 2 in^2 (1290 mm^2), repair the fireseal boot.

2) If a repair that was done before has come loose and the total area of the above damages that are found in the fireseal boot are not more than 2 in^2 (1290 mm^2), repair the fireseal boot.

3) If the total area of the above damages are not repaired and are more than 2 in^2 (1290 mm^2), repair the fireseal boot.

NOTE: If a repair that was done before is found to be in a good condition, do not include the repair in the total area.

B. Install Power Plant

Make certain throttle/thrust reverser lever is tagged and following circuit breakers are open

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
U	34	B1-140	OIL PRESSURE LOW CAUTION RIGHT

WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893 (Continued)

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
U	35	B1-139	OIL PRESSURE LOW CAUTION LEFT
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
U	40	B1-40	ENGINE START PUMP
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 877, 880, 892, 893			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 877, 880, 892, 893			
U	42	B1-422	ENGINE START VALVE LEFT
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	27	B1-51	LEFT HYD PUMP CONTROL
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893 (Continued)

(Continued)

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	34	B1-181	LEFT FUEL TEMP
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
S	34	B1-969	LEFT SYSTEMS DISPLAY PANEL
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	21	B1-10	RIGHT OIL QUANTITY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	22	B1-12	RIGHT OIL TEMP
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
T	24	B1-972	ANN PANEL
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	27	B1-52	RIGHT HYD PUMP CONTROL
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
T	34	B1-970	RIGHT SYSTEMS DISPLAY PANEL
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 891			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY

WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 891 (Continued)

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

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

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

(1) Make certain that following listed levers are in indicated positions.

Table 404

(a) Throttle	Idle
(b) Thrust reverser lever	Forward thrust
(c) Fuel shutoff lever	Off
(d) Fire control handle	Pulled.

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 that thrust reverser control valve arm is in dump position and safety pin is installed.

(3) Make certain the applicable Pneumatic Crossfeed Lever is in the CLOSED position and a “Do Not Operate” tag is attached.

(4) Make sure that the fireseal boot of the engine fuel vapor removal duct assembly was inspected.

(5) If forward upper cone bolt and aft cone bolt are not installed, install per CONE BOLTS, SUBJECT 71-20-01, page 201.

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads, refer to CONE BOLTS, SUBJECT 71-20-01, Page 201, Paragraph 7 .

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTORS BE INSTALLED ON EACH CONE BOLT PRIOR TO EACH ENGINE REMOVAL AND INSTALLATION. CONE BOLTS WITH DAMAGED THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

(6) Install thread protectors.

NOTE: Make certain thread protector is fully engaged (approximately 15 to 18 turns).

(7) Prepare electrical wiring prior to engine installation as follows:

(a) Disconnect all clamps from engine wiring two feet behind electrical connectors.

(b) Apply petrolatum to power cable clamp cushions. This makes it easier to install clamps after electrical connectors are connected.

(c) Loosely attach top clamp of power cable to support cable during engine installation.

(d) Make certain when installing engine to pull electrical connector through lighting hole.

(8) Install engine removal/installation support equipment.

WARNING: ENGINE WEIGHS APPROXIMATELY 5900 POUNDS (2676KG). MAKE CERTAIN ENGINE REMOVAL/INSTALLATION SUPPORT EQUIPMENT IS ADJUSTED TO GIVE EVEN FORE AND AFT SUPPORT TO ENGINE. UNEVEN SUPPORT CAN CAUSE SHIFT OF ENGINE WEIGHT AND RESULT IN INJURY TO PERSONNEL OR DAMAGE TO ENGINE.

(9) Carefully remove engine from transportation dolly and raise into approximate position for installation.

(10) Install forward lower cone bolt. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads, refer to CONE BOLTS, SUBJECT 71-20-01, Page 201, paragraph 7 .

(11) Apply a light coat of antiseize compound EASE-OFF 990 on conical surfaces and threads of dry lubricated cone bolts.

CAUTION: MAKE CERTAIN ALL LINES, DUCTS, ELECTRICAL CONNECTORS, AND CONTROL CABLES ARE GUIDED INTO POSITION. BE ESPECIALLY CAREFUL NOT TO DAMAGE FIRE DETECTOR UNITS OR KINK CONTROL CABLES AT YPLON BULKHEAD SWIVEL PLATES.

(12) Align forward and aft cone bolts with vibration isolators; carefully move engine toward pylon to engage cone bolts and isolators.

(13) Make certain forward and aft cone bolts are properly engaged, remove thread protectors, and install washers and new nuts fingertight only.

NOTE: In the event of an unscheduled engine change at a remote location and replacement nut is not available, nut should be checked and proper running torque maintained at time of installation.

NOTE: If split aluminum thread protectors have been used, aluminum shavings should be removed from cone bolt threads using a stainless steel brush only.

(14) Insure apron support fittings which attach apron to engine flanges are properly positioned between flanges.

CAUTION: WHEN INSTALLING DOUBLE SHOULDERED BOLT, ENSURE BOLT BUSHING HAS BEEN INSTALLED PRIOR TO TIGHTENING, OR DISTORTION OF BOLT MAY OCCUR.

(15) Install bolt guides on bolts and install bolts which connect apron upper structure to engine aft rails.

NOTE: Pylon apron bolt guides are used to align pylon apron aft attach fittings during bolt installation.

(16) Install forward bolts which connects pylon apron to support brackets at nose cowl.

(17) Install bolt which connects apron lower structure to engine aft rails.

CAUTION: IF USING AN EXTENSION WITH TORQUE WRENCH TO TIGHTEN AFT CONE BOLT NUT, TORQUE VALUE CORRECTIONS MUST BE COMPUTED IN ACCORDANCE WITH FORMULA.

(18) STANDARD PRACTICES - ENGINE, CHAPTER 70

CAUTION: CONE BOLT THREADS MUST BE CLEAN AND DRY WHEN PERFORMING RUNNING TORQUE OF CONE BOLT NUTS.

CAUTION: RUNNING TORQUE OF FORWARD CONE BOLT NUT MUST NOT BE LESS THAN 90 INCH-POUNDS (10.2 N.M.).

CAUTION: RUNNING TORQUE OF AFT CONE BOLT NUT MUST NOT BE LESS THAN 50 INCH-POUNDS (5.6 N.M.).

CAUTION: IF THERE IS ANY DOUBT AS TO INTEGRITY OF NUT SELF LOCKING FEATURE, IT SHOULD BE DISCARDED TO PROVIDE HIGHEST MARGIN OF SAFETY.

(19) Perform running torque of forward and aft cone bolt nuts.

(20) Remove nuts and prepare forward and aft cone bolts as follows:

(a) Apply coating of anti-seize compound (MIL-L-25681) on threads only of dry lubricated cone bolts.

(21) Install cone bolt nuts.

(22) Tighten nuts of forward cone bolts to a final torque of 425 to 650 foot-pounds (5100 to 7800 in.-lbs.) (576.3 to 881.4 N·m).

(23) Tighten nut of aft cone bolt to a final torque of 200 to 220 foot-pounds (2400 to 2640 in.-lb.) (271.2 to 298.3 N·m).

(24) Torque-stripe forward and aft cone bolt nuts with yellow-green FR primer.

NOTE: Purpose of the torque-stripe is to provide operators with a visual means of determining if cone bolt nuts have backed off in service.

(25) Remove engine removal/installation support equipment.

CAUTION: USE EXTREME CARE WHEN WORKING WITH ENGINE PUSH-PULL CABLES. DO NOT BEND CABLE IN RADIUS SMALLER THAN 7-INCHES (177.8MM) MINIMUM OR DAMAGE TO CABLE WILL RESULT.

(26) Install fuel shutoff and power control cable support on side of right engine.

NOTE: Cable has a flat internal sliding ribbon and will bend in one direction only.

CAUTION: DO NOT EXCEED 1000 INCH-POUNDS (113 N.M.) OF CLAMP UP TORQUE (FINAL TORQUE LESS RUNNING TORQUE).

(27) After engine is installed and if cotter pin was not previously installed, complete attach bolt nut final adjustment procedure as follows:

(a) Note position of nut, advance nut minimum amount to align either cotter pin hole with any notch, but not to exceed 1000 in-lb (113 N·m) of clamp up torque.

CAUTION: ENSURE NUT ROTATION DOES NOT EXCEED 45 DEGREES.

(b) Make certain that nut rotation does not exceed 45 degrees from position noted in Paragraph 3.B.(26)(a).

(c) If cotter pin hole alignment is accomplished and nut rotation was within the 45 degrees, and 1000 in-lb (113 N·m) of torque was not exceeded, install cotter pin.

(d) If alignment cannot be accomplished without exceeding 1000 in-lb (113 N·m), or of clamp up torque, or 45 degrees from noted position, back off nut half turn, then retighten. Occasionally it may be necessary to select a new nut.

(e) Torque attach bolt nut to a value of 200 in-lb (23 N·m) to 250 in-lb (28 N·m) above the nut running torque measured in Paragraph 3.B.(26)(d).

CAUTION: DO NOT EXCEED 1000 INCH-POUNDS (113 N.M.) OF CLAMP UP TORQUE (FINAL TORQUE LESS RUNNING TORQUE).

(f) Advance nut minimum amount to align either cotter pin hole with any notch, but not to exceed 1000 in-lb (113 N·m) of torque.

(g) Install cotter pin and trim as required.

(28) Bend attach bolt retainer washer to come in contact with flat surface of attach bolt head to provide the anti-rotation feature of the washer.

(29) Install fuel shutoff and power control cable support and guide on side of left engine.

(30) Connect and adjust power control cable, refer Quick Engine Change (THROTTLE SYSTEMS, SUBJECT 76-11-00, Page 501.)

(31) Connect and adjust fuel shutoff cable, refer Quick Engine Change (FUEL SHUTOFF SYSTEM, SUBJECT 76-12-00, Page 501).

(32) Connect and adjust engine synchronizer at left engine (ENGINE SYNCHRONIZER, SUBJECT 76-11-02, Page 201).

(33) Connect thrust reverser flex hydraulic deploy line to support bracket fitting.

(34) Connect thrust reverser flex hydraulic stow line to support bracket fitting.

(35) Install clamps (without Dubl-Lock if applicable) on 13th and 8th stage bleed air manifold ducts as follows:

NOTE: To aid seating of clamp, inside of retainer segment may be lubricated with light coating of high temperature anti-seize (MIL-A-907) or petrolatum lubricant (VV-P-236) or equivalent, being careful not to allow lubricant to contact T-bolt.

(a) Position clamp over matting flange of duct.

CAUTION: DO NOT EXCEED MAXIMUM TORQUE VALUE OF 120 INCH POUNDS, AS SPECIFIED ON CLAMP.

(b) Place T-bolt in trunnion of clamp and tap clamp lightly with non-metallic mallet while tightening clamp to torque value specified on clamp (110-120 inch-pounds).

NOTE: Tapping should be around circumference of any accessible clamp surface in order to aid in the distribution of the load as the clamp is tightened.

(36) Install (Dubl-Lock if applicable) on 13th and 8th stage bleed air manifold ducts as follows:

NOTE: To aid seating of clamp, inside of retainer segment may be lubricated with light coating of high temperature anti-seize (MIL-A-907) or petrolatum lubricant (VV-P-236) or equivalent, being careful not to allow lubricant to contact T-bolt.

(a) Position clamp over matting flage of duct.

CAUTION: DO NOT EXCEED MAXIMUM TORQUE VALUE, AS SPECIFIED ON CLAMP.

(b) Position Dubl-Lock tang in opening beneath head of T-bolt and tighten nut using torque wrench until tang locks. Do not exceed torque value stamped on clamp. While tightening nut, tap clamp with non-metallic mallet around circumference or any accessible clamp surface in order to aid distribution of load.

(c) After Dubl-Lock tang has engaged, continue to tighten nut until torque value specified on clamp is reached. While tightening nut to specified torque value, tap clamp with non-metallic mallet around circumference or any accessible clamp surface until value is achieved and install safety pin.

(37) Maintain 3/16 inch minimum clearance between bleed air manifold ducts and clamps, and burn-thru barrier. Duct support links may be adjusted to obtain clearance.

(38) Install new gasket and connect fuel supply flex line to engine fuel bridle.

CAUTION: DURING INSTALLATION OF FUEL SUPPLY FLEX LINE, MAINTAIN 0.50 (12.7 MM) INCH MINIMUM CLEARANCE FROM ADJACENT AIR MANIFOLD DUCTS TO PREVENT DAMAGE FROM CHAFING FROM VIBRATION.

(39) Connect fuel vapor vent flex line to engine fitting.

(40) Connect Pt_2 flex line to fitting on engine bracket.

(41) Connect Pt_7 flex line to fitting at side of engine hydraulic bridle support bracket.

(42) Connect following hydraulic flex lines to engine hydraulic bridle support bracket.

CAUTION: MAKE CERTAIN THAT ANY SPILLED HYDRAULIC FLUID IS CLEANED UP IMMEDIATELY.

(a) Hydraulic supply

(b) Hydraulic pressure

(c) Hydraulic drain

CAUTION: TO PREVENT ELECTRICAL CONNECTOR DAMAGE DO NOT USE AN UP, DOWN OR SIDE MOTION ON ELECTRICAL CONNECTORS DURING INSTALLATION.

(43) Connect electrical connectors listed in Table 403. Make certain fire detector loop A and fire detector loop B are connected as shown in Figure 406Figure 407..

NOTE: For ease of installation, install electrical connectors in sequence shown in table.

NOTE: Electrical connectors for left and right engine installations are identical except engine synchronizer.

NOTE: Performing the following steps in the correct order will help prevent damage to electrical connectors, make the job easier and save time.

(a) Connect power cable plug P1-802 first.

NOTE: If six wire bundle clamps have not been loosened, it is much more difficult to align plug and prevent cross threading.

1) Start connector by hand and make certain that plug is in alignment. Turn connector one or two revolutions.

2) Tighten connector with strap wrench only after ensuring that plug is not cross threaded.

3) Safety connector with P05-288 lockwire.

(b) Connect plugs aft of power cable plug (P1-800, P1-803, P1-804, P1-822, P1-823 and P1-824).

NOTE: When tightening self-locking connectors, be careful not to overtighten. Tighten until the plug body bottoms into receptacle (stops moving into receptacle), then just snug up coupling ring.

1) Hand start large plug P1-800, but do not tighten yet. This supports wire bundle while other plugs are connected.

2) Hand start plug P1-822, then tighten with plug pliers.

3) Hand start plug P1-823, then tighten.

4) Hand start plug P1-803, then tighten.

5) Tighten plug P1-800, previously hand started in step (29) (b) 1). Use extra care not to cross thread plug.

6) Hand start and tighten two aft lower connectors P1-804, P1-824.

(c) Connect plugs forward of power cable plug (P1-801, P1-825 and P1-855).

1) Hand start plug P1-855, then tighten.

2) Hand start plug P1-801, then tighten. This connector might have preload from wire bundle. Use care to properly align plug.

3) Hand start plug P1-825, then tighten.

NOTE: Only the large power cable connector (P1-802) needs to be safety wired in this area.

(44) Clamp wire bundles as follows:

(a) First install four clamps that are approximately 4 inches behind plugs.

NOTE: The order of installation is not critical.

(b) These clamps have captive screws, three of which have phillips heads.

(c) Upward pressure is needed to close clamps. On phillips head screws use screwdriver. On power cable clamp screw use socket wrench. (To prevent screw from backing into socket, half fill socket with tape, etc.)

(d) It is very important to locate clamps on wire bundles before trying to close clamps.

(e) Make sure rubber cushions on clamps are in proper position when complete.

(45) Connect engine synchronizer electrical connector to actuator on left engine only.

(46) Install cowl doors as follows:

(a) Make certain all pylon apron upper pin latches are fully open.

(b) Remove screws from upper cowl door sling attach points and install sling.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

(c) Hoist door into approximate position and install door making certain all door latch eyes engage apron pin latches properly.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(d) Close all pylon apron upper pin latches.

(e) Make certain all pin latch triggers are flush with pylon apron surface.

(f) Remove sling and install screws in upper cowl door sling attach points, flush with door surface.

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.

(g) Open upper cowl door, install both hold open rods, and make certain pins are properly engaged.

(h) Make certain pylon apron aft lower pin latches are fully open.

WARNING: AFT LOWER COWL DOOR WEIGHS APPROXIMATELY 65 POUNDS (30KG).

(i) Position aft lower cowl door, making certain latch eyes are engaged on apron, and allow door to hang vertically.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(j) Close pylon apron aft lower pin latches.

(k) Make certain pin latch triggers are flush with apron surface.

CAUTION: SNUBBER REEL CABLE IS SPRING-LOADED. RESTRAIN CABLE DURING INSTALLATION OF PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(l) Connect aft snubber reel cable to engine bracket.

(m) Make certain pylon apron forward lower pin latches are fully open.

WARNING: FORWARD LOWER COWL DOOR WEIGHS APPROXIMATELY 99 POUNDS (45KG).

(n) Position forward lower cowl door, making certain latch eyes are engaged on apron, and allow door to hang vertically.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(o) Close pylon apron forward lower pin latches.

(p) Make certain pin latch triggers are flush with apron surface.

CAUTION: SNUBBER REEL CABLE IS SPRING-LOADED. RESTRAIN CABLE DURING INSTALLATION OF PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(q) Connect snubber reel cable(s) to engine bracket(s).

(r) Open lower cowl doors, install both hold-open rods, and make certain pins are properly engaged.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(s) Close pylon apron forward lower pin latches.

(t) Make certain pin latch triggers are flush with apron surface.

CAUTION: SNUBBER REEL CABLE IS SPRING-LOADED. RESTRAIN CABLE DURING INSTALLATION OF PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(u) Connect snubber reel cable(s) to engine bracket(s).

(v) Open lower cowl doors, install both hold-open rods, and make certain pins are properly engaged.

(47) Remove tags and close following circuit breakers

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 401-404, 412, 414, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
U	34	B1-140	OIL PRESSURE LOW CAUTION RIGHT
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
U	35	B1-139	OIL PRESSURE LOW CAUTION LEFT

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893 (Continued)

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
U	40	B1-40	ENGINE START PUMP
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 877, 880, 892, 893			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873, 874, 891			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 877, 880, 892, 893			
U	42	B1-422	ENGINE START VALVE LEFT
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	27	B1-51	LEFT HYD PUMP CONTROL
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY

WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893 (Continued)

(Continued)

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION
S	34	B1-181	LEFT FUEL TEMP
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
S	34	B1-969	LEFT SYSTEMS DISPLAY PANEL
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	21	B1-10	RIGHT OIL QUANTITY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	22	B1-12	RIGHT OIL TEMP
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
T	24	B1-972	ANN PANEL
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	27	B1-52	RIGHT HYD PUMP CONTROL
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 891-893			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE 401-404, 412, 414, 415, 418, 863, 864, 866, 875-879			
T	34	B1-970	RIGHT SYSTEMS DISPLAY PANEL
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 891			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

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

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

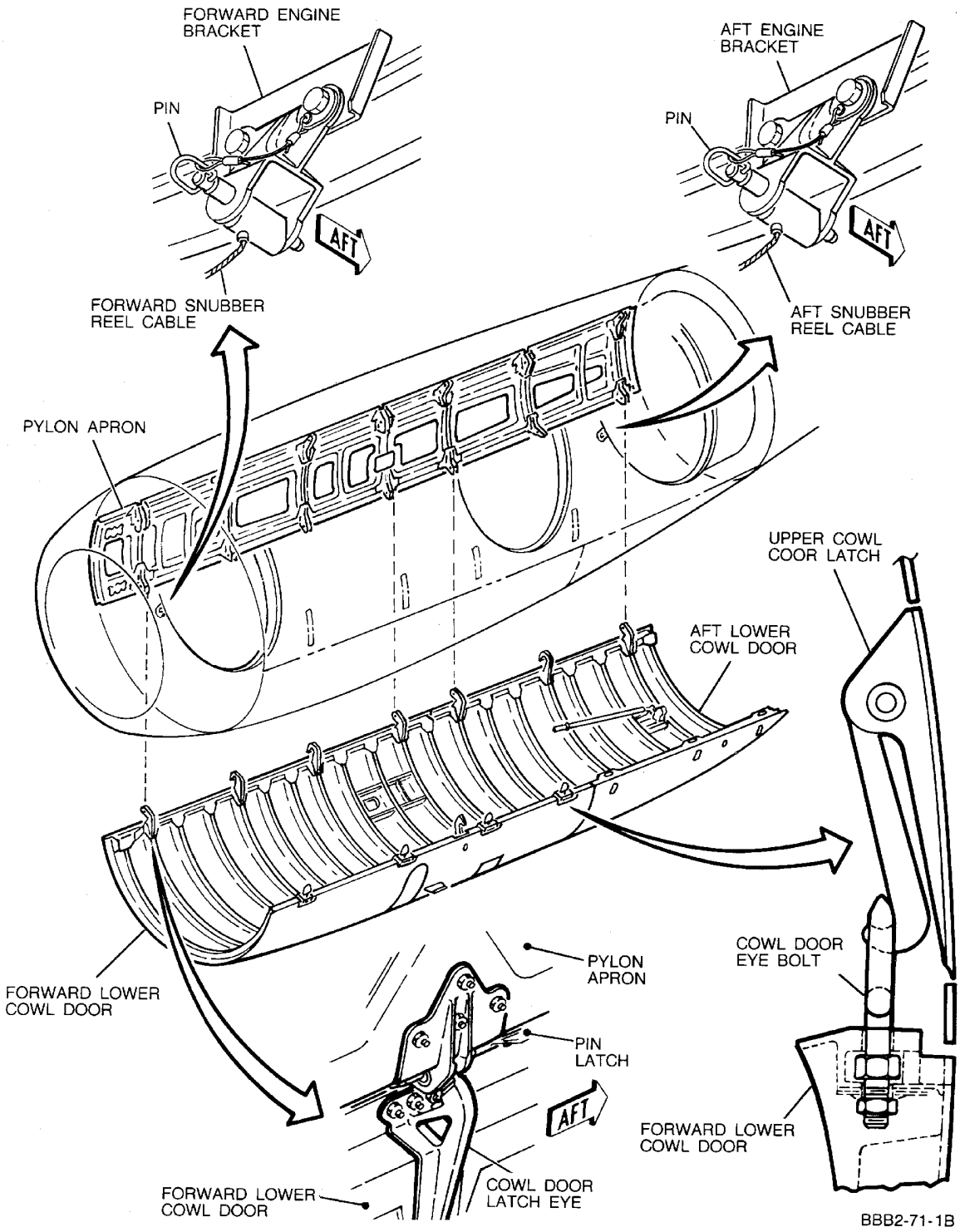
UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

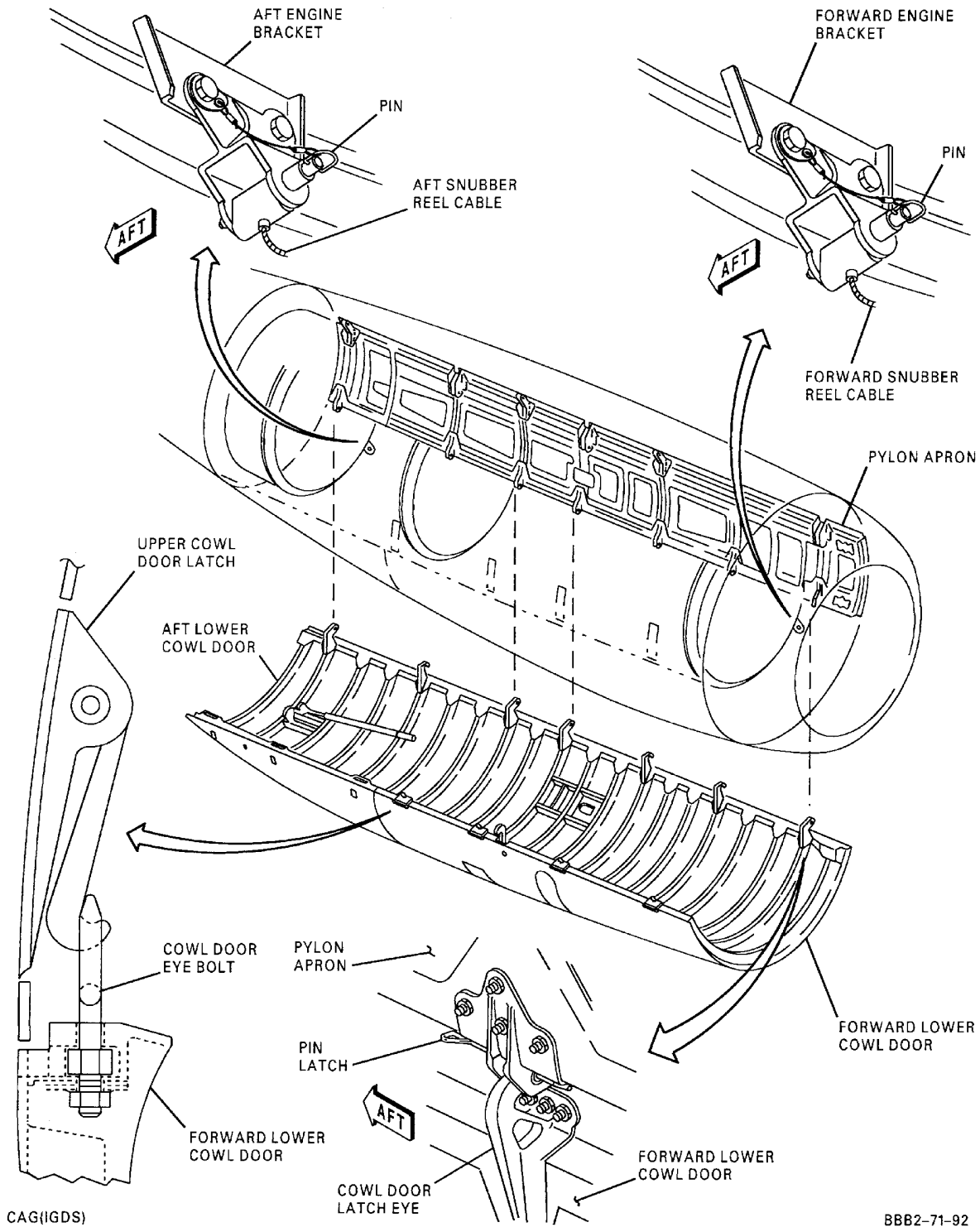
(48) Place fire control handle in normal position.

(49) Remove the “Do Not Operate” tag from the applicable Pneumatic Crossfeed Lever.

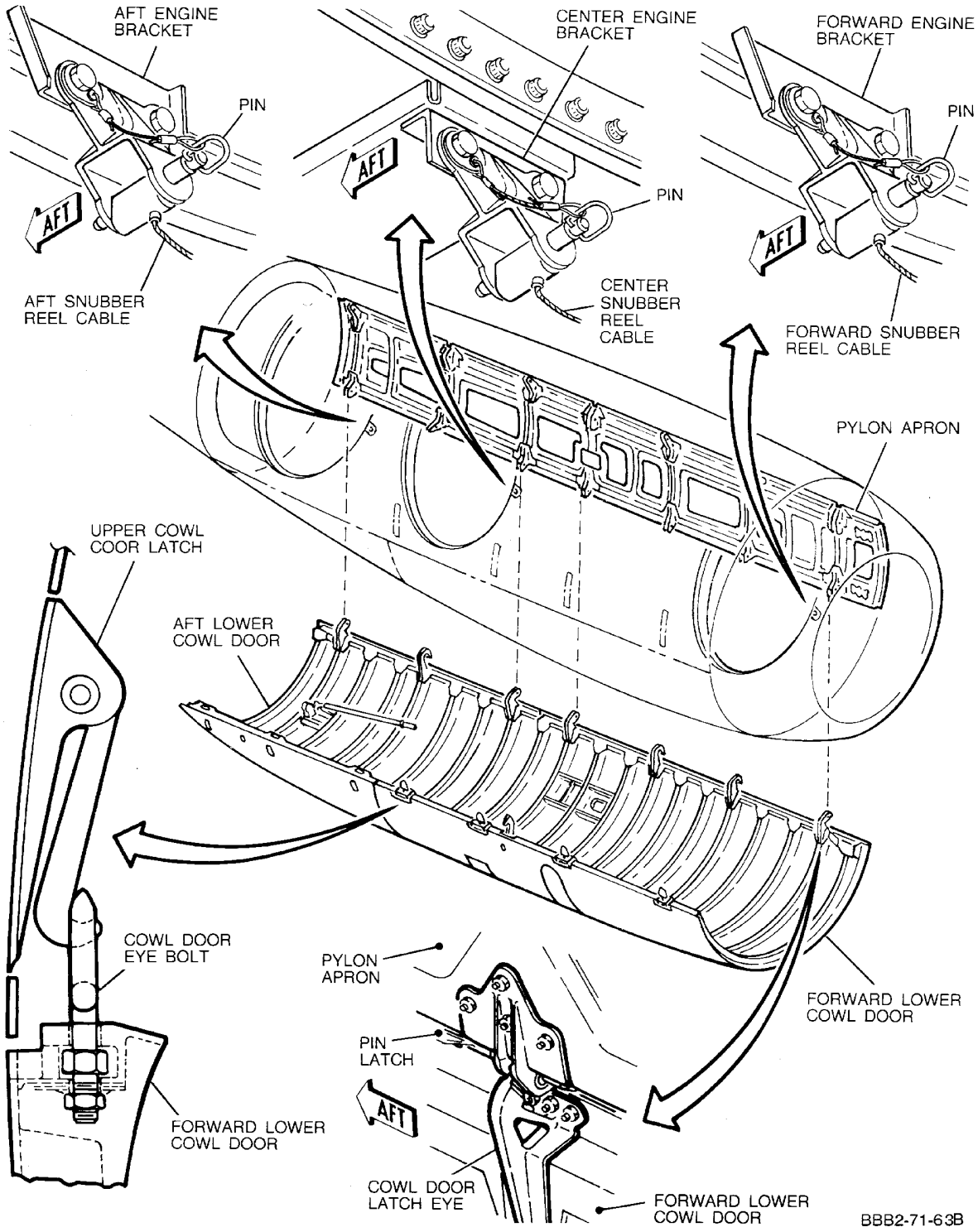
(50) Perform check outlined in Check Power Plant paragraph.



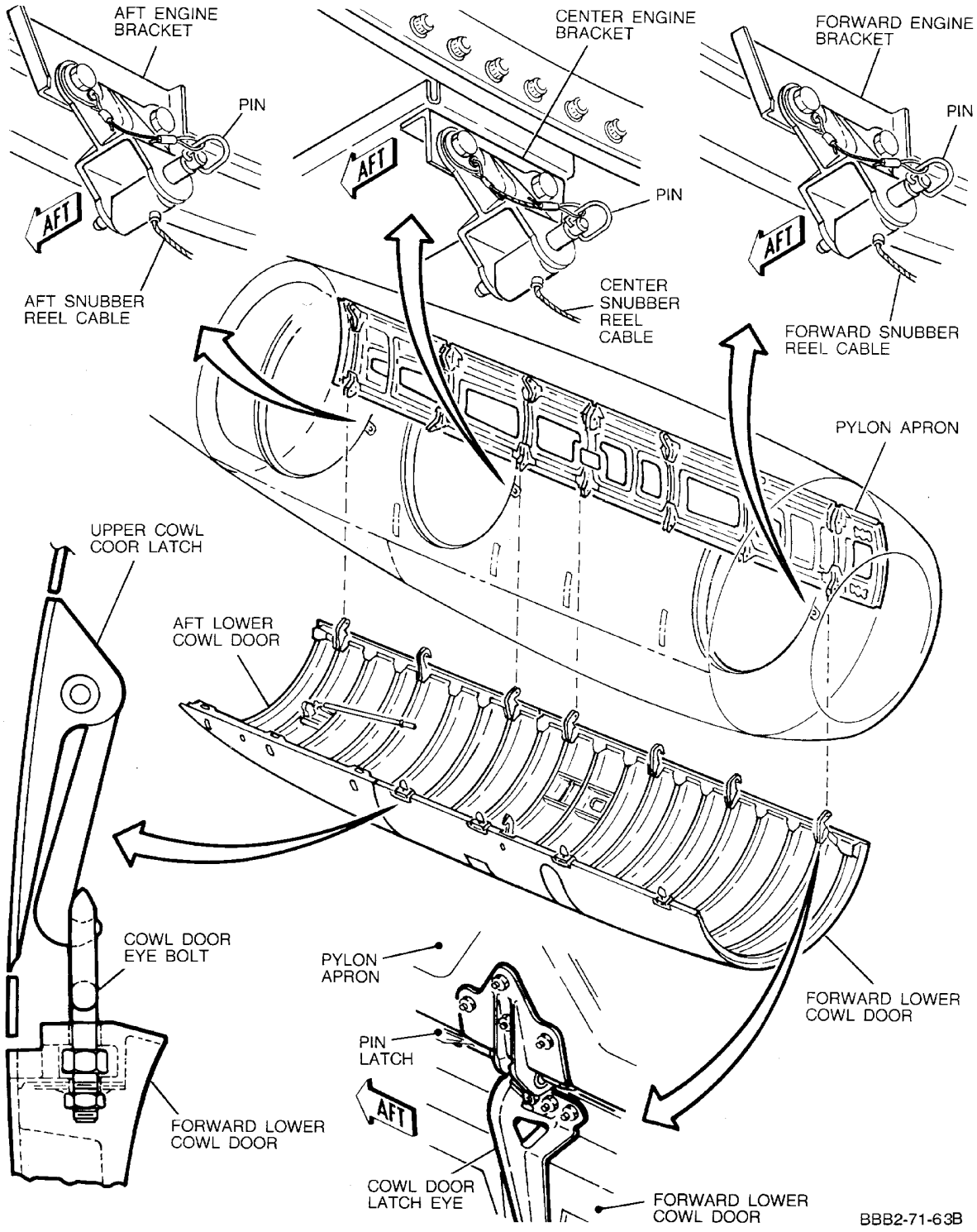
Left Lower Cowl Door -- Removal/Installation
Figure 401/71-00-00-990-829



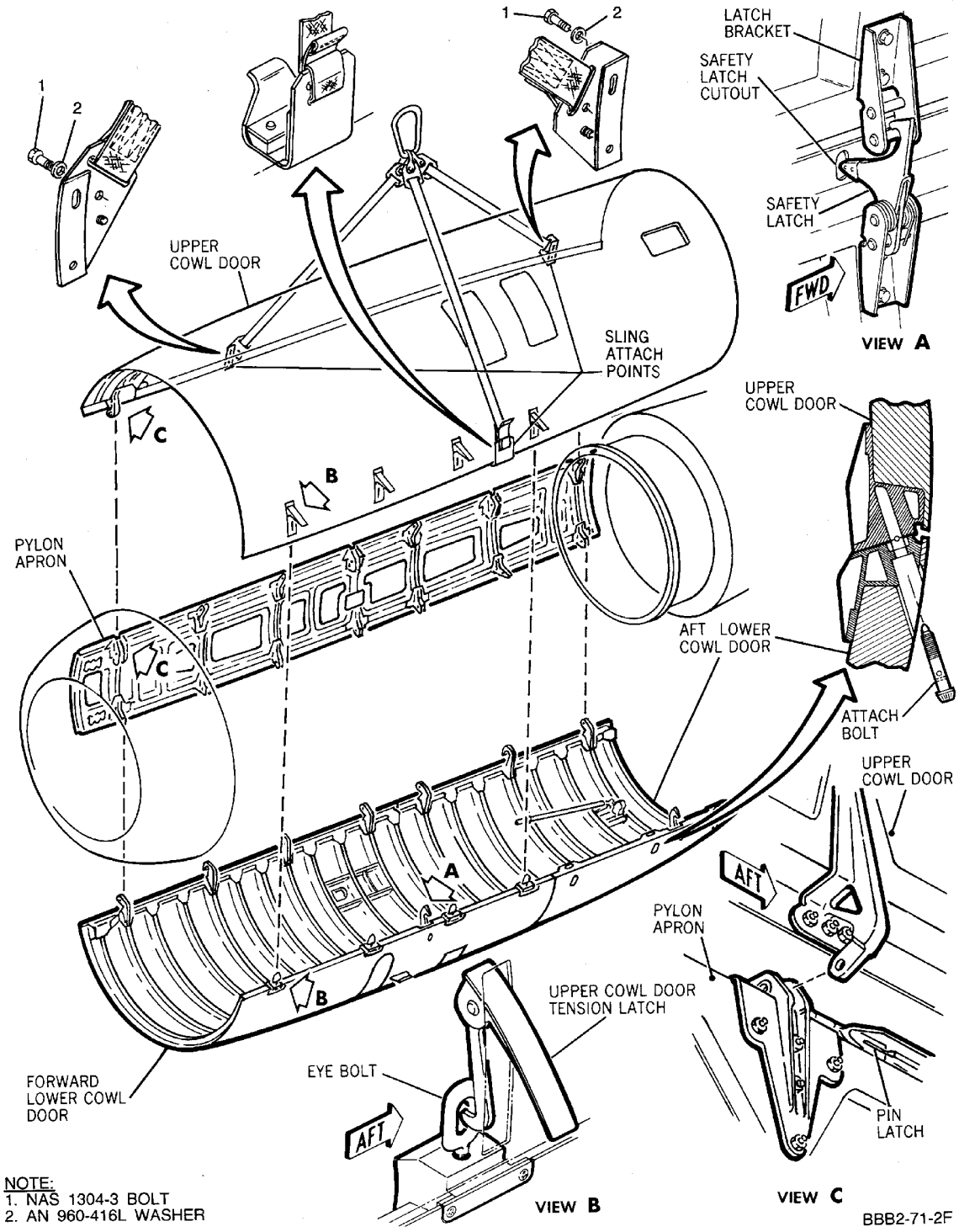
Right Lower Cowl Door -- Removal/Installation
Figure 402/71-00-00-990-830



Right Lower Cowl Door -- Removal/Installation
Figure 403/71-00-00-990-831

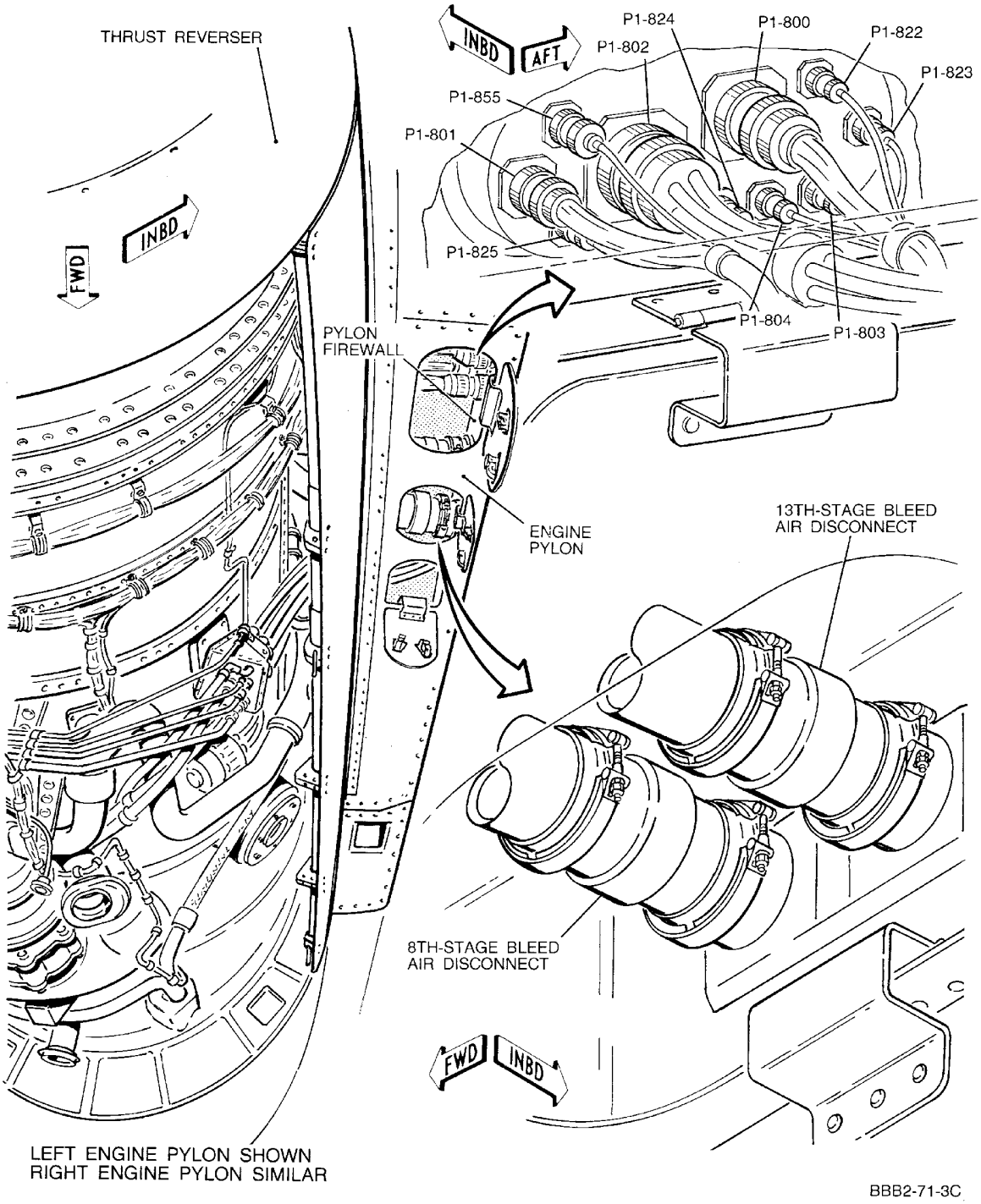


Right Lower Cowl Door -- Removal/Installation
Figure 404/71-00-00-990-838

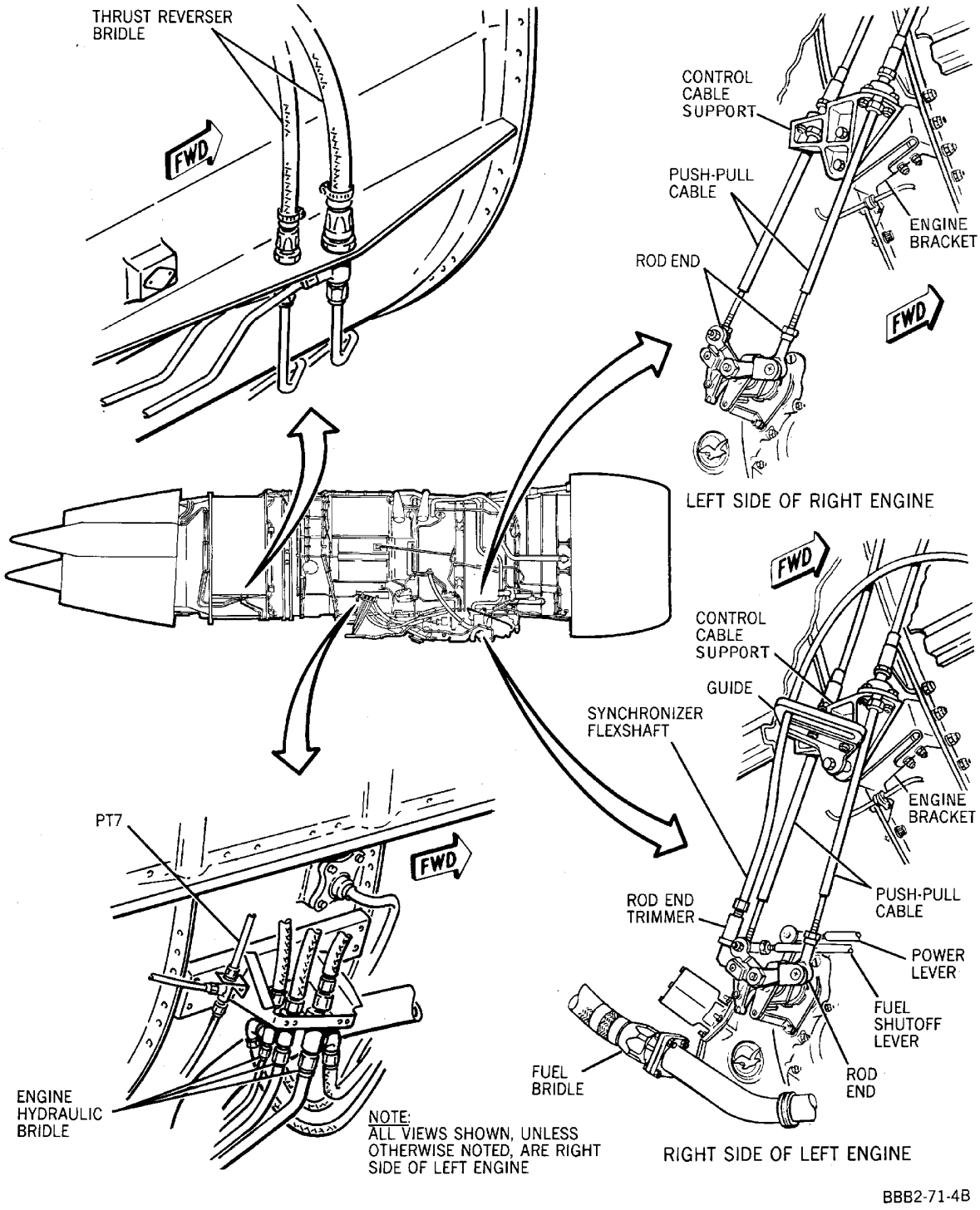


NOTE:
1. NAS 1304-3 BOLT
2. AN 960-416L WASHER

Cowl Door -- Removal/Installation
Figure 405/71-00-00-990-832

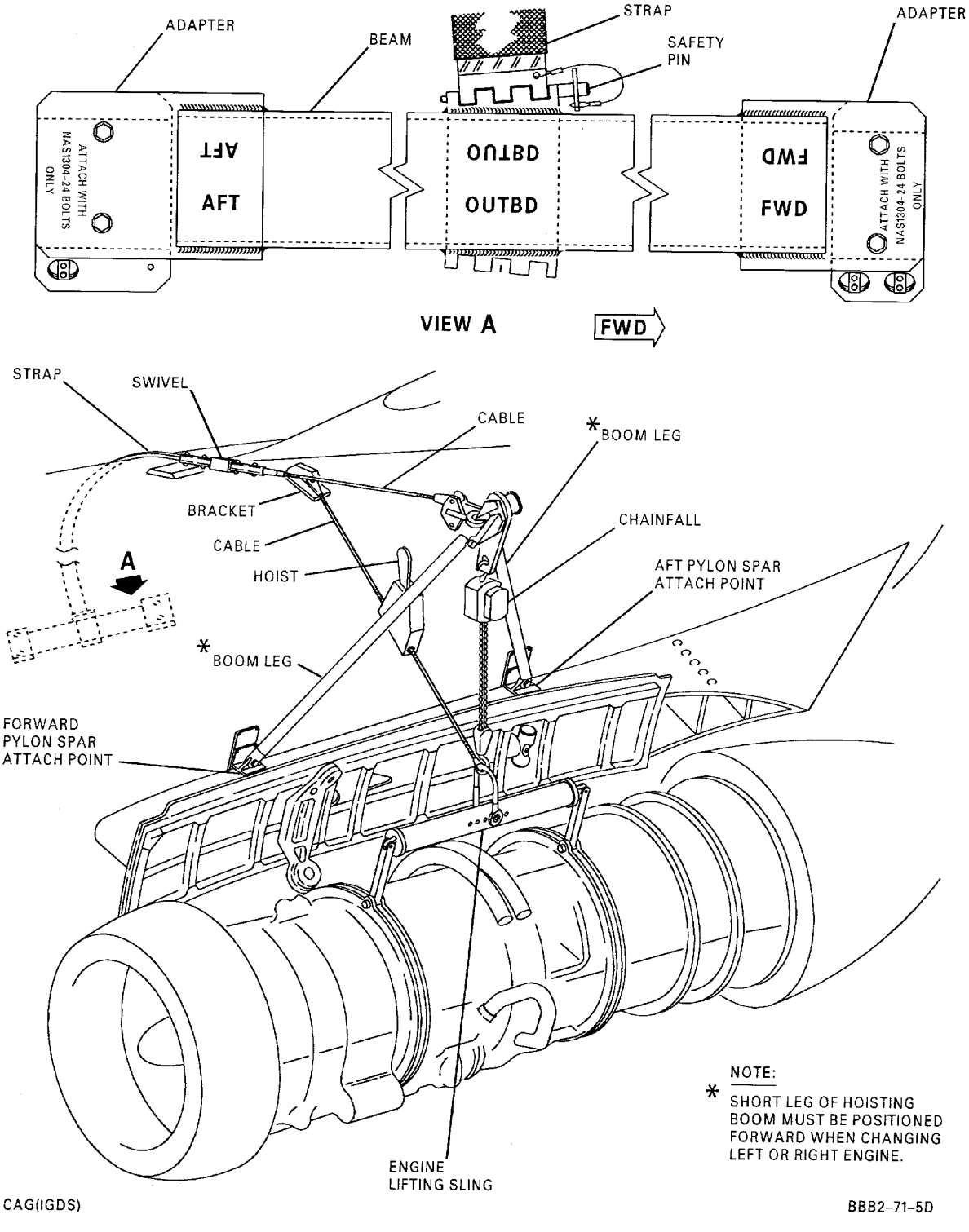


Power Plant Disconnect Points
Figure 406/71-00-00-990-837

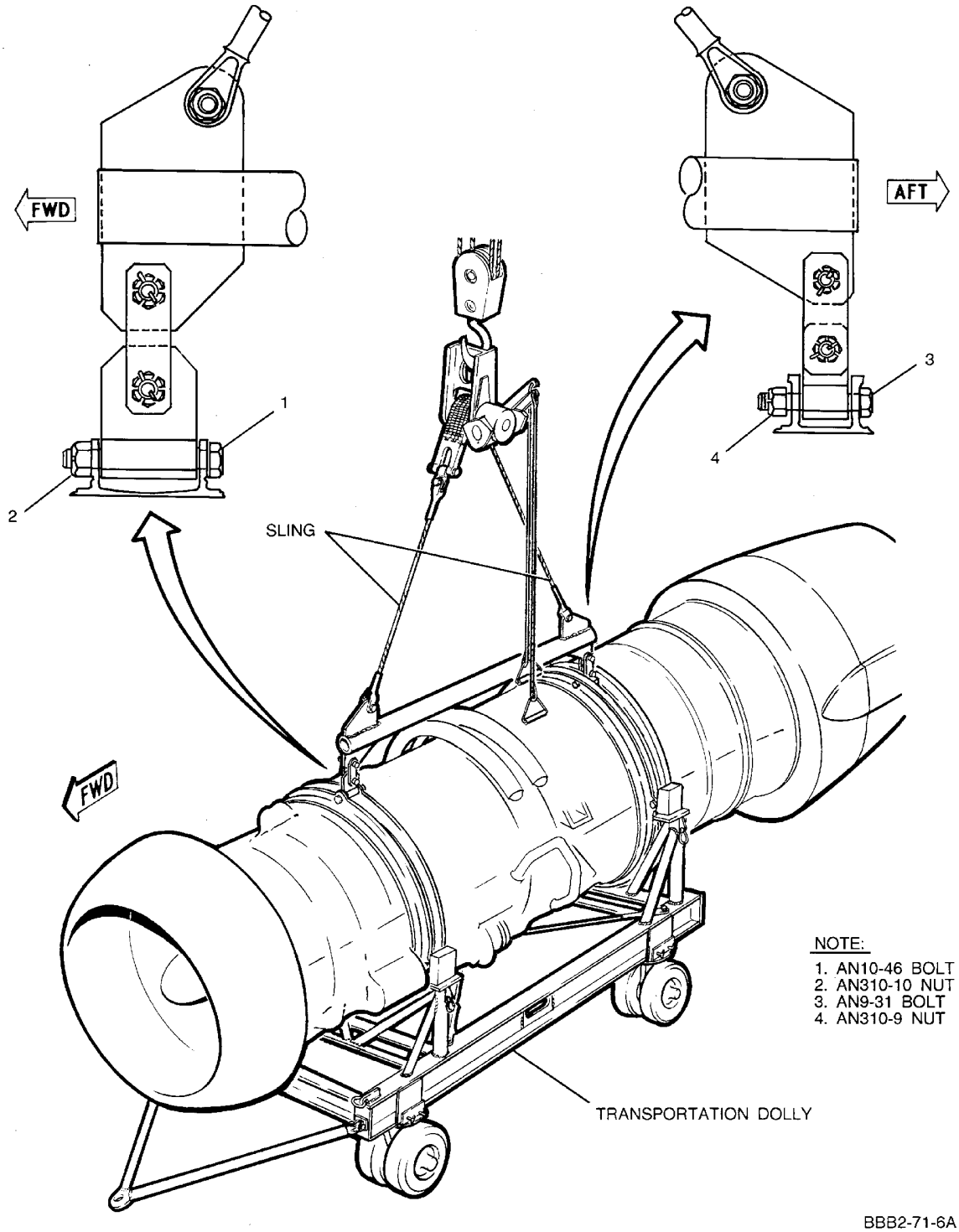


Power Plant Disconnect Points
Figure 407/71-00-00-990-836

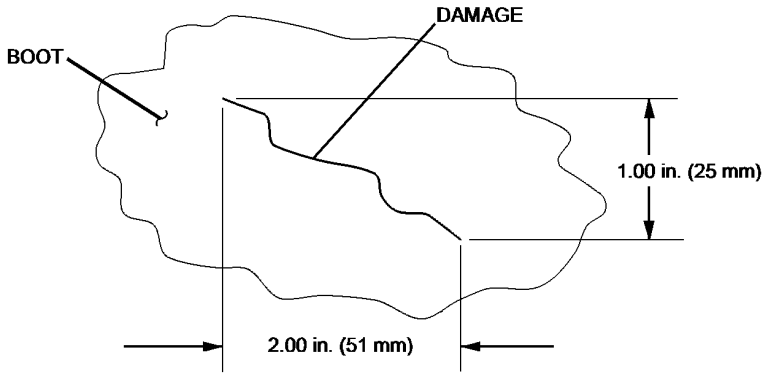
EFFECTIVITY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893



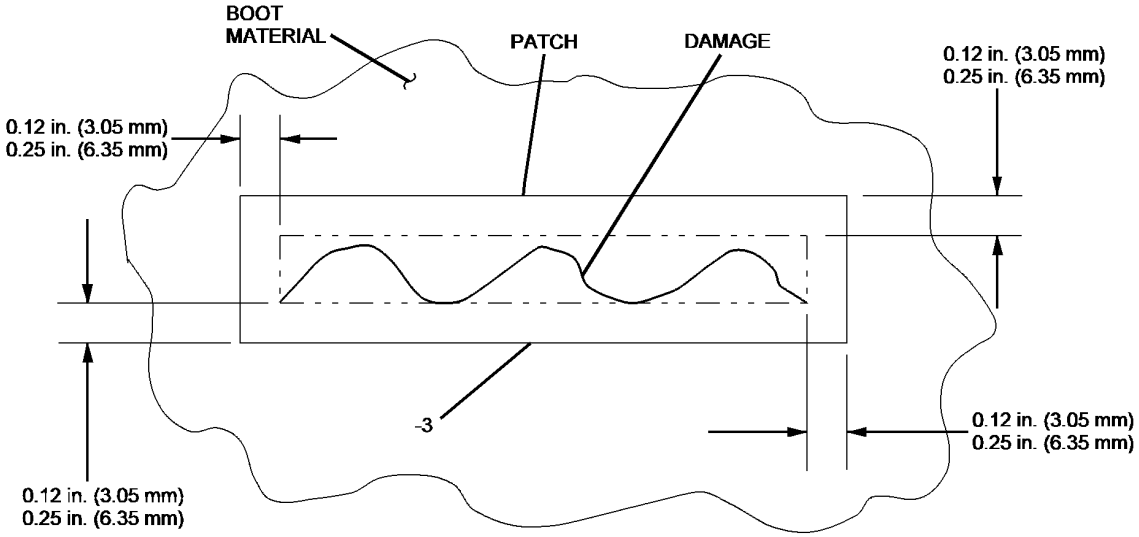
Power plant Support Equipment
Figure 408/71-00-00-990-834



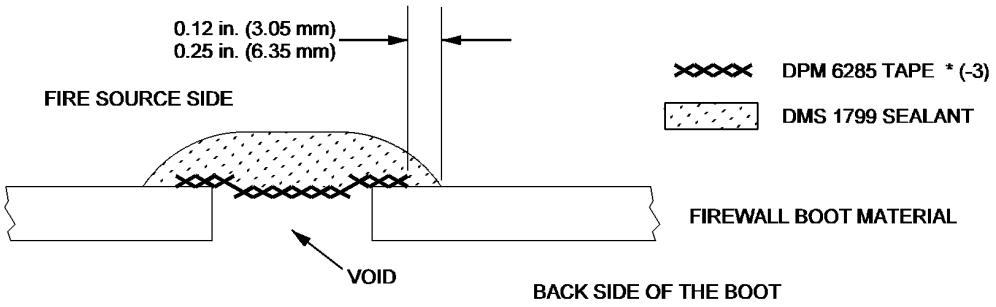
Power plant Support Equipment
Figure 409/71-00-00-990-835



MAXIMUM DAMAGE AREA



TYPICAL INSTALLATION



APPLY A MAXIMUM OF 2 LAYERS OF DPM 6285 PER PATCH.

PATCH APPLICATION

BBB2-71-133
S0000488449V1

FIRESEAL BOOT REPAIR
Figure 410/71-00-00-990-884

EFFECTIVITY
WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893

4. Check Power Plant

A. Check Throttle and Fuel Shutoff Lever

(1) Cycle throttle several times from idle to full forward thrust position and back to idle. Make certain there is complete freedom-of-movement through entire range.

(2) Cycle fuel shutoff lever several times from fuel off to fuel on position and back to fuel off. Make certain there is complete freedom-of-movement through entire range.

(3) If throttle and fuel shutoff rigging is required, refer to Quick Engine Change THROTTLE SYSTEMS, SUBJECT 76-11-00, Page 501 and FUEL SHUTOFF SYSTEM, SUBJECT 76-12-00, Page 501.

B. Apply Electrical Power

(1) Energize airplane electrical buses. (ELECTRICAL POWER, CHAPTER 24)

C. Check Engine Anti-ice Valves and Indicators

(1) Place engine anti-ice valve switch in ON position.

(2) Check that valves operate properly, amber light on momentarily, then blue light on, and that mechanical indicator on valves indicate open.

(3) Place engine anti-ice valve switch in OFF position.

D. Check Fuel System

(1) Place fuel boost or start pump switch in ON position.

(2) Check that no fuel leakage exists at fuel bridle or flex line.

(3) Loosen vapor removal line connection at fuel bridle. Bleed until clear fuel is observed and tighten connection.

(4) Place fuel pump switch in OFF position.

E. Check CSD Shaft Disconnect

(1) Pull disconnect handle on bottom of CSD, lightly, until handle bottoms. Hold handle lightly in this extended position.

(2) Actuate and release flight compartment CSD disconnect switch.

(3) CSD disconnect handle on bottom of CSD should pull in by spring action. Allow handle to move in.

(4) Pull disconnect handle out until audible click is heard, indicating disconnect is latched out.

NOTE: A reduction in pull force required on CSD disconnect handle is also evidence that disconnect is latched out.

F. Perform Fire Protection System Test. (GENERAL, SUBJECT 26-00-00, Page 201)

G. Perform Ignition System Test. (GENERAL, SUBJECT 74-00-00, Page 501)

H. Make certain throttle is at idle position and that thrust reverser lever is in forward thrust position.

I. Visually check thrust reverser upper door fairing clearance to pylon. Allowable mismatch between fairing and pylon is 0.13(±0.13) inch (3.30(±3.30) mm). Allowable gap between fairing and pylon is 0.25(±0.13) inch (6.35(±3.30) mm). If any adjustment is required, EXHAUST, CHAPTER 78.

J. Remove and stow thrust reverser control valve safety pin.

K. Close fuselage access door 5901C for left engine, 5902C for right engine.

L. Make certain all systems are serviced and perform normal engine runup outlined in GENERAL, SUBJECT 71-00-00, Page 501 to make certain that all systems function properly.

CAUTION: DO NOT APPLY POWER IN THE REVERSE THRUST POSITION WITHOUT USING A TAIL SUPPORT.

M. If desirable to check thrust reverser operation. (EXHAUST, CHAPTER 78).

N. Visually check that there is no fluid leakage.

O. Shut down engine as outlined in GENERAL, SUBJECT 71-00-00, Page 201 unless trimming is necessary.

P. Torque T-bolt nut on 8th and 13th stage pneumatic manifold end cap clamps 110 to 120 inch-pounds.

NOTE: If engine installed after engine buildup (includes spare engines), all pneumatic duct clamp T-bolt connections on the engine should be retorqued following engine run.

NOTE: If same installed (removed for maintenance not related to the pneumatic system), only the pylon and end cap clamp T-bolt connections should be retorqued following engine run.

Q. Close pylon access doors.

R. Close cowl doors. If adjustment is necessary, (COWL DOORS, SUBJECT 71-10-03).

S. De-energize airplane electrical buses.

GENERAL - REMOVAL/INSTALLATION

1. General

A. The removal and installation procedures for left and right power plants are identical unless otherwise stated.

B. The following procedures cover installation of a power plant in the correct configuration.

C. If conversion of a power plant is required before installation, follow conversion procedures outlined in SUBJECT 71-01-00, Page 201.

WJE 417, 419, 421, 423, 865, 869, 871, 872

D. On aircraft with APU inhibit switch installed on right engine only APU will not start with right upper cowl door open.

WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed 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 401

Name and Number	Manufacturer
Sling, JT8D handling 5916777-501	The Boeing Company
Portable hoisting boom 5936850-501	The Boeing Company
Chain fall, 4 ton capacity	
Hoist, 1 ton capacity	
Shipping stand JT8D	
Trailer, engine handling JT8D	
Thread protector, engine cone bolt 4916744-503 and 4916744-505 (2 required)	The Boeing Company
Sling, upper cowl 5952168-1	The Boeing Company
Cover, intake 510-1235	Texstar Plastics
Cover, exhaust 510-1236	Texstar Plastics
Torque wrench (100-700 foot- pounds range)	
Socket 1 3/16 12 point	
Socket 15/16 12 point	
Socket 1 1/8 12 point	
Antiseize compound MIL-L-25681	
Stainless steel brush	
Lockwire .032 corrosion-resistant steel P05-289	

Table 401 (Continued)

Name and Number	Manufacturer
Guide, pylon apron bolt 4953893-1	Douglas Aircraft Company, Inc.
Primer, fluid resistant (FR) base product 463-12-8 catalyst product CA-116	AKZO Coatings, Inc.
Torque wrench (0-600 inch pound range) (0-67.2N·m)	
Tag “Do Not Operate”	

3. **Removal/Installation Power Plant**

A. Remove Power Plant

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) Tag throttle/thrust reverser lever, and open and tag following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 407-409, 411, 412, 414, 881, 883, 884, 886, 887			
U	34	B1-140	OIL PRESSURE LOW CAUTION RIGHT
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
U	35	B1-967	ANN PANEL
WJE 405, 407-409, 411, 881, 883, 884			
U	35	B1-139	OIL PRESSURE LOW CAUTION LEFT
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
U	40	B1-40	ENGINE START PUMP
WJE 417, 419, 421, 423, 865, 869, 871, 872			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 405-408, 410, 411, 884, 886, 887			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 417, 419, 421, 423, 865, 869, 871, 872			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 405-408, 410, 411, 884, 886, 887			
U	42	B1-422	ENGINE START VALVE LEFT
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	27	B1-51	LEFT HYD PUMP CONTROL
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 881, 883, 884			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION
S	34	B1-181	LEFT FUEL TEMP
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
S	34	B1-969	LEFT SYSTEMS DISPLAY PANEL
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
T	21	B1-10	RIGHT OIL QUANTITY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	22	B1-12	RIGHT OIL TEMP
WJE 405, 407-409, 411, 881, 883, 884			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
T	24	B1-972	ANN PANEL
WJE 405, 407-409, 411, 881, 883, 884			
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	27	B1-52	RIGHT HYD PUMP CONTROL
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
T	34	B1-970	RIGHT SYSTEMS DISPLAY PANEL
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION
WJE 865			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
WJE 405-412, 414, 881, 883, 884, 886, 887			
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
WJE 405-412, 414, 881, 883, 884, 886, 887			
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
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

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

(2) Make certain that following listed levers are in indicated positions.

Table 402

(a) Throttle	Idle
(b) Thrust reverser lever	Forward thrust
(c) Fuel shutoff lever	Off
(d) Fire control handle	Pulled.

(3) Open fuselage 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 arm in dump position and install safety pin.

(5) Make certain the applicable Pneumatic Crossfeed Lever is in the CLOSED position.

(a) Attach a “Do Not Operate” tag to the applicable Pneumatic Crossfeed Lever. Write on the tag: PNEUMATIC CROSSFEED LEVER TO REMAIN IN THE CLOSED POSITION - ENGINE MAINTENANCE IN PROGRESS.

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

(6) Remove cowl doors as follows:

(Figure 401)

(a) Open forward lower cowl door latches and stow fully open with all hooks visible.

(b) Support forward lower cowl door, release ground safety latch and allow door to hang vertically.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(c) Disconnect snubber reel cable(s) from engine bracket(s).

(d) Open pylon apron forward lower pin latches.

NOTE: With pin latches opened, door will remain engaged on apron frame bosses.

WARNING: FORWARD LOWER COWL DOOR WEIGHS APPROXIMATELY 99 POUNDS (45KG).

(e) Lift door up and inboard to disengage door latch eyes from apron.

(f) Remove door and place in suitable protective rack.

(g) Open aft lower cowl door bolts.

(h) Support aft lower cowl door, release ground safety latch and allow door to hang vertically.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(i)

Disconnect aft snubber reel cable from engine bracket.

(j) Open pylon apron lower aft pin latches.

NOTE: With pin latches opened, door will remain engaged on apron from bosses.

(k) Lift door up and inboard to disengage door latch eyes from apron.

WARNING: AFT LOWER COWL DOOR WEIGHS APPROXIMATELY 65 POUNDS (30KG).

(l) Remove door and place in suitable protective rack.

(m) Position all upper cowl door tension latch handles and triggers flush with door surface.

(n) Remove screws from door sling attach points and install sling.

(o) Open all apron upper pin latches, making certain each latch is fully open.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

(p) With upper cowl door in closed position, hoist door to remove, taking care to prevent damage to latch eyes, pylon apron, and engine components.

(q) Carefully lower door, remove sling, and install screws in door sling attach points.

(r) Place door in suitable protective rack.

(7) Open pylon access doors.

(8) Disconnect all clamps from engine wiring two feet behind electrical connectors.

CAUTION: TO PREVENT ELECTRICAL CONNECTOR DAMAGE DO NOT USE AN UP, DOWN OR SIDE MOTION ON ELECTRICAL CONNECTORS DURING REMOVAL.

CAUTION: MAKE CERTAIN THAT ALL ELECTRICAL CONNECTORS HAVE BEEN PULLED THROUGH PYLON APRON LIGHTENING HOLE TO PREVENT DAMAGE DURING ENGINE REMOVAL.

(9) Disconnect electrical connectors. (Table 403)

NOTE: Use a strap wrench to loosen electrical connector then plug pliers to remove.

NOTE: Electrical connectors for left and right engine installations are identical.

Table 403 Engine Electrical connectors

Connector Name	Engine Plug		Pylon Receptacle		
			Item		
	Item	Number	Left	Right	Number
Generator power	P1-802	FW42851	R5-9	R5-10	FW42850
Miscellaneous electrical No. 1	P1-800	DC63E36K-8PN	R5-5	R5-6	DC60E36M8SN
Fire detector Engine Loop A	P1-822	DC63E14SK-7PN	R5-19	R5-20	DC60E14SM7SN
Fire detector Engine Loop B	P1-823	DC63E14SK-7PW	R5-21	R5-22	DC60E14SM7SW
Generator control	P1-803	DC62E16SK-1SN	R5-7	R5-8	DC61E16SM1PN
Exhaust gas temperature	P1-804	DC63E12SBK 51PN	R5-11	R5-12	DC60E12SBM51SN
Fire detector Burn-through barrier Loop A	P1-824	DC63E12SK-3PN	R5-27	R5-28	DC60E12SM3SN
ART and Idle Solenoids	P1-855	DC63E20K-27PN	R5-433	R5-434	DC60E20M27SN
Miscellaneous electrical No. 2	P1-801	DC63E28K-21PN	R5-3	R5-4	DC60E28M21SN
Fire detector Burn-through barrier Loop B	P1-825	DC63E12SK-3PW	R5-29	R5-30	DC60E12SM3SW

(10) Disconnect engine synchronizer electrical connector at synchronizer actuator.

WJE 417, 419

(11) On right engine only, disconnect APU inhibit switch electrical connector. (Figure 405)

WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

(12) Disconnect following hydraulic flex lines from engine hydraulic bridle support bracket.

NOTE: A five gallon container should be provided to catch hydraulic fluid.

CAUTION: MAKE CERTAIN THAT ANY SPILLED HYDRAULIC FLUID IS CLEANED UP IMMEDIATELY.

(a) Hydraulic supply

(b) Hydraulic pressure

(c) Hydraulic drain.

(13) Disconnect Pt_7 flex line from fitting at side of engine hydraulic bridle support bracket.

(14) Disconnect Pt_2 flex line from fitting on engine bracket.

(15) Disconnect fuel vapor vent flex line from engine fitting.

(16) Remove fuel bridle drain plug, located at bottom of fuel bridle, and drain fuel into suitable container.

NOTE: Fuel bridle and line contain approximately 1 gallon (3.8 liters).

(17) Install drain plug using new gasket and safety with P05-289 lockwire.

(18) Disconnect fuel supply flex line from engine fuel bridle and remove gasket.

CAUTION: SUPPORT OR REMOVE SHORT SECTION OF DUCT.

(19) Remove clamps from 8th-stage bleed air manifold duct.

CAUTION: SUPPORT OR REMOVE SHORT SECTION OF DUCT.

(20) Remove clamps from 13th-stage bleed air manifold duct.

(21) Disconnect thrust reverser flex hydraulic stow line from support bracket fitting.

NOTE: A two gallon (7.6 liters) container should be provided to catch hydraulic fluid.

(22) Disconnect thrust reverser flex hydraulic deploy line from support bracket fitting.

(23) On right engine disconnect power control rod end from engine cross shaft.

(24) On left engine disconnect engine synchronizer rod end trimmer from engine cross shaft.

(25) Disconnect fuel shutoff control rod end from engine cross shaft crank.

CAUTION: USE EXTREME CARE WHEN WORKING WITH ENGINE PUSH-PULL CABLES. DO NOT BEND CABLE IN RADIUS SMALLER THAN 7-INCHES (177.8MM) MINIMUM OR DAMAGE TO CABLE WILL RESULT.

(26) Remove fuel shutoff and power control cable support from side of right engine.

NOTE: Cable has a flat internal sliding ribbon and will bend in one direction only.

(27) Remove fuel shutoff and power control cable support and guide from side of left engine.

NOTE: Bolts, washers, and spacers used to attach support to engine mounted bracket should be retained with support to ensure installation when engine is installed.

(28) Install engine removal/installation support equipment as follows: (Figure 410)

(a) Move engine removal/installation sling into place over engine.

(b) Carefully lower engine sling in place.

(c) Install sling on engine. (Figure 410)

(29) Install portable hoisting boom if required as follows: (Figure 408).

(a) Install forward and aft beam adapters at pylon attach points on opposite side of aircraft from engine being removed.

(b) Install beam on adapters making certain it is positioned as marked on beam.

(c) Attach strap to beam and carefully pass over fuselage.

NOTE: Place strap swivel on foam to protect fuselage from damage.

(d) Install bracket on upper fuselage at attach point and connect cable to bracket.

CAUTION: DO NOT INSTALL BOOM LEG BOLTS FIRST. DAMAGE TO AIRCRAFT COULD OCCUR IF BOOM LEANS OUTBOARD TOO FAR.

(e) Position boom legs at pylon attach points. First connect cable at upper end boom then install bolt attaching legs to pylon.

NOTE: Short leg of boom hoist is always in forward position.

(f) Raise chain fall and connect chain fall to boom hanger.

(g) Connect hoist to cable.

(h) Install engine sling on engine.

(i) Connect chain fall and hoist to engine sling.

WARNING: ENGINE WEIGHS APPROXIMATELY 5900 POUNDS (2676KG). MAKE CERTAIN ENGINE REMOVAL/INSTALLATION SUPPORT EQUIPMENT IS ADJUSTED TO GIVE EVEN FORE AND AFT SUPPORT TO ENGINE. UNEVEN SUPPORT CAN CAUSE SHIFT OF ENGINE WEIGHT AND RESULT IN INJURY TO PERSONNEL OR DAMAGE TO ENGINE.

(30) Take up weight of engine until sag is removed from vibration isolators.

NOTE: If available, a dynamometer (load cell) may be used to help maintain proper engine support.

(31) Untorque forward cone bolts but do not back off.

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTORS BE INSTALLED ON EACH CONE BOLT PRIOR TO EACH ENGINE REMOVAL AND INSTALLATION. CONE BOLTS WITH DAMAGED THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

(32) Remove aft cone bolt nut and washer, and install thread protector, discard nut.

NOTE: Make certain thread protector is fully engaged approximately 15 to 18 turns.

(33) Remove forward bolts which connect pylon apron to engine.

(34) Remove bolts which connect apron lower structure to engine aft engine mount flange.

(35) Remove bolts which connect apron upper structure to engine aft engine mount flange.

NOTE: On installations using double shouldered bolts, bushings should be removed and retained with bolts to ensure installation when engine is installed.

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTORS BE INSTALLED ON EACH CONE BOLT PRIOR TO EACH ENGINE REMOVAL AND INSTALLATION. CONE BOLTS WITH DAMAGED THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

CAUTION: FAILURE TO BACK OFF ATTACH BOLT NUT COULD CAUSE CONE BOLT GALLING AND OR DAMAGE TO VIBRATION ISOLATOR.

(36) Remove cotter pins from the upper and lower forward cone bolt attach bolt and back off nut until a gap exists between nut and washer.

(37) Remove forward lower cone bolt nut and washer, and install thread protector, discard nut.

(38) Remove forward upper cone bolt nut and washer, and install thread protector, discard nut.

(39) Carefully move engine away from pylon to disengage cone bolts from vibration isolators. Guide electrical harness during engine removal.

CAUTION: MAKE CERTAIN ALL LINES, DUCTS, ELECTRICAL CONNECTORS, AND CONTROL CABLES ARE CLEAR BEFORE LOWERING ENGINE. BE ESPECIALLY CAREFUL NOT TO DAMAGE FIRE DETECTOR UNITS OR KINK CONTROL CABLES AT PYLON BULKHEAD SWIVEL PLATES.

(40) Make certain cone bolts are fully disengaged from vibration isolators and lower engine.

(41) Remove lower cone bolt and attaching hardware from engine, discard nut. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

NOTE: Lower cone bolt must be removed before lowering engine into dolly.

(42) Lower engine onto an approved transportation dolly.

(43) Remove engine removal/installation support equipment from engine.

(44) Remove upper forward cone bolt and attaching hardware from engine, discard nut. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

(45) Remove aft cone bolt and attaching hardware from engine. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

(46) Check condition of cone bolts and attach through bolts. (SUBJECT 71-20-01, Page 201)

NOTE: After each engine removal, it is recommended that both a visual and magnetic particle inspection be performed on cone bolts, and cone bolt through bolts. Refer to Barry Controls Component Maintenance Manual, 71-20-02 and PAGEBLOCK 71-20-02/601.

(47) Clean and check vibration isolators for general security condition, with particular attention to conical surface of inner cone assembly for scratches, nicks, burrs, galling, corrosion or wear.

NOTE: For inspection, repair or rework refer to Barry Controls Component Maintenance Manual, 71-20-02.

(48) Make certain forward vibration isolator alignment marks are within limits. (PAGEBLOCK 71-20-02/201)

(49) Examine the fireseal boot as follows: Figure 411

(a) Examine the fireseal boot around the engine fuel vapor removal duct assembly for cuts, cracks or holes.

1) If the total area of the above damages that are found in the fireseal boot and are not more than 2 in^2 (1290 mm^2), repair the fireseal boot.

2) If a repair that was done before has come loose and the total area of the above damages that are found in the fireseal boot are not more than 2 in^2 (1290 mm^2), repair the fireseal boot.

3) If the total area of the above damages are not repaired and are more than 2 in^2 (1290 mm^2), repair the fireseal boot.

NOTE: If a repair that was done before is found to be in a good condition, do not include the repair in the total area.

B. Install Power Plant

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 certain throttle/thrust reverser lever is tagged and following circuit breakers are open.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 407-409, 411, 412, 414, 881, 883, 884, 886, 887			
U	34	B1-140	OIL PRESSURE LOW CAUTION RIGHT
WJE 405, 407-409, 411, 881, 883, 884			
U	35	B1-139	OIL PRESSURE LOW CAUTION LEFT
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
U	40	B1-40	ENGINE START PUMP
WJE 417, 419, 421, 423, 865, 869, 871, 872			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 405-408, 410, 411, 884, 886, 887			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 417, 419, 421, 423, 865, 869, 871, 872			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 405-408, 410, 411, 884, 886, 887			
U	42	B1-422	ENGINE START VALVE LEFT
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	27	B1-51	LEFT HYD PUMP CONTROL
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY

(Continued)

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 881, 883, 884			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION
S	34	B1-181	LEFT FUEL TEMP
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
S	34	B1-969	LEFT SYSTEMS DISPLAY PANEL
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
T	21	B1-10	RIGHT OIL QUANTITY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	22	B1-12	RIGHT OIL TEMP
WJE 405, 407-409, 411, 881, 883, 884			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
T	24	B1-972	ANN PANEL
WJE 405, 407-409, 411, 881, 883, 884			
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	27	B1-52	RIGHT HYD PUMP CONTROL
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 881, 883, 884			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
T	34	B1-970	RIGHT SYSTEMS DISPLAY PANEL
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 865			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
WJE 405-412, 414, 881, 883, 884, 886, 887			
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
WJE 405-412, 414, 881, 883, 884, 886, 887			
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
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

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

(2) Make certain that following listed levers are in indicated positions.

Table 404

(a) Throttle	Idle
(b) Thrust reverser lever	Forward thrust
(c) Fuel shutoff lever	Off
(d) Fire control handle	Pulled.

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 that thrust reverser control valve arm is in dump position and safety pin is installed.

(4) Make certain the applicable Pneumatic Crossfeed Lever is in the CLOSED position and a “Do Not Operate” tag is attached.

(5) Make sure that the fireseal boot of the engine fuel vapor removal duct assembly was inspected.

(6) If forward upper cone bolt and aft cone bolt are not installed, install per CONE BOLTS, SUBJECT 71-20-01, Page 201.

WJE 405-411, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads, refer to SUBJECT 71-20-01, Page 201, Paragraph 7.

WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTORS BE INSTALLED ON EACH CONE BOLT PRIOR TO EACH ENGINE REMOVAL AND INSTALLATION. CONE BOLTS WITH DAMAGED THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

(7) Install thread protectors.

NOTE: Make certain thread protector is fully engaged (approximately 15 to 18 turns).

(8) Prepare electrical wiring prior to engine installation as follows:

(a) Disconnect all clamps from engine wiring two feet behind electrical connectors.

(b) Apply petrolatum to power cable clamp cushions. This makes it easier to install clamps after electrical connectors are connected.

(c) Loosely attach top clamp of power cable to support cable during engine installation.

(d) Make certain when installing engine to pull electrical connector through lighting hole.

(9) Install engine removal/installation support equipment.

WARNING: ENGINE WEIGHS APPROXIMATELY 5900 POUNDS (2676KG). MAKE CERTAIN ENGINE REMOVAL/INSTALLATION SUPPORT EQUIPMENT IS ADJUSTED TO GIVE EVEN FORE AND AFT SUPPORT TO ENGINE. UNEVEN SUPPORT CAN CAUSE SHIFT OF ENGINE WEIGHT AND RESULT IN INJURY TO PERSONNEL OR DAMAGE TO ENGINE.

(10) Carefully remove engine from transportation dolly and raise into approximate position for installation.

(11) Install forward lower cone bolt. (CONE BOLTS, SUBJECT 71-20-01, Page 201)

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads, refer to SUBJECT 71-20-01, Page 201, Paragraph 7.

CAUTION: MAKE CERTAIN ALL LINES, DUCTS, ELECTRICAL CONNECTORS, AND CONTROL CABLES ARE GUIDED INTO POSITION. BE ESPECIALLY CAREFUL NOT TO DAMAGE FIRE DETECTOR UNITS OR KINK CONTROL CABLES AT YPLON BULKHEAD SWIVEL PLATES.

(12) Align forward and aft cone bolts with vibration isolators; carefully move engine toward pylon to engage cone bolts and isolators.

(13) Make certain forward and aft cone bolts are properly engaged, remove thread protectors, and install washers and new nuts fingertight only.

NOTE: In the event of an unscheduled engine change at a remote location and replacement nut is not available, nut should be checked and proper running torque maintained at time of installation.

NOTE: If split aluminum thread protectors have been used, aluminum shavings should be removed from cone bolt threads using a stainless steel brush only.

(14) Insure apron support fittings which attach apron to engine flanges are properly positioned between flanges.

CAUTION: WHEN INSTALLING DOUBLE SHOULDERED BOLT, ENSURE BOLT BUSHING HAS BEEN INSTALLED PRIOR TO TIGHTENING, OR DISTORTION OF BOLT MAY OCCUR.

(15) Install bolt guides on bolts and install bolts which connect apron upper structure to engine aft rails.

NOTE: Pylon apron bolt guides are used to align pylon apron aft attach fittings during bolt installation.

(16) Install forward bolts which connects pylon apron to support brackets at nose cowl.

(17) Install bolt which connects apron lower structure to engine aft rails.

CAUTION: IF USING AN EXTENSION WITH TORQUE WRENCH TO TIGHTEN AFT CONE BOLT NUT, TORQUE VALUE CORRECTIONS MUST BE COMPUTED IN ACCORDANCE WITH FORMULA.

(18) STANDARD PRACTICES - ENGINE, CHAPTER 70

CAUTION: CONE BOLT THREADS MUST BE CLEAN AND DRY WHEN PERFORMING RUNNING TORQUE OF CONE BOLT NUTS.

CAUTION: RUNNING TORQUE OF FORWARD CONE BOLT NUT MUST NOT BE LESS THAN 90 INCH-POUNDS (10.2 N.M.).

CAUTION: RUNNING TORQUE OF AFT CONE BOLT NUT MUST NOT BE LESS THAN 50 INCH-POUNDS (5.6 N.M.).

CAUTION: IF THERE IS ANY DOUBT AS TO INTEGRITY OF NUT SELF LOCKING FEATURE, IT SHOULD BE DISCARDED TO PROVIDE HIGHEST MARGIN OF SAFETY.

(19) Perform running torque of forward and aft cone bolt nuts.

(20) Remove nuts and prepare forward and aft cone bolts as follows:

(a) Apply coating of anti-seize compound (MIL-L-25681) on threads only of dry lubricated cone bolts.

(21) Install cone bolt nuts.

(22) Tighten nuts of forward cone bolts to a final torque of 425 to 650 foot-pounds (5100 to 7800 in.-lbs.) (576.3 to 881.4 N·m).

(23) Tighten nut of aft cone bolt to a final torque of 200 to 220 foot-pounds (2400 to 2640 in.-lb.) (271.2 to 298.3 N·m).

(24) Torque-stripe forward and aft cone bolt nuts with yellow-green FR primer.

NOTE: Purpose of the torque-stripe is to provide operators with a visual means of determining if cone bolt nuts have backed off in service.

(25) Remove engine removal/installation support equipment.

(26) After engine is installed and if cotter pin was not previously installed, complete attach bolt nut final adjustment procedure as follows:

CAUTION: DO NOT EXCEED 1000 INCH-POUNDS (113 N.M.) OF CLAMP UP TORQUE (FINAL TORQUE LESS RUNNING TORQUE).

(a) Note position of nut, advance nut minimum amount to align either cotter pin hole with any notch, but not to exceed 1000 inch-pounds (113 N·m) of clamp up torque.

CAUTION: ENSURE NUT ROTATION DOES NOT EXCEED 45 DEGREES.

(b) Make certain that nut rotation does not exceed 45 degrees from position noted in Paragraph 3.B.(26)(a).

(c) If cotter pin hole alignment is accomplished and nut rotation was within the 45 degrees, and 1000 inch-pounds (113 N·m) of torque was not exceeded, install cotter pin.

(d) If alignment cannot be accomplished without exceeding 1000 inch-pounds (113 N·m), or of clamp up torque, or 45 degrees from noted position, back off nut half turn, then retighten. Occasionally it may be necessary to select a new nut.

(e) Torque attach bolt nut to a value of 200 to 250 inch-pounds (22.6 to 28.3 N·m) above the nut running torque measured in Paragraph 3.B.(26)(d).

CAUTION: DO NOT EXCEED 1000 INCH-POUNDS (113 N.M.) OF CLAMP UP TORQUE (FINAL TORQUE LESS RUNNING TORQUE).

(f) Advance nut minimum amount to align either cotter pin hole with any notch, but not to exceed 1000 inch-pounds (113 N·m) of torque.

(g) Install cotter pin and trim as required.

(27) Bend attach bolt retainer washer to come in contact with flat surface of attach bolt head to provide the anti-rotation feature of the washer.

CAUTION: USE EXTREME CARE WHEN WORKING WITH ENGINE PUSH-PULL CABLES. DO NOT BEND CABLE IN RADIUS SMALLER THAN 7-INCHES (177.8MM) MINIMUM OR DAMAGE TO CABLE WILL RESULT.

(28) Install fuel shutoff and power control cable support on side of right engine.

NOTE: Cable has a flat internal sliding ribbon and will bend in one direction only.

(29) Install fuel shutoff and power control cable support and guide on side of left engine.

(30) Connect and adjust power control cable, refer Quick Engine Change. (SUBJECT 76-11-00, Page 501)

(31) Connect and adjust fuel shutoff cable, refer Quick Engine Change PAGEBLOCK 76-12-00/501.

(32) Connect and adjust engine synchronizer at left engine. (PAGEBLOCK 76-11-02/201 Config 1)

(33) Connect thrust reverser flex hydraulic deploy line to support bracket fitting.

(34) Connect thrust reverser flex hydraulic stow line to support bracket fitting.

(35) Install clamps (without Dubl-Lock if applicable) on 13th and 8th stage bleed air manifold ducts as follows:

NOTE: To aid seating of clamp, inside of retainer segment may be lubricated with light coating of high temperature anti-seize (MIL-A-907) or petrolatum lubricant (VV-P-236) or equivalent, being careful not to allow lubricant to contact T-bolt.

(a) Position clamp over matting flange of duct.

CAUTION: DO NOT EXCEED MAXIMUM TORQUE VALUE OF 120 INCH POUNDS, AS SPECIFIED ON CLAMP.

(b) Place T-bolt in trunnion of clamp and tap clamp lightly with non-metallic mallet while tightening clamp to torque value specified on clamp (110-120 inch-pounds).

NOTE: Tapping should be around circumference of any accessible clamp surface in order to aid in the distribution of the load as the clamp is tightened.

(36) Install (Dubl-Lock if applicable) on 13th and 8th stage bleed air manifold ducts as follows:

NOTE: To aid seating of clamp, inside of retainer segment may be lubricated with light coating of high temperature anti-seize (MIL-A-907) or petrolatum lubricant (VV-P-236) or equivalent, being careful not to allow lubricant to contact T-bolt.

(a) Position clamp over matting flange of duct.

CAUTION: DO NOT EXCEED MAXIMUM TORQUE VALUE, AS SPECIFIED ON CLAMP.

(b) Position Dubl-Lock tang in opening beneath head of T-bolt and tighten nut using torque wrench until tang locks. Do not exceed torque value stamped on clamp. While tightening nut, tap clamp with non-metallic mallet around circumference or any accessible clamp surface in order to aid distribution of load.

(c) After Dubl-Lock tang has engaged, continue to tighten nut until torque value specified on clamp is reached. While tightening nut to specified torque value, tap clamp with non-metallic mallet around circumference or any accessible clamp surface until value is achieved and install safety pin.

(37) Maintain 3/16 inch minimum clearance between bleed air manifold ducts and clamps, and burn-thru barrier. Duct support links may be adjusted to obtain clearance.

(38) Install new gasket and connect fuel supply flex line to engine fuel bridle.

CAUTION: DURING INSTALLATION OF FUEL SUPPLY FLEX LINE, MAINTAIN 0.50 (12.7 MM) INCH MINIMUM CLEARANCE FROM ADJACENT AIR MANIFOLD DUCTS TO PREVENT DAMAGE FROM CHAFING FROM VIBRATION.

(39) Connect fuel vapor vent flex line to engine fitting.

(40) Connect Pt_2 flex line to fitting on engine bracket.

(41) Connect Pt_7 flex line to fitting at side of engine hydraulic bridle support bracket.

(42) Connect following hydraulic flex lines to engine hydraulic bridle support bracket.

CAUTION: MAKE CERTAIN THAT ANY SPILLED HYDRAULIC FLUID IS CLEANED UP IMMEDIATELY.

(a) Hydraulic supply

(b) Hydraulic pressure

(c) Hydraulic drain

CAUTION: TO PREVENT ELECTRICAL CONNECTOR DAMAGE DO NOT USE AN UP, DOWN OR SIDE MOTION ON ELECTRICAL CONNECTORS DURING INSTALLATION.

(43) Connect electrical connectors listed in Table 403. Make certain fire detector loop A and fire detector loop B are connected as shown in Figure 406Figure 407.

NOTE: For ease of installation, install electrical connectors in sequence shown in Table 403.

NOTE: Electrical connectors for left and right engine installations are identical except engine synchronizer.

NOTE: Performing the following steps in the correct order will help prevent damage to electrical connectors, make the job easier and save time.

(a) Connect power cable plug P1-802 first.

NOTE: If six wire bundle clamps have not been loosened, it is much more difficult to align plug and prevent cross threading.

1) Start connector by hand and make certain that plug is in alignment. Turn connector one or two revolutions.

2) Tighten connector with strap wrench only after ensuring that plug is not cross threaded.

3) Safety connector with P05-288 lockwire.

(b) Connect plugs aft of power cable plug (P1-800, P1-803, P1-804, P1-822, P1-823 and P1-824).

NOTE: When tightening self-locking connectors, be careful not to overtighten. Tighten until the plug body bottoms into receptacle (stops moving into receptacle), then just snug up coupling ring.

1) Hand start large plug P1-800, but do not tighten yet. This supports wire bundle while other plugs are connected.

2) Hand start plug P1-822, then tighten with plug pliers.

3) Hand start plug P1-823, then tighten.

4) Hand start plug P1-803, then tighten.

5) Tighten plug P1-800, previously hand started in Paragraph 3.B.(43)(b)1). Use extra care not to cross thread plug.

6) Hand start and tighten two aft lower connectors P1-804, P1-824.

(c) Connect plugs forward of power cable plug (P1-801, P1-825 and P1-855).

1) Hand start plug P1-855, then tighten.

2) Hand start plug P1-801, then tighten. This connector might have preload from wire bundle. Use care to properly align plug.

3) Hand start plug P1-825, then tighten.

NOTE: Only the large power cable connector (P1-802) needs to be safety wired in this area.

(44) Clamp wire bundles as follows:

(a) First install four clamps that are approximately 4 inches behind plugs.

NOTE: The order of installation is not critical.

(b) These clamps have captive screws, three of which have Phillips heads.

(c) Upward pressure is needed to close clamps. On Phillips head screws use screwdriver. On power cable clamp screw use socket wrench. (To prevent screw from backing into socket, half fill socket with tape, etc.)

(d) It is very important to locate clamps on wire bundles before trying to close clamps.

(e) Make sure rubber cushions on clamps are in proper position when complete.

(45) Connect engine synchronizer electrical connector to actuator on left engine only.

(46) Install cowl doors as follows:

(a) Make certain all pylon apron upper pin latches are fully open.

(b) Remove screws from upper cowl door sling attach points and install sling.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

(c) Hoist door into approximate position and install door making certain all door latch eyes engage apron pin latches properly.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(d) Close all pylon apron upper pin latches.

(e) Make certain all pin latch triggers are flush with pylon apron surface.

(f) Remove sling and install screws in upper cowl door sling attach points, flush with door surface.

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.

(g) Open upper cowl door, install both hold open rods, and make certain pins are properly engaged.

(h) Make certain pylon apron aft lower pin latches are fully open.

WARNING: AFT LOWER COWL DOOR WEIGHS APPROXIMATELY 65 POUNDS (30KG).

(i) Position aft lower cowl door, making certain latch eyes are engaged on apron, and allow door to hang vertically.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(j) Close pylon apron aft lower pin latches.

(k) Make certain pin latch triggers are flush with apron surface.

CAUTION: SNUBBER REEL CABLE IS SPRING-LOADED. RESTRAIN CABLE DURING INSTALLATION OF PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(l) Connect aft snubber reel cable to engine bracket.

(m) Make certain pylon apron forward lower pin latches are fully open.

WARNING: FORWARD LOWER COWL DOOR WEIGHS APPROXIMATELY 99 POUNDS (45KG).

(n) Position forward lower cowl door, making certain latch eyes are engaged on apron, and allow door to hang vertically.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(o) Close pylon apron forward lower pin latches.

(p) Make certain pin latch triggers are flush with apron surface.

CAUTION: SNUBBER REEL CABLE IS SPRING-LOADED. RESTRAIN CABLE DURING INSTALLATION OF PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(q) Connect snubber reel cable(s) to engine bracket(s).

(r) Open lower cowl doors, install both hold-open rods, and make certain pins are properly engaged.

WJE 417, 419

(s) On right engine only, install electrical connector on APU inhibit switch. Perform adjustment and test per PAGEBLOCK 71-10-10/201.

NOTE: On aircraft with APU inhibit switch installed on right engine only, APU will not start with right upper cowl door open.

WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
WJE 407-409, 411, 412, 414, 881, 883, 884, 886, 887			
U	34	B1-140	OIL PRESSURE LOW CAUTION RIGHT
WJE 405, 407-409, 411, 881, 883, 884			
U	35	B1-139	OIL PRESSURE LOW CAUTION LEFT
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
U	40	B1-40	ENGINE START PUMP
WJE 417, 419, 421, 423, 865, 869, 871, 872			
U	41	B1-2	ENGINE IGNITION RIGHT
WJE 405-408, 410, 411, 884, 886, 887			
U	41	B1-423	ENGINE START VALVE RIGHT
WJE 417, 419, 421, 423, 865, 869, 871, 872			
U	42	B1-1	ENGINE IGNITION LEFT
WJE 405-408, 410, 411, 884, 886, 887			
U	42	B1-422	ENGINE START VALVE LEFT
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	27	B1-51	LEFT HYD PUMP CONTROL
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY

(Continued)

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION
S	34	B1-181	LEFT FUEL TEMP
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
S	34	B1-969	LEFT SYSTEMS DISPLAY PANEL
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 881, 883, 884			
T	21	B1-10	RIGHT OIL QUANTITY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	22	B1-12	RIGHT OIL TEMP
WJE 405, 407-409, 411, 881, 883, 884			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
T	24	B1-972	ANN PANEL
WJE 405, 407-409, 411, 881, 883, 884			
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	27	B1-52	RIGHT HYD PUMP CONTROL
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 881, 883, 884			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE 406, 410, 412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 886, 887			
T	34	B1-970	RIGHT SYSTEMS DISPLAY PANEL
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION
WJE 865			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY

WJE 865 (Continued)

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
WJE 405-412, 414, 881, 883, 884, 886, 887			
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
WJE 405-412, 414, 881, 883, 884, 886, 887			
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887			
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

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

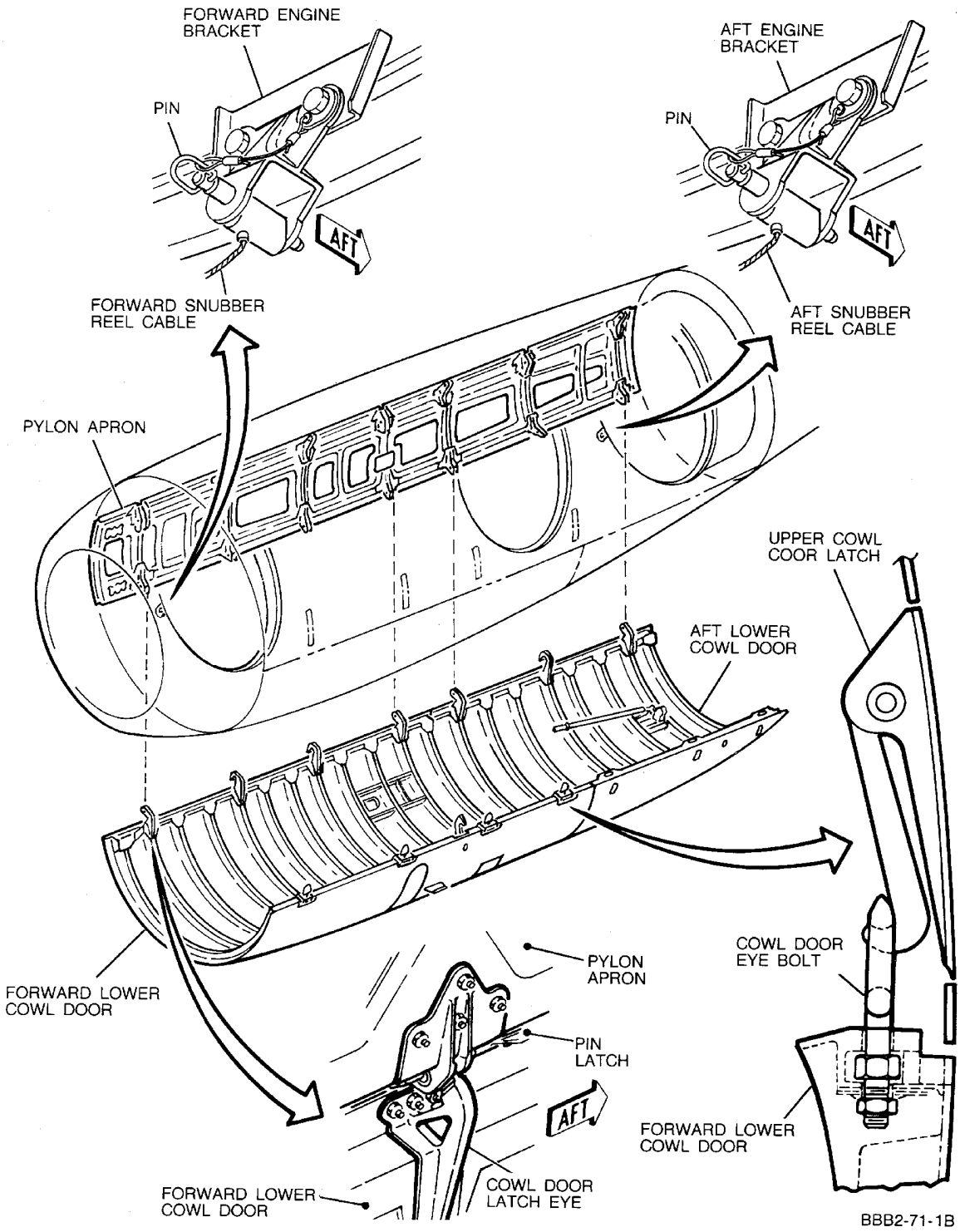
UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

(48) Place fire control handle in normal position.

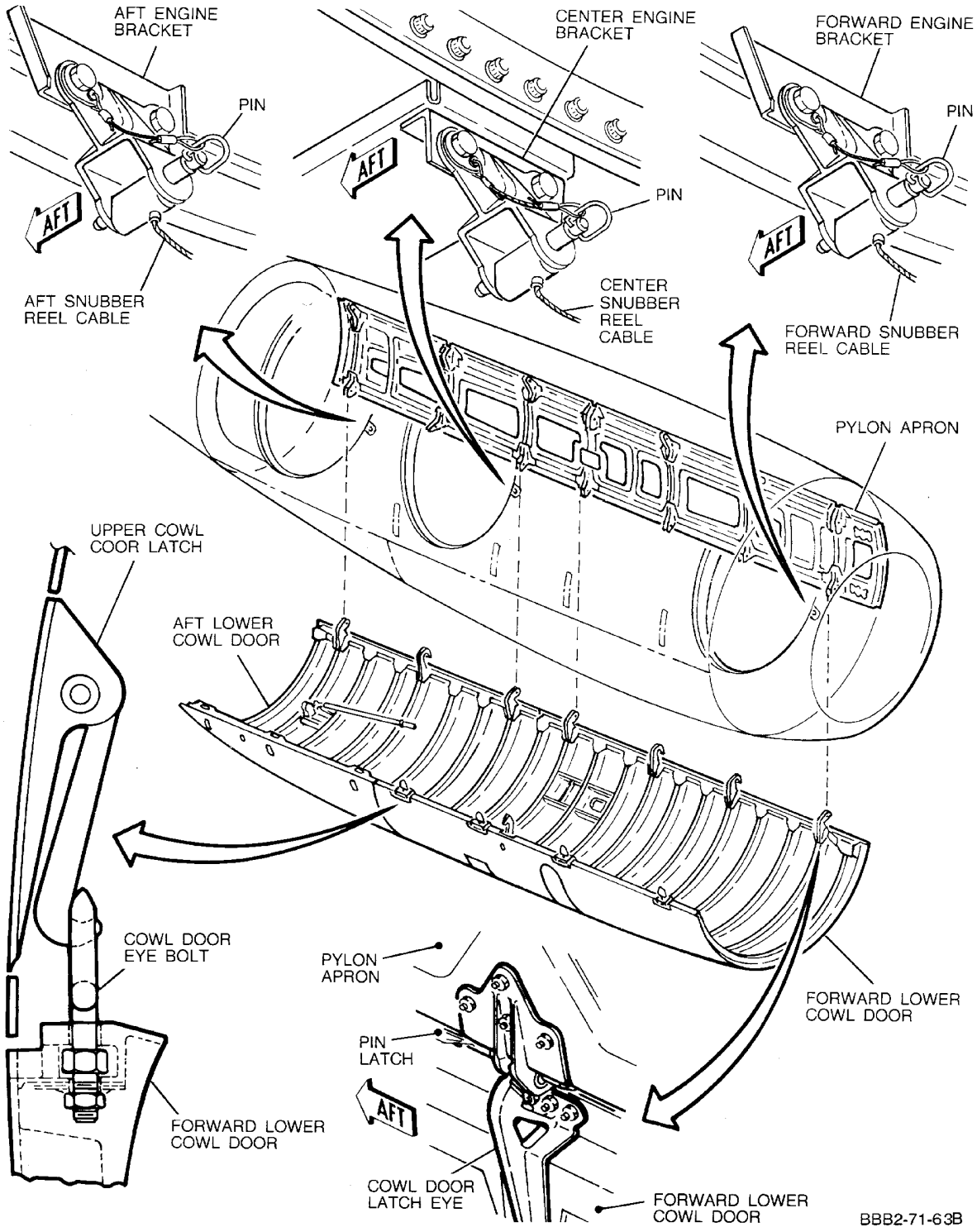
(49) Remove the “Do Not Operate” tag from the applicable Pneumatic Crossfeed Lever.

(50) Perform check as outlined in Check Power Plant paragraph.

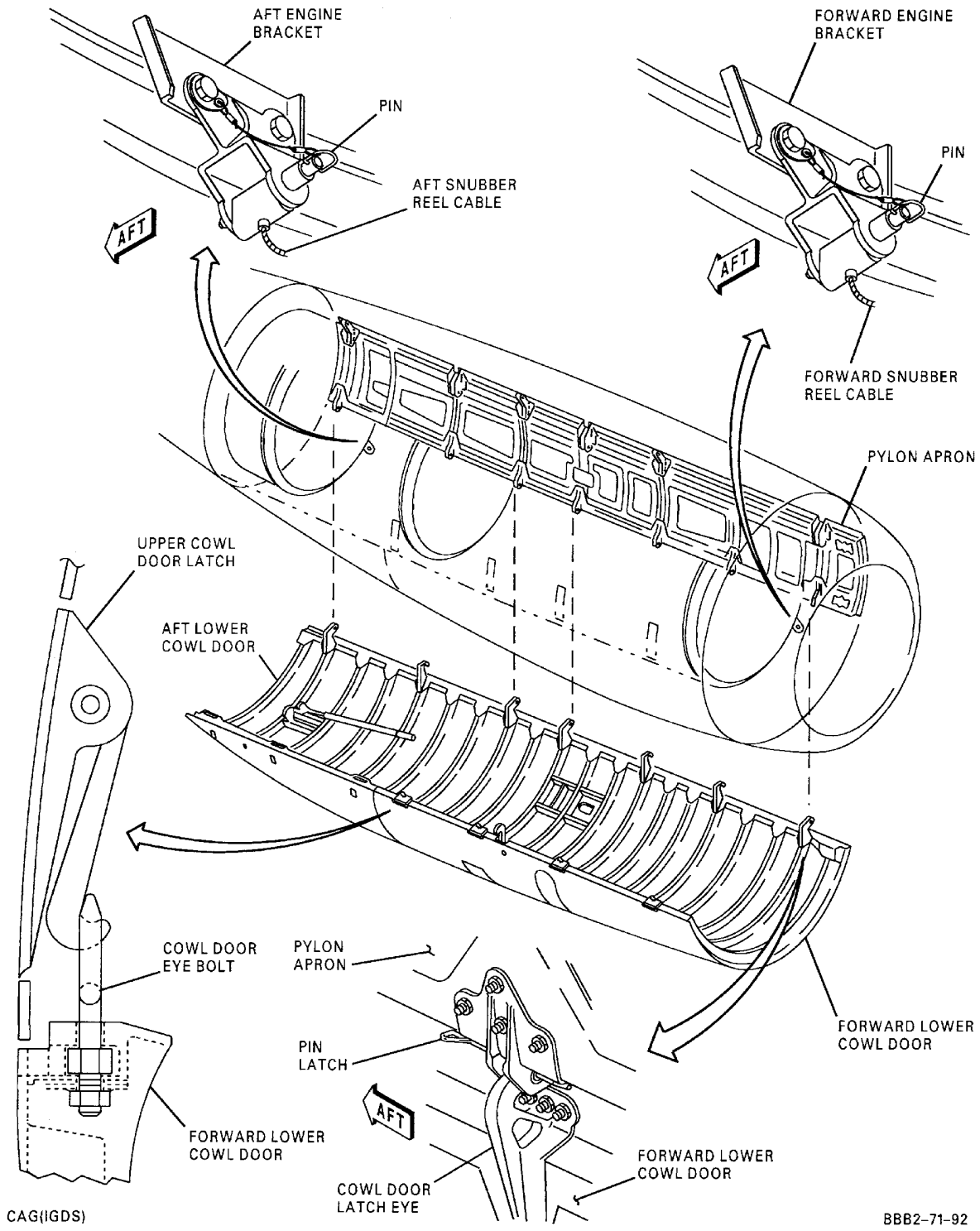


Left Lower Cowl Door -- Removal/Installation
Figure 401/71-00-00-990-819

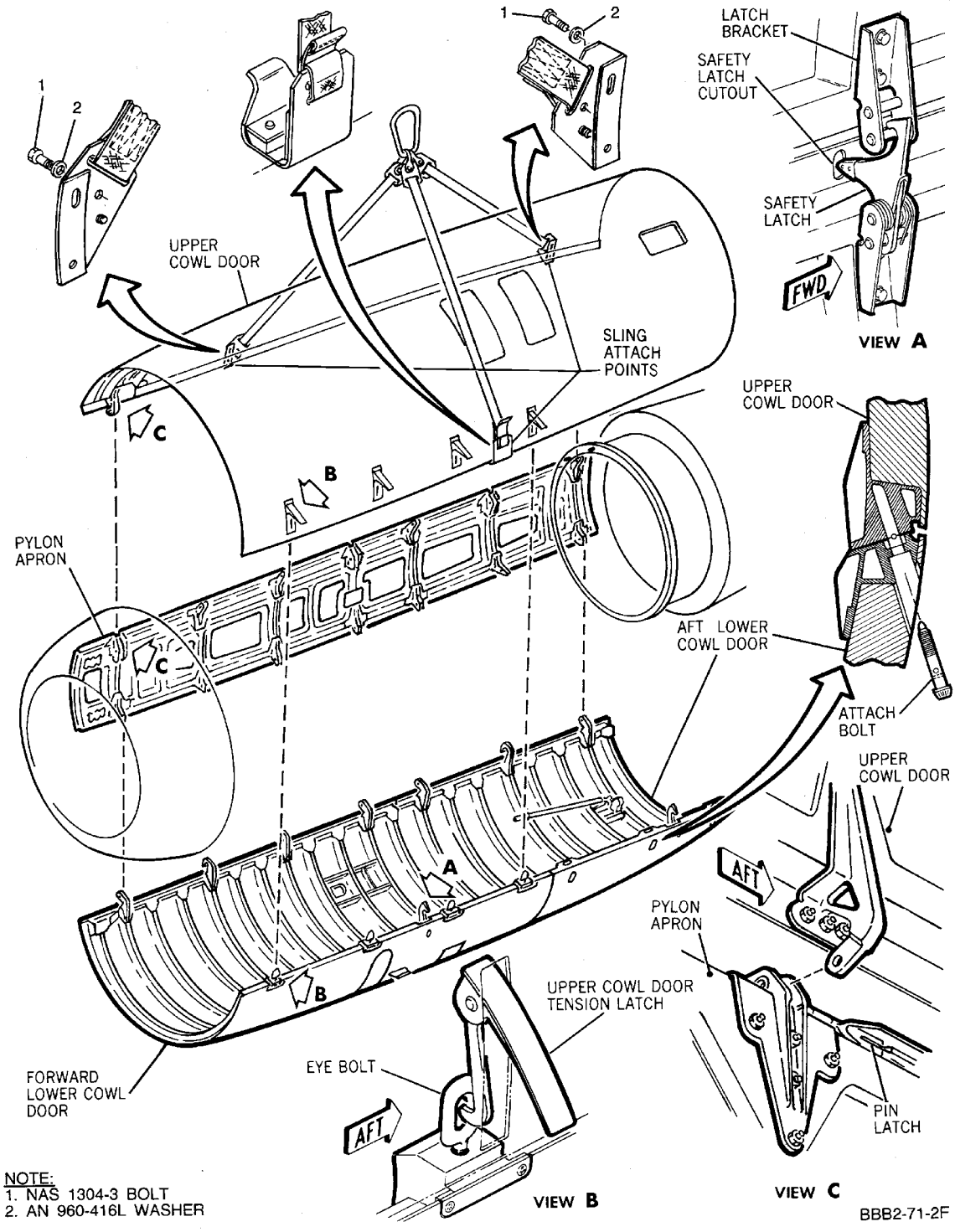
EFFECTIVITY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887



Right Lower Cowl Door (Configuration with Center Snubber) -- Removal/Installation
Figure 402/71-00-00-990-820



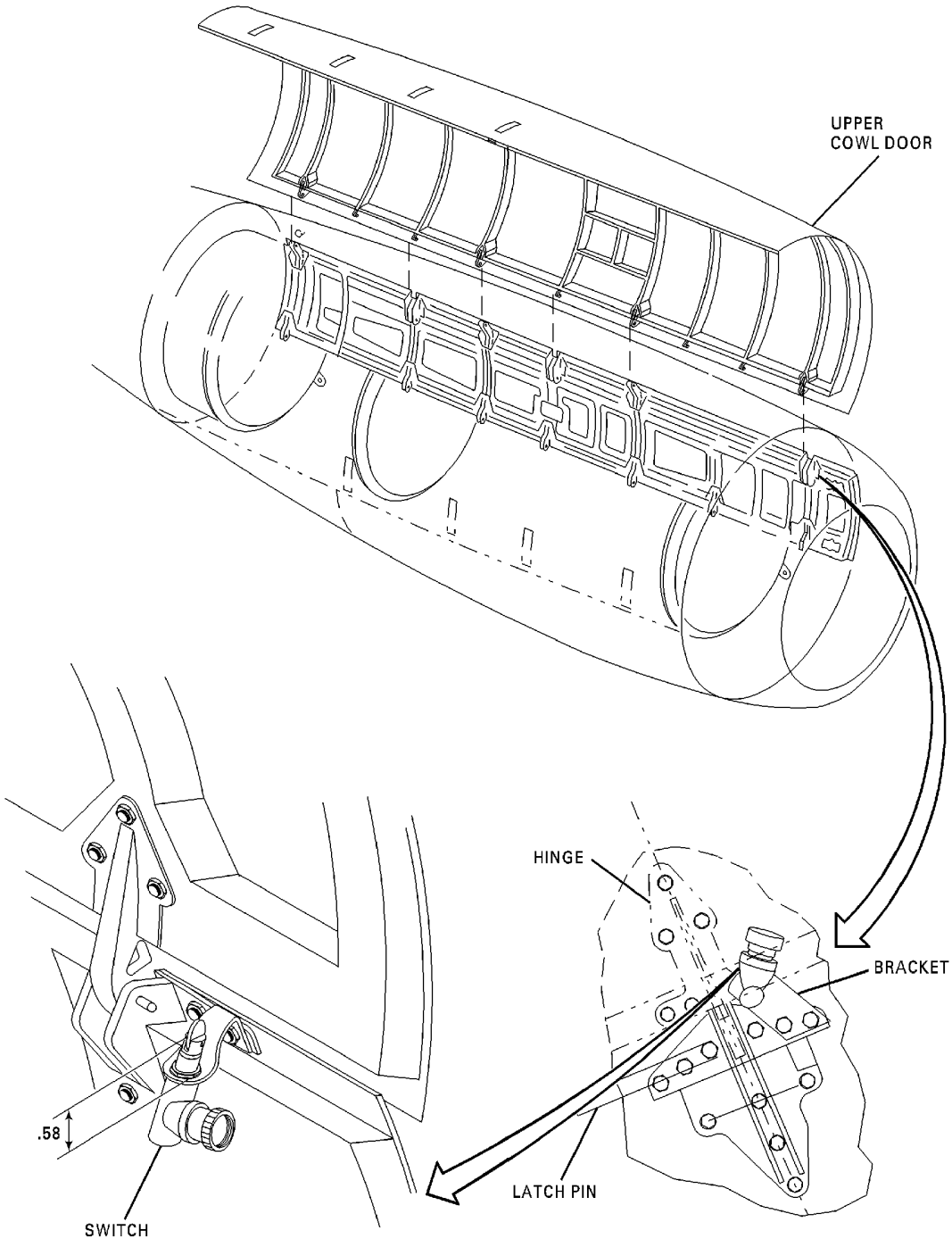
Right Lower Cowl Door (Configuration without Center Snubber) -- Removal/Installation
Figure 403/71-00-00-990-821



NOTE:
1. NAS 1304-3 BOLT
2. AN 960-416L WASHER

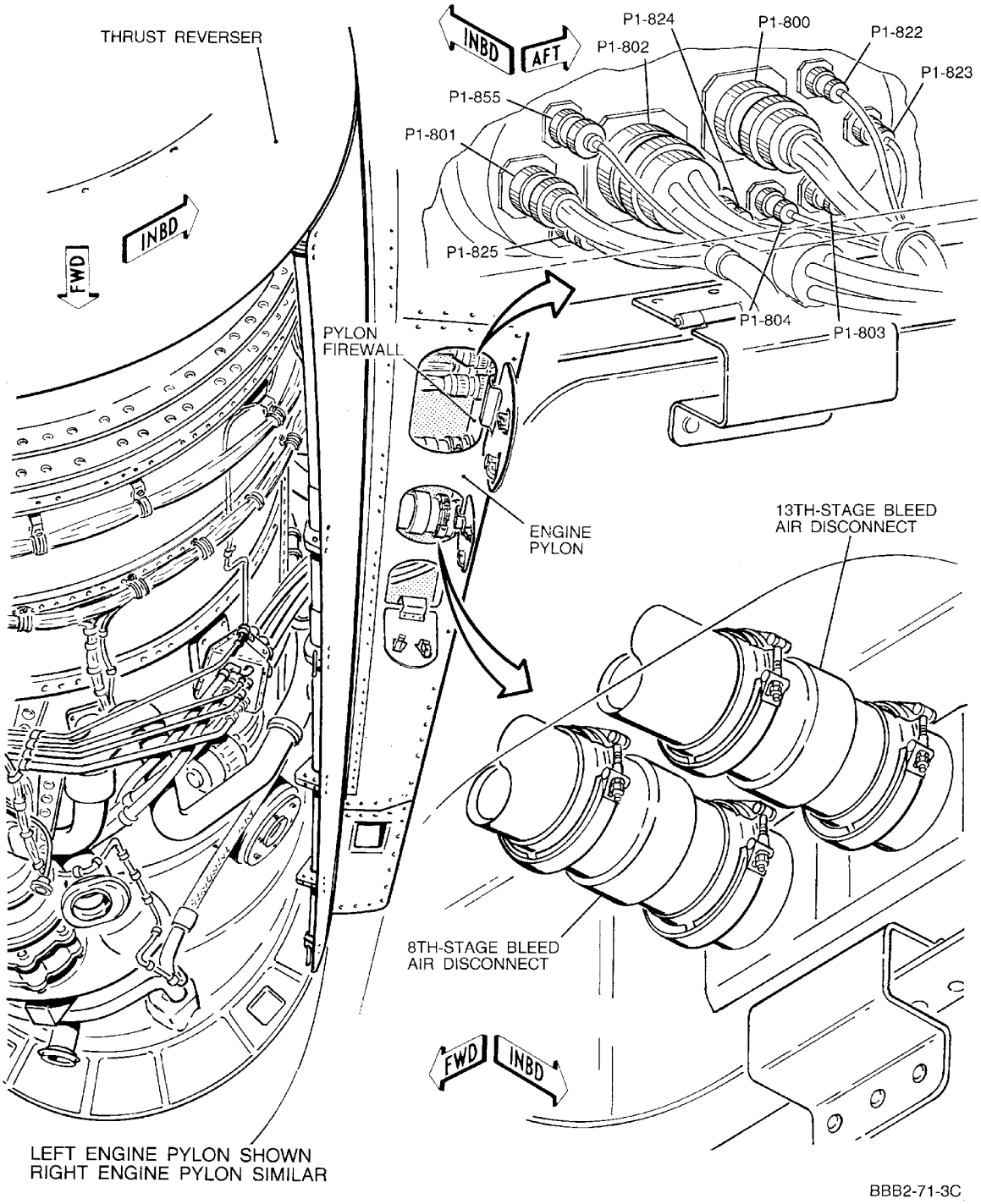
Cowl Door -- Removal/Installation
Figure 404/71-00-00-990-822

EFFECTIVITY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

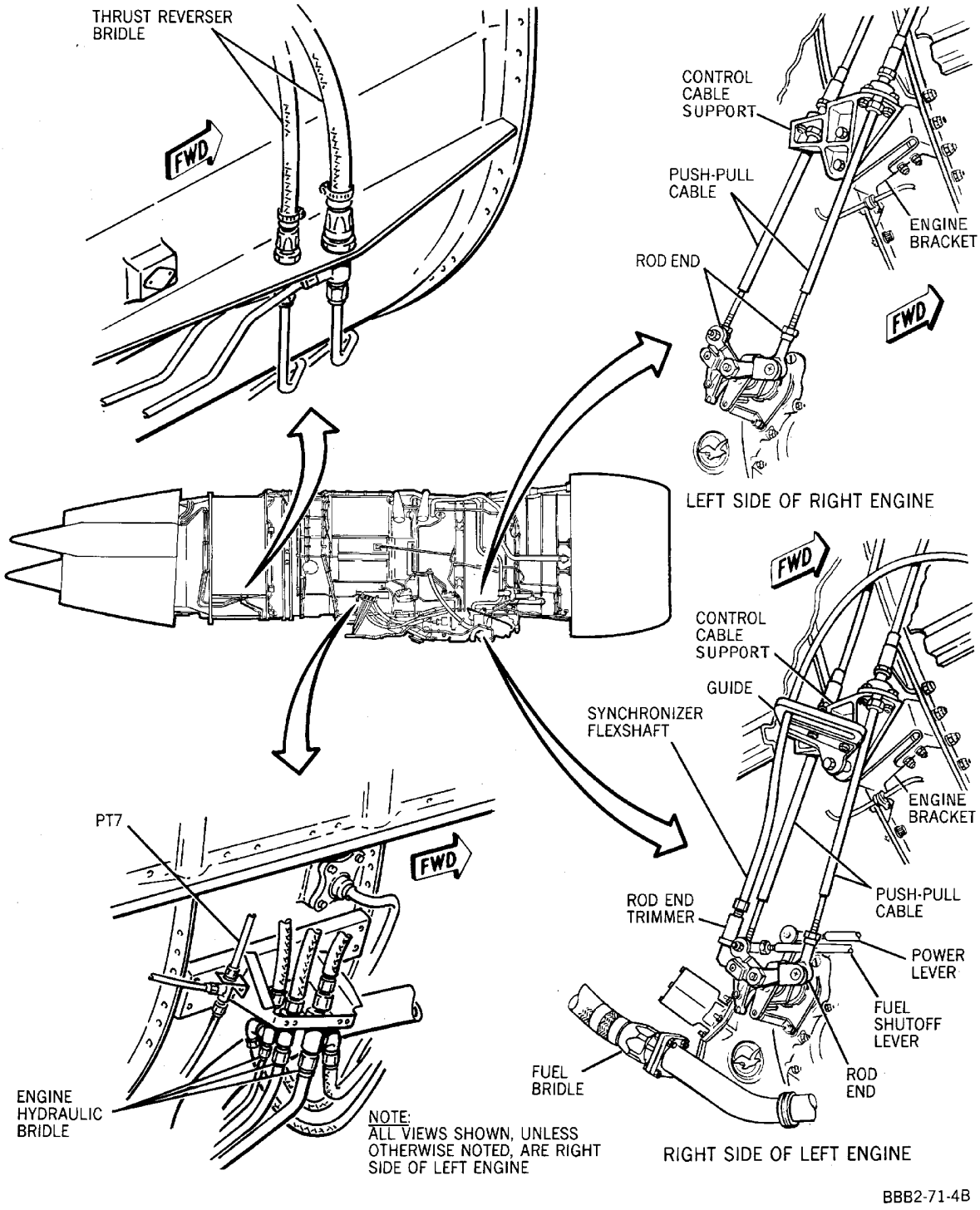


Power Plant Disconnect Points
Figure 405/71-00-00-990-823

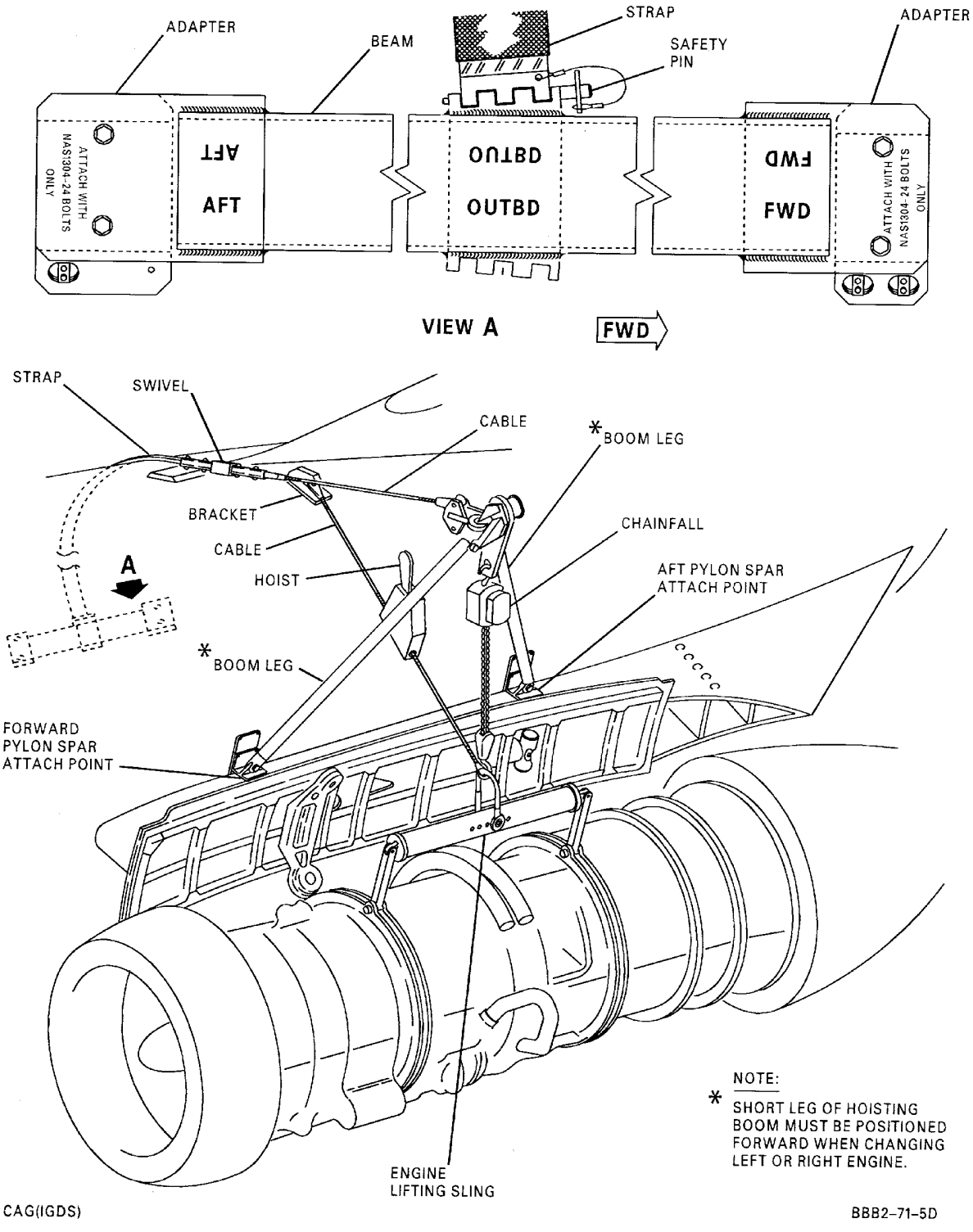
EFFECTIVITY
WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887



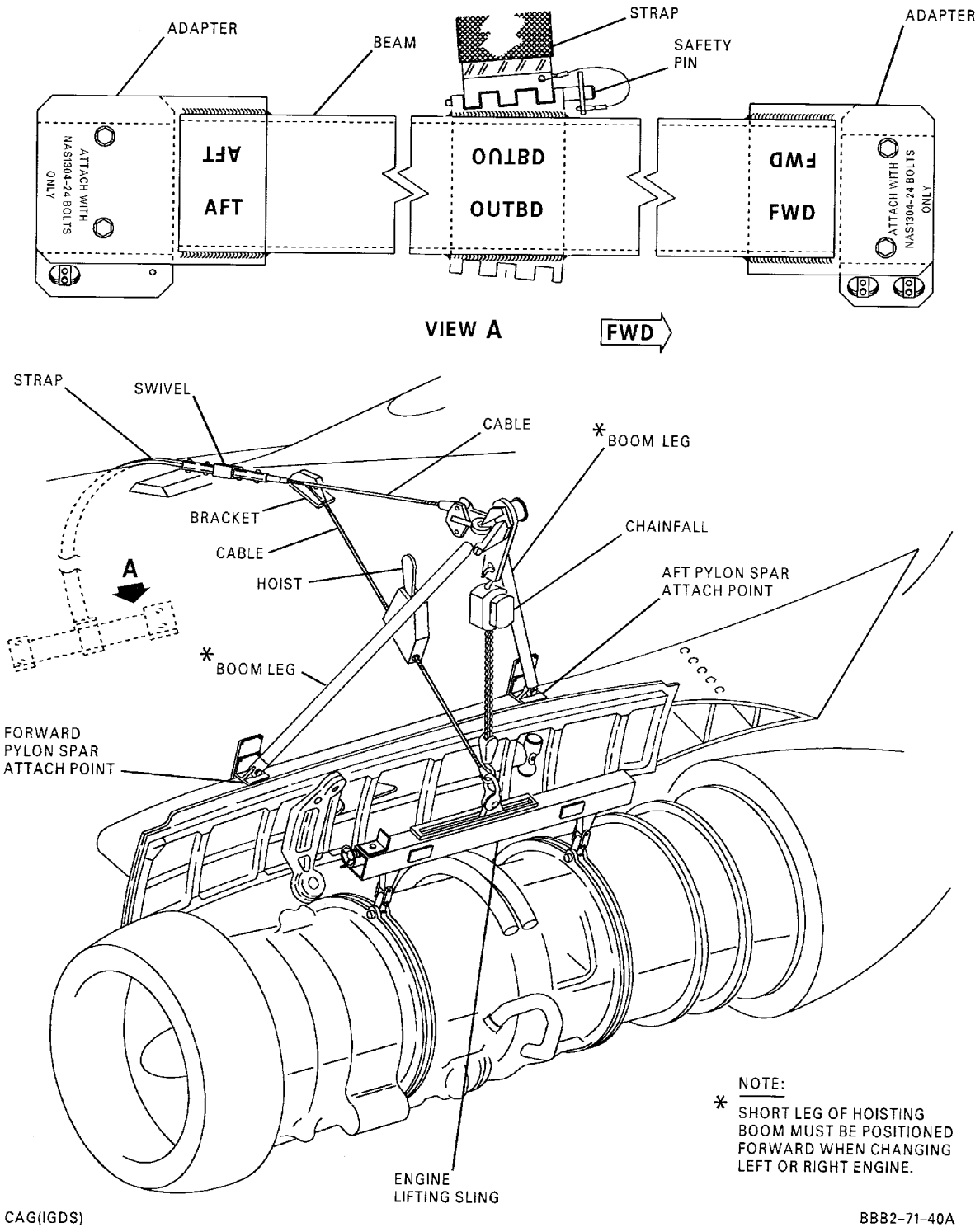
Power Plant Disconnect Points
Figure 406/71-00-00-990-824



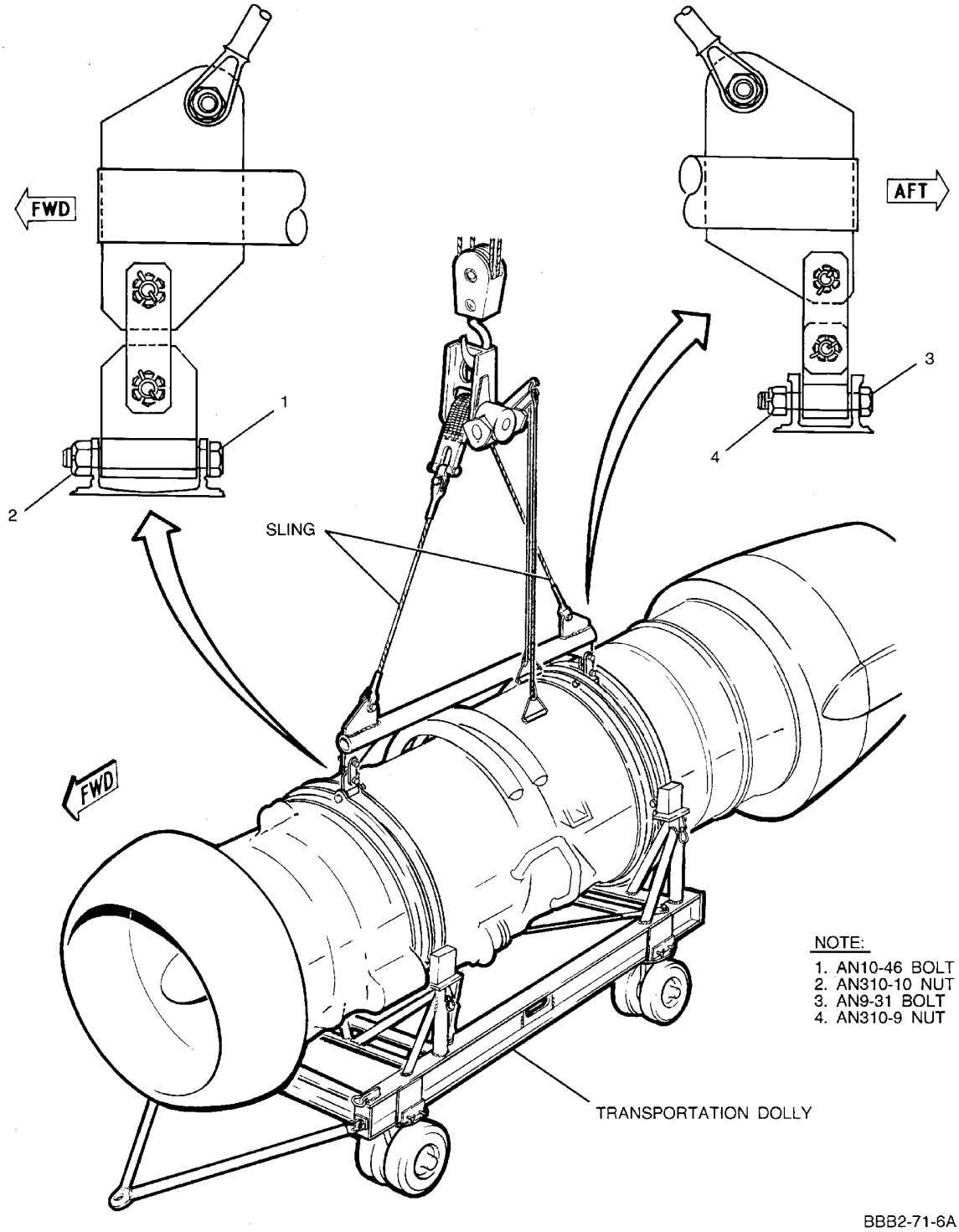
Power Plant Disconnect Points
Figure 407/71-00-00-990-825



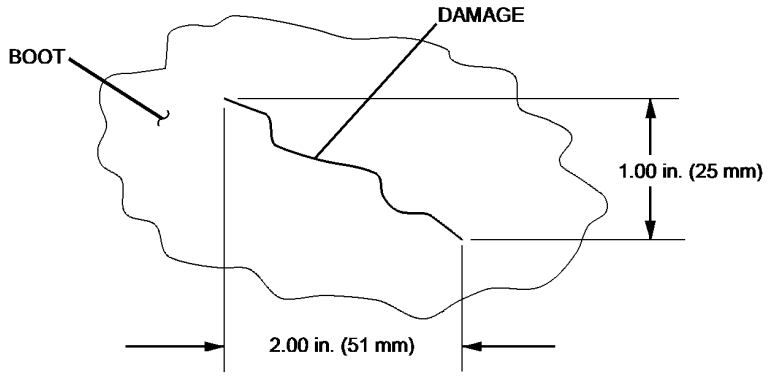
Power Plant Support Equipment
Figure 408/71-00-00-990-826



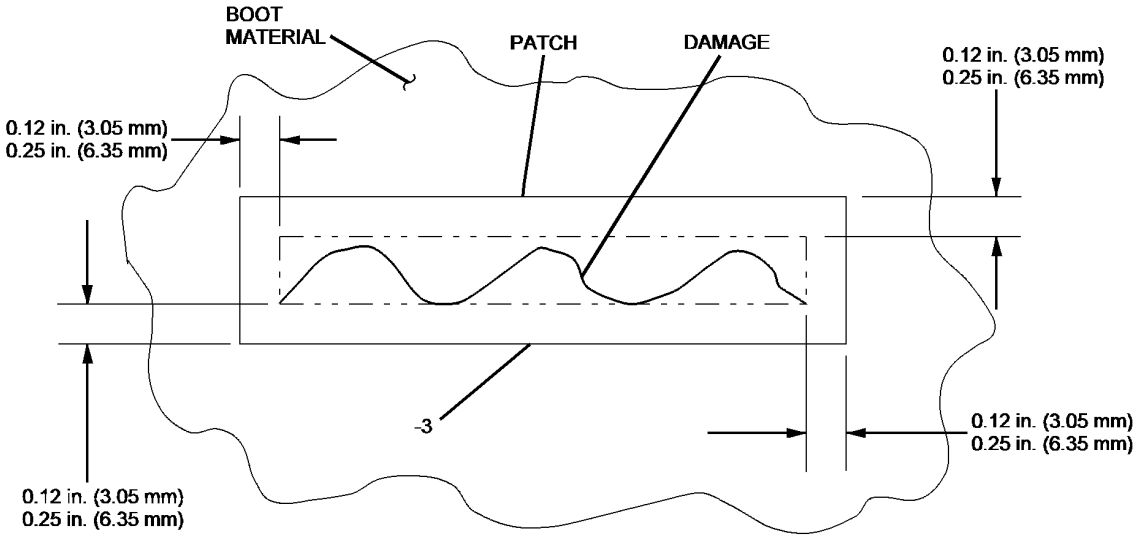
Power Plant Support Equipment
Figure 409/71-00-00-990-827



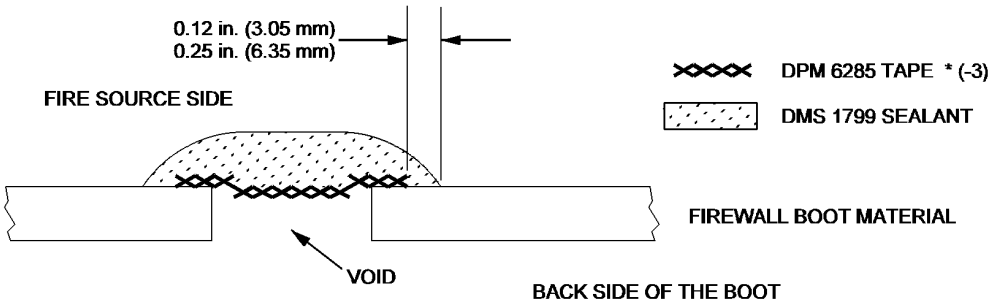
Power Plant Support Equipment
Figure 410/71-00-00-990-828



MAXIMUM DAMAGE AREA



TYPICAL INSTALLATION



APPLY A MAXIMUM OF 2 LAYERS OF DPM 6285 PER PATCH.

PATCH APPLICATION

BBB2-71-133
S0000488449V1

FIRESEAL BOOT REPAIR
Figure 411/71-00-00-990-885

4. Check Power Plant

A. Check Throttle and Fuel Shutoff Lever

(1) Cycle throttle several times from idle to full forward thrust position and back to idle. Make certain there is complete freedom-of-movement through entire range.

(2) Cycle fuel shutoff lever several times from fuel off to fuel on position and back to fuel off. Make certain there is complete freedom-of-movement through entire range.

(3) If throttle and fuel shutoff rigging is required, refer to Quick Engine Change SUBJECT 76-11-00, Page 501 and PAGEBLOCK 76-12-00/501.

B. Apply Electrical Power

(1) Energize airplane electrical buses. (CHAPTER 24)

C. Check Engine Anti-ice Valves and Indicators

(1) Place engine anti-ice valve switch in ON position.

(2) Check that valves operate properly, amber light on momentarily, then blue light on, and that mechanical indicator on valves indicate open.

(3) Place engine anti-ice valve switch in OFF position.

D. Check Fuel System

(1) Place fuel boost or start pump switch in ON position.

(2) Check that no fuel leakage exists at fuel bridle or flex line.

(3) Loosen vapor removal line connection at fuel bridle. Bleed until clear fuel is observed and tighten connection.

(4) Place fuel pump switch in OFF position.

E. Check CSD Shaft Disconnect

(1) Pull disconnect handle on bottom of CSD, lightly, until handle bottoms. Hold handle lightly in this extended position.

(2) Actuate and release flight compartment CSD disconnect switch.

(3) CSD disconnect handle on bottom of CSD should pull in by spring action. Allow handle to move in.

(4) Pull disconnect handle out until audible click is heard, indicating disconnect is latched out.

NOTE: A reduction in pull force required on CSD disconnect handle is also evidence that disconnect is latched out.

F. Perform Fire Protection System Test. (PAGEBLOCK 26-00-00/201).

G. Perform Ignition System Test. (SUBJECT 74-00-00, Page 501)

H. Make certain throttle is at idle position and that thrust reverser lever is in forward thrust position.

I. Visually check thrust reverser upper door fairing clearance to pylon. Allowable mismatch between fairing and pylon is 0.13(±0.13) inch (3.30(±3.30) mm). Allowable gap between fairing and pylon is 0.25(±0.13) inch (6.35(±3.30) mm). If any adjustment is required, refer to CHAPTER 78.

J. Remove and stow thrust reverser control valve safety pin.

K. Close fuselage access door 5901C for left engine, 5902C for right engine.

L. Make certain all systems are serviced and perform normal engine runup outlined in GENERAL, SUBJECT 71-00-00, Page 501 to make certain that all systems function properly.

CAUTION: DO NOT APPLY POWER IN THE REVERSE THRUST POSITION WITHOUT USING A TAIL SUPPORT.

M. If desirable to check thrust reverser operation, refer to CHAPTER 78.

N. Visually check that there is no fluid leakage.

O. Shut down engine as outlined in PAGEBLOCK 71-00-00/201, unless trimming is necessary.

P. Torque T-bolt nut on 8th and 13th stage pneumatic manifold end cap clamps 110 to 120 inch-pounds.

NOTE: If engine installed after engine buildup (includes spare engines), all pneumatic duct clamp T-bolt connections on the engine should be retorqued following engine run.

NOTE: If same installed (removed for maintenance not related to the pneumatic system), only the pylon and end cap clamp T-bolt connections should be retorqued following engine run.

Q. Close pylon access doors.

R. Close cowl doors. If adjustment is necessary refer SUBJECT 71-10-03, Page 201.

S. Deenergize airplane electrical buses. (EXTERNAL POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 24-40-00/001)

GENERAL - ADJUSTMENT/TEST

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-00-00-710-801

2. Operational Check of the Suction Feed System

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-00-00 P/B 501 Config 1	GENERAL - ADJUSTMENT/TEST
71-00-00 P/B 501 Config 5	GENERAL - ADJUSTMENT/TEST
71-00-00 P/B 501 Config 7	GENERAL - ADJUSTMENT/TEST
71-00-00 P/B 501 Config 8	GENERAL - ADJUSTMENT/TEST

B. Prepare for the Suction Feed System Operational Check

SUBTASK 71-00-00-650-001

(1) Make sure that the left and right wing tanks contain a maximum of 1500 lbs. of fuel on each side.

SUBTASK 71-00-00-868-001

(2) Idle run engines. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

C. Suction Feed System Operational Check

SUBTASK 71-00-00-710-001

(1) Turn OFF all forward and aft fuel boost pumps and wait for at least five minutes.

(2) Make sure that engines are continuing to run.

D. Job Close-up

SUBTASK 71-00-00-868-002

(1) Perform normal engine shutdown. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

SUBTASK 71-00-00-942-001

(2) Remove all the tools and equipment from the work area. Make sure the area is clean.

——— END OF TASK ———

GENERAL - ADJUSTMENT/TEST

1. General

A. Adjustment of the power plant is required to assure optimum operation and to prolong the life of the engine. The following procedures outline the recommended methods for engine starting and trimming.

NOTE: Power lever misalignment will require a trim check of both engines to determine which power lever is misaligned.

B. Engine trimming requires the use of a calibrated trim test set Paragraph 8.. Engine trimming using the aircraft instruments in lieu of a calibrated trim test set is an acceptable option Paragraph 9.. A calibrated trim test set is required to include the following conditions:

(1) If two engines are installed and trimmed at the same time.

(2) If two fuel controls are installed and trimmed at the same time.

C. Before starting an engine, a check should be made to ensure all systems associated with engine operation have been serviced, and that no maintenance is being performed on any system which may be affected.

D. Restricted areas, must be clear of personnel and foreign objects. (Figure 501)

E. The main landing gear wheels must be chocked.

F. Engine inlet and exhaust duct covers must be removed.

G. The airplane should be headed into the wind during engine trimming. (Figure 502)

H. Engine starting can be accomplished by utilizing a low-pressure pneumatic ground source, an operating engine, or the auxiliary power unit. If an engine start is to be performed using the auxiliary power unit, additional operating precautions must be observed. For auxiliary power unit starting procedures refer to: (AIRBORNE AUXILIARY POWER, CHAPTER 49)

I. Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (5°F) of each other. Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for a minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

J. Static engine operation at thrust settings above idle should be limited as much as possible.

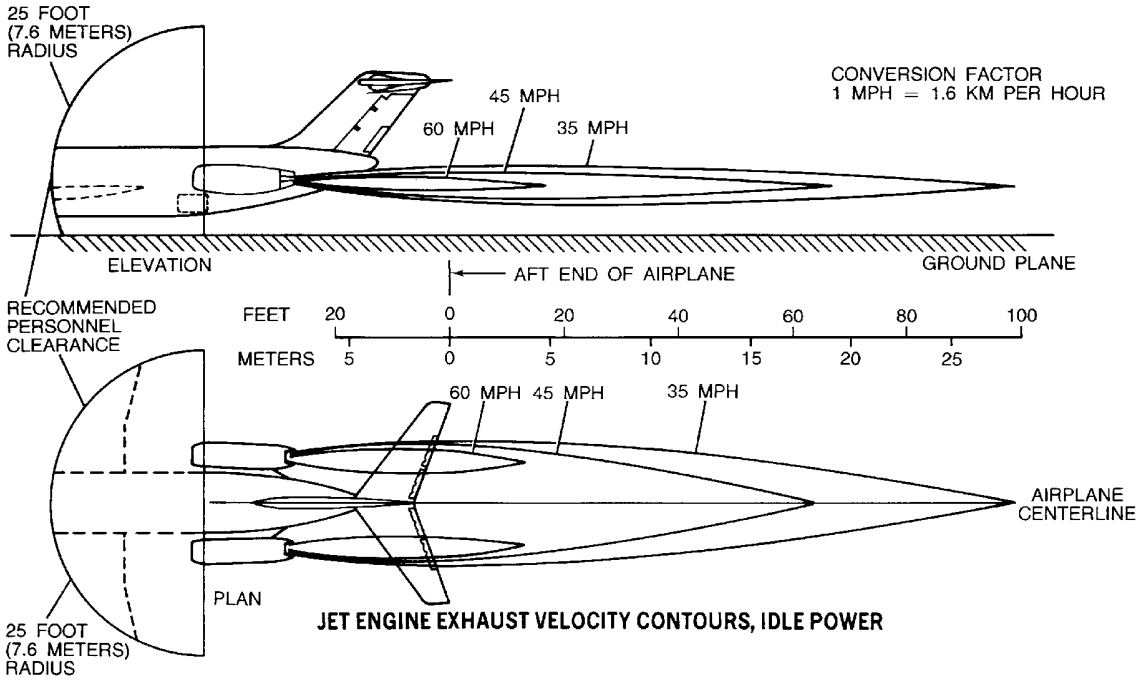
K. Symbols utilized in this section are defined as follows:

Table 501

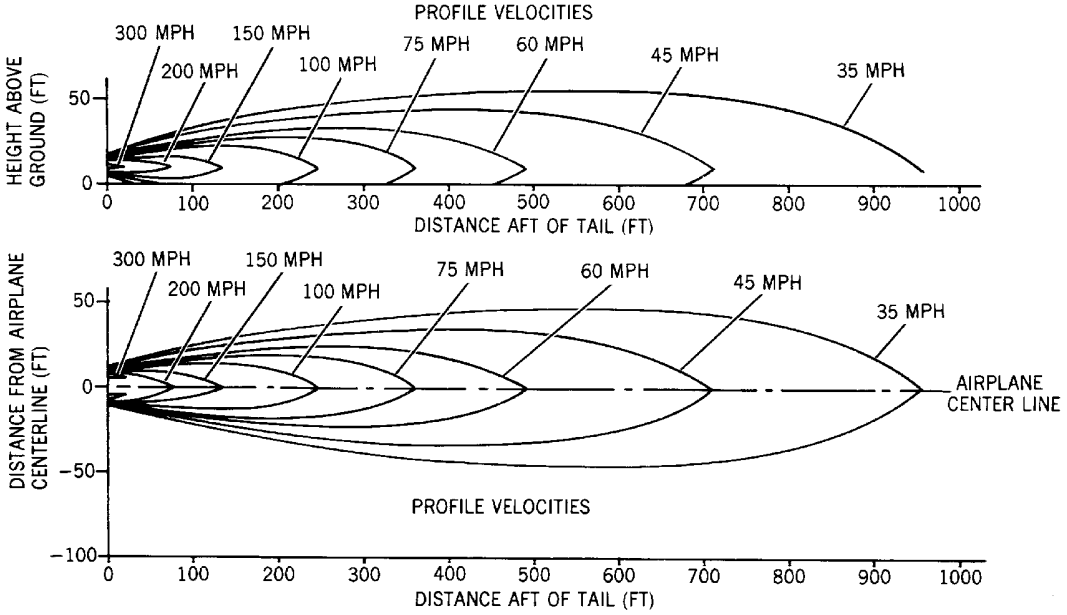
(1) EGT	- Exhaust Gas Temperature
(2) EPR	- Engine Pressure Ratio (EPR = Pt_7/Pt_2)
(3) N_1 rpm	- Low-pressure Compressor Rotor Speed
(4) N_2 rpm	- High Pressure Compressor Rotor Speed
(5) Pamb	- Barometric Pressure
(6) PP EPR	- Part Power Engine Pressure Ratio
(7) Pt_2	- Compressor Inlet Total Pressure
(8) Pt_7	- Turbine Discharge Total Pressure
(9) PP Pt_7	- Part Power Turbine Discharge Pressure

Table 501 (Continued)

(10) Tamb	- Ambient Temperature
(11) TO EPR	- Takeoff Engine Pressure Ratio



JET ENGINE EXHAUST VELOCITY CONTOURS, IDLE POWER

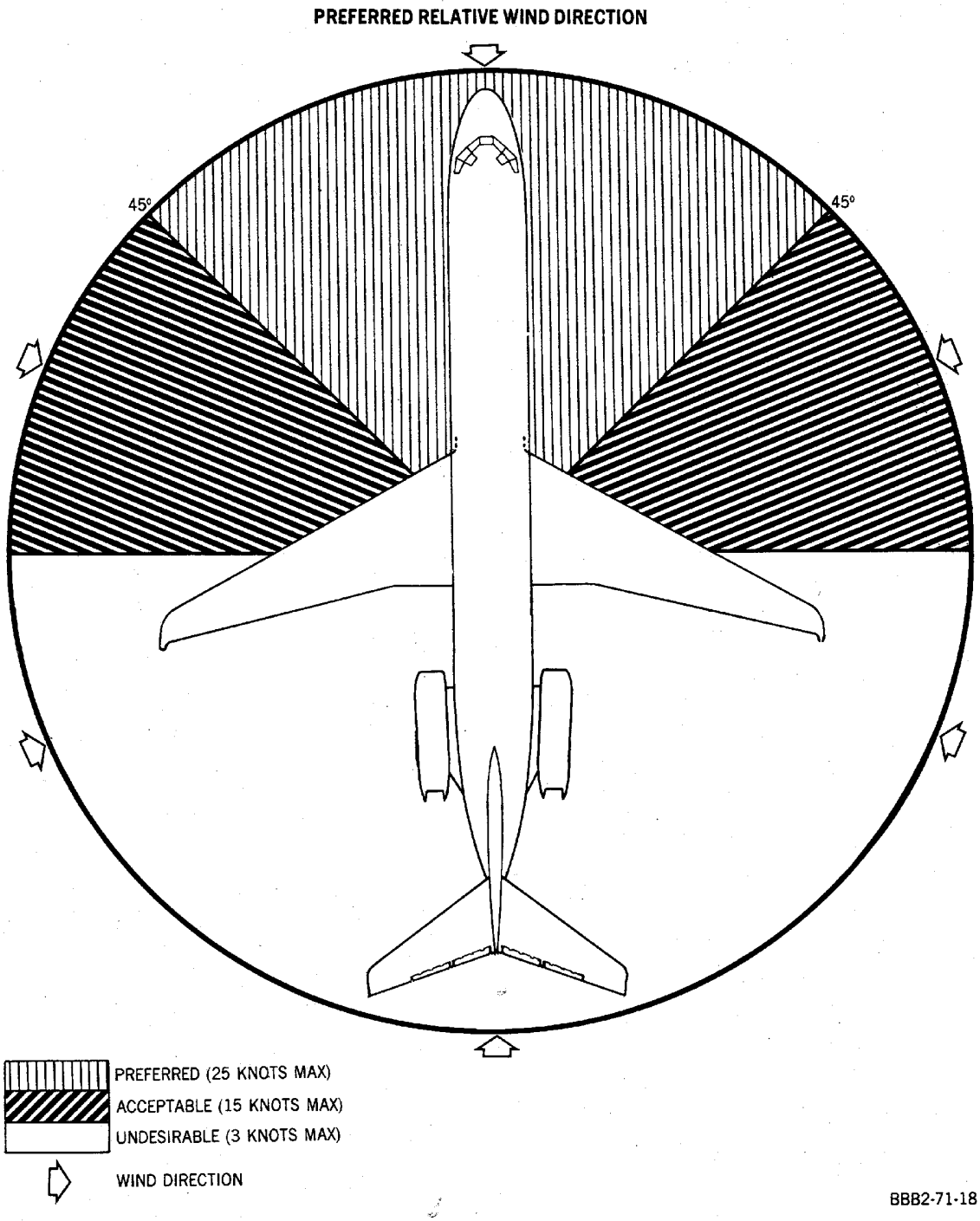


JET ENGINE EXHAUST VELOCITY CONTOURS, TAKEOFF POWER

NOTES:
1. THESE CONTOURS ARE TO BE USED AS GUIDELINES ONLY SINCE OPERATIONAL ENVIRONMENT VARIES GREATLY – OPERATIONAL SAFETY ASPECTS ARE THE RESPONSIBILITY OF THE USER/PLANNER.
2. ALL VELOCITY VALUES ARE STATUTE MILES/HOUR
3. CROSSWINDS WILL HAVE CONSIDERABLE EFFECT ON CONTOURS
4. SEA LEVEL STATIC – STANDARD DAY

BBB2-71-35B

Engine Restricted Areas -- JT8D-209 Engine
Figure 501/71-00-00-990-839



Engine Trim Wind Heading
Figure 502/71-00-00-990-840

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

2. Equipment and Materials

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

Table 502

Name and Number	Manufacturer
Remote engine trimmer D231	PEGASUS Comp Air Inc. 422 Trimber Ridge Road, Middletown CT. 06457-7540 Phone: 860 632-0345 FAX: 860 633-4973 Email: www.pegasusmfg.com
Engine trim test set, multi-engine with two trim heads, checks N1, N2, EPR, PT7, PT2, EGT, OAT	
Remote engine trimmer TEE 46-4/TE8D-06	Regelungs Messtechnik Schmidt, KG 2057 Reinbek-Hamburg Gutenberg Strasse 27, Germany Phone: 011-49-40-727 6030 Fax: 011-49-40-727 3066 Cincinnati office Phone: 513-237-4385 Fax: 513-469-0605

3. Engine Operating Limits

A. Engine Operating Limits JT8D-209

Table 503

Thrust Setting	Time Limit (Minutes)	Max. EGT (Degrees C) JT8D-209	Min. Oil Press. (PSI)	Max. Oil Temp. (Degrees C)
Takeoff (Normal)	5	550	*[1]40 (276 kPa)	135
Takeoff (Maximum)	5	570	*[1]40 (276 kPa)	135
Max Continuous	Continuous	530	*[1]40 (276 kPa)	135
Starting	Momentary	*[2]500	*[1]40 (276 kPa)	135

*[1] CAUTION: NORMAL OIL PRESSURE IS 40 TO 55 PSI (276 TO 380 KPA). OIL PRESSURE BETWEEN 35 AND 40 PSI (242-276 KPA) IS PERMISSIBLE FOR SUSTAINED OPERATIONS (TO COMPLETE FLIGHT), PREFERABLY AT REDUCED THROTTLE SETTING. OIL PRESSURE BELOW 35 PSI (242 KPA) IS UNSAFE.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

*[2] NOTE: Temperature is time limited to momentary. If the maximum EGT temperature is exceeded, the engine should be shut down and inspected in accordance with the instructions contained in CHAPTER 72 of the Maintenance Manual.

B. With the exception of idle, thrust settings are obtained by positioning the throttles to obtain the required engine pressure ratio for existing inlet air temperature.

C. A maximum oil temperature of 165°C is allowable for a time period not to exceed 15 minutes.

D. At normal takeoff the N_2 high-pressure compressor rotor speed should not exceed 99.2 percent (12,150 rpm), and the N_1 low-pressure compressor rotor speed should not exceed 95.5 percent (7850 rpm).

E. Starter duty cycle:

(1) Three successive 30 second start attempts i.e.; 90 seconds on, 5 minutes off.

(2) Subsequent start attempts 30 seconds on, 5 minutes off or 60 seconds on, 10 minutes off.

(3) Dry motoring 90 seconds on 15 minutes off.

NOTE: Starter duty cycle limits do not supersede ignition system duty cycle limits.

F. Thrust reverser ground maintenance operation precautions:

(1) Do not operate engine above idle thrust when thrust reverser is deployed.

(2) Ensure aircraft is secured to prevent it from rolling backwards.

NOTE: Use of brakes when aircraft is rolling backwards may cause aircraft to tip back.

(3) Observe all normal precautions related to engine ground operations.

G. Operation in icing conditions:

(1) Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (9°F) of each other.

(2) Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

4. Engine Starting

WARNING: MAKE CERTAIN THAT ENGINE INLET AND EXHAUST AREAS ARE CLEAR OF FOREIGN OBJECTS AND PERSONNEL.

A. (Figure 501)

Before starting engine, check following switch and lever positions:

NOTE: Observe engine hazard area. (Figure 501)

(1) Check that all engine related circuit breakers are closed.

(2) If using external electrical power:

Table 504

(a) External power available light	On
(b) Voltage/frequency	Checked
(c) External power bus switches	On
(d) Ground service panel external power bus	Off
(e) Ground service panel APU power bus switch	Off
(3) Galley power	Off
(4) CSD disconnect	Normal
(5) Generators	Reset & On
(6) AC crosstie	Auto
(7) DC crosstie	Open
(8) Emergency electrical power	Checked
(9) Auxiliary power unit panel	

Table 504 (Continued)

(a) Fire control	Normal
(b) Bleed air	Off
(c) Master	Off
(d) Doors	Automatic
(10) Air-conditioning supply switch	Off
(11) Start pump	Off
(12) Ignition selector switch	Off
(13) Fuel tank pump switches	Off
(14) Airfoil anti-icing	Off
(15) Engine anti-icing	Off
(16) Annunciator panel	Tested
(17) All warning lights	Tested
(18) Fire detection and extinguishing systems	Checked & Tested
(19) Engine hydraulic pump	High
(20) Auxiliary hydraulic pump	On
(21) Hydraulic pressure and quantity	Checked
(22) Engine instruments	Checked & Set
(23) Fuel flow counters	Reset
(24) Fuel quantity	Checked & Tested
(25) Throttles	Idle
(26) Autothrottle	Disengaged
(27) Engine synchronize switch	Off
(28) Thrust reverser lever	Forward thrust
(29) Fuel shutoff lever	Off
(30) Fire control handle	Normal
(31) Fuel crossfeed	Off
(32) Pneumatic crossfeed	Closed
(33) If using auxiliary power unit for start:	
(a) Battery switch	On
(b) APU door control switch	Auto
(c) Fire control switch	Normal
(d) APU left and right bus switch	On
(e) APU bleed air switch	Off
(f) Start pump or fuel tank boost pump	On
(g) APU master switch	Start/Run

Table 504 (Continued)

(h) Voltage/frequency	Checked
(34) Parking brakes	Set
(35) Antiskid	Off

CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS AFTER FUEL CONTROL LEVER IS PLACED TO FUEL ON, DISCONTINUE ENGINE START. DO NOT ATTEMPT SECOND START UNTIL ENGINE CLEARING PROCEDURES ARE COMPLIED WITH, OTHERWISE HOT OR BOOMING START MAY RESULT.

CAUTION: INSUFFICIENT AIR PRESSURE TO PNEUMATIC STARTER OR TO COMBUSTION STARTER THAT IS BEING USED AS PNEUMATIC STARTER MAY NOT SUPPLY ENOUGH STARTER TORQUE TO START AN ENGINE PROPERLY, RESULTING IN HOT, HUNG OR "TORCHING" STARTS. WHEN AIRBLEED FROM ANOTHER ENGINE IS USED TO OPERATE STARTER, CAUTION IS NECESSARY TO ENSURE THAT OPERATING ENGINE IS TURNING OVER FAST ENOUGH TO PROVIDE AN ADEQUATE SUPPLY OF PRESSURIZED AIR TO ENGINE BEING STARTED. AN ENGINE SHOULD NEVER BE PERMITTED TO TAKE LONGER THAN 2 MINUTES TO ACCELERATE TO IDLE RPM. IN EVENT OF TORCHING, HIGHER THAN USUAL EXHAUST GAS STARTING TEMPERATURE, TOO LONG AN ACCELERATION TIME OR OTHER ABNORMALITIES, DISCONTINUE STARTING ATTEMPT AND INVESTIGATE.

B. Start engine by placing switches and levers in indicated position.

(1) To start engine:

Table 505

(1) Obtain clearance to start engine	Received
(2) Pneumatic pressure	Checked (*36 psi minimum)(248 kPa)
NOTE: *Can be 1 psi (7 kPa) less per 1000 feet (305M) in pressure altitude above sea level.	
(3) Air-conditioning supply switch	Off
(4) Pneumatic crossfeed	
(a) If making crossfeed start	Both open
(b) If using APU or ground pneumatic source	Left or right open as applicable
(5) Anti-collision light (if required)	On
(6) Fuel boost or start pump	On
(7) Inlet fuel pressure low light	Off
CAUTION: IF FUEL IS SHUT OFF INADVERTENTLY, DO NOT CONTINUE START CYCLE. WHENEVER ENGINE FAILS TO START, SHUT OFF FUEL AND IGNITION AND CONTINUE TURNING COMPRESSOR OVER WITH STARTER FOR 10 TO 15 SECONDS TO CLEAR OUT TRAPPED FUEL OR VAPOR. BEFORE ATTEMPTING ANOTHER START, ALLOW EITHER 30-SECOND DRAINING PERIOD OR PRESCRIBED STARTER COOLING PERIOD, WHICHEVER IS LONGER. STARTER SHOULD NOT BE REENGAGED UNTIL ENGINE HAS COME TO COMPLETE STOP.	
(8) Ignition selector switch	Position for normal ground start

Table 505 (Continued)

NOTE: Ground personnel should check for N_1 and N_2 rotor rotation as the tachometer indicator (N_1) will not indicate very low windmilling speeds.	
CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL N_1 AND N_2 ROTORS HAVE STOPPED ROTATING.	
(9) Start switch	Position for normal ground start
(10) Start valve open light	On
(11) Oil pressure	Rising
CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N_1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION ALONG WITH A MINIMUM INDICATED N_2 OF 20% BEFORE RAISING FUEL SHUTOFF LEVER.	
(12) N_1 rotor	Positive rotation indicated
(13) N_2 rotor	Rotation
CAUTION: IF N_2 DOES NOT INDICATE A MINIMUM OF 20% DO NOT RAISE FUEL SHUTOFF LEVER. TERMINATE START UNTIL CAUSE OF MALFUNCTION CAN BE DETERMINED AND CORRECTIVE ACTION TAKEN.	
(14) Fuel shutoff lever	Fuel on at maximum motoring (20 percent N_2 rpm percent minimum)
NOTE: Moving the FUEL lever to ON (i.e., pressurizing the engine) when the N_2 tachometer indicates maximum motoring RPM (maximum motoring is defined as no N_2 RPM change for 5 seconds) and N_1 RPM indicates positive rotation, will improve probability of a good start. Minimum N_2 RPM for moving FUEL lever to ON is 20% RPM.	
(15) Initial fuel flow	Approximately 800 lb/hr (362.9KG/HR)
NOTE: At initial engine start, the fuel flow indicator may fluctuate slightly due to air in the system. How- ever, the indicator will function properly and the system will be clear of air after approximately 3 minutes of operation. Throttle action may be required as an aid in clearing the system of air.	
CAUTION: FOR AIRCRAFT WITH ANALOG INSTRUMENTS, WHEN STARTING EGT REACHES WITHIN 50°C (425°C) OF STARTING TEMPERATURE LIMIT (500°C) AND CONTINUES TO CLIMB DURING GROUND STARTING CYCLE, HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.	
CAUTION: FOR AIRCRAFT WITH ENGINE DISPLAY PANEL (EDP), WHEN EGT AND/OR FUEL FLOW DISPLAY FLASHES, A HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.	

Table 505 (Continued)

CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS, DISCONTINUE START AND PROCEED WITH UNSATISFACTORY START AND/OR ENGINE CLEARING PROCEDURES. Paragraph 5., Paragraph 6.	
To add Note for paragraphs 5 and 6	
(16) Exhaust gas temperature	Rising
(17) Start switch	Release/off (between 35 and 40 percent N_2 rpm)
CAUTION: IF START VALVE LIGHT FAILS TO GO OUT, AND THERE IS NO INDICATION OF DUCT PRESSURE RISE BY TIME ENGINE ACCELERATES TO 40% N_2, PNEUMATIC CROSSFEED VALVE MUST BE CLOSED IMMEDIATELY AND START TERMINATED UNTIL CAUSE OF MALFUNCTION CAN BE DETER MINED AND CORRECTIVE ACTION TAKEN.	
(18) Start valve open light	Off
(19) Oil pressure low light	Off
(20) CSD oil pressure low light	Off
(21) After idle has stabilized, check following:	
(a) N_2 rotor rpm	50 to 61 percent
(b) N_1 rotor rpm	22 to 30 percent
(c) Exhaust gas temperature	300 to 480°C
(d) Fuel flow	600 to 1100 pounds per hour (270 to 500 KG/HR)
(e) Oil pressure	40 to 55 psi (276 to 380 kPa)
(f) Hydraulic pressure low light	Off
(g) Generator	115(±3) volts 400(±4) Hz
(h) Ignition selector switch	Off
(i) Fuel boost or start pump	Off

5. Unsatisfactory Start

NOTE: Unsatisfactory start procedures should be followed if any of the following conditions occur.

- Hot Start -- EGT exceeds starting limit. A hot start may be anticipated by greater than normal fuel flow for a given field elevation.
- No Start -- Engine does not light off as evidenced by no rise in exhaust gas temperature.
- False Start -- Engine lights off but rpm does not accelerate to idle. EGT may or may not reach the maximum.

A. Place following levers and switches in indicated positions.

(1) The levers and indicated positions:

Table 506

(1) Throttle	Idle
(2) Fuel shutoff	Off

Table 506 (Continued)

NOTE: If no start is obtained, continue to motor engine for 20 seconds to clear engine of fuel and vapors.	
(3) Starter control switch	Release/off
NOTE: In the event of engine fire, starter can be re-engaged when N_2 RPM decreases to 20%.	
(4) Ignition selector switch	Off
(5) Fuel boost or start pump	Off

CAUTION: STARTER DUTY CYCLE MUST BE FOLLOWED; REFER TO CHAPTER 80. ENGINE MUST BE CLEARED OF FUEL AND TRAPPED VAPORS BEFORE ATTEMPTING ANOTHER START.

(2) (STARTING, CHAPTER 80)

Check that no fire hazard exists and determine cause of unsatisfactory start before attempting another start.

6. Engine Clearing Procedures

CAUTION: MAKE CERTAIN N_2 TACHOMETER INDICATOR DOES NOT INDICATE ANY COMPRESSOR ROTATION.

A. Clear Engine

(1) To clear engine of fuel and vapors place the following levers and switches in indicated positions.

Table 507

(a) Throttle	Idle
(b) Fuel shutoff	Off

(2) Place following switches in indicated positions to keep accessory load and bleed air at minimum during operational check.

Table 508

(a) Airfoil and engine anti-ice	Off
(b) Air-conditioning supply	Off
(c) N_2 Tachometer	Indicates rotation has ceased
(d) Ignition selector switch	Off
(e) Fuel boost or start pump	On
(f) Start switch	Start (for approximately 20 seconds)

(3) Attempt another start Paragraph 4.

7. Engine Shutdown Procedures

CAUTION: IF ENGINE HAS BEEN OPERATED AT OR ABOVE 85 PERCENT N_2 FOR MORE THAN 1 MINUTE DURING 5 MINUTES BEFORE SHUTDOWN, ENGINE MUST BE OPERATED AT IDLE RPM FOR 5 MINUTES TO REDUCE POSSIBILITY OF A ROTOR SEIZURE.

A. Shutdown Engine

(1) Place the following levers and switches in indicated positions.

Table 509

(a) Throttle	Idle
(b) Fuel shutoff	Off
(c) Ignition selector	Off
(d) Fuel boost or start pump	Off

(2) Observe that compressor rotors decelerate freely.

(3) Remove ground pneumatic source from airplane or shut down auxiliary power unit. (GENERAL - MAINTENANCE PRACTICES, PAGEBLOCK 49-00-00/201 Config 1)

(4) Remove electrical power source from airplane.

(5) Install inlet and exhaust duct covers as soon as engine has cooled sufficiently.

8. Engine Trimming Procedures

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

CAUTION: IF OUTSIDE AIR TEMPERATURE IS LESS THAN 6°C (42°F) AND VISIBLE MOISTURE IS PRESENT OR DEWPOINT AND OUTSIDE AIR TEMPERATURE (RAT OR SAT) ARE WITHIN 3°C (5°F) OF EACH OTHER, ENGINE TRIMMING SHOULD BE AVOIDED.

A. Install Test Equipment

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb) and determine trim stop position:

(a) Using ambient temperature and Figure Table 513Table 514, determine part power trim stop position to be used. When temperature is in area where either Standard Day or Cold Day stop can be used; use Standard Day Trim chart/stop when temperature will be increasing, use Cold Day Trim chart/stop when temperature will be decreasing. If ambient temperture is below minimum value given in Standard Day Trim chart, Cold Day Trim chart must be used.

NOTE: The part power trim stop is marked with letter S (Standard Day Trim) on one side and letter C (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

(4) ART system check may be performed per Paragraph 13..

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

(5) Open and tag following circuit breakers.

Open and tag following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(6) To assure proper trimming, maintain no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 510

(1) ENG SYNC	OFF
(2) ICE PROTECT	
(a) Airfoil	OFF
(b) Eng	OFF
(3) AIR CONDITIONING	
(a) Supply	OFF
(4) HYD PUMPS	
(a) Eng	LOW
(5) ELEC PWR	
(a) Gen	OFF
NOTE: During engine trim procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When trimming the right engine, the left air-conditioning pack should be turned on. When trimming the left engine, the right air-conditioning pack should be turned on.	

(7) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 8.A.(7) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Operate engine with throttle in idle position for 5 minutes.

(2) Record N_2, ambient temperature (Tamb), and pressure (Pamb).

(3) Determine low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511Table 512.

(4) After N_2 has stabilized for 5 minutes, adjust fuel control idle trim adjustment until idle N_2 RPM percent is within idle N_2 determined in Paragraph 3..

(5) Record actual N_2 percent set.

NOTE: The Idle trim screw is identified by the letters "IDLE" on the fuel control adjacent to the screw. The Part Power screw is identified by the letters "MIL" adjacent to the screw. (Part Power is sometimes called Military or Maximum trim.) Both screws are also identified adjacent to the screws with the letters "INC" with an arrow indicating the direction to turn the screws for increased trim levels.

Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

C. Part Power Trim

(1) Record ambient temperature (Tamb) and pressure (Pamb).

(a) Ambient temperature (Tamb):

1) Use a laboratory approved thermometer.

2) Alternate: Contact airport control tower.

(b) Ambient barometric pressure (Pamb):

1) Use a laboratory approved barometer.

2) Alternate: Contact airport control tower; ask for "Field Barometric Pressure", not Mean Sea Level (MSL) pressure.

3) Alternate: Set No. 1 and No. 2 cockpit altimeters to zero and read barometric scale in window. Record average of the two readings.

(2) Make certain part power trim stop is in position as outlined in Paragraph 8.A.(2)

(3) Using values obtained in step (1) determine value of part power engine pressure ratio (EPR) from Table 513Table 514.

(4) Advance throttle until power lever contacts part power trim stop.

CAUTION: DO NOT EXCEED JT8D-209 ENGINE OPERATING LIMITS OF 550°C EGT OR 135°C OIL TEMP.

(5) Operate the engine at part power position for 5 minutes to allow EPR to stabilize.

(6) Observe test instrument and determine stabilized EPR. Check that EPR is within limits obtained in step (2).

Table 511 Low Idle Trim -- JT8D-209 Engine

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	51.2-52.0	51.6-52.4	52.2-53.0	52.9-53.7
-49 (-56.2)	51.1-51.9	51.5-52.3	52.1-52.9	52.8-53.6
-48 (-54.4)	51.0-51.8	51.5-52.3	52.1-53.0	52.8-53.6
-47 (-52.6)	51.0-51.8	51.4-52.2	52.0-52.8	52.7-53.5
-46 (-50.8)	50.9-51.7	51.4-52.1	52.0-52.8	52.7-53.5
-45 (-49.0)	50.9-51.7	51.9-52.1	51.9-52.7	52.7-53.5
-44 (-47.2)	50.8-51.6	51.2-52.0	51.9-52.7	52.6-53.4
-43 (-45.4)	50.8-51.6	51.2-52.0	51.8-52.6	52.6-53.4
-42 (-43.6)	50.8-51.6	51.1-51.9	51.8-52.6	52.6-53.4
-41 (-41.8)	50.7-51.7	51.1-51.9	51.8-52.6	52.5-53.3

Table 511 Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-40 (-40.0)	50.7-51.5	51.1-51.9	51.7-52.5	52.5-53.3
-39 (-38.2)	50.7-51.5	51.0-51.8	51.7-52.5	52.5-53.3
-38 (-36.4)	50.6-51.4	51.0-51.8	51.7-52.5	52.5-53.3
-37 (-34.6)	50.6-51.4	50.9-51.7	51.7-52.5	52.5-53.3
-36 (-32.8)	50.6-51.4	50.9-51.7	51.6-52.4	52.4-53.2
-35 (-31.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-34 (-29.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-33 (-27.4)	50.5-51.3	50.8-51.6	51.6-52.4	52.4-53.2
-32 (-25.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-31 (-23.8)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-30 (-22.0)	50.4-51.2	50.8-51.6	51.6-52.4	52.3-53.1
-29 (-20.2)	50.4-51.2	50.7-51.5	51.6-52.4	52.3-53.1
-28 (-18.4)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-27 (-16.6)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-26 (-14.8)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-25 (-13.0)	50.3-51.1	50.8-51.6	51.6-52.4	52.3-53.1
-24 (-11.2)	50.3-51.1	50.8-51.6	51.6-52.4	52.4-53.2
-23 (- 9.4)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-22 (- 7.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-21 (- 5.8)	50.4-51.2	50.8-51.6	51.7-52.5	52.4-53.2
-20 (- 4.0)	50.4-51.2	50.9-51.7	51.7-52.5	52.5-53.3
-19 (- 2.2)	50.5-51.3	50.9-51.7	51.7-52.5	52.5-53.3
-18 (- 0.4)	50.5-51.3	50.9-51.7	51.8-52.6	52.6-53.4
-17 (1.4)	50.6-51.4	51.0-51.8	51.8-52.6	52.6-53.4
-16 (3.2)	50.6-51.4	51.0-51.8	51.9-52.7	52.7-53.5
-15 (5.0)	50.7-51.5	51.1-51.9	51.9-52.7	52.7-53.5
-14 (6.8)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-13 (8.6)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-12 (10.4)	50.9-51.7	51.3-52.1	52.1-52.9	52.9-53.7
-11 (12.2)	51.0-51.8	51.4-52.2	52.2-53.0	53.0-53.8
-10 (14.0)	51.1-51.9	51.4-52.2	52.2-53.0	53.1-53.9
- 9 (15.8)	51.1-51.9	51.5-52.3	52.3-53.1	53.1-53.9

Table 511 Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
- 8 (17.6)	51.2-52.0	51.6-52.4	52.4-53.2	53.2-54.0
- 7 (19.4)	51.3-52.1	51.6-52.4	52.5-53.3	53.3-54.1
- 6 (21.2)	51.4-52.2	51.7-52.5	52.6-53.4	53.4-54.2
- 5 (23.0)	51.5-52.3	51.8-52.6	52.7-53.5	53.5-54.3
- 4 (24.8)	51.5-52.3	51.9-52.7	52.8-53.6	53.6-54.4
- 3 (26.6)	51.6-52.4	52.0-52.8	52.9-53.7	53.7-54.5
- 2 (28.4)	51.7-52.5	52.1-52.9	53.0-53.8	53.8-54.6
- 1 (30.2)	51.8-52.6	52.2-53.0	53.1-53.9	53.9-54.7
0 (32.0)	51.9-52.7	52.3-53.1	53.2-54.0	54.0-54.8
1 (33.8)	52.0-52.8	52.4-53.2	53.3-54.1	54.1-54.9
2 (35.6)	52.1-52.9	52.5-53.3	53.4-54.2	54.2-55.0
3 (37.4)	52.2-53.0	52.6-53.4	53.5-54.3	54.3-55.1
4 (39.2)	52.3-53.1	52.7-53.5	53.5-54.3	54.4-55.2
5 (41.0)	52.3-53.1	52.8-53.6	53.6-54.4	54.5-55.3
6 (42.8)	52.4-53.2	52.9-53.7	53.7-54.5	54.6-55.4
7 (44.6)	52.5-53.3	53.0-53.8	53.8-54.6	54.7-55.5
8 (46.4)	52.6-53.4	53.1-53.9	53.9-54.7	54.7-55.5
9 (48.2)	52.7-53.5	53.1-53.9	54.0-54.8	54.8-55.6
10 (50.0)	52.8-53.6	53.2-54.0	54.0-54.8	54.9-55.7
11 (51.8)	52.9-53.7	53.3-54.1	54.1-54.9	55.0-55.8
12 (53.6)	52.9-53.7	53.4-54.2	54.2-55.0	55.1-55.9
13 (55.4)	53.0-53.8	53.5-54.3	54.3-55.1	55.2-56.0
14 (57.2)	53.1-53.9	53.5-54.3	54.4-55.2	55.2-56.0
15 (59.0)	53.2-54.0	53.6-54.4	54.4-55.2	55.3-56.1
16 (60.8)	53.3-54.1	53.7-54.5	54.5-55.3	55.4-56.2
17 (62.6)	53.4-54.2	53.8-54.6	54.6-55.4	55.4-56.2
18 (64.4)	53.4-54.2	53.8-54.6	54.7-55.5	55.5-56.3
19 (66.2)	53.5-54.3	53.9-54.7	54.7-55.5	55.6-56.4
20 (68.0)	53.6-54.4	54.0-54.8	54.8-55.6	55.7-56.5
21 (69.8)	53.7-54.5	54.0-54.8	54.9-55.7	55.7-56.5
22 (71.6)	53.7-54.5	54.1-54.9	55.0-55.8	55.8-56.6
23 (73.4)	53.8-54.6	54.2-55.0	55.0-55.8	55.9-56.7

Table 511 Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
24 (75.2)	53.9-54.7	54.3-55.1	55.1-55.9	56.0-56.8
25 (77.0)	54.0-54.8	54.4-55.2	55.2-56.0	56.0-56.8
26 (78.8)	54.1-54.9	54.5-55.3	55.3-56.1	56.1-56.9
27 (80.6)	54.1-54.9	54.5-55.3	55.4-56.2	56.2-57.0
28 (82.4)	54.2-55.0	54.6-55.4	55.4-56.2	56.3-57.1
29 (84.2)	54.3-55.1	54.7-55.5	55.5-56.3	56.4-57.2
30 (86.0)	54.4-55.2	54.8-55.6	55.6-56.4	56.4-57.2
31 (87.8)	54.5-55.3	54.9-55.7	55.7-56.5	56.5-57.3
32 (89.6)	54.5-55.3	54.9-55.7	55.8-56.6	56.6-57.4
33 (91.4)	54.6-55.4	55.0-55.8	55.8-56.6	56.7-57.5
34 (93.2)	54.7-55.5	55.1-55.9	55.9-56.7	56.7-57.5
35 (95.0)	54.8-55.6	55.2-56.0	56.0-56.8	56.8-57.6
36 (96.8)	54.9-55.7	55.3-56.1	56.1-56.9	56.9-57.7
37 (98.6)	54.9-55.7	55.4-56.2	56.2-57.0	57.0-57.8
38 (100.4)	55.0-55.8	55.5-56.3	56.3-57.1	57.1-57.9
39 (102.2)	55.1-55.9	55.6-56.4	56.4-57.2	57.1-57.9
40 (104.0)	55.2-56.0	55.6-56.4	56.4-57.2	57.2-58.0
41 (105.8)	55.3-56.1	57.7-56.5	56.5-57.3	57.3-58.1
42 (107.6)	55.3-56.1	55.8-56.6	56.6-57.4	57.4-58.2
43 (109.4)	55.4-56.2	55.9-56.7	56.7-57.5	57.5-58.3
44 (111.2)	55.5-56.3	56.0-56.8	56.8-57.6	57.5-58.3
45 (113.0)	55.6-56.4	56.1-56.9	56.8-57.6	57.6-58.4
46 (114.8)	55.7-56.5	56.2-57.0	56.9-57.7	57.7-58.5
47 (116.6)	55.8-56.6	56.2-57.0	57.0-57.8	57.8-58.6
48 (118.4)	55.9-56.7	56.3-57.1	57.1-57.9	57.8-58.6
49 (120.2)	55.9-56.7	56.4-57.2	57.1-57.9	57.9-58.7
50 (122.0)	56.0-56.8	56.5-57.3	57.2-58.0	58.0-58.8

Table 512 (Continued) Low Idle Trim -- JT8D-209 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	53.8-54.7	54.8-55.6		

Table 512 (Continued) Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-49 (-56.2)	53.7-54.5	54.7-55.5		
-48 (-54.4)	53.7-54.5	54.7-55.5		
-47 (-52.6)	53.7-54.5	54.7-55.5		
-46 (-50.8)	53.7-54.5	54.7-55.5		
-45 (-49.0)	53.6-54.4	54.6-55.4		
-44 (-47.2)	53.6-54.4	54.6-55.4		
-43 (-45.4)	53.6-54.4	54.6-55.4		
-42 (-43.6)	53.6-54.4	54.6-55.5		
-41 (-41.8)	53.5-54.3	54.6-55.4		
-40 (-40.0)	53.5-54.3	54.5-55.3		
-39 (-38.2)	53.5-54.3	54.5-55.3		
-38 (-36.4)	53.5-54.3	54.5-55.3		
-37 (-34.6)	53.5-54.3	54.5-55.3		
-36 (-32.8)	53.5-54.3	54.5-55.3		
-35 (-31.0)	53.5-54.3	54.5-55.3		
-34 (-29.0)	53.4-54.2	54.5-55.3		
-33 (-27.4)	53.4-54.2	54.5-55.3		
-32 (-25.6)	53.4-54.2	54.4-55.2		
-31 (-23.8)	53.4-54.2	54.4-55.2		
-30 (-22.0)	53.4-54.2	54.4-55.2		
-29 (-20.2)	53.4-54.2	54.4-55.2		
-28 (-18.4)	53.4-54.2	54.4-55.2		
-27 (-16.6)	53.4-54.2	54.4-55.2		
-26 (-14.8)	53.4-54.2	54.4-55.2		
-25 (-13.0)	53.5-54.3	54.5-55.3		
-24 (-11.2)	53.5-54.3	54.5-55.3		
-23 (- 9.4)	53.5-54.3	54.5-55.3		
-22 (- 7.6)	53.5-54.3	54.6-55.4		
-21 (- 5.8)	53.5-54.3	54.6-55.4		
-20 (- 4.0)	53.6-54.4	54.6-55.4		
-19 (- 2.2)	53.6-54.4	54.7-55.5		
-18 (- 0.4)	53.7-54.5	54.7-55.5		

Table 512 (Continued) Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-17 (1.4)	53.7-54.5	54.8-55.6		
-16 (3.2)	53.8-54.6	54.8-55.6		
-15 (5.0)	53.8-54.6	54.9-55.7		
-14 (6.8)	53.9-54.7	54.9-55.7		
-13 (8.6)	53.9-54.7	55.0-55.8		
-12 (10.4)	54.0-54.8	55.1-55.9		
-11 (12.2)	54.1-54.9	55.2-56.0		
-10 (14.0)	54.2-55.0	55.2-56.0		
- 9 (15.8)	54.2-55.0	55.3-56.1		
- 8 (17.6)	54.3-55.1	55.4-56.2		
- 7 (19.4)	54.4-55.2	55.5-56.3		
- 6 (21.2)	54.5-55.3	55.6-56.4		
- 5 (23.0)	54.6-55.4	55.7-56.5		
- 4 (24.8)	54.7-55.5	55.8-56.6		
- 3 (26.6)	54.8-55.6	55.9-56.7		
- 2 (28.4)	54.9-55.7	56.0-56.8		
- 1 (30.2)	55.0-55.8	56.1-56.9		
0 (32.0)	55.1-55.9	56.2-57.0		
1 (33.8)	55.2-56.0	56.3-57.1		
2 (35.6)	55.3-56.1	56.4-57.2		
3 (37.4)	55.4-56.2	56.5-57.3		
4 (39.2)	55.5-56.3	56.6-57.4		
5 (41.0)	55.6-56.4	56.7-57.5		
6 (42.8)	55.7-56.5	56.8-57.6		
7 (44.6)	55.8-56.6	56.9-57.7		
8 (46.4)	55.9-56.7	57.0-57.8		
9 (48.2)	56.0-56.8	57.1-57.9		
10 (50.0)	56.0-56.8	57.2-58.0		
11 (51.8)	56.1-56.9	57.2-58.0		
12 (53.6)	56.2-57.0	57.3-58.1		
13 (55.4)	56.3-57.1	57.4-58.2		
14 (57.2)	56.3-57.1	57.5-58.3		

Table 512 (Continued) Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
15 (59.0)	56.4-57.2	57.6-58.4		
16 (60.8)	56.5-57.3	57.6-58.4		
17 (62.6)	56.6-57.4	57.7-58.5		
18 (64.4)	56.6-57.4	57.8-58.6		
19 (66.2)	56.7-57.5	57.9-58.7		
20 (68.0)	56.7-57.5	57.9-58.7		
21 (69.8)	56.8-57.6	58.0-58.8		
22 (71.6)	56.9-57.7	58.1-58.9		
23 (73.4)	57.0-57.8	58.1-58.9		
24 (75.2)	57.0-57.8	58.2-59.0		
25 (77.0)	57.1-57.9	58.3-59.1		
26 (78.8)	57.2-58.0	58.3-59.1		
27 (80.6)	57.3-58.1	58.4-59.2		
28 (82.4)	57.3-58.1	58.5-59.3		
29 (84.2)	57.4-58.2	58.5-59.3		
30 (86.0)	57.5-58.3	58.6-59.4		
31 (87.8)	57.6-58.4	58.7-59.5		
32 (89.6)	57.7-58.5	58.7-59.5		
33 (91.4)	57.7-58.5	58.8-59.6		
34 (93.2)	57.8-58.6	58.9-59.7		
35 (95.0)	57.9-58.7	58.9-59.7		
36 (96.8)	57.9-58.7	59.0-59.8		
37 (98.6)	58.0-58.8	59.1-59.9		
38 (100.4)	58.1-58.9	59.2-60.0		
39 (102.2)	58.2-59.0	59.2-60.0		
40 (104.0)	58.2-59.0	59.3-60.1		
41 (105.8)	58.3-59.1	59.4-60.2		
42 (107.6)	58.4-59.2	59.5-60.3		
43 (109.4)	58.5-59.3	59.5-60.3		
44 (111.2)	58.5-59.3	59.6-60.4		
45 (113.0)	58.6-59.4	59.6-60.4		
46 (114.8)	58.7-59.5	59.7-60.5		

Table 512 (Continued) Low Idle Trim -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
47 (116.6)	58.8-59.6	59.8-60.6		
48 (118.4)	58.8-59.6	59.8-60.6		
49 (120.2)	58.9-59.7	59.9-60.7		
50 (122.0)	59.0-59.8	60.0-60.8		

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-209 Engine

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F) 32.0	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
-50(-58.0 TO -45 (-49.0)	DO NOT TRIM							
-44 (-47.2)								2.08
-43 (-45.4)								2.07
-42 (-43.6)								2.06
-41 (-41.8)								2.06
-40 (-40.0)								2.05
-39 (-38.2)							2.03	2.03
-38 (-36.4)							2.03	2.03
-37 (-34.6)							2.02	2.02
-36 (-32.8)							2.01	2.01
-35 (-31.0)							2.00	2.00
-34 (-29.0)							2.00	2.00
-33 (-27.4)						1.98	1.99	1.99
-32 (-25.6)						1.97	1.97	1.97
-31 (-23.8)						1.97	1.97	1.97
-30 (-22.0)						1.96	1.96	1.96
-29 (-20.2)						1.95	1.95	1.95
-28 (-18.4)						1.94	1.94	1.95
-27 (-16.6)					1.94	1.94	1.94	1.94
-26 (-14.8)					1.93	1.93	1.93	1.93
-25 (-13.0)					1.92	1.92	1.92	1.92
-24 (-11.2)					1.91	1.91	1.91	1.91
-23 (- 9.4)					1.90	1.90	1.90	1.90

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F) 32.0	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
-22 (- 7.6)				1.89	1.89	1.89	1.89	1.89
-21 (- 5.8)				1.88	1.88	1.88	1.88	1.88
-20 (- 4.0)				1.88	1.88	1.88	1.88	1.88
-19 (- 2.2)			1.87	1.87	1.87	1.87	1.87	1.87
-18 (- 0.4)			1.86	1.86	1.86	1.86	1.86	1.86
-17 (1.4)			1.85	1.85	1.85	1.85	1.85	1.85
-16 (3.2)			1.84	1.84	1.84	1.84	1.84	1.84
-15 (5.0)			1.83	1.83	1.83	1.83	1.83	1.83
-14 (6.8)		1.83	1.83	1.83	1.83	1.83	1.83	1.83
-13 (8.6)		1.82	1.82	1.82	1.82	1.82	1.82	1.82
-12 (10.4)		1.81	1.81	1.81	1.81	1.81	1.81	1.81
-11 (12.2)		1.80	1.80	1.80	1.80	1.80	1.80	1.80
-10 (14.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
- 9 (15.8)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
- 8 (17.6)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
- 7 (19.4)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
- 6 (21.2)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
- 5 (23.0)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
- 4 (24.8)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
- 3 (26.6)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
- 2 (28.4)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
- 1 (30.2)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
0 (32.0)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
1 (33.8)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
2 (35.6)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
3 (37.4)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
4 (39.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
5 (41.0)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
6 (42.8)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
7 (44.6)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
8 (46.4)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
9 (48.2)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
10 (50.0)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F) 32.0	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
11 (51.8)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
12 (53.6)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
13 (55.4)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-209 Engine

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
8 (46.4)			1.85	1.85	1.85	1.85	1.85	1.85
9 (48.2)			1.84	1.84	1.84	1.84	1.84	1.84
10 (50.0)		1.83	1.83	1.83	1.83	1.83	1.83	1.83
11 (51.8)		1.82	1.82	1.82	1.82	1.82	1.82	1.82
12 (53.6)		1.81	1.81	1.81	1.81	1.81	1.81	1.81
13 (55.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
14 (57.2)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
15 (59.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
16 (60.8)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
17 (62.6)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
18 (64.4)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
19 (66.2)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
20 (68.0)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
21 (69.8)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
22 (71.6)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
23 (73.4)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
24 (75.2)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
25 (77.0)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
26 (78.8)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
27 (80.6)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
28 (82.4)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
29 (84.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
30 (86.0)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
31 (87.8)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
32 (89.6)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
33 (91.4)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
34 (93.2)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
35 (95.0)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
36 (96.8)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
37 (98.6)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
38 (100.4)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
39 (102.2)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
40 (104.0)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
41 (105.8)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
42 (107.6)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
43 (109.4)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
44 (111.2)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
45 (113.0)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
46 (114.8)	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
47 (116.6)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
48 (118.4)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
49 (120.2)	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
50 (122.0)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
NOTE: Part Power EPR +0.015, -0.0								

CAUTION: DO NOT EXCEED JT8D-209 ENGINE OPERATING LIMITS OF 550°C EGT OR 135°C OIL TEMP.

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(7) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits.

(8) With power lever against part power stop, observe test and engine gages and record following:

Table 515

Test Instruments	Airplane Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperture (EGT)	Exhaust Gas Temperture (EGT)
N_2 rotor speed	N_2 rotor speed
N_1 rotor speed	N_1 rotor speed
	Oil Temp

Table 515 (Continued)

	Oil Pressure
	Fuel Flow

(9) Move throttle to idle.

(10) EPR readings obtained from test instrument and airplane instruments in Paragraph 8.C.(8) must not differ by more than ±.01.

(11) Test instrument readings obtained from step (7) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(12) Compare test and aircraft readings obtained from step (7) for exhaust gas temperature (EGT); readings must not differ by more than ±5°C.

(13) Since idle and maximum speed trimmers affect each other, repeat Paragraph 8.B.Paragraph 8.C.. until desired settings are obtained without intermediate adjustment.

NOTE: Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

NOTE: If a problem is encountered in trimming the engine where either the idle trim screw or the part power trim screw is adjusted and the engine does not respond, re-center the fuel control adjustment screws Paragraph 8.C.(14).

NOTE: Air trapped in the fuel system, after an engine or JFC change, can also cause no response to adjustments of the trim screws. This can be eliminated by bleeding fuel system.

(14) Fuel control trim screw re-centering procedure.

(a) It can be necessary to set Idle and Part Power trim screws to new positions and start trim procedure again. It is possible that one of these causes will make this necessary:

1) No engine N2 response to either trim screw movement (with apparently no problem with fuel control).
2) Malfunction of trim equipment (this can put trim screw at one of stop positions).
3) Trim position unknown (which makes it necessary for operator to start procedure again).

(b) For information only, trim screw turns have these approximate results in full range from stop to stop:

1) 22 full turns (typical)
2) 36 clicks per turn
3) 792 clicks total range (typical)
4) One full turn of Part Power trim screw changes N2 approximately 225 rpm and 0.1 EPR. 4 clicks equals approximately 0.01 EPR. Counter Clockwise is increasing EPR.
5) One full turn of Idle trim screw changes N2 approximately 155 rpm.

NOTE: Part Power trim screw has effect on both Part Power and Idle trim. Idle screw has very small or no effect on Part Power trim.

(c) Procedure:

1) If re-centering is needed during an engine run, do shutdown procedure.
2) Turn Idle and Part Power trim screws in counterclockwise direction down to bottom.
3) Turn Idle and Part Power screws lightly in clockwise direction ten (10) full turns (this will get the screws to center of trim range and make it possible to start trim procedure again).

NOTE: Run engine at part power at least two minutes prior to attempting to adjust idle trim.

(15) Repeat Paragraph 8.B. and Paragraph 8.C. until desired settings are obtained.

(16) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire. (Figure 503)

xxx

D. Approach Idle Check

(1) Place throttle in idle position.

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.

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

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for five minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using values obtained in Paragraph 8.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 517Table 518Table 519Table 520. Interpolate between chart values, if necessary.

(6) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(7) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(8) Place throttle in idle position.

Remove the safety tag and close this circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(9) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay)

E. Takeoff Power Assurance Check

(1) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 516

ENG SYNC	OFF

Table 516 (Continued)

ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(2) Operate engine with throttle in idle position for five minutes.

Table 517 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	56.7-60.3	58.3-61.9	60.1-63.5	62.0-65.4
-49 (-56.2)	56.7-60.3	58.2-61.9	60.1-63.5	62.0-65.4
-48 (-54.4)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.4
-47 (-52.6)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.5
-46 (-50.8)	56.6-60.2	58.1-61.9	60.1-63.6	62.0-65.5
-45 (-49.0)	56.5-60.2	58.1-61.8	60.0-63.6	62.0-65.5
-44 (-47.2)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.5
-43 (-45.4)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-42 (-43.6)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-41 (-41.8)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-40 (-40.0)	56.4-60.1	58.0-61.9	60.0-63.6	62.0-65.7
-39 (-38.2)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.7
-38 (-36.4)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-37 (-34.6)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-36 (-32.8)	56.4-60.2	58.0-61.9	60.0-63.7	62.1-65.8
-35 (-31.0)	56.4-60.2	58.0-61.9	60.1-63.8	62.1-65.9
-34 (-29.0)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-65.9
-33 (-27.4)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-66.0
-32 (-25.6)	56.3-60.2	58.1-62.0	60.1-63.8	62.2-66.0
-31 (-23.8)	56.3-60.2	58.1-62.1	60.1-63.9	62.3-66.1
-30 (-22.0)	56.3-60.3	58.1-62.1	60.1-63.9	62.3-66.1

Table 517 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-29 (-20.2)	56.4-60.3	58.1-62.1	60.1-64.0	62.3-66.1
-28 (-18.4)	56.4-60.3	58.1-62.2	60.2-64.0	62.4-66.2
-27 (-16.6)	56.4-60.3	58.1-62.2	60.2-64.1	62.4-66.2
-26 (-14.8)	56.4-60.4	58.2-62.2	60.2-64.1	62.5-66.3
-25 (-13.0)	56.4-60.4	58.2-62.3	60.3-64.1	62.5-66.3
-24 (-11.2)	56.5-60.5	58.3-62.3	60.3-64.2	62.6-66.4
-23 (- 9.4)	56.5-60.5	58.3-62.4	60.4-64.2	62.6-66.4
-22 (- 7.6)	56.6-60.5	58.4-62.4	60.4-64.3	62.7-66.5
-21 (- 5.8)	56.6-60.6	58.4-62.5	60.5-64.4	62.7-66.5
-20 (- 4.0)	56.7-60.6	58.5-62.5	60.5-64.4	62.8-66.6
-19 (- 2.2)	56.7-60.7	58.6-62.6	60.6-64.5	62.9-66.6
-18 (- 0.4)	56.8-60.8	58.6-62.7	60.6-64.5	62.9-66.7
-17 (1.4)	56.8-60.8	58.7-62.7	60.7-64.6	63.0-66.7
-16 (3.2)	56.9-60.9	58.8-62.8	60.8-64.6	63.1-66.8
-15 (5.0)	57.0-61.0	58.9-62.8	60.9-64.7	63.1-66.9
-14 (6.8)	57.1-61.1	59.0-62.9	60.9-64.8	63.2-66.9

Table 518 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE		
	24.00	22.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	64.0-67.6	65.9-69.6	68.0-71.8
-49 (-56.2)	64.0-67.6	66.0-69.6	68.0-71.8
-48 (-54.4)	64.0-67.6	66.0-69.6	68.1-71.9
-47 (-52.6)	64.0-67.7	66.0-69.7	68.1-71.9
-46 (-50.8)	64.1-67.7	66.0-69.7	68.1-71.9
-45 (-49.0)	64.1-67.7	66.1-69.8	68.2-72.0
-44 (-47.2)	64.1-67.7	66.1-69.8	68.2-72.0
-43 (-45.4)	64.1-67.8	66.1-69.8	68.3-72.0
-42 (-43.6)	64.2-67.8	66.2-69.9	68.3-72.1
-41 (-41.8)	64.2-67.8	66.2-69.9	68.3-72.1
-40 (-40.0)	64.2-67.9	66.3-69.9	68.4-72.1
-39 (-38.2)	64.3-67.9	66.3-70.0	68.4-72.2

Table 518 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE		
	24.00	22.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-38 (-36.4)	64.3-68.0	66.3-70.0	68.4-72.2
-37 (-34.6)	64.3-68.0	66.4-70.0	68.5-72.2
-36 (-32.8)	64.4-68.0	66.4-70.1	68.5-72.3
-35 (-31.0)	64.4-68.1	66.5-70.1	68.6-72.3
-34 (-29.0)	64.4-68.1	66.5-70.2	68.6-72.3
-33 (-27.4)	64.5-68.2	66.5-70.2	68.7-72.4
-32 (-25.6)	64.5-68.2	66.6-70.2	68.7-72.4
-31 (-23.8)	64.6-68.3	66.6-70.3	68.7-72.5
-30 (-22.0)	64.6-68.3	66.7-70.3	68.8-72.5
-29 (-20.2)	64.7-68.3	66.7-70.4	68.8-72.5
-28 (-18.4)	64.7-68.4	66.8-70.4	68.9-72.6
-27 (-16.6)	64.8-68.4	66.8-70.5	68.9-72.6
-26 (-14.8)	64.8-68.5	66.9-70.5	69.0-72.7
-25 (-13.0)	64.9-68.5	66.9-70.5	69.0-72.7
-24 (-11.2)	64.9-68.6	67.0-70.6	69.1-72.7
-23 (- 9.4)	65.0-68.6	67.0-70.6	69.1-72.8
-22 (- 7.6)	65.0-68.7	67.1-70.7	69.2-72.8
-21 (- 5.8)	65.1-68.7	67.2-70.7	69.2-72.9
-20 (- 4.0)	65.1-68.8	67.2-70.8	69.3-72.9
-19 (- 2.2)	65.2-68.8	67.3-70.9	69.3-72.9
-18 (- 0.4)	65.2-68.9	67.3-70.9	69.4-73.0
-17 (1.4)	65.3-68.9	67.4-71.0	69.4-73.0
-16 (3.2)	65.4-69.0	67.4-71.0	69.5-73.1
-15 (5.0)	65.4-69.1	67.5-71.1	69.6-73.1
-14 (6.8)	65.5-69.1	67.5-71.1	69.6-73.2

Table 519 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	58.2-62.1	59.1-63.0	60.1-64.0	61.0-64.9
-12 (10.4)	58.2-62.1	59.1-63.0	60.1-64.0	61.1-64.9
-11 (12.2)	58.3-62.2	59.2-63.1	60.2-64.1	61.2-65.0

Table 519 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-10 (14.0)	58.4-62.3	59.3-63.2	60.3-64.2	61.2-65.1
- 9 (15.8)	58.5-62.3	59.4-63.2	60.4-64.2	61.3-65.1
- 8 (17.6)	58.6-62.4	59.5-63.3	60.5-64.3	61.4-65.2
- 7 (19.4)	58.7-62.5	59.6-63.4	60.6-64.4	61.5-65.3
- 6 (21.2)	58.8-62.6	59.7-63.5	60.7-64.4	61.6-65.3
- 5 (23.0)	58.8-62.6	59.7-63.5	60.7-64.5	61.6-65.4
- 4 (24.8)	58.9-62.7	59.8-63.6	60.8-64.6	61.7-65.5
- 3 (26.6)	59.0-62.8	59.9-63.7	60.9-64.6	61.8-65.5
- 2 (28.4)	59.1-62.9	60.0-63.8	61.0-64.7	61.9-65.6
- 1 (30.2)	59.2-63.0	60.1-63.9	61.0-64.8	61.9-65.7
0 (32.0)	59.3-63.0	60.2-63.9	61.1-64.9	62.0-65.8
1 (33.8)	59.4-63.1	60.2-64.0	61.2-64.9	62.1-65.8
2 (35.6)	59.5-63.2	60.3-64.1	61.3-65.0	62.2-65.9
3 (37.4)	59.6-63.3	60.4-64.2	61.3-65.1	62.2-66.0
4 (39.2)	59.6-63.3	60.5-64.2	61.4-65.1	62.3-66.0
5 (41.0)	59.7-63.4	60.5-64.3	61.5-65.2	62.4-66.1
6 (42.8)	59.8-63.5	60.6-64.4	61.5-65.2	62.4-66.1
7 (44.6)	59.9-63.5	60.7-64.4	61.6-65.3	62.5-66.2
8 (46.4)	60.0-63.6	60.8-64.5	61.7-65.4	62.6-66.3
9 (48.2)	60.0-63.7	60.9-64.6	61.7-65.4	62.6-66.3
10 (50.0)	60.1-63.8	60.9-64.6	61.8-65.5	62.7-66.4
11 (51.8)	60.1-63.8	61.0-64.7	61.9-65.5	62.8-66.4
12 (53.6)	60.2-63.8	61.1-64.7	61.9-65.5	62.8-66.5
13 (55.4)	60.3-63.9	61.2-64.8	62.0-65.6	62.9-66.5
14 (57.2)	60.3-64.0	61.2-64.9	62.1-65.7	63.0-66.6
15 (59.0)	60.4-64.1	61.3-64.9	62.1-65.7	63.0-66.6
16 (60.8)	60.5-64.1	61.4-65.0	62.2-65.8	63.1-66.7
17 (62.6)	60.6-64.2	61.5-65.0	62.3-65.8	63.2-66.7
18 (64.4)	60.6-64.2	61.5-65.1	62.3-65.9	63.2-66.8
19 (66.2)	60.7-64.3	61.6-65.1	62.4-65.9	63.3-66.8
20 (68.0)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.8
21 (69.8)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.9

Table 519 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
22 (71.6)	60.9-64.5	61.8-65.3	62.6-66.1	63.5-67.0
23 (73.4)	61.0-64.5	61.9-65.4	62.7-66.2	63.6-67.0
24 (75.2)	61.0-64.6	61.9-65.4	62.7-66.2	63.6-67.1
25 (77.0)	61.1-64.7	62.0-65.5	62.8-66.3	63.7-67.1
26 (78.8)	61.2-64.7	62.1-65.5	62.9-66.3	63.7-67.2
27 (80.6)	61.2-64.8	62.1-65.6	62.9-66.4	63.8-67.2
28 (82.4)	61.3-64.8	62.2-65.7	63.0-66.5	63.8-67.3
29 (84.2)	61.3-64.9	62.2-65.7	63.0-66.5	63.9-67.3
30 (86.0)	61.4-65.0	62.3-65.8	63.1-66.6	64.0-67.4
31 (87.8)	61.5-65.0	62.4-65.8	63.2-66.6	64.0-67.4
32 (89.6)	61.6-65.1	62.4-65.9	63.3-66.7	64.1-67.5
33 (91.4)	61.6-65.1	62.5-65.9	63.3-66.8	64.1-67.6
34 (93.2)	61.7-65.2	62.5-66.0	63.4-66.8	64.2-67.6
35 (95.0)	61.8-65.2	62.6-66.0	63.4-66.9	64.2-67.7
36 (96.8)	61.8-65.3	62.7-66.1	63.5-66.9	64.3-67.7
37 (98.6)	61.9-65.4	62.7-66.2	63.6-67.0	64.4-67.8
38 (100.4)	61.9-65.4	62.8-66.2	63.6-67.0	64.4-67.8
39 (102.2)	62.0-65.5	62.8-66.3	63.7-67.1	64.5-67.9
40 (104.0)	62.1-65.5	62.9-66.3	63.7-67.1	64.5-67.9
41 (105.8)	62.1-65.6	62.9-66.4	63.8-67.2	64.6-68.0
42 (107.6)	62.2-65.7	63.0-66.4	63.8-67.2	64.6-68.0
43 (109.4)	62.3-65.7	63.1-66.5	63.9-67.3	64.7-68.1
44 (111.2)	62.3-65.8	63.1-66.5	64.0-67.3	64.8-68.1
45 (113.0)	62.4-65.8	63.2-66.6	64.0-67.4	64.8-68.2
46 (114.8)	62.5-65.9	63.2-66.6	64.1-67.4	64.9-68.2
47 (116.6)	62.5-65.9	63.3-66.7	64.1-67.5	64.9-68.3
48 (118.4)	62.6-66.0	63.4-66.8	64.2-67.5	65.0-68.3
49 (120.2)	62.6-66.1	63.4-66.8	64.2-67.6	65.0-68.4
50 (122.0)	62.7-66.1	63.5-66.9	64.3-67.6	65.1-68.4

Table 520 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	62.1-66.0	63.2-67.0	64.4-68.1	65.5-69.2
-12 (10.4)	62.2-66.0	63.3-67.0	64.5-68.2	65.6-69.3
-11 (12.2)	62.3-66.1	63.4-67.1	64.6-68.2	65.7-69.3
-10 (14.0)	62.4-66.2	63.5-67.2	64.6-68.3	65.7-69.4
- 9 (15.8)	62.4-66.2	63.5-67.2	64.7-68.3	65.8-69.4
- 8 (17.6)	62.5-66.3	63.6-67.3	64.8-68.4	65.9-69.5
- 7 (19.4)	62.6-66.3	63.7-67.3	64.8-68.4	65.9-69.5
- 6 (21.2)	62.7-66.4	63.7-67.4	64.9-68.5	66.0-69.6
- 5 (23.0)	62.7-66.5	63.8-67.5	64.9-68.6	66.0-69.7
- 4 (24.8)	62.8-66.5	63.9-67.5	65.0-68.6	66.1-69.7
- 3 (26.6)	69.9-66.6	63.9-67.6	65.1-68.7	66.2-69.8
- 2 (28.4)	63.0-66.7	64.0-67.7	65.1-68.8	66.2-69.8
- 1 (30.2)	63.0-66.7	64.1-67.7	65.2-68.8	66.3-69.9
0 (32.0)	63.1-66.8	64.2-67.8	65.3-68.8	66.4-69.9
1 (33.8)	63.2-66.8	64.2-67.8	65.3-68.9	66.4-70.0
2 (35.6)	63.3-66.9	64.3-67.9	65.4-69.0	66.5-70.0
3 (37.4)	63.3-67.0	64.3-68.0	65.4-69.1	66.5-70.1
4 (39.2)	63.4-67.0	64.4-68.0	65.5-69.1	66.6-70.2
5 (41.0)	63.5-67.1	64.5-68.1	65.5-69.2	66.6-70.2
6 (42.8)	63.5-67.1	64.5-68.1	65.6-69.2	66.7-70.3
7 (44.6)	63.6-67.2	64.6-68.2	65.7-69.3	66.7-70.3
8 (46.4)	63.7-67.3	64.6-68.2	65.8-69.3	66.8-70.4
9 (48.2)	63.7-67.3	64.7-68.3	65.8-69.4	66.9-70.4
10 (50.0)	63.8-67.4	64.8-68.3	65.9-69.4	66.9-70.5
11 (51.8)	63.8-67.4	64.8-68.4	65.9-69.5	67.0-70.5
12 (53.6)	63.9-67.5	64.9-68.4	66.0-69.5	67.0-70.5
13 (55.4)	63.9-67.5	64.9-68.5	66.0-69.6	67.1-70.6
14 (57.2)	64.0-67.6	65.0-68.5	66.1-69.6	67.2-70.6
15 (59.0)	64.1-67.6	65.1-68.6	66.2-69.7	67.2-70.6
16 (60.8)	64.1-67.7	65.1-68.6	66.2-69.7	67.3-70.7
17 (62.6)	64.2-67.7	65.2-68.7	66.3-69.8	67.3-70.8
18 (64.4)	64.2-67.8	65.2-68.7	66.3-69.8	67.4-70.8

Table 520 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
19 (66.2)	64.3-67.8	65.3-68.8	66.3-69.9	67.5-70.9
20 (68.0)	64.4-67.8	65.3-68.8	66.4-69.9	67.5-70.9
21 (69.8)	64.4-67.9	65.4-68.9	66.5-70.0	67.6-71.0
22 (71.6)	64.5-68.0	65.4-68.9	66.5-70.0	67.6-71.0
23 (73.4)	64.6-68.0	65.5-68.9	66.6-70.0	67.7-71.0
24 (75.2)	64.6-68.1	65.5-69.0	66.6-70.1	67.7-71.1
25 (77.0)	64.7-68.1	65.6-69.1	66.7-70.1	67.8-71.1
26 (78.8)	64.7-68.2	65.7-69.1	66.8-70.2	67.8-71.2
27 (80.6)	64.8-68.2	65.7-69.2	66.8-70.2	67.9-71.2
28 (82.4)	64.8-68.3	65.8-69.2	66.9-70.2	67.9-71.3
29 (84.2)	64.9-68.3	65.8-69.3	66.9-70.3	67.9-71.3
30 (86.0)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
31 (87.8)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
32 (89.6)	65.1-68.5	66.0-69.4	67.1-70.4	68.1-71.4
33 (91.4)	65.1-68.6	66.0-69.5	67.1-70.5	68.1-71.5
34 (93.2)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.5
35 (95.0)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.6
36 (96.8)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
37 (98.6)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
38 (100.4)	65.4-68.8	66.3-69.7	67.4-70.7	68.4-71.7
39 (102.2)	65.5-68.8	66.4-69.7	67.4-70.7	68.4-71.7
40 (104.0)	65.5-68.9	66.4-69.8	67.5-70.8	68.5-71.8
41 (105.8)	65.6-68.9	66.5-69.8	67.5-70.8	68.5-71.8
42 (107.6)	65.6-69.0	66.5-69.9	67.5-70.9	68.5-71.9
43 (109.4)	65.7-69.0	66.6-69.9	67.6-70.9	68.6-71.9
44 (111.2)	65.7-69.1	66.6-70.0	67.6-71.0	68.6-72.0
45 (113.0)	65.8-69.1	66.7-70.0	67.7-71.0	68.7-72.0
46 (114.8)	65.8-69.2	66.7-70.1	67.7-71.1	68.7-72.0
47 (116.6)	65.8-69.2	66.7-70.1	67.8-71.1	68.8-72.1
48 (118.4)	65.9-69.3	66.8-70.2	67.8-71.2	68.8-72.1
49 (120.2)	66.0-69.3	66.9-70.2	67.9-71.3	68.9-72.2
50 (122.0)	66.0-69.4	66.9-70.3	67.9-71.3	68.9-72.2

Table 521 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine

AMBIENT TEMP.	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
°C (°F)	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	66.6-70.2	67.6-71.2	68.7-72.2	69.7-73.2
-12 (10.4)	66.6-70.3	67.7-71.2	68.7-72.3	69.7-73.3
-11 (12.2)	66.7-70.3	67.7-71.3	68.8-72.3	69.8-73.3
-10 (14.0)	66.8-70.4	67.8-71.4	68.8-72.4	69.8-73.4
- 9 (15.8)	66.8-70.4	67.8-71.4	68.9-72.4	69.9-73.4
- 8 (17.6)	66.9-70.5	67.9-71.5	68.9-72.5	69.9-73.5
- 7 (19.4)	67.0-70.5	68.0-71.5	69.0-72.5	70.0-73.5
- 6 (21.2)	67.0-70.6	68.0-71.6	69.0-72.6	70.0-73.6
- 5 (23.0)	67.1-70.7	68.1-71.6	69.1-72.6	70.1-73.6
- 4 (24.8)	67.1-70.7	68.1-71.7	69.1-72.7	70.1-73.7
- 3 (26.6)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.7
- 2 (28.4)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.8
- 1 (30.2)	67.3-70.9	68.3-71.9	69.3-72.9	70.3-73.9
0 (32.0)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-73.9
1 (33.8)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-74.0
2 (35.6)	67.5-71.0	68.5-72.0	69.5-73.0	70.5-74.0
3 (37.4)	67.5-71.1	68.5-72.1	69.5-73.1	70.5-74.0
4 (39.2)	67.6-71.2	68.6-72.1	69.6-73.1	70.6-74.1
5 (41.0)	67.6-71.2	68.6-72.2	69.6-73.2	70.6-74.1
6 (42.8)	67.7-71.3	68.7-72.2	69.7-73.2	70.7-74.2
7 (44.6)	67.7-71.3	68.7-72.3	69.7-73.3	70.7-74.2
8 (46.4)	67.8-71.4	68.7-72.3	69.7-73.3	70.7-74.3
9 (48.2)	67.9-71.4	68.8-72.4	69.8-73.4	70.8-74.3
10 (50.0)	67.9-71.5	68.8-72.4	69.8-73.4	70.8-74.4
11 (51.8)	68.0-71.5	68.9-72.4	69.9-73.4	70.9-74.4
12 (53.6)	68.0-71.5	68.9-72.5	69.9-73.5	70.9-74.4
13 (55.4)	68.1-71.6	69.0-72.5	70.0-73.5	71.0-74.5
14 (57.2)	68.1-71.6	69.0-72.6	70.0-73.6	71.0-74.5
15 (59.0)	68.2-71.7	69.1-72.6	70.1-73.6	71.1-74.6
16 (60.8)	68.2-71.7	69.1-72.7	70.1-73.7	71.1-74.6
17 (62.6)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.6
18 (64.4)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.7

Table 521 Approach Idle Check Percent N_2 RPM -- JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
°C (°F)	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
19 (66.2)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
20 (68.0)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
21 (69.8)	68.5-71.9	69.4-72.8	70.4-73.8	71.3-74.8
22 (71.6)	68.5-72.0	69.4-72.9	70.4-73.9	71.4-74.8
23 (73.4)	68.6-72.0	69.5-72.9	70.5-73.9	71.4-74.9
24 (75.2)	68.6-72.1	69.5-73.0	70.5-74.0	71.5-74.9
25 (77.0)	68.7-72.1	69.6-73.0	70.6-74.0	71.5-74.9
26 (78.8)	68.7-72.1	69.6-73.0	70.6-74.0	71.6-75.0
27 (80.6)	68.8-72.2	69.6-73.1	70.6-74.1	71.6-75.0
28 (82.4)	68.8-72.2	69.7-73.1	70.7-74.1	71.7-75.0
29 (84.2)	68.8-72.3	69.7-73.2	70.7-74.2	71.7-75.1
30 (86.0)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.1
31 (87.8)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.2
32 (89.6)	69.0-72.4	69.9-73.3	70.9-74.3	71.8-75.2
33 (91.4)	69.0-72.4	69.9-73.3	70.9-74.3	71.9-75.2
34 (93.2)	69.1-72.5	70.0-73.4	71.0-74.4	71.9-75.3
35 (95.0)	69.1-72.5	70.0-73.4	71.0-74.4	72.0-75.3
36 (96.8)	69.2-72.5	70.1-73.4	71.1-74.4	72.0-75.4
37 (98.6)	69.2-72.6	70.1-73.5	71.1-74.5	72.0-75.4
38 (100.4)	69.3-72.6	70.2-73.5	71.2-74.5	72.1-75.4
39 (102.2)	69.3-72.7	70.2-73.6	71.2-74.6	72.1-75.5
40 (104.0)	69.4-72.7	70.2-73.6	71.2-74.6	72.2-75.5
41 (105.8)	69.4-72.7	70.3-73.6	71.3-74.6	72.2-75.6
42 (107.6)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
43 (109.4)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
44 (111.2)	69.6-72.9	70.5-73.7	71.5-74.7	72.4-75.7
45 (113.0)	69.6-72.9	70.5-73.8	71.5-74.8	72.4-75.7
46 (114.8)	69.6-73.0	70.5-73.8	71.5-74.8	72.5-75.8
47 (116.6)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.8
48 (118.4)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.9
49 (120.2)	69.8-73.1	70.7-73.9	71.7-74.9	72.6-75.9
50 (122.0)	69.8-73.1	70.7-74.0	71.7-75.0	72.6-76.0

(3) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(4) Using values from Paragraph 8.E.(3) and Table 523, determine engine pressure ratio (EPR) for takeoff thrust setting.

(5) Advance throttle until value determined in Paragraph 8.E.(4) is obtained.

Table 522

CAUTION: DO NOT EXCEED JT8D-209 ENGINE OPERATING LIMITS AS FOLLOWS:	
EXHAUST GAS TEMPERATURE (EGT)	550°C
N_1 RPM	95.5%
N_2 RPM	99.2%
TAKEOFF EPR	±.01
AT TAKEOFF EPR	5 Min.
OIL TEMPERATURE	135°C

(6) Operate engine for 2 minutes at takeoff power, adjusting throttle as required, until stabilized value of EPR is obtained.

(7) Place throttle in idle position and operate engine at idle for 5 minutes.

F. Reverse Thrust EPR Check

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust until either one of the engines reaches 1.60(±0.10) EPR.

(6) Allow engine to stabilize and observe EPR for both engines. Maximum allowable difference between engines is 0.15 EPR.

(a) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(b) Allow engine to stabilize and record EPR for both engines (L. Engine ----------, R. Engine ----------).

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 8.F.(7).

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft (Figure 504)(View A).

(b) Install rigging aid (R-24) in interlock stop (View C).

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

(13) Close lower cowl doors.

(14) Move both thrust reverser control valve dump levers in normal position.

(15) Remove and stow thrust reverser control valve safety pins.

G. Reverse Thrust EPR Check (Aircraft with S/B 78-68 Incorporated and Later Aircraft Equipped with Reverse Thrust Intermediate Detent Position)

NOTE: Check procedures contained in this paragraph only apply to aircraft with an additional detent at the reverse thrust intermediate position.

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust intermediate detent position.

(6) Record EPR for both engines (L. Engine ----------, R. Engine ----------)

NOTE: Maximum allowable difference between engines is 0.13 EPR.

(7) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(8) Allow engine to stabilize and record EPR for both engines (L. Engine ----------, R. Engine ----------)

NOTE: Maximum allowable EPR for either engine is 1.10.

(9) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(10) Shut down engine as outlined in Paragraph 8.G.(9).

(11) Remove test equipment.

(12) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft Figure 505(View A).

(b) Install rigging aid (R-24) in interlock stop (View C).

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

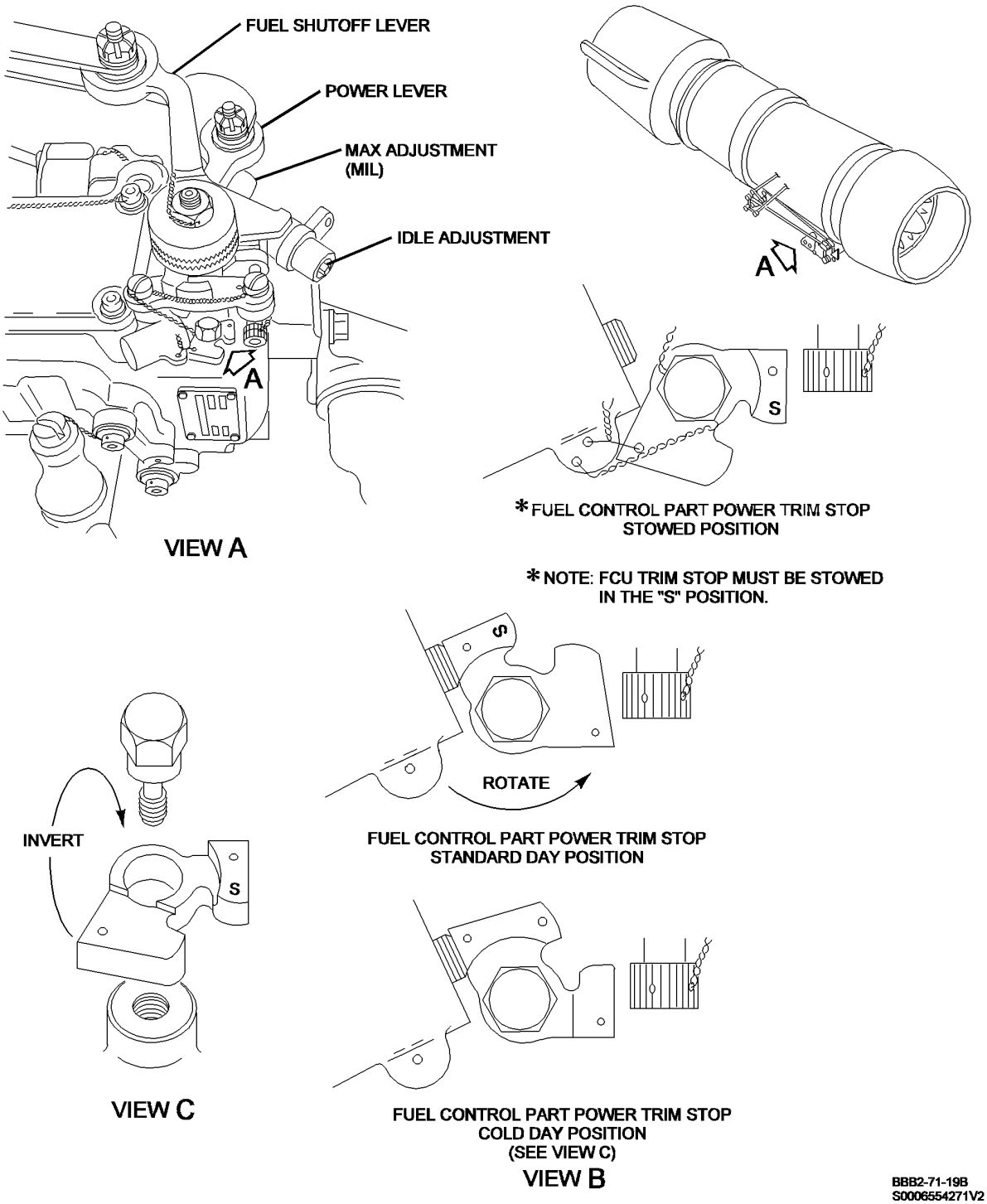
(13) Remove rigging aids 4-2, and R-24.

(14) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

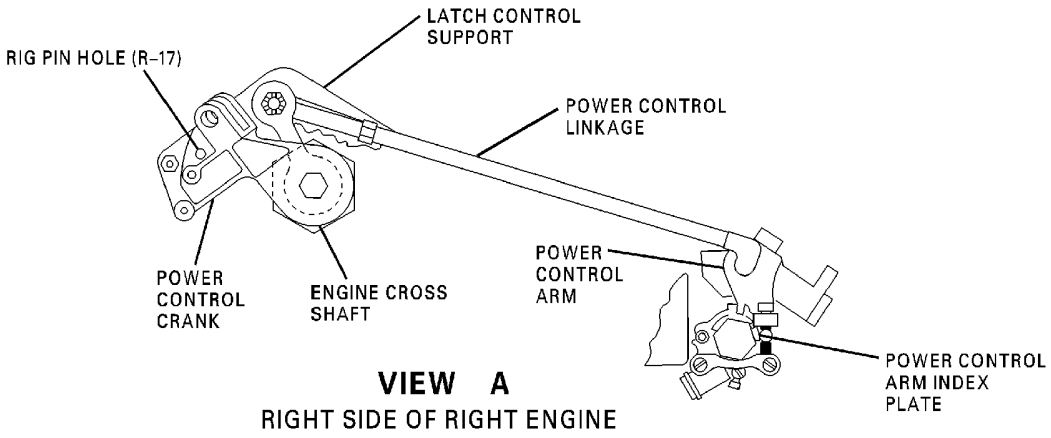
(15) Close lower cowl doors.

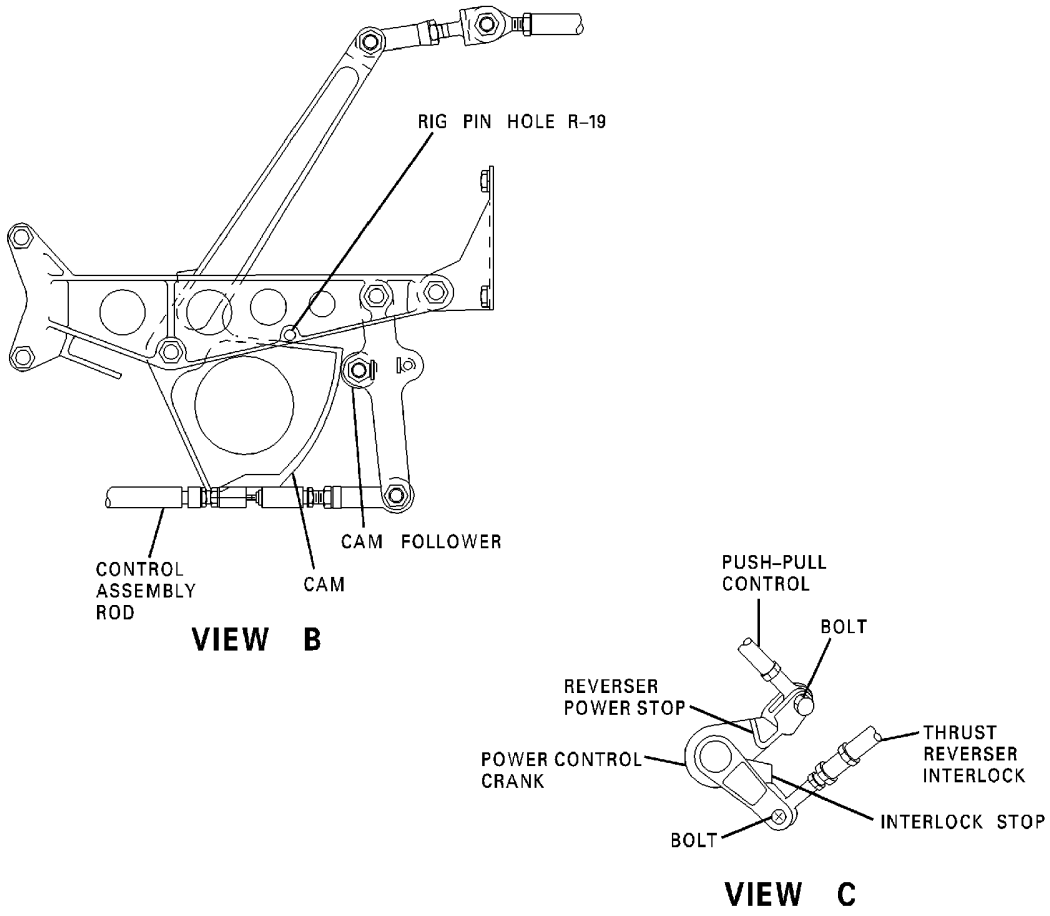
(16) Move both thrust reverser control valve dump levers in normal position.

(17) Remove and stow thrust reverser control valve safety pins.



Test Equipment Connection Points
Figure 503/71-00-00-990-841





CAG(IGDS)

BBB2-71-56B

Throttle System - Adjustment
Figure 504/71-00-00-990-842

9. **Engine Trimming Procedures Using Aircraft Instruments Only**

NOTE: This procedure is not approved for engine trimming during icing conditions Paragraph 11..

NOTE: This procedure allows operators to trim engines utilizing engine instruments only, but it is recommended that the engines be trimmed utilizing the calibrated trim test equipment periodically. It is also recommended that this procedure not be utilized as the standard maintenance practice unless the operator has a viable Engine Monitoring Program in place to insure constant monitoring of engine parameters.

NOTE: When trimming engines utilizing cockpit instrumentation only the engines should be trimmed to the upper limit of the EPR trim chart.

NOTE: This procedure to be used for one engine only. All instruments and the other engine must be functioning normally and a cross check with the other engine must show performance within acceptable range. Disregard steps referring to test instruments.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

(2) Check engine oil pressure as outlines in: (ENGINE GENERAL, SUBJECT 72-00-00, Page 501) paragraph 8.

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 11..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

Table 523 Takeoff Power Assurance Check -- JT8D-209 Engine

AMBIENT TEMP.	BAROMETRIC PRESSURE							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
-50 (-58.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-49 (-56.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-48 (-54.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-47 (-52.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-46 (-50.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-45 (-49.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-44 (-47.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-43 (-45.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-42 (-43.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-41 (-41.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-40 (-40.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-39 (-38.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-38 (-36.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-37 (-34.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08

Table 523 Takeoff Power Assurance Check -- JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
-36 (-32.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-35 (-31.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-34 (-29.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-33 (-27.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-32 (-25.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-31 (-23.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-30 (-22.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-29 (-20.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-28 (-18.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-27 (-16.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-26 (-14.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-25 (-13.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-24 (-11.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-23 (- 9.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-22 (- 7.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.08
-21 (- 5.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.07
-20 (- 4.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.07
-19 (- 2.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.06
-18 (- 0.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.05
-17 (1.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.05
-16 (3.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.04
-15 (5.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.04
-14 (6.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.03	2.03
-13 (8.6)	1.80	1.83	1.86	1.90	1.94	1.98	2.02	2.02
-12 (10.4)	1.80	1.83	1.86	1.90	1.94	1.98	2.01	2.01
-11 (12.2)	1.80	1.83	1.86	1.90	1.94	1.98	2.01	2.01
-10 (14.0)	1.80	1.83	1.86	1.90	1.94	1.98	2.00	2.00
- 9 (15.8)	1.80	1.83	1.86	1.90	1.94	1.98	2.00	2.00
- 8 (17.6)	1.80	1.83	1.86	1.90	1.94	1.98	1.99	1.99
- 7 (19.4)	1.80	1.83	1.86	1.90	1.94	1.98	1.98	1.98
- 6 (21.2)	1.80	1.83	1.86	1.90	1.94	1.98	1.98	1.98
- 5 (23.0)	1.80	1.83	1.86	1.90	1.94	1.97	1.97	1.97
- 4 (24.8)	1.80	1.83	1.86	1.90	1.94	1.97	1.97	1.97

Table 523 Takeoff Power Assurance Check -- JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
- 3 (26.6)	1.80	1.83	1.86	1.90	1.94	1.96	1.96	1.96
- 2 (28.4)	1.80	1.83	1.86	1.90	1.94	1.95	1.95	1.95
- 1 (30.2)	1.80	1.83	1.86	1.90	1.94	1.95	1.95	1.95
0 (32.0)	1.80	1.83	1.86	1.90	1.94	1.94	1.94	1.94
1 (33.8)	1.80	1.83	1.86	1.90	1.94	1.94	1.94	1.94
2 (35.6)	1.80	1.83	1.86	1.90	1.93	1.93	1.93	1.93
3 (37.4)	1.80	1.83	1.86	1.90	1.93	1.93	1.93	1.93
4 (39.2)	1.80	1.83	1.86	1.90	1.92	1.92	1.92	1.92
5 (41.0)	1.80	1.83	1.86	1.90	1.92	1.92	1.92	1.92
6 (42.8)	1.80	1.83	1.86	1.90	1.91	1.91	1.91	1.91
7 (44.6)	1.80	1.83	1.86	1.90	1.91	1.91	1.91	1.91
8 (46.4)	1.80	1.83	1.86	1.90	1.90	1.90	1.90	1.90
9 (48.2)	1.80	1.83	1.86	1.90	1.90	1.90	1.90	1.90
10 (50.0)	1.80	1.83	1.86	1.89	1.89	1.89	1.89	1.89
11 (51.8)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
12 (53.6)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
13 (55.4)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
14 (57.2)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
15 (59.0)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
16 (60.8)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
17 (62.6)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
18 (64.4)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
19 (66.2)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
20 (68.0)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
21 (69.8)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
22 (71.6)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
23 (73.4)	1.80	1.83	1.86	1.88	1.89	1.89	1.89	1.89
24 (75.2)	1.80	1.83	1.86	1.88	1.88	1.88	1.88	1.88
25 (77.0)	1.80	1.83	1.86	1.87	1.87	1.87	1.87	1.87
26 (78.8)	1.80	1.83	1.86	1.86	1.86	1.86	1.86	1.86
27 (80.6)	1.80	1.83	1.85	1.86	1.86	1.86	1.86	1.86
28 (82.4)	1.80	1.83	1.85	1.85	1.85	1.85	1.85	1.85
29 (84.2)	1.80	1.83	1.84	1.84	1.84	1.84	1.84	1.84

Table 523 Takeoff Power Assurance Check -- JT8D-209 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	25.13 & BELOW
30 (86.0)	1.80	1.83	1.83	1.83	1.83	1.83	1.83	1.83
31 (87.8)	1.80	1.83	1.83	1.83	1.83	1.83	1.83	1.83
32 (89.6)	1.80	1.82	1.82	1.82	1.82	1.82	1.82	1.82
33 (91.4)	1.80	1.81	1.81	1.81	1.81	1.81	1.81	1.81
34 (93.2)	1.80	1.81	1.81	1.81	1.81	1.81	1.81	1.81
35 (95.0)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
36 (96.8)	1.80	1.79	1.79	1.79	1.79	1.79	1.79	1.79
37 (98.6)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
38 (100.4)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
39 (102.2)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
40 (104.0)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
41 (105.8)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
42 (107.6)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
43 (109.4)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
44 (111.2)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
45 (113.0)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
46 (114.8)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
47 (116.6)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
48 (118.4)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
49 (120.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
50 (122.0)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68

10. Optional Anti-Surge Bleed Valve Operational Check

A. Check Anti-Surge Bleed Valves As Outlined In Chapter.
(ENGINE GENERAL, SUBJECT 72-00-00) page 501.

11. Engine Trimming Procedure During Icing Conditions

NOTE: When circumstances require engine trimming during icing conditions, the following procedure may be used.

NOTE: This procedure to be used for one engine only.

CAUTION: A COMPLETE TRIM RUN WITHOUT THE USE OF ENGINE ANTI-ICE MUST BE PERFORMED AS SOON AS AIRCRAFT REACHES A BASE WHERE THIS IS POSSIBLE.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Install Test Equipment:

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb).

(a) Using ambient temperature and Table 513 place part power trim stop in the "C" (Cold Day Trim).

NOTE: The part power trim stop is marked with letter "S" (Standard Day Trim) on one side and letter "C" (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

(4) Place engine anti-ice switch in ON position.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

(5) Check engine oil pressure see Paragraph 3.).

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

(6) ART system check may be performed per Paragraph 13..

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(8) Place following switches in indicated positions.

Table 524

(1) ENG SYNC	OFF
(2) ICE PROTECT	

Table 524 (Continued)

(a) Airfoil	OFF
(b) Eng	ON
(3) AIR CONDITIONING	
(a) Supply	OFF
(4) HYD PUMPS	
(a) Eng	LOW
(5) ELEC PWR Gen	
(a) Gen	OFF

(9) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 11.A.(9) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Place engine anti-ice switch in ON position, operate engine with throttle in the idle position for 5 minutes.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(2) Record ambient temperature (Tamb) and pressure (Pamb).

(3) Determine minimum-bleed low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511Table 512.

(4) After N_2 has stabilized for 5 minutes, record N_2 percent.

(5) Place engine anti-ice switch in OFF position.

(6) With engine anti-ice OFF, allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Calculate the N_2 target adjustment as the difference between the N_2 value from Paragraph 11.B.(6) and the N_2 value from Paragraph 11.B.(4), not to exceed 2 percent.

(9) Reduce the minimum-bleed N_2 determined in Paragraph 11.B.(3) by the adjustment determined in Paragraph 11.B.(8).

CAUTION: PERIODIC ENGINE RUN-UP (WITH ENGINE ANTI-ICING SYSTEM ON), TO AS HIGH A THRUST SETTING AS PRACTICAL (70 PERCENT N_1 FOR A MINIMUM OF 15 SECONDS IS DESIRED) SHOULD BE PERFORMED TO MINIMIZE POSSIBILITY OF ICE BUILD-UP DURING EXTENDED GROUND IDLE OPERATION IN SEVERE ICING CONDITIONS. IT IS SUGGESTED THAT SUCH RUN-UPS NEED NOT BE MADE MORE FREQUENTLY THAN AT TEN MINUTE INTERVALS.

(10) After N_2 has stabilized for 5 minutes with engine anti-ice ON, adjust fuel control idle trim adjustment until idle N_2 is within idle N_2 determined in Paragraph 11.B.(9).

NOTE: Always make final adjustment in the increase direction (counterclockwise).

(11) Record actual N_2 percent set.

C. Part Power Trim

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(1) Record ambient temperature (Tamb) and Pressure (Pamb).

(2) Make certain part power trim stop is in position as outlined in paragraph 10.A., step (2).

(3) Using values obtained in step (1) determine value of minimum-bleed part power engine pressure ratio (EPR) from Table 513Table 514.

(4) Place engine anti-ice switch in ON position.

(5) With engine anti-ice ON, advance throttle until power lever contacts part power stop.

CAUTION: DO NOT EXCEED JT8D-209 ENGINE OPERATING LIMITS OF 550°C EGT OR 135°C OIL TEMP.

(6) Operate engine at part power position for 5 minutes to allow EPR to stabilize. Observe test instrument and record stabilized EPR.

(7) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds and record EPR value.

(8) Immediately place engine anti-ice switch in ON position.

(9) Calculate the EPR target adjustment as the difference between the EPR value in Paragraph 11.C.(7) and the EPR value in Paragraph 11.C.(6).

(10) Reduce the minimum-bleed EPR value determined in Paragraph 11.C.(3) by the adjustment determined in Paragraph 11.C.(9), not to exceed 0.12.

(11) With engine anti-ice ON, operate engine at part power position for 5 minutes to stabilize.

(12) Observe EPR indicator and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 11.C.(10).

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(13) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits established in Paragraph 11.C.(10).

(14) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds, and record EPR value.

(15) Immediately place engine anti-ice switch in ON position.

(16) Compare minimum-bleed EPR from Paragraph 11.C.(14) with EPR from Paragraph 11.C.(3) and determine trim error, if any.

(17) Adjust engine anti-ice ON EPR value in Paragraph 11.C.(10) by trim error.

(18) Adjust fuel control max trimmer screw, repeating above steps as necessary until minimum bleed EPR is within limits.

(19) With power lever against part power stop and engine anti-ice ON, observe test and engine gages and record following:

Table 525

Test Instruments	Aircraft Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperature (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed

Table 525 (Continued)

Test Instruments	Aircraft Instruments
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(20) Move throttle lever to idle position.

(21) EPR readings obtained from test instrument and aircraft instruments Paragraph 11.C.(19) must not differ by more than ±.01.

(22) Test instrument readings obtained from Paragraph 11.C.(19) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(23) Compare test and aircraft readings obtained from step (19) for EGT; readings must not differ by more than ±5°C.

(24) Since idle and maximum speed trimmers affect each other, repeat Paragraph 11.B. and Paragraph 11.C. until desired settings are obtained without intermediate adjustment.

NOTE: Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

CAUTION: IF TRIM PROCEDURE WAS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(25) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire (Figure 503).

D. Approach Idle Check

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be turned OFF for short periods of time.

(1) Place engine anti-ice switch in ON position and throttle in idle position.

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 this circuit breaker and install safety tag:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(3) Engine N_2 RPM should increase to approach idle.

(4) Operate engine at approach idle for 5 minutes to allow N_2 to stabilize.

(5) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(6) Using value obtained in Paragraph 11.D.(5) determine approach idle minimum-maximum N_2 RPM percent from Table 517Table 518Table 519Table 520Table 521. Interpolate between chart values, if necessary.

(7) Place engine anti-ice switch in OFF position. Allow engine to stabilize for 30 seconds and record N_2 percent.

(8) Immediately place engine anti-ice switch in ON position.

(9) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(10) Place throttle in idle position.

(11) Remove the safety tag and close this circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(12) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay)

E. Takeoff Power Assurance Check

(1) This check is to be made as outlined in Paragraph 8.E.. except with engine anti-ice on.

F. Reverse Thrust EPR Check

(1) This check is to be made as outlined in Paragraph 8.F.. except with engine anti-ice on.

12. Engine Deterioration Check

When desired, an engine deterioration check can be performed as outlined in Chapter.

(ENGINE GENERAL, SUBJECT 72-00-00) page 501.

13. Optional Automatic Reserve Thrust (ART) System Check

NOTE: If aircraft has met steps (1) thru (12) and passes ARTS self-test, green ART READY light on center main instrument panel comes on. If ART fails, amber ART INOP light on overhead annunciator panel comes on. If aircraft is on the ground and only one engine is running, ARTS INOP light also comes on.

NOTE: The NO MODE light on the TRI is only active during the ARTS test on aircraft equipped with Digital Flight Guidance Computer (DFGC), Honeywell P/N 4034241-970 and subsequent computers.

A. Perform ART System Check

(1) Start both engines as outlined in Paragraph 4..

WARNING: BEFORE MOVING FLAP/SLAT HANDLE, MAKE CERTAIN THAT AREAS AROUND FLAPS AND SLATS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(2) With both engines running at idle place flap/slat handle in full up position.

(3) Place AP DFGC selector in 1 position.

(4) Place ART switch in AUTO position. Check that ART, ART READY and ART INOP lights go off.

(5) Momentarily press T.O. FLX button on thrust rating indicator (TRI), T.O. FLX button and NO MODE lights will come on.

(6) Set ASSUMED TEMP selector to 50°C and record EPR LIM value displayed on TRI.

NOTE: EPR LIM bugs on EPR indicators will agree with TRI.

(7) Place ART switch in off position and check that:

(a) ART and ART READY Lights remain off.

(b) ART INOP light remains off.

(c) EPR LIM on TRI increased above value recorded in Paragraph 13.A.(6).

(d) EPR LIM bugs on EPR indicators agree with EPR limit on TRI.

(e) NO MODE light on the TRI will go off.

(8) Place flap/slat handle at 11 degrees and check that:

(a) ART INOP light comes on.

(b) Master caution light comes on.

(9) Place AIR COND SHUTOFF switch in override (OVRD) position.

(10) Place ART switch in AUTO position and momentarily press master caution light. Check that:

(a) ART INOP goes off.

(b) EPR LIM on TRI and EPR indicators equals EPR LIM recorded in Paragraph 13.A.(6).

(c) ART READY light comes on.

(d) Master caution light goes off.

(11) Advance both throttles to above 64.0 percent N_1 and allow engines to stabilize at this setting.

NOTE: The ART ready light will blink one time after both throttles are advanced to 64% N_1 with the ART system in auto.

NOTE: ART will actuate when it detects N_1 difference of 30.2 percent between engines. However, both engines N_1 must be over 64.0 percent for ARTS to become armed for actuation.

(12) Record right engine EPR value.

(13) Slowly retard left throttle until ART READY light goes off. Check that:

(a) ART light comes on.

(b) Right engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(14) Place AP DFGC selector in 2 position.

(15) Place ART switch off for approximately 3 seconds, then place ART switch back to AUTO position. Check that:

(a) ART light goes off.

(b) EPR LIM on TRI decreased.

(c) EPR LIM on EEDP decreased.

(d) EPR LIM bug on right EPR indicator decreased.

(e) ART READY light comes on.

(16) Slowly advance left throttle to above 64.0 percent N_1 (same N_1 as right engine).

(17) Slowly retard right throttle until READY light goes off and check that:

(a) ART light comes on.

(b) Left engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(18) Place AP DFGC selector switch to 1 position.

(19) Place AP DFGC selecor switch to 1 position.

(20) Place throttles in idle position.

(21) Place flap/slat handle in full up position.

(22) Momentarily place ART switch off and then back to AUTO. Check that:

(a) ART light goes off.

(b) ART READY light is off.

(23) Shut down engines as outlined in Paragraph 7..

14. Engine Trimming Procedures After Engine Change

NOTE: If an engine trim test set is not available, refer to Paragraph 8.A., Engine Trimming Procedure Using Aircraft Instruments Only.

NOTE: Only one engine can be changed at a time.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A.

(2) Check engine oil pressure as outlined in: Paragraph 8..

(ENGINE GENERAL, SUBJECT 72-00-00) page 501.

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 11..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Engine acceleration check as outlined in Paragraph 16..

(6) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

15. Engine Trimming Procedures After Fuel Control Change

NOTE: If an engine trim test set is not available, refer to Paragraph 9., Engine Trimming Procedures Using Aircraft Instruments Only.

NOTE: Only one fuel control can be changed at a time.

NOTE: This procedure to be used for one engine only. All instruments and the other engine must be functioning normally and a cross check with the other engine must show performance within acceptable range. Disregard steps referring to test instruments.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

B. Perform Following Trim Tests:

(1) Part Power Trim as outlined in Paragraph 8.C..

(2) Engine Acceleration Check as outlined in Paragraph 16..

16. Engine Acceleration Check

A. Check Engine Acceleration:

(1) Start engine as outlined in paragraph 4.

(2) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 526

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF

Table 526 (Continued)

Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF
NOTE: During accel check procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When checking the right engine, the left air-conditioning pack should be turned on. When checking the left engine, the right air-conditioning pack should be turned on.	

(3) Operate engine with throttle in idle position until all engine parameters stabilize.

(4) Place the throttle in idle position.

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.

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

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(6) Engine N2 RPM should increase to approach idle.

(7) Operate engine at approach idle for 5 minutes to allow N2 to stabilize. After 5 minutes, observe minimum oil temperature requirement of 38°C before proceeding.

(8) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(9) Using values from Paragraph 16.A.(8) and Table 523, determine engine pressure ratio (EPR) for takeoff thrust setting.

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS.

(10) Advance throttle until takeoff thrust setting determined in Paragraph 16.A.(9) is obtained and maintain for exactly 60 seconds.

(11) While maintaining takeoff setting mark forward edge position of throttle lever on pedestal and record takeoff EPR, N_1, EGT and N_2.

(12) Using N_2 value obtained in Paragraph 16.A.(11) calculate and record 95% of takeoff N_2.

(13) Place throttle in idle position and operate engine at approach idle for 20-25 seconds.

(14) Advance throttle in less than one second to takeoff EPR mark on pedestal.

(15) Measure (with a stop watch) and record time from start of throttle advance to 95% of takeoff N_2 as determined in Paragraph 16.A.(12).

(16) Place throttle in idle position and operate engine at approach idle for 5 minutes.

(17) Repeat Paragraph 16.A.(8) through Paragraph 16.A.(16) twice more.

(18) Calculate average of all three acceleration times and compare average acceleration time to limits of (Figure 505).

(19) If acceleration time is unacceptable, refer to Paragraph 16.B..

B. Potential Acceleration Time Problem Sources

(1) If engine does not meet limits in Figure 508, following potential problem sources should be investigated.

(a) Internal structural damage

(b) Bleed load

(c) Idle Trim

(d) Part Power Trim

(e) First NGV match

(f) First Nozzle Guide Vane (NGV) match

(g) Fuel Control Unit Schedule

(h) P&D Valve Setting

(i) PRBC Schdule

(j) PRBC Schedule

(k) Fuel pumps and/or filters

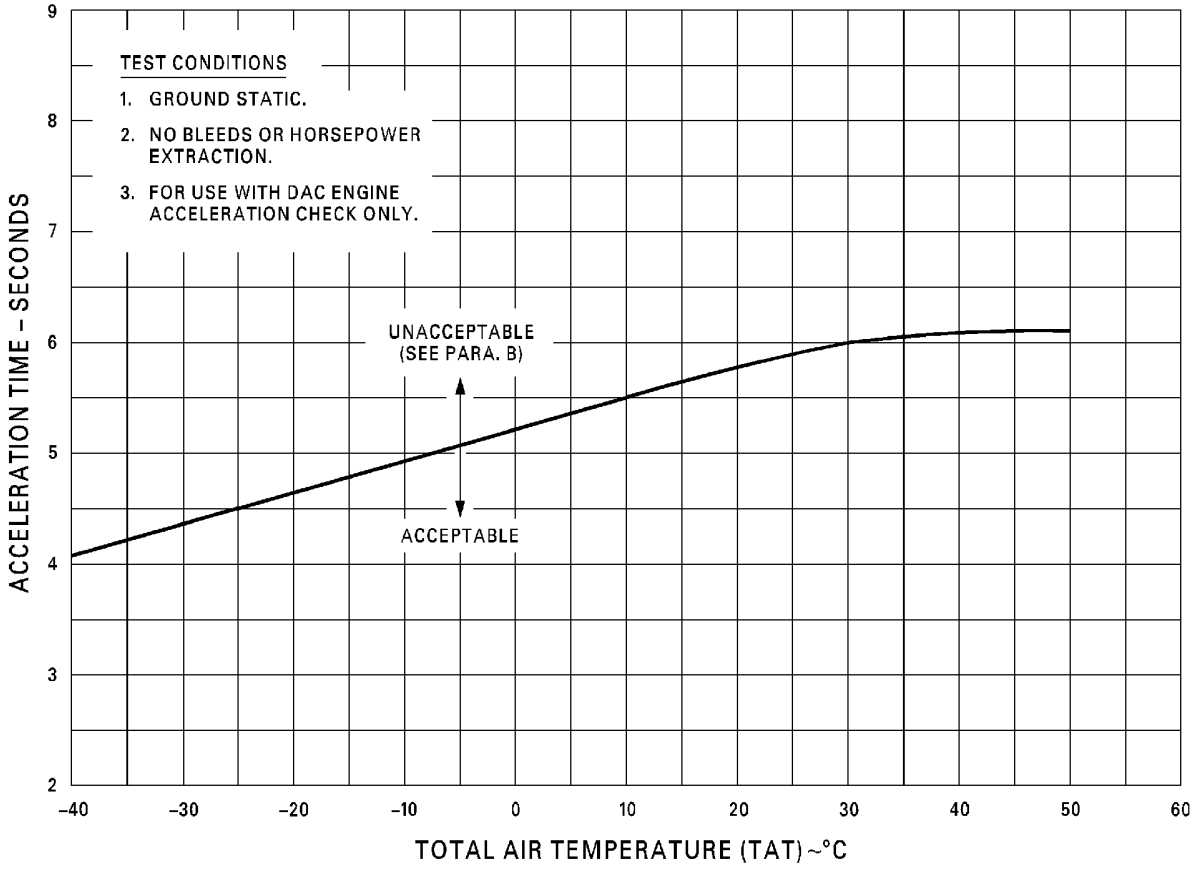
(l) PS_3 Filter

(m) P_b moisture trap

(n) Combustion chamber positioning pins/combustion chamber misalignment, cracks and burnthrough

(o) Pneumatic leaks

ENGINE ACCELERATION CHECK
LIMIT FOR IN-SERVICE ENGINES
FROM APPROACH (HIGH) IDLE



CAG(IGDS)

BBB2-71-43A

Engine Acceleration Check Time Limits
Figure 505/71-00-00-990-843

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

17. Part Power Trim Procedures During Extreme Cold Conditions

A. General

(1) Part Power EPR increases as ambient temperature decreases. The purpose of the Cold Part Power trim stop is to make trim operations possible at lower temperatures.

(2) There can be conditions in which the ambient temperature is so low that it is not possible to get a Part Power EPR which is lower than Takeoff EPR.

(3) The procedure given below is permitted on an engine only as a temporary solution and is not an alternate trim procedure. If trim is necessary on both engines, this procedure is not permitted. If engine trim is adjusted with this procedure, it will be necessary to trim the engine again in 25 hours or less with the aircraft manufacturer's trim tables. If maintenance operations on one engine made this temporary trim necessary, but the other engine was adjusted to align the throttles, it will be necessary to trim both the engines using the aircraft manufacturer's trim tables in 25 hours or less.

(4) The Part Power trim stop does not need to be moved into the trim position when using this procedure. The throttle will not be advanced far enough to contact the trim stop when the ambient temperature is cold enough to require use of this procedure.

NOTE: FOR JT8D-217C ENGINES ONLY:

Below a given ambient temperature, there is no EPR recorded in the aircraft manufacturer's trim tables. For operators with an engine fleet consisting of both JT8D-217C and JT8D-219 engine models there is a common level trim table available from the aircraft manufacturer which allows trim of the JT8D-219 model down to a lower ambient temperature than that which is allowed for the JT8D-217C model (this is because the Maximum Takeoff EPR of the JT8D-219 model is higher than the Maximum Takeoff EPR of the JT8D-217C model). If you use the common JT8D-217C/-219 trim levels and this occurs with a JT8D-217C model it is permitted to use the JT8D-219 portion of the table which extends to a lower ambient temperature. This can make JT8D-217C trim possible without the Extreme Cold Part Power Trim Procedure.

B. Procedure

(1) Run Engine No. 1 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(2) Run Engine No. 2 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(3) Adjust the Part Power trim of the engine which had the throttle in the more forward position to increase the fuel flow. This will let that engine get to the Power Assurance EPR with the throttle at a lower position.

NOTE: It is permitted to adjust the trim of only one engine with this procedure. After the selection of one engine for adjustment, Part Power Trim adjustment on the other engine is not permitted.

(4) Run the engine for which Part Power was adjusted back to the Power Assurance EPR and let the engine become stable for 1 minute minimum. Make Part Power trim adjustments to the engine that was adjusted as necessary until the throttles are aligned with the position mark for the other throttle. Throttle "stagger" (throttles not aligned) of up to 1/2 throttle knob is permitted. Pull back the throttle to Idle.

(5) Let the engine become stable at Idle for 3 minutes minimum and record N_2 and ambient temperature. Make sure that engine Idle trim is in limits at the coldest value on the applicable trim table. If the engine is not in limits, adjust the Idle trim as necessary.

(6) Advance the power lever for one engine to the Power Assurance level and let that engine become stable for one minute minimum. Record the position of the throttle for that engine. Use the same procedure to record the throttle position of the other engine. The throttle stagger limit is 1/2 knob. If further adjustment is necessary, return to Paragraph 17.B.(4) above.

18. Engine Dry or Wet Motor Operation

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

A. Engine Dry Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight compartment, set the applicable engine controls and switches as follow:

(a) Left and right throttle lever to Idle position.

(b) Left and right FUEL levers in OFF position.

(c) ICE PROTECT panel AIR FOIL L SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP to ON.

1) The FUEL INLET PRESS LOW light is off.

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

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

(3) Pressurize aircraft pneumatic system with APU or external air. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 49-00-00/001 Config 1)(GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 36-00-00/001)

(4) Do the engine Dry Motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(d) Hold the START switch in ON for approximately 20 seconds or for the maximum starter operational limit, then release the START switch to OFF.

NOTE: For dry motoring, the starter duty cycle is 90 seconds on 15 minutes off.

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

B. Engine Wet Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight comparment, set these engine controls and switches as follow:

(a) Left and right throttle lever in Idle position.

(b) Left and right FUEL levers in OFF.

(c) ICE PROTECT panel AIR FOIL SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP switch to ON.

1) Make sure that there is enough fuel in the fuel system for this procedure. (FUEL SYSTEMS GENERAL, SUBJECT 12-11-04)

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(3) Do the engine wet motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

(d) Hold the START switch in ON for not more than 20 seconds to get 15-20 percent N2 speed, then put the FUEL lever to ON for not more than 20 seconds.

1) Make certain that there is fuel flow shown on the FUEL FLOW indication, then move the FUEL lever to OFF.

NOTE: Large quantities of fuel can collect in the engine if the fuel switch stays ON for more than 20 seconds.

2) Continue to hold the START switch in ON to clear the engine of fuel and fuel vapors for not more than 60 seconds.

(e) If necessary, cool down the starter per the Normal Start Cycle Limits. (PNEUMATIC STARTER, SUBJECT 80-10-01)

(f) Upon release of the START switch , make certain that the applicable L or R START VALVE OPEN light goes out and the N2 rotation speed comes to a stop.

GENERAL - ADJUSTMENT/TEST

1. General

A. Adjustment of the power plant is required to assure optimum operation and to prolong the life of the engine. The following procedures outline the recommended methods for engine starting and trimming.

NOTE: Power lever misalignment will require a trim check of both engines to determine which power lever is misaligned.

B. Engine trimming requires the use of a calibrated trim test set Paragraph 8.. Engine trimming using the aircraft instruments in lieu of a calibrated trim test set is an acceptable option Paragraph 9.. A calibrated trim test set is required to include the following conditions:

(1) If two engines are installed and trimmed at the same time.

(2) If two fuel controls are installed and trimmed at the same time.

C. Before starting an engine, a check should be made to ensure all systems associated with engine operation have been serviced, and that no maintenance is being performed on any system which may be affected.

D. Restricted areas, shown in (Figure 501), must be clear of personnel and foreign objects.

E. The main landing gear wheels must be chocked.

F. Engine inlet and exhaust duct covers must be removed.

G. The airplane should be headed into the wind during engine trimming (Figure 502).

H. Engine starting can be accomplished by utilizing a low-pressure pneumatic ground source, an operating engine, or the auxiliary power unit. If an engine start is to be performed using the auxiliary power unit, additional operating precautions must be observed. For auxiliary power unit starting procedures refer to: AIRBORNE AUXILIARY POWER, CHAPTER 49.

I. Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (5°F) of each other. Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for a minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

J. Static engine operation at thrust settings above idle should be limited as much as possible.

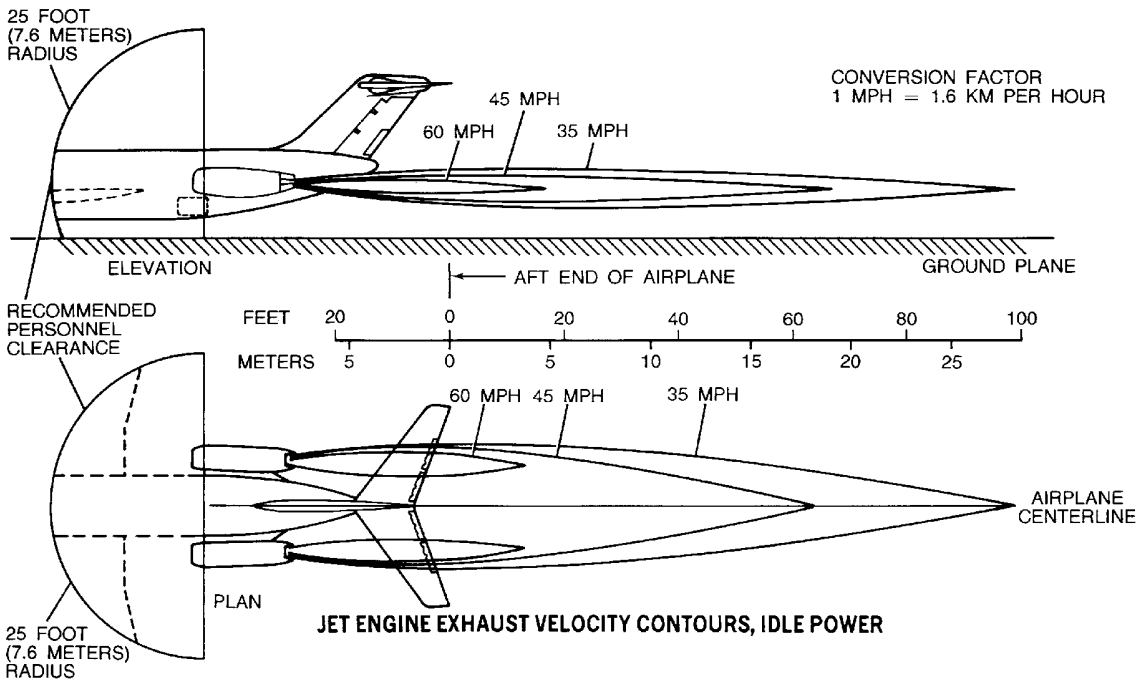
K. Symbols utilized in this section are defined as follows:

Table 501

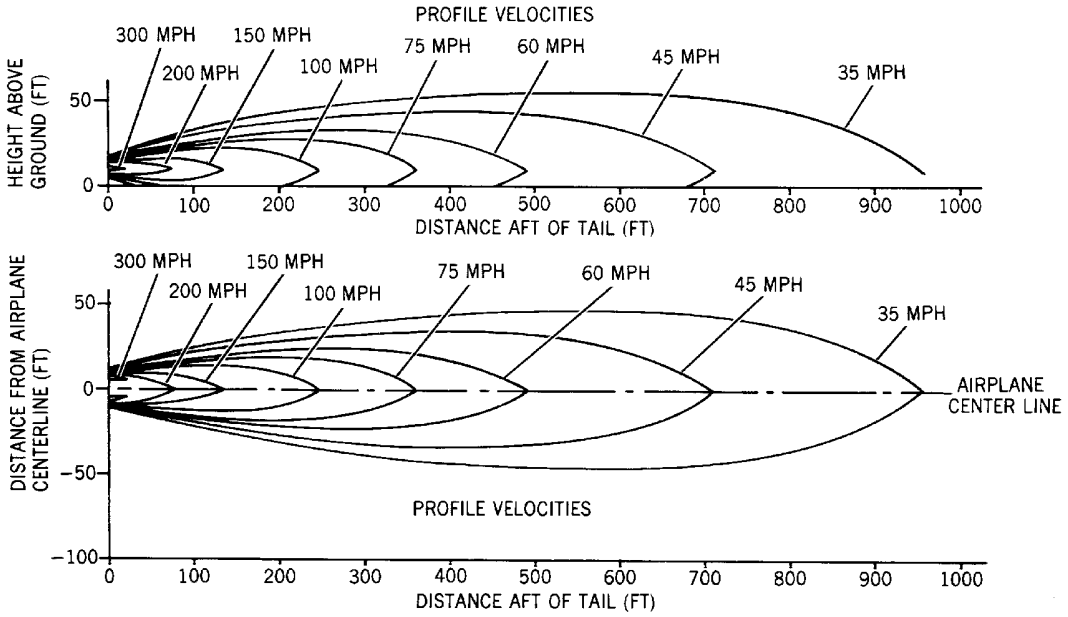
(1) EGT	- Exhaust Gas Temperature
(2) EPR	- Engine Pressure Ratio (EPR = Pt_7/Pt_2)
(3) N_1 rpm	- Low-pressure Compressor Rotor Speed
(4) N_2 rpm	- High Pressure Compressor Rotor Speed
(5) Pamb	- Barometric Pressure
(6) PP EPR	- Part Power Engine Pressure Ratio
(7) Pt_2	- Compressor Inlet Total Pressure
(8) Pt_7	- Turbine Discharge Total Pressure
(9) PP Pt_7	- Part Power Turbine Discharge Pressure

Table 501 (Continued)

(10) Tamb	- Ambient Temperature
(11) TO EPR	- Takeoff Engine Pressure Ratio



JET ENGINE EXHAUST VELOCITY CONTOURS, IDLE POWER

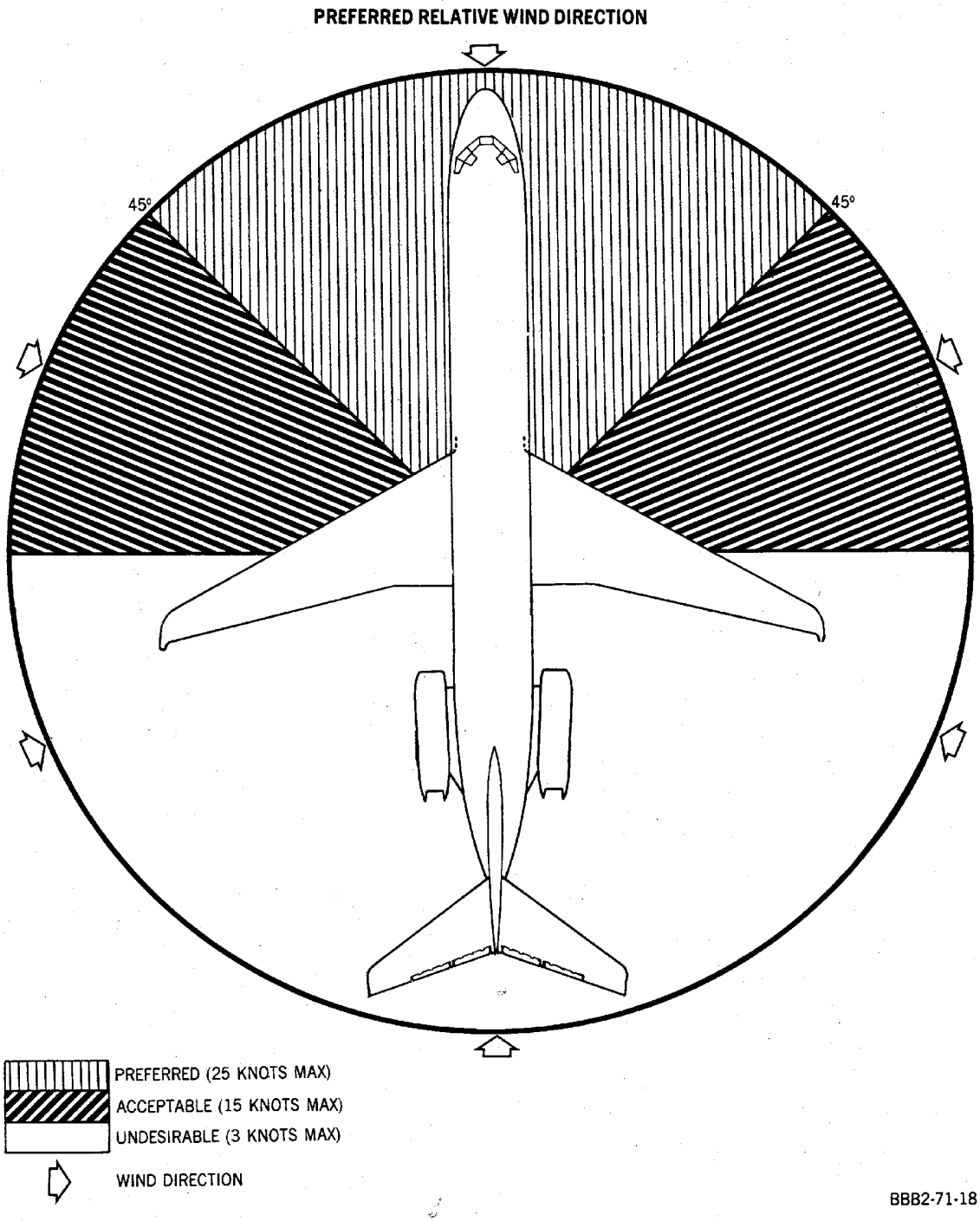


JET ENGINE EXHAUST VELOCITY CONTOURS, TAKEOFF POWER

NOTES:
1. THESE CONTOURS ARE TO BE USED AS GUIDELINES ONLY SINCE OPERATIONAL ENVIRONMENT VARIES GREATLY – OPERATIONAL SAFETY ASPECTS ARE THE RESPONSIBILITY OF THE USER/PLANNER.
2. ALL VELOCITY VALUES ARE STATUTE MILES/HOUR
3. CROSSWINDS WILL HAVE CONSIDERABLE EFFECT ON CONTOURS
4. SEA LEVEL STATIC – STANDARD DAY

BBB2-71-35B

Engine Restricted Areas -- JT8D-219 Engine
Figure 501/71-00-00-990-854



Engine Trim Wind Heading
Figure 502/71-00-00-990-855

2. Equipment and Materials

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

Table 502

Name and Number	Manufacturer
Remote engine trimmer D231	PEGASUS Comp Air Inc. 422 Trimber Ridge Road, Middletown CT. 06457-7540 Phone: 860 632-0345 FAX: 860 633-4973 Email: www.pegasusmfg.com
Engine trim test set, multi-engine with two trim heads, checks N1, N2, EPR, PT7, PT2, EGT, OAT	
Remote engine trimmer TEE 46-4/TE8D-06	Regelungs Messtechnik Schmidt, KG 2057 Reinbek-Hamburg Gutenberg Strasse 27, Germany Phone: 011-49-40-727 6030 Fax: 011-49-40-727 3066 Cincinnati office Phone: 513-237-4385 Fax: 513-469-0605

3. Engine Operating Limits JT8D-219

A. Engine Operating Limits

Table 503

Thrust Setting	Time Limit (Minutes)	Max. EGT (Degrees C) JT8D-219	Min. Oil Press. (PSI)	Max. Oil Temp. (Degrees C)
Takeoff (Normal)	5 2	590 595	*[1]40 (276 kPa)	135
Takeoff (Maximum)	5 2	625 630	*[1]40 (276 kPa)	135
Max Continuous	Continuous	580	*[1]40 (276 kPa)	135
Starting	Momentary	*[2]475	*[1]40 (276 kPa)	135

*[1] CAUTION: NORMAL OIL PRESSURE IS 40 TO 55 PSI (276 TO 380 KPA). OIL PRESSURE BETWEEN 35 AND 40 PSI (242-276 KPA) IS PERMISSIBLE FOR SUSTAINED OPERATIONS (TO COMPLETE FLIGHT), PREFERABLY AT REDUCED THROTTLE SETTING. OIL PRESSURE BELOW 35 PSI (242 KPA) IS UNSAFE.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

*[2] NOTE: Temperature is time limited to momentary. If the maximum EGT temperature is exceeded, the engine should be shut down and inspected in accordance with the instructions contained in CHAPTER 72 of the Maintenance Manual.

B. With the exception of idle, thrust settings are obtained by positioning the throttles to obtain the required engine pressure ratio for existing inlet air temperature.

C. A maximum oil temperature of 165°C is allowable for a time period not to exceed 15 minutes.

D. At normal takeoff the N_2 high-pressure compressor rotor speed should not exceed 100.9 percent (12,350 rpm), and the N_1 low-pressure compressor rotor speed should not exceed 98.8 percent (8,120 rpm).

E. Starter duty cycle:

(1) Three successive 30 seconds start attempts i.e.; 90 seconds on 5 minutes off.

(2) Subsequent start attempts 30 seconds on, 5 minutes off or 60 seconds on, 10 minutes off.

(3) Dry motoring 90 seconds on 15 minutes off.

NOTE: Starter duty cycle limits do not supersede ignition system duty cycle limits.

F. Thrust reverser ground maintenance operation precautions:

(1) Do not operate engine above idle thrust when thrust reverser is deployed.

(2) Ensure aircraft is secured to prevent it from rolling backwards.

NOTE: Use of brakes when aircraft is rolling backwards may cause aircraft to tip back.

(3) Observe all normal precautions related to engine ground operations.

G. Operation in icing conditions:

(1) Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (5°F) of each other.

(2) Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for a minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

4. Engine Starting

WARNING: MAKE CERTAIN THAT ENGINE INLET AND EXHAUST AREAS ARE CLEAR OF FOREIGN OBJECTS AND PERSONNEL.

A. (Figure 501)

Before starting engine, check following switch and lever positions:

(1) Check that all engine related circuit breakers are closed:

Table 504

(1) Check that all engine related circuit breakers are:	Closed
(2) If using external electrical power:	
(a) External power available light	On
(b) Voltage/frequency	Checked

Table 504 (Continued)

(c) External power bus switches	On
(d) Ground service panel external power bus	Off
(e) Ground service panel APU power bus switch	Off
(3) Galley power	Off
(4) CSD disconnect	Normal
(5) Generators	Reset & On
(6) AC crosstie	Auto
(7) DC crosstie	Open
(8) Emergency electrical power	Checked
(9) Auxiliary power unit panel	
(a) Fire control	Normal
(b) Bleed air	Off
(c) Master	Off
(d) Doors	Automatic
(10) Air-conditioning supply switch	Off
(11) Start pump	Off
(12) Ignition selector switch	Off
(13) Fuel tank pump switches	Off
(14) Airfoil anti-icing	Off
(15) Engine anti-icing	Off
(16) Annunciator panel	Tested
(17) All warning lights	Tested
(18) Fire detection and extinguishing systems	Checked & Tested
(19) Engine hydraulic pump	High
(20) Auxiliary hydraulic pump	On
(21) Hydraulic pressure and quantity	Checked
(22) Engine instruments	Checked & Set
(23) Fuel flow counters	Reset
(24) Fuel quantity	Checked & Tested
(25) Throttles	Idle
(26) Autothrottle	Disengaged
(27) Engine synchronize switch	Off
(28) Thrust reverser lever	Forward thrust
(29) Fuel shutoff lever	Off
(30) Fire control handle	Normal

Table 504 (Continued)

(31) Fuel crossfeed	Off
(32) Pneumatic crossfeed	Closed
(33) If using auxiliary power unit for start:	
(a) Battery switch	On
(b) APU door control switch	Auto
(c) Fire control switch	Normal
(d) APU left and right bus switch	On
(e) APU bleed air switch	ON
(f) Start pump or fuel tank boost pump	On
(g) APU master switch	Start/Run
(h) Voltage/frequency	Checked
(34) Parking brakes	Set
(35) Antiskid	Off

CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS AFTER FUEL CONTROL LEVER IS PLACED TO FUEL ON, DISCONTINUE ENGINE START. DO NOT ATTEMPT SECOND START UNTIL ENGINE CLEARING PROCEDURES ARE COMPLIED WITH, OTHERWISE HOT OR BOOMING START MAY RESULT.

CAUTION: INSUFFICIENT AIR PRESSURE TO PNEUMATIC STARTER OR TO COMBUSTION STARTER THAT IS BEING USED AS PNEUMATIC STARTER MAY NOT SUPPLY ENOUGH STARTER TORQUE TO START AN ENGINE PROPERLY, RESULTING IN HOT, HUNG OR "TORCHING" STARTS. WHEN AIRBLEED FROM ANOTHER ENGINE IS USED TO OPERATE STARTER, CAUTION IS NECESSARY TO ENSURE THAT OPERATING ENGINE IS TURNING OVER FAST ENOUGH TO PROVIDE AN ADEQUATE SUPPLY OF PRESSURIZED AIR TO ENGINE BEING STARTED. AN ENGINE SHOULD NEVER BE PERMITTED TO TAKE LONGER THAN 2 MINUTES TO ACCELERATE TO IDLE RPM. IN EVENT OF TORCHING, HIGHER THAN USUAL EXHAUST GAS STARTING TEMPERATURE, TOO LONG AN ACCELERATION TIME OR OTHER ABNORMALITIES, DISCONTINUE STARTING ATTEMPT AND INVESTIGATE.

B. Start engine by placing switches and levers in indicated position.

(1) Obtain clearance to start engine.

Table 505

(1) Obtain clearance to start engine	Received
(2) Pneumatic pressure	Checked (*36 psi minimum)(248 kPa)
NOTE: Can be 1 psi (7 kPa) less per 1000 feet (305M) in pressure altitude above sea level.	
(3) Air-conditioning supply switch	Off
(4) Pneumatic crossfeed	
(a) If making crossfeed start	Both open
(b) If using APU or ground pneumatic source	Left or right open as applicable
(5) Anti-collision light (if required)	On

Table 505 (Continued)

(6) Fuel boost or start pump	On
(7) Inlet fuel pressure low light	Off
CAUTION: IF FUEL IS SHUT OFF INADVERTENTLY, DO NOT CONTINUE START CYCLE. WHENEVER ENGINE FAILS TO START, SHUT OFF FUEL AND IGNITION AND CONTINUE TURNING COMPRESSOR OVER WITH STARTER FOR 10 TO 15 SECONDS TO CLEAR OUT TRAPPED FUEL OR VAPOR. BEFORE ATTEMPTING ANOTHER START, ALLOW EITHER 30-SECOND DRAINING PERIOD OR PRESCRIBED STARTER COOLING PERIOD, WHICHEVER IS LONGER. STARTER SHOULD NOT BE REENGAGED UNTIL ENGINE HAS COME TO COMPLETE STOP.	
(8) Ignition selector switch	Position for normal ground start
NOTE: Ground personnel should check for N_1 and N_2 rotor rotation as the tachometer indicator (N_1) will not indicate very low windmilling speeds.	
CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL N_1 AND N_2 ROTORS HAVE STOPPED ROTATING.	
(9) Start switch	Position for normal ground start
(10) Start valve open light	On
(11) Oil pressure	Rising
CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N_1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION ALONG WITH A MINIMUM INDICATED N_2 OF 20% BEFORE RAISING FUEL SHUTOFF LEVER.	
(12) N_1 rotor	Positive rotation indicated
(13) N_2 rotor	Rotation
CAUTION: IF N_2 DOES NOT INDICATE A MINIMUM OF 20% DO NOT RAISE FUEL SHUTOFF LEVER. TERMINATE START UNTIL CAUSE OF MALFUNCTION CAN BE DETERMINED AND CORRECTIVE ACTION TAKEN.	
(14) Fuel shutoff lever	Fuel on at Maximum Motoring (20 percent N_2 rpm percent minimum)
NOTE: Moving the FUEL lever to ON (i.e., pressurizing the engine) when the N_2 tachometer indicates maximum motoring RPM (maximum motoring is defined as no N_2 RPM change for 5 seconds) and N_1 RPM indicates positive rotation, will improve probability of a good start. Minimum N_2 RPM for moving FUEL lever to ON is 20% RPM.	
(15) Initial fuel flow	Approximately 800 lb/hr (362.9KG/HR)
NOTE: At initial engine start, the fuel flow indicator may fluctuate slightly due to air in the system. How- ever, the indicator will function properly and the system will be clear of air after approximately 3 minutes of operation. Throttle action may be required as an aid in clearing the system of air.	

Table 505 (Continued)

WJE 405-411, 880, 881, 883, 884	
CAUTION: WHEN STARTING EGT REACHES WITHIN 50°C (425°C) OF STARTING TEMPERATURE LIMIT (475°C) AND CONTINUES TO CLIMB DURING GROUND STARTING CYCLE, HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.	
WJE 401-404, 412, 414, 886, 887	
CAUTION: WHEN EGT AND FUEL FLOW DISPLAY FLASHES, A HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.	
WJE 401-412, 414, 880, 881, 883, 884, 886, 887	
CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS, DISCONTINUE START AND PROCEED WITH UNSATISFACTORY START AND/OR ENGINE CLEARING PROCEDURES.	
(16) Exhaust gas temperature	Rising
(17) Start switch	Release/off (between 35 and 40 percent N_2 rpm)
CAUTION: IF START VALVE LIGHT FAILS TO GO OUT, AND THERE IS NO INDICATION OF DUCT PRESSURE RISE BY TIME ENGINE ACCELERATES TO 40% N_2, PNEUMATIC CROSSFEED VALVE MUST BE CLOSED IMMEDIATELY AND START TERMINATED UNTIL CAUSE OF MALFUNCTION CAN BE DETER MINED AND CORRECTIVE ACTION TAKEN.	
(18) Start valve open light	Off
(19) Oil pressure low light	Off
(20) CSD oil pressure low light	Off
(21) After idle has stabilized, check following:	
NOTE: On engines without Pratt and Whitney SB 5863 or its production equivalent (Revised Surge Bleed System) incorporated, if N2 stabilizes below 50% throttle should be advanced momentarily to 65% N2 and returned to idle. This will close 13th stage bleed valve.	
(a) N_2 rotor rpm	50 to 61 percent
(b) N_1 rotor rpm	22 to 30 percent
(c) Exhaust gas temperature	300 to 480°C
(d) Fuel flow	600 to 1100 pounds per hour (270 to 500 KG/HR)
(e) Oil pressure	40 to 55 psi (276 to 380 kPa)
(f) Hydraulic pressure low light	Off
(g) Generator	115(±3) volts 400(±4) Hz
(h) Ignition selector switch	Off
(i) Fuel boost or start pump	Off

5. Unsatisfactory Start

NOTE: Unsatisfactory start procedures should be followed if any of the following conditions occur.

- Hot Start -- EGT exceeds starting limit. A hot start may be anticipated by greater than normal fuel flow for a given field elevation.
- No Start -- Engine does not light off as evidenced by no rise in exhaust gas temperature.
- False Start -- Engine lights off but rpm does not accelerate to idle. EGT may or may not reach the maximum.

A. Place following levers and switches in indicated positions.

Table 506

(1) Throttle	Idle
(2) Fuel shutoff	Off
NOTE: If no start is obtained, continue to motor engine for 20 seconds to clear engine of fuel and vapors.	
(3) Starter control switch	Release/off
NOTE: In the event of engine fire, starter can be re-engaged when N_2 RPM decreases to 20%.	
(4) Ignition selector switch	Off
(5) Fuel boost or start pump	Off

CAUTION: STARTER DUTY CYCLE MUST BE FOLLOWED; REFER TO CHAPTER 80. ENGINE MUST BE CLEARED OF FUEL AND TRAPPED VAPORS BEFORE ATTEMPTING ANOTHER START.

(1) (STARTING, CHAPTER 80)

Check that no fire hazard exists and determine cause of unsatisfactory start before attempting another start.

6. Engine Clearing Procedures

CAUTION: MAKE CERTAIN N_2 TACHOMETER INDICATOR DOES NOT INDICATE ANY COMPRESSOR ROTATION.

A. Clear Engine

(1) To clear engine of fuel and vapors place the following levers and switches in indicated positions.

Table 507

(a) Throttle	Idle
(b) Fuel shutoff	Off

(2) Place following switches in indicated positions to keep accessory load and bleed air at minimum during operational check.

Table 508

(a) Airfoil and engine anti-ice	Off
(b) Air-conditioning supply	Off

Table 508 (Continued)

WJE 401-404, 412, 414	
CAUTION: DO NOT SELECT OVERRIDE. SELECTION OF OVERRIDE POSITION WILL GIVE CONTINUOUS IGNITION AND CAUSE FUEL SHUTOFF SWITCH TO BE BYPASSED.	
WJE 401-412, 414, 880, 881, 883, 884, 886, 887	
(c) N_2 Tachometer	Indicates Rotation Has Ceased
WJE 405-411, 880, 881, 883, 884, 886, 887	
(d) Ignition selector switch	Off
WJE 401-404, 412, 414	
(d) Ignition selector switch	SYS A, SYS B, or BOTH
WJE 401-412, 414, 880, 881, 883, 884, 886, 887	
(e) Fuel boost or start pump	On
(f) Start switch	Start (for approximately 20 seconds)

(3) Attempt another start Paragraph 4..

7. Engine Shutdown Procedures

CAUTION: IF ENGINE HAS BEEN OPERATED AT OR ABOVE 85 PERCENT N_2 FOR MORE THAN 1 MINUTE DURING 5 MINUTES BEFORE SHUTDOWN, ENGINE MUST BE OPERATED AT IDLE RPM FOR 5 MINUTES TO REDUCE POSSIBILITY OF A ROTOR SEIZURE.

A. Shutdown Engine

(1) Place the following levers and switches in indicated positions.

Table 509

(a) Throttle	Idle
(b) Fuel shutoff	Off
(c) Ignition selector	Off
(d) Fuel boost or start pump	Off

(2) Observe that compressor rotors decelerate freely.

(3) Remove ground pneumatic source from airplane or shut down auxiliary power unit (AIRBORNE AUXILIARY POWER, CHAPTER 49) as applicable.

(4) Remove electrical power source from airplane.

(5) Install inlet and exhaust duct covers as soon as engine has cooled sufficiently.

8. Engine Trimming Procedures

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

CAUTION: IF OUTSIDE AIR TEMPERATURE IS LESS THAN 6°C (42°F) AND VISIBLE MOISTURE IS PRESENT OR DEWPOINT AND OUTSIDE AIR TEMPERATURE (RAT OR SAT) ARE WITHIN 3°C (5°F) OF EACH OTHER, ENGINE TRIMMING SHOULD BE AVOIDED.

A. Install Test Equipment

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb) and determine trim stop position:

(a) Using ambient temperature and Table 513Table 514, determine part power trim stop position to be used. When temperature is in area where either Standard Day or Cold Day stop can be used; use Standard Day Trim chart/stop when temperature will be increasing, use Cold Day Trim chart/stop when temperature will be decreasing. If ambient temperture is below minimum value given in Standard Day Trim chart, Cold Day Trim chart must be used.

NOTE: The part power trim stop is marked with letter S (Standard Day Trim) on one side and letter C (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

NOTE: Fuel control part power trim stops are interchangeable with -217A, -217C and -219 fuel controls.

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

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

(4) ART system check may be performed per Paragraph 13..

WJE 401-404, 412, 414, 886, 887

ART system check may be performed per Paragraph 14..

WJE 401-412, 414, 880, 881, 883, 884, 886, 887

(5) Open and tag following circuit breakers.

Open and tag following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(6) To assure proper trimming, maintain no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 510

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF
NOTE: During engine trim procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When trimming the right engine, the left air-conditioning pack should be turned on. When trimming the left engine, the right air-conditioning pack should be turned on.	

(7) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 8.A.(7) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Operate engine with throttle in idle position for 5 minutes.

(2) Record N_2, ambient temperature (Tamb), and pressure (Pamb).

(3) Determine low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511.

(4) After N_2 has stabilized for 5 minutes, adjust fuel control idle trim adjustment until idle N_2 RPM percent is within idle N_2 determined in Paragraph 8.B.(3).

(5) Record actual N_2 percent set.

NOTE: The Idle trim screw is identified by the letters "IDLE" on the fuel control adjacent to the screw. The Part Power screw is identified by the letters "MIL" adjacent to the screw. (Part Power is sometimes called Military or Maximum trim.) Both screws are also identified adjacent to the screws with the letters "INC" with an arrow indicating the direction to turn the screws for increased trim levels.

Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

C. Part Power Trim

(1) Record ambient temperature (Tamb) and pressure (Pamb).

(a) Ambient temperature (Tamb):

1) Use a laboratory approved thermometer.

2) Alternate: Contact airport control tower.

(b) Ambient barometric pressure (Pamb):

1) Use a laboratory approved barometer.

2) Alternate: Contact airport control tower; ask for "Field Barometric Pressure", not Mean Sea Level (MSL) pressure.

3) Alternate: Set No. 1 and No. 2 cockpit altimeters to zero and read barometric scale in window. Record average of the two readings.

(2) Make certain part power trim stop is in position as outlined in Paragraph 8.A.(2).

(3) Using values obtained in Paragraph 8.C.(1) determine value of part power engine pressure ratio (EPR) from Table 513Table 514.

(4) Advance throttle until power lever contacts part power trim stop.

CAUTION: DO NOT EXCEED JT8D-219 ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

(5) Operate the engine at part power position for 5 minutes to allow EPR to stabilize.

(6) Observe test instrument and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 8.C.(3).

CAUTION: DO NOT EXCEED JT8D-219 ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(7) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits.

Table 511 Low Idle Trim -- JT8D-219 Engine

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	51.2-52.0	51.6-52.4	52.2-53.0	52.9-53.7
-49 (-56.2)	51.1-51.9	51.5-52.3	52.1-52.9	52.8-53.6
-48 (-54.4)	51.0-51.8	51.5-52.3	52.1-53.0	52.8-53.6
-47 (-52.6)	51.0-51.8	51.4-52.2	52.0-52.8	52.7-53.5
-46 (-50.8)	50.9-51.7	51.4-52.1	52.0-52.8	52.7-53.5
-45 (-49.0)	50.9-51.7	51.9-52.1	51.9-52.7	52.7-53.5

Table 511 Low Idle Trim -- JT8D-219 Engine (Continued)

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-44 (-47.2)	50.8-51.6	51.2-52.0	51.9-52.7	52.6-53.4
-43 (-45.4)	50.8-51.6	51.2-52.0	51.8-52.6	52.6-53.4
-42 (-43.6)	50.8-51.6	51.1-51.9	51.8-52.6	52.6-53.4
-41 (-41.8)	50.7-51.7	51.1-51.9	51.8-52.6	52.5-53.3
-40 (-40.0)	50.7-51.5	51.1-51.9	51.7-52.5	52.5-53.3
-39 (-38.2)	50.7-51.5	51.0-51.8	51.7-52.5	52.5-53.3
-38 (-36.4)	50.6-51.4	51.0-51.8	51.7-52.5	52.5-53.3
-37 (-34.6)	50.6-51.4	50.9-51.7	51.7-52.5	52.5-53.3
-36 (-32.8)	50.6-51.4	50.9-51.7	51.6-52.4	52.4-53.2
-35 (-31.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-34 (-29.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-33 (-27.4)	50.5-51.3	50.8-51.6	51.6-52.4	52.4-53.2
-32 (-25.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-31 (-23.8)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-30 (-22.0)	50.4-51.2	50.8-51.6	51.6-52.4	52.3-53.1
-29 (-20.2)	50.4-51.2	50.7-51.5	51.6-52.4	52.3-53.1
-28 (-18.4)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-27 (-16.6)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-26 (-14.8)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-25 (-13.0)	50.3-51.1	50.8-51.6	51.6-52.4	52.3-53.1
-24 (-11.2)	50.3-51.1	50.8-51.6	51.6-52.4	52.4-53.2
-23 (- 9.4)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-22 (- 7.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-21 (- 5.8)	50.4-51.2	50.8-51.6	51.7-52.5	52.4-53.2
-20 (- 4.0)	50.4-51.2	50.9-51.7	51.7-52.5	52.5-53.3
-19 (- 2.2)	50.5-51.3	50.9-51.7	51.7-52.5	52.5-53.3
-18 (- 0.4)	50.5-51.3	50.9-51.7	51.8-52.6	52.6-53.4
-17 (1.4)	50.6-51.4	51.0-51.8	51.8-52.6	52.6-53.4
-16 (3.2)	50.6-51.4	51.0-51.8	51.9-52.7	52.7-53.5
-15 (5.0)	50.7-51.5	51.1-51.9	51.9-52.7	52.7-53.5
-14 (6.8)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-13 (8.6)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6

Table 511 Low Idle Trim -- JT8D-219 Engine (Continued)

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-12 (10.4)	50.9-51.7	51.3-52.1	52.1-52.9	52.9-53.7
-11 (12.2)	51.0-51.8	51.4-52.2	52.2-53.0	53.0-53.8
-10 (14.0)	51.1-51.9	51.4-52.2	52.2-53.0	53.1-53.9
- 9 (15.8)	51.1-51.9	51.5-52.3	52.3-53.1	53.1-53.9
- 8 (17.6)	51.2-52.0	51.6-52.4	52.4-53.2	53.2-54.0
- 7 (19.4)	51.3-52.1	51.6-52.4	52.5-53.3	53.3-54.1
- 6 (21.2)	51.4-52.2	51.7-52.5	52.6-53.4	53.4-54.2
- 5 (23.0)	51.5-52.3	51.8-52.6	52.7-53.5	53.5-54.3
- 4 (24.8)	51.5-52.3	51.9-52.7	52.8-53.6	53.6-54.4
- 3 (26.6)	51.6-52.4	52.0-52.8	52.9-53.7	53.7-54.5
- 2 (28.4)	51.7-52.5	52.1-52.9	53.0-53.8	53.8-54.6
- 1 (30.2)	51.8-52.6	52.2-53.0	53.1-53.9	53.9-54.7
0 (32.0)	51.9-52.7	52.3-53.1	53.2-54.0	54.0-54.8
1 (33.8)	52.0-52.8	52.4-53.2	53.3-54.1	54.1-54.9
2 (35.6)	52.1-52.9	52.5-53.3	53.4-54.2	54.2-55.0
3 (37.4)	52.2-53.0	52.6-53.4	53.5-54.3	54.3-55.1
4 (39.2)	52.3-53.1	52.7-53.5	53.5-54.3	54.4-55.2
5 (41.0)	52.3-53.1	52.8-53.6	53.6-54.4	54.5-55.3
6 (42.8)	52.4-53.2	52.9-53.7	53.7-54.5	54.6-55.4
7 (44.6)	52.5-53.3	53.0-53.8	53.8-54.6	54.7-55.5
8 (46.4)	52.6-53.4	53.1-53.9	53.9-54.7	54.7-55.5
9 (48.2)	52.7-53.5	53.1-53.9	54.0-54.8	54.8-55.6
10 (50.0)	52.8-53.6	53.2-54.0	54.0-54.8	54.9-55.7
11 (51.8)	52.9-53.7	53.3-54.1	54.1-54.9	55.0-55.8
12 (53.6)	52.9-53.7	53.4-54.2	54.2-55.0	55.1-55.9
13 (55.4)	53.0-53.8	53.5-54.3	54.3-55.1	55.2-56.0
14 (57.2)	53.1-53.9	53.5-54.3	54.4-55.2	55.2-56.0
15 (59.0)	53.2-54.0	53.6-54.4	54.4-55.2	55.3-56.1
16 (60.8)	53.3-54.1	53.7-54.5	54.5-55.3	55.4-56.2
17 (62.6)	53.4-54.2	53.8-54.6	54.6-55.4	55.4-56.2
18 (64.4)	53.4-54.2	53.8-54.6	54.7-55.5	55.5-56.3
19 (66.2)	53.5-54.3	53.9-54.7	54.7-55.5	55.6-56.4

Table 511 Low Idle Trim -- JT8D-219 Engine (Continued)

AMBIENT TEMP °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
20 (68.0)	53.6-54.4	54.0-54.8	54.8-55.6	55.7-56.5
21 (69.8)	53.7-54.5	54.0-54.8	54.9-55.7	55.7-56.5
22 (71.6)	53.7-54.5	54.1-54.9	55.0-55.8	55.8-56.6
23 (73.4)	53.8-54.6	54.2-55.0	55.0-55.8	55.9-56.7
24 (75.2)	53.9-54.7	54.3-55.1	55.1-55.9	56.0-56.8
25 (77.0)	54.0-54.8	54.4-55.2	55.2-56.0	56.0-56.8
26 (78.8)	54.1-54.9	54.5-55.3	55.3-56.1	56.1-56.9
27 (80.6)	54.1-54.9	54.5-55.3	55.4-56.2	56.2-57.0
28 (82.4)	54.2-55.0	54.6-55.4	55.4-56.2	56.3-57.1
29 (84.2)	54.3-55.1	54.7-55.5	55.5-56.3	56.4-57.2
30 (86.0)	54.4-55.2	54.8-55.6	55.6-56.4	56.4-57.2
31 (87.8)	54.5-55.3	54.9-55.7	55.7-56.5	56.5-57.3
32 (89.6)	54.5-55.3	54.9-55.7	55.8-56.6	56.6-57.4
33 (91.4)	54.6-55.4	55.0-55.8	55.8-56.6	56.7-57.5
34 (93.2)	54.7-55.5	55.1-55.9	55.9-56.7	56.7-57.5
35 (95.0)	54.8-55.6	55.2-56.0	56.0-56.8	56.8-57.6
36 (96.8)	54.9-55.7	55.3-56.1	56.1-56.9	56.9-57.7
37 (98.6)	54.9-55.7	55.4-56.2	56.2-57.0	57.0-57.8
38 (100.4)	55.0-55.8	55.5-56.3	56.3-57.1	57.1-57.9
39 (102.2)	55.1-55.9	55.6-56.4	56.4-57.2	57.1-57.9
40 (104.0)	55.2-56.0	55.6-56.4	56.4-57.2	57.2-58.0
41 (105.8)	55.3-56.1	57.7-56.5	56.5-57.3	57.3-58.1
42 (107.6)	55.3-56.1	55.8-56.6	56.6-57.4	57.4-58.2
43 (109.4)	55.4-56.2	55.9-56.7	56.7-57.5	57.5-58.3
44 (111.2)	55.5-56.3	56.0-56.8	56.8-57.6	57.5-58.3
45 (113.0)	55.6-56.4	56.1-56.9	56.8-57.6	57.6-58.4
46 (114.8)	55.7-56.5	56.2-57.0	56.9-57.7	57.7-58.5
47 (116.6)	55.8-56.6	56.2-57.0	57.0-57.8	57.8-58.6
48 (118.4)	55.9-56.7	56.3-57.1	57.1-57.9	57.8-58.6
49 (120.2)	55.9-56.7	56.4-57.2	57.1-57.9	57.9-58.7
50 (122.0)	56.0-56.8	56.5-57.3	57.2-58.0	58.0-58.8

Table 512 Low Idle Trim -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	53.8-54.7	54.8-55.6		
-49 (-56.2)	53.7-54.5	54.7-55.5		
-48 (-54.4)	53.7-54.5	54.7-55.5		
-47 (-52.6)	53.7-54.5	54.7-55.5		
-46 (-50.8)	53.7-54.5	54.7-55.5		
-45 (-49.0)	53.6-54.4	54.6-55.4		
-44 (-47.2)	53.6-54.4	54.6-55.4		
-43 (-45.4)	53.6-54.4	54.6-55.4		
-42 (-43.6)	53.6-54.4	54.6-55.5		
-41 (-41.8)	53.5-54.3	54.6-55.4		
-40 (-40.0)	53.5-54.3	54.5-55.3		
-39 (-38.2)	53.5-54.3	54.5-55.3		
-38 (-36.4)	53.5-54.3	54.5-55.3		
-37 (-34.6)	53.5-54.3	54.5-55.3		
-36 (-32.8)	53.5-54.3	54.5-55.3		
-35 (-31.0)	53.5-54.3	54.5-55.3		
-34 (-29.0)	53.4-54.2	54.5-55.3		
-33 (-27.4)	53.4-54.2	54.5-55.3		
-32 (-25.6)	53.4-54.2	54.4-55.2		
-31 (-23.8)	53.4-54.2	54.4-55.2		
-30 (-22.0)	53.4-54.2	54.4-55.2		
-29 (-20.2)	53.4-54.2	54.4-55.2		
-28 (-18.4)	53.4-54.2	54.4-55.2		
-27 (-16.6)	53.4-54.2	54.4-55.2		
-26 (-14.8)	53.4-54.2	54.4-55.2		
-25 (-13.0)	53.5-54.3	54.5-55.3		
-24 (-11.2)	53.5-54.3	54.5-55.3		
-23 (- 9.4)	53.5-54.3	54.5-55.3		
-22 (- 7.6)	53.5-54.3	54.6-55.4		
-21 (- 5.8)	53.5-54.3	54.6-55.4		
-20 (- 4.0)	53.6-54.4	54.6-55.4		
-19 (- 2.2)	53.6-54.4	54.7-55.5		

Table 512 Low Idle Trim -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-18 (- 0.4)	53.7-54.5	54.7-55.5		
-17 (1.4)	53.7-54.5	54.8-55.6		
-16 (3.2)	53.8-54.6	54.8-55.6		
-15 (5.0)	53.8-54.6	54.9-55.7		
-14 (6.8)	53.9-54.7	54.9-55.7		
-13 (8.6)	53.9-54.7	55.0-55.8		
-12 (10.4)	54.0-54.8	55.1-55.9		
-11 (12.2)	54.1-54.9	55.2-56.0		
-10 (14.0)	54.2-55.0	55.2-56.0		
- 9 (15.8)	54.2-55.0	55.3-56.1		
- 8 (17.6)	54.3-55.1	55.4-56.2		
- 7 (19.4)	54.4-55.2	55.5-56.3		
- 6 (21.2)	54.5-55.3	55.6-56.4		
- 5 (23.0)	54.6-55.4	55.7-56.5		
- 4 (24.8)	54.7-55.5	55.8-56.6		
- 3 (26.6)	54.8-55.6	55.9-56.7		
- 2 (28.4)	54.9-55.7	56.0-56.8		
- 1 (30.2)	55.0-55.8	56.1-56.9		
0 (32.0)	55.1-55.9	56.2-57.0		
1 (33.8)	55.2-56.0	56.3-57.1		
2 (35.6)	55.3-56.1	56.4-57.2		
3 (37.4)	55.4-56.2	56.5-57.3		
4 (39.2)	55.5-56.3	56.6-57.4		
5 (41.0)	55.6-56.4	56.7-57.5		
6 (42.8)	55.7-56.5	56.8-57.6		
7 (44.6)	55.8-56.6	56.9-57.7		
8 (46.4)	55.9-56.7	57.0-57.8		
9 (48.2)	56.0-56.8	57.1-57.9		
10 (50.0)	56.0-56.8	57.2-58.0		
11 (51.8)	56.1-56.9	57.2-58.0		
12 (53.6)	56.2-57.0	57.3-58.1		
13 (55.4)	56.3-57.1	57.4-58.2		

Table 512 Low Idle Trim -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
14 (57.2)	56.3-57.1	57.5-58.3		
15 (59.0)	56.4-57.2	57.6-58.4		
16 (60.8)	56.5-57.3	57.6-58.4		
17 (62.6)	56.6-57.4	57.7-58.5		
18 (64.4)	56.6-57.4	57.8-58.6		
19 (66.2)	56.7-57.5	57.9-58.7		
20 (68.0)	56.7-57.5	57.9-58.7		
21 (69.8)	56.8-57.6	58.0-58.8		
22 (71.6)	56.9-57.7	58.1-58.9		
23 (73.4)	57.0-57.8	58.1-58.9		
24 (75.2)	57.0-57.8	58.2-59.0		
25 (77.0)	57.1-57.9	58.3-59.1		
26 (78.8)	57.2-58.0	58.3-59.1		
27 (80.6)	57.3-58.1	58.4-59.2		
28 (82.4)	57.3-58.1	58.5-59.3		
29 (84.2)	57.4-58.2	58.5-59.3		
30 (86.0)	57.5-58.3	58.6-59.4		
31 (87.8)	57.6-58.4	58.7-59.5		
32 (89.6)	57.7-58.5	58.7-59.5		
33 (91.4)	57.7-58.5	58.8-59.6		
34 (93.2)	57.8-58.6	58.9-59.7		
35 (95.0)	57.9-58.7	58.9-59.7		
36 (96.8)	57.9-58.7	59.0-59.8		
37 (98.6)	58.0-58.8	59.1-59.9		
38 (100.4)	58.1-58.9	59.2-60.0		
39 (102.2)	58.2-59.0	59.2-60.0		
40 (104.0)	58.2-59.0	59.3-60.1		
41 (105.8)	58.3-59.1	59.4-60.2		
42 (107.6)	58.4-59.2	59.5-60.3		
43 (109.4)	58.5-59.3	59.5-60.3		
44 (111.2)	58.5-59.3	59.6-60.4		
45 (113.0)	58.6-59.4	59.6-60.4		

Table 512 Low Idle Trim -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
46 (114.8)	58.7-59.5	59.7-60.5		
47 (116.6)	58.8-59.6	59.8-60.6		
48 (118.4)	58.8-59.6	59.8-60.6		
49 (120.2)	58.9-59.7	59.9-60.7		
50 (122.0)	59.0-59.8	60.0-60.8		
NOTE: Part Power EPR +0.015, -0.0				

Table 513 Part Power Trim - COLD TRIM STOP -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50(-58.0) TO -28 (-18.4)				DO	NOT	TRIM		
-27 (-16.6)						2.09	2.09	2.09
-26 (-14.8)						2.08	2.08	2.08
-25 (-13.0)						2.08	2.08	2.08
-24 (-11.2)					2.07	2.07	2.07	2.07
-23 (- 9.4)					2.07	2.07	2.07	2.07
-22 (- 7.6)					2.06	2.06	2.06	2.06
-21 (- 5.8)					2.06	2.06	2.06	2.06
-20 (- 4.0)				2.05	2.05	2.05	2.05	2.05
-19 (- 2.2)				2.05	2.05	2.05	2.05	2.05
-18 (- 0.4)				2.04	2.04	2.04	2.04	2.04
-17 (1.4)				2.04	2.04	2.04	2.04	2.04
-16 (3.2)			2.03	2.03	2.03	2.03	2.03	2.03
-15 (5.0)			2.03	2.03	2.03	2.03	2.03	2.03
-14 (6.8)			2.02	2.02	2.02	2.02	2.02	2.02
-13 (8.6)			2.02	2.02	2.02	2.02	2.02	2.02
-12 (10.4)			2.01	2.01	2.01	2.01	2.01	2.01
-11 (12.2)			2.00	2.00	2.00	2.00	2.00	2.00
-10 (14.0)			2.00	2.00	2.00	2.00	2.00	2.00
-9 (15.8)		1.99	1.99	1.99	1.99	1.99	1.99	1.99
- 8 (17.6)		1.99	1.99	1.99	1.99	1.99	1.99	1.99

Table 513 Part Power Trim - COLD TRIM STOP -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
- 7 (19.4)		1.98	1.98	1.98	1.98	1.98	1.98	1.98
- 6 (21.2)		1.98	1.98	1.98	1.98	1.98	1.98	1.98
- 5 (23.0)		1.97	1.97	1.97	1.97	1.97	1.97	1.97
- 4 (24.8)		1.96	1.96	1.96	1.96	1.96	1.96	1.96
- 3 (26.6)	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
- 2 (28.4)	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93
- 1 (30.2)	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
0 (32.0)	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
1 (33.8)	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
2 (35.6)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
3 (37.4)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
4 (39.2)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
5 (41.0)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
6 (42.8)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
7 (44.6)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
8 (46.4)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
9 (48.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
10 (50.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
11 (51.8)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
12 (53.6)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
13 (55.4)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
14 (57.2)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
15 (59.0)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
16 (60.8)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
17 (62.6)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
18 (64.4)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
19 (66.2)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
20 (68.0)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
21 (69.8)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
22 (71.6)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
23 (73.4)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
24 (75.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
25 (77.0)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69

Table 513 Part Power Trim - COLD TRIM STOP -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
26 (78.8)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
27 (80.6)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
28 (82.4)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
29 (84.2)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
30 (86.0)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
31 (87.8)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
32 (89.6)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
33 (91.4)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
34 (93.2)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
35 (95.0)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
36 (96.8)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
37 (98.6)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
38 (100.4)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
39 (102.2)	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
40 (104.0)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
41 (105.8)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
42 (107.6)	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
43 (109.4)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
44 (111.2)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
45 (113.0)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
46 (114.8)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
47 (116.6)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
48 (118.4)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
49 (120.2)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
50 (122.0)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51

NOTE: Part Power EPR +0.015, -0.0

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-219 Engine

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50(-58.0) TO + 2 (35.6)				DO	NOT	TRIM		

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-219 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
3 (37.4)								2.06
4 (39.2)							2.05	2.05
5 (41.0)							2.05	2.05
6 (42.8)							2.04	2.04
7 (44.6)							2.04	2.04
8 (46.4)						2.03	2.03	2.03
9 (48.2)						2.03	2.03	2.03
10 (50.0)					2.02	2.02	2.02	2.02
11 (51.8)					2.02	2.02	2.02	2.02
12 (53.6)					2.01	2.01	2.01	2.01
13 (55.4)					2.01	2.01	2.01	2.01
14 (57.2)				2.00	2.00	2.00	2.00	2.00
15 (59.0)				2.00	2.00	2.00	2.00	2.00
16 (60.8)				1.99	1.99	1.99	1.99	1.99
17 (62.6)			1.98	1.98	1.98	1.98	1.98	1.98
18 (64.4)			1.98	1.98	1.98	1.98	1.98	1.98
19 (66.2)			1.97	1.97	1.97	1.97	1.97	1.97
20 (68.0)			1.96	1.96	1.96	1.96	1.96	1.96
21 (69.8)			1.95	1.95	1.95	1.95	1.95	1.95
22 (71.6)		1.94	1.94	1.94	1.94	1.94	1.94	1.94
23 (73.4)		1.93	1.93	1.93	1.93	1.93	1.93	1.93
24 (75.2)		1.92	1.92	1.92	1.92	1.92	1.92	1.92
25 (77.0)		1.90	1.90	1.90	1.90	1.90	1.90	1.90
26 (78.8)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
27 (80.6)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
28 (82.4)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
29 (84.2)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
30 (86.0)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
31 (87.8)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
32 (89.6)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
33 (91.4)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
34 (93.2)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
35 (95.0)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-219 Engine (Continued)

AMBIENT TEMP.	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
°C (°F)	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
36 (96.8)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
37 (98.6)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
38 (100.4)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
39 (102.2)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
40 (104.0)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
41 (105.8)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
42 (107.6)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
43 (109.4)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
44 (111.2)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
45 (113.0)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
46 (114.8)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
47 (116.6)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
48 (118.4)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
49 (120.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
50 (122.0)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
NOTE: Part Power EPR +0.015, -0.0								

(8) With power lever against part power stop, observe test and engine gages and record following:

Table 515

Test Instruments	Airplane Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperture (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(9) Move throttle to idle.

(10) EPR readings obtained from test instrument and airplane instruments Paragraph 8.C.(8) must not differ by more than ±.01.

(11) Test instrument readings obtained from Paragraph 8.C.(8) for N_1 and N_2 tachometers must not differ from airplane readings of N_1 and N_2 by more than ±0.8 percent.

(12) Compare test and aircraft readings obtained from Paragraph 8.C.(8) for exhaust gas temperature (EGT); readings must not differ by more than ±5°C.

(13) Since idle and maximum speed trimmers affect each other, repeat Paragraph 8.B. and Paragraph 8.C.. until desired settings are obtained without intermediate adjustment.

NOTE: Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

NOTE: If a problem is encountered in trimming the engine where either the idle trim screw or the part power trim screw is adjusted and the engine does not respond, re-center the fuel control adjustment screws Paragraph 8.C.(14).

NOTE: Air trapped in the fuel system, after an engine or JFC change, can also cause no response to adjustments of the trim screws. This can be eliminated by bleeding fuel system.

(14) Fuel control trim screw re-centering procedure.

(a) It can be necessary to set Idle and Part Power trim screws to new positions and start trim procedure again. It is possible that one of these causes will make this necessary:

1) No engine N2 response to either trim screw movement (with apparently no problem with fuel control).
2) Malfunction of trim equipment (this can put trim screw at one of stop positions).
3) Trim position unknown (which makes it necessary for operator to start procedure again).

(b) For information only, trim screw turns have these approximate results in full range from stop to stop:

1) 22 full turns (typical)
2) 36 clicks per turn
3) 792 clicks total range (typical)
4) One full turn of Part Power trim screw changes N2 approximately 225 rpm and 0.1 EPR. 4 clicks equals approximately 0.01 EPR. Counter Clockwise is increasing EPR.
5) One full turn of Idle trim screw changes N2 approximately 155 rpm.

NOTE: Part Power trim screw has effect on both Part Power and Idle trim. Idle screw has very small or no effect on Part Power trim.

(c) Procedure:

1) If re-centering is needed during an engine run, do shutdown procedure.
2) Turn Idle and Part Power trim screws in counterclockwise direction down to bottom.
3) Turn Idle and Part Power screws lightly in clockwise direction ten (10) full turns (this will get the screws to center of trim range and make it possible to start trim procedure again).

NOTE: Run engine at part power at least two minutes prior to attempting to adjust idle trim.

(15) Repeat Paragraph 8.B. and Paragraph 8.C. until desired settings are obtained.

(16) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire. (Figure 503).

D. Approach Idle Check

(1) With throttle in idle position open following circiuit breaker.

With throttle in idle position open following circuit breaker.

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for five minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using values obtained in Paragraph 8.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 517Table 518Table 519Table 520Table 521. Interpolate between chart values, if necessary.

(6) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(7) With throttle in idle position close following circuit breaker.

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(8) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay).

E. Takeoff Power Assurance Check

(1) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 516

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(2) Operate engine with throttle in idle position for five minutes.

(3) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(4) Using values from Paragraph 8.E.(3) and Table 523, determine engine pressure ratio (EPR) for takeoff thrust setting.

(5) Advance throttle until value determined in Paragraph 8.E.(4) is obtained.

Table 517 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	56.7-60.3	58.3-61.9	60.1-63.5	62.0-65.4
-49 (-56.2)	56.7-60.3	58.2-61.9	60.1-63.5	62.0-65.4
-48 (-54.4)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.4
-47 (-52.6)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.5
-46 (-50.8)	56.6-60.2	58.1-61.9	60.1-63.6	62.0-65.5
-45 (-49.0)	56.5-60.2	58.1-61.8	60.0-63.6	62.0-65.5
-44 (-47.2)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.5
-43 (-45.4)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-42 (-43.6)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-41 (-41.8)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-40 (-40.0)	56.4-60.1	58.0-61.9	60.0-63.6	62.0-65.7
-39 (-38.2)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.7
-38 (-36.4)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-37 (-34.6)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-36 (-32.8)	56.4-60.2	58.0-61.9	60.0-63.7	62.1-65.8
-35 (-31.0)	56.4-60.2	58.0-61.9	60.1-63.8	62.1-65.9
-34 (-29.0)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-65.9
-33 (-27.4)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-66.0
-32 (-25.6)	56.3-60.2	58.1-62.0	60.1-63.8	62.2-66.0
-31 (-23.8)	56.3-60.2	58.1-62.1	60.1-63.9	62.3-66.1
-30 (-22.0)	56.3-60.3	58.1-62.1	60.1-63.9	62.3-66.1
-29 (-20.2)	56.4-60.3	58.1-62.1	60.1-64.0	62.3-66.1
-28 (-18.4)	56.4-60.3	58.1-62.2	60.2-64.0	62.4-66.2
-27 (-16.6)	56.4-60.3	58.1-62.2	60.2-64.1	62.4-66.2
-26 (-14.8)	56.4-60.4	58.2-62.2	60.2-64.1	62.5-66.3
-25 (-13.0)	56.4-60.4	58.2-62.3	60.3-64.1	62.5-66.3
-24 (-11.2)	56.5-60.5	58.3-62.3	60.3-64.2	62.6-66.4
-23 (- 9.4)	56.5-60.5	58.3-62.4	60.4-64.2	62.6-66.4
-22 (- 7.6)	56.6-60.5	58.4-62.4	60.4-64.3	62.7-66.5
-21 (- 5.8)	56.6-60.6	58.4-62.5	60.5-64.4	62.7-66.5
-20 (- 4.0)	56.7-60.6	58.5-62.5	60.5-64.4	62.8-66.6
-19 (- 2.2)	56.7-60.7	58.6-62.6	60.6-64.5	62.9-66.6

Table 517 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-18 (- 0.4)	56.8-60.8	58.6-62.7	60.6-64.5	62.9-66.7
-17 (1.4)	56.8-60.8	58.7-62.7	60.7-64.6	63.0-66.7
-16 (3.2)	56.9-60.9	58.8-62.8	60.8-64.6	63.1-66.8
-15 (5.0)	57.0-61.0	58.9-62.8	60.9-64.7	63.1-66.9
-14 (6.8)	57.1-61.1	59.0-62.9	60.9-64.8	63.2-66.9

Table 518 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE		
	24.00	22.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	64.0-67.6	65.9-69.6	68.0-71.8
-49 (-56.2)	64.0-67.6	66.0-69.6	68.0-71.8
-48 (-54.4)	64.0-67.6	66.0-69.6	68.1-71.9
-47 (-52.6)	64.0-67.7	66.0-69.7	68.1-71.9
-46 (-50.8)	64.1-67.7	66.0-69.7	68.1-71.9
-45 (-49.0)	64.1-67.7	66.1-69.8	68.2-72.0
-44 (-47.2)	64.1-67.7	66.1-69.8	68.2-72.0
-43 (-45.4)	64.1-67.8	66.1-69.8	68.3-72.0
-42 (-43.6)	64.2-67.8	66.2-69.9	68.3-72.1
-41 (-41.8)	64.2-67.8	66.2-69.9	68.3-72.1
-40 (-40.0)	64.2-67.9	66.3-69.9	68.4-72.1
-39 (-38.2)	64.3-67.9	66.3-70.0	68.4-72.2
-38 (-36.4)	64.3-68.0	66.3-70.0	68.4-72.2
-37 (-34.6)	64.3-68.0	66.4-70.0	68.5-72.2
-36 (-32.8)	64.4-68.0	66.4-70.1	68.5-72.3
-35 (-31.0)	64.4-68.1	66.5-70.1	68.6-72.3
-34 (-29.0)	64.4-68.1	66.5-70.2	68.6-72.3
-33 (-27.4)	64.5-68.2	66.5-70.2	68.7-72.4
-32 (-25.6)	64.5-68.2	66.6-70.2	68.7-72.4
-31 (-23.8)	64.6-68.3	66.6-70.3	68.7-72.5
-30 (-22.0)	64.6-68.3	66.7-70.3	68.8-72.5
-29 (-20.2)	64.7-68.3	66.7-70.4	68.8-72.5
-28 (-18.4)	64.7-68.4	66.8-70.4	68.9-72.6

Table 518 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE		
	24.00	22.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-27 (-16.6)	64.8-68.4	66.8-70.5	68.9-72.6
-26 (-14.8)	64.8-68.5	66.9-70.5	69.0-72.7
-25 (-13.0)	64.9-68.5	66.9-70.5	69.0-72.7
-24 (-11.2)	64.9-68.6	67.0-70.6	69.1-72.7
-23 (- 9.4)	65.0-68.6	67.0-70.6	69.1-72.8
-22 (- 7.6)	65.0-68.7	67.1-70.7	69.2-72.8
-21 (- 5.8)	65.1-68.7	67.2-70.7	69.2-72.9
-20 (- 4.0)	65.1-68.8	67.2-70.8	69.3-72.9
-19 (- 2.2)	65.2-68.8	67.3-70.9	69.3-72.9
-18 (- 0.4)	65.2-68.9	67.3-70.9	69.4-73.0
-17 (1.4)	65.3-68.9	67.4-71.0	69.4-73.0
-16 (3.2)	65.4-69.0	67.4-71.0	69.5-73.1
-15 (5.0)	65.4-69.1	67.5-71.1	69.6-73.1
-14 (6.8)	65.5-69.1	67.5-71.1	69.6-73.2

Table 519 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	58.2-62.1	59.1-63.0	60.1-64.0	61.0-64.9
-12 (10.4)	58.2-62.1	59.1-63.0	60.1-64.0	61.1-64.9
-11 (12.2)	58.3-62.2	59.2-63.1	60.2-64.1	61.2-65.0
-10 (14.0)	58.4-62.3	59.3-63.2	60.3-64.2	61.2-65.1
- 9 (15.8)	58.5-62.3	59.4-63.2	60.4-64.2	61.3-65.1
- 8 (17.6)	58.6-62.4	59.5-63.3	60.5-64.3	61.4-65.2
- 7 (19.4)	58.7-62.5	59.6-63.4	60.6-64.4	61.5-65.3
- 6 (21.2)	58.8-62.6	59.7-63.5	60.7-64.4	61.6-65.3
- 5 (23.0)	58.8-62.6	59.7-63.5	60.7-64.5	61.6-65.4
- 4 (24.8)	58.9-62.7	59.8-63.6	60.8-64.6	61.7-65.5
- 3 (26.6)	59.0-62.8	59.9-63.7	60.9-64.6	61.8-65.5
- 2 (28.4)	59.1-62.9	60.0-63.8	61.0-64.7	61.9-65.6
- 1 (30.2)	59.2-63.0	60.1-63.9	61.0-64.8	61.9-65.7
0 (32.0)	59.3-63.0	60.2-63.9	61.1-64.9	62.0-65.8

Table 519 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
1 (33.8)	59.4-63.1	60.2-64.0	61.2-64.9	62.1-65.8
2 (35.6)	59.5-63.2	60.3-64.1	61.3-65.0	62.2-65.9
3 (37.4)	59.6-63.3	60.4-64.2	61.3-65.1	62.2-66.0
4 (39.2)	59.6-63.3	60.5-64.2	61.4-65.1	62.3-66.0
5 (41.0)	59.7-63.4	60.5-64.3	61.5-65.2	62.4-66.1
6 (42.8)	59.8-63.5	60.6-64.4	61.5-65.2	62.4-66.1
7 (44.6)	59.9-63.5	60.7-64.4	61.6-65.3	62.5-66.2
8 (46.4)	60.0-63.6	60.8-64.5	61.7-65.4	62.6-66.3
9 (48.2)	60.0-63.7	60.9-64.6	61.7-65.4	62.6-66.3
10 (50.0)	60.1-63.8	60.9-64.6	61.8-65.5	62.7-66.4
11 (51.8)	60.1-63.8	61.0-64.7	61.9-65.5	62.8-66.4
12 (53.6)	60.2-63.8	61.1-64.7	61.9-65.5	62.8-66.5
13 (55.4)	60.3-63.9	61.2-64.8	62.0-65.6	62.9-66.5
14 (57.2)	60.3-64.0	61.2-64.9	62.1-65.7	63.0-66.6
15 (59.0)	60.4-64.1	61.3-64.9	62.1-65.7	63.0-66.6
16 (60.8)	60.5-64.1	61.4-65.0	62.2-65.8	63.1-66.7
17 (62.6)	60.6-64.2	61.5-65.0	62.3-65.8	63.2-66.7
18 (64.4)	60.6-64.2	61.5-65.1	62.3-65.9	63.2-66.8
19 (66.2)	60.7-64.3	61.6-65.1	62.4-65.9	63.3-66.8
20 (68.0)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.8
21 (69.8)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.9
22 (71.6)	60.9-64.5	61.8-65.3	62.6-66.1	63.5-67.0
23 (73.4)	61.0-64.5	61.9-65.4	62.7-66.2	63.6-67.0
24 (75.2)	61.0-64.6	61.9-65.4	62.7-66.2	63.6-67.1
25 (77.0)	61.1-64.7	62.0-65.5	62.8-66.3	63.7-67.1
26 (78.8)	61.2-64.7	62.1-65.5	62.9-66.3	63.7-67.2
27 (80.6)	61.2-64.8	62.1-65.6	62.9-66.4	63.8-67.2
28 (82.4)	61.3-64.8	62.2-65.7	63.0-66.5	63.8-67.3
29 (84.2)	61.3-64.9	62.2-65.7	63.0-66.5	63.9-67.3
30 (86.0)	61.4-65.0	62.3-65.8	63.1-66.6	64.0-67.4
31 (87.8)	61.5-65.0	62.4-65.8	63.2-66.6	64.0-67.4
32 (89.6)	61.6-65.1	62.4-65.9	63.3-66.7	64.1-67.5

Table 519 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
33 (91.4)	61.6-65.1	62.5-65.9	63.3-66.8	64.1-67.6
34 (93.2)	61.7-65.2	62.5-66.0	63.4-66.8	64.2-67.6
35 (95.0)	61.8-65.2	62.6-66.0	63.4-66.9	64.2-67.7
36 (96.8)	61.8-65.3	62.7-66.1	63.5-66.9	64.3-67.7
37 (98.6)	61.9-65.4	62.7-66.2	63.6-67.0	64.4-67.8
38 (100.4)	61.9-65.4	62.8-66.2	63.6-67.0	64.4-67.8
39 (102.2)	62.0-65.5	62.8-66.3	63.7-67.1	64.5-67.9
40 (104.0)	62.1-65.5	62.9-66.3	63.7-67.1	64.5-67.9
41 (105.8)	62.1-65.6	62.9-66.4	63.8-67.2	64.6-68.0
42 (107.6)	62.2-65.7	63.0-66.4	63.8-67.2	64.6-68.0
43 (109.4)	62.3-65.7	63.1-66.5	63.9-67.3	64.7-68.1
44 (111.2)	62.3-65.8	63.1-66.5	64.0-67.3	64.8-68.1
45 (113.0)	62.4-65.8	63.2-66.6	64.0-67.4	64.8-68.2
46 (114.8)	62.5-65.9	63.2-66.6	64.1-67.4	64.9-68.2
47 (116.6)	62.5-65.9	63.3-66.7	64.1-67.5	64.9-68.3
48 (118.4)	62.6-66.0	63.4-66.8	64.2-67.5	65.0-68.3
49 (120.2)	62.6-66.1	63.4-66.8	64.2-67.6	65.0-68.4
50 (122.0)	62.7-66.1	63.5-66.9	64.3-67.6	65.1-68.4

Table 520 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	62.1-66.0	63.2-67.0	64.4-68.1	65.5-69.2
-12 (10.4)	62.2-66.0	63.3-67.0	64.5-68.2	65.6-69.3
-11 (12.2)	62.3-66.1	63.4-67.1	64.6-68.2	65.7-69.3
-10 (14.0)	62.4-66.2	63.5-67.2	64.6-68.3	65.7-69.4
- 9 (15.8)	62.4-66.2	63.5-67.2	64.7-68.3	65.8-69.4
- 8 (17.6)	62.5-66.3	63.6-67.3	64.8-68.4	65.9-69.5
- 7 (19.4)	62.6-66.3	63.7-67.3	64.8-68.4	65.9-69.5
- 6 (21.2)	62.7-66.4	63.7-67.4	64.9-68.5	66.0-69.6
- 5 (23.0)	62.7-66.5	63.8-67.5	64.9-68.6	66.0-69.7
- 4 (24.8)	62.8-66.5	63.9-67.5	65.0-68.6	66.1-69.7

Table 520 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
- 3 (26.6)	69.9-66.6	63.9-67.6	65.1-68.7	66.2-69.8
- 2 (28.4)	63.0-66.7	64.0-67.7	65.1-68.8	66.2-69.8
- 1 (30.2)	63.0-66.7	64.1-67.7	65.2-68.8	66.3-69.9
0 (32.0)	63.1-66.8	64.2-67.8	65.3-68.8	66.4-69.9
1 (33.8)	63.2-66.8	64.2-67.8	65.3-68.9	66.4-70.0
2 (35.6)	63.3-66.9	64.3-67.9	65.4-69.0	66.5-70.0
3 (37.4)	63.3-67.0	64.3-68.0	65.4-69.1	66.5-70.1
4 (39.2)	63.4-67.0	64.4-68.0	65.5-69.1	66.6-70.2
5 (41.0)	63.5-67.1	64.5-68.1	65.5-69.2	66.6-70.2
6 (42.8)	63.5-67.1	64.5-68.1	65.6-69.2	66.7-70.3
7 (44.6)	63.6-67.2	64.6-68.2	65.7-69.3	66.7-70.3
8 (46.4)	63.7-67.3	64.6-68.2	65.8-69.3	66.8-70.4
9 (48.2)	63.7-67.3	64.7-68.3	65.8-69.4	66.9-70.4
10 (50.0)	63.8-67.4	64.8-68.3	65.9-69.4	66.9-70.5
11 (51.8)	63.8-67.4	64.8-68.4	65.9-69.5	67.0-70.5
12 (53.6)	63.9-67.5	64.9-68.4	66.0-69.5	67.0-70.5
13 (55.4)	63.9-67.5	64.9-68.5	66.0-69.6	67.1-70.6
14 (57.2)	64.0-67.6	65.0-68.5	66.1-69.6	67.2-70.6
15 (59.0)	64.1-67.6	65.1-68.6	66.2-69.7	67.2-70.6
16 (60.8)	64.1-67.7	65.1-68.6	66.2-69.7	67.3-70.7
17 (62.6)	64.2-67.7	65.2-68.7	66.3-69.8	67.3-70.8
18 (64.4)	64.2-67.8	65.2-68.7	66.3-69.8	67.4-70.8
19 (66.2)	64.3-67.8	65.3-68.8	66.3-69.9	67.5-70.9
20 (68.0)	64.4-67.8	65.3-68.8	66.4-69.9	67.5-70.9
21 (69.8)	64.4-67.9	65.4-68.9	66.5-70.0	67.6-71.0
22 (71.6)	64.5-68.0	65.4-68.9	66.5-70.0	67.6-71.0
23 (73.4)	64.6-68.0	65.5-68.9	66.6-70.0	67.7-71.0
24 (75.2)	64.6-68.1	65.5-69.0	66.6-70.1	67.7-71.1
25 (77.0)	64.7-68.1	65.6-69.1	66.7-70.1	67.8-71.1
26 (78.8)	64.7-68.2	65.7-69.1	66.8-70.2	67.8-71.2
27 (80.6)	64.8-68.2	65.7-69.2	66.8-70.2	67.9-71.2
28 (82.4)	64.8-68.3	65.8-69.2	66.9-70.2	67.9-71.3

Table 520 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	64.9-68.3	65.8-69.3	66.9-70.3	67.9-71.3
30 (86.0)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
31 (87.8)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
32 (89.6)	65.1-68.5	66.0-69.4	67.1-70.4	68.1-71.4
33 (91.4)	65.1-68.6	66.0-69.5	67.1-70.5	68.1-71.5
34 (93.2)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.5
35 (95.0)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.6
36 (96.8)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
37 (98.6)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
38 (100.4)	65.4-68.8	66.3-69.7	67.4-70.7	68.4-71.7
39 (102.2)	65.5-68.8	66.4-69.7	67.4-70.7	68.4-71.7
40 (104.0)	65.5-68.9	66.4-69.8	67.5-70.8	68.5-71.8
41 (105.8)	65.6-68.9	66.5-69.8	67.5-70.8	68.5-71.8
42 (107.6)	65.6-69.0	66.5-69.9	67.5-70.9	68.5-71.9
43 (109.4)	65.7-69.0	66.6-69.9	67.6-70.9	68.6-71.9
44 (111.2)	65.7-69.1	66.6-70.0	67.6-71.0	68.6-72.0
45 (113.0)	65.8-69.1	66.7-70.0	67.7-71.0	68.7-72.0
46 (114.8)	65.8-69.2	66.7-70.1	67.7-71.1	68.7-72.0
47 (116.6)	65.8-69.2	66.7-70.1	67.8-71.1	68.8-72.1
48 (118.4)	65.9-69.3	66.8-70.2	67.8-71.2	68.8-72.1
49 (120.2)	66.0-69.3	66.9-70.2	67.9-71.3	68.9-72.2
50 (122.0)	66.0-69.4	66.9-70.3	67.9-71.3	68.9-72.2

Table 521 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	66.6-70.2	67.6-71.2	68.7-72.2	69.7-73.2
-12 (10.4)	66.6-70.3	67.7-71.2	68.7-72.3	69.7-73.3
-11 (12.2)	66.7-70.3	67.7-71.3	68.8-72.3	69.8-73.3
-10 (14.0)	66.8-70.4	67.8-71.4	68.8-72.4	69.8-73.4
- 9 (15.8)	66.8-70.4	67.8-71.4	68.9-72.4	69.9-73.4
- 8 (17.6)	66.9-70.5	67.9-71.5	68.9-72.5	69.9-73.5

Table 521 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
- 7 (19.4)	67.0-70.5	68.0-71.5	69.0-72.5	70.0-73.5
- 6 (21.2)	67.0-70.6	68.0-71.6	69.0-72.6	70.0-73.6
- 5 (23.0)	67.1-70.7	68.1-71.6	69.1-72.6	70.1-73.6
- 4 (24.8)	67.1-70.7	68.1-71.7	69.1-72.7	70.1-73.7
- 3 (26.6)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.7
- 2 (28.4)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.8
- 1 (30.2)	67.3-70.9	68.3-71.9	69.3-72.9	70.3-73.9
0 (32.0)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-73.9
1 (33.8)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-74.0
2 (35.6)	67.5-71.0	68.5-72.0	69.5-73.0	70.5-74.0
3 (37.4)	67.5-71.1	68.5-72.1	69.5-73.1	70.5-74.0
4 (39.2)	67.6-71.2	68.6-72.1	69.6-73.1	70.6-74.1
5 (41.0)	67.6-71.2	68.6-72.2	69.6-73.2	70.6-74.1
6 (42.8)	67.7-71.3	68.7-72.2	69.7-73.2	70.7-74.2
7 (44.6)	67.7-71.3	68.7-72.3	69.7-73.3	70.7-74.2
8 (46.4)	67.8-71.4	68.7-72.3	69.7-73.3	70.7-74.3
9 (48.2)	67.9-71.4	68.8-72.4	69.8-73.4	70.8-74.3
10 (50.0)	67.9-71.5	68.8-72.4	69.8-73.4	70.8-74.4
11 (51.8)	68.0-71.5	68.9-72.4	69.9-73.4	70.9-74.4
12 (53.6)	68.0-71.5	68.9-72.5	69.9-73.5	70.9-74.4
13 (55.4)	68.1-71.6	69.0-72.5	70.0-73.5	71.0-74.5
14 (57.2)	68.1-71.6	69.0-72.6	70.0-73.6	71.0-74.5
15 (59.0)	68.2-71.7	69.1-72.6	70.1-73.6	71.1-74.6
16 (60.8)	68.2-71.7	69.1-72.7	70.1-73.7	71.1-74.6
17 (62.6)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.6
18 (64.4)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.7
19 (66.2)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
20 (68.0)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
21 (69.8)	68.5-71.9	69.4-72.8	70.4-73.8	71.3-74.8
22 (71.6)	68.5-72.0	69.4-72.9	70.4-73.9	71.4-74.8
23 (73.4)	68.6-72.0	69.5-72.9	70.5-73.9	71.4-74.9
24 (75.2)	68.6-72.1	69.5-73.0	70.5-74.0	71.5-74.9

Table 521 Approach Idle Check Percent N_2 RPM -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
25 (77.0)	68.7-72.1	69.6-73.0	70.6-74.0	71.5-74.9
26 (78.8)	68.7-72.1	69.6-73.0	70.6-74.0	71.6-75.0
27 (80.6)	68.8-72.2	69.6-73.1	70.6-74.1	71.6-75.0
28 (82.4)	68.8-72.2	69.7-73.1	70.7-74.1	71.7-75.0
29 (84.2)	68.8-72.3	69.7-73.2	70.7-74.2	71.7-75.1
30 (86.0)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.1
31 (87.8)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.2
32 (89.6)	69.0-72.4	69.9-73.3	70.9-74.3	71.8-75.2
33 (91.4)	69.0-72.4	69.9-73.3	70.9-74.3	71.9-75.2
34 (93.2)	69.1-72.5	70.0-73.4	71.0-74.4	71.9-75.3
35 (95.0)	69.1-72.5	70.0-73.4	71.0-74.4	72.0-75.3
36 (96.8)	69.2-72.5	70.1-73.4	71.1-74.4	72.0-75.4
37 (98.6)	69.2-72.6	70.1-73.5	71.1-74.5	72.0-75.4
38 (100.4)	69.3-72.6	70.2-73.5	71.2-74.5	72.1-75.4
39 (102.2)	69.3-72.7	70.2-73.6	71.2-74.6	72.1-75.5
40 (104.0)	69.4-72.7	70.2-73.6	71.2-74.6	72.2-75.5
41 (105.8)	69.4-72.7	70.3-73.6	71.3-74.6	72.2-75.6
42 (107.6)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
43 (109.4)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
44 (111.2)	69.6-72.9	70.5-73.7	71.5-74.7	72.4-75.7
45 (113.0)	69.6-72.9	70.5-73.8	71.5-74.8	72.4-75.7
46 (114.8)	69.6-73.0	70.5-73.8	71.5-74.8	72.5-75.8
47 (116.6)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.8
48 (118.4)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.9
49 (120.2)	69.8-73.1	70.7-73.9	71.7-74.9	72.6-75.9
50 (122.0)	69.8-73.1	70.7-74.0	71.7-75.0	72.6-76.0

CAUTION: DO NOT EXCEED JT8D-219 ENGINE OPERATING LIMITS AS FOLLOWS:

(6) Do not exceed the limits as follows:

Table 522

EXHAUST GAS TEMPERATURE (EGT)	590°C
N_1 RPM	98.8%
N_2 RPM	100.9%

Table 522 (Continued)

TAKEOFF EPR	±.01
AT TAKEOFF EPR	5 Min.
OIL TEMPERATURE	135°C

(7) Operate engine for 2 minutes at takeoff power, adjusting throttle as required, until stabilized value of EPR is obtained.

(8) Place throttle in idle position and operate engine at idle for a minimum of 5 minutes.

F. Reverse Thrust EPR Check

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust until either one of the engines reaches 1.60(±0.10) EPR.

(6) Allow engine to stabilize and observe EPR for both engines. Maximum allowable difference between engines is 0.15 EPR.

(a) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(b) Allow engine to stabilize and record EPR for both engines (L. Engine ----------, R. Engine ----------).

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 7..

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft (Figure 504), View A.

(b) Install rigging aid R-24) in interlock stop (View C).

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

(13) Close lower cowl doors.

(14) Move both thrust reverser control valve dump levers in normal position.

(15) Remove and stow thrust reverser control valve safety pins.

G. Reverse Thrust EPR Check (Aircraft with S/B 78-68 Incorporated and Later Aircraft Equipped with Reverse Thrust Intermediate Detent Position)

NOTE: Check procedures contained in this paragraph only apply to aircraft with an additional detent at the reverse thrust intermediate position.

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust intermediate detent position.

(6) Allow engine to stabilize and observe EPR for both engines.

(a) Record EPR for both engines

1) L. Engine ----------, R. Engine ----------).

NOTE: Maximum allowable difference between engines is 0.13 EPR.

(b) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(c) Allow engine to stabilize and record EPR for both engines (L. Engine -------, R. Engine ---------).

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 7..

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft (Figure 505) View A.

(b) Install rigging aid (R-24) in interlock stop (View C).

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

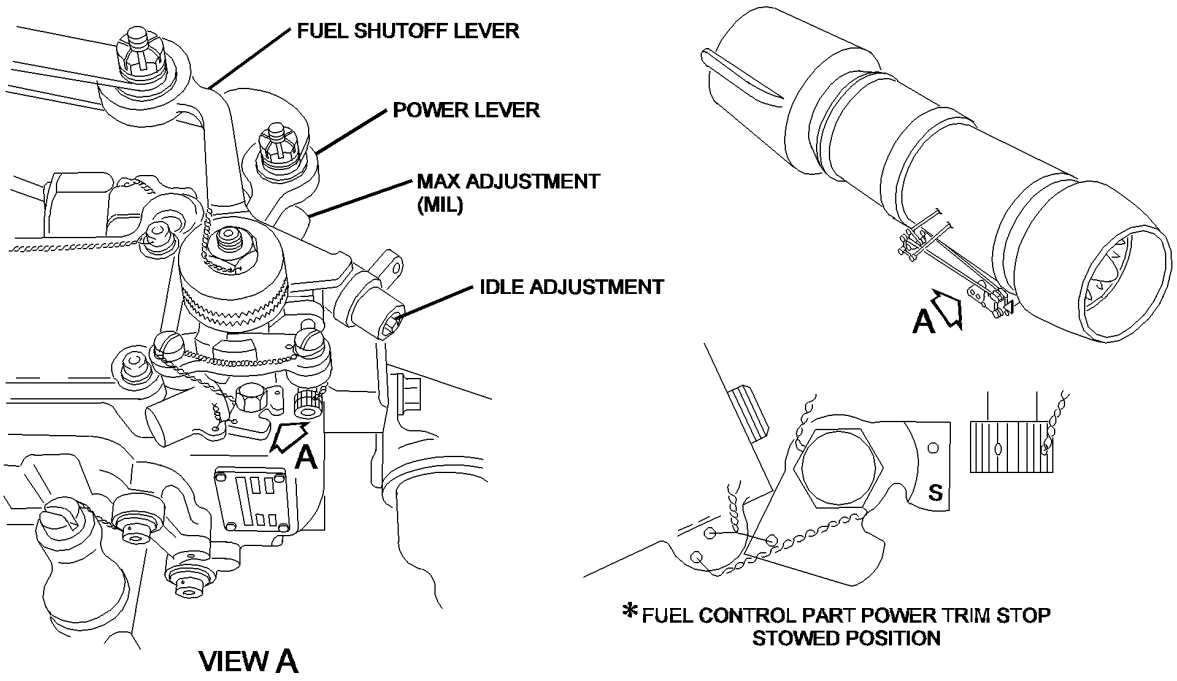
(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

(13) Close lower cowl doors.

(14) Move both thrust reverser control valve dump levers in normal position.

(15) Remove and stow thrust reverser control valve safety pins.



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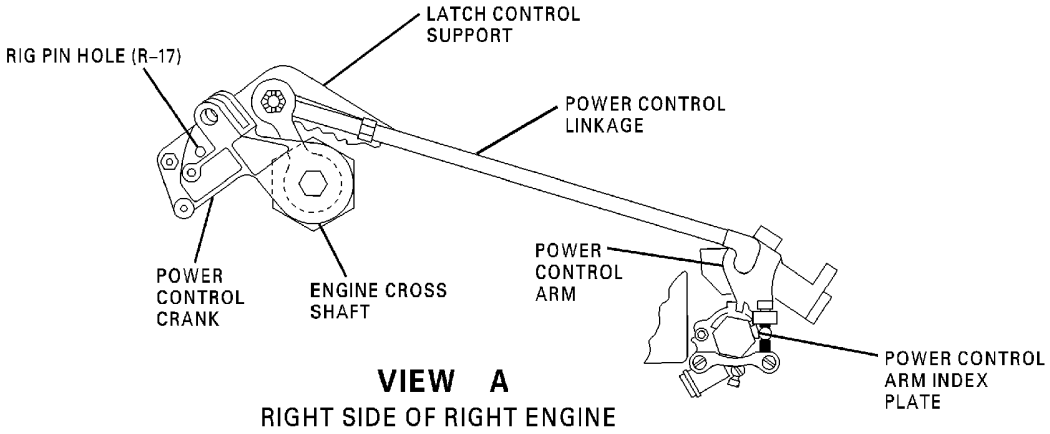
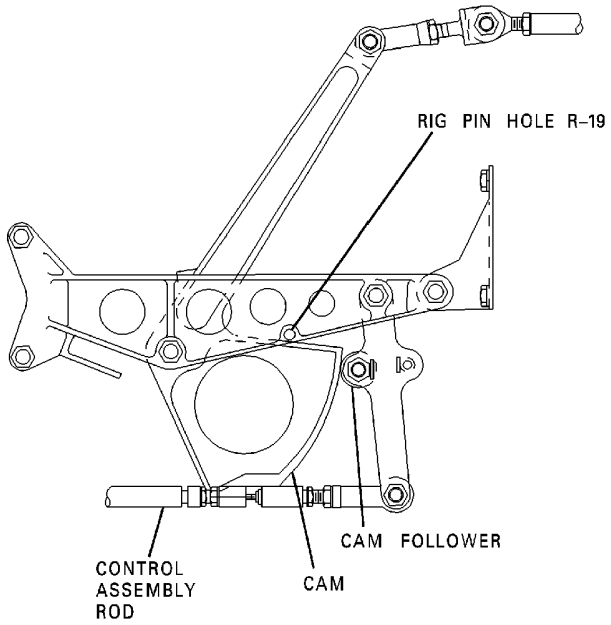
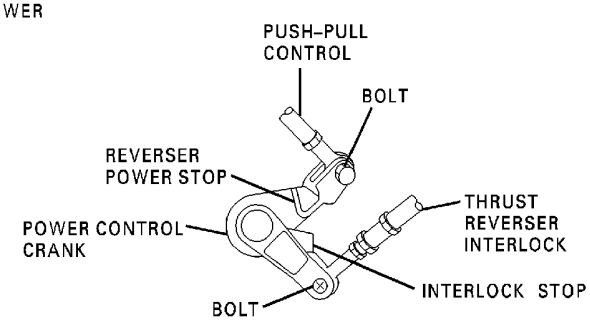
Test Equipment Connection Points
Figure 503/71-00-00-990-856



VIEW A
RIGHT SIDE OF RIGHT ENGINE



VIEW B



VIEW C

CAG(IGDS)

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Throttle System - Adjustment
Figure 504/71-00-00-990-857

9. **Engine Trimming Procedures Using Aircraft Instruments Only**

NOTE: This procedure is not approved for engine trimming during icing conditions Paragraph 10..

NOTE: This procedure allows operators to trim engines utilizing engine instruments only, but it is recommended that the engines be trimmed utilizing the calibrated trim test equipment periodically. It is also recommended that this procedure not be utilized as the standard maintenance practice unless the operator has a viable Engine Monitoring Program in place to insure constant monitoring of engine parameters.

NOTE: When trimming engines utilizing cockpit instrumentation only the engines should be trimmed to the upper limit of the EPR trim chart.

NOTE: This procedure to be used for one engine only. All instruments and the other engine must be functioning normally and a cross check with the other engine must show performance within acceptable range. Disregard steps referring to test instruments.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

(2) Check engine oil pressure as outlines in paragraph 8 of (ENGINE GENERAL, SUBJECT 72-00-00) page 501.

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C. .

(3) Approach Idle Check as outlined in Paragraph 8.D..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

(6) Engine acceleration check as outlined in Paragraph 17..

Table 523 Takeoff Power Assurance check -- JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE						
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW
-50 (-58.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-49 (-56.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-48 (-54.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-47 (-52.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-46 (-50.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-45 (-49.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-44 (-47.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-43 (-45.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-42 (-43.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08

Table 523 Takeoff Power Assurance check -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE						
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW
-41 (-41.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-40 (-40.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-39 (-38.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-38 (-36.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-37 (-34.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-36 (-32.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-35 (-31.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-34 (-29.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-33 (-27.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-32 (-25.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-31 (-23.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-30 (-22.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-29 (-20.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-28 (-18.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-27 (-16.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-26 (-14.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-25 (-13.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-24 (-11.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-23 (- 9.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-22 (- 7.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-21 (- 5.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-20 (- 4.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-19 (- 2.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-18 (- 0.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-17 (1.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-16 (3.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-15 (5.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-14 (6.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-13 (8.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-12 (10.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-11 (12.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
-10 (14.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 9 (15.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08

Table 523 Takeoff Power Assurance check -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE						
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW
- 8 (17.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 7 (19.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 6 (21.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 5 (23.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 4 (24.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 3 (26.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 2 (28.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
- 1 (30.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
0 (32.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
1 (33.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
2 (35.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
3 (37.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
4 (39.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
5 (41.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
6 (42.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
7 (44.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
8 (46.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
9 (48.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
10 (50.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
11 (51.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
12 (53.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
13 (55.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
14 (57.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
15 (59.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08
16 (60.8)	1.90	1.95	2.01	2.03	2.05	2.07	2.07
17 (62.6)	1.90	1.95	2.01	2.03	2.05	2.07	2.07
18 (64.4)	1.90	1.95	2.01	2.03	2.05	2.07	2.07
19 (66.2)	1.90	1.95	2.01	2.03	2.05	2.07	2.07
20 (68.0)	1.90	1.95	2.01	2.03	2.05	2.06	2.06
21 (69.8)	1.90	1.95	2.01	2.03	2.05	2.06	2.06
22 (71.6)	1.90	1.95	2.01	2.03	2.05	2.06	2.06
23 (73.4)	1.90	1.95	2.01	2.03	2.05	2.05	2.05
24 (75.2)	1.90	1.95	2.01	2.03	2.05	2.05	2.05

Table 523 Takeoff Power Assurance check -- JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE						
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW
25 (77.0)	1.90	1.95	2.01	2.03	2.04	2.04	2.04
26 (78.8)	1.90	1.95	2.01	2.03	2.04	2.04	2.04
27 (80.6)	1.90	1.95	2.01	2.03	2.03	2.03	2.03
28 (82.4)	1.90	1.95	2.01	2.02	2.02	2.02	2.02
29 (84.2)	1.90	1.95	2.01	2.01	2.01	2.01	2.01
30 (86.0)	1.90	1.95	2.00	2.00	2.00	2.00	2.00
31 (87.8)	1.90	1.95	1.99	1.99	1.99	1.99	1.99
32 (89.6)	1.90	1.95	1.98	1.98	1.98	1.98	1.98
33 (91.4)	1.90	1.95	1.97	1.97	1.97	1.97	1.97
34 (93.2)	1.90	1.95	1.96	1.96	1.96	1.96	1.96
35 (95.0)	1.90	1.95	1.95	1.95	1.95	1.95	1.95
36 (96.8)	1.90	1.94	1.94	1.94	1.94	1.94	1.94
37 (98.6)	1.90	1.93	1.93	1.93	1.93	1.93	1.93
38 (100.4)	1.90	1.92	1.92	1.92	1.92	1.92	1.92
39 (102.2)	1.90	1.91	1.91	1.91	1.91	1.91	1.91
40 (104.0)	1.90	1.90	1.90	1.90	1.90	1.90	1.90
41 (105.8)	1.89	1.89	1.89	1.89	1.89	1.89	1.89
42 (107.6)	1.88	1.88	1.88	1.88	1.88	1.88	1.88
43 (109.4)	1.87	1.87	1.87	1.87	1.87	1.87	1.87
44 (111.2)	1.86	1.86	1.86	1.86	1.86	1.86	1.86
45 (113.0)	1.85	1.85	1.85	1.85	1.85	1.85	1.85
46 (114.8)	1.84	1.84	1.84	1.84	1.84	1.84	1.84
47 (116.6)	1.84	1.84	1.84	1.84	1.84	1.84	1.84
48 (118.4)	1.82	1.82	1.82	1.82	1.82	1.82	1.82
49 (120.2)	1.82	1.82	1.82	1.82	1.82	1.82	1.82
50 (122.0)	1.81	1.81	1.81	1.81	1.81	1.81	1.81

10. Engine Trimming Procedure During Icing Conditions

NOTE: When circumstances require engine trimming during icing conditions, the following procedure may be used.

NOTE: This procedure to be used for one engine only.

CAUTION: A COMPLETE TRIM RUN WITHOUT THE USE OF ENGINE ANTI-ICE MUST BE PERFORMED AS SOON AS AIRCRAFT REACHES A BASE WHERE THIS IS POSSIBLE.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Install Test Equipment:

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb).

(a) Using ambient temperature and Table 513Table 514, place part power trim stop in the "C" (Cold Day Trim) position.

NOTE: The part power trim stop is marked with letter "S" (Standard Day Trim) on one side and letter "C" (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

NOTE: Fuel control part power trim stops are interchangeable with -217A, -217C, and -219 fuel controls.

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

(4) Place engine anti-ice switch in ON position.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

(5) Check engine oil pressure Paragraph 3..

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

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

(6) ART system check may be performed per Paragraph 13..

WJE 401-404, 412, 414, 886, 887

ART system check may be performed Paragraph 14..

WJE 401-412, 414, 880, 881, 883, 884, 886, 887

(7) Open and tag following circuit breaker:

Open and tag following circuit breakers

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(8) Place following switches in indicated positions.

Table 524

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	ON
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(9) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 10.A.(9) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Place engine anti-ice switch in ON position, operate engine with throttle in the idle position for 5 minutes.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(2) Record ambient temperature (Tamb) and pressure (Pamb).

(3) Determine minimum-bleed low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511Table 512.

(4) After N_2 has stabilized for 5 minutes, record N_2 percent.

(5) Place engine anti-ice switch in OFF position.

(6) With engine anti-ice OFF, allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Calculate the N_2 target adjustment as the difference between the N_2 value from Paragraph 10.B.(6) and the N_2 value from Paragraph 10.B.(4), not to exceed 2 percent.

(9) Reduce the minimum-bleed N_2 determined in Paragraph 10.B.(3) by the adjustment determined in Paragraph 10.B.(8).

CAUTION: PERIODIC ENGINE RUN-UP (WITH ENGINE ANTI-ICING SYSTEM ON), TO AS HIGH A THRUST SETTING AS PRACTICAL (70 PERCENT N_1 FOR A MINIMUM OF 15 SECONDS IS DESIRED) SHOULD BE PERFORMED TO MINIMIZE POSSIBILITY OF ICE BUILD-UP DURING EXTENDED GROUND IDLE OPERATION IN SEVERE ICING CONDITIONS. IT IS SUGGESTED THAT SUCH RUN-UPS NEED NOT BE MADE MORE FREQUENTLY THAN AT TEN MINUTE INTERVALS.

(10) After N_2 has stabilized for 5 minutes with engine anti-ice ON, adjust fuel control idle trim adjustment until idle N_2 is within idle N_2 determined in Paragraph 10.B.(9).

NOTE: Always make final adjustment in the increase direction (counterclockwise).

(11) Record actual N_2 percent set.

C. Part Power Trim

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(1) Record ambient temperature (Tamb) and Pressure (Pamb).

(2) Make certain part power trim stop is in position as outlined in Paragraph 11..

(3) Using values obtained in Paragraph 10.C.(1) determine value of minimum-bleed part power engine pressure ratio (EPR) from Table 513Table 514.

(4) Place engine anti-ice switch in ON position.

(5) With engine anti-ice ON, advance throttle until power lever contacts part power stop.

CAUTION: DO NOT EXCEED JT8D-219 ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

(6) Operate engine at part power position for 5 minutes to allow EPR to stabilize. Observe test instrument and record stabilized EPR.

(7) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds and record EPR value.

(8) Immediately place engine anti-ice switch in ON position.

(9) Calculate the EPR target adjustment as the difference between the EPR value in Paragraph 10.C.(7) and the EPR value in Paragraph 10.C.(6).

(10) Reduce the minimum-bleed EPR value determined in Paragraph 10.C.(3) by the adjustment determined in Paragraph 10.C.(9), not to exceed 0.12.

(11) With engine anti-ice ON, operate engine at part power position for 5 minutes to stabilize.

(12) Observe EPR indicator and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 10.C.(10).

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(13) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits established in Paragraph 10.C.(10).

(14) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds, and record EPR value.

(15) Immediately place engine anti-ice switch in ON position.

(16) Compare minimum-bleed EPR from Paragraph 10.C.(14) with EPR from Paragraph 10.C.(3) and determine trim error, if any.

(17) Adjust engine anti-ice ON EPR value in Paragraph 10.C.(10) by trim error.

(18) Adjust fuel control max trimmer screw, repeating above steps as necessary until minimum-bleed EPR is within limits.

(19) With power lever against part power stop and engine anti-ice ON, observe test and engine gages and record following:

Table 525

Test Instruments	Aircraft Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperature (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(20) Move throttle lever to idle position.

(21) EPR readings obtained from test instrument and aircraft instruments Paragraph 10.C.(10) must not differ by more than ±.01.

(22) Test instrument readings obtained from Paragraph 10.C.(19) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(23) Compare test and aircraft readings obtained from Paragraph 10.C.(19) for EGT; readings must not differ by more than ±5°C.

(24) Since idle and maximum speed trimmers affect each other, repeat Paragraph 10.B. and Paragraph 10.C.. until desired settings are obtained without intermediate adjustment.

CAUTION: IF TRIM PROCEDURE WAS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(25) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire (Figure 503).

D. Approach Idle Check

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be turned OFF for short periods of time.

(1) Place engine anti-ice switch in ON position and throttle in idle position, and

open the following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for 5 minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using value obtained in Paragraph 10.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 517Table 518Table 519Table 520Table 521. Interpolate between chart values, if necessary.

(6) Place engine anti-ice switch in OFF position. Allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(9) With throttle in idle position close following circuit breaker:

Close this circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(10) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay)

E. Takeoff Power Assurance Check

(1) This check is to be made as outlined in Paragraph 8.E. except with engine anti-ice on.

F. Reverse Thrust EPR Check

(1) This check is to be made as outlined in Paragraph 8.F. except with engine anti-ice on.

11. Optional Anti-Surge Bleed Valve Operational Check

A. Check Anti-Surge Bleed Valves As Outlined In Chapter (GENERAL, SUBJECT 71-00-00), PAGE 501.

12. Engine Deterioration Check

When desired, an engine deterioration check can be performed as outlined in Chapter (GENERAL, SUBJECT 71-00-00), PAGE 501.

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

13. Optional Automatic Reserve Thrust (ART) System Check (For Aircraft With Analog Engine Instrument)

NOTE: If aircraft has met Paragraph 13.A.(1) thru Paragraph 13.A.(12) and passes ARTS self-test, green ART READY light on center main instrument panel comes on. If ART fails, amber ART INOP light on overhead annunciator panel comes on. If aircraft is on the ground and only one engine is running, ARTS INOP light also comes on.

NOTE: The NO MODE light on the TRI is only active during the ARTS test on aircraft equipped with Digital Flight Guidance Computer (DFGC), Honeywell P/N 4034241-970 and subsequent computers.

A. Perform ART System Check

(1) Start both engines as outlined in Paragraph 4..

WARNING: BEFORE MOVING FLAP/SLAT HANDLE, MAKE CERTAIN THAT AREAS AROUND FLAPS AND SLATS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(2) With both engines running at idle place flap/slat handle in full up position.

(3) Place AP DFGC selector in 1 position.

(4) Place ART switch in AUTO position. Check that ART, ART READY and ART INOP lights go off.

WJE 405-411, 880, 881, 883, 884 (Continued)

(5) Momentarily press T.O. FLX button on thrust rating indicator (TRI), T.O. FLX button and NO MODE lights will come on.

(6) Set ASSUMED TEMP selector to 50°C and record EPR LIM value displayed on TRI.

NOTE: EPR LIM bugs on EPR indicators will agree with TRI.

(7) Place ART switch in off position and check that:

(a) ART and ART READY Lights remain off.

(b) ART INOP light remains off.

(c) EPR LIM on TRI increased above value recorded in Paragraph 13.A.(6).

(d) EPR LIM bugs on EPR indicators agree with EPR limit on TRI.

(e) NO MODE light on the TRI will go off.

(8) Place flap/slat handle at 11 degrees and check that:

(a) ART INOP light comes on.

(b) Master caution light comes on.

(9) Place AIR COND SHUTOFF switch in override (OVRD) position.

(10) Place ART switch in AUTO position and momentarily press master caution light. Check that:

(a) ART INOP goes off.

(b) EPR LIM on TRI and EPR indicators equals EPR LIM recorded in Paragraph 13.A.(6).

(c) ART READY light comes on.

(d) Master caution light goes off.

(11) Advance both throttles to above 64.0 percent N_1 and allow engines to stabilize at this setting.

NOTE: The ART ready light will blink one time after both throttles are advanced to 64% N_1 with the ART system in auto.

NOTE: ART will actuate when it detects N_1 difference of 30.2 percent between engines. However, both engines N_1 must be over 64.0 percent for ARTS to become armed for actuation.

(12) Record right engine EPR value.

(13) Slowly retard left throttle until ART READY light goes off. Check that:

(a) ART light comes on.

(b) Right engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(14) Place AP DFGC selector in 2 position.

(15) Place ART switch off for approximately 3 seconds, then place ART switch back to AUTO position. Check that:

(a) ART light goes off.

(b) EPR LIM on TRI decreased.

(c) EPR LIM bug on right EPR indicator decreased.

(d) ART READY light comes on.

NOTE: Ready light confirms operation of followup switch in engine fuel control during arts auto self test.

WJE 405-411, 880, 881, 883, 884 (Continued)

(16) Slowly advance left throttle to above 64.0 percent N_1 (same N_1 as right engine).

(17) Slowly retard right throttle until READY light goes off and check that:

(a) ART light comes on.

(b) Left engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(18) Place AP DFGC selector switch to 1 position.

(19) Place throttles in idle position.

(20) Place flap/slat handle in full up position.

(21) Momentarily place ART switch off and then back to AUTO. Check that:

(a) ART light goes off.

(b) ART READY light is off.

(22) Shut down engines as outlined in Paragraph 7..

WJE 401-412, 414, 880, 881, 883, 884, 886, 887

14. Optional Automatic Reserve Thrust (ART) System Check (For Aircraft with Electronic Engine Display Panel Installed)

NOTE: If aircraft has met Paragraph 14.A.(1) thru Paragraph 14.A.(12) and passes ARTS self-test, green ART READY light on center main instrument panel comes on. If ART fails, amber ART INOP light on overhead annunciator panel comes on. If aircraft is on the ground and only one engine is running, ARTS INOP light also comes on.

NOTE: The NO MODE light on the TRP is only active during the ARTS test on aircraft equipped with Digital Flight Guidance Computer (DFGC), Honeywell P/N 4034241-970 and subsequent computers.

A. Perform ART System Check

(1) Start both engines as outlined in Paragraph 4..

WARNING: BEFORE MOVING FLAP/SLAT HANDLE, MAKE CERTAIN THAT AREAS AROUND FLAPS AND SLATS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(2) With both engines running at idle place flap/slat handle in full up position.

(3) Place AP DFGC selector in 1 position.

(4) Place ART switch in AUTO position. Check that ART and ART READY lights go off.

(5) Momentarily press T.O. FLX button on thrust rating panel (TRP), T.O. FLX button and NO MODE lights will come on.

(6) Rotate ASSUMED TEMP knob on TRP to obtain 50°C on throttle FMA and record EPR LIM value displayed on EEDP.

NOTE: Dashes appear in EPR limit display.

(7) Place ART switch in off position and check that:

(a) ART, ART INOP and ART READY lights remain off.

(b) EPR LIM increased above value recorded in Paragraph 14.A.(6).

(c) EPR LIM bugs on EPR indicators agree with EPR limit on EEDP.

(d) NO MODE light on the TRP will go off.

(8) Place flap/slat handle at 11 degrees and check that:

(a) ART INOP is displayed on EDAP.

(b) Master caution light comes on.

(9) Place AIR COND SHUTOFF switch in override (OVRD) position.

(10) Place ART switch in AUTO position and momentarily press master caution light. Check that:

(a) ART INOP goes off.

(b) EPR LIM on EEDP equals EPR LIM recorded in Paragraph 14.A.(6).

(c) ART READY light comes on.

(d) Master caution light goes off.

(11) Advance both throttles to above 64.0 percent N_1 and allow engines to stabilize at this setting.

NOTE: The ART ready light will blink one time after both throttles are advanced to 64% N_1 with the ART system in auto.

NOTE: ART will actuate when it detects N_1 difference of 30.2 percent between engines. However, both engines N_1 must be over 64.0 percent for ARTS to become armed for actuation.

(12) Record right engine EPR value.

(13) Slowly retard left throttle until ART READY light goes off. Check that:

(a) ART light comes on.

(b) Right engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(14) Place AP DFGC selector in 2 position.

(15) Place ART switch off for approximately 3 seconds, then place ART switch back to AUTO position. Check that:

(a) ART light goes off.

(b) EPR LIM on EEDP decreased.

(c) EPR LIM bug on right EPR indicator decreased.

(d) ART READY light comes on.

(16) Slowly advance left throttle to above 64.0 percent N_1 (same N_1 as right engine).

(17) Slowly retard right throttle until READY light goes off. Check that:

(a) ART light comes on.

(b) Left engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(18) Place AP DFGC selector switch to 1 position.

(19) Place throttles in idle position.

(20) Place flat/slat handle in full up position.

(21) Momentarily place ART switch off and then back to AUTO. Check that:

(a) ART light goes off.

(b) ART READY light is off.

(22) Shut down engines as outlined in Paragraph 7..

15. Engine Trimming Procedures After Engine Change

WJE 401-404, 412, 414, 886, 887

NOTE: If an engine trim test set is not available, refer to Paragraph 14., Engine Trimming Procedures Using Aircraft Instruments Only.

NOTE: Only one engine can be changed at a time.

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

NOTE: Engine trim test set is not required if the following conditions exist. If the following conditions cannot be met and engine trim test set is not available, refer to Paragraph 9..

- Engine instruments; N1, N2, EPR have not been changed since last engine trim.
- No more than 50 engine hours have been accumulated since last engine trim.
- Only one engine can be changed at a time.

NOTE: This procedure to be used for one engine only. All instruments and the other engine must be functioning normally a cross check with the other engine must show performance within acceptable range. Disregard steps referring to test instruments.

WJE 401-412, 414, 880, 881, 883, 884, 886, 887

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

(2) Check engine oil pressure as outlined in paragraph 8 of (ENGINE GENERAL, SUBJECT 72-00-00) , page 501.

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 8.D..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Engine acceleration check as outlined in Paragraph 17..

(6) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

16. Engine Trimming Procedures After Fuel Control Change

NOTE: If an engine trim test set is not available, refer to Paragraph 9., Engine Trimming Procedures Using Aircraft Instruments Only.

NOTE: Only one fuel control can be changed at a time.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

B. Perform Following Trim Tests:

(1) Part Power Trim as outlined in Paragraph 8.C..

(2) Engine acceleration check as outlined in Paragraph 17..

17. Engine Acceleration Check

A. Check Engine Acceleration:

(1) Start engine as outlined in Paragraph 4..

(2) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 526

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF
NOTE: During accel check procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When checking the right engine, the left air-conditioning pack should be turned on. When checking the left engine, the right air-conditioning pack should be turned on.	

(3) Operate engine with throttle in idle position until all engine parameters stabilize.

(4) With the throttle in idle position, open following circuit breaker:

Open the following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(5) Engine N2 RPM should increase to approach idle.

(6) Operate engine at approach idle for 5 minutes to allow N2 to stabilize. After 5 minutes, observe minimum oil temperature requirement of 38°C before proceeding.

(7) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(8) Using values from Paragraph 17.A.(7) and Table 523, determine engine pressure ratio (EPR) for takeoff thrust setting.

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS.

(9) Advance throttle until takeoff thrust setting determined in Paragraph 17.A.(8) is obtained and maintain for exactly 60 seconds.

(10) While maintaining takeoff setting mark forward edge position of throttle lever on pedestal and record takeoff EPR, N_1, EGT and N_2.

(11) Using N_2 value obtained in Paragraph 17.A.(10) calculate and record 95% of takeoff N_2.

(12) Place throttle in idle position and operate engine at approach idle for 20-25 seconds.

(13) Advance throttle in less than one second to takeoff EPR mark on pedestal.

(14) Measure (with a stop watch) and record time from start of throttle advance to 95% of takeoff N_2 as determined in Paragraph 17.A.(11)

(15) Place throttle in idle position and operate engine at approach idle for 5 minutes.

(16) Repeat Paragraph 17.A.(7) through Paragraph 17.A.(12) twice more.

(17) Calculate average of all three acceleration times and compare average acceleration time to limits of (Figure 505).

(18) If acceleration time is unacceptable, Paragraph 17.B..

B. Potential Acceleration Time Problem Sources

(1) If engine does not meet limits in (Figure 505), following potential problem sources should be investigated.

(a) Internal structural damage

(b) Bleed load

(c) Idle Trim

(d) Part Power Trim

(e) First NGV match

(f) First Nozzle Guide Vane (NGV) match

(g) Fuel Control Unit Schedule

(h) P&D Valve Setting

(i) PRBC Schedule

(j) Fuel pumps and/or filters

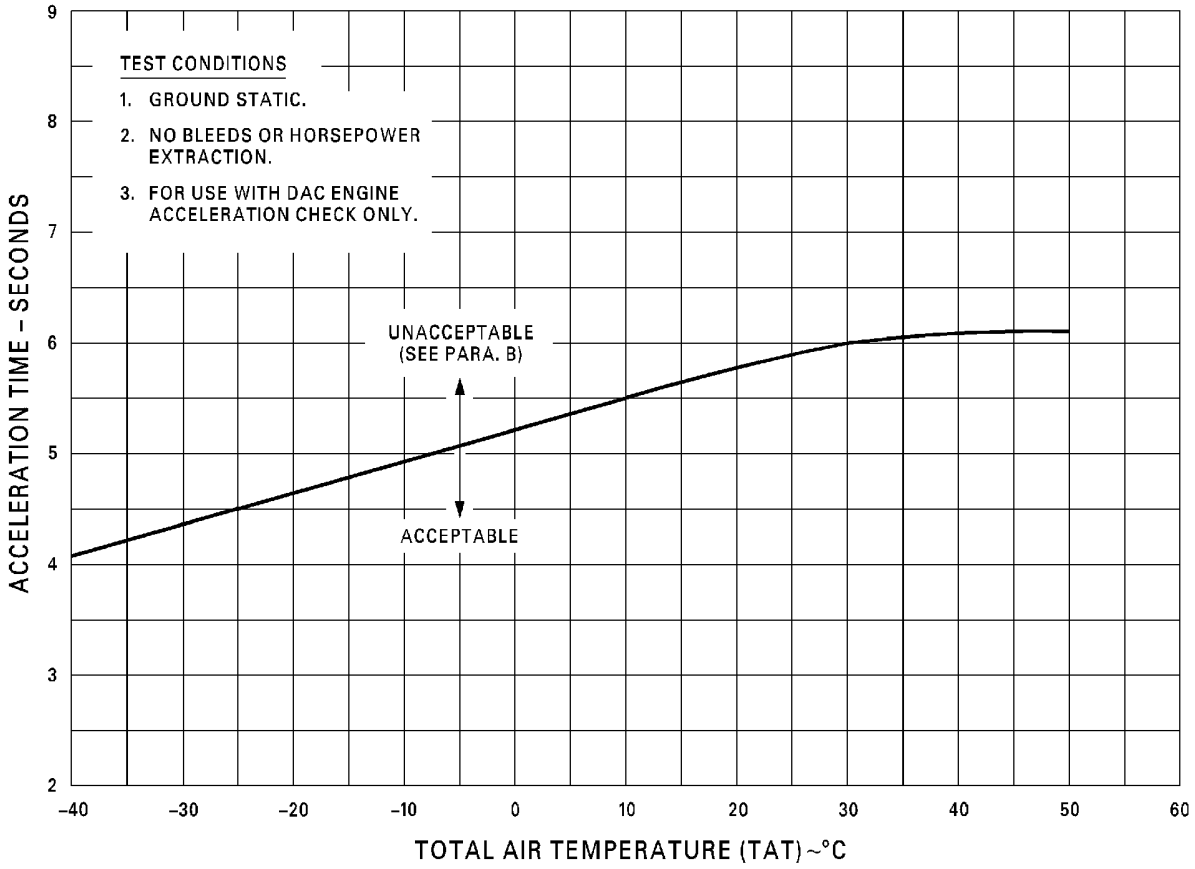
(k) PS_3 Filter

(l) P_b moisture trap

(m) Combustion chamber positioning pins/combustion chamber misalignment, cracks and burnthrough

(n) Pneumatic leaks

ENGINE ACCELERATION CHECK
LIMIT FOR IN–SERVICE ENGINES
FROM APPROACH (HIGH) IDLE



CAG(IGDS)

BBB2–71–43A

Engine Acceleration Check Time Limits
Figure 505/71-00-00-990-858

18. Part Power Trim Procedures During Extreme Cold Conditions

A. General

(1) Part Power EPR increases as ambient temperature decreases. The purpose of the Cold Part Power trim stop is to make trim operations possible at lower temperatures.

(2) There can be conditions in which the ambient temperature is so low that it is not possible to get a Part Power EPR which is lower than Takeoff EPR.

(3) The procedure given below is permitted on an engine only as a temporary solution and is not an alternate trim procedure. If trim is necessary on both engines, this procedure is not permitted. If engine trim is adjusted with this procedure, it will be necessary to trim the engine again in 25 hours or less with the aircraft manufacturer's trim tables. If maintenance operations on one engine made this temporary trim necessary, but the other engine was adjusted to align the throttles, it will be necessary to trim both the engines using the aircraft manufacturer's trim tables in 25 hours or less.

(4) The Part Power trim stop does not need to be moved into the trim position when using this procedure. The throttle will not be advanced far enough to contact the trim stop when the ambient temperature is cold enough to require use of this procedure.

NOTE: FOR JT8D-217C ENGINES ONLY:

Below a given ambient temperature, there is no EPR recorded in the aircraft manufacturer's trim tables. For operators with an engine fleet consisting of both JT8D-217C and JT8D-219 engine models there is a common level trim table available from the aircraft manufacturer which allows trim of the JT8D-219 model down to a lower ambient temperature than that which is allowed for the JT8D-217C model (this is because the Maximum Takeoff EPR of the JT8D-219 model is higher than the Maximum Takeoff EPR of the JT8D-217C model). If you use the common JT8D-217C/-219 trim levels and this occurs with a JT8D-217C model it is permitted to use the JT8D-219 portion of the table which extends to a lower ambient temperature. This can make JT8D-217C trim possible without the Extreme Cold Part Power Trim Procedure.

B. Procedure

(1) Run Engine No. 1 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(2) Run Engine No. 2 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(3) Adjust the Part Power trim of the engine which had the throttle in the more forward position to increase the fuel flow. This will let that engine get to the Power Assurance EPR with the throttle at a lower position.

NOTE: It is permitted to adjust the trim of only one engine with this procedure. After the selection of one engine for adjustment, Part Power Trim adjustment on the other engine is not permitted.

(4) Run the engine for which Part Power was adjusted back to the Power Assurance EPR and let the engine become stable for one minute minimum. Make Part Power trim adjustments to the engine that was adjusted as necessary until the throttles are aligned with the position mark for the other throttle. Throttle "stagger" (throttles not aligned) of up to 1/2 throttle knob is permitted. Pull back the throttle to Idle.

(5) Let the engine become stable at Idle for three minutes minimum and record N2 and ambient temperature. Make sure that engine Idle trim is in limits at the coldest value on the applicable trim table. If the engine is not in limits, adjust the Idle trim as necessary.

(6) Advance the power lever for one engine to the Power Assurance level and let that engine become stable for one minute minimum. Record the position of the throttle for that engine. Use the same procedure to record the throttle position of the other engine. The throttle stagger limit is 1/2 knob. If further adjustment is necessary, return to Paragraph 18.B.(4) above.

19. Engine Dry or Wet Motor Operation

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

A. Engine Dry Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight compartment, set the applicable engine controls and switches as follow:

(a) Left and right throttle lever to Idle position.

(b) Left and right FUEL levers in OFF position.

(c) ICE PROTECT panel AIR FOIL L SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP to ON.

1) The FUEL INLET PRESS LOW light is off.

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

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

(3) Pressurize aircraft pneumatic system with APU or external air. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 49-00-00/001 Config 1)(GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 36-00-00/001)

(4) Do the engine Dry Motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(d) Hold the START switch in ON for approximately 20 seconds or for the maximum starter operational limit, then release the START switch to OFF.

NOTE: For dry motoring, the starter duty cycle is 90 seconds on 15 minutes off.

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

B. Engine Wet Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight comparment, set these engine controls and switches as follow:

(a) Left and right throttle lever in Idle position.

(b) Left and right FUEL levers in OFF.

(c) ICE PROTECT panel AIR FOIL SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP switch to ON.

1) Make sure that there is enough fuel in the fuel system for this procedure. (FUEL SYSTEMS GENERAL, SUBJECT 12-11-04)

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(3) Do the engine wet motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

(d) Hold the START switch in ON for not more than 20 seconds to get 15-20 percent N2 speed, then put the FUEL lever to ON for not more than 20 seconds.

1) Make certain that there is fuel flow shown on the FUEL FLOW indication, then move the FUEL lever to OFF.

NOTE: Large quantities of fuel can collect in the engine if the fuel switch stays ON for more than 20 seconds.

2) Continue to hold the START switch in ON to clear the engine of fuel and fuel vapors for not more than 60 seconds.

(e) If necessary, cool down the starter per the Normal Start Cycle Limits. (PNEUMATIC STARTER, SUBJECT 80-10-01)

(f) Upon release of the START switch , make certain that the applicable L or R START VALVE OPEN light goes out and the N2 rotation speed comes to a stop.

GENERAL - ADJUSTMENT/TEST

1. General

A. Adjustment of the power plant is required to assure optimum operation and to prolong the life of the engine. The following procedures outline the recommended methods for engine starting and trimming.

NOTE: Power lever misalignment will require a trim check of both engines to determine which power lever is misaligned.

B. Engine trimming requires the use of a calibrated trim test set, refer to (Paragraph 8.). Engine trimming using the aircraft instruments in lieu of a calibrated trim test set is an acceptable option, refer to (Paragraph 9.). A calibrated trim test set is required to include the following conditions:

(1) If two engines are installed and trimmed at the same time.

(2) If two fuel controls are installed and trimmed at the same time.

C. Before starting an engine, a check should be made to ensure all systems associated with engine operation have been serviced, and that no maintenance is being performed on any system which may be affected.

D. Restricted areas, shown in Figure 501, must be clear of personnel and foreign objects.

E. The main landing gear wheels must be chocked.

F. Engine inlet and exhaust duct covers must be removed.

G. The airplane should be headed into the wind during engine trimming (Figure 502).

H. Engine starting can be accomplished by utilizing a low-pressure pneumatic ground source, an operating engine, or the auxiliary power unit. If an engine start is to be performed using the auxiliary power unit, additional operating precautions must be observed. Refer to CHAPTER 49 for auxiliary power unit starting procedures.

I. Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (5°F) of each other. Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for a minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

J. Static engine operation at thrust settings above idle should be limited as much as possible.

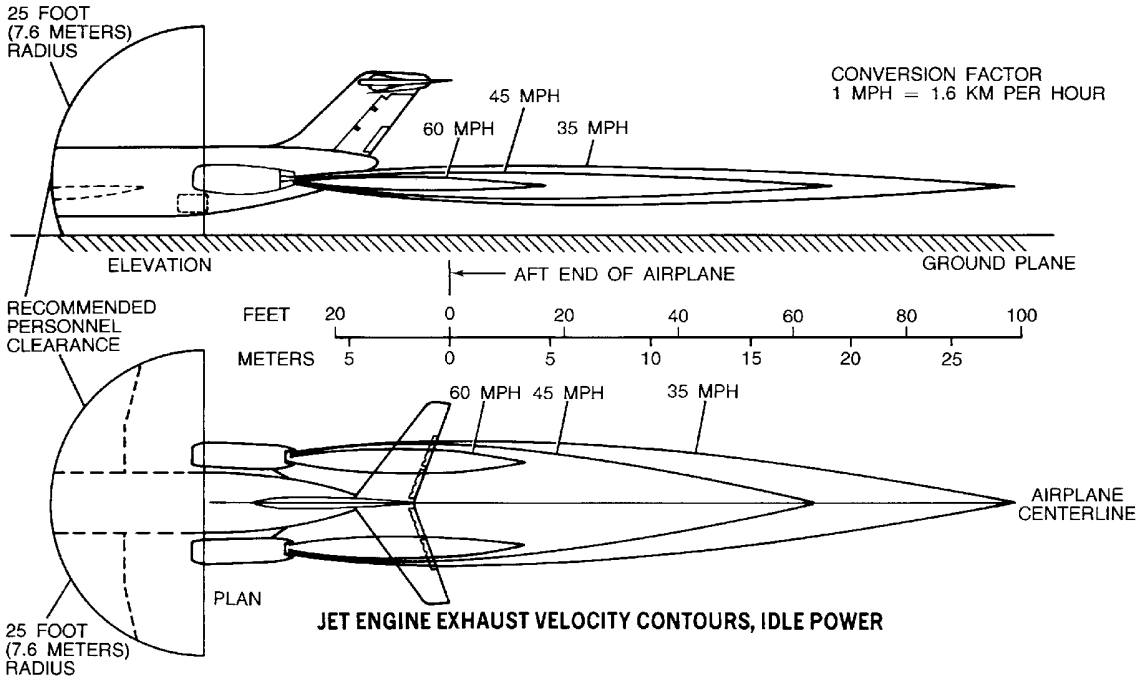
K. Symbols utilized in this section are defined as follows:

Table 501

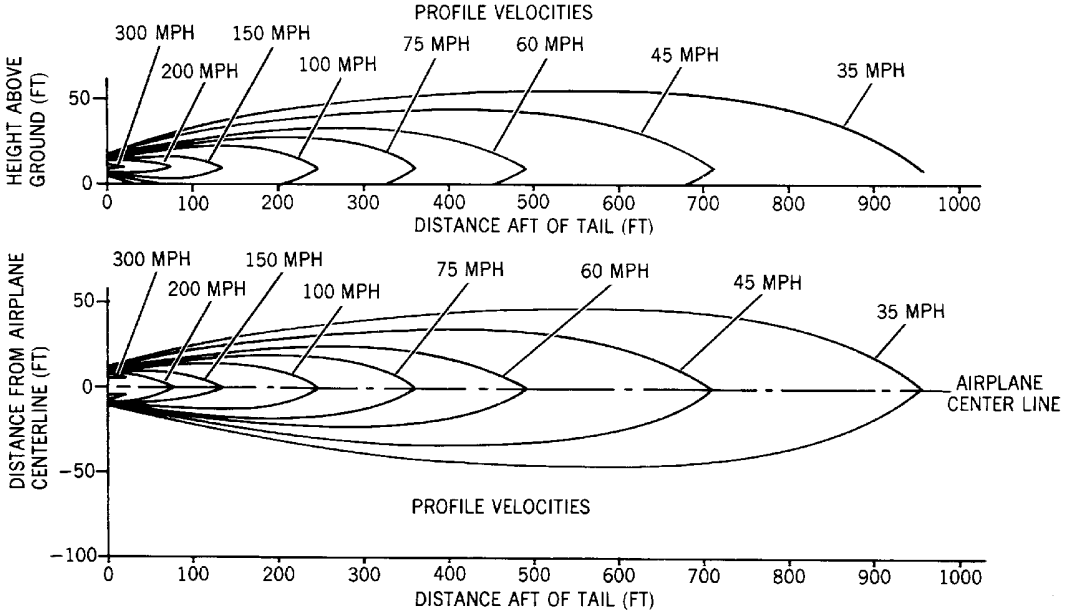
(1)	EGT	- Exhaust Gas Temperature
(2)	EPR	- Engine Pressure Ratio (EPR = Pt_7/Pt_2)
(3)	N_1 rpm	- Low-pressure Compressor Rotor Speed
(4)	N_2 rpm	- High Pressure Compressor Rotor Speed
(5)	Pamb	- Barometric Pressure
(6)	PP EPR	- Part Power Engine Pressure Ratio
(7)	Pt_2	- Compressor Inlet Total Pressure
(8)	Pt_7	- Turbine Discharge Total Pressure
(9)	PP Pt_7	- Part Power Turbine Discharge Pressure

Table 501 (Continued)

(10)	Tamb	- Ambient Temperature
(11)	TO EPR	- Takeoff Engine Pressure Ratio



JET ENGINE EXHAUST VELOCITY CONTOURS, IDLE POWER

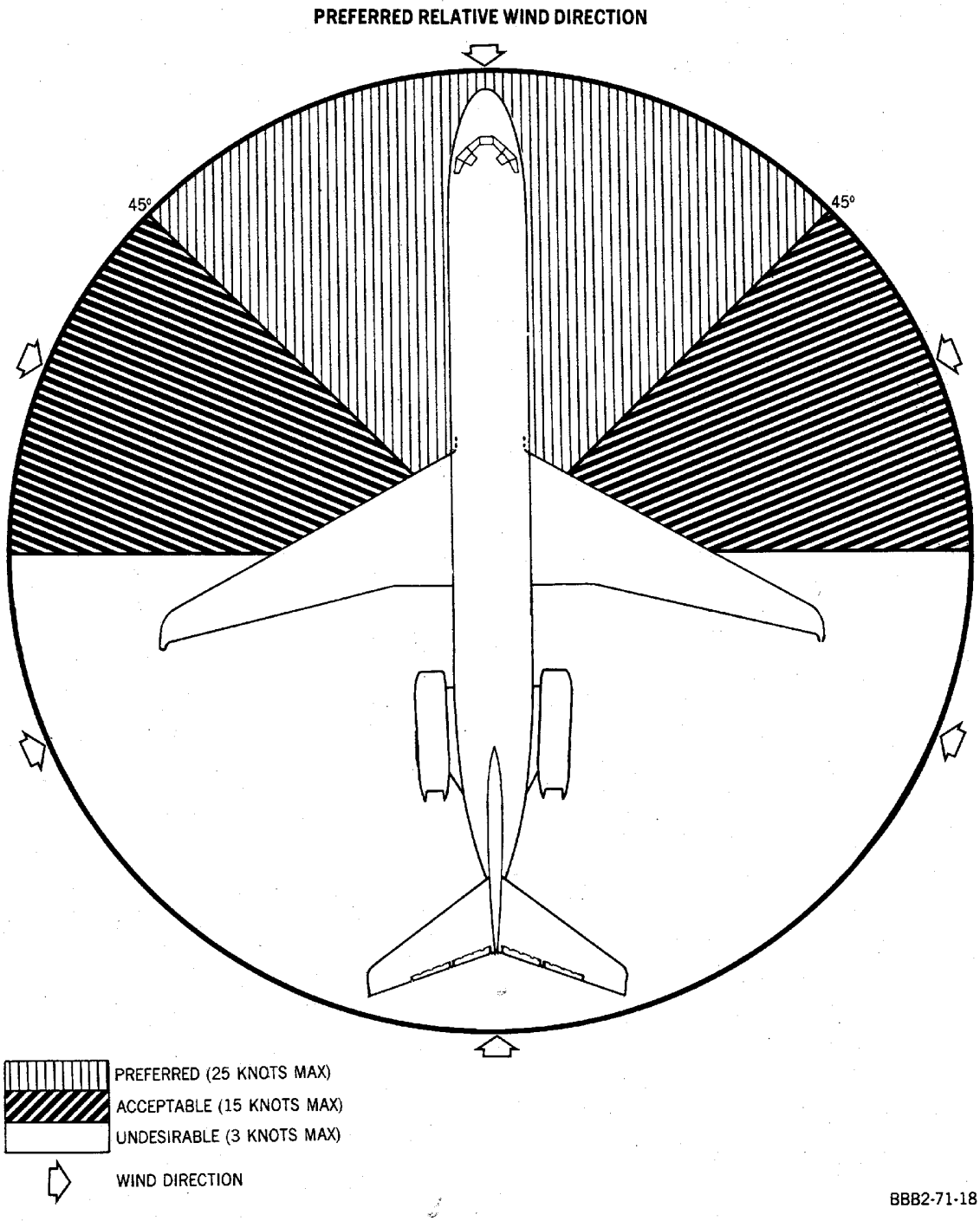


JET ENGINE EXHAUST VELOCITY CONTOURS, TAKEOFF POWER

NOTES:
1. THESE CONTOURS ARE TO BE USED AS GUIDELINES ONLY SINCE OPERATIONAL ENVIRONMENT VARIES GREATLY – OPERATIONAL SAFETY ASPECTS ARE THE RESPONSIBILITY OF THE USER/PLANNER.
2. ALL VELOCITY VALUES ARE STATUTE MILES/HOUR
3. CROSSWINDS WILL HAVE CONSIDERABLE EFFECT ON CONTOURS
4. SEA LEVEL STATIC – STANDARD DAY

BBB2-71-35B

Engine Restricted Areas - JT8D-217/-217A Engine
Figure 501/71-00-00-990-864



Engine Trim Wind Heading
Figure 502/71-00-00-990-865

2. Equipment and Materials

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

Table 502

Name and Number	Manufacturer
Remote engine trimmer D231	PEGASUS Comp Air Inc. 422 Trimber Ridge Road, Middletown CT. 06457-7540 Phone: 860 632-0345 FAX: 860 633-4973 Email: www.pegasusmfg.com
Engine trim test set, multi-engine with two trim heads, checks N1, N2, EPR, PT7, PT2, EGT, OAT	
Remote engine trimmer TEE 46-4/TE8D-06	Regelungs Messtechnik Schmidt, KG 2057 Reinbek-Hamburg Gutenberg Strasse 27, Germany Phone: 011-49-40-727 6030 Fax: 011-49-40-727 3066 Cincinnati office Phone: 513-237-4385 Fax: 513-469-0605

3. Engine Operating Limits JT8D-217/-217A

Table 503

Thrust Setting	Time Limit (Minutes)	Max. EGT (Degrees C) JT8D-217/-217A	Min. Oil Press. (PSI)	Max. Oil Temp. (Degrees C)
Takeoff (Normal)	5 2	590 595	*[1]40 (276 kPa)	135
Takeoff (Maximum)	5 2	625 630	*[1]40 (276 kPa)	135
Max Continuous	Continuous	580	*[1]40 (276 kPa)	135
WJE 875-879				
Starting	Momentary	*[2]500	*[1]40 (276 kPa)	135
WJE 401-404, 412, 414				
Starting	Momentary	*[2]500	*[1]40 (276 kPa)	135
WJE 401-404, 412, 414, 875-879				

*[1] CAUTION: NORMAL OIL PRESSURE IS 40 TO 55 PSI (276 TO 380 KPA). OIL PRESSURE BETWEEN 35 AND 40 PSI (242-276 KPA) IS PERMISSIBLE FOR SUSTAINED OPERATIONS (TO COMPLETE FLIGHT), PREFERABLY AT REDUCED THROTTLE SETTING. OIL PRESSURE BELOW 35 PSI (242 KPA) IS UNSAFE.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

*[2] NOTE: Temperature is time limited to momentary. If the maximum EGT temperature is exceeded, the engine should be shut down and inspected in accordance with the instructions contained in CHAPTER 72 of the Maintenance Manual.

A. With the exception of idle, thrust settings are obtained by positioning the throttles to obtain the required engine pressure ratio for existing inlet air temperature.

B. A maximum oil temperature of 165°C is allowable for a time period not to exceed 15 minutes.

C. Normal Takeoff Limits:

(1) For JT8D-217 engine aircraft at normal takeoff the N_2 high-pressure compressor rotor speed should not exceed 100.3 percent (12,285 rpm), and the N_1 low-pressure compressor rotor speed should not exceed 94.5 percent (7,770 rpm).

(2) For JT8D-217A engine aircraft at normal takeoff the N_2 high-pressure compressor rotor speed should not exceed 100.9 percent (12,350 rpm), and the N_1 low-pressure compressor rotor speed should not exceed 98.3 percent (8,080 rpm).

D. Starter duty cycle:

(1) Three successive 30 seconds start attempts i.e.; 90 seconds on 5 minutes off.

(2) Subsequent start attempts 30 seconds on, 5 minutes off or 60 seconds on, 10 minutes off.

(3) Dry motoring 90 seconds on 15 minutes off.

NOTE: Starter duty cycle limits do not supersede ignition system duty cycle limits.

E. Thrust reverser ground maintenance operation precautions:

(1) Do not operate engine above idle thrust when thrust reverser is deployed.

(2) Ensure aircraft is secured to prevent it from rolling backwards.

NOTE: Use of brakes when aircraft is rolling backwards may cause aircraft to tip back.

(3) Observe all normal precautions related to engine ground operations.

F. Operation in icing conditions:

(1) Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (5°F) of each other.

(2) Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for a minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

4. Engine Starting

WARNING: MAKE CERTAIN THAT ENGINE INLET AND EXHAUST AREAS ARE CLEAR OF FOREIGN OBJECTS AND PERSONNEL.

A. Before starting engine, check following switch and lever positions:

Table 504

(1)	Check that all engine related circuit breakers are closed.	
(2)	If using external electrical power:	
(a)	External power available light	On

Table 504 (Continued)

(b)	Voltage/frequency	Checked
(c)	External power bus switches	On
(d)	Ground service panel external power bus	Off
(e)	Ground service panel APU power bus switch	Off
(3)	Galley power	Off
(4)	CSD disconnect	Normal
(5)	Generators	Reset & On
(6)	AC crosstie	Auto
(7)	DC crosstie	Open
(8)	Emergency electrical power	Checked
(9)	Auxiliary power unit panel	
(a)	Fire control	Normal
(b)	Bleed air	Off
(c)	Master	Off
(d)	Doors	Automatic
(10)	Air-conditioning supply switch	Off
(11)	Start pump	Off
(12)	Ignition selector switch	Off
(13)	Fuel tank pump switches	Off
(14)	Airfoil anti-icing	Off
(15)	Engine anti-icing	Off
(16)	Annunciator panel	Tested
(17)	All warning lights	Tested
(18)	Fire detection and extinguishing systems	Checked & Tested
(19)	Engine hydraulic pump	High
(20)	Auxiliary hydraulic pump	On
(21)	Hydraulic pressure and quantity	Checked
(22)	Engine instruments	Checked & Set
(23)	Fuel flow counters	Reset
(24)	Fuel quantity	Checked & Tested
(25)	Throttles	Idle
(26)	Autothrottle	Disengaged
(27)	Engine synchronize switch	Off
(28)	Thrust reverser lever	Forward thrust
(29)	Fuel shutoff lever	Off

Table 504 (Continued)

(30)	Fire control handle	Normal
(31)	Fuel crossfeed	Off
(32)	Pneumatic crossfeed	Closed
(33)	If using auxiliary power unit for start:	
(a)	Battery switch	On
(b)	APU door control switch	Auto
(c)	Fire control switch	Normal
(d)	APU left and right bus switch	On
(e)	APU bleed air switch	Off
(f)	Start pump or fuel tank boost pump	On
(g)	APU master switch	Start/Run
(h)	Voltage/frequency	Checked
(34)	Parking brakes	Set
(35)	Antiskid	Off

CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS AFTER FUEL CONTROL LEVER IS PLACED TO FUEL ON, DISCONTINUE ENGINE START. DO NOT ATTEMPT SECOND START UNTIL ENGINE CLEARING PROCEDURES ARE COMPLIED WITH, OTHERWISE HOT OR BOOMING START MAY RESULT.

CAUTION: INSUFFICIENT AIR PRESSURE TO PNEUMATIC STARTER OR TO COMBUSTION STARTER THAT IS BEING USED AS PNEUMATIC STARTER MAY NOT SUPPLY ENOUGH STARTER TORQUE TO START AN ENGINE PROPERLY, RESULTING IN HOT, HUNG OR "TORCHING" STARTS. WHEN AIRBLEED FROM ANOTHER ENGINE IS USED TO OPERATE STARTER, CAUTION IS NECESSARY TO ENSURE THAT OPERATING ENGINE IS TURNING OVER FAST ENOUGH TO PROVIDE AN ADEQUATE SUPPLY OF PRESSURIZED AIR TO ENGINE BEING STARTED. AN ENGINE SHOULD NEVER BE PERMITTED TO TAKE LONGER THAN 2 MINUTES TO ACCELERATE TO IDLE RPM. IN EVENT OF TORCHING, HIGHER THAN USUAL EXHAUST GAS STARTING TEMPERATURE, TOO LONG AN ACCELERATION TIME OR OTHER ABNORMALITIES, DISCONTINUE STARTING ATTEMPT AND INVESTIGATE.

B. Start engine by placing switches and levers in indicated position.

Table 505

(1)	Obtain clearance to start engine	Received
(2)	Pneumatic pressure	Checked (*36 psi minimum) (248 kPa)
NOTE: *Can be 1 psi (7 kPa) less per 1000 feet (305M) in pressure altitude above sea level.		
(3)	Air-conditioning supply switch	Off
(4)	Pneumatic crossfeed	
(a)	If making crossfeed start	Both open
(b)	If using APU or ground pneumatic source	Left or right open as applicable

Table 505 (Continued)

(5)	Anti-collision light (if required)	On
(6)	Fuel boost or start pump	On
(7)	Inlet fuel pressure low light	Off
CAUTION: IF FUEL IS SHUT OFF INADVERTENTLY, DO NOT CONTINUE START CYCLE. WHENEVER ENGINE FAILS TO START, SHUT OFF FUEL AND IGNITION AND CONTINUE TURNING COMPRESSOR OVER WITH STARTER FOR 10 TO 15 SECONDS TO CLEAR OUT TRAPPED FUEL OR VAPOR. BEFORE ATTEMPTING ANOTHER START, ALLOW EITHER 30-SECOND DRAINING PERIOD OR PRESCRIBED STARTER COOLING PERIOD, WHICHEVER IS LONGER. STARTER SHOULD NOT BE REENGAGED UNTIL ENGINE HAS COME TO COMPLETE STOP.		
(8)	Ignition selector switch	Position for normal ground start
NOTE: Ground personnel should check for N_1 and N_2 rotor rotation as the tachometer indicator (N_1) will not indicate very low windmilling speeds.		
CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL N_1 AND N_2 ROTORS HAVE STOPPED ROTATING.		
(9)	Start switch	Position for normal ground start
(10)	Start valve open light	On
(11)	Oil pressure	Rising
CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N_1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION ALONG WITH A MINIMUM INDICATED N_2 OF 20% BEFORE RAISING FUEL SHUTOFF LEVER.		
(12)	N_1 rotor	Positive rotation indicated
(13)	N_2 rotor	Rotation
CAUTION: IF N_2 DOES NOT INDICATE A MINIMUM OF 20% DO NOT RAISE FUEL SHUTOFF LEVER. TERMINATE START UNTIL CAUSE OF MALFUNCTION CAN BE DETERMINED AND CORRECTIVE ACTION TAKEN.		
(14)	Fuel shutoff lever	Fuel on at maximum motoring (20 percent N_2 rpm percent minimum)
NOTE: Moving the FUEL lever to ON (i.e., pressurizing the engine) when the N_2 tachometer indicates maximum motoring RPM (maximum motoring is defined as no N_2 RPM change for 5 seconds) and N_1 RPM indicates positive rotation, will improve probability of a good start. Minimum N_2 RPM for moving FUEL lever to ON is 20% RPM.		
(15)	Initial fuel flow	Approximately 800 lb/hr (362.9KG/HR)
NOTE: At initial engine start, the fuel flow indicator may fluctuate slightly due to air in the system. However, the indicator will function properly and the system will be clear of air after approximately 3 minutes of operation. Throttle action may be required as an aid in clearing the system of air.		

Table 505 (Continued)

WJE 401-404, 412, 414		
CAUTION: WHEN EGT AND/OR FUEL FLOW DISPLAY FLASHES, A HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		
WJE 875-879		
CAUTION: WHEN STARTING EGT REACHES WITHIN 50°C (425°C) OF STARTING TEMPERATURE LIMIT (500°C) AND CONTINUES TO CLIMB DURING GROUND STARTING CYCLE, HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		
WJE 401-404, 412, 414, 875-879		
CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS, DISCONTINUE START AND PROCEED WITH UNSATISFACTORY START AND/OR ENGINE CLEARING PROCEDURES.		
(16)	Exhaust gas temperature	Rising
(17)	Start switch	Release/off (between 35 and 40 percent N_2 rpm)
CAUTION: IF START VALVE LIGHT FAILS TO GO OUT, AND THERE IS NO INDICATION OF DUCT PRESSURE RISE BY TIME ENGINE ACCELERATES TO 40% N_2, PNEUMATIC CROSSFEED VALVE MUST BE CLOSED IMMEDIATELY AND START TERMINATED UNTIL CAUSE OF MALFUNCTION CAN BE DETER MINED AND CORRECTIVE ACTION TAKEN.		
(18)	Start valve open light	Off
(19)	Oil pressure low light	Off
(20)	CSD oil pressure low light	Off
(21)	After idle has stabilized, check following:	
(a)	N_2 rotor rpm	50 to 61 percent
(b)	N_1 rotor rpm	22 to 30 percent
(c)	Exhaust gas temperature	300 to 480°C
(d)	Fuel flow	600 to 1100 pounds per hour (270 to 500 KG/HR)
(e)	Oil pressure	40 to 55 psi (276 to 380 kPa)
(f)	Hydraulic pressure low light	Off
(g)	Generator	115(±3) volts 400(±4) Hz
(h)	Ignition selector switch	Off

Table 505 (Continued)

	WJE 401-404, 412, 414		
	(i)	Fuel boost or start pump	Off
WJE	**WJE 875-879**		
WJE	(i)	Fuel boost pump(s)	On
WJE	(j)	DC start pump (if used)	Off
WJE	**WJE 401-404, 412, 414, 875-879**		

5. Unsatisfactory Start

NOTE: Unsatisfactory start procedures should be followed if any of the following conditions occur.

- Hot Start -- EGT exceeds starting limit. A hot start may be anticipated by greater than normal fuel flow for a given field elevation.
- No Start -- Engine does not light off as evidenced by no rise in exhaust gas temperature.
- False Start -- Engine lights off but rpm does not accelerate to idle. EGT may or may not reach the maximum.

A. Place following levers and switches in indicated positions.

Table 506

(1)	Throttle	Idle
(2)	Fuel shutoff	Off
NOTE: If no start is obtained, continue to motor engine for 20 seconds to clear engine of fuel and vapors.		
(3)	Starter control switch	Release/off
NOTE: In the event of engine fire, starter can be reengaged when N_2 RPM decreases to 20%.		
(4)	Ignition selector switch	Off
(5)	Fuel boost or start pump	Off

CAUTION: STARTER DUTY CYCLE MUST BE FOLLOWED; REFER TO CHAPTER 80. ENGINE MUST BE CLEARED OF FUEL AND TRAPPED VAPORS BEFORE ATTEMPTING ANOTHER START.

B. Check that no fire hazard exists and determine cause of unsatisfactory start before attempting another start.

6. Engine Clearing Procedures

WJE 401-404, 412, 414

CAUTION: MAKE CERTAIN N_2 TACHOMETER INDICATOR DOES NOT INDICATE ANY COMPRESSOR ROTATION.

WJE 401-404, 412, 414, 875-879

A. Clear Engine

(1) To clear engine of fuel and vapors place the following levers and switches in indicated positions.

Table 507

	WJE 401-404, 412, 414		
	(a)	Throttle	Idle
WJE	**WJE 875-879**		
WJE	(a)	Fuel shutoff	Off
	WJE 401-404, 412, 414		
	(b)	Fuel shutoff	Off
WJE	**WJE 875-879**		
WJE	(b)	Throttle	Idle
	(c)	Ignition selector switch	Off
WJE	(d)	Fuel boost or start pump	Off
WJE WJE	**CAUTION:** MAKE CERTAIN N_2 TACHOMETER INDICATOR DOES NOT INDICATE ANY COMPRESSOR ROTATION.		
	(e)	Start switch	Start (for approximately 20 seconds)'
WJE	NOTE: After engine has been cleared, another start attempt may be made.		
WJE	**WJE 401-404, 412, 414, 875-879**		

(2) Place following switches in indicated positions to keep accessory load and bleed air at minimum during operational check.

WJE 401-404, 412, 414

Table 508

(a)	Airfoil and engine anti-ice	Off
(b)	Air-conditioning supply	Off
CAUTION: DO NOT SELECT OVERRIDE. SELECTION OF OVERRIDE POSITION WILL GIVE CONTINUOUS IGNITION AND CAUSE FUEL SHUTOFF SWITCH TO BE BYPASSED.		
(c)	N_2 Tachometer	Indicates rotation has ceased
(d)	Ignition selector switch	SYS A, SYS B, or BOTH
(e)	Fuel boost or start pump	On
(f)	Start switch	Start (for approximately 20 seconds)

(3) Attempt another start. Paragraph 4.

WJE 401-404, 412, 414, 875-879

7. Engine Shutdown Procedures

CAUTION: IF ENGINE HAS BEEN OPERATED AT OR ABOVE 85 PERCENT N_2 FOR MORE THAN 1 MINUTE DURING 5 MINUTES BEFORE SHUTDOWN, ENGINE MUST BE OPERATED AT IDLE RPM FOR 5 MINUTES TO REDUCE POSSIBILITY OF A ROTOR SEIZURE.

A. Shutdown Engine

(1) Place the following levers and switches in indicated positions.

Table 509

(a)	Throttle	Idle
(b)	Fuel shutoff	Off
(c)	Ignition selector	Off
(d)	Fuel boost or start pump	Off

(2) Observe that compressor rotors decelerate freely.

(3) Remove ground pneumatic source from airplane or shut down auxiliary power unit (SECTION 49-00) as applicable.

(4) Remove electrical power source from airplane.

(5) Install inlet and exhaust duct covers as soon as engine has cooled sufficiently.

8. Engine Trimming Procedures

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

CAUTION: IF OUTSIDE AIR TEMPERATURE IS LESS THAN 6°C (42°F) AND VISIBLE MOISTURE IS PRESENT OR DEWPOINT AND OUTSIDE AIR TEMPERATURE (RAT OR SAT) ARE WITHIN 3°C (5°F) OF EACH OTHER, ENGINE TRIMMING SHOULD BE AVOIDED.

A. Install Test Equipment

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb) and determine trim stop position:

(a) Using ambient temperature and Table 513 or Table 514 or Table 515 or Table 516, determine part power trim stop position to be used. When temperature is in area where either Standard Day or Cold Day stop can be used, use of Cold Day stop results in trim operation at lower engine thrust levels but increases the possibility of throttle stagger. As a general rule, use of Standard Day stop at temperatures above 30°C (86°F) is recommended, unless noise or other local restriction requires operation at lower thrust levels. If ambient temperature is below minimum value given in Standard Day Trim chart, Cold Day Trim chart must be used.

NOTE: The part power trim stop is marked with letter S (Standard Day Trim) on one side and letter C (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

NOTE: Fuel control part power trim stops are interchangeable with -217A, -217C and -219 fuel controls.

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

(4) ART system check may be performed per Paragraph 13..

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(6) To assure proper trimming, maintain no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 510

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

NOTE: During engine trim procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When trimming the right engine, the left air-conditioning pack should be turned on. When trimming the left engine, the right air-conditioning pack should be turned on.

(7) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 8.A.(7) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Operate engine with throttle in idle position for 5 minutes.

(2) Record N_2, ambient temperature (Tamb), and pressure (Pamb).

(3) Determine low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511 Table 512.

(4) After N_2 has stabilized for 5 minutes, adjust fuel control idle trim adjustment until idle N_2 RPM percent is within idle N_2 determined in Paragraph 8.B.(3).

(5) Record actual N_2 percent set.

NOTE: The Idle trim screw is identified by the letters "IDLE" on the fuel control adjacent to the screw. The Part Power screw is identified by the letters "MIL" adjacent to the screw. (Part Power is sometimes called Military or Maximum trim.) Both screws are also identified adjacent to the screws with the letters "INC" with an arrow indicating the direction to turn the screws for increased trim levels.

Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

Table 511 Low Idle Trim - JT8D-217/-217A Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	51.2-52.0	51.6-52.4	52.2-53.0	52.9-53.7
-49 (-56.2)	51.1-51.9	51.5-52.3	52.1-52.9	52.8-53.6
-48 (-54.4)	51.0-51.8	51.5-52.3	52.1-53.0	52.8-53.6
-47 (-52.6)	51.0-51.8	51.4-52.2	52.0-52.8	52.7-53.5
-46 (-50.8)	50.9-51.7	51.4-52.1	52.0-52.8	52.7-53.5
-45 (-49.0)	50.9-51.7	51.9-52.1	51.9-52.7	52.7-53.5
-44 (-47.2)	50.8-51.6	51.2-52.0	51.9-52.7	52.6-53.4
-43 (-45.4)	50.8-51.6	51.2-52.0	51.8-52.6	52.6-53.4
-42 (-43.6)	50.8-51.6	51.1-51.9	51.8-52.6	52.6-53.4
-41 (-41.8)	50.7-51.7	51.1-51.9	51.8-52.6	52.5-53.3
-40 (-40.0)	50.7-51.5	51.1-51.9	51.7-52.5	52.5-53.3
-39 (-38.2)	50.7-51.5	51.0-51.8	51.7-52.5	52.5-53.3
-38 (-36.4)	50.6-51.4	51.0-51.8	51.7-52.5	52.5-53.3
-37 (-34.6)	50.6-51.4	50.9-51.7	51.7-52.5	52.5-53.3
-36 (-32.8)	50.6-51.4	50.9-51.7	51.6-52.4	52.4-53.2
-35 (-31.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-34 (-29.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-33 (-27.4)	50.5-51.3	50.8-51.6	51.6-52.4	52.4-53.2
-32 (-25.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-31 (-23.8)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-30 (-22.0)	50.4-51.2	50.8-51.6	51.6-52.4	52.3-53.1
-29 (-20.2)	50.4-51.2	50.7-51.5	51.6-52.4	52.3-53.1
-28 (-18.4)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1

Table 511 Low Idle Trim - JT8D-217/-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-27 (-16.6)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-26 (-14.8)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-25 (-13.0)	50.3-51.1	50.8-51.6	51.6-52.4	52.3-53.1
-24 (-11.2)	50.3-51.1	50.8-51.6	51.6-52.4	52.4-53.2
-23 (-9.4)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-22 (-7.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-21 (-5.8)	50.4-51.2	50.8-51.6	51.7-52.5	52.4-53.2
-20 (-4.0)	50.4-51.2	50.9-51.7	51.7-52.5	52.5-53.3
-19 (-2.2)	50.5-51.3	50.9-51.7	51.7-52.5	52.5-53.3
-18 (-0.4)	50.5-51.3	50.9-51.7	51.8-52.6	52.6-53.4
-17 (1.4)	50.6-51.4	51.0-51.8	51.8-52.6	52.6-53.4
-16 (3.2)	50.6-51.4	51.0-51.8	51.9-52.7	52.7-53.5
-15 (5.0)	50.7-51.5	51.1-51.9	51.9-52.7	52.7-53.5
-14 (6.8)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-13 (8.6)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-12 (10.4)	50.9-51.7	51.3-52.1	52.1-52.9	52.9-53.7
-11 (12.2)	51.0-51.8	51.4-52.2	52.2-53.0	53.0-53.8
-10 (14.0)	51.1-51.9	51.4-52.2	52.2-53.0	53.1-53.9
- 9 (15.8)	51.1-51.9	51.5-52.3	52.3-53.1	53.1-53.9
- 8 (17.6)	51.2-52.0	51.6-52.4	52.4-53.2	53.2-54.0
- 7 (19.4)	51.3-52.1	51.6-52.4	52.5-53.3	53.3-54.1
- 6 (21.2)	51.4-52.2	51.7-52.5	52.6-53.4	53.4-54.2
- 5 (23.0)	51.5-52.3	51.8-52.6	52.7-53.5	53.5-54.3
- 4 (24.8)	51.5-52.3	51.9-52.7	52.8-53.6	53.6-54.4
- 3 (26.6)	51.6-52.4	52.0-52.8	52.9-53.7	53.7-54.5
- 2 (28.4)	51.7-52.5	52.1-52.9	53.0-53.8	53.8-54.6
- 1 (30.2)	51.8-52.6	52.2-53.0	53.1-53.9	53.9-54.7
0 (32.0)	51.9-52.7	52.3-53.1	53.2-54.0	54.0-54.8
1 (33.8)	52.0-52.8	52.4-53.2	53.3-54.1	54.1-54.9
2 (35.6)	52.1-52.9	52.5-53.3	53.4-54.2	54.2-55.0
3 (37.4)	52.2-53.0	52.6-53.4	53.5-54.3	54.3-55.1
4 (39.2)	52.3-53.1	52.7-53.5	53.5-54.3	54.4-55.2

Table 511 Low Idle Trim - JT8D-217/-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
5 (41.0)	52.3-53.1	52.8-53.6	53.6-54.4	54.5-55.3
6 (42.8)	52.4-53.2	52.9-53.7	53.7-54.5	54.6-55.4
7 (44.6)	52.5-53.3	53.0-53.8	53.8-54.6	54.7-55.5
8 (46.4)	52.6-53.4	53.1-53.9	53.9-54.7	54.7-55.5
9 (48.2)	52.7-53.5	53.1-53.9	54.0-54.8	54.8-55.6
10 (50.0)	52.8-53.6	53.2-54.0	54.0-54.8	54.9-55.7
11 (51.8)	52.9-53.7	53.3-54.1	54.1-54.9	55.0-55.8
12 (53.6)	52.9-53.7	53.4-54.2	54.2-55.0	55.1-55.9
13 (55.4)	53.0-53.8	53.5-54.3	54.3-55.1	55.2-56.0
14 (57.2)	53.1-53.9	53.5-54.3	54.4-55.2	55.2-56.0
15 (59.0)	53.2-54.0	53.6-54.4	54.4-55.2	55.3-56.1
16 (60.8)	53.3-54.1	53.7-54.5	54.5-55.3	55.4-56.2
17 (62.6)	53.4-54.2	53.8-54.6	54.6-55.4	55.4-56.2
18 (64.4)	53.4-54.2	53.8-54.6	54.7-55.5	55.5-56.3
19 (66.2)	53.5-54.3	53.9-54.7	54.7-55.5	55.6-56.4
20 (68.0)	53.6-54.4	54.0-54.8	54.8-55.6	55.7-56.5
21 (69.8)	53.7-54.5	54.0-54.8	54.9-55.7	55.7-56.5
22 (71.6)	53.7-54.5	54.1-54.9	55.0-55.8	55.8-56.6
23 (73.4)	53.8-54.6	54.2-55.0	55.0-55.8	55.9-56.7
24 (75.2)	53.9-54.7	54.3-55.1	55.1-55.9	56.0-56.8
25 (77.0)	54.0-54.8	54.4-55.2	55.2-56.0	56.0-56.8
26 (78.8)	54.1-54.9	54.5-55.3	55.3-56.1	56.1-56.9
27 (80.6)	54.1-54.9	54.5-55.3	55.4-56.2	56.2-57.0
28 (82.4)	54.2-55.0	54.6-55.4	55.4-56.2	56.3-57.1
29 (84.2)	54.3-55.1	54.7-55.5	55.5-56.3	56.4-57.2
30 (86.0)	54.4-55.2	54.8-55.6	55.6-56.4	56.4-57.2
31 (87.8)	54.5-55.3	54.9-55.7	55.7-56.5	56.5-57.3
32 (89.6)	54.5-55.3	54.9-55.7	55.8-56.6	56.6-57.4
33 (91.4)	54.6-55.4	55.0-55.8	55.8-56.6	56.7-57.5
34 (93.2)	54.7-55.5	55.1-55.9	55.9-56.7	56.7-57.5
35 (95.0)	54.8-55.6	55.2-56.0	56.0-56.8	56.8-57.6
36 (96.8)	54.9-55.7	55.3-56.1	56.1-56.9	56.9-57.7

Table 511 Low Idle Trim - JT8D-217/-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
37 (98.6)	54.9-55.7	55.4-56.2	56.2-57.0	57.0-57.8
38 (100.4)	55.0-55.8	55.5-56.3	56.3-57.1	57.1-57.9
39 (102.2)	55.1-55.9	55.6-56.4	56.4-57.2	57.1-57.9
40 (104.0)	55.2-56.0	55.6-56.4	56.4-57.2	57.2-58.0
41 (105.8)	55.3-56.1	57.7-56.5	56.5-57.3	57.3-58.1
42 (107.6)	55.3-56.1	55.8-56.6	56.6-57.4	57.4-58.2
43 (109.4)	55.4-56.2	55.9-56.7	56.7-57.5	57.5-58.3
44 (111.2)	55.5-56.3	56.0-56.8	56.8-57.6	57.5-58.3
45 (113.0)	55.6-56.4	56.1-56.9	56.8-57.6	57.6-58.4
46 (114.8)	55.7-56.5	56.2-57.0	56.9-57.7	57.7-58.5
47 (116.6)	55.8-56.6	56.2-57.0	57.0-57.8	57.8-58.6
48 (118.4)	55.9-56.7	56.3-57.1	57.1-57.9	57.8-58.6
49 (120.2)	55.9-56.7	56.4-57.2	57.1-57.9	57.9-58.7
50 (122.0)	56.0-56.8	56.5-57.3	57.2-58.0	58.0-58.8

Table 512 Low Idle Trim - JT8D-217/-217A Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	53.8-54.7	54.8-55.6		
-49 (-56.2)	53.7-54.5	54.7-55.5		
-48 (-54.4)	53.7-54.5	54.7-55.5		
-47 (-52.6)	53.7-54.5	54.7-55.5		
-46 (-50.8)	53.7-54.5	54.7-55.5		
-45 (-49.0)	53.6-54.4	54.6-55.4		
-44 (-47.2)	53.6-54.4	54.6-55.4		
-43 (-45.4)	53.6-54.4	54.6-55.4		
-42 (-43.6)	53.6-54.4	54.6-55.5		
-41 (-41.8)	53.5-54.3	54.6-55.4		
-40 (-40.0)	53.5-54.3	54.5-55.3		
-39 (-38.2)	53.5-54.3	54.5-55.3		
-38 (-36.4)	53.5-54.3	54.5-55.3		

Table 512 Low Idle Trim - JT8D-217/-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-37 (-34.6)	53.5-54.3	54.5-55.3		
-36 (-32.8)	53.5-54.3	54.5-55.3		
-35 (-31.0)	53.5-54.3	54.5-55.3		
-34 (-29.0)	53.4-54.2	54.5-55.3		
-33 (-27.4)	53.4-54.2	54.5-55.3		
-32 (-25.6)	53.4-54.2	54.4-55.2		
-31 (-23.8)	53.4-54.2	54.4-55.2		
-30 (-22.0)	53.4-54.2	54.4-55.2		
-29 (-20.2)	53.4-54.2	54.4-55.2		
-28 (-18.4)	53.4-54.2	54.4-55.2		
-27 (-16.6)	53.4-54.2	54.4-55.2		
-26 (-14.8)	53.4-54.2	54.4-55.2		
-25 (-13.0)	53.5-54.3	54.5-55.3		
-24 (-11.2)	53.5-54.3	54.5-55.3		
-23 (-9.4)	53.5-54.3	54.5-55.3		
-22 (-7.6)	53.5-54.3	54.6-55.4		
-21 (-5.8)	53.5-54.3	54.6-55.4		
-20 (-4.0)	53.6-54.4	54.6-55.4		
-19 (-2.2)	53.6-54.4	54.7-55.5		
-18 (-0.4)	53.7-54.5	54.7-55.5		
-17 (1.4)	53.7-54.5	54.8-55.6		
-16 (3.2)	53.8-54.6	54.8-55.6		
-15 (5.0)	53.8-54.6	54.9-55.7		
-14 (6.8)	53.9-54.7	54.9-55.7		
-13 (8.6)	53.9-54.7	55.0-55.8		
-12 (10.4)	54.0-54.8	55.1-55.9		
-11 (12.2)	54.1-54.9	55.2-56.0		
-10 (14.0)	54.2-55.0	55.2-56.0		
- 9 (15.8)	54.2-55.0	55.3-56.1		
- 8 (17.6)	54.3-55.1	55.4-56.2		
- 7 (19.4)	54.4-55.2	55.5-56.3		
- 6 (21.2)	54.5-55.3	55.6-56.4		

Table 512 Low Idle Trim - JT8D-217/-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
- 5 (23.0)	54.6-55.4	55.7-56.5		
- 4 (24.8)	54.7-55.5	55.8-56.6		
- 3 (26.6)	54.8-55.6	55.9-56.7		
- 2 (28.4)	54.9-55.7	56.0-56.8		
- 1 (30.2)	55.0-55.8	56.1-56.9		
0 (32.0)	55.1-55.9	56.2-57.0		
1 (33.8)	55.2-56.0	56.3-57.1		
2 (35.6)	55.3-56.1	56.4-57.2		
3 (37.4)	55.4-56.2	56.5-57.3		
4 (39.2)	55.5-56.3	56.6-57.4		
5 (41.0)	55.6-56.4	56.7-57.5		
6 (42.8)	55.7-56.5	56.8-57.6		
7 (44.6)	55.8-56.6	56.9-57.7		
8 (46.4)	55.9-56.7	57.0-57.8		
9 (48.2)	56.0-56.8	57.1-57.9		
10 (50.0)	56.0-56.8	57.2-58.0		
11 (51.8)	56.1-56.9	57.2-58.0		
12 (53.6)	56.2-57.0	57.3-58.1		
13 (55.4)	56.3-57.1	57.4-58.2		
14 (57.2)	56.3-57.1	57.5-58.3		
15 (59.0)	56.4-57.2	57.6-58.4		
16 (60.8)	56.5-57.3	57.6-58.4		
17 (62.6)	56.6-57.4	57.7-58.5		
18 (64.4)	56.6-57.4	57.8-58.6		
19 (66.2)	56.7-57.5	57.9-58.7		
20 (68.0)	56.7-57.5	57.9-58.7		
21 (69.8)	56.8-57.6	58.0-58.8		
22 (71.6)	56.9-57.7	58.1-58.9		
23 (73.4)	57.0-57.8	58.1-58.9		
24 (75.2)	57.0-57.8	58.2-59.0		
25 (77.0)	57.1-57.9	58.3-59.1		
26 (78.8)	57.2-58.0	58.3-59.1		

Table 512 Low Idle Trim - JT8D-217/-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
27 (80.6)	57.3-58.1	58.4-59.2		
28 (82.4)	57.3-58.1	58.5-59.3		
29 (84.2)	57.4-58.2	58.5-59.3		
30 (86.0)	57.5-58.3	58.6-59.4		
31 (87.8)	57.6-58.4	58.7-59.5		
32 (89.6)	57.7-58.5	58.7-59.5		
33 (91.4)	57.7-58.5	58.8-59.6		
34 (93.2)	57.8-58.6	58.9-59.7		
35 (95.0)	57.9-58.7	58.9-59.7		
36 (96.8)	57.9-58.7	59.0-59.8		
37 (98.6)	58.0-58.8	59.1-59.9		
38 (100.4)	58.1-58.9	59.2-60.0		
39 (102.2)	58.2-59.0	59.2-60.0		
40 (104.0)	58.2-59.0	59.3-60.1		
41 (105.8)	58.3-59.1	59.4-60.2		
42 (107.6)	58.4-59.2	59.5-60.3		
43 (109.4)	58.5-59.3	59.5-60.3		
44 (111.2)	58.5-59.3	59.6-60.4		
45 (113.0)	58.6-59.4	59.6-60.4		
46 (114.8)	58.7-59.5	59.7-60.5		
47 (116.6)	58.8-59.6	59.8-60.6		
48 (118.4)	58.8-59.6	59.8-60.6		
49 (120.2)	58.9-59.7	59.9-60.7		
50 (122.0)	59.0-59.8	60.0-60.8		

C. Part Power Trim

(1) Record ambient temperature (Tamb) and pressure (Pamb).

(a) Ambient temperature (Tamb):

1) Use a laboratory approved thermometer.

2) Alternate: Contact airport control tower.

(b) Ambient barometric pressure (Pamb):

1) Use a laboratory approved barometer.

2) Alternate: Contact airport control tower; ask for "Field Barometric Pressure", not Mean Sea Level (MSL) pressure.

3) Alternate: Set No. 1 and No. 2 cockpit altimeters to zero and read barometric scale in window. Record average of the two readings.

(2) Make certain part power trim stop is in position as outlined in Paragraph 8.A.(2).

CAUTION: WHEN YOU USE PART POWER TRIM-COLD TRIM STOP-JT8D-217A TABLES TO TRIM JT8D-217A ENGINE, THE ENGINE MUST INCORPORATE P&W SB 5618 OR 5752, OR THE PRODUCTION EQUIVALENT. COMPLIANCE WITH THIS REQUIREMENT BY 30 JULY 1990 HAS BEEN DIRECTED BY THE FAA.

(3) Using values obtained in Paragraph 8.C.(1) determine value of part power engine pressure ratio (EPR) from Table 513 or Table 514 or Table 515 or Table 516.

(4) Advance throttle until power lever contacts part power trim stop.

CAUTION: DO NOT EXCEED JT8D-217/-217A ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

(5) Operate the engine at part power position for 5 minutes to allow EPR to stabilize.

(6) Observe test instrument and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 8.C.(3).

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-217 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO -37 -34.6)				DO	NOT	TRIM		
-36 (-32.8)						2.08	2.08	2.08
-35 (-31.0)						2.07	2.07	2.07
-34 (-29.0)						2.07	2.07	2.07
-33 (-27.4)						2.06	2.06	2.06
-32 (-25.6)						2.06	2.06	2.06
-31 (-23.8)						2.05	2.05	2.05
-30 (-22.0)						2.05	2.05	2.05
-29 (-20.2)					2.04	2.04	2.04	2.04
-28 (-18.4)					2.04	2.04	2.04	2.04
-27 (-16.6)					2.03	2.03	2.03	2.03
-26 (-14.8)					2.03	2.03	2.03	2.03
-25 (-13.0)					2.02	2.02	2.02	2.02
-24 (-11.2)					2.01	2.01	2.01	2.01
-23 (-9.4)					2.01	2.01	2.01	2.01
-22 (-7.6)				2.00	2.00	2.00	2.00	2.00
-21 (-5.8)				1.99	1.99	1.99	1.99	1.99
-20 (-4.0)				1.99	1.99	1.99	1.99	1.99
-19 (- 2.2)				1.98	1.98	1.98	1.98	1.98

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-18 (- 0.4)				1.97	1.97	1.97	1.97	1.97
-17 (1.4)				1.96	1.96	1.96	1.96	1.96
-16 (3.2)			1.95	1.95	1.95	1.95	1.95	1.95
-15 (5.0)			1.95	1.95	1.95	1.95	1.95	1.95
-14 (6.8)			1.94	1.94	1.94	1.94	1.94	1.94
-13 (8.6)			1.93	1.93	1.93	1.93	1.93	1.93
-12 (10.4)			1.92	1.92	1.92	1.92	1.92	1.92
-11 (12.2)		1.91	1.91	1.91	1.91	1.91	1.91	1.91
-10 (14.0)		1.90	1.90	1.90	1.90	1.90	1.90	1.90
- 9 (15.8)		1.89	1.89	1.89	1.89	1.89	1.89	1.89
- 8 (17.6)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
- 7 (19.4)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
- 6 (21.2)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
- 5 (23.0)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
- 4 (24.8)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
- 3 (26.6)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
- 2 (28.4)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
- 1 (30.2)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
0 (32.0)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
1 (33.8)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
2 (35.6)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
3 (37.4)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
4 (39.2)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
5 (41.0)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
6 (42.8)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
7 (44.6)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
8 (46.4)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
9 (48.2)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
10 (50.0)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
11 (51.8)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
12 (53.6)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
13 (55.4)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
14 (57.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
15 (59.0)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
NOTE: Part Power EPR +0.015, -0.0								

Table 514 Part Power Trim - COLD TRIM STOP - JT8D-217A Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO -29 (-20.2)				DO	NOT	TRIM		
-28 (-18.4)								2.07
-27 (-16.4)								2.07
-26 (-14.8)								2.06
-25 (-13.0)								2.06
-24 (-11.2)							2.05	2.05
-23 (-9.4)							2.05	2.05
-22 (-7.6)							2.04	2.04
-21 (-5.8)							2.04	2.04
-20 (-4.0)						2.03	2.03	2.03
-19 (-2.2)						2.03	2.03	2.03
-18 (-0.4)					2.02	2.02	2.02	2.02
-17 (1.4)					2.02	2.02	2.02	2.02
-16 (3.2)					2.01	2.01	2.01	2.01
-15 (5.0)					2.01	2.01	2.01	2.01
-14 (6.8)				2.00	2.00	2.00	2.00	2.00
-13 (8.6)				1.99	1.99	1.99	1.99	1.99
-12 (10.4)				1.99	1.99	1.99	1.99	1.99
-11 (12.2)			1.98	1.98	1.98	1.98	1.98	1.98
-10 (14.0)			1.98	1.98	1.98	1.98	1.98	1.98
-9 (15.8)			1.97	1.97	1.97	1.97	1.97	1.97
-8 (17.6)			1.96	1.96	1.96	1.96	1.96	1.96
-7 (19.4)			1.95	1.95	1.95	1.95	1.95	1.95
-6 (21.2)		1.94	1.94	1.94	1.94	1.94	1.94	1.94
-5 (23.0)		1.92	1.92	1.92	1.92	1.92	1.92	1.92

Table 514 Part Power Trim - COLD TRIM STOP - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-4 (24.8)		1.91	1.91	1.91	1.91	1.91	1.91	1.91
-3 (26.6)		1.90	1.90	1.90	1.90	1.90	1.90	1.90
-2 (28.4)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
-1 (30.2)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
0 (32.0)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
1 (33.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
2 (35.6)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
3 (37.4)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
4 (39.2)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
5 (41.0)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6 (42.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
7 (44.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
8 (46.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
9 (48.2)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
10 (50.0)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
11 (51.8)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
12 (53.6)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
13 (55.4)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
14 (57.2)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
15 (59.0)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
16 (60.8)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
17 (62.6)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
18 (64.4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
19 (66.2)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
20 (68.0)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
21 (69.8)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
22 (71.6)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
23 (73.4)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
24 (75.2)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
25 (77.0)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
26 (78.8)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
27 (80.6)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
28 (82.4)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63

Table 514 Part Power Trim - COLD TRIM STOP - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
29 (84.2)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
30 (86.0)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
31 (87.8)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
32 (89.6)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
33 (91.4)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
34 (93.2)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
35 (95.0)	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
36 (96.8)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
37 (98.6)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
38 (100.4)	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
39 (102.2)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
40 (104.0)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
41 (105.8)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
42 (107.6)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
43 (109.4)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
44 (111.2)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
45 (113.0)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
46 (114.8)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
47 (116.6)	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
48 (118.4)	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
49 (120.2)	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
50 (122.0)	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48

NOTE: Part Power EPR +0.015, -0.0

Table 515 Part Power Trim - STANDARD TRIM STOP - JT8D-217 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
10 (50.0)			1.94	1.94	1.94	1.94	1.94	1.94
11 (51.8)			1.93	1.93	1.93	1.93	1.93	1.93
12 (53.6)			1.92	1.92	1.92	1.92	1.92	1.92
13 (55.4)		1.91	1.91	1.91	1.91	1.91	1.91	1.91
14 (57.2)		1.90	1.90	1.90	1.90	1.90	1.90	1.90

Table 515 Part Power Trim - STANDARD TRIM STOP - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
15 (59.0)		1.89	1.89	1.89	1.89	1.89	1.89	1.89
16 (60.8)		1.88	1.88	1.88	1.88	1.88	1.88	1.88
17 (62.6)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
18 (64.4)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
19 (66.2)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
20 (68.0)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
21 (69.8)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
22 (71.6)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
23 (73.4)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
24 (75.2)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
25 (77.0)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
26 (78.8)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
27 (80.6)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
28 (82.4)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
29 (84.2)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
30 (86.0)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
31 (87.8)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
32 (89.6)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
33 (91.4)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
34 (93.2)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
35 (95.0)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
36 (96.8)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
37 (98.6)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
38 (100.4)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
39 (102.2)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
40 (104.0)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
41 (105.8)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
42 (107.6)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
43 (109.4)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
44 (111.2)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
45 (113.0)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
46 (114.8)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
47 (116.6)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62

Table 515 Part Power Trim - STANDARD TRIM STOP - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
48 (118.4)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
49 (120.2)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
NOTE: Part Power EPR +0.015, -0.0								

Table 516 Part Power Trim - STANDARD TRIM STOP - JT8D-217A Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO +2 (35.6)				DO	NOT	TRIM		
3 (37.4)								2.04
4 (39.2)								2.04
5 (41.0)								2.03
6 (42.8)							2.02	2.02
7 (44.6)							2.02	2.02
8 (46.4)							2.01	2.01
9 (48.2)							2.01	2.01
10 (50.0)							2.00	2.00
11 (51.8)							2.00	2.00
12 (53.6)						1.99	1.99	1.99
13 (55.4)						1.98	1.98	1.98
14 (57.2)						1.98	1.98	1.98
15 (59.0)					1.97	1.97	1.97	1.97
16 (60.8)					1.96	1.96	1.96	1.96
17 (62.6)				1.95	1.95	1.95	1.95	1.95
18 (64.4)				1.94	1.94	1.94	1.94	1.94
19 (66.2)			1.93	1.93	1.93	1.93	1.93	1.93
20 (68.0)			1.92	1.92	1.92	1.92	1.92	1.92
21 (69.8)			1.91	1.91	1.91	1.91	1.91	1.91
22 (71.6)		1.89	1.89	1.89	1.89	1.89	1.89	1.89
23 (73.4)		1.88	1.88	1.88	1.88	1.88	1.88	1.88
24 (75.2)		1.87	1.87	1.87	1.87	1.87	1.87	1.87
25 (77.0)		1.87	1.87	1.87	1.87	1.87	1.87	1.87

Table 516 Part Power Trim - STANDARD TRIM STOP - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
26 (78.8)		1.86	1.86	1.86	1.86	1.86	1.86	1.86
27 (80.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
28 (82.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
29 (84.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
30 (86.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
31 (87.8)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
32 (89.6)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
33 (91.4)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
34 (93.2)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
35 (95.0)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
36 (96.8)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
37 (98.6)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
38 (100.4)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
39 (102.2)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
40 (104.0)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
41 (105.8)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
42 (107.6)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
43 (109.4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
44 (111.2)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
45 (113.0)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
46 (114.8)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
47 (116.6)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
48 (118.4)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
49 (120.2)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
50 (122.0)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65

NOTE: Part Power EPR +0.015, -0.0

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(7) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits.

(8) With power lever against part power stop, observe test and engine gages and record following:

Table 517

Test Instruments	Aircraft Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperature (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(9) Move throttle lever to idle position.

(10) EPR readings obtained from test instrument and airplane instruments Paragraph 8.C.(8) must not differ by more than ±.01.

(11) Test instrument readings obtained from Paragraph 8.C.(8) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(12) Compare test and aircraft readings obtained from Paragraph 8.C.(8) for exhaust gas temperature (EGT); readings must not differ by more than ±5°C.

(13) Since idle and maximum speed trimmers affect each other, repeat Paragraph 8.B. and Paragraph 8.C. until desired settings are obtained without intermediate adjustment.

NOTE: Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

NOTE: If a problem is encountered in trimming the engine where either the idle trim screw or the part power trim screw is adjusted and the engine does not respond, re-center the fuel control adjustment screws. (Paragraph 8.C.(14))

NOTE: Air trapped in the fuel system, after an engine or JFC change, can also cause no response to adjustments of the trim screws. This can be eliminated by bleeding fuel system.

(14) Fuel control trim screw re-centering procedure.

(a) It can be necessary to set Idle and Part Power trim screws to new positions and start trim procedure again. It is possible that one of these causes will make this necessary:

1) No engine N2 response to either trim screw movement (with apparently no problem with fuel control).

2) Malfunction of trim equipment (this can put trim screw at one of stop positions).

3) Trim position unknown (which makes it necessary for operator to start procedure again).

(b) For information only, trim screw turns have these approximate results in full range from stop to stop:

1) 22 full turns (typical)

2) 36 clicks per turn

3) 792 clicks total range (typical)

4) One full turn of Part Power trim screw changes N2 approximately 225 rpm and 0.1 EPR. 4 clicks equals approximately 0.01 EPR. Counter Clockwise is increasing EPR.

5) One full turn of Idle trim screw changes N2 approximately 155 rpm.

NOTE: Part Power trim screw has effect on both Part Power and Idle trim. Idle screw has very small or no effect on Part Power trim.

(c) Procedure:

1) If re-centering is needed during an engine run, do shutdown procedure.

2) Turn Idle and Part Power trim screws in counterclockwise direction down to bottom.

3) Turn Idle and Part Power screws lightly in clockwise direction ten (10) full turns (this will get the screws to center of trim range and make it possible to start trim procedure again).

NOTE: Run engine at part power at least two minutes prior to attempting to adjust idle trim.

(15) Repeat Paragraph 8.B. and Paragraph 8.C. until desired settings are obtained.

(16) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire (Figure 503).

D. Approach Idle Check

(1) With throttle in idle position open following circuit breaker.

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for five minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using values obtained in Paragraph 8.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 518 or Table 519 or Table 520 or Table 521 or Table 522 or Table 523 or Table 524 or Table 525 or Table 526 or Table 527 or Table 528 or Table 529 or Table 530. Interpolate between chart values, if necessary

(6) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(7) With throttle in idle position close following circuit breaker.

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(8) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay).

Table 518 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 1)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	56.7-60.3	58.3-61.9	60.1-63.5	62.0-65.4
-49 (-56.2)	56.7-60.3	58.2-61.9	60.1-63.5	62.0-65.4
-48 (-54.4)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.4
-47 (-52.6)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.5
-46 (-50.8)	56.6-60.2	58.1-61.9	60.1-63.6	62.0-65.5
-45 (-49.0)	56.5-60.2	58.1-61.8	60.0-63.6	62.0-65.5
-44 (-47.2)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.5
-43 (-45.4)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-42 (-43.6)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-41 (-41.8)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-40 (-40.0)	56.4-60.1	58.0-61.9	60.0-63.6	62.0-65.7
-39 (-38.2)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.7
-38 (-36.4)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-37 (-34.6)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-36 (-32.8)	56.4-60.2	58.0-61.9	60.0-63.7	62.1-65.8
-35 (-31.0)	56.4-60.2	58.0-61.9	60.1-63.8	62.1-65.9
-34 (-29.0)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-65.9
-33 (-27.4)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-66.0

Table 519 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 2)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-50 (-58.0)	64.0-67.6	65.9-69.6	68.0-71.8	
-49 (-56.2)	64.0-67.6	66.0-69.6	68.0-71.8	
-48 (-54.4)	64.0-67.6	66.0-69.6	68.1-71.9	
-47 (-52.6)	64.0-67.7	66.0-69.7	68.1-71.9	
-46 (-50.8)	64.1-67.7	66.0-69.7	68.1-71.9	
-45 (-49.0)	64.1-67.7	66.1-69.8	68.2-72.0	
-44 (-47.2)	64.1-67.7	66.1-69.8	68.2-72.0	
-43 (-45.4)	64.1-67.8	66.1-69.8	68.3-72.0	
-42 (-43.6)	64.2-67.8	66.2-69.9	68.3-72.1	

Table 519 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 2) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-41 (-41.8)	64.2-67.8	66.2-69.9	68.3-72.1	
-40 (-40.0)	64.2-67.9	66.3-69.9	68.4-72.1	
-39 (-38.2)	64.3-67.9	66.3-70.0	68.4-72.2	
-38 (-36.4)	64.3-68.0	66.3-70.0	68.4-72.2	
-37 (-34.6)	64.3-68.0	66.4-70.0	68.5-72.2	
-36 (-32.8)	64.4-68.0	66.4-70.1	68.5-72.3	
-35 (-31.0)	64.4-68.1	66.5-70.1	68.6-72.3	
-34 (-29.0)	64.4-68.1	66.5-70.2	68.6-72.3	
-33 (-27.4)	64.5-68.2	66.5-70.2	68.7-72.4	

Table 520 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 3)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-32 (-25.6)	56.3-60.2	58.1-62.0	60.1-63.8	62.2-66.0
-31 (-23.8)	56.3-60.2	58.1-62.1	60.1-63.9	62.3-66.1
-30 (-22.0)	56.3-60.3	58.1-62.1	60.1-63.9	62.3-66.1
-29 (-20.2)	56.4-60.3	58.1-62.1	60.1-64.0	62.3-66.1
-28 (-18.4)	56.4-60.3	58.1-62.2	60.2-64.0	62.4-66.2
-27 (-16.6)	56.4-60.3	58.1-62.2	60.2-64.1	62.4-66.2
-26 (-14.8)	56.4-60.4	58.2-62.2	60.2-64.1	62.5-66.3
-25 (-13.0)	56.4-60.4	58.2-62.3	60.3-64.1	62.5-66.3
-24 (-11.2)	56.5-60.5	58.3-62.3	60.3-64.2	62.6-66.4
-23 (-9.4)	56.5-60.5	58.3-62.4	60.4-64.2	62.6-66.4
-22 (-7.6)	56.6-60.5	58.4-62.4	60.4-64.3	62.7-66.5
-21 (-5.8)	56.6-60.6	58.4-62.5	60.5-64.4	62.7-66.5
-20 (-4.0)	56.7-60.6	58.5-62.5	60.5-64.4	62.8-66.6
-19 (-2.2)	56.7-60.7	58.6-62.6	60.6-64.5	62.9-66.6
-18 (-0.4)	56.8-60.8	58.6-62.7	60.6-64.5	62.9-66.7
-17 (1.4)	56.8-60.8	58.7-62.7	60.7-64.6	63.0-66.7
-16 (3.2)	56.9-60.9	58.8-62.8	60.8-64.6	63.1-66.8
-15 (5.0)	57.0-61.0	58.9-62.8	60.9-64.7	63.1-66.9

Table 520 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 3) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-14 (6.8)	57.1-61.1	59.0-62.9	60.9-64.8	63.2-66.9

Table 521 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 4)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-32 (-25.6)	64.5-68.2	66.6-70.2	68.7-72.4	
-31 (-23.8)	64.6-68.3	66.6-70.3	68.7-72.5	
-30 (-22.0)	64.6-68.3	66.7-70.3	68.8-72.5	
-29 (-20.2)	64.7-68.3	66.7-70.4	68.8-72.5	
-28 (-18.4)	64.7-68.4	66.8-70.4	68.9-72.6	
-27 (-16.6)	64.8-68.4	66.8-70.5	68.9-72.6	
-26 (-14.8)	64.8-68.5	66.9-70.5	69.0-72.7	
-25 (-13.0)	64.9-68.5	66.9-70.5	69.0-72.7	
-24 (-11.2)	64.9-68.6	67.0-70.6	69.1-72.7	
-23 (-9.4)	65.0-68.6	67.0-70.6	69.1-72.8	
-22 (-7.6)	65.0-68.7	67.1-70.7	69.2-72.8	
-21 (-5.8)	65.1-68.7	67.2-70.7	69.2-72.9	
-20 (-4.0)	65.1-68.8	67.2-70.8	69.3-72.9	
-19 (-2.2)	65.2-68.8	67.3-70.9	69.3-72.9	
-18 (-0.4)	65.2-68.9	67.3-70.9	69.4-73.0	
-17 (1.4)	65.3-68.9	67.4-71.0	69.4-73.0	
-16 (3.2)	65.4-69.0	67.4-71.0	69.5-73.1	
-15 (5.0)	65.4-69.1	67.5-71.1	69.6-73.1	
-14 (6.8)	65.5-69.1	67.5-71.1	69.6-73.2	

Table 522 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 5)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	58.2-62.1	59.1-63.0	60.1-64.0	61.0-64.9
-12 (10.4)	58.2-62.1	59.1-63.0	60.1-64.0	61.1-64.9

Table 522 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 5) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-11 (12.2)	58.3-62.2	59.2-63.1	60.2-64.1	61.2-65.0
-10 (14.0)	58.4-62.3	59.3-63.2	60.3-64.2	61.2-65.1
- 9 (15.8)	58.5-62.3	59.4-63.2	60.4-64.2	61.3-65.1
- 8 (17.6)	58.6-62.4	59.5-63.3	60.5-64.3	61.4-65.2
- 7 (19.4)	58.7-62.5	59.6-63.4	60.6-64.4	61.5-65.3
- 6 (21.2)	58.8-62.6	59.7-63.5	60.7-64.4	61.6-65.3
- 5 (23.0)	58.8-62.6	59.7-63.5	60.7-64.5	61.6-65.4
- 4 (24.8)	58.9-62.7	59.8-63.6	60.8-64.6	61.7-65.5
- 3 (26.6)	59.0-62.8	59.9-63.7	60.9-64.6	61.8-65.5
- 2 (28.4)	59.1-62.9	60.0-63.8	61.0-64.7	61.9-65.6
- 1 (30.2)	59.2-63.0	60.1-63.9	61.0-64.8	61.9-65.7
0 (32.0)	59.3-63.0	60.2-63.9	61.1-64.9	62.0-65.8
1 (33.8)	59.4-63.1	60.2-64.0	61.2-64.9	62.1-65.8
2 (35.6)	59.5-63.2	60.3-64.1	61.3-65.0	62.2-65.9
3 (37.4)	59.6-63.3	60.4-64.2	61.3-65.1	62.2-66.0
4 (39.2)	59.6-63.3	60.5-64.2	61.4-65.1	62.3-66.0
5 (41.0)	59.7-63.4	60.5-64.3	61.5-65.2	62.4-66.1
6 (42.8)	59.8-63.5	60.6-64.4	61.5-65.2	62.4-66.1
7 (44.6)	59.9-63.5	60.7-64.4	61.6-65.3	62.5-66.2

Table 523 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 6)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	62.1-66.0	63.2-67.0	64.4-68.1	65.5-69.2
-12 (10.4)	62.2-66.0	63.3-67.0	64.5-68.2	65.6-69.3
-11 (12.2)	62.3-66.1	63.4-67.1	64.6-68.2	65.7-69.3
-10 (14.0)	62.4-66.2	63.5-67.2	64.6-68.3	65.7-69.4
- 9 (15.8)	62.4-66.2	63.5-67.2	64.7-68.3	65.8-69.4
- 8 (17.6)	62.5-66.3	63.6-67.3	64.8-68.4	65.9-69.5
- 7 (19.4)	62.6-66.3	63.7-67.3	64.8-68.4	65.9-69.5
- 6 (21.2)	62.7-66.4	63.7-67.4	64.9-68.5	66.0-69.6

Table 523 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 6) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
- 5 (23.0)	62.7-66.5	63.8-67.5	64.9-68.6	66.0-69.7
- 4 (24.8)	62.8-66.5	63.9-67.5	65.0-68.6	66.1-69.7
- 3 (26.6)	69.9-66.6	63.9-67.6	65.1-68.7	66.2-69.8
- 2 (28.4)	63.0-66.7	64.0-67.7	65.1-68.8	66.2-69.8
- 1 (30.2)	63.0-66.7	64.1-67.7	65.2-68.8	66.3-69.9
0 (32.0)	63.1-66.8	64.2-67.8	65.3-68.8	66.4-69.9
1 (33.8)	63.2-66.8	64.2-67.8	65.3-68.9	66.4-70.0
2 (35.6)	63.3-66.9	64.3-67.9	65.4-69.0	66.5-70.0
3 (37.4)	63.3-67.0	64.3-68.0	65.4-69.1	66.5-70.1
4 (39.2)	63.4-67.0	64.4-68.0	65.5-69.1	66.6-70.2
5 (41.0)	63.5-67.1	64.5-68.1	65.5-69.2	66.6-70.2
6 (42.8)	63.5-67.1	64.5-68.1	65.6-69.2	66.7-70.3
7 (44.6)	63.6-67.2	64.6-68.2	65.7-69.3	66.7-70.3

Table 524 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 7)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	66.6-70.2	67.6-71.2	68.7-72.2	69.7-73.2
-12 (10.4)	66.6-70.3	67.7-71.2	68.7-72.3	69.7-73.3
-11 (12.2)	66.7-70.3	67.7-71.3	68.8-72.3	69.8-73.3
-10 (14.0)	66.8-70.4	67.8-71.4	68.8-72.4	69.8-73.4
- 9 (15.8)	66.8-70.4	67.8-71.4	68.9-72.4	69.9-73.4
- 8 (17.6)	66.9-70.5	67.9-71.5	68.9-72.5	69.9-73.5
- 7 (19.4)	67.0-70.5	68.0-71.5	69.0-72.5	70.0-73.5
- 6 (21.2)	67.0-70.6	68.0-71.6	69.0-72.6	70.0-73.6
- 5 (23.0)	67.1-70.7	68.1-71.6	69.1-72.6	70.1-73.6
- 4 (24.8)	67.1-70.7	68.1-71.7	69.1-72.7	70.1-73.7
- 3 (26.6)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.7
- 2 (28.4)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.8
- 1 (30.2)	67.3-70.9	68.3-71.9	69.3-72.9	70.3-73.9
0 (32.0)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-73.9

Table 524 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A (Sheet 7) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
1 (33.8)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-74.0
2 (35.6)	67.5-71.0	68.5-72.0	69.5-73.0	70.5-74.0
3 (37.4)	67.5-71.1	68.5-72.1	69.5-73.1	70.5-74.0
4 (39.2)	67.6-71.2	68.6-72.1	69.6-73.1	70.6-74.1
5 (41.0)	67.6-71.2	68.6-72.2	69.6-73.2	70.6-74.1
6 (42.8)	67.7-71.3	68.7-72.2	69.7-73.2	70.7-74.2
7 (44.6)	67.7-71.3	68.7-72.3	69.7-73.3	70.7-74.2

Table 525 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 8)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
8 (46.4)	60.0-63.6	60.8-64.5	61.7-65.4	62.6-66.3
9 (48.2)	60.0-63.7	60.9-64.6	61.7-65.4	62.6-66.3
10 (50.0)	60.1-63.8	60.9-64.6	61.8-65.5	62.7-66.4
11 (51.8)	60.1-63.8	61.0-64.7	61.9-65.5	62.8-66.4
12 (53.6)	60.2-63.8	61.1-64.7	61.9-65.5	62.8-66.5
13 (55.4)	60.3-63.9	61.2-64.8	62.0-65.6	62.9-66.5
14 (57.2)	60.3-64.0	61.2-64.9	62.1-65.7	63.0-66.6
15 (59.0)	60.4-64.1	61.3-64.9	62.1-65.7	63.0-66.6
16 (60.8)	60.5-64.1	61.4-65.0	62.2-65.8	63.1-66.7
17 (62.6)	60.6-64.2	61.5-65.0	62.3-65.8	63.2-66.7
18 (64.4)	60.6-64.2	61.5-65.1	62.3-65.9	63.2-66.8
19 (66.2)	60.7-64.3	61.6-65.1	62.4-65.9	63.3-66.8
20 (68.0)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.8
21 (69.8)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.9
22 (71.6)	60.9-64.5	61.8-65.3	62.6-66.1	63.5-67.0
23 (73.4)	61.0-64.5	61.9-65.4	62.7-66.2	63.6-67.0
24 (75.2)	61.0-64.6	61.9-65.4	62.7-66.2	63.6-67.1
25 (77.0)	61.1-64.7	62.0-65.5	62.8-66.3	63.7-67.1
26 (78.8)	61.2-64.7	62.1-65.5	62.9-66.3	63.7-67.2
27 (80.6)	61.2-64.8	62.1-65.6	62.9-66.4	63.8-67.2

Table 525 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 8) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
28 (82.4)	61.3-64.8	62.2-65.7	63.0-66.5	63.8-67.3

Table 526 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 9)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
8 (46.4)	63.7-67.3	64.6-68.2	65.8-69.3	66.8-70.4
9 (48.2)	63.7-67.3	64.7-68.3	65.8-69.4	66.9-70.4
10 (50.0)	63.8-67.4	64.8-68.3	65.9-69.4	66.9-70.5
11 (51.8)	63.8-67.4	64.8-68.4	65.9-69.5	67.0-70.5
12 (53.6)	63.9-67.5	64.9-68.4	66.0-69.5	67.0-70.5
13 (55.4)	63.9-67.5	64.9-68.5	66.0-69.6	67.1-70.6
14 (57.2)	64.0-67.6	65.0-68.5	66.1-69.6	67.2-70.6
15 (59.0)	64.1-67.6	65.1-68.6	66.2-69.7	67.2-70.6
16 (60.8)	64.1-67.7	65.1-68.6	66.2-69.7	67.3-70.7
17 (62.6)	64.2-67.7	65.2-68.7	66.3-69.8	67.3-70.8
18 (64.4)	64.2-67.8	65.2-68.7	66.3-69.8	67.4-70.8
19 (66.2)	64.3-67.8	65.3-68.8	66.3-69.9	67.5-70.9
20 (68.0)	64.4-67.8	65.3-68.8	66.4-69.9	67.5-70.9
21 (69.8)	64.4-67.9	65.4-68.9	66.5-70.0	67.6-71.0
22 (71.6)	64.5-68.0	65.4-68.9	66.5-70.0	67.6-71.0
23 (73.4)	64.6-68.0	65.5-68.9	66.6-70.0	67.7-71.0
24 (75.2)	64.6-68.1	65.5-69.0	66.6-70.1	67.7-71.1
25 (77.0)	64.7-68.1	65.6-69.1	66.7-70.1	67.8-71.1
26 (78.8)	64.7-68.2	65.7-69.1	66.8-70.2	67.8-71.2
27 (80.6)	64.8-68.2	65.7-69.2	66.8-70.2	67.9-71.2
28 (82.4)	64.8-68.3	65.8-69.2	66.9-70.2	67.9-71.3

Table 527 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 10)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
8 (46.4)	67.8-71.4	68.7-72.3	69.7-73.3	70.7-74.3
9 (48.2)	67.9-71.4	68.8-72.4	69.8-73.4	70.8-74.3
10 (50.0)	67.9-71.5	68.8-72.4	69.8-73.4	70.8-74.4
11 (51.8)	68.0-71.5	68.9-72.4	69.9-73.4	70.9-74.4
12 (53.6)	68.0-71.5	68.9-72.5	69.9-73.5	70.9-74.4
13 (55.4)	68.1-71.6	69.0-72.5	70.0-73.5	71.0-74.5
14 (57.2)	68.1-71.6	69.0-72.6	70.0-73.6	71.0-74.5
15 (59.0)	68.2-71.7	69.1-72.6	70.1-73.6	71.1-74.6
16 (60.8)	68.2-71.7	69.1-72.7	70.1-73.7	71.1-74.6
17 (62.6)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.6
18 (64.4)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.7
19 (66.2)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
20 (68.0)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
21 (69.8)	68.5-71.9	69.4-72.8	70.4-73.8	71.3-74.8
22 (71.6)	68.5-72.0	69.4-72.9	70.4-73.9	71.4-74.8
23 (73.4)	68.6-72.0	69.5-72.9	70.5-73.9	71.4-74.9
24 (75.2)	68.6-72.1	69.5-73.0	70.5-74.0	71.5-74.9
25 (77.0)	68.7-72.1	69.6-73.0	70.6-74.0	71.5-74.9
26 (78.8)	68.7-72.1	69.6-73.0	70.6-74.0	71.6-75.0
27 (80.6)	68.8-72.2	69.6-73.1	70.6-74.1	71.6-75.0
28 (82.4)	68.8-72.2	69.7-73.1	70.7-74.1	71.7-75.0

Table 528 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 11)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	61.3-64.9	62.2-65.7	63.0-66.5	63.9-67.3
30 (86.0)	61.4-65.0	62.3-65.8	63.1-66.6	64.0-67.4
31 (87.8)	61.5-65.0	62.4-65.8	63.2-66.6	64.0-67.4
32 (89.6)	61.6-65.1	62.4-65.9	63.3-66.7	64.1-67.5
33 (91.4)	61.6-65.1	62.5-65.9	63.3-66.8	64.1-67.6
34 (93.2)	61.7-65.2	62.5-66.0	63.4-66.8	64.2-67.6

Table 528 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 11) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
35 (95.0)	61.8-65.2	62.6-66.0	63.4-66.9	64.2-67.7
36 (96.8)	61.8-65.3	62.7-66.1	63.5-66.9	64.3-67.7
37 (98.6)	61.9-65.4	62.7-66.2	63.6-67.0	64.4-67.8
38 (100.4)	61.9-65.4	62.8-66.2	63.6-67.0	64.4-67.8
39 (102.2)	62.0-65.5	62.8-66.3	63.7-67.1	64.5-67.9
40 (104.0)	62.1-65.5	62.9-66.3	63.7-67.1	64.5-67.9
41 (105.8)	62.1-65.6	62.9-66.4	63.8-67.2	64.6-68.0
42 (107.6)	62.2-65.7	63.0-66.4	63.8-67.2	64.6-68.0
43 (109.4)	62.3-65.7	63.1-66.5	63.9-67.3	64.7-68.1
44 (111.2)	62.3-65.8	63.1-66.5	64.0-67.3	64.8-68.1
45 (113.0)	62.4-65.8	63.2-66.6	64.0-67.4	64.8-68.2
46 (114.8)	62.5-65.9	63.2-66.6	64.1-67.4	64.9-68.2
47 (116.6)	62.5-65.9	63.3-66.7	64.1-67.5	64.9-68.3
48 (118.4)	62.6-66.0	63.4-66.8	64.2-67.5	65.0-68.3
49 (120.2)	62.6-66.1	63.4-66.8	64.2-67.6	65.0-68.4
50 (122.0)	62.7-66.1	63.5-66.9	64.3-67.6	65.1-68.4

Table 529 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 12)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	64.9-68.3	65.8-69.3	66.9-70.3	67.9-71.3
30 (86.0)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
31 (87.8)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
32 (89.6)	65.1-68.5	66.0-69.4	67.1-70.4	68.1-71.4
33 (91.4)	65.1-68.6	66.0-69.5	67.1-70.5	68.1-71.5
34 (93.2)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.5
35 (95.0)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.6
36 (96.8)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
37 (98.6)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
38 (100.4)	65.4-68.8	66.3-69.7	67.4-70.7	68.4-71.7
39 (102.2)	65.5-68.8	66.4-69.7	67.4-70.7	68.4-71.7

Table 529 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 12) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
40 (104.0)	65.5-68.9	66.4-69.8	67.5-70.8	68.5-71.8
41 (105.8)	65.6-68.9	66.5-69.8	67.5-70.8	68.5-71.8
42 (107.6)	65.6-69.0	66.5-69.9	67.5-70.9	68.5-71.9
43 (109.4)	65.7-69.0	66.6-69.9	67.6-70.9	68.6-71.9
44 (111.2)	65.7-69.1	66.6-70.0	67.6-71.0	68.6-72.0
45 (113.0)	65.8-69.1	66.7-70.0	67.7-71.0	68.7-72.0
46 (114.8)	65.8-69.2	66.7-70.1	67.7-71.1	68.7-72.0
47 (116.6)	65.8-69.2	66.7-70.1	67.8-71.1	68.8-72.1
48 (118.4)	65.9-69.3	66.8-70.2	67.8-71.2	68.8-72.1
49 (120.2)	66.0-69.3	66.9-70.2	67.9-71.3	68.9-72.2
50 (122.0)	66.0-69.4	66.9-70.3	67.9-71.3	68.9-72.2

Table 530 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 13)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	68.8-72.3	69.7-73.2	70.7-74.2	71.7-75.1
30 (86.0)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.1
31 (87.8)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.2
32 (89.6)	69.0-72.4	69.9-73.3	70.9-74.3	71.8-75.2
33 (91.4)	69.0-72.4	69.9-73.3	70.9-74.3	71.9-75.2
34 (93.2)	69.1-72.5	70.0-73.4	71.0-74.4	71.9-75.3
35 (95.0)	69.1-72.5	70.0-73.4	71.0-74.4	72.0-75.3
36 (96.8)	69.2-72.5	70.1-73.4	71.1-74.4	72.0-75.4
37 (98.6)	69.2-72.6	70.1-73.5	71.1-74.5	72.0-75.4
38 (100.4)	69.3-72.6	70.2-73.5	71.2-74.5	72.1-75.4
39 (102.2)	69.3-72.7	70.2-73.6	71.2-74.6	72.1-75.5
40 (104.0)	69.4-72.7	70.2-73.6	71.2-74.6	72.2-75.5
41 (105.8)	69.4-72.7	70.3-73.6	71.3-74.6	72.2-75.6
42 (107.6)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
43 (109.4)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
44 (111.2)	69.6-72.9	70.5-73.7	71.5-74.7	72.4-75.7

Table 530 Approach Idle Check Percent N_2 RPM - JT8D-217/-217A Engine (Sheet 13) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
45 (113.0)	69.6-72.9	70.5-73.8	71.5-74.8	72.4-75.7
46 (114.8)	69.6-73.0	70.5-73.8	71.5-74.8	72.5-75.8
47 (116.6)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.8
48 (118.4)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.9
49 (120.2)	69.8-73.1	70.7-73.9	71.7-74.9	72.6-75.9
50 (122.0)	69.8-73.1	70.7-74.0	71.7-75.0	72.6-76.0

E. Takeoff Power Assurance Check

(1) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 531

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(2) Operate engine with throttle in idle position for five minutes.

(3) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(4) Using values from Paragraph 8.E.(3) and Table 533 Table 534, determine engine pressure ratio (EPR) for takeoff thrust setting.

(5) Advance throttle until value determined in Paragraph 8.E.(4) is obtained.

(a) For JT8D-217 engine aircraft.

Table 532

CAUTION: DO NOT EXCEED JT8D-217 ENGINE OPERATING LIMITS AS FOLLOWS:	
EXHAUST GAS TEMPERATURE (EGT)	590°C
N_1 RPM	94.5%
N_2 RPM	100.3%

Table 532 (Continued)

TAKEOFF EPR	±.01
AT TAKEOFF EPR	5 Min.
OIL TEMPERATURE	135°C

(b) For JT8D-217A engine aircraft.

CAUTION: DO NOT EXCEED JT8D-217A ENGINE OPERATING LIMITS AS FOLLOWS:	
EXHAUST GAS TEMPERATURE (EGT)	590°C
N_1 RPM	98.3%
N_2 RPM	100.9%
TAKEOFF EPR	±.01
AT TAKEOFF EPR	5 Min.
OIL TEMPERATURE	135°C

(6) Operate engine for 2 minutes at takeoff power, adjusting throttle as required, until stabilized value of EPR is obtained.

(7) Place throttle in idle position and operate engine at idle for 5 minutes.

F. Reverse Thrust EPR Check

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust until either one of the engines reaches 1.60(±0.10) EPR.

(6) Allow engine to stabilize and observe EPR for both engines. Maximum allowable difference between engines is 0.15 EPR.

(a) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(b) Allow engine to stabilize and record EPR for both engines.

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 7..

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft. (Figure 504, View A)

(b) Install rigging aid (R-24) in interlock stop. (Figure 504, View C)

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (Figure 504, View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

(13) Close lower cowl doors.

(14) Move both thrust reverser control valve dump levers in normal position.

(15) Remove and stow thrust reverser control valve safety pins.

G. Reverse Thrust EPR Check (Aircraft with S/B 78-68 Incorporated and Later Aircraft Equipped with Reverse Thrust Intermediate Detent Position)

NOTE: Check procedures contained in this paragraph only apply to aircraft with an additional detent at the reverse thrust intermediate position.

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust intermediate detent position.

(6) Allow engine to stabilize and observe EPR for both engines.

(a) Record EPR for both engines

NOTE: Maximum allowable difference between engines is 0.13 EPR.

(b) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(c) Allow engine to stabilize and record EPR for both engines

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 7..

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft. (Figure 504, View A)

(b) Install rigging aid (R-24) in interlock stop. (Figure 504, View C)

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (Figure 504, View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

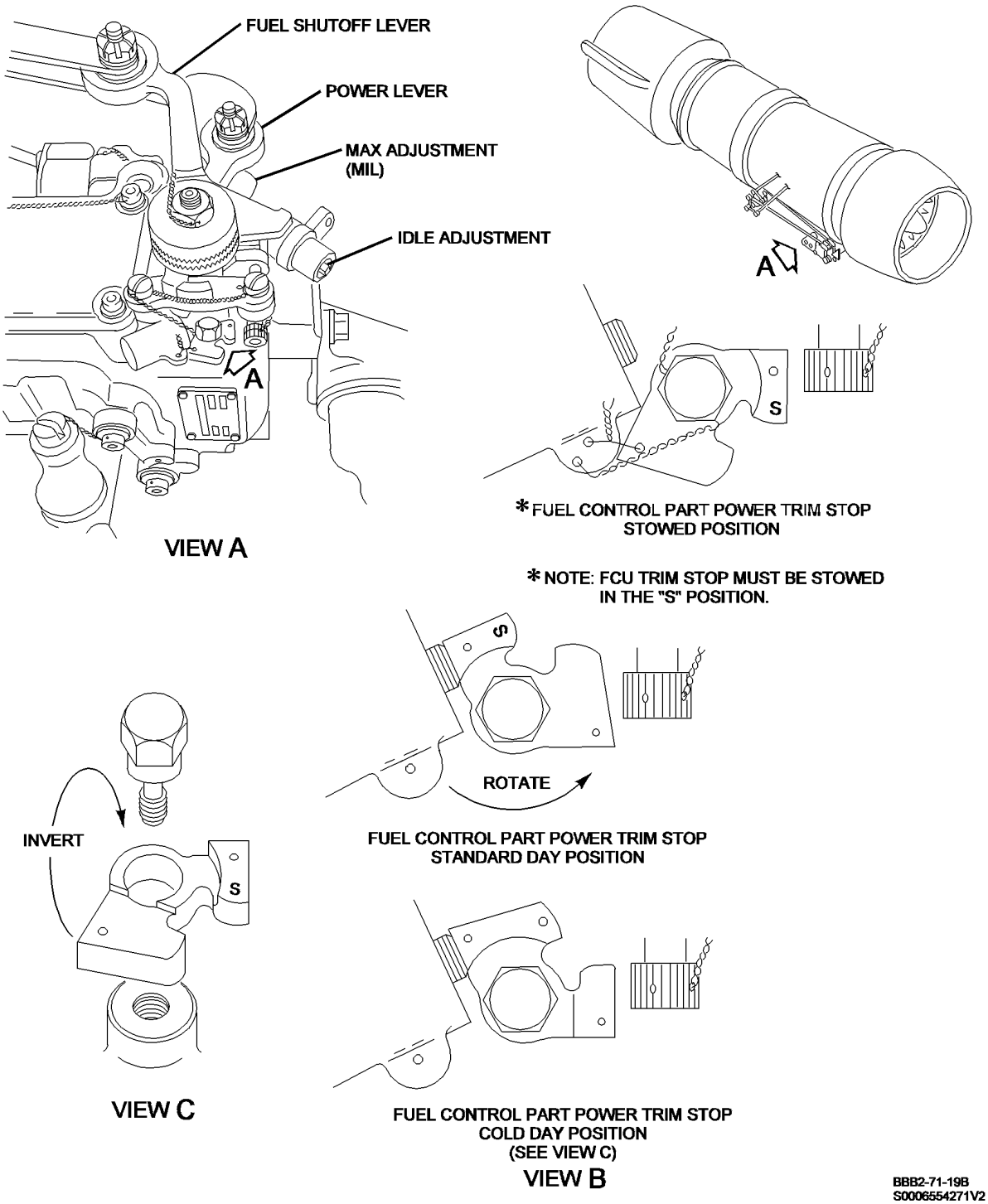
(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

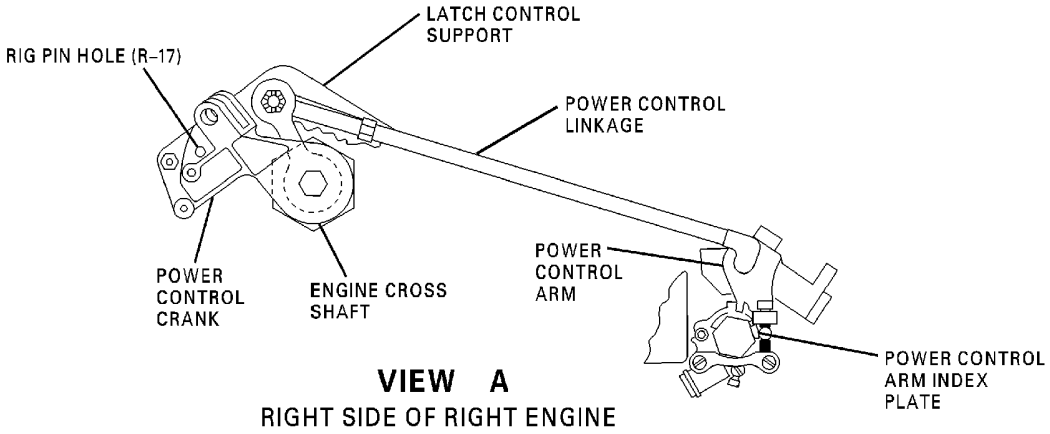
(13) Close lower cowl doors.

(14) Move both thrust reverser control valve dump levers in normal position.

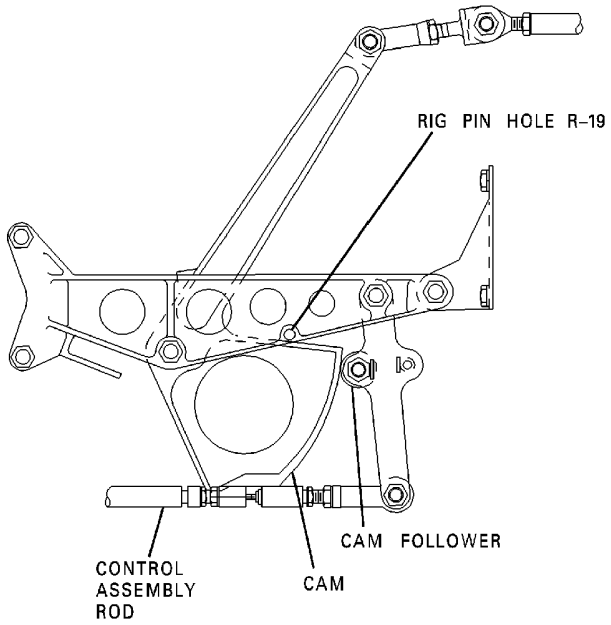
(15) Remove and stow thrust reverser control valve safety pins.



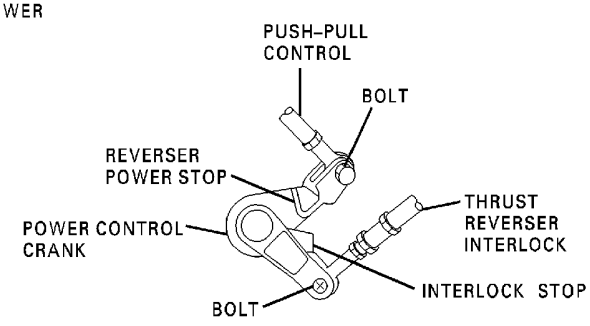
Test Equipment Connection Points
Figure 503/71-00-00-990-866



VIEW A
RIGHT SIDE OF RIGHT ENGINE



VIEW B



VIEW C

CAG(IGDS)

BBB2-71-56B

Throttle System - Adjustment
Figure 504/71-00-00-990-872

9. **Engine Trimming Procedures Using Aircraft Instruments Only**

NOTE: This procedure is not approved for engine trimming during icing conditions. (Paragraph 11.)

NOTE: This procedure allows operators to trim engines utilizing engine instruments only, but it is recommended that the engines be trimmed utilizing the calibrated trim test equipment periodically. It is also recommended that this procedure not be utilized as the standard maintenance practice unless the operator has a viable Engine Monitoring Program in place to insure constant monitoring of engine parameters.

NOTE: When trimming engines utilizing cockpit instrumentation only the engines should be trimmed to the upper limit of the EPR trim chart.

NOTE: This procedure to be used for one engine only. All instruments and the other engine must be functioning normally and a cross check with the other engine must show performance within acceptable range. Disregard steps referring to test instruments.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

WJE 412, 414

(2) Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 1 Oil Pressure Adjustment.

WJE 401-404, 412, 414

Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 2 Oil Pressure Adjustment.

WJE 875-879

Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 3 Oil Pressure Adjustment.

WJE 401-404, 412, 414, 875-879

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 8.D..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

(6) Engine acceleration check as outlined in Paragraph 4..

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
-50 (-58.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-49 (-56.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
-48 (-54.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-47 (-52.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-46 (-50.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-45 (-49.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-44 (-47.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-43 (-45.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-42 (-43.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-41 (-41.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-40 (-40.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-39 (-38.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-38 (-36.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-37 (-34.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-36 (-32.8)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-35 (-31.0)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-34 (-29.0)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-33 (-27.4)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-32 (-25.6)	1.88	1.91	1.95	1.98	2.05	2.08	2.08	2.08
-31 (-23.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-30 (-22.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-29 (-20.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-28 (-18.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-27 (-16.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-26 (-14.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-25 (-13.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-24 (-11.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-23 (-9.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-22 (-7.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-21 (-5.8)	1.88	1.91	1.95	2.00	2.05	2.07	2.07	2.07
-20 (-4.0)	1.88	1.91	1.95	2.00	2.05	2.07	2.07	2.07
-19 (-2.2)	1.88	1.91	1.95	2.00	2.05	2.07	2.07	2.07
-18 (-0.4)	1.88	1.91	1.95	2.00	2.05	2.06	2.06	2.06
-17 (1.4)	1.88	1.91	1.95	2.00	2.05	2.06	2.06	2.06
-16 (3.2)	1.88	1.91	1.95	2.00	2.05	2.06	2.06	2.06

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
-15 (5.0)	1.88	1.91	1.95	2.00	2.05	2.05	2.05	2.05
-14 (6.8)	1.88	1.91	1.95	2.00	2.05	2.05	2.05	2.05
-13 (8.6)	1.88	1.91	1.95	2.00	2.05	2.05	2.05	2.05
-12 (10.4)	1.88	1.91	1.95	2.00	2.04	2.04	2.04	2.04
-11 (12.2)	1.88	1.91	1.95	2.00	2.04	2.04	2.04	2.04
-10 (14.0)	1.88	1.91	1.95	2.00	2.04	2.04	2.04	2.04
- 9 (15.8)	1.88	1.91	1.95	2.00	2.03	2.03	2.03	2.03
- 8 (17.6)	1.88	1.91	1.95	2.00	2.03	2.03	2.03	2.03
- 7 (19.4)	1.88	1.91	1.95	2.00	2.03	2.03	2.03	2.03
- 6 (21.2)	1.88	1.91	1.95	2.00	2.02	2.02	2.02	2.02
- 5 (23.0)	1.88	1.91	1.95	2.00	2.02	2.02	2.02	2.02
- 4 (24.8)	1.88	1.91	1.95	2.00	2.02	2.02	2.02	2.02
- 3 (26.6)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
- 2 (28.4)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
- 1 (30.2)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
0 (32.0)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
1 (33.8)	1.88	1.91	1.95	2.00	2.00	2.00	2.00	2.00
2 (35.6)	1.88	1.91	1.95	2.00	2.00	2.00	1.99	2.00
3 (37.4)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
4 (39.2)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
5 (41.0)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
6 (42.8)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
7 (44.6)	1.88	1.91	1.95	1.98	1.98	1.98	1.99	2.00
8 (46.4)	1.88	1.91	1.95	1.98	1.98	1.98	1.99	2.00
9 (48.2)	1.88	1.91	1.95	1.98	1.98	1.98	1.99	2.00
10 (50.0)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
11 (51.8)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
12 (53.6)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
13 (55.4)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
14 (57.2)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
15 (59.0)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
16 (60.8)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
17 (62.6)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
18 (64.4)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
19 (66.2)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
20 (68.0)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
21 (69.8)	1.88	1.91	1.95	1.97	1.98	1.98	1.98	1.98
22 (71.6)	1.88	1.91	1.95	1.97	1.98	1.98	1.98	1.98
23 (73.4)	1.88	1.91	1.95	1.97	1.97	1.97	1.97	1.97
24 (75.2)	1.88	1.91	1.95	1.96	1.96	1.96	1.96	1.96
25 (77.0)	1.88	1.91	1.95	1.95	1.95	1.95	1.95	1.95
26 (78.8)	1.88	1.91	1.95	1.95	1.95	1.95	1.95	1.95
27 (80.6)	1.88	1.91	1.94	1.94	1.94	1.94	1.94	1.94
28 (82.4)	1.88	1.91	1.93	1.93	1.93	1.93	1.93	1.93
29 (84.2)	1.88	1.91	1.92	1.92	1.92	1.92	1.92	1.92
30 (86.0)	1.88	1.91	1.91	1.91	1.91	1.91	1.91	1.91
31 (87.8)	1.88	1.90	1.90	1.90	1.90	1.90	1.90	1.90
32 (89.6)	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.89
33 (91.4)	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.89
34 (93.2)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
35 (95.0)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
36 (96.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
37 (98.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
38 (100.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
39 (102.2)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
40 (104.0)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
41 (105.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
42 (107.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
43 (109.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
44 (111.2)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
45 (113.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
46 (114.8)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
47 (116.6)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
48 (118.4)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
49 (120.2)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
50 (122.0)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
-50 (-58.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-49 (-56.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-48 (-54.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-47 (-52.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-46 (-50.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-45 (-49.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-44 (-47.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-43 (-45.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-42 (-43.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-41 (-41.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-40 (-40.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-39 (-38.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-38 (-36.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-37 (-34.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-36 (-32.8)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-35 (-31.0)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-34 (-29.0)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-33 (-27.4)	1.88	1.91	1.95	1.99	2.05	2.08	2.08	2.08
-32 (-25.6)	1.88	1.91	1.95	1.98	2.05	2.08	2.08	2.08
-31 (-23.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-30 (-22.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-29 (-20.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-28 (-18.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-27 (-16.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-26 (-14.8)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-25 (-13.0)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-24 (-11.2)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-23 (-9.4)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-22 (-7.6)	1.88	1.91	1.95	2.00	2.05	2.08	2.08	2.08
-21 (-5.8)	1.88	1.91	1.95	2.00	2.05	2.07	2.07	2.07
-20 (-4.0)	1.88	1.91	1.95	2.00	2.05	2.07	2.07	2.07
-19 (-2.2)	1.88	1.91	1.95	2.00	2.05	2.07	2.07	2.07
-18 (-0.4)	1.88	1.91	1.95	2.00	2.05	2.06	2.06	2.06

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
-17 (1.4)	1.88	1.91	1.95	2.00	2.05	2.06	2.06	2.06
-16 (3.2)	1.88	1.91	1.95	2.00	2.05	2.06	2.06	2.06
-15 (5.0)	1.88	1.91	1.95	2.00	2.05	2.05	2.05	2.05
-14 (6.8)	1.88	1.91	1.95	2.00	2.05	2.05	2.05	2.05
-13 (8.6)	1.88	1.91	1.95	2.00	2.05	2.05	2.05	2.05
-12 (10.4)	1.88	1.91	1.95	2.00	2.04	2.04	2.04	2.04
-11 (12.2)	1.88	1.91	1.95	2.00	2.04	2.04	2.04	2.04
-10 (14.0)	1.88	1.91	1.95	2.00	2.04	2.04	2.04	2.04
- 9 (15.8)	1.88	1.91	1.95	2.00	2.03	2.03	2.03	2.03
- 8 (17.6)	1.88	1.91	1.95	2.00	2.03	2.03	2.03	2.03
- 7 (19.4)	1.88	1.91	1.95	2.00	2.03	2.03	2.03	2.03
- 6 (21.2)	1.88	1.91	1.95	2.00	2.02	2.02	2.02	2.02
- 5 (23.0)	1.88	1.91	1.95	2.00	2.02	2.02	2.02	2.02
- 4 (24.8)	1.88	1.91	1.95	2.00	2.02	2.02	2.02	2.02
- 3 (26.6)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
- 2 (28.4)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
- 1 (30.2)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
0 (32.0)	1.88	1.91	1.95	2.00	2.01	2.01	2.01	2.01
1 (33.8)	1.88	1.91	1.95	2.00	2.00	2.00	2.00	2.00
2 (35.6)	1.88	1.91	1.95	2.00	2.00	2.00	1.99	2.00
3 (37.4)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
4 (39.2)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
5 (41.0)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
6 (42.8)	1.88	1.91	1.95	1.99	1.99	1.99	1.99	2.00
7 (44.6)	1.88	1.91	1.95	1.98	1.98	1.98	1.99	2.00
8 (46.4)	1.88	1.91	1.95	1.98	1.98	1.98	1.99	2.00
9 (48.2)	1.88	1.91	1.95	1.98	1.98	1.98	1.99	2.00
10 (50.0)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
11 (51.8)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
12 (53.6)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
13 (55.4)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
14 (57.2)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
15 (59.0)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
16 (60.8)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
17 (62.6)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
18 (64.4)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
19 (66.2)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
20 (68.0)	1.88	1.91	1.95	1.97	1.98	1.98	1.99	2.00
21 (69.8)	1.88	1.91	1.95	1.97	1.98	1.98	1.98	1.98
22 (71.6)	1.88	1.91	1.95	1.97	1.98	1.98	1.98	1.98
23 (73.4)	1.88	1.91	1.95	1.97	1.97	1.97	1.97	1.97
24 (75.2)	1.88	1.91	1.95	1.96	1.96	1.96	1.96	1.96
25 (77.0)	1.88	1.91	1.95	1.95	1.95	1.95	1.95	1.95
26 (78.8)	1.88	1.91	1.95	1.95	1.95	1.95	1.95	1.95
27 (80.6)	1.88	1.91	1.94	1.94	1.94	1.94	1.94	1.94
28 (82.4)	1.88	1.91	1.93	1.93	1.93	1.93	1.93	1.93
29 (84.2)	1.88	1.91	1.92	1.92	1.92	1.92	1.92	1.92
30 (86.0)	1.88	1.91	1.91	1.91	1.91	1.91	1.91	1.91
31 (87.8)	1.88	1.90	1.90	1.90	1.90	1.90	1.90	1.90
32 (89.6)	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.89
33 (91.4)	1.88	1.89	1.89	1.89	1.89	1.89	1.89	1.89
34 (93.2)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
35 (95.0)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
36 (96.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
37 (98.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
38 (100.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
39 (102.2)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
40 (104.0)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
41 (105.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
42 (107.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
43 (109.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
44 (111.2)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
45 (113.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
46 (114.8)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
47 (116.6)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
48 (118.4)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76

Table 533 Takeoff Power Assurance Check - JT8D-217 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.51	26.0	24.90 & BELOW
49 (120.2)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
50 (122.0)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
-50 (-58.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-49 (-56.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-48 (-54.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-47 (-52.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-46 (-50.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-45 (-49.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-44 (-47.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-43 (-45.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-42 (-43.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-41 (-41.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-40 (-40.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-39 (-38.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-38 (-36.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-37 (-34.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-36 (-32.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-35 (-31.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-34 (-29.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-33 (-27.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-32 (-25.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-31 (-23.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-30 (-22.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-29 (-20.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-28 (-18.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-27 (-16.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-26 (-14.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-25 (-13.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-24 (-11.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
-23 (- 9.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-22 (- 7.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-21 (- 5.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-20 (-4.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-19 (-2.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-18 (-0.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-17 (1.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-16 (3.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-15 (5.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-14 (6.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-13 (8.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-12 (10.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-11 (12.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-10 (14.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 9 (15.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 8 (17.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 7 (19.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 6 (21.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 5 (23.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 4 (24.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 3 (26.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 2 (28.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 1 (30.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
0 (32.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
1 (33.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
2 (35.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
3 (37.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
4 (39.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
5 (41.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
6 (42.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
7 (44.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
8 (46.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
9 (48.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
10 (50.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
11 (51.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
12 (53.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
13 (55.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
14 (57.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
15 (59.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
16 (60.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
17 (62.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
18 (64.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
19 (66.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
20 (68.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.05
21 (69.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.04
22 (71.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.03	2.03
23 (73.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.03	2.03
24 (75.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.02	2.02
25 (77.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.01	2.01
26 (78.8)	1.87	1.91	1.95	1.97	1.99	2.00	2.00	2.00
27 (80.6)	1.87	1.91	1.95	1.97	1.99	2.00	2.00	2.00
28 (82.4)	1.87	1.91	1.95	1.97	1.99	1.99	1.99	1.99
29 (84.2)	1.87	1.91	1.95	1.97	1.98	1.98	1.98	1.98
30 (86.0)	1.87	1.91	1.95	1.97	1.97	1.97	1.97	1.97
31 (87.8)	1.87	1.91	1.94	1.96	1.96	1.96	1.96	1.96
32 (89.6)	1.87	1.91	1.93	1.95	1.95	1.95	1.95	1.95
33 (91.4)	1.87	1.91	1.92	1.94	1.94	1.94	1.94	1.94
34 (93.2)	1.87	1.91	1.91	1.92	1.93	1.93	1.93	1.93
35 (95.0)	1.87	1.90	1.90	1.91	1.91	1.91	1.91	1.91
36 (96.8)	1.87	1.90	1.90	1.90	1.90	1.90	1.90	1.90
37 (98.6)	1.87	1.89	1.89	1.89	1.89	1.89	1.89	1.89
38 (100.4)	1.87	1.88	1.88	1.88	1.88	1.88	1.88	1.88
39 (102.2)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
40 (104.0)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
41 (105.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
42 (107.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
43 (109.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
44 (111.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
45 (113.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
46 (114.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
47 (116.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
48 (118.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
49 (120.2)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
50 (122.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
-50 (-58.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-49 (-56.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-48 (-54.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-47 (-52.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-46 (-50.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-45 (-49.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-44 (-47.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-43 (-45.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-42 (-43.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-41 (-41.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-40 (-40.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-39 (-38.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-38 (-36.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-37 (-34.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-36 (-32.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-35 (-31.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-34 (-29.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-33 (-27.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-32 (-25.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-31 (-23.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-30 (-22.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-29 (-20.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-28 (-18.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-27 (-16.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-26 (-14.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
-25 (-13.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-24 (-11.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-23 (-9.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-22 (-7.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-21 (-5.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-20 (-4.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-19 (-2.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-18 (-0.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-17 (1.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-16 (3.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-15 (5.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-14 (6.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-13 (8.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-12 (10.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-11 (12.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-10 (14.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 9 (15.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 8 (17.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 7 (19.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 6 (21.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 5 (23.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 4 (24.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 3 (26.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 2 (28.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 1 (30.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
0 (32.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
1 (33.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
2 (35.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
3 (37.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
4 (39.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
5 (41.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
6 (42.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
7 (44.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
8 (46.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
9 (48.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
10 (50.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
11 (51.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
12 (53.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
13 (55.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
14 (57.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
15 (59.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
16 (60.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
17 (62.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
18 (64.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
19 (66.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
20 (68.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.05
21 (69.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.04
22 (71.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.03	2.03
23 (73.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.03	2.03
24 (75.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.02	2.02
25 (77.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.01	2.01
26 (78.8)	1.87	1.91	1.95	1.97	1.99	2.00	2.00	2.00
27 (80.6)	1.87	1.91	1.95	1.97	1.99	2.00	2.00	2.00
28 (82.4)	1.87	1.91	1.95	1.97	1.99	1.99	1.99	1.99
29 (84.2)	1.87	1.91	1.95	1.97	1.98	1.98	1.98	1.98
30 (86.0)	1.87	1.91	1.95	1.97	1.97	1.97	1.97	1.97
31 (87.8)	1.87	1.91	1.94	1.96	1.96	1.96	1.96	1.96
32 (89.6)	1.87	1.91	1.93	1.95	1.95	1.95	1.95	1.95
33 (91.4)	1.87	1.91	1.92	1.94	1.94	1.94	1.94	1.94
34 (93.2)	1.87	1.91	1.91	1.92	1.93	1.93	1.93	1.93
35 (95.0)	1.87	1.90	1.90	1.91	1.91	1.91	1.91	1.91
36 (96.8)	1.87	1.90	1.90	1.90	1.90	1.90	1.90	1.90
37 (98.6)	1.87	1.89	1.89	1.89	1.89	1.89	1.89	1.89
38 (100.4)	1.87	1.88	1.88	1.88	1.88	1.88	1.88	1.88
39 (102.2)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
40 (104.0)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86

Table 534 Takeoff Power Assurance Check - JT8D-217A Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
41 (105.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
42 (107.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
43 (109.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
44 (111.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
45 (113.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
46 (114.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
47 (116.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
48 (118.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
49 (120.2)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
50 (122.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79

10. Optional Anti-Surge Bleed Valve Operational Check

WJE 412, 414

A. Check Anti-Surge Bleed Valves As Outlined In PAGEBLOCK 72-00-00/501 Config 1.

WJE 401-404, 412, 414

Check Anti-Surge Bleed Valves As Outlined In PAGEBLOCK 72-00-00/501 Config 2.

WJE 875-879

Check Anti-Surge Bleed Valves As Outlined In PAGEBLOCK 72-00-00/501 Config 3.

WJE 401-404, 412, 414, 875-879

11. Engine Trimming Procedure During Icing Conditions

NOTE: When circumstances require engine trimming during icing conditions, the following procedure may be used.

NOTE: This procedure to be used for one engine only.

CAUTION: A COMPLETE TRIM RUN WITHOUT THE USE OF ENGINE ANTI-ICE MUST BE PERFORMED AS SOON AS AIRCRAFT REACHES A BASE WHERE THIS IS POSSIBLE.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Install Test Equipment:

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb) and determine trim stop position:

(a) Using ambient temperature and Table 513 or Table 514 or Table 515 or Table 516, determine part power trim stop position to be used. When temperature is in area where either Standard Day or Cold Day stop can be used, use of Cold Day stop results in trim operation at lower engine thrust levels but increases the possibility of throttle stagger. As a general rule, use of Standard Day stop at temperatures above 30°C (86°F) is recommended, unless noise or other local restriction requires operation at lower thrust levels. If ambient temperature is below minimum value given in Standard Day Trim chart, Cold Day Trim chart must be used.

NOTE: The part power trim stop is marked with letter "S" (Standard Day Trim) on one side and letter "C" (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

NOTE: Fuel control part power trim stops are interchangeable with -217A, -217C, and -219 fuel controls.

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

NOTE: Fuel control part power trim stops are interchangeable with -217A and -217C fuel controls.

(3) Start engine as outlined in Paragraph 4..

(4) Place engine anti-ice switch in ON position.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

(5) Check engine oil pressure. (Paragraph 3.)

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

(6) ART system check may be performed per Paragraph 13..

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(8) Place following switches in indicated positions.

Table 535

ENG SYNC	OFF
ICE PROTECT	

Table 535 (Continued)

Airfoil	OFF
Eng	ON
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(9) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 11.A.(9) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Place engine anti-ice switch in ON position, operate engine with throttle in the idle position for 5 minutes.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(2) Record ambient temperature (Tamb) and pressure (Pamb).

(3) Determine minimum-bleed low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511 and Table 512.

(4) After N_2 has stabilized for 5 minutes, record N_2 percent.

(5) Place engine anti-ice switch in OFF position.

(6) With engine anti-ice OFF, allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Calculate the N_2 target adjustment as the difference between the N_2 value from Paragraph 11.B.(6) and the N_2 value from Paragraph 11.B.(4), not to exceed 2 percent.

(9) Reduce the minimum-bleed N_2 determined in Paragraph 11.B.(3) by the adjustment determined in Paragraph 11.B.(8).

CAUTION: PERIODIC ENGINE RUN-UP (WITH ENGINE ANTI-ICING SYSTEM ON), TO AS HIGH A THRUST SETTING AS PRACTICAL (70 PERCENT N_1 FOR A MINIMUM OF 15 SECONDS IS DESIRED) SHOULD BE PERFORMED TO MINIMIZE POSSIBILITY OF ICE BUILD-UP DURING EXTENDED GROUND IDLE OPERATION IN SEVERE ICING CONDITIONS. IT IS SUGGESTED THAT SUCH RUN-UPS NEED NOT BE MADE MORE FREQUENTLY THAN AT TEN MINUTE INTERVALS.

(10) After N_2 has stabilized for 5 minutes with engine anti-ice ON, adjust fuel control idle trim adjustment until idle N_2 is within idle N_2 determined in Paragraph 11.B.(9).

NOTE: Always make final adjustment in the increase direction (counterclockwise).

(11) Record actual N_2 percent set.

C. Part Power Trim

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(1) Record ambient temperature (Tamb) and Pressure (Pamb).

(2) Make certain part power trim stop is in position as outlined in Paragraph 11..

(3) Using values obtained in Paragraph 11.C.(1) determine value of minimum-bleed part power engine pressure ratio (EPR) from Table 513 or Table 514 or Table 515 or Table 516.

(4) Place engine anti-ice switch in ON position.

(5) With engine anti-ice ON, advance throttle until power lever contacts part power stop.

CAUTION: DO NOT EXCEED JT8D-217/-217A ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

(6) Operate engine at part power position for 5 minutes to allow EPR to stabilize. Observe test instrument and record stabilized EPR.

(7) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds and record EPR value.

(8) Immediately place engine anti-ice switch in ON position.

(9) Calculate the EPR target adjustment as the difference between the EPR value in Paragraph 11.C.(7) and the EPR value in Paragraph 11.C.(6).

(10) Reduce the minimum-bleed EPR value determined in Paragraph 11.C.(3) by the adjustment determined in Paragraph 11.C.(9), not to exceed 0.12.

(11) With engine anti-ice ON, operate engine at part power position for 5 minutes to stabilize.

(12) Observe EPR indicator and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 11.C.(10).

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(13) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits established in Paragraph 11.C.(10).

(14) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds, and record EPR value.

(15) Immediately place engine anti-ice switch in ON position.

(16) Compare minimum-bleed EPR from Paragraph 11.C.(14) with EPR from Paragraph 11.C.(3) and determine trim error, if any.

(17) Adjust engine anti-ice ON EPR value in Paragraph 11.C.(10) by trim error.

(18) Adjust fuel control max trimmer screw, repeating above steps as necessary until minimum-bleed EPR is within limits.

(19) With power lever against part power stop and engine anti-ice ON, observe test and engine gages and record following:

Table 536

Test Instruments	Aircraft Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperature (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed

Table 536 (Continued)

Test Instruments	Aircraft Instruments
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(20) Move throttle lever to idle position.

(21) EPR readings obtained from test instrument and aircraft instruments Paragraph 11.C.(19) must not differ by more than ±.01.

(22) Test instrument readings obtained from Paragraph 11.C.(19) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(23) Compare test and aircraft readings obtained from Paragraph 11.C.(19) for EGT; readings must not differ by more than ±5°C.

(24) Since idle and maximum speed trimmers affect each other, repeat Paragraph 11.B. and Paragraph 11.C. until desired settings are obtained without intermediate adjustment.

CAUTION: IF TRIM PROCEDURE WAS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(25) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire. (Figure 503)

D. Approach Idle Check

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be turned OFF for short periods of time.

(1) Place engine anti-ice switch in ON position and throttle in idle position, open following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for 5 minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using value obtained in Paragraph 11.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 518 or Table 519 or Table 520 or Table 521 or Table 522 or Table 523 or Table 524 or Table 525 or Table 526 or Table 527 or Table 528 or Table 529 or Table 530. Interpolate between chart values, if necessary.

(6) Place engine anti-ice switch in OFF position. Allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(9) With throttle in idle position close following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(10) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay).

E. Takeoff Power Assurance Check

(1) This check is to be made as outlined in Paragraph 8.E. except with engine anti-ice on.

F. Reverse Thrust EPR Check

(1) This check is to be made as outlined in Paragraph 8.F. except with engine anti-ice on.

12. Engine Deterioration Check

WJE 412, 414

When desired, an engine deterioration check can be performed as outlined in PAGEBLOCK 72-00-00/501 Config 1.

WJE 401-404, 412, 414

When desired, an engine deterioration check can be performed as outlined in PAGEBLOCK 72-00-00/501 Config 2.

WJE 875-879

When desired, an engine deterioration check can be performed as outlined in PAGEBLOCK 72-00-00/501 Config 3.

WJE 401-404, 412, 414, 875-879

13. Optional Automatic Reserve Thrust (ART) System Check

NOTE: If aircraft has met Paragraph 13.A.(1) thru Paragraph 13.A.(9) and passes ARTS self-test, green ART READY light on center main instrument panel comes on. If ART fails, amber ART INOP light on overhead annunciator panel comes on. If aircraft is on the ground and only one engine is running, ARTS INOP light also comes on.

NOTE: The NO MODE light on the TRI is only active during the ARTS test on aircraft equipped with Digital Flight Guidance Computer (DFGC), Honeywell P/N 4034241-970 and subsequent computers.

A. Perform ART System Check

(1) Start both engines as outlined in Paragraph 4..

WARNING: BEFORE MOVING FLAP/SLAT HANDLE, MAKE CERTAIN THAT AREAS AROUND FLAPS AND SLATS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(2) With both engines running at idle place flap/slat handle in full up position.

(3) Place AP DFGC selector in 1 position.

(4) Place ART switch in AUTO position. Check that ART, ART READY and ART INOP lights go off.

(5) Momentarily press T.O. FLX button on thrust rating indicator (TRI), T.O. FLX button and NO MODE lights will come on.

(6) Set ASSUMED TEMP selector to 50°C and record EPR LIM value displayed on TRI.

NOTE: EPR LIM bugs on EPR indicators will agree with TRI.

(7) Place ART switch in off position and check that:

(a) ART and ART READY Lights remain off.

(b) ART INOP light remains off.

(c) EPR LIM on TRI increased above value recorded in Paragraph 13.A.(6).

(d) EPR LIM bugs on EPR indicators agree with EPR limit on TRI.

(e) NO MODE light on the TRI will go off.

(8) Place flap/slat handle at 11 degrees and check that:

(a) ART INOP is displayed on EDAP.

(b) Master caution light comes on.

(9) Place AIR COND SHUTOFF switch in override (OVRD) position.

(10) Place ART switch in AUTO position and momentarily press master caution light. Check that:

(a) ART INOP goes off.

(b) EPR LIM on TRI and EPR indicators equals EPR LIM recorded in Paragraph 13.A.(6).

(c) ART READY light comes on.

(d) Master caution light goes off.

(11) Advance both throttles to above 64.0 percent N_1 and allow engines to stabilize at this setting.

NOTE: The ART ready light will blink one time after both throttles are advanced to 64% N_1 with the ART system in auto.

NOTE: ART will actuate when it detects N_1 difference of 30.2 percent between engines. However, both engines N_1 must be over 64.0 percent for ARTS to become armed for actuation.

(12) Record right engine EPR value.

(13) Slowly retard left throttle until ART READY light goes off. Check that:

(a) ART light comes on.

(b) Right engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(14) Place AP DFGC selector in 2 position.

(15) Place ART switch off for approximately 3 seconds, then place ART switch back to AUTO position. Check that:

(a) ART light goes off.

(b) EPR LIM on TRI decreased.

(c) EPR LIM bug on right EPR indicator decreased.

(d) ART READY light comes on.

(16) Slowly advance left throttle to above 64.0 percent N_1 (same N_1 as right engine).

(17) Slowly retard right throttle until READY light goes off and check that:

(a) ART light comes on.

(b) Left engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(18) Place DFGC selector switch to 1 position.

(19) Place throttles in idle position.

(20) Place flap/slat handle in full up position.

(21) Momentarily place ART switch off and then back to AUTO. Check that:

(a) ART light goes off.

(b) ART READY light is off.

(22) Shut down engines as outlined in Paragraph 7..

14. Engine Trimming Procedures After Engine Change

NOTE: If an engine trim test set is not available, refer to Paragraph 9., Engine Trimming Procedure Using Aircraft Instruments Only.

NOTE: Only one engine can be changed at a time.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

WJE 412, 414

(2) Check engine oil pressure as outlines in Oil Pressure Adjustment PAGEBLOCK 72-00-00/501 Config 1.

WJE 401-404, 412, 414

Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 2.

WJE 875-879

Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 3.

WJE 401-404, 412, 414, 875-879

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 8.D..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Engine acceleration check as outlined in Paragraph 16..

(6) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

15. Engine Trimming Procedures After Fuel Control Change

NOTE: If an engine trim test set is not available, refer to Paragraph 9., Engine Trimming Procedures Using Aircraft Instruments Only.

NOTE: Only one fuel control can be changed at a time.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

B. Perform Following Trim Tests:

(1) Part Power Trim as outlined in Paragraph 8.C..

(2) Engine acceleration check as outlined in Paragraph 16..

16. Engine Acceleration Check

A. Check Engine Acceleration

(1) Start engine as outlined in Paragraph 4..

(2) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 537

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF
NOTE: During accel check procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When checking the right engine, the left air-conditioning pack should be turned on. When checking the left engine, the right air-conditioning pack should be turned on.	

(3) Operate engine with throttle in idle position until all engine parameters stabilize.

(4) With the throttle in idle position, open following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(5) Engine N2 RPM should increase to approach idle.

(6) Operate engine at approach idle for 5 minutes to allow N2 to stabilize. After 5 minutes, observe minimum oil temperature requirement of 38°C before proceeding.

(7) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(8) Using values from Paragraph 16.A.(7) and Table 533 or Table 534, determine engine pressure ratio (EPR) for takeoff thrust setting.

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS.

(9) Advance throttle until takeoff thrust setting determined in Paragraph 16.A.(8) is obtained and maintain for exactly 60 seconds.

(10) While maintaining takeoff setting mark forward edge position of throttle lever on pedestal and record takeoff EPR, N_1, EGT and N_2.

(11) Using N_2 value obtained in Paragraph 16.A.(10) calculate and record 95% of takeoff N_2.

(12) Place throttle in idle position and operate engine at approach idle for 20-25 seconds.

(13) Advance throttle in less than one second to takeoff EPR mark on pedestal.

(14) Measure (with a stop watch) and record time from start of throttle advance to 95% of takeoff N_2 as determined in Paragraph 16.A.(11).

(15) Place throttle in idle position and operate engine at approach idle for 5 minutes.

(16) Repeat Paragraph 16.A.(7) through Paragraph 16.A.(15) twice more.

(17) Calculate average of all three acceleration times and compare average acceleration time to limits of Figure 505.

(18) If acceleration time is unacceptable, refer to Paragraph 16.B..

B. Potential Acceleration Time Problem Sources

(1) If engine does not meet limits in Figure 505, following potential problem sources should be investigated.

(a) Internal structural damage

(b) Bleed load

(c) Idle Trim

(d) Part Power Trim

(e) First NGV match

(f) Fuel Control Unit Schedule

(g) P&D Valve Setting

(h) PRBC Schedule

(i) Fuel pumps and/or filters

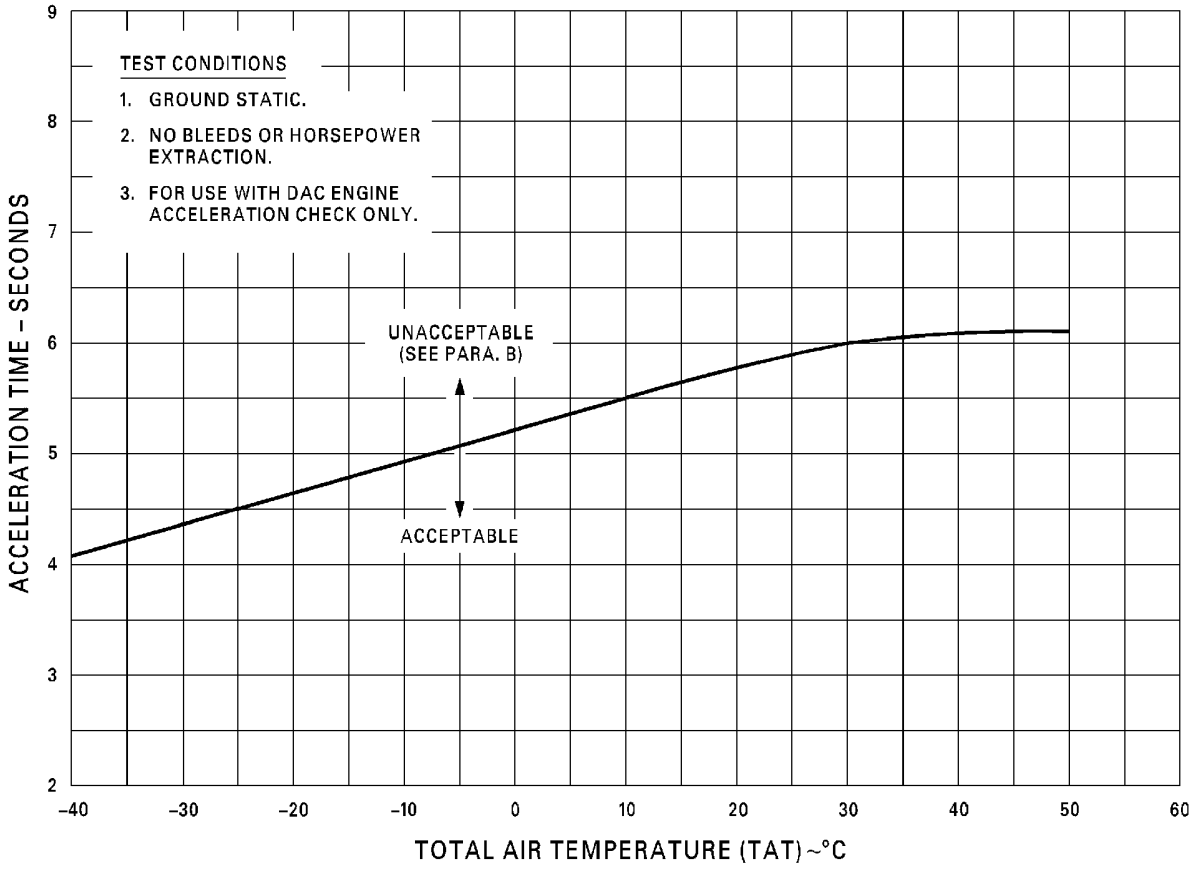
(j) PS_3 Filter

(k) P_b moisture trap

(l) Combustion chamber positioning pins/combustion chamber misalignment, cracks and burnthrough

(m) Pneumatic leaks

ENGINE ACCELERATION CHECK
LIMIT FOR IN–SERVICE ENGINES
FROM APPROACH (HIGH) IDLE



CAG(IGDS)

BBB2–71–43A

Engine Acceleration Check Time Limits
Figure 505/71-00-00-990-873

17. Part Power Trim Procedures During Extreme Cold Conditions

A. General

(1) Part Power EPR increases as ambient temperature decreases. The purpose of the Cold Part Power trim stop is to make trim operations possible at lower temperatures.

(2) There can be conditions in which the ambient temperature is so low that it is not possible to get a Part Power EPR which is lower than Takeoff EPR.

(3) The procedure given below is permitted on an engine only as a temporary solution and is not an alternate trim procedure. If trim is necessary on both engines, this procedure is not permitted. If engine trim is adjusted with this procedure, it will be necessary to trim the engine again in 25 hours or less with the aircraft manufacturer's trim tables. If maintenance operations on one engine made this temporary trim necessary, but the other engine was adjusted to align the throttles, it will be necessary to trim both the engines using the aircraft manufacturer's trim tables in 25 hours or less.

(4) The Part Power trim stop does not need to be moved into the trim position when using this procedure. The throttle will not be advanced far enough to contact the trim stop when the ambient temperature is cold enough to require use of this procedure.

NOTE: FOR JT8D-217C ENGINES ONLY:

Below a given ambient temperature, there is no EPR recorded in the aircraft manufacturer's trim tables. For operators with an engine fleet consisting of both JT8D-217C and JT8D-219 engine models there is a common level trim table available from the aircraft manufacturer which allows trim of the JT8D-219 model down to a lower ambient temperature than that which is allowed for the JT8D-217C model (this is because the Maximum Takeoff EPR of the JT8D-219 model is higher than the Maximum Takeoff EPR of the JT8D-217C model). If you use the common JT8D-217C/-219 trim levels and this occurs with a JT8D-217C model it is permitted to use the JT8D-219 portion of the table which extends to a lower ambient temperature. This can make JT8D-217C trim possible without the Extreme Cold Part Power Trim Procedure.

B. Procedure

(1) Run Engine No. 1 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(2) Run Engine No. 2 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(3) Adjust the Part Power trim of the engine which had the throttle in the more forward position to increase the fuel flow. This will let that engine get to the Power Assurance EPR with the throttle at a lower position.

NOTE: It is permitted to adjust the trim of only one engine with this procedure. After the selection of one engine for adjustment, Part Power Trim adjustment on the other engine is not permitted.

(4) Run the engine for which Part Power was adjusted back to the Power Assurance EPR and let the engine become stable for one minute minimum. Make Part Power trim adjustments to the engine that was adjusted as necessary until the throttles are aligned with the position mark for the other throttle. Throttle "stagger" (throttles not aligned) of up to 1/2 throttle knob is permitted. Pull back the throttle to Idle.

(5) Let the engine become stable at Idle for three minutes minimum and record N2 and ambient temperature. Make sure that engine Idle trim is in limits at the coldest value on the applicable trim table. If the engine is not in limits, adjust the Idle trim as necessary.

(6) Advance the power lever for one engine to the Power Assurance level and let that engine become stable for one minute minimum. Record the position of the throttle for that engine. Use the same procedure to record the throttle position of the other engine. The throttle stagger limit is 1/2 knob. If further adjustment is necessary, return to Paragraph 17.B.(4).

18. Engine Dry or Wet Motor Operation

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

A. Engine Dry Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight compartment, set the applicable engine controls and switches as follow:

(a) Left and right throttle lever to Idle position.

(b) Left and right FUEL levers in OFF position.

(c) ICE PROTECT panel AIR FOIL L SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP to ON.

1) The FUEL INLET PRESS LOW light is off.

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

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

(3) Pressurize aircraft pneumatic system with APU or external air. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 49-00-00/001 Config 1)(GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 36-00-00/001)

(4) Do the engine Dry Motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(d) Hold the START switch in ON for approximately 20 seconds or for the maximum starter operational limit, then release the START switch to OFF.

NOTE: For dry motoring, the starter duty cycle is 90 seconds on 15 minutes off.

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

B. Engine Wet Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight comparment, set these engine controls and switches as follow:

(a) Left and right throttle lever in Idle position.

(b) Left and right FUEL levers in OFF.

(c) ICE PROTECT panel AIR FOIL SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP switch to ON.

1) Make sure that there is enough fuel in the fuel system for this procedure. (FUEL SYSTEMS GENERAL, SUBJECT 12-11-04)

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(3) Do the engine wet motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

(d) Hold the START switch in ON for not more than 20 seconds to get 15-20 percent N2 speed, then put the FUEL lever to ON for not more than 20 seconds.

1) Make certain that there is fuel flow shown on the FUEL FLOW indication, then move the FUEL lever to OFF.

NOTE: Large quantities of fuel can collect in the engine if the fuel switch stays ON for more than 20 seconds.

2) Continue to hold the START switch in ON to clear the engine of fuel and fuel vapors for not more than 60 seconds.

(e) If necessary, cool down the starter per the Normal Start Cycle Limits. (PNEUMATIC STARTER, SUBJECT 80-10-01)

(f) Upon release of the START switch , make certain that the applicable L or R START VALVE OPEN light goes out and the N2 rotation speed comes to a stop.

GENERAL - ADJUSTMENT/TEST

1. General

A. Adjustment of the power plant is required to assure optimum operation and to prolong the life of the engine. The following procedures outline the recommended methods for engine starting and trimming.

NOTE: Power lever misalignment will require a trim check of both engines to determine which power lever is misaligned.

NOTE: This maintenance practice provides special instructions for those operators with either the JT8D-217A, -217C or -219 engines installed and should be used with JT8D-217A, -217C or -219 engine intermix.

(SUBJECT 71-02-00)

B. Engine trimming requires the use of a calibrated trim test set. (Paragraph 8.) Engine trimming using the aircraft instruments in lieu of a calibrated trim test set is an acceptable option Paragraph 8.A.calibrated trim test set is required to include the following conditions:

(1) If two engines are installed and trimmed at the same time.

(2) If two fuel controls are installed and trimmed at the same time.

C. Part Power Trim: To minimize the amount of engine retrimming required when intermixing JT8D-217A, -217C, or -219 engines, two sets of part power trim charts are provided. Operators may select the trim charts which best fit the combinations of engines in their fleet, within the constraints on the charts. BOTH LEFT AND RIGHT HAND ENGINES MUST BE TRIMMED TO THE SAME PART POWER TRIM CHARTS. If only one engine requires trimming for the reasons specified in Paragraph 8., retrimming the other engine may be avoided by appropriate choice of trim charts. Before proceeding with the part power trim, the trim level, as represented by Table 513, Table 514 or Table 515 or Table 516 or Table 517 or Table 518 to which the engine is to be trimmed, must be specified.

NOTE: JT8D-217A engines must be trimmed to Table 513, Table 514. Operators with only -217C may use either Table 513, Table 514 or Table 515 or Table 516 or Table 517 or Table 518. The lower level of Table 513, Table 514 results in less noise and fuel consumption. Use of Table 515 or Table 516 or Table 517 or Table 518 for JT8D-217C may minimize retrimming for operators without -217A engines who intermix -217C and -219 engines.

D. Before starting an engine, a check should be made to ensure all systems associated with engine operation have been serviced, and that no maintenance is being performed on any system which may be affected.

E. Restricted areas, must be clear of personnel and foreign objects. (Figure 501)

F. The main landing gear wheels must be chocked.

G. Engine inlet and exhaust duct covers must be removed.

H. The airplane should be headed into the wind during engine trimming. (Figure 502)

I. Engine starting can be accomplished by utilizing a low-pressure pneumatic ground source, an operating engine, or the auxiliary power unit. If an engine start is to be performed using the auxiliary power unit, additional operating precautions must be observed. Refer to CHAPTER 49 for auxiliary power unit starting procedures.

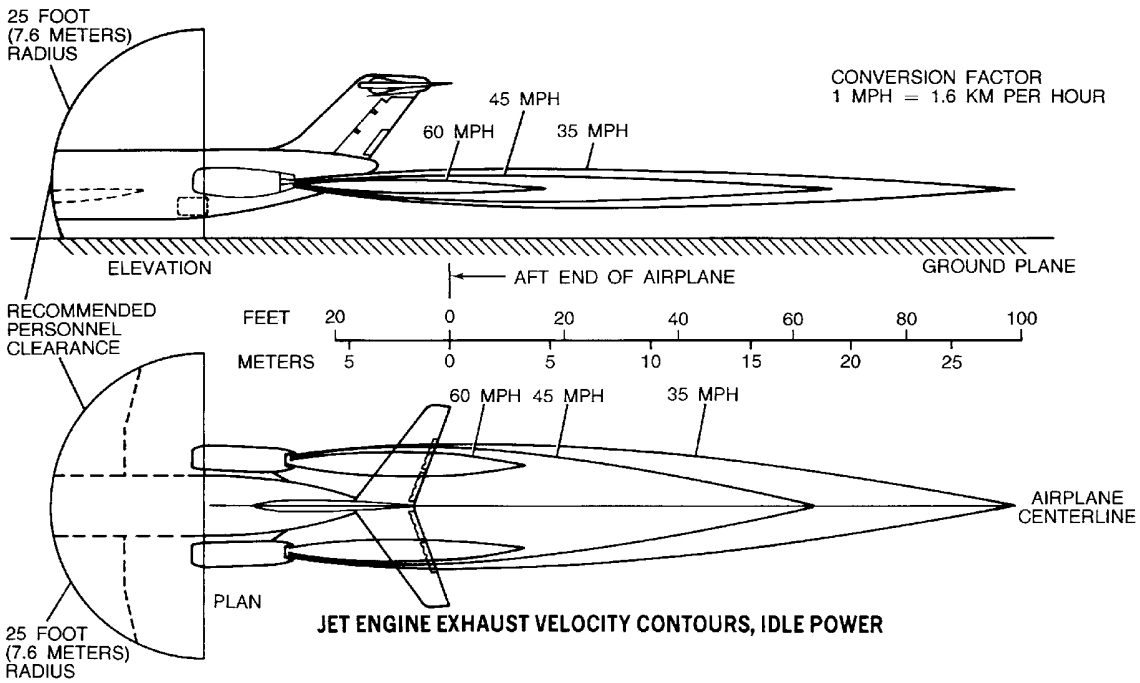
J. Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (5°F) of each other. Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for a minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

K. Static engine operation at thrust settings above idle should be limited as much as possible.

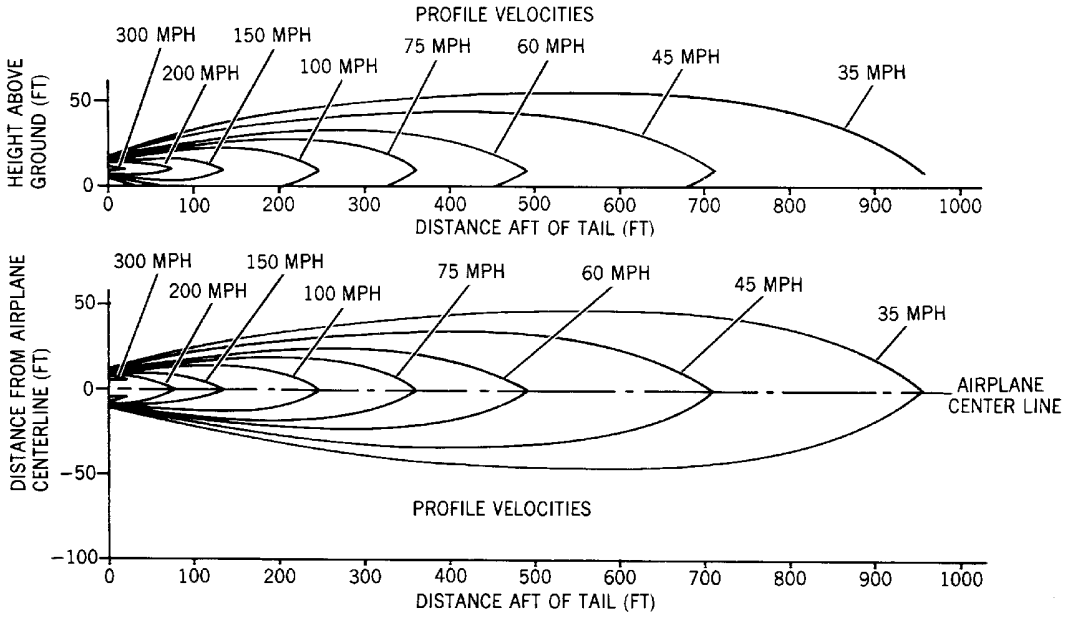
L. Symbols utilized in this section are defined as follows:

Table 501

(1)	EGT	- Exhaust Gas Temperature
(2)	EPR	- Engine Pressure Ratio (EPR = Pt_7/Pt_2)
(3)	N_1 rpm	- Low-pressure Compressor Rotor Speed
(4)	N_2 rpm	- High Pressure Compressor Rotor Speed
(5)	Pamb	- Barometric Pressure
(6)	PP EPR	- Part Power Engine Pressure Ratio
(7)	Pt_2	- Compressor Inlet Total Pressure
(8)	Pt_7	- Turbine Discharge Total Pressure
(9)	PP Pt_7	- Part Power Turbine Discharge Pressure
(10)	Tamb	- Ambient Temperature
(11)	TO EPR	- Takeoff Engine Pressure Ratio



JET ENGINE EXHAUST VELOCITY CONTOURS, IDLE POWER

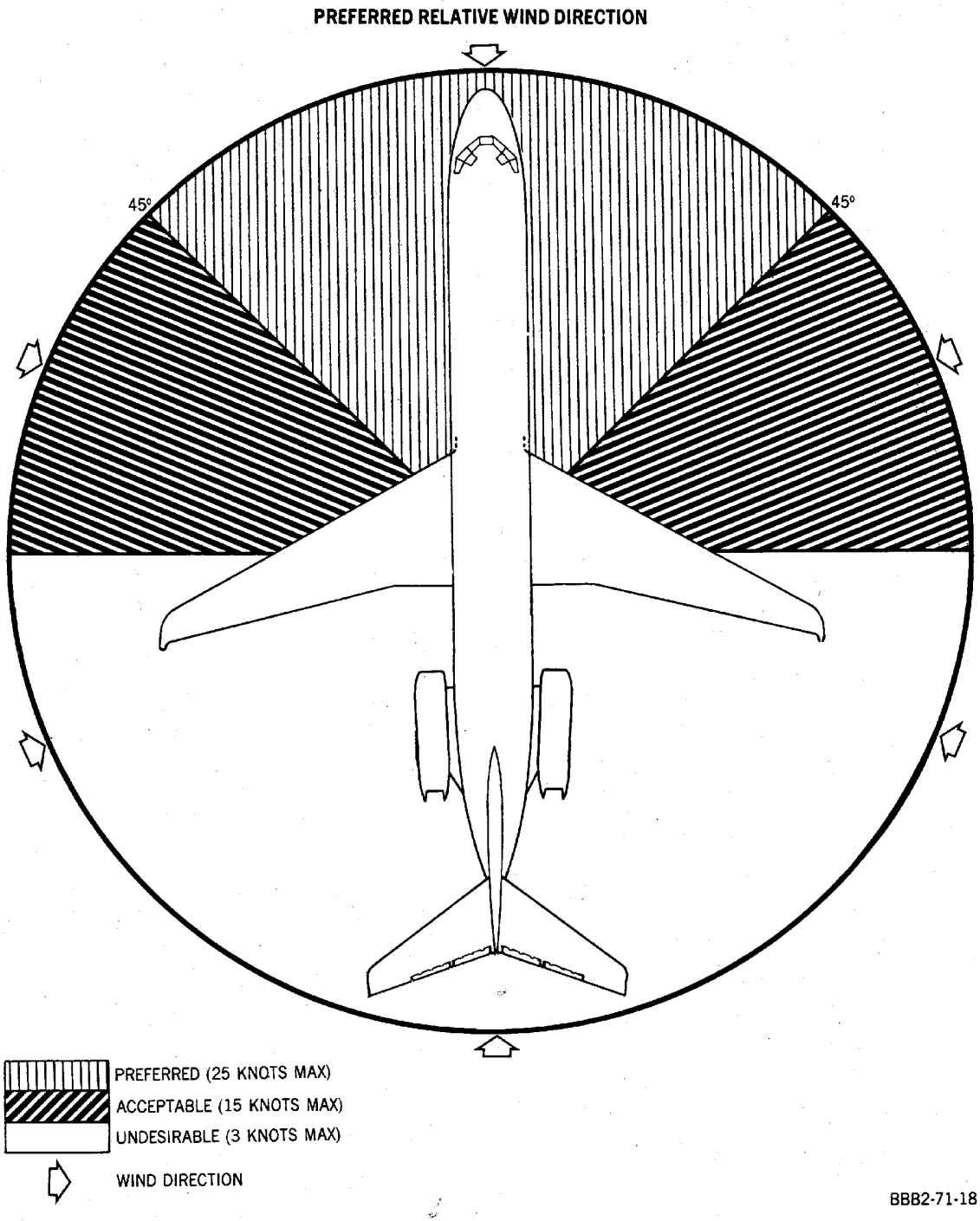


JET ENGINE EXHAUST VELOCITY CONTOURS, TAKEOFF POWER

NOTES:
1. THESE CONTOURS ARE TO BE USED AS GUIDELINES ONLY SINCE OPERATIONAL ENVIRONMENT VARIES GREATLY – OPERATIONAL SAFETY ASPECTS ARE THE RESPONSIBILITY OF THE USER/PLANNER.
2. ALL VELOCITY VALUES ARE STATUTE MILES/HOUR
3. CROSSWINDS WILL HAVE CONSIDERABLE EFFECT ON CONTOURS
4. SEA LEVEL STATIC – STANDARD DAY

BBB2-71-35B

Engine Restricted Areas - JT8D-217A, -217C, or -219 Engine
Figure 501/71-00-00-990-859



Engine Trim Wind Heading
Figure 502/71-00-00-990-860

2. Equipment and Materials

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

Table 502

Name and Number	Manufacturer
Remote engine trimmer D231	PEGASUS Comp Air Inc. 422 Trimber Ridge Road, Middletown CT. 06457-7540 Phone: 860 632-0345 FAX: 860 633-4973 Email: www.pegasusmfg.com
Engine trim test set, multi-engine with two trim heads, checks N1, N2, EPR, PT7, PT2, EGT, OAT	
Remote engine trimmer TEE 46-4/TE8D-06	Regelungs Messtechnik Schmidt, KG 2057 Reinbek-Hamburg Gutenberg Strasse 27, Germany Phone: 011-49-40-727 6030 Fax: 011-49-40-727 3066 Cincinnati office Phone: 513-237-4385 Fax: 513-469-0605

3. Engine Operating Limits

Table 503

Thrust Setting	Time Limit (Minutes)	Max. EGT (Degrees C) JT8D-217A/-217C/-219	Min. Oil Press. (PSI)	Max. Oil Temp. (Degrees C)
Takeoff (Normal)	5 2	590 595	*[1]40 (276 kPa)	135
Takeoff (Maximum)	5 2	625 630	*[1]40 (276 kPa)	135
Max Continuous	Continuous	580	*[1]40 (276 kPa)	135
WJE 412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-879, 891				
Starting	Momentary	*[2]500	*[1]40 (276 kPa)	135
WJE 405-411, 880, 881, 883, 884, 886, 887				
Starting	Momentary	*[2]500	*[1]40 (276 kPa)	135
WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893				

*[1] CAUTION: NORMAL OIL PRESSURE IS 40 TO 55 PSI (276 TO 380 KPA). OIL PRESSURE BETWEEN 35 AND 40 PSI (242-276 KPA) IS PERMISSIBLE FOR SUSTAINED OPERATIONS (TO COMPLETE FLIGHT), PREFERABLY AT REDUCED THROTTLE SETTING. OIL PRESSURE BELOW 35 PSI (242 KPA) IS UNSAFE.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

*[2] NOTE: Temperature is time limited to momentary. If the maximum EGT temperature is exceeded, the engine should be shut down and inspected in accordance with the instructions contained in CHAPTER 72 of the Maintenance Manual.

A. With the exception of idle, thrust settings are obtained by positioning the throttles to obtain the required engine pressure ratio for existing inlet air temperature.

B. A maximum oil temperature of 165°C is allowable for a time period not to exceed 15 minutes.

C. At normal takeoff the N_2 high-pressure compressor rotor speed should not exceed 100.9 percent (12,350 rpm), and the N_1 low-pressure compressor rotor speed should not exceed 98.3 percent (8,080 rpm).

D. Starter duty cycle:

(1) Three successive 30 second start attempts i.e.; 90 seconds on, 5 minutes off.

(2) Subsequent start attempts 30 seconds on, 5 minutes off or 60 seconds on, 10 minutes off.

(3) Dry motoring 90 seconds on 15 minutes off.

NOTE: Starter duty cycle limits do not supersede ignition system duty cycle limits.

E. Thrust reverser ground maintenance operation precautions:

(1) Do not operate engine above idle thrust when thrust reverser is deployed.

(2) Ensure aircraft is secured to prevent it from rolling backwards.

NOTE: Use of brakes when aircraft is rolling backwards may cause aircraft to tip back.

(3) Observe all normal precautions related to engine ground operations.

F. Operation in icing conditions:

(1) Engine anti-ice should be used during ground operation if outside air temperature is less than 6°C (42°F) and visible moisture is present or dewpoint and outside air temperature (RAT or SAT) are within 3°C (9°F) of each other.

(2) Periodic engine run-up (with engine anti-icing system on) to as high a thrust setting as practical (70% N_1 for minimum of 15 seconds is desired) should be performed to minimize possibility of ice build-up during extended ground idle operation in severe icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minute intervals.

4. Engine Starting

WARNING: MAKE CERTAIN THAT ENGINE INLET AND EXHAUST AREAS ARE CLEAR OF FOREIGN OBJECTS AND PERSONNEL.

A. Before starting engine, check following switch and lever positions:

Table 504

(1)	Check that all engine related circuit breakers are closed.	
(2)	If using external electrical power:	
(a)	External power available light	On
(b)	Voltage/frequency	Checked
(c)	External power bus switches	On
(d)	Ground service panel external power bus	Off

Table 504 (Continued)

(e)	Ground service panel APU power bus switch	Off
(3)	Galley power	Off
(4)	CSD disconnect	Normal
(5)	Generators	Reset & On
(6)	AC crosstie	Auto
(7)	DC crosstie	Open
(8)	Emergency electrical power	Checked
(9)	Auxiliary power unit panel	
(a)	Fire control	Normal
(b)	Bleed air	Off
(c)	Master	Off
(d)	Doors	Automatic
(10)	Air-conditioning supply switch	Off
(11)	Start pump	Off
(12)	Ignition selector switch	Off
(13)	Fuel tank pump switches	Off
(14)	Airfoil anti-icing	Off
(15)	Engine anti-icing	Off
(16)	Annunciator panel	Tested
(17)	All warning lights	Tested
(18)	Fire detection and extinguishing systems	Checked & Tested
(19)	Engine hydraulic pump	High
(20)	Auxiliary hydraulic pump	On
(21)	Hydraulic pressure and quantity	Checked
(22)	Engine instruments	Checked & Set
(23)	Fuel flow counters	Reset
(24)	Fuel quantity	Checked & Tested
(25)	Throttles	Idle
(26)	Autothrottle	Disengaged
(27)	Engine synchronize switch	Off
(28)	Thrust reverser lever	Forward thrust
(29)	Fuel shutoff lever	Off
(30)	Fire control handle	Normal
(31)	Fuel crossfeed	Off
(32)	Pneumatic crossfeed	Closed

Table 504 (Continued)

(33)	If using auxiliary power unit for start:	
(a)	Battery switch	On
(b)	APU door control switch	Auto
(c)	Fire control switch	Normal
(d)	APU left and right bus switch	On
(e)	APU bleed air switch	Off
(f)	Start pump or fuel tank boost pump	On
(g)	APU master switch	Start/Run
(h)	Voltage/frequency	Checked
(34)	Parking brakes	Set
(35)	Antiskid	Off

CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS AFTER FUEL CONTROL LEVER IS PLACED TO FUEL ON, DISCONTINUE ENGINE START. DO NOT ATTEMPT SECOND START UNTIL ENGINE CLEARING PROCEDURES ARE COMPLIED WITH, OTHERWISE HOT OR BOOMING START MAY RESULT.

CAUTION: INSUFFICIENT AIR PRESSURE TO PNEUMATIC STARTER OR TO COMBUSTION STARTER THAT IS BEING USED AS PNEUMATIC STARTER MAY NOT SUPPLY ENOUGH STARTER TORQUE TO START AN ENGINE PROPERLY, RESULTING IN HOT, HUNG OR "TORCHING" STARTS. WHEN AIRBLEED FROM ANOTHER ENGINE IS USED TO OPERATE STARTER, CAUTION IS NECESSARY TO ENSURE THAT OPERATING ENGINE IS TURNING OVER FAST ENOUGH TO PROVIDE AN ADEQUATE SUPPLY OF PRESSURIZED AIR TO ENGINE BEING STARTED. AN ENGINE SHOULD NEVER BE PERMITTED TO TAKE LONGER THAN 2 MINUTES TO ACCELERATE TO IDLE RPM. IN EVENT OF TORCHING, HIGHER THAN USUAL EXHAUST GAS STARTING TEMPERATURE, TOO LONG AN ACCELERATION TIME OR OTHER ABNORMALITIES, DISCONTINUE STARTING ATTEMPT AND INVESTIGATE.

B. Start engine by placing switches and levers in indicated position.

Table 505

(1)	Obtain clearance to start engine	Received
(2)	Pneumatic pressure	Checked (*36 psi minimum) (248 kPa)
NOTE: *Can be 1 psi (7 kPa) less per 1000 feet (305M) in pressure altitude above sea level.		
(3)	Air-conditioning supply switch	Off
(4)	Pneumatic crossfeed	
(a)	If making crossfeed start	Both open
(b)	If using APU or ground pneumatic source	Left or right open as applicable
(5)	Anti-collision light (if required)	On
(6)	Fuel boost or start pump	On
(7)	Inlet fuel pressure low light	Off

Table 505 (Continued)

CAUTION: IF FUEL IS SHUT OFF INADVERTENTLY, DO NOT CONTINUE START CYCLE. WHENEVER ENGINE FAILS TO START, SHUT OFF FUEL AND IGNITION AND CONTINUE TURNING COMPRESSOR OVER WITH STARTER FOR 10 TO 15 SECONDS TO CLEAR OUT TRAPPED FUEL OR VAPOR. BEFORE ATTEMPTING ANOTHER START, ALLOW EITHER 30-SECOND DRAINING PERIOD OR PRESCRIBED STARTER COOLING PERIOD, WHICHEVER IS LONGER. STARTER SHOULD NOT BE REENGAGED UNTIL ENGINE HAS COME TO COMPLETE STOP.		
WJE 412, 414		
(8)	Ignition selector switch	Position for normal ground start
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893		
(8)	Ignition selector switch	GRD START and CONTIN
WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893		
NOTE: Ground personnel should check for N_1 and N_2 rotor rotation as the tachometer indicator (N_1) will not indicate very low windmilling speeds.		
CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL N_1 AND N_2 ROTORS HAVE STOPPED ROTATING.		
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893		
(9)	Start switch	Position for normal ground start
WJE 412, 414		
(9)	Start switch	HOLD TO ON
WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893		
(10)	Start valve open light	On
(11)	Oil pressure	Rising
CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N_1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION ALONG WITH A MINIMUM INDICATED N_2 OF 20% BEFORE RAISING FUEL SHUTOFF LEVER.		
(12)	N_1 rotor	Positive rotation indicated
(13)	N_2 rotor	Rotation
CAUTION: IF N_2 DOES NOT INDICATE A MINIMUM OF 20% DO NOT RAISE FUEL SHUTOFF LEVER. TERMINATE START UNTIL CAUSE OF MALFUNCTION CAN BE DETERMINED AND CORRECTIVE ACTION TAKEN.		
(14)	Fuel shutoff lever	Fuel on at maximum motoring (20 percent N_2 rpm percent minimum)

Table 505 (Continued)

NOTE: Moving the FUEL lever to ON (i.e., pressurizing the engine) when the N_2 tachometer indicates maximum motoring RPM (maximum motoring is defined as no N_2 RPM change for 5 seconds) and N_1 RPM indicates positive rotation, will improve probability of a good start. Minimum N_2 RPM for moving FUEL lever to ON is 20% RPM.		
(15)	Initial fuel flow	Approximately 800 lb/hr (362.9KG/HR)
NOTE: At initial engine start, the fuel flow indicator may fluctuate slightly due to air in the system. However, the indicator will function properly and the system will be clear of air after approximately 3 minutes of operation. Throttle action may be required as an aid in clearing the system of air.		
WJE 886, 887		
CAUTION: WHEN EGT AND/OR FUEL FLOW DISPLAY FLASHES, A HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891		
CAUTION: FOR AIRCRAFT WITH ANALOG INSTRUMENTS, WHEN STARTING EGT REACHES WITHIN 50°C (425°C) OF STARTING TEMPERATURE LIMIT (500°C) AND CONTINUES TO CLIMB DURING GROUND STARTING CYCLE, HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		
WJE 412, 414, 875-879		
CAUTION: WHEN STARTING EGT REACHES WITHIN 50°C (425°C) OF STARTING TEMPERATURE LIMIT (500°C) AND CONTINUES TO CLIMB DURING GROUND STARTING CYCLE, HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		
WJE 405-411, 873, 874, 880, 881, 883, 884, 892, 893		
CAUTION: WHEN STARTING EGT REACHES WITHIN 50°C (425°C) OF STARTING TEMPERATURE LIMIT (475°C) AND CONTINUES TO CLIMB DURING GROUND STARTING CYCLE, HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891		
CAUTION: FOR AIRCRAFT WITH ENGINE DISPLAY PANEL (EDP), WHEN EGT AND/OR FUEL FLOW DISPLAY FLASHES, A HOT START SHOULD BE ANTICIPATED. IF ENGINE FUEL IS SHUT OFF IMMEDIATELY UPON OBSERVING THIS CONDITION, TEMPERATURES ABOVE MAXIMUM ALLOWABLE LIMIT CAN USUALLY BE AVOIDED.		

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891 (Continued)

Table 505 (Continued)

WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893		
CAUTION: IF EGT DOES NOT RISE WITHIN 20 SECONDS, DISCONTINUE START AND PROCEED WITH UNSATISFACTORY START AND/OR ENGINE CLEARING PROCEDURES.		
(16)	Exhaust gas temperature	Rising
(17)	Start switch	Release/off (between 35 and 40 percent N_2 rpm)
CAUTION: IF START VALVE LIGHT FAILS TO GO OUT, AND THERE IS NO INDICATION OF DUCT PRESSURE RISE BY TIME ENGINE ACCELERATES TO 40% N_2, PNEUMATIC CROSSFEED VALVE MUST BE CLOSED IMMEDIATELY AND START TERMINATED UNTIL CAUSE OF MALFUNCTION CAN BE DETER MINED AND CORRECTIVE ACTION TAKEN.		
(18)	Start valve open light	Off
(19)	Oil pressure low light	Off
(20)	CSD oil pressure low light	Off
(21)	After idle has stabilized, check following:	
(a)	N_2 rotor rpm	50 to 61 percent
(b)	N_1 rotor rpm	22 to 30 percent
(c)	Exhaust gas temperature	300 to 480°C
(d)	Fuel flow	600 to 1100 pounds per hour (270 to 500 KG/HR)
(e)	Oil pressure	40 to 55 psi (276 to 380 kPa)
(f)	Hydraulic pressure low light	Off
(g)	Generator	115(±3) volts 400(±4) Hz
(h)	Ignition selector switch	Off
(i)	Fuel boost or start pump	Off

5. Unsatisfactory Start

NOTE: Unsatisfactory start procedures should be followed if any of the following conditions occur.

- Hot Start -- EGT exceeds starting limit. A hot start may be anticipated by greater than normal fuel flow for a given field elevation.
- No Start -- Engine does not light off as evidenced by no rise in exhaust gas temperature.
- False Start -- Engine lights off but rpm does not accelerate to idle. EGT may or may not reach the maximum.

A. Place following levers and switches in indicated positions.

Table 506

(1)	Throttle	Idle
(2)	Fuel shutoff	Off

Table 506 (Continued)

NOTE: If no start is obtained, continue to motor engine for 20 seconds to clear engine of fuel and vapors.		
(3)	Starter control switch	Release/off
NOTE: In the event of engine fire, starter can be reengaged when N_2 RPM decreases to 20%.		
(4)	Ignition selector switch	Off
(5)	Fuel boost or start pump	Off

CAUTION: STARTER DUTY CYCLE MUST BE FOLLOWED; REFER TO CHAPTER 80. ENGINE MUST BE CLEARED OF FUEL AND TRAPPED VAPORS BEFORE ATTEMPTING ANOTHER START.

B. Check that no fire hazard exists and determine cause of unsatisfactory start before attempting another start.

6. Engine Clearing Procedures

CAUTION: MAKE CERTAIN N_2 TACHOMETER INDICATOR DOES NOT INDICATE ANY COMPRESSOR ROTATION.

A. Clear Engine

(1) To clear engine of fuel and vapors place the following levers and switches in indicated positions.

Table 507

(a)	Throttle	Idle
(b)	Fuel shutoff	Off

(2) Place following switches in indicated positions to keep accessory load and bleed air at minimum during operational check.

Table 508

(a)	Airfoil and engine anti-ice	Off
(b)	Air-conditioning supply	Off
(c)	N_2 Tachometer	Indicates rotation has ceased
(d)	Ignition selector switch	Off
(e)	Fuel boost or start pump	On
(f)	Start switch	Start (for approximately 20 seconds)

(3) Attempt another start. (Paragraph 4.)

7. Engine Shutdown Procedures

CAUTION: IF ENGINE HAS BEEN OPERATED AT OR ABOVE 85 PERCENT N_2 FOR MORE THAN 1 MINUTE DURING 5 MINUTES BEFORE SHUTDOWN, ENGINE MUST BE OPERATED AT IDLE RPM FOR 5 MINUTES TO REDUCE POSSIBILITY OF A ROTOR SEIZURE.

A. Shutdown Engine

(1) Place the following levers and switches in indicated positions.

Table 509

(a)	Throttle	Idle
(b)	Fuel shutoff	Off
(c)	Ignition selector	Off
(d)	Fuel boost or start pump	Off

(2) Observe that compressor rotors decelerate freely.

(3) Remove ground pneumatic source from airplane or shut down auxiliary power unit as applicable. (SECTION 49-00)

(4) Remove electrical power source from airplane.

(5) Install inlet and exhaust duct covers as soon as engine has cooled sufficiently.

8. Engine Trimming Procedures

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

CAUTION: IF OUTSIDE AIR TEMPERATURE IS LESS THAN 6°C (42°F) AND VISIBLE MOISTURE IS PRESENT OR DEWPOINT AND OUTSIDE AIR TEMPERATURE (RAT OR SAT) ARE WITHIN 3°C (5°F) OF EACH OTHER, ENGINE TRIMMING SHOULD BE AVOIDED.

A. Install Test Equipment

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb) and determine trim stop position:

CAUTION: WHEN YOU USE PART POWER TRIM-COLD TRIM STOP-JT8D-217A TABLES TO TRIM JT8D-217A ENGINE, THE ENGINE MUST INCORPORATE P&W SB 5618 OR 5752, OR THE PRODUCTION EQUIVALENT. COMPLIANCE WITH THIS REQUIREMENT BY 30 JULY 1990 HAS BEEN DIRECTED BY THE FAA.

(a) Using ambient temperature and Table 513, Table 514 or Table 515 or Table 516 or Table 517 or Table 518, determine part power trim stop position to be used. When temperature is in area where either Standard Day or Cold Day stop can be used, use of Cold Day stop results in trim operation at lower engine thrust levels but increases the possibility of throttle stagger. As a general rule, use of Standard Day stop at temperatures above 30°C (86°F) is recommended, unless noise or other local restriction requires operation at lower thrust levels. If ambient temperature is below minimum value given in Standard Day Trim chart, Cold Day Trim chart must be used.

NOTE: The part power trim stop is marked with letter S (Standard Day Trim) on one side and letter C (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward. (Figure 503)

NOTE: Fuel control part power trim stops are interchangeable with -217A, -217C and -219 fuel controls.

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

(4) ART system check may be performed per Paragraph 13..

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(6) To assure proper trimming, maintain no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 510

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

NOTE: During engine trim procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When trimming the right engine, the left air-conditioning pack should be turned on. When trimming the left engine, the right air-conditioning pack should be turned on.

(7) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 8.A.(7) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Operate engine with throttle in idle position for 5 minutes.

(2) Record N_2, ambient temperature (Tamb), and pressure (Pamb).

(3) Determine low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511, Table 512 .

(4) After N_2 has stabilized for 5 minutes, adjust fuel control idle trim adjustment until idle N_2 RPM percent is within idle N_2 determined in Paragraph 8.B.(3).

(5) Record actual N_2 percent set.

NOTE: The Idle trim screw is identified by the letters "IDLE" on the fuel control adjacent to the screw. The Part Power screw is identified by the letters "MIL" adjacent to the screw. (Part Power is sometimes called Military or Maximum trim.) Both screws are also identified adjacent to the screws with the letters "INC" with an arrow indicating the direction to turn the screws for increased trim levels.

Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

Table 511 Low Idle Trim - JT8D-217A/-217C/-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	51.2-52.0	51.6-52.4	52.2-53.0	52.9-53.7
-49 (-56.2)	51.1-51.9	51.5-52.3	52.1-52.9	52.8-53.6
-48 (-54.4)	51.0-51.8	51.5-52.3	52.1-53.0	52.8-53.6
-47 (-52.6)	51.0-51.8	51.4-52.2	52.0-52.8	52.7-53.5
-46 (-50.8)	50.9-51.7	51.4-52.1	52.0-52.8	52.7-53.5
-45 (-49.0)	50.9-51.7	51.9-52.1	51.9-52.7	52.7-53.5
-44 (-47.2)	50.8-51.6	51.2-52.0	51.9-52.7	52.6-53.4
-43 (-45.4)	50.8-51.6	51.2-52.0	51.8-52.6	52.6-53.4
-42 (-43.6)	50.8-51.6	51.1-51.9	51.8-52.6	52.6-53.4
-41 (-41.8)	50.7-51.7	51.1-51.9	51.8-52.6	52.5-53.3
-40 (-40.0)	50.7-51.5	51.1-51.9	51.7-52.5	52.5-53.3
-39 (-38.2)	50.7-51.5	51.0-51.8	51.7-52.5	52.5-53.3
-38 (-36.4)	50.6-51.4	51.0-51.8	51.7-52.5	52.5-53.3
-37 (-34.6)	50.6-51.4	50.9-51.7	51.7-52.5	52.5-53.3
-36 (-32.8)	50.6-51.4	50.9-51.7	51.6-52.4	52.4-53.2
-35 (-31.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-34 (-29.0)	50.5-51.3	50.9-51.7	51.6-52.4	52.4-53.2
-33 (-27.4)	50.5-51.3	50.8-51.6	51.6-52.4	52.4-53.2
-32 (-25.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2

Table 511 Low Idle Trim - JT8D-217A/-217C/-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-31 (-23.8)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-30 (-22.0)	50.4-51.2	50.8-51.6	51.6-52.4	52.3-53.1
-29 (-20.2)	50.4-51.2	50.7-51.5	51.6-52.4	52.3-53.1
-28 (-18.4)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-27 (-16.6)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-26 (-14.8)	50.3-51.1	50.7-51.5	51.6-52.4	52.3-53.1
-25 (-13.0)	50.3-51.1	50.8-51.6	51.6-52.4	52.3-53.1
-24 (-11.2)	50.3-51.1	50.8-51.6	51.6-52.4	52.4-53.2
-23 (-9.4)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-22 (-7.6)	50.4-51.2	50.8-51.6	51.6-52.4	52.4-53.2
-21 (-5.8)	50.4-51.2	50.8-51.6	51.7-52.5	52.4-53.2
-20 (-4.0)	50.4-51.2	50.9-51.7	51.7-52.5	52.5-53.3
-19 (-2.2)	50.5-51.3	50.9-51.7	51.7-52.5	52.5-53.3
-18 (-0.4)	50.5-51.3	50.9-51.7	51.8-52.6	52.6-53.4
-17 (1.4)	50.6-51.4	51.0-51.8	51.8-52.6	52.6-53.4
-16 (3.2)	50.6-51.4	51.0-51.8	51.9-52.7	52.7-53.5
-15 (5.0)	50.7-51.5	51.1-51.9	51.9-52.7	52.7-53.5
-14 (6.8)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-13 (8.6)	50.8-51.6	51.2-52.0	52.0-52.8	52.8-53.6
-12 (10.4)	50.9-51.7	51.3-52.1	52.1-52.9	52.9-53.7
-11 (12.2)	51.0-51.8	51.4-52.2	52.2-53.0	53.0-53.8
-10 (14.0)	51.1-51.9	51.4-52.2	52.2-53.0	53.1-53.9
-9 (15.8)	51.1-51.9	51.5-52.3	52.3-53.1	53.1-53.9
-8 (17.6)	51.2-52.0	51.6-52.4	52.4-53.2	53.2-54.0
-7 (19.4)	51.3-52.1	51.6-52.4	52.5-53.3	53.3-54.1
-6 (21.2)	51.4-52.2	51.7-52.5	52.6-53.4	53.4-54.2
-5 (23.0)	51.5-52.3	51.8-52.6	52.7-53.5	53.5-54.3
-4 (24.8)	51.5-52.3	51.9-52.7	52.8-53.6	53.6-54.4
-3 (26.6)	51.6-52.4	52.0-52.8	52.9-53.7	53.7-54.5
-2 (28.4)	51.7-52.5	52.1-52.9	53.0-53.8	53.8-54.6
-1 (30.2)	51.8-52.6	52.2-53.0	53.1-53.9	53.9-54.7
0 (32.0)	51.9-52.7	52.3-53.1	53.2-54.0	54.0-54.8

Table 511 Low Idle Trim - JT8D-217A/-217C/-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
1 (33.8)	52.0-52.8	52.4-53.2	53.3-54.1	54.1-54.9
2 (35.6)	52.1-52.9	52.5-53.3	53.4-54.2	54.2-55.0
3 (37.4)	52.2-53.0	52.6-53.4	53.5-54.3	54.3-55.1
4 (39.2)	52.3-53.1	52.7-53.5	53.5-54.3	54.4-55.2
5 (41.0)	52.3-53.1	52.8-53.6	53.6-54.4	54.5-55.3
6 (42.8)	52.4-53.2	52.9-53.7	53.7-54.5	54.6-55.4
7 (44.6)	52.5-53.3	53.0-53.8	53.8-54.6	54.7-55.5
8 (46.4)	52.6-53.4	53.1-53.9	53.9-54.7	54.7-55.5
9 (48.2)	52.7-53.5	53.1-53.9	54.0-54.8	54.8-55.6
10 (50.0)	52.8-53.6	53.2-54.0	54.0-54.8	54.9-55.7
11 (51.8)	52.9-53.7	53.3-54.1	54.1-54.9	55.0-55.8
12 (53.6)	52.9-53.7	53.4-54.2	54.2-55.0	55.1-55.9
13 (55.4)	53.0-53.8	53.5-54.3	54.3-55.1	55.2-56.0
14 (57.2)	53.1-53.9	53.5-54.3	54.4-55.2	55.2-56.0
15 (59.0)	53.2-54.0	53.6-54.4	54.4-55.2	55.3-56.1
16 (60.8)	53.3-54.1	53.7-54.5	54.5-55.3	55.4-56.2
17 (62.6)	53.4-54.2	53.8-54.6	54.6-55.4	55.4-56.2
18 (64.4)	53.4-54.2	53.8-54.6	54.7-55.5	55.5-56.3
19 (66.2)	53.5-54.3	53.9-54.7	54.7-55.5	55.6-56.4
20 (68.0)	53.6-54.4	54.0-54.8	54.8-55.6	55.7-56.5
21 (69.8)	53.7-54.5	54.0-54.8	54.9-55.7	55.7-56.5
22 (71.6)	53.7-54.5	54.1-54.9	55.0-55.8	55.8-56.6
23 (73.4)	53.8-54.6	54.2-55.0	55.0-55.8	55.9-56.7
24 (75.2)	53.9-54.7	54.3-55.1	55.1-55.9	56.0-56.8
25 (77.0)	54.0-54.8	54.4-55.2	55.2-56.0	56.0-56.8
26 (78.8)	54.1-54.9	54.5-55.3	55.3-56.1	56.1-56.9
27 (80.6)	54.1-54.9	54.5-55.3	55.4-56.2	56.2-57.0
28 (82.4)	54.2-55.0	54.6-55.4	55.4-56.2	56.3-57.1
29 (84.2)	54.3-55.1	54.7-55.5	55.5-56.3	56.4-57.2
30 (86.0)	54.4-55.2	54.8-55.6	55.6-56.4	56.4-57.2
31 (87.8)	54.5-55.3	54.9-55.7	55.7-56.5	56.5-57.3
32 (89.6)	54.5-55.3	54.9-55.7	55.8-56.6	56.6-57.4

Table 511 Low Idle Trim - JT8D-217A/-217C/-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.90 & ABOVE	24.00	23.00	22.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
33 (91.4)	54.6-55.4	55.0-55.8	55.8-56.6	56.7-57.5
34 (93.2)	54.7-55.5	55.1-55.9	55.9-56.7	56.7-57.5
35 (95.0)	54.8-55.6	55.2-56.0	56.0-56.8	56.8-57.6
36 (96.8)	54.9-55.7	55.3-56.1	56.1-56.9	56.9-57.7
37 (98.6)	54.9-55.7	55.4-56.2	56.2-57.0	57.0-57.8
38 (100.4)	55.0-55.8	55.5-56.3	56.3-57.1	57.1-57.9
39 (102.2)	55.1-55.9	55.6-56.4	56.4-57.2	57.1-57.9
40 (104.0)	55.2-56.0	55.6-56.4	56.4-57.2	57.2-58.0
41 (105.8)	55.3-56.1	57.7-56.5	56.5-57.3	57.3-58.1
42 (107.6)	55.3-56.1	55.8-56.6	56.6-57.4	57.4-58.2
43 (109.4)	55.4-56.2	55.9-56.7	56.7-57.5	57.5-58.3
44 (111.2)	55.5-56.3	56.0-56.8	56.8-57.6	57.5-58.3
45 (113.0)	55.6-56.4	56.1-56.9	56.8-57.6	57.6-58.4
46 (114.8)	55.7-56.5	56.2-57.0	56.9-57.7	57.7-58.5
47 (116.6)	55.8-56.6	56.2-57.0	57.0-57.8	57.8-58.6
48 (118.4)	55.9-56.7	56.3-57.1	57.1-57.9	57.8-58.6
49 (120.2)	55.9-56.7	56.4-57.2	57.1-57.9	57.9-58.7
50 (122.0)	56.0-56.8	56.5-57.3	57.2-58.0	58.0-58.8

Table 512 Low Idle Trim - JT8D-217A/-217C/-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	53.8-54.7	54.8-55.6		
-49 (-56.2)	53.7-54.5	54.7-55.5		
-48 (-54.4)	53.7-54.5	54.7-55.5		
-47 (-52.6)	53.7-54.5	54.7-55.5		
-46 (-50.8)	53.7-54.5	54.7-55.5		
-45 (-49.0)	53.6-54.4	54.6-55.4		
-44 (-47.2)	53.6-54.4	54.6-55.4		
-43 (-45.4)	53.6-54.4	54.6-55.4		
-42 (-43.6)	53.6-54.4	54.6-55.5		

Table 512 Low Idle Trim - JT8D-217A/-217C/-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-41 (-41.8)	53.5-54.3	54.6-55.4		
-40 (-40.0)	53.5-54.3	54.5-55.3		
-39 (-38.2)	53.5-54.3	54.5-55.3		
-38 (-36.4)	53.5-54.3	54.5-55.3		
-37 (-34.6)	53.5-54.3	54.5-55.3		
-36 (-32.8)	53.5-54.3	54.5-55.3		
-35 (-31.0)	53.5-54.3	54.5-55.3		
-34 (-29.0)	53.4-54.2	54.5-55.3		
-33 (-27.4)	53.4-54.2	54.5-55.3		
-32 (-25.6)	53.4-54.2	54.4-55.2		
-31 (-23.8)	53.4-54.2	54.4-55.2		
-30 (-22.0)	53.4-54.2	54.4-55.2		
-29 (-20.2)	53.4-54.2	54.4-55.2		
-28 (-18.4)	53.4-54.2	54.4-55.2		
-27 (-16.6)	53.4-54.2	54.4-55.2		
-26 (-14.8)	53.4-54.2	54.4-55.2		
-25 (-13.0)	53.5-54.3	54.5-55.3		
-24 (-11.2)	53.5-54.3	54.5-55.3		
-23 (-9.4)	53.5-54.3	54.5-55.3		
-22 (-7.6)	53.5-54.3	54.6-55.4		
-21 (-5.8)	53.5-54.3	54.6-55.4		
-20 (-4.0)	53.6-54.4	54.6-55.4		
-19 (-2.2)	53.6-54.4	54.7-55.5		
-18 (-0.4)	53.7-54.5	54.7-55.5		
-17 (1.4)	53.7-54.5	54.8-55.6		
-16 (3.2)	53.8-54.6	54.8-55.6		
-15 (5.0)	53.8-54.6	54.9-55.7		
-14 (6.8)	53.9-54.7	54.9-55.7		
-13 (8.6)	53.9-54.7	55.0-55.8		
-12 (10.4)	54.0-54.8	55.1-55.9		
-11 (12.2)	54.1-54.9	55.2-56.0		
-10 (14.0)	54.2-55.0	55.2-56.0		

Table 512 Low Idle Trim - JT8D-217A/-217C/-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-9 (15.8)	54.2-55.0	55.3-56.1		
-8 (17.6)	54.3-55.1	55.4-56.2		
-7 (19.4)	54.4-55.2	55.5-56.3		
-6 (21.2)	54.5-55.3	55.6-56.4		
-5 (23.0)	54.6-55.4	55.7-56.5		
-4 (24.8)	54.7-55.5	55.8-56.6		
-3 (26.6)	54.8-55.6	55.9-56.7		
-2 (28.4)	54.9-55.7	56.0-56.8		
-1 (30.2)	55.0-55.8	56.1-56.9		
0 (32.0)	55.1-55.9	56.2-57.0		
1 (33.8)	55.2-56.0	56.3-57.1		
2 (35.6)	55.3-56.1	56.4-57.2		
3 (37.4)	55.4-56.2	56.5-57.3		
4 (39.2)	55.5-56.3	56.6-57.4		
5 (41.0)	55.6-56.4	56.7-57.5		
6 (42.8)	55.7-56.5	56.8-57.6		
7 (44.6)	55.8-56.6	56.9-57.7		
8 (46.4)	55.9-56.7	57.0-57.8		
9 (48.2)	56.0-56.8	57.1-57.9		
10 (50.0)	56.0-56.8	57.2-58.0		
11 (51.8)	56.1-56.9	57.2-58.0		
12 (53.6)	56.2-57.0	57.3-58.1		
13 (55.4)	56.3-57.1	57.4-58.2		
14 (57.2)	56.3-57.1	57.5-58.3		
15 (59.0)	56.4-57.2	57.6-58.4		
16 (60.8)	56.5-57.3	57.6-58.4		
17 (62.6)	56.6-57.4	57.7-58.5		
18 (64.4)	56.6-57.4	57.8-58.6		
19 (66.2)	56.7-57.5	57.9-58.7		
20 (68.0)	56.7-57.5	57.9-58.7		
21 (69.8)	56.8-57.6	58.0-58.8		
22 (71.6)	56.9-57.7	58.1-58.9		

Table 512 Low Idle Trim - JT8D-217A/-217C/-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	21.00	20.00		
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
23 (73.4)	57.0-57.8	58.1-58.9		
24 (75.2)	57.0-57.8	58.2-59.0		
25 (77.0)	57.1-57.9	58.3-59.1		
26 (78.8)	57.2-58.0	58.3-59.1		
27 (80.6)	57.3-58.1	58.4-59.2		
28 (82.4)	57.3-58.1	58.5-59.3		
29 (84.2)	57.4-58.2	58.5-59.3		
30 (86.0)	57.5-58.3	58.6-59.4		
31 (87.8)	57.6-58.4	58.7-59.5		
32 (89.6)	57.7-58.5	58.7-59.5		
33 (91.4)	57.7-58.5	58.8-59.6		
34 (93.2)	57.8-58.6	58.9-59.7		
35 (95.0)	57.9-58.7	58.9-59.7		
36 (96.8)	57.9-58.7	59.0-59.8		
37 (98.6)	58.0-58.8	59.1-59.9		
38 (100.4)	58.1-58.9	59.2-60.0		
39 (102.2)	58.2-59.0	59.2-60.0		
40 (104.0)	58.2-59.0	59.3-60.1		
41 (105.8)	58.3-59.1	59.4-60.2		
42 (107.6)	58.4-59.2	59.5-60.3		
43 (109.4)	58.5-59.3	59.5-60.3		
44 (111.2)	58.5-59.3	59.6-60.4		
45 (113.0)	58.6-59.4	59.6-60.4		
46 (114.8)	58.7-59.5	59.7-60.5		
47 (116.6)	58.8-59.6	59.8-60.6		
48 (118.4)	58.8-59.6	59.8-60.6		
49 (120.2)	58.9-59.7	59.9-60.7		
50 (122.0)	59.0-59.8	60.0-60.8		

C. Part Power Trim

(1) Record ambient temperature (Tamb) and pressure (Pamb).

(a) Ambient temperature (Tamb):

1) Use a laboratory approved thermometer.

2) Alternate: Contact airport control tower.

(b) Ambient barometric pressure (Pamb):

1) Use a laboratory approved barometer.

2) Alternate: Contact airport control tower; ask for "Field Barometric Pressure", not Mean Sea Level (MSL) pressure.

3) Alternate: Set No. 1 and No. 2 cockpit altimeters to zero and read barometric scale in window. Record average of the two readings.

(2) Make certain part power trim stop is in position as outlined in Paragraph 8.A.(2).

CAUTION: WHEN YOU USE PART POWER TRIM-COLD TRIM STOP-JT8D-217A TABLES TO TRIM JT8D-217A ENGINE, THE ENGINE MUST INCORPORATE P&W SB 5618 OR 5752, OR THE PRODUCTION EQUIVALENT. COMPLIANCE WITH THIS REQUIREMENT BY 30 JULY 1990 HAS BEEN DIRECTED BY THE FAA.

(3) Using values obtained in Paragraph 8.C.(1) determine value of part power engine pressure ratio (EPR) from either Table 513, Table 514 or Table 515 or Table 516 or Table 517 or Table 518 to match engine type being trimmed.

(4) Advance throttle until power lever contacts part power trim stop.

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

(5) Operate the engine at part power position for 5 minutes to allow EPR to stabilize.

(6) Observe test instrument and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 8.C.(3).

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(7) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits.

(8) With power lever against part power stop, observe test and engine gages and record following:

Test Instruments	Airplane Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperature (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(9) Move throttle to idle.

(10) EPR readings obtained from test instrument and airplane instruments Paragraph 8.C.(8) must not differ by more than ±0.01.

(11) Test instrument readings obtained from Paragraph 8.C.(8) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(12) Compare test and aircraft readings obtained from Paragraph 8.C.(8) for exhaust gas temperature (EGT); readings must not differ by more than ±5°C.

(13) Since idle and maximum speed trimmers affect each other, repeat Paragraph 8.B. and Paragraph 8.C. until desired settings are obtained without intermediate adjustment.

NOTE: Idle trim adjustment as much as 5% N2 is permitted after final setting of part power trim without a recheck of part power trim provided that final adjustment is made in the increasing RPM direction.

If it is necessary to further increase idle trim either during this trim, or later, then a part power trim check is required.

NOTE: If a problem is encountered in trimming the engine where either the idle trim screw or the part power trim screw is adjusted and the engine does not respond, re-center the fuel control adjustment screws. (Paragraph 8.C.(14))

NOTE: Air trapped in the fuel system, after an engine or JFC change, can also cause no response to adjustments of the trim screws. This can be eliminated by bleeding fuel system.

(14) Fuel control trim screw re-centering procedure.

(a) It can be necessary to set Idle and Part Power trim screws to new positions and start trim procedure again. It is possible that one of these causes will make this necessary:

1) No engine N2 response to either trim screw movement (with apparently no problem with fuel control).
2) Malfunction of trim equipment (this can put trim screw at one of stop positions).
3) Trim position unknown (which makes it necessary for operator to start procedure again).

(b) For information only, trim screw turns have these approximate results in full range from stop to stop:

1) 22 full turns (typical)
2) 36 clicks per turn
3) 792 clicks total range (typical)
4) One full turn of Part Power trim screw changes N2 approximately 225 rpm and 0.1 EPR. 4 clicks equals approximately 0.01 EPR. Counter Clockwise is increasing EPR.
5) One full turn of Idle trim screw changes N2 approximately 155 rpm.

NOTE: Part Power trim screw has effect on both Part Power and Idle trim. Idle screw has very small or no effect on Part Power trim.

(c) Procedure:

1) If re-centering is needed during an engine run, do shutdown procedure.
2) Turn Idle and Part Power trim screws in counterclockwise direction down to bottom.
3) Turn Idle and Part Power screws lightly in clockwise direction ten (10) full turns (this will get the screws to center of trim range and make it possible to start trim procedure again).

NOTE: Run engine at part power at least two minutes prior to attempting to adjust idle trim.

(15) Repeat Paragraph 8.B. and Paragraph 8.C. until desired settings are obtained.

(16) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire. (Figure 503)

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-217A/-217C Engines

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO -29 (-20.2)				DO	NOT	TRIM		
-28 (-18.4)								2.07
-27 (-16.4)								2.07
-26 (-14.8)								2.06
-25 (-13.0)								2.06
-24 (-11.2)							2.05	2.05
-23 (-9.4)							2.05	2.05
-22 (-7.6)							2.04	2.04
-21 (-5.8)							2.04	2.04
-20 (-4.0)						2.03	2.03	2.03
-19 (-2.2)						2.03	2.03	2.03
-18 (-0.4)					2.02	2.02	2.02	2.02
-17 (1.4)					2.02	2.02	2.02	2.02
-16 (3.2)					2.01	2.01	2.01	2.01
-15 (5.0)					2.01	2.01	2.01	2.01
-14 (6.8)				2.00	2.00	2.00	2.00	2.00
-13 (8.6)				1.99	1.99	1.99	1.99	1.99
-12 (10.4)				1.99	1.99	1.99	1.99	1.99
-11 (12.2)			1.98	1.98	1.98	1.98	1.98	1.98
-10 (14.0)			1.98	1.98	1.98	1.98	1.98	1.98
-9 (15.8)			1.97	1.97	1.97	1.97	1.97	1.97
-8 (17.6)			1.96	1.96	1.96	1.96	1.96	1.96
-7 (19.4)			1.95	1.95	1.95	1.95	1.95	1.95
-6 (21.2)		1.94	1.94	1.94	1.94	1.94	1.94	1.94
-5 (23.0)		1.92	1.92	1.92	1.92	1.92	1.92	1.92
-4 (24.8)		1.91	1.91	1.91	1.91	1.91	1.91	1.91
-3 (26.6)		1.90	1.90	1.90	1.90	1.90	1.90	1.90
-2 (28.4)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
-1 (30.2)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
0 (32.0)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-217A/-217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
1 (33.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
2 (35.6)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
3 (37.4)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
4 (39.2)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
5 (41.0)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
6 (42.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
7 (44.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
8 (46.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
9 (48.2)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
10 (50.0)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
11 (51.8)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
12 (53.6)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
13 (55.4)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
14 (57.2)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
15 (59.0)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
16 (60.8)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
17 (62.6)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
18 (64.4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
19 (66.2)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
20 (68.0)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
21 (69.8)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
22 (71.6)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
23 (73.4)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
24 (75.2)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
25 (77.0)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
26 (78.8)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
27 (80.6)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
28 (82.4)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
29 (84.2)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
30 (86.0)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
31 (87.8)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
32 (89.6)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
33 (91.4)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59

Table 513 Part Power Trim - COLD TRIM STOP - JT8D-217A/-217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
34 (93.2)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
35 (95.0)	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
36 (96.8)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
37 (98.6)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
38 (100.4)	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
39 (102.2)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
40 (104.0)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
41 (105.8)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
42 (107.6)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
43 (109.4)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
44 (111.2)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
45 (113.0)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
46 (114.8)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
47 (116.6)	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
48 (118.4)	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
49 (120.2)	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
50 (122.0)	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48

NOTE: Part Power EPR +0.015, -0.0

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-217A/217C Engines

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO +2 (35.6)				DO	NOT	TRIM		
3 (37.4)								2.04
4 (39.2)								2.04
5 (41.0)								2.03
6 (42.8)							2.02	2.02
7 (44.6)							2.02	2.02
8 (46.4)							2.01	2.01
9 (48.2)							2.01	2.01
10 (50.0)							2.00	2.00

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-217A/217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
11 (51.8)							2.00	2.00
12 (53.6)						1.99	1.99	1.99
13 (55.4)						1.98	1.98	1.98
14 (57.2)						1.98	1.98	1.98
15 (59.0)					1.97	1.97	1.97	1.97
16 (60.8)					1.96	1.96	1.96	1.96
17 (62.6)				1.95	1.95	1.95	1.95	1.95
18 (64.4)				1.94	1.94	1.94	1.94	1.94
19 (66.2)			1.93	1.93	1.93	1.93	1.93	1.93
20 (68.0)			1.92	1.92	1.92	1.92	1.92	1.92
21 (69.8)			1.91	1.91	1.91	1.91	1.91	1.91
22 (71.6)		1.89	1.89	1.89	1.89	1.89	1.89	1.89
23 (73.4)		1.88	1.88	1.88	1.88	1.88	1.88	1.88
24 (75.2)		1.87	1.87	1.87	1.87	1.87	1.87	1.87
25 (77.0)		1.87	1.87	1.87	1.87	1.87	1.87	1.87
26 (78.8)		1.86	1.86	1.86	1.86	1.86	1.86	1.86
27 (80.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
28 (82.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
29 (84.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
30 (86.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
31 (87.8)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
32 (89.6)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
33 (91.4)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
34 (93.2)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
35 (95.0)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
36 (96.8)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
37 (98.6)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
38 (100.4)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
39 (102.2)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
40 (104.0)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
41 (105.8)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
42 (107.6)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
43 (109.4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71

Table 514 Part Power Trim - STANDARD TRIM STOP - JT8D-217A/217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
44 (111.2)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
45 (113.0)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
46 (114.8)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
47 (116.6)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
48 (118.4)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
49 (120.2)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
50 (122.0)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
NOTE: Part Power EPR +0.015, -0.0								

Table 515 Part Power Trim - COLD TRIM STOP - JT8D-217C Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.0 & BELOW
-50 (-58.0) TO -25 (-13.0)				DO	NOT	TRIM		
-24 (-11.2)								2.07
-23 (-9.4)								2.07
-22 (-7.6)								2.06
-21 (-5.8)								2.06
-20 (-4.0)							2.05	2.05
-19 (-2.2)							2.05	2.05
-18 (-0.4)						2.04	2.04	2.04
-17 (1.4)						2.04	2.04	2.04
-16 (3.2)						2.03	2.03	2.03
-15 (5.0)						2.03	2.03	2.03
-14 (6.8)					2.02	2.02	2.02	2.02
-13 (8.6)					2.02	2.02	2.02	2.02
-12 (10.4)					2.01	2.01	2.01	2.01
-11 (12.2)				2.00	2.00	2.00	2.00	2.00
-10 (14.0)				2.00	2.00	2.00	2.00	2.00
-9 (15.8)				1.99	1.99	1.99	1.99	1.99
-8 (17.6)				1.99	1.99	1.99	1.99	1.99
-7 (19.4)			1.98	1.98	1.98	1.98	1.98	1.98

Table 515 Part Power Trim - COLD TRIM STOP - JT8D-217C Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.0 & BELOW
-6 (21.2)			1.98	1.98	1.98	1.98	1.98	1.98
-5 (23.0)			1.97	1.97	1.97	1.97	1.97	1.97
-4 (24.8)			1.96	1.96	1.96	1.96	1.96	1.96
-3 (26.6)			1.95	1.95	1.95	1.95	1.95	1.95
-2 (28.4)		1.93	1.93	1.93	1.93	1.93	1.93	1.93
-1 (30.2)		1.92	1.92	1.92	1.92	1.92	1.92	1.92
0 (32.0)		1.91	1.91	1.91	1.91	1.91	1.91	1.91
1 (33.8)		1.90	1.90	1.90	1.90	1.90	1.90	1.90
2 (35.6)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
3 (37.4)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
4 (39.2)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
5 (41.0)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
6 (42.8)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
7 (44.6)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
8 (46.4)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
9 (48.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
10 (50.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
11 (51.8)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81

NOTE: Part Power EPR +0.015, -0.0

Table 516 Part Power Trim - COLD TRIM STOP - JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO -28 (-18.4)				DO	NOT	TRIM		
-27 (-16.6)						2.09	2.09	2.09
-26 (-14.8)						2.08	2.08	2.08
-25 (-13.0)						2.08	2.08	2.08
-24 (-11.2)					2.07	2.07	2.07	2.07
-23 (-9.4)					2.07	2.07	2.07	2.07
-22 (-7.6)					2.06	2.06	2.06	2.06
-21 (-5.8)					2.06	2.06	2.06	2.06

Table 516 Part Power Trim - COLD TRIM STOP - JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-20 (-4.0)				2.05	2.05	2.05	2.05	2.05
-19 (-2.2)				2.05	2.05	2.05	2.05	2.05
-18 (-0.4)				2.04	2.04	2.04	2.04	2.04
-17 (1.4)				2.04	2.04	2.04	2.04	2.04
-16 (3.2)			2.03	2.03	2.03	2.03	2.03	2.03
-15 (5.0)			2.03	2.03	2.03	2.03	2.03	2.03
-14 (6.8)			2.02	2.02	2.02	2.02	2.02	2.02
-13 (8.6)			2.02	2.02	2.02	2.02	2.02	2.02
-12 (10.4)			2.01	2.01	2.01	2.01	2.01	2.01
-11 (12.2)			2.00	2.00	2.00	2.00	2.00	2.00
-10 (14.0)			2.00	2.00	2.00	2.00	2.00	2.00
-9 (15.8)		1.99	1.99	1.99	1.99	1.99	1.99	1.99
-8 (17.6)		1.99	1.99	1.99	1.99	1.99	1.99	1.99
-7 (19.4)		1.98	1.98	1.98	1.98	1.98	1.98	1.98
-6 (21.2)		1.98	1.98	1.98	1.98	1.98	1.98	1.98
-5 (23.0)		1.97	1.97	1.97	1.97	1.97	1.97	1.97
-4 (24.8)		1.96	1.96	1.96	1.96	1.96	1.96	1.96
-3 (26.6)	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
-2 (28.4)	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93
-1 (30.2)	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92
0 (32.0)	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
1 (33.8)	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.90
2 (35.6)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
3 (37.4)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
4 (39.2)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
5 (41.0)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
6 (42.8)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
7 (44.6)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
8 (46.4)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
9 (48.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
10 (50.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
11 (51.8)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81

Table 516 Part Power Trim - COLD TRIM STOP - JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
NOTE: Part Power EPR +0.015, -0.0								

Table 517 Part Power Trim - COLD TRIM STOP - JT8D-219/-217C Engines

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
12 (53.6)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
13 (55.4)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
14 (57.2)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
15 (59.0)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
16 (60.8)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
17 (62.6)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
18 (64.4)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
19 (66.2)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
20 (68.0)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
21 (69.8)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
22 (71.6)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
23 (73.4)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
24 (75.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
25 (77.0)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
26 (78.8)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
27 (80.6)	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
28 (82.4)	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
29 (84.2)	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
30 (86.0)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64
31 (87.8)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
32 (89.6)	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
33 (91.4)	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
34 (93.2)	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
35 (95.0)	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
36 (96.8)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
37 (98.6)	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
38 (100.4)	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58

Table 517 Part Power Trim - COLD TRIM STOP - JT8D-219/-217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
39 (102.2)	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
40 (104.0)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
41 (105.8)	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
42 (107.6)	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55
43 (109.4)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
44 (111.2)	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
45 (113.0)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
46 (114.8)	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
47 (116.6)	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
48 (118.4)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
49 (120.2)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
50 (122.0)	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51

NOTE: Part Power EPR +0.015, -0.0

Table 518 Part Power Trim - STANDARD TRIM STOP - JT8D-219/-217C Engines

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
-50 (-58.0) TO +2 (35.6)				DO	NOT	TRIM		
3 (37.4)								2.06
4 (39.2)							2.05	2.05
5 (41.0)							2.05	2.05
6 (42.8)							2.04	2.04
7 (44.6)							2.04	2.04
8 (46.4)						2.03	2.03	2.03
9 (48.2)						2.03	2.03	2.03
10 (50.0)					2.02	2.02	2.02	2.02
11 (51.8)					2.02	2.02	2.02	2.02
12 (53.6)					2.01	2.01	2.01	2.01
13 (55.4)					2.01	2.01	2.01	2.01
14 (57.2)				2.00	2.00	2.00	2.00	2.00
15 (59.0)				2.00	2.00	2.00	2.00	2.00

Table 518 Part Power Trim - STANDARD TRIM STOP - JT8D-219/-217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
16 (60.8)				1.99	1.99	1.99	1.99	1.99
17 (62.6)			1.98	1.98	1.98	1.98	1.98	1.98
18 (64.4)			1.98	1.98	1.98	1.98	1.98	1.98
19 (66.2)			1.97	1.97	1.97	1.97	1.97	1.97
20 (68.0)			1.96	1.96	1.96	1.96	1.96	1.96
21 (69.8)			1.95	1.95	1.95	1.95	1.95	1.95
22 (71.6)		1.94	1.94	1.94	1.94	1.94	1.94	1.94
23 (73.4)		1.93	1.93	1.93	1.93	1.93	1.93	1.93
24 (75.2)		1.92	1.92	1.92	1.92	1.92	1.92	1.92
25 (77.0)		1.90	1.90	1.90	1.90	1.90	1.90	1.90
26 (78.8)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89
27 (80.6)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88
28 (82.4)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
29 (84.2)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
30 (86.0)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
31 (87.8)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
32 (89.6)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
33 (91.4)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
34 (93.2)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
35 (95.0)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
36 (96.8)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
37 (98.6)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
38 (100.4)	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
39 (102.2)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
40 (104.0)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
41 (105.8)	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
42 (107.6)	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
43 (109.4)	1.74	1.74	1.74	1.74	1.74	1.74	1.74	1.74
44 (111.2)	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
45 (113.0)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
46 (114.8)	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
47 (116.6)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
48 (118.4)	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70

Table 518 Part Power Trim - STANDARD TRIM STOP - JT8D-219/-217C Engines (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.9 & BELOW
49 (120.2)	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
50 (122.0)	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68
NOTE: Part Power EPR +0.015, -0.0								

D. Approach Idle Check

(1) With throttle in idle position open following circuit breaker.

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for five minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using values obtained in Paragraph 8.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 519 or Table 520 or Table 521 or Table 522 or Table 523 or Table 524 or Table 525 or Table 526 or Table 527 or Table 528 or Table 529 or Table 530 or Table 531. Interpolate between chart values, if necessary.

(6) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(7) With throttle in idle position close following circuit breaker.

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(8) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay).

Table 519 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 1)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-50 (-58.0)	56.7-60.3	58.3-61.9	60.1-63.5	62.0-65.4
-49 (-56.2)	56.7-60.3	58.2-61.9	60.1-63.5	62.0-65.4
-48 (-54.4)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.4
-47 (-52.6)	56.6-60.2	58.2-61.9	60.1-63.5	62.0-65.5
-46 (-50.8)	56.6-60.2	58.1-61.9	60.1-63.6	62.0-65.5
-45 (-49.0)	56.5-60.2	58.1-61.8	60.0-63.6	62.0-65.5
-44 (-47.2)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.5

Table 519 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 1) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-43 (-45.4)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-42 (-43.6)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-41 (-41.8)	56.5-60.1	58.1-61.8	60.0-63.6	62.0-65.6
-40 (-40.0)	56.4-60.1	58.0-61.9	60.0-63.6	62.0-65.7
-39 (-38.2)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.7
-38 (-36.4)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-37 (-34.6)	56.4-60.1	58.0-61.9	60.0-63.7	62.1-65.8
-36 (-32.8)	56.4-60.2	58.0-61.9	60.0-63.7	62.1-65.8
-35 (-31.0)	56.4-60.2	58.0-61.9	60.1-63.8	62.1-65.9
-34 (-29.0)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-65.9
-33 (-27.4)	56.4-60.2	58.0-62.0	60.1-63.8	62.2-66.0

Table 520 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 2)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-50 (-58.0)	64.0-67.6	65.9-69.6	68.0-71.8	
-49 (-56.2)	64.0-67.6	66.0-69.6	68.0-71.8	
-48 (-54.4)	64.0-67.6	66.0-69.6	68.1-71.9	
-47 (-52.6)	64.0-67.7	66.0-69.7	68.1-71.9	
-46 (-50.8)	64.1-67.7	66.0-69.7	68.1-71.9	
-45 (-49.0)	64.1-67.7	66.1-69.8	68.2-72.0	
-44 (-47.2)	64.1-67.7	66.1-69.8	68.2-72.0	
-43 (-45.4)	64.1-67.8	66.1-69.8	68.3-72.0	
-42 (-43.6)	64.2-67.8	66.2-69.9	68.3-72.1	
-41 (-41.8)	64.2-67.8	66.2-69.9	68.3-72.1	
-40 (-40.0)	64.2-67.9	66.3-69.9	68.4-72.1	
-39 (-38.2)	64.3-67.9	66.3-70.0	68.4-72.2	
-38 (-36.4)	64.3-68.0	66.3-70.0	68.4-72.2	
-37 (-34.6)	64.3-68.0	66.4-70.0	68.5-72.2	
-36 (-32.8)	64.4-68.0	66.4-70.1	68.5-72.3	
-35 (-31.0)	64.4-68.1	66.5-70.1	68.6-72.3	

Table 520 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 2) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-34 (-29.0)	64.4-68.1	66.5-70.2	68.6-72.3	
-33 (-27.4)	64.5-68.2	66.5-70.2	68.7-72.4	

Table 521 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 3)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	32.00	29.92	28.00	26.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-32 (-25.6)	56.3-60.2	58.1-62.0	60.1-63.8	62.2-66.0
-31 (-23.8)	56.3-60.2	58.1-62.1	60.1-63.9	62.3-66.1
-30 (-22.0)	56.3-60.3	58.1-62.1	60.1-63.9	62.3-66.1
-29 (-20.2)	56.4-60.3	58.1-62.1	60.1-64.0	62.3-66.1
-28 (-18.4)	56.4-60.3	58.1-62.2	60.2-64.0	62.4-66.2
-27 (-16.6)	56.4-60.3	58.1-62.2	60.2-64.1	62.4-66.2
-26 (-14.8)	56.4-60.4	58.2-62.2	60.2-64.1	62.5-66.3
-25 (-13.0)	56.4-60.4	58.2-62.3	60.3-64.1	62.5-66.3
-24 (-11.2)	56.5-60.5	58.3-62.3	60.3-64.2	62.6-66.4
-23 (-9.4)	56.5-60.5	58.3-62.4	60.4-64.2	62.6-66.4
-22 (-7.6)	56.6-60.5	58.4-62.4	60.4-64.3	62.7-66.5
-21 (-5.8)	56.6-60.6	58.4-62.5	60.5-64.4	62.7-66.5
-20 (-4.0)	56.7-60.6	58.5-62.5	60.5-64.4	62.8-66.6
-19 (-2.2)	56.7-60.7	58.6-62.6	60.6-64.5	62.9-66.6
-18 (-0.4)	56.8-60.8	58.6-62.7	60.6-64.5	62.9-66.7
-17 (1.4)	56.8-60.8	58.7-62.7	60.7-64.6	63.0-66.7
-16 (3.2)	56.9-60.9	58.8-62.8	60.8-64.6	63.1-66.8
-15 (5.0)	57.0-61.0	58.9-62.8	60.9-64.7	63.1-66.9
-14 (6.8)	57.1-61.1	59.0-62.9	60.9-64.8	63.2-66.9

Table 522 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 4)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-32 (-25.6)	64.5-68.2	66.6-70.2	68.7-72.4	

Table 522 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 4) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	24.00	22.00	20.00	
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	
-31 (-23.8)	64.6-68.3	66.6-70.3	68.7-72.5	
-30 (-22.0)	64.6-68.3	66.7-70.3	68.8-72.5	
-29 (-20.2)	64.7-68.3	66.7-70.4	68.8-72.5	
-28 (-18.4)	64.7-68.4	66.8-70.4	68.9-72.6	
-27 (-16.6)	64.8-68.4	66.8-70.5	68.9-72.6	
-26 (-14.8)	64.8-68.5	66.9-70.5	69.0-72.7	
-25 (-13.0)	64.9-68.5	66.9-70.5	69.0-72.7	
-24 (-11.2)	64.9-68.6	67.0-70.6	69.1-72.7	
-23 (-9.4)	65.0-68.6	67.0-70.6	69.1-72.8	
-22 (-7.6)	65.0-68.7	67.1-70.7	69.2-72.8	
-21 (-5.8)	65.1-68.7	67.2-70.7	69.2-72.9	
-20 (-4.0)	65.1-68.8	67.2-70.8	69.3-72.9	
-19 (-2.2)	65.2-68.8	67.3-70.9	69.3-72.9	
-18 (-0.4)	65.2-68.9	67.3-70.9	69.4-73.0	
-17 (1.4)	65.3-68.9	67.4-71.0	69.4-73.0	
-16 (3.2)	65.4-69.0	67.4-71.0	69.5-73.1	
-15 (5.0)	65.4-69.1	67.5-71.1	69.6-73.1	
-14 (6.8)	65.5-69.1	67.5-71.1	69.6-73.2	

Table 523 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 5)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	58.2-62.1	59.1-63.0	60.1-64.0	61.0-64.9
-12 (10.4)	58.2-62.1	59.1-63.0	60.1-64.0	61.1-64.9
-11 (12.2)	58.3-62.2	59.2-63.1	60.2-64.1	61.2-65.0
-10 (14.0)	58.4-62.3	59.3-63.2	60.3-64.2	61.2-65.1
- 9 (15.8)	58.5-62.3	59.4-63.2	60.4-64.2	61.3-65.1
- 8 (17.6)	58.6-62.4	59.5-63.3	60.5-64.3	61.4-65.2
- 7 (19.4)	58.7-62.5	59.6-63.4	60.6-64.4	61.5-65.3
- 6 (21.2)	58.8-62.6	59.7-63.5	60.7-64.4	61.6-65.3
- 5 (23.0)	58.8-62.6	59.7-63.5	60.7-64.5	61.6-65.4

Table 523 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 5) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
- 4 (24.8)	58.9-62.7	59.8-63.6	60.8-64.6	61.7-65.5
- 3 (26.6)	59.0-62.8	59.9-63.7	60.9-64.6	61.8-65.5
- 2 (28.4)	59.1-62.9	60.0-63.8	61.0-64.7	61.9-65.6
- 1 (30.2)	59.2-63.0	60.1-63.9	61.0-64.8	61.9-65.7
0 (32.0)	59.3-63.0	60.2-63.9	61.1-64.9	62.0-65.8
1 (33.8)	59.4-63.1	60.2-64.0	61.2-64.9	62.1-65.8
2 (35.6)	59.5-63.2	60.3-64.1	61.3-65.0	62.2-65.9
3 (37.4)	59.6-63.3	60.4-64.2	61.3-65.1	62.2-66.0
4 (39.2)	59.6-63.3	60.5-64.2	61.4-65.1	62.3-66.0
5 (41.0)	59.7-63.4	60.5-64.3	61.5-65.2	62.4-66.1
6 (42.8)	59.8-63.5	60.6-64.4	61.5-65.2	62.4-66.1
7 (44.6)	59.9-63.5	60.7-64.4	61.6-65.3	62.5-66.2

Table 524 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 6)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	62.1-66.0	63.2-67.0	64.4-68.1	65.5-69.2
-12 (10.4)	62.2-66.0	63.3-67.0	64.5-68.2	65.6-69.3
-11 (12.2)	62.3-66.1	63.4-67.1	64.6-68.2	65.7-69.3
-10 (14.0)	62.4-66.2	63.5-67.2	64.6-68.3	65.7-69.4
- 9 (15.8)	62.4-66.2	63.5-67.2	64.7-68.3	65.8-69.4
- 8 (17.6)	62.5-66.3	63.6-67.3	64.8-68.4	65.9-69.5
- 7 (19.4)	62.6-66.3	63.7-67.3	64.8-68.4	65.9-69.5
- 6 (21.2)	62.7-66.4	63.7-67.4	64.9-68.5	66.0-69.6
- 5 (23.0)	62.7-66.5	63.8-67.5	64.9-68.6	66.0-69.7
- 4 (24.8)	62.8-66.5	63.9-67.5	65.0-68.6	66.1-69.7
- 3 (26.6)	69.9-66.6	63.9-67.6	65.1-68.7	66.2-69.8
- 2 (28.4)	63.0-66.7	64.0-67.7	65.1-68.8	66.2-69.8
- 1 (30.2)	63.0-66.7	64.1-67.7	65.2-68.8	66.3-69.9
0 (32.0)	63.1-66.8	64.2-67.8	65.3-68.8	66.4-69.9
1 (33.8)	63.2-66.8	64.2-67.8	65.3-68.9	66.4-70.0

Table 524 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 6) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
2 (35.6)	63.3-66.9	64.3-67.9	65.4-69.0	66.5-70.0
3 (37.4)	63.3-67.0	64.3-68.0	65.4-69.1	66.5-70.1
4 (39.2)	63.4-67.0	64.4-68.0	65.5-69.1	66.6-70.2
5 (41.0)	63.5-67.1	64.5-68.1	65.5-69.2	66.6-70.2
6 (42.8)	63.5-67.1	64.5-68.1	65.6-69.2	66.7-70.3
7 (44.6)	63.6-67.2	64.6-68.2	65.7-69.3	66.7-70.3

Table 525 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 7)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
-13 (8.6)	66.6-70.2	67.6-71.2	68.7-72.2	69.7-73.2
-12 (10.4)	66.6-70.3	67.7-71.2	68.7-72.3	69.7-73.3
-11 (12.2)	66.7-70.3	67.7-71.3	68.8-72.3	69.8-73.3
-10 (14.0)	66.8-70.4	67.8-71.4	68.8-72.4	69.8-73.4
- 9 (15.8)	66.8-70.4	67.8-71.4	68.9-72.4	69.9-73.4
- 8 (17.6)	66.9-70.5	67.9-71.5	68.9-72.5	69.9-73.5
- 7 (19.4)	67.0-70.5	68.0-71.5	69.0-72.5	70.0-73.5
- 6 (21.2)	67.0-70.6	68.0-71.6	69.0-72.6	70.0-73.6
- 5 (23.0)	67.1-70.7	68.1-71.6	69.1-72.6	70.1-73.6
- 4 (24.8)	67.1-70.7	68.1-71.7	69.1-72.7	70.1-73.7
- 3 (26.6)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.7
- 2 (28.4)	67.2-70.8	68.2-71.8	69.2-72.8	70.2-73.8
- 1 (30.2)	67.3-70.9	68.3-71.9	69.3-72.9	70.3-73.9
0 (32.0)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-73.9
1 (33.8)	67.4-71.0	68.4-72.0	69.4-73.0	70.4-74.0
2 (35.6)	67.5-71.0	68.5-72.0	69.5-73.0	70.5-74.0
3 (37.4)	67.5-71.1	68.5-72.1	69.5-73.1	70.5-74.0
4 (39.2)	67.6-71.2	68.6-72.1	69.6-73.1	70.6-74.1
5 (41.0)	67.6-71.2	68.6-72.2	69.6-73.2	70.6-74.1
6 (42.8)	67.7-71.3	68.7-72.2	69.7-73.2	70.7-74.2
7 (44.6)	67.7-71.3	68.7-72.3	69.7-73.3	70.7-74.2

Table 526 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 8)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
8 (46.4)	60.0-63.6	60.8-64.5	61.7-65.4	62.6-66.3
9 (48.2)	60.0-63.7	60.9-64.6	61.7-65.4	62.6-66.3
10 (50.0)	60.1-63.8	60.9-64.6	61.8-65.5	62.7-66.4
11 (51.8)	60.1-63.8	61.0-64.7	61.9-65.5	62.8-66.4
12 (53.6)	60.2-63.8	61.1-64.7	61.9-65.5	62.8-66.5
13 (55.4)	60.3-63.9	61.2-64.8	62.0-65.6	62.9-66.5
14 (57.2)	60.3-64.0	61.2-64.9	62.1-65.7	63.0-66.6
15 (59.0)	60.4-64.1	61.3-64.9	62.1-65.7	63.0-66.6
16 (60.8)	60.5-64.1	61.4-65.0	62.2-65.8	63.1-66.7
17 (62.6)	60.6-64.2	61.5-65.0	62.3-65.8	63.2-66.7
18 (64.4)	60.6-64.2	61.5-65.1	62.3-65.9	63.2-66.8
19 (66.2)	60.7-64.3	61.6-65.1	62.4-65.9	63.3-66.8
20 (68.0)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.8
21 (69.8)	60.8-64.4	61.7-65.2	62.5-66.0	63.4-66.9
22 (71.6)	60.9-64.5	61.8-65.3	62.6-66.1	63.5-67.0
23 (73.4)	61.0-64.5	61.9-65.4	62.7-66.2	63.6-67.0
24 (75.2)	61.0-64.6	61.9-65.4	62.7-66.2	63.6-67.1
25 (77.0)	61.1-64.7	62.0-65.5	62.8-66.3	63.7-67.1
26 (78.8)	61.2-64.7	62.1-65.5	62.9-66.3	63.7-67.2
27 (80.6)	61.2-64.8	62.1-65.6	62.9-66.4	63.8-67.2
28 (82.4)	61.3-64.8	62.2-65.7	63.0-66.5	63.8-67.3

Table 527 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 9)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
8 (46.4)	63.7-67.3	64.6-68.2	65.8-69.3	66.8-70.4
9 (48.2)	63.7-67.3	64.7-68.3	65.8-69.4	66.9-70.4
10 (50.0)	63.8-67.4	64.8-68.3	65.9-69.4	66.9-70.5
11 (51.8)	63.8-67.4	64.8-68.4	65.9-69.5	67.0-70.5
12 (53.6)	63.9-67.5	64.9-68.4	66.0-69.5	67.0-70.5
13 (55.4)	63.9-67.5	64.9-68.5	66.0-69.6	67.1-70.6

Table 527 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 9) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
14 (57.2)	64.0-67.6	65.0-68.5	66.1-69.6	67.2-70.6
15 (59.0)	64.1-67.6	65.1-68.6	66.2-69.7	67.2-70.6
16 (60.8)	64.1-67.7	65.1-68.6	66.2-69.7	67.3-70.7
17 (62.6)	64.2-67.7	65.2-68.7	66.3-69.8	67.3-70.8
18 (64.4)	64.2-67.8	65.2-68.7	66.3-69.8	67.4-70.8
19 (66.2)	64.3-67.8	65.3-68.8	66.3-69.9	67.5-70.9
20 (68.0)	64.4-67.8	65.3-68.8	66.4-69.9	67.5-70.9
21 (69.8)	64.4-67.9	65.4-68.9	66.5-70.0	67.6-71.0
22 (71.6)	64.5-68.0	65.4-68.9	66.5-70.0	67.6-71.0
23 (73.4)	64.6-68.0	65.5-68.9	66.6-70.0	67.7-71.0
24 (75.2)	64.6-68.1	65.5-69.0	66.6-70.1	67.7-71.1
25 (77.0)	64.7-68.1	65.6-69.1	66.7-70.1	67.8-71.1
26 (78.8)	64.7-68.2	65.7-69.1	66.8-70.2	67.8-71.2
27 (80.6)	64.8-68.2	65.7-69.2	66.8-70.2	67.9-71.2
28 (82.4)	64.8-68.3	65.8-69.2	66.9-70.2	67.9-71.3

Table 528 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 10)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
8 (46.4)	67.8-71.4	68.7-72.3	69.7-73.3	70.7-74.3
9 (48.2)	67.9-71.4	68.8-72.4	69.8-73.4	70.8-74.3
10 (50.0)	67.9-71.5	68.8-72.4	69.8-73.4	70.8-74.4
11 (51.8)	68.0-71.5	68.9-72.4	69.9-73.4	70.9-74.4
12 (53.6)	68.0-71.5	68.9-72.5	69.9-73.5	70.9-74.4
13 (55.4)	68.1-71.6	69.0-72.5	70.0-73.5	71.0-74.5
14 (57.2)	68.1-71.6	69.0-72.6	70.0-73.6	71.0-74.5
15 (59.0)	68.2-71.7	69.1-72.6	70.1-73.6	71.1-74.6
16 (60.8)	68.2-71.7	69.1-72.7	70.1-73.7	71.1-74.6
17 (62.6)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.6
18 (64.4)	68.3-71.8	69.2-72.7	70.2-73.7	71.2-74.7
19 (66.2)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7

Table 528 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 10) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
20 (68.0)	68.4-71.9	69.3-72.8	70.3-73.8	71.3-74.7
21 (69.8)	68.5-71.9	69.4-72.8	70.4-73.8	71.3-74.8
22 (71.6)	68.5-72.0	69.4-72.9	70.4-73.9	71.4-74.8
23 (73.4)	68.6-72.0	69.5-72.9	70.5-73.9	71.4-74.9
24 (75.2)	68.6-72.1	69.5-73.0	70.5-74.0	71.5-74.9
25 (77.0)	68.7-72.1	69.6-73.0	70.6-74.0	71.5-74.9
26 (78.8)	68.7-72.1	69.6-73.0	70.6-74.0	71.6-75.0
27 (80.6)	68.8-72.2	69.6-73.1	70.6-74.1	71.6-75.0
28 (82.4)	68.8-72.2	69.7-73.1	70.7-74.1	71.7-75.0

Table 529 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 11)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	61.3-64.9	62.2-65.7	63.0-66.5	63.9-67.3
30 (86.0)	61.4-65.0	62.3-65.8	63.1-66.6	64.0-67.4
31 (87.8)	61.5-65.0	62.4-65.8	63.2-66.6	64.0-67.4
32 (89.6)	61.6-65.1	62.4-65.9	63.3-66.7	64.1-67.5
33 (91.4)	61.6-65.1	62.5-65.9	63.3-66.8	64.1-67.6
34 (93.2)	61.7-65.2	62.5-66.0	63.4-66.8	64.2-67.6
35 (95.0)	61.8-65.2	62.6-66.0	63.4-66.9	64.2-67.7
36 (96.8)	61.8-65.3	62.7-66.1	63.5-66.9	64.3-67.7
37 (98.6)	61.9-65.4	62.7-66.2	63.6-67.0	64.4-67.8
38 (100.4)	61.9-65.4	62.8-66.2	63.6-67.0	64.4-67.8
39 (102.2)	62.0-65.5	62.8-66.3	63.7-67.1	64.5-67.9
40 (104.0)	62.1-65.5	62.9-66.3	63.7-67.1	64.5-67.9
41 (105.8)	62.1-65.6	62.9-66.4	63.8-67.2	64.6-68.0
42 (107.6)	62.2-65.7	63.0-66.4	63.8-67.2	64.6-68.0
43 (109.4)	62.3-65.7	63.1-66.5	63.9-67.3	64.7-68.1
44 (111.2)	62.3-65.8	63.1-66.5	64.0-67.3	64.8-68.1
45 (113.0)	62.4-65.8	63.2-66.6	64.0-67.4	64.8-68.2

Table 529 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 11) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	31.00	29.92	29.00	28.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
46 (114.8)	62.5-65.9	63.2-66.6	64.1-67.4	64.9-68.2
47 (116.6)	62.5-65.9	63.3-66.7	64.1-67.5	64.9-68.3
48 (118.4)	62.6-66.0	63.4-66.8	64.2-67.5	65.0-68.3
49 (120.2)	62.6-66.1	63.4-66.8	64.2-67.6	65.0-68.4
50 (122.0)	62.7-66.1	63.5-66.9	64.3-67.6	65.1-68.4

Table 530 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 12)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	64.9-68.3	65.8-69.3	66.9-70.3	67.9-71.3
30 (86.0)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
31 (87.8)	65.0-68.4	65.9-69.3	67.0-70.4	68.0-71.4
32 (89.6)	65.1-68.5	66.0-69.4	67.1-70.4	68.1-71.4
33 (91.4)	65.1-68.6	66.0-69.5	67.1-70.5	68.1-71.5
34 (93.2)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.5
35 (95.0)	65.2-68.6	66.1-69.5	67.2-70.5	68.2-71.6
36 (96.8)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
37 (98.6)	65.3-68.7	66.2-69.6	67.3-70.6	68.3-71.6
38 (100.4)	65.4-68.8	66.3-69.7	67.4-70.7	68.4-71.7
39 (102.2)	65.5-68.8	66.4-69.7	67.4-70.7	68.4-71.7
40 (104.0)	65.5-68.9	66.4-69.8	67.5-70.8	68.5-71.8
41 (105.8)	65.6-68.9	66.5-69.8	67.5-70.8	68.5-71.8
42 (107.6)	65.6-69.0	66.5-69.9	67.5-70.9	68.5-71.9
43 (109.4)	65.7-69.0	66.6-69.9	67.6-70.9	68.6-71.9
44 (111.2)	65.7-69.1	66.6-70.0	67.6-71.0	68.6-72.0
45 (113.0)	65.8-69.1	66.7-70.0	67.7-71.0	68.7-72.0
46 (114.8)	65.8-69.2	66.7-70.1	67.7-71.1	68.7-72.0
47 (116.6)	65.8-69.2	66.7-70.1	67.8-71.1	68.8-72.1
48 (118.4)	65.9-69.3	66.8-70.2	67.8-71.2	68.8-72.1
49 (120.2)	66.0-69.3	66.9-70.2	67.9-71.3	68.9-72.2

Table 530 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 12) (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	27.00	26.00	25.00	24.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
50 (122.0)	66.0-69.4	66.9-70.3	67.9-71.3	68.9-72.2

Table 531 Approach Idle Check Percent N_2 RPM - JT8D-217A/-217C/-219 Engine (Sheet 13)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY			
	23.00	22.00	21.00	20.00
	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2	MIN - MAX N_2
29 (84.2)	68.8-72.3	69.7-73.2	70.7-74.2	71.7-75.1
30 (86.0)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.1
31 (87.8)	68.9-72.3	69.8-73.2	70.8-74.2	71.8-75.2
32 (89.6)	69.0-72.4	69.9-73.3	70.9-74.3	71.8-75.2
33 (91.4)	69.0-72.4	69.9-73.3	70.9-74.3	71.9-75.2
34 (93.2)	69.1-72.5	70.0-73.4	71.0-74.4	71.9-75.3
35 (95.0)	69.1-72.5	70.0-73.4	71.0-74.4	72.0-75.3
36 (96.8)	69.2-72.5	70.1-73.4	71.1-74.4	72.0-75.4
37 (98.6)	69.2-72.6	70.1-73.5	71.1-74.5	72.0-75.4
38 (100.4)	69.3-72.6	70.2-73.5	71.2-74.5	72.1-75.4
39 (102.2)	69.3-72.7	70.2-73.6	71.2-74.6	72.1-75.5
40 (104.0)	69.4-72.7	70.2-73.6	71.2-74.6	72.2-75.5
41 (105.8)	69.4-72.7	70.3-73.6	71.3-74.6	72.2-75.6
42 (107.6)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
43 (109.4)	69.5-72.8	70.4-73.7	71.4-74.7	72.3-75.6
44 (111.2)	69.6-72.9	70.5-73.7	71.5-74.7	72.4-75.7
45 (113.0)	69.6-72.9	70.5-73.8	71.5-74.8	72.4-75.7
46 (114.8)	69.6-73.0	70.5-73.8	71.5-74.8	72.5-75.8
47 (116.6)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.8
48 (118.4)	69.7-73.0	70.6-73.9	71.6-74.9	72.5-75.9
49 (120.2)	69.8-73.1	70.7-73.9	71.7-74.9	72.6-75.9
50 (122.0)	69.8-73.1	70.7-74.0	71.7-75.0	72.6-76.0

E. Takeoff Power Assurance Check

(1) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 532

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(2) Operate engine with throttle in idle position for five minutes.

(3) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(4) Using values from Paragraph 8.E.(3) and Table 534, determine engine pressure ratio (EPR) for takeoff thrust setting.

(5) Advance throttle until value determined in Paragraph 8.E.(4) is obtained.

(a) For aircraft with JT8D-217A, -217C, and -219 engine installed.

Table 533

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS AS FOLLOWS:	
EXHAUST GAS TEMPERATURE (EGT)	590°C
N_1 RPM	98.3%
N_2 RPM	100.9%
TAKEOFF EPR	±.01
AT TAKEOFF EPR	5 Min.
OIL TEMPERATURE	135°C

(6) Operate engine for 2 minutes at takeoff power, adjusting throttle as required, until stabilized value of EPR is obtained.

(7) Place throttle in idle position and operate engine at idle for 5 minutes.

Table 534 Takeoff Power Assurance Check - JT8D-217A/-217C Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
-50 (-58.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-49 (-56.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-48 (-54.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-47 (-52.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A/-217C Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
-46 (-50.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-45 (-49.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-44 (-47.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-43 (-45.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-42 (-43.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-41 (-41.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-40 (-40.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-39 (-38.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-38 (-36.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-37 (-34.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-36 (-32.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-35 (-31.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-34 (-29.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-33 (-27.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-32 (-25.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-31 (-23.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-30 (-22.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-29 (-20.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-28 (-18.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-27 (-16.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-26 (-14.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-25 (-13.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-24 (-11.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-23 (-9.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-22 (-7.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-21 (-5.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-20 (-4.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-19 (-2.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-18 (-0.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-17 (1.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-16 (3.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-15 (5.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-14 (6.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A/-217C Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
-13 (8.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-12 (10.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-11 (12.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
-10 (14.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 9 (15.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 8 (17.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 7 (19.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 6 (21.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 5 (23.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 4 (24.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 3 (26.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 2 (28.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
- 1 (30.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
0 (32.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
1 (33.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
2 (35.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
3 (37.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
4 (39.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
5 (41.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
6 (42.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
7 (44.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
8 (46.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
9 (48.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
10 (50.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
11 (51.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
12 (53.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
13 (55.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
14 (57.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
15 (59.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
16 (60.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
17 (62.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
18 (64.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06
19 (66.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.06

Table 534 Takeoff Power Assurance Check - JT8D-217A/-217C Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.0	24.90 & BELOW
20 (68.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.05
21 (69.8)	1.87	1.91	1.95	1.97	1.99	2.01	2.04	2.04
22 (71.6)	1.87	1.91	1.95	1.97	1.99	2.01	2.03	2.03
23 (73.4)	1.87	1.91	1.95	1.97	1.99	2.01	2.03	2.03
24 (75.2)	1.87	1.91	1.95	1.97	1.99	2.01	2.02	2.02
25 (77.0)	1.87	1.91	1.95	1.97	1.99	2.01	2.01	2.01
26 (78.8)	1.87	1.91	1.95	1.97	1.99	2.00	2.00	2.00
27 (80.6)	1.87	1.91	1.95	1.97	1.99	2.00	2.00	2.00
28 (82.4)	1.87	1.91	1.95	1.97	1.99	1.99	1.99	1.99
29 (84.2)	1.87	1.91	1.95	1.97	1.98	1.98	1.98	1.98
30 (86.0)	1.87	1.91	1.95	1.97	1.97	1.97	1.97	1.97
31 (87.8)	1.87	1.91	1.94	1.96	1.96	1.96	1.96	1.96
32 (89.6)	1.87	1.91	1.93	1.95	1.95	1.95	1.95	1.95
33 (91.4)	1.87	1.91	1.92	1.94	1.94	1.94	1.94	1.94
34 (93.2)	1.87	1.91	1.91	1.92	1.93	1.93	1.93	1.93
35 (95.0)	1.87	1.90	1.90	1.91	1.91	1.91	1.91	1.91
36 (96.8)	1.87	1.90	1.90	1.90	1.90	1.90	1.90	1.90
37 (98.6)	1.87	1.89	1.89	1.89	1.89	1.89	1.89	1.89
38 (100.4)	1.87	1.88	1.88	1.88	1.88	1.88	1.88	1.88
39 (102.2)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
40 (104.0)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
41 (105.8)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
42 (107.6)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
43 (109.4)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
44 (111.2)	1.83	1.83	1.83	1.83	1.83	1.83	1.83	1.83
45 (113.0)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
46 (114.8)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
47 (116.6)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
48 (118.4)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
49 (120.2)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79
50 (122.0)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79

Table 535 Takeoff Power Assurance Check - JT8D-219 Engine

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW	
-50 (-58.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-49 (-56.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-48 (-54.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-47 (-52.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-46 (-50.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-45 (-49.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-44 (-47.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-43 (-45.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-42 (-43.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-41 (-41.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-40 (-40.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-39 (-38.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-38 (-36.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-37 (-34.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-36 (-32.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-35 (-31.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-34 (-29.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-33 (-27.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-32 (-25.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-31 (-23.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-30 (-22.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-29 (-20.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-28 (-18.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-27 (-16.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-26 (-14.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-25 (-13.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-24 (-11.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-23 (-9.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-22 (-7.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-21 (-5.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-20 (-4.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-19 (-2.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-18 (-0.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	

Table 535 Takeoff Power Assurance Check - JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW	
-17 (1.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-16 (3.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-15 (5.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-14 (6.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-13 (8.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-12 (10.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-11 (12.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
-10 (14.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 9 (15.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 8 (17.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 7 (19.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 6 (21.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 5 (23.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 4 (24.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 3 (26.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 2 (28.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
- 1 (30.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
0 (32.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
1 (33.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
2 (35.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
3 (37.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
4 (39.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
5 (41.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
6 (42.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
7 (44.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
8 (46.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
9 (48.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
10 (50.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
11 (51.8)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
12 (53.6)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
13 (55.4)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
14 (57.2)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	
15 (59.0)	1.90	1.95	2.01	2.03	2.05	2.08	2.08	

Table 535 Takeoff Power Assurance Check - JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW	
16 (60.8)	1.90	1.95	2.01	2.03	2.05	2.07	2.07	
17 (62.6)	1.90	1.95	2.01	2.03	2.05	2.07	2.07	
18 (64.4)	1.90	1.95	2.01	2.03	2.05	2.07	2.07	
19 (66.2)	1.90	1.95	2.01	2.03	2.05	2.07	2.07	
20 (68.0)	1.90	1.95	2.01	2.03	2.05	2.06	2.06	
21 (69.8)	1.90	1.95	2.01	2.03	2.05	2.06	2.06	
22 (71.6)	1.90	1.95	2.01	2.03	2.05	2.06	2.06	
23 (73.4)	1.90	1.95	2.01	2.03	2.05	2.05	2.05	
24 (75.2)	1.90	1.95	2.01	2.03	2.05	2.05	2.05	
25 (77.0)	1.90	1.95	2.01	2.03	2.04	2.04	2.04	
26 (78.8)	1.90	1.95	2.01	2.03	2.04	2.04	2.04	
27 (80.6)	1.90	1.95	2.01	2.03	2.03	2.03	2.03	
28 (82.4)	1.90	1.95	2.01	2.02	2.02	2.02	2.02	
29 (84.2)	1.90	1.95	2.01	2.01	2.01	2.01	2.01	
30 (86.0)	1.90	1.95	2.00	2.00	2.00	2.00	2.00	
31 (87.8)	1.90	1.95	1.99	1.99	1.99	1.99	1.99	
32 (89.6)	1.90	1.95	1.98	1.98	1.98	1.98	1.98	
33 (91.4)	1.90	1.95	1.97	1.97	1.97	1.97	1.97	
34 (93.2)	1.90	1.95	1.96	1.96	1.96	1.96	1.96	
35 (95.0)	1.90	1.95	1.95	1.95	1.95	1.95	1.95	
36 (96.8)	1.90	1.94	1.94	1.94	1.94	1.94	1.94	
37 (98.6)	1.90	1.93	1.93	1.93	1.93	1.93	1.93	
38 (100.4)	1.90	1.92	1.92	1.92	1.92	1.92	1.92	
39 (102.2)	1.90	1.91	1.91	1.91	1.91	1.91	1.91	
40 (104.0)	1.90	1.90	1.90	1.90	1.90	1.90	1.90	
41 (105.8)	1.89	1.89	1.89	1.89	1.89	1.89	1.89	
42 (107.6)	1.88	1.88	1.88	1.88	1.88	1.88	1.88	
43 (109.4)	1.87	1.87	1.87	1.87	1.87	1.87	1.87	
44 (111.2)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	
45 (113.0)	1.85	1.85	1.85	1.85	1.85	1.85	1.85	
46 (114.8)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	
47 (116.6)	1.84	1.84	1.84	1.84	1.84	1.84	1.84	
48 (118.4)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	

Table 535 Takeoff Power Assurance Check - JT8D-219 Engine (Continued)

AMBIENT TEMP. °C (°F)	BAROMETRIC PRESSURE IN INCHES OF MERCURY							
	32.0	31.0	29.92	29.0	28.0	27.0	26.82 & BELOW	
49 (120.2)	1.82	1.82	1.82	1.82	1.82	1.82	1.82	
50 (122.0)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	

F. Reverse Thrust EPR Check

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust until either one of the engines reaches 1.60(±0.10) EPR.

(6) Allow engine to stabilize and observe EPR for both engines. Maximum allowable difference between engines is 0.15 EPR.

(a) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(b) Allow engine to stabilize and record EPR for both engines

(L. Engine _____, R. Engine _____).

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 7..

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft. (Figure 504, View A)

(b) Install rigging aid (R-24) in interlock stop. (Figure 504, View C)

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (Figure 504, View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

(13) Close lower cowl doors.

(14) Move both thrust reverser control valve dump levers in normal position.

(15) Remove and stow thrust reverser control valve safety pins.

G. Reverse Thrust EPR Check (Aircraft with S/B 78-68 Incorporated and Later Aircraft Equipped with Reverse Thrust Intermediate Detent Position)

NOTE: Check procedures contained in this paragraph only apply to aircraft with an additional detent at the reverse thrust intermediate position.

(1) Disconnect thrust reverser interlock push-pull control cable from power control crank on both engines. Tie back control cable so that it does not interfere with rotation of power control crank.

(2) Place both thrust reverser control valves in dump position and install safety pin.

(3) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(4) Allow engines to stabilize and observe EPR for both engines. Maximum allowable EPR difference between engines is 0.10 EPR.

(5) Slowly, in one smooth continuous motion with knobs aligned, move both thrust reverser levers to reverse thrust intermediate detent position.

(6) Allow engine to stabilize and observe EPR for both engines.

(a) Record EPR for both engines

(L. Engine _____, R. Engine _____).

NOTE: Maximum allowable difference between engines is 0.13 EPR.

(b) Slowly, in one smooth continuous motion, with knobs aligned, move both thrust reverser levers to reverse idle detent.

NOTE: Do not push on throttle levers.

(c) Allow engine to stabilize and record EPR for both engines

(L. Engine _____, R. Engine _____).

NOTE: Maximum allowable EPR for either engine is 1.10.

(7) Move both thrust reverser levers to forward idle position and operate engine at idle for 5 minutes.

(8) Shut down engine as outlined in Paragraph 7..

(9) Remove test equipment.

(10) Make certain interlock control is properly connected to power control crank as follows:

(a) Install rigging aid (4-2) in rig pin hole (R-17) at engine cross-shaft. (Figure 504, View A)

(b) Install rigging aid (R-24) in interlock stop. (Figure 504, View C)

(c) Hold rigging aid (R-24) firmly between reverser power stop and interlock stop.

(d) Hold thrust reverser interlock push-pull control so that cam follower (Figure 504, View B) is firmly in contact with cam, then adjust thrust reverser interlock push-pull control if required until bolt can be inserted freely.

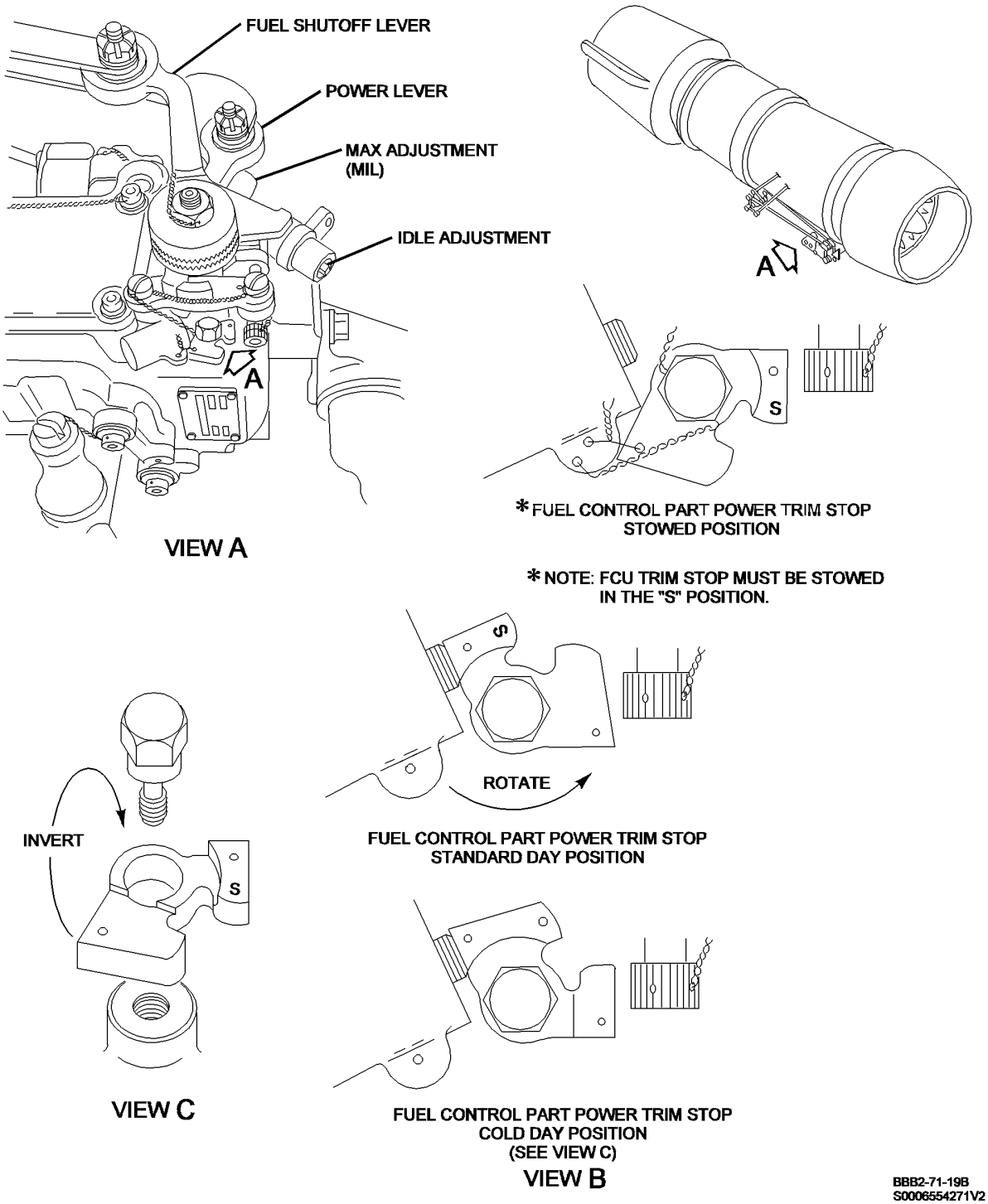
(11) Remove rigging aids 4-2, and R-24.

(12) Connect thrust reverser interlock push-pull control cable to power control crank on both engines.

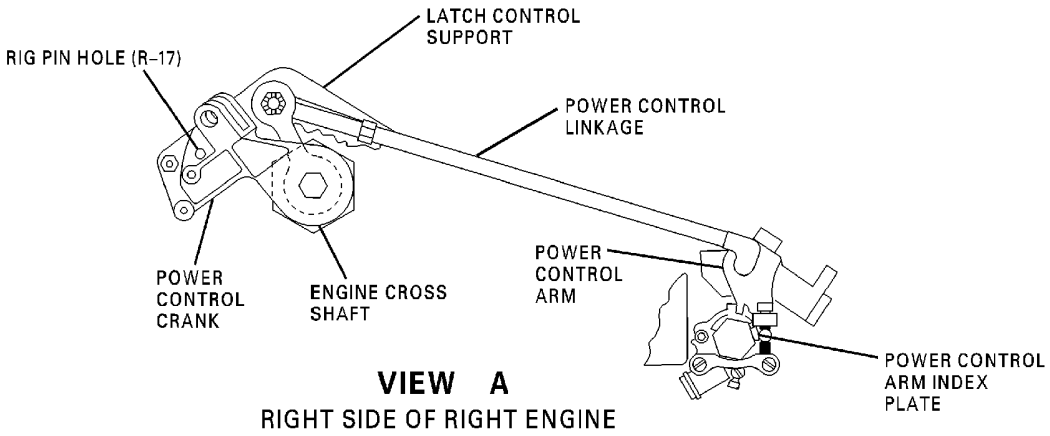
(13) Close lower cowl doors.

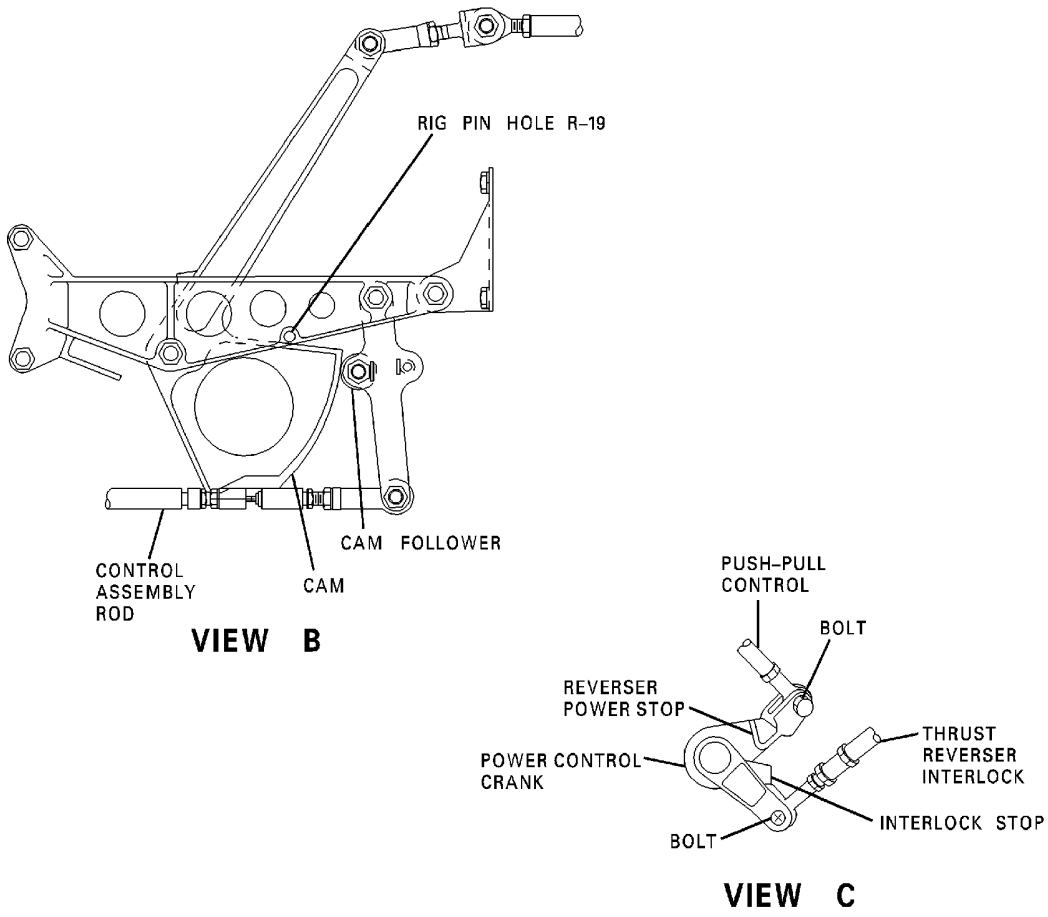
(14) Move both thrust reverser control valve dump levers in normal position.

(15) Remove and stow thrust reverser control valve safety pins.



Test Equipment Connection Points
Figure 503/71-00-00-990-861





CAG(IGDS)

BBB2-71-56B

Throttle System - Adjustment
Figure 504/71-00-00-990-862

9. **Engine Trimming Procedures Using Aircraft Instruments Only**

NOTE: This procedure is not approved for engine trimming during icing conditions. (Paragraph 9.A.)

NOTE: This procedure allows operators to trim engines utilizing engine instruments only, but it is recommended that the engines be trimmed utilizing the calibrated trim test equipment periodically. It is also recommended that this procedure not be utilized as the standard maintenance practice unless the operator has a viable Engine Monitoring Program in place to insure constant monitoring of engine parameters.

NOTE: When trimming engines utilizing cockpit instrumentation only the engines should be trimmed to the upper limit of the EPR trim chart.

NOTE: This procedure to be used for one engine only. All instruments and the other engine must be functioning normally and a cross check with the other engine must show performance within acceptable range. Disregard steps referring to test instruments.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

WJE 405-412, 414, 880, 881, 883, 884

(2) Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 1 Oil Pressure Adjustment.

WJE 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 2 Oil Pressure Adjustment.

WJE 875-879

Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 3 Oil Pressure Adjustment.

WJE 886, 887

Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 4 Oil Pressure Adjustment.

WJE 873, 874, 892, 893

Check engine oil pressure as outlines in PAGEBLOCK 72-00-00/501 Config 5 Oil Pressure Adjustment.

WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 8.D..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

(6) Engine acceleration check as outlined in Paragraph 17..

10. Optional Anti-Surge Bleed Valve Operational Check

A. Check anti-surge bleed valves as outlined in ENGINE GENERAL, SUBJECT 72-00-00, Page 501, Test E.

11. Engine Trimming Procedure During Icing Conditions

NOTE: When circumstances require engine trimming during icing conditions, the following procedure may be used.

NOTE: This procedure to be used for one engine only.

CAUTION: A COMPLETE TRIM RUN WITHOUT THE USE OF ENGINE ANTI-ICE MUST BE PERFORMED AS SOON AS AIRCRAFT REACHES A BASE WHERE THIS IS POSSIBLE.

CAUTION: ENGINE TRIMMING MUST BE PERFORMED ON NEW OR OVER-HAULED ENGINES WHICH HAVE NOT BEEN PRETRIMMED IN TEST IN INSTALLED CONFIGURATION, OR AFTER REPLACEMENT OF FUEL CONTROL. ENGINES WHICH HAVE BEEN OVERHAULED MAY REQUIRE MORE EXTENSIVE TRIMMING.

A. Install Test Equipment:

(1) Open lower forward cowl door and connect test equipment.

(2) Measure ambient temperature (Tamb) and determine trim stop position:

(a) Using ambient temperature and Table 513 and Table 514 or Table 515 or Table 516 or Table 517 or Table 518, determine part power trim stop position to be used. When temperature is in area where either Standard Day or Cold Day stop can be used, use of Cold Day stop results in trim operation at lower engine thrust levels but increases the possibility of throttle stagger. As a general rule, use of Standard Day stop at temperatures above 30°C (86°F) is recommended, unless noise or other local restriction requires operation at lower thrust levels. If ambient temperature is below minimum value given in Standard Day Trim chart, Cold Day Trim chart must be used.

NOTE: The part power trim stop is marked with letter "S" (Standard Day Trim) on one side and letter "C" (Cold Day Trim) on the other side. To change position, the stop must be removed and inverted so the correct letter faces outward (Figure 503).

NOTE: Fuel control part power trim stops are interchangeable with -217A, -217C, and -219 fuel controls.

CAUTION: INCORRECT USE OF PART POWER TRIM STOP IN COLD DAY POSITION (LETTER C FACING OUT) CAN CAUSE OVERTRIM AND SERIOUS DAMAGE TO ENGINE. IF TRIM IS PERFORMED WITH PART POWER TRIM STOP IN COLD DAY POSITION, MAKE CERTAIN STOP IS INVERTED SO THAT LETTER "S" IS FACING OUTWARD BEFORE STOWING.

(b) Place part power trim stop in required position.

(3) Start engine as outlined in Paragraph 4..

(4) Place engine anti-ice switch in ON position.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

CAUTION: DURING COLD WEATHER STARTING, OIL PRESSURE IN EXCESS OF 55 PSI MAY BE EVIDENCED UNTIL OIL VISCOSITIES ARE REDUCED BY INCREASING OIL TEMPERATURE. ENGINE OPERATION IS LIMITED TO IDLE POWER WHEN OIL PRESSURE IS IN EXCESS OF 55 PSI DURING COLD WEATHER STARTS.

(5) Check engine oil pressure. (Paragraph 3.)

CAUTION: AUTOMATIC RESERVE THRUST (ART) SYSTEM MUST BE DISARMED DURING ENGINE TRIM TO PREVENT INADVERTENT TAKEOFF THRUST DURING SINGLE ENGINE ACCELERATION IF BOTH ENGINES ARE OPERATING.

(6) ART system check may be performed per Paragraph 14..

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.

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(8) Place following switches in indicated positions.

Table 536

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	ON
AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF

(9) Accelerate engine three times from idle to part power position and back to idle.

NOTE: Paragraph 11.A.(9) will assure that all air and preserving oil is removed from engine systems.

B. Low-Idle Trim

(1) Place engine anti-ice switch in ON position, operate engine with throttle in the idle position for 5 minutes.

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(2) Record ambient temperature (Tamb) and pressure (Pamb).

(3) Determine minimum-bleed low idle minimum-maximum N_2 RPM percent for ambient temperature (Tamb) and pressure (Pamb) using values obtained from Table 511, Table 512.

(4) After N_2 has stabilized for 5 minutes, record N_2 percent.

(5) Place engine anti-ice switch in OFF position.

(6) With engine anti-ice OFF, allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Calculate the N_2 target adjustment as the difference between the N_2 value from Paragraph 11.B.(6) and the N_2 value from Paragraph 11.B.(4), not to exceed 2 percent.

(9) Reduce the minimum-bleed N_2 determined in Paragraph 11.B.(3) by the adjustment determined in Paragraph 11.B.(8).

CAUTION: PERIODIC ENGINE RUN-UP (WITH ENGINE ANTI-ICING SYSTEM ON), TO AS HIGH A THRUST SETTING AS PRACTICAL (70 PERCENT N_1 FOR A MINIMUM OF 15 SECONDS IS DESIRED) SHOULD BE PERFORMED TO MINIMIZE POSSIBILITY OF ICE BUILD-UP DURING EXTENDED GROUND IDLE OPERATION IN SEVERE ICING CONDITIONS. IT IS SUGGESTED THAT SUCH RUN-UPS NEED NOT BE MADE MORE FREQUENTLY THAN AT TEN MINUTE INTERVALS.

(10) After N_2 has stabilized for 5 minutes with engine anti-ice ON, adjust fuel control idle trim adjustment until idle N_2 is within idle N_2 determined in Paragraph 11.B.(9).

NOTE: Always make final adjustment in the increase direction (counterclockwise).

(11) Record actual N_2 percent set.

C. Part Power Trim

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be OFF for short periods of time.

(1) Record ambient temperature (Tamb) and Pressure (Pamb).

(2) Make certain part power trim stop is in position as outlined in Paragraph 11.A.(2).

(3) Using values obtained in Paragraph 11.C.(1) determine value of minimum-bleed part power engine pressure ratio (EPR) from Table 513, Table 514.

(4) Place engine anti-ice switch in ON position.

(5) With engine anti-ice ON, advance throttle until power lever contacts part power stop.

CAUTION: DO NOT EXCEED ENGINE JT8D-217A/-217C/-219 OPERATING LIMITS OF 590°C EGT OR 135°C OIL TEMP.

(6) Operate engine at part power position for 5 minutes to allow EPR to stabilize. Observe test instrument and record stabilized EPR.

(7) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds and record EPR value.

(8) Immediately place engine anti-ice switch in ON position.

(9) Calculate the EPR target adjustment as the difference between the EPR value in Paragraph 11.C.(7) and the EPR value in Paragraph 11.C.(6).

(10) Reduce the minimum-bleed EPR value determined in Paragraph 11.C.(3) by the adjustment determined in Paragraph 11.C.(9), not to exceed 0.12.

(11) With engine anti-ice ON, operate engine at part power position for 5 minutes to stabilize.

(12) Observe EPR indicator and determine stabilized EPR. Check that EPR is within limits obtained in Paragraph 11.C.(10).

CAUTION: ONLY ALLOWABLE ADJUSTMENTS THAT CAN BE MADE ON FUEL CONTROL ARE IDLE AND MAX SPEED TRIMMERS. TO INCREASE SPEED TRIMMER SCREWS SHOULD BE TURNED IN COUNTERCLOCKWISE DIRECTION. ALL FINAL ADJUSTMENTS SHOULD BE MADE IN INCREASE RPM DIRECTION.

(13) If EPR is not within limits, adjust fuel control max trimmer screw until EPR is within limits established in Paragraph 11.C.(10).

(14) Place engine anti-ice switch in OFF position, allow engine to stabilize for 30 seconds, and record EPR value.

(15) Immediately place engine anti-ice switch in ON position.

(16) Compare minimum-bleed EPR from Paragraph 11.C.(14) with EPR from Paragraph 11.C.(3) and determine trim error, if any.

(17) Adjust engine anti-ice ON EPR value in Paragraph 11.C.(10) by trim error.

(18) Adjust fuel control max trimmer screw, repeating above steps as necessary until minimum-bleed EPR is within limits.

(19) With power lever against part power stop and engine anti-ice ON, observe test and engine gages and record following:

Table 537

Test Instruments	Aircraft Instruments
Engine Pressure Ratio (EPR)	Engine Pressure Ratio (EPR)
Exhaust Gas Temperature (EGT)	Exhaust Gas Temperature (EGT)
N_2 rotor speed	N_2 rotor speed
N_1 rotor speed	N_1 rotor speed
	Oil Temp
	Oil Pressure
	Fuel Flow

(20) Move throttle lever to idle position.

(21) EPR readings obtained from test instrument and aircraft instruments Paragraph 11.C.(18) must not differ by more than ±0.01.

(22) Test instrument readings obtained from Paragraph 11.C.(18) for N_1 and N_2 tachometers must not differ from aircraft readings of N_1 and N_2 by more than ±0.8 percent.

(23) Compare test and aircraft readings obtained from Paragraph 11.C.(18) for EGT; readings must not differ by more than ±5°C.

(24) Since idle and maximum speed trimmers affect each other, repeat Paragraph 11.B. and Paragraph 11.C.. until desired settings are obtained without intermediate adjustment.

(25) Remove remote trimmer from fuel control, return part power trim stop to stowed position, and safety with lockwire. (Figure 503)

D. Approach Idle Check

NOTE: Engine anti-ice must remain ON during this engine trimming procedure except during those steps that specify that engine anti-ice be turned OFF for short periods of time.

(1) Place engine anti-ice switch in ON position and throttle in idle position, open following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(2) Engine N_2 RPM should increase to approach idle.

(3) Operate engine at approach idle for 5 minutes to allow N_2 to stabilize.

(4) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(5) Using value obtained in Paragraph 11.D.(4) determine approach idle minimum-maximum N_2 RPM percent from Table 515 or Table 516 or Table 517 or Table 518. Interpolate between chart values, if necessary.

(6) Place engine anti-ice switch in OFF position. Allow engine to stabilize for 30 seconds and record N_2 percent.

(7) Immediately place engine anti-ice switch in ON position.

(8) Check that actual approach idle N_2 RPM observed on aircraft gauge is within minimum-maximum limits.

(9) With throttle in idle position close following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(10) Engine N_2 RPM should decrease to low idle (after approximately 5 seconds delay)

E. Takeoff Power Assurance Check

(1) This check is to be made as outlined in Paragraph 8.E. except with engine anti-ice on.

F. Reverse Thrust EPR Check

(1) This check is to be made as outlined in Paragraph 8.F. except with engine anti-ice on.

12. Engine Deterioration Check

When desired, an engine deterioration check can be performed as outlined in ENGINE GENERAL, SUBJECT 72-00-00, Page 501 Adjustment/Test.

13. Optional Automatic Reserve Thrust (ART) System Check (For Aircraft with Analog Engine Instrument)

NOTE: If aircraft has met Paragraph 13.A.(1) thru Paragraph 13.A.(13) and passes ARTS self-test, green ART READY light on center main instrument panel comes on. If ART fails, amber ART INOP light on overhead annunciator panel comes on. If aircraft is on the ground and only one engine is running, ARTS INOP light also comes on.

NOTE: The NO MODE light on the TRI is only active during the ARTS test on aircraft equipped with Digital Flight Guidance Computer (DFGC), Honeywell P/N 4034241-970 and subsequent computers.

A. Perform ART System Check

(1) Start both engines as outlined in Paragraph 4..

WARNING: BEFORE MOVING FLAP/SLAT HANDLE, MAKE CERTAIN THAT AREAS AROUND FLAPS AND SLATS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(2) With both engines running at idle place flap/slat handle in full up position.

(3) Place AP DFGC selector in 1 position.

(4) Place ART switch in AUTO position. Check that ART, ART READY and ART INOP lights go off.

(5) Momentarily press T.O. FLX button on thrust rating indicator (TRI), T.O. FLX button and NO MODE lights will come on.

(6) Set ASSUMED TEMP selector to 50°C and record EPR LIM value displayed on TRI.

NOTE: EPR LIM bugs on EPR indicators will agree with TRI.

(7) Place ART switch in off position and check that:

(a) ART and ART READY Lights remain off.

(b) ART INOP light remains off.

(c) EPR LIM on TRI increased above value recorded in Paragraph 13.A.(6).

(d) EPR LIM bugs on EPR indicators agree with EPR limit on TRI.

(e) NO MODE light on the TRI will go off.

(8) Place flap/slat handle at 11 degrees and check that:

(a) ART INOP light comes on.

(b) Master caution light comes on.

(9) Place AIR COND SHUTOFF switch in override (OVRD) position.

(10) Place ART switch in AUTO position and momentarily press master caution light. Check that:

(a) ART INOP goes off.

(b) EPR LIM on TRI and EPR indicators equals EPR LIM recorded in Paragraph 13.A.(6).

(c) ART READY light comes on.

(d) Master caution light goes off.

(11) Advance both throttles to above 64.0 percent N_1 and allow engines to stabilize at this setting.

NOTE: The ART ready light will blink one time after both throttles are advanced to 64% N_1 with the ART system in auto.

NOTE: ART will actuate when it detects N_1 difference of 30.2 percent between engines. However, both engines N_1 must be over 64.0 percent for ARTS to become armed for actuation.

(12) Record right engine EPR value.

(13) Slowly retard left throttle until ART READY light goes off. Check that:

(a) ART light comes on.

(b) Right engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(14) Place AP DFGC selector in 2 position.

(15) Place ART switch off for approximately 3 seconds, then place ART switch back to AUTO position. Check that:

(a) ART light goes off.

(b) EPR LIM on TRI decreased.

(c) EPR LIM bug on right EPR indicator decreased.

(d) ART READY light comes on.

(16) Slowly advance left throttle to above 64.0 percent N_1 (same N_1 as right engine).

(17) Slowly retard right throttle until READY light goes off and check that:

(a) ART light comes on.

(b) Left engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(18) Place AP DFGC selector switch to 1 position.

(19) Place throttles in idle position.

(20) Place flat/slat handle in full up position.

(21) Momentarily place ART switch off and then back to AUTO. Check that:

(a) ART light goes off.

(b) ART READY light is off.

(22) Shut down engines as outlined in Paragraph 7..

14. Optional Automatic Reserve Thrust (ART) System Check (For Aircraft with Electronic Engine Display Panel Installed)

NOTE: If aircraft has met Paragraph 13.A.(1) thru Paragraph 13.A.(13)and passes ARTS self-test, green ART READY light on center main instrument panel comes on. If ART fails, amber ART INOP light on overhead annunciator panel comes on. If aircraft is on the ground and only one engine is running, ARTS INOP light also comes on.

NOTE: The NO MODE light on the TRP is only active during the ARTS test on aircraft equipped with Digital Flight Guidance Computer (DFGC), Honeywell P/N 4034241-970 and subsequent computers.

A. Perform ART System Check

(1) Start both engines as outlined in Paragraph 4..

WARNING: BEFORE MOVING FLAP/SLAT HANDLE, MAKE CERTAIN THAT AREAS AROUND FLAPS AND SLATS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(2) With both engines running at idle place flap/slat handle in full up position.

(3) Place AP DFGC selector in 1 position.

(4) Place ART switch in AUTO position. Check that ART and ART READY lights go off.

(5) Momentarily press T.O. FLX button on thrust rating panel (TRP), T.O. FLX button and NO MODE lights will come on.

(6) Rotate ASSUMED TEMP knob on TRP to obtain 50°C on throttle FMA and record EPR LIM value displayed on EEDP.

NOTE: Dashes appear in EPR limit display.

(7) Place ART switch in off position and check that:

(a) ART, ART INOP and ART READY lights remain off.

(b) EPR LIM increased above value recorded in Paragraph 14.A.(6).

(c) EPR LIM bugs on EPR indicators agree with EPR limit on EEDP.

(d) NO MODE light on the TRP will go off.

(8) Place flap/slat handle at 11 degrees and check that:

(a) ART INOP is displayed on EDAP.

(b) Master caution light comes on.

(9) Place AIR COND SHUTOFF switch in override (OVRD) position.

(10) Place ART switch in AUTO position and momentarily press master caution light. Check that:

(a) ART INOP goes off.

(b) EPR LIM on EEDP equals EPR LIM recorded in Paragraph 14.A.(6).

(c) ART READY light comes on.

(d) Master caution light goes off.

(11) Advance both throttles to above 64.0 percent N_1 and allow engines to stabilize at this setting.

NOTE: The ART ready light will blink one time after both throttles are advanced to 64% N_1 with the ART system in auto.

NOTE: ART will actuate when it detects N_1 difference of 30.2 percent between engines. However, both engines N_1 must be over 64.0 percent for ARTS to become armed for actuation.

(12) Record right engine EPR value.

(13) Slowly retard left throttle until ART READY light goes off. Check that:

(a) ART light comes on.

(b) Right engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(14) Place AP DFGC selector in 2 position.

(15) Place ART switch off for approximately 3 seconds, then place ART switch back to AUTO position. Check that:

(a) ART light goes off.

(b) EPR LIM on EEDP decreased.

(c) EPR LIM bug on right EPR indicator decreased.

(d) ART READY light comes on.

(16) Slowly advance left throttle to above 64.0 percent N_1 (same N_1 as right engine).

(17) Slowly retard right throttle until READY light goes off. Check that:

(a) ART light comes on.

(b) Left engine EPR increases minimum of 0.02 and fuel flow increases.

NOTE: This should occur at a difference of greater than 30.2 percent N_1.

(18) Place AP DFGC selector switch to 1 position.

(19) Place throttles in idle position.

(20) Place flat/slat handle in full up position.

(21) Momentarily place ART switch off and then back to AUTO. Check that:

(a) ART light goes off.

(b) ART READY light is off.

(22) Shut down engines as outlined in Paragraph 7..

15. Engine Trimming Procedures After Engine Change

NOTE: If an engine trim test set is not available, refer to Paragraph 9., Engine Trimming Procedure Using Aircraft Instruments Only.

NOTE: Only one engine can be changed at a time.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

WJE 405-412, 414, 880, 881, 883, 884

(2) Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 1.

WJE 412, 414-427, 429, 861-866, 868, 869, 871, 872, 891

Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 2.

WJE 875-879

Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 3.

WJE 886, 887

Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 4.

WJE 873, 874, 892, 893

Check engine oil pressure as outlines in Oil Pressure Adjustment ENGINE GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 72-00-00/501 Config 5.

WJE 405-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 886, 887, 891-893

B. Perform Following Trim Tests:

(1) Low-Idle Trim as outlined in Paragraph 8.B..

(2) Part Power Trim as outlined in Paragraph 8.C..

(3) Approach Idle Check as outlined in Paragraph 8.D..

(4) Takeoff Power Assurance Check as outlined in Paragraph 8.E..

(5) Engine acceleration check as outlined in Paragraph 17..

(6) Reverse Thrust EPR Check as outlined in Paragraph 8.F..

16. Engine Trimming Procedures After Fuel Control Change

NOTE: If an engine trim test set is not available, refer to Paragraph 9., Engine Trimming Procedures Using Aircraft Instruments Only.

NOTE: Only one fuel control can be changed at a time.

A. Engine Preparation

(1) Set up and start both engines as outlined in Paragraph 8.A..

B. Perform Following Trim Tests:

(1) Part Power Trim as outlined in Paragraph 8.C..

(2) Engine acceleration check as outlined in Paragraph 17..

17. Engine Acceleration Check

A. Check Engine Acceleration

(1) Start engine as outlined in Paragraph 4..

(2) For proper acceleration check ensure no engine bleed air or power extraction, by placing following switches in indicated positions.

Table 538

ENG SYNC	OFF
ICE PROTECT	
Airfoil	OFF
Eng	OFF

Table 538 (Continued)

AIR CONDITIONING	
Supply	OFF
HYD PUMPS	
Eng	LOW
ELEC PWR	
Gen	OFF
NOTE: During accel check procedures when the outside air temperature exceeds 80 - 85°F (26.7 - 29.4°C), it is desirable to cool the flight compartment. The flight compartment is the cooling air source for the electrical/electronics bay and forward accessory compartment. The APU should be started and the pneumatic crossfeed lever placed in the closed position. When checking the right engine, the left air-conditioning pack should be turned on. When checking the left engine, the right air-conditioning pack should be turned on.	

(3) Operate engine with throttle in idle position until all engine parameters stabilize.

(4) With the throttle in idle position, open following circuit breaker:

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	40	B1-835	APPROACH IDLE CONTROL

(5) Engine N2 RPM should increase to approach idle.

(6) Operate engine at approach idle for 5 minutes to allow N2 to stabilize. After 5 minutes, observe minimum oil temperature requirement of 38°C before proceeding.

(7) Record barometric pressure (Pamb) and ambient temperature (Tamb).

(8) Using values from Paragraph 17.A.(7) and Table 534 or Table 535, determine engine pressure ratio (EPR) for takeoff thrust setting.

CAUTION: DO NOT EXCEED ENGINE OPERATING LIMITS.

(9) Advance throttle until takeoff thrust setting determined in Paragraph 17.A.(8) is obtained and maintain for exactly 60 seconds.

(10) While maintaining takeoff setting mark forward edge position of throttle lever on pedestal and record takeoff EPR, N_1, EGT and N_2.

(11) Using N_2 value obtained in Paragraph 17.A.(10) calculate and record 95% of takeoff N_2.

(12) Place throttle in idle position and operate engine at approach idle for 20-25 seconds.

(13) Advance throttle in less than one second to takeoff EPR mark on pedestal.

(14) Measure (with a stop watch) and record time from start of throttle advance to 95% of takeoff N_2 as determined in Paragraph 17.A.(11).

(15) Place throttle in idle position and operate engine at approach idle for 5 minutes.

(16) Repeat Paragraph 17.A.(7) through Paragraph 17.A.(15) twice more.

(17) Calculate average of all three acceleration times and compare average acceleration time to limits of Figure 505.

(18) If acceleration time is unacceptable, refer to Paragraph 16.B..

B. Potential Acceleration Time Problem Sources

(1) If engine does not meet limits in Figure 505, following potential problem sources should be investigated.

(a) Internal structural damage

(b) Bleed load

(c) Idle Trim

(d) Part Power Trim

(e) Fuel Control Unit Schedule

(f) P&D Valve Setting

(g) PRBC Schedule

(h) Fuel pumps and/or filters

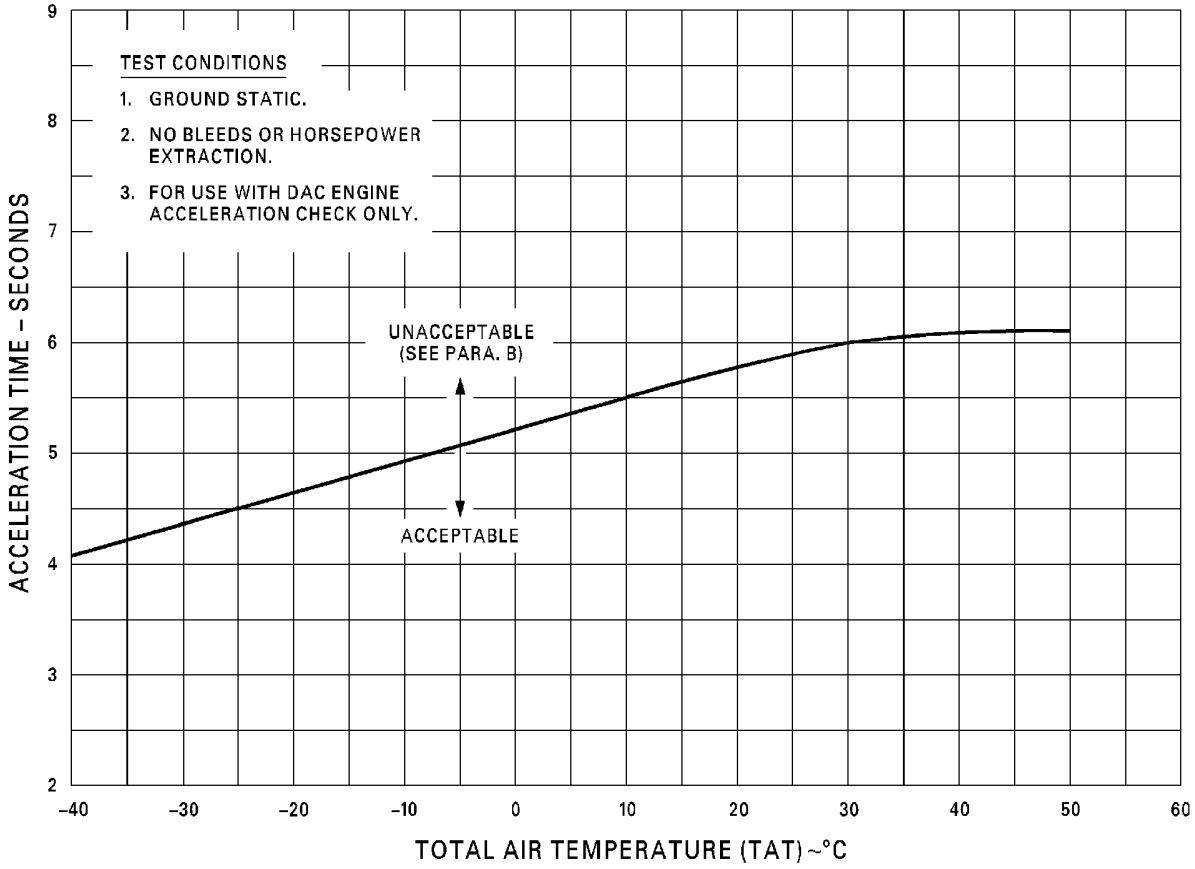
(i) PS_3 Filter

(j) P_b moisture trap

(k) Combustion chamber positioning pins/combustion chamber misalignment, cracks and burnthrough

(l) Pneumatic leaks

ENGINE ACCELERATION CHECK
LIMIT FOR IN–SERVICE ENGINES
FROM APPROACH (HIGH) IDLE



CAG(IGDS)

BBB2–71–43A

Engine Acceleration Check Time Limits
Figure 505/71-00-00-990-863

18. Part Power Trim Procedures During Extreme Cold Conditions

A. General

(1) Part Power EPR increases as ambient temperature decreases. The purpose of the Cold Part Power trim stop is to make trim operations possible at lower temperatures.

(2) There can be conditions in which the ambient temperature is so low that it is not possible to get a Part Power EPR which is lower than Takeoff EPR.

(3) The procedure given below is permitted on an engine only as a temporary solution and is not an alternate trim procedure. If trim is necessary on both engines, this procedure is not permitted. If engine trim is adjusted with this procedure, it will be necessary to trim the engine again in 25 hours or less with the aircraft manufacturer's trim tables. If maintenance operations on one engine made this temporary trim necessary, but the other engine was adjusted to align the throttles, it will be necessary to trim both the engines using the aircraft manufacturer's trim tables in 25 hours or less.

(4) The Part Power trim stop does not need to be moved into the trim position when using this procedure. The throttle will not be advanced far enough to contact the trim stop when the ambient temperature is cold enough to require use of this procedure.

NOTE: FOR JT8D-217C ENGINES ONLY:

Below a given ambient temperature, there is no EPR recorded in the aircraft manufacturer's trim tables. For operators with an engine fleet consisting of both JT8D-217C and JT8D-219 engine models there is a common level trim table available from the aircraft manufacturer which allows trim of the JT8D-219 model down to a lower ambient temperature than that which is allowed for the JT8D-217C model (this is because the Maximum Takeoff EPR of the JT8D-219 model is higher than the Maximum Takeoff EPR of the JT8D-217C model). If you use the common JT8D-217C/-219 trim levels and this occurs with a JT8D-217C model it is permitted to use the JT8D-219 portion of the table which extends to a lower ambient temperature. This can make JT8D-217C trim possible without the Extreme Cold Part Power Trim Procedure.

B. Procedure

(1) Run Engine No. 1 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(2) Run Engine No. 2 to the Power Assurance EPR in the trim tables for the coldest temperature on the tables for the same barometric pressure and let the engine become stable for one minute minimum. Make a mark of the throttle position on the throttle quadrant. Pull back the throttle to Idle.

(3) Adjust the Part Power trim of the engine which had the throttle in the more forward position to increase the fuel flow. This will let that engine get to the Power Assurance EPR with the throttle at a lower position.

NOTE: It is permitted to adjust the trim of only one engine with this procedure. After the selection of one engine for adjustment, Part Power Trim adjustment on the other engine is not permitted.

(4) Run the engine for which Part Power was adjusted back to the Power Assurance EPR and let the engine become stable for one minute minimum. Make Part Power trim adjustments to the engine that was adjusted as necessary until the throttles are aligned with the position mark for the other throttle. Throttle "stagger" (throttles not aligned) of up to 1/2 throttle knob is permitted. Pull back the throttle to Idle.

(5) Let the engine become stable at Idle for three minutes minimum and record N2 and ambient temperature. Make sure that engine Idle trim is in limits at the coldest value on the applicable trim table. If the engine is not in limits, adjust the Idle trim as necessary.

(6) Advance the power lever for one engine to the Power Assurance level and let that engine become stable for one minute minimum. Record the position of the throttle for that engine. Use the same procedure to record the throttle position of the other engine. The throttle stagger limit is 1/2 knob. If further adjustment is necessary, return to Paragraph 18.B.(5).

19. Engine Dry or Wet Motor Operation

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

A. Engine Dry Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight compartment, set the applicable engine controls and switches as follow:

(a) Left and right throttle lever to Idle position.

(b) Left and right FUEL levers in OFF position.

(c) ICE PROTECT panel AIR FOIL L SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP to ON.

1) The FUEL INLET PRESS LOW light is off.

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

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

(3) Pressurize aircraft pneumatic system with APU or external air. (GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 49-00-00/001 Config 1)(GENERAL - DESCRIPTION AND OPERATION, PAGEBLOCK 36-00-00/001)

(4) Do the engine Dry Motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(d) Hold the START switch in ON for approximately 20 seconds or for the maximum starter operational limit, then release the START switch to OFF.

NOTE: For dry motoring, the starter duty cycle is 90 seconds on 15 minutes off.

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

CAUTION: DO NOT MOTOR THE ENGINE UNLESS THERE IS A DISPLAY OF A POSITIVE FUEL INLET PRESSURE. THE FUEL PUMP AND THE MAIN ENGINE CONTROL ARE LUBRICATED BY THE FUEL. THIS WILL PREVENT DAMAGE TO THESE DEVICES.

CAUTION: IF N_1 IS WINDMILLING DUE TO GROUND WINDS, ASSURE POSITIVE N1 INDICATION IS IN THE CORRECT DIRECTION OF ROTATION.

B. Engine Wet Motor

(1) Make certain that the hydraulic system is fully serviced. (HYDRAULIC RESERVOIRS, SUBJECT 12-13-01)

(a) Set the HYD PUMPS switches, TRANS and AUX, to ON and ENG L and R to HIGH on the main instrument panel.

(2) In the flight comparment, set these engine controls and switches as follow:

(a) Left and right throttle lever in Idle position.

(b) Left and right FUEL levers in OFF.

(c) ICE PROTECT panel AIR FOIL SYS and R SYS OFF and ENG L and R in OFF.

(d) AIR CONDITIONING panel SUPPLY switch to OFF.

(e) ENG panel IGN switch is OFF.

(f) FUEL TANKS panel applicable tank AFT PUMPS switch to ON or at ENG panel START PUMP switch to ON.

1) Make sure that there is enough fuel in the fuel system for this procedure. (FUEL SYSTEMS GENERAL, SUBJECT 12-11-04)

(g) Open applicable pneumatic cross feed lever on the aft pedestal.

WARNING: CLOSE THE PNEUMATIC CROSSFEED VALVE IF THE INDICATION FOR THE START SHUTOFF VALVE IS NOT OFF AND DUCT PRESSURE DOES NOT INCREASE AT THE RELEASE OF THE START SWITCH. REPAIR THE CAUSE OF THE MALFUNCTION BEFORE THE SUBSEQUENT ENGINE START. THIS WILL HELP PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE AIRCRAFT.

CAUTION: DO NOT EXCEED THE DUTY CYCLE OF 90 SECONDS ON AND 15 MINUTES OFF WHEN DRY MOTORING. THIS WILL PREVENT DAMAGE TO THE ENGINE.

(3) Do the engine wet motor as follows:

CAUTION: IF FINGER SLIPS, DO NOT ATTEMPT TO REENGAGE UNTIL AND N_2 ROTORS HAVE STOPPED.

(a) Move the applicable L or R ENG START switch to ON.

(b) Make certain that the applicable L or R START VALVE OPEN light comes on and there is a noticeable drop in the PNEU PRESS indication.

(c) Make certain that the applicable N2 and OIL PRESS increase.

1) L or R OIL PRESS LOW light must go out. If it does not go out, then release the START switch to OFF.

(d) Hold the START switch in ON for not more than 20 seconds to get 15-20 percent N2 speed, then put the FUEL lever to ON for not more than 20 seconds.

1) Make certain that there is fuel flow shown on the FUEL FLOW indication, then move the FUEL lever to OFF.

NOTE: Large quantities of fuel can collect in the engine if the fuel switch stays ON for more than 20 seconds.

2) Continue to hold the START switch in ON to clear the engine of fuel and fuel vapors for not more than 60 seconds.

(e) If necessary, cool down the starter per the Normal Start Cycle Limits. (PNEUMATIC STARTER, SUBJECT 80-10-01)

(f) Upon release of the START switch , make certain that the applicable L or R START VALVE OPEN light goes out and the N2 rotation speed comes to a stop.

POWER PLANT CONVERSION - MAINTENANCE PRACTICES

1. General

A. This maintenance practices provides instructions for converting a left power plant to a right power plant and a right power plant to a left power plant.

2. Equipment and Materials

NOTE: Equivalent substitutes may be used instead of the following listed 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
Torque wrench 0 to 600 inch- pounds range (0 to 67.2 N·m)	
Rig pin (4-2) 1/4 x 2 5/8	
Rig aid (R-19) 1/4 x 2 3/8	
Rig aid (R-24) .468 square x 4	
NOTE: Rig pins are contained in kit 5952169-1 which may be purchased from Douglas.	
Thread protector engine cone bolt 4916744-1 4916744-501 (2 required)	
Thrust reverser hoist adapter 3936853-1	
Antiseize compound MIL-L-25681 DPM 5782	
Sealant, silicone (two part) (RTV-88 with RTV-9910 catalyst) DMS 1799 Rev. C	General Electric Silicone Div.
Lockwire, .032 corrosion- resistant steel P05-289	
Lockwire, .020 corrosion- resistant steel P05-288	

3. Convert Left Power Plant to Right Power Plant

A. Convert Left Thrust Reverser to Right

(1) Disconnect electrical connectors from upper and lower thrust reverser latch position switches.

(2) Remove channel supports attaching thrust reverser latch mechanisms to engine flange N.

(3) Disconnect thrust reverser hydraulic lines at T fittings.

(4) Disconnect feedback control link from interlock cam.

(5) Remove screws from left engine thrust reverser hoist attach point and install hoist adapter.

(6) Support thrust reverser with hoist adapter and remove mounting bolts.

(7) Carefully remove thrust reverser from engine at flange P.

(8) Place thrust reverser on suitable protective pad.

(9) Remove hoist adapter and install screws in thrust reverser hoist attach points.

(10) Remove screws from right engine thrust reverser hoist attach points and install hoist adapter.

(11) Hoist thrust reverser into approximate position; push thrust reverser forward and align with guide pin.

(12) Install thrust reverser mounting bolts and tighten to torque of 120 to 160 inch-pounds (13.4 to 18.0 N·m).

(13) Remove hoist adapter and install screws in thrust reverser hoist attach points.

(14) Disconnect push-pull control cable from interlock control crank.

(15) Remove jamnut from push-pull control cable; withdraw cable from telescopic support and engine flange N.

(16) Remove bolts attaching interlock mechanism to engine brackets; rotate interlock mechanism 180 degrees and install bolts attaching interlock mechanism to brackets.

(17) Remove bolt attaching interlock control crank to interlock mechanism; rotate crank 180 degrees and install bolt attaching crank to interlock mechanism.

(18) Remove bolt attaching interlock control crank roller to interlock control crank; position roller on opposite side of crank and install bolt attaching roller to interlock control crank.

(19) Remove bolts attaching telescopic support and cover plate to engine flange N; move support to top hole and cover plate to lower hole. Install attaching bolts and tighten to torque of 62 to 72 inch-pounds (6.9 to 8.1 N·m).

(20) Insert push-pull control cable through engine flange N and telescopic support; install jamnut on control cable and safety with P05-289 lockwire.

WARNING: SILICONE RTV IS AN AGENT THAT IS POISONOUS, CARGINOGENIC, CORROSIVE, AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN SILICONE RTV 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 SILICONE RTV IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

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.

(21) Using RTV-88 silicone sealant, fill gap between flange N, spacer and telescopic support.

(22) Rotate interlock cam until rig pin (R-19) can be installed in interlock mechanism and interlock cam.

(23) Adjust rod end of feedback control link until connecting bolt can be freely removed and installed. Install bolt and safety nut with cotter pin.

(24) Install rig pin (4-2) in rig pin hole in power control crank (right side of engine).

(25) Install rig aid (R-24) between interlock stop and reverse power stop (left side of engine).

(26) While holding interlock control crank cam roller against cam surface of interlock cam, adjust rod end of push-pull control cable until connecting bolt can be freely removed and installed. Install bolt and safety nut with cotter pin.

(27) Connect thrust reverser hydraulic lines at T fittings.

(28) Install channel supports attaching thrust reverser latch mechanisms to engine flange N.

(29) Connect electrical connectors to upper and lower thrust reverser latch position switches. Safety connectors with P05-289 lockwire.

B. Convert Left Starter and Pneumatic Bleed Air Ducts to Right

(1) Disconnect sensing line from left starter duct and air filter, remove clamp.

(2) Remove clamp connecting left starter duct to starter air shutoff valve.

(3) Remove clamp connecting left starter duct to right starter duct.

(4) Support left starter duct and remove bolt connecting support link to bracket at flange J.

(5) Remove clamp connecting right starter duct to tee duct.

(6) Remove bolt connecting support link to bracket at flange H.

(7) Support right starter duct and remove bolt connecting support link to starter duct support. Remove duct, being careful not to damage fire detector unit or duct.

(8) Remove bolts attaching starter duct support at flange J and J1 and remove support.

(9) Support tee duct and remove clamp connecting tee duct to check valve.

(10) Remove clamp connecting check valve to air manifold and remove check valve.

(11) Remove clamps connecting dome caps to 8th-stage and 13th-stage air manifolds and remove dome caps.

(12) Install dome caps on right side of 8th-stage and 13th-stage air manifolds with clamps, orient clamp "T" bolt to maintain a maximum clearance with cowl door, and tighten to torque specified on clamp. Install safety pin on clamp tang.

(13) Install check valve, flow arrow pointing down, on left side of 8th-stage air manifold with clamp, orient clamp "T" bolt to maintain a maximum clearance with cowl door, and tighten to torque specified on clamp. Install safety pin on clamp tang.

(14) Install tee duct on check valve with clamp but do not tighten at this time.

(15) Adjust support link to 3.30 inch (83.8 mm) and install between tee duct and engine bracket.

NOTE: Install support link to duct without preload.

(16) Install starter duct between tee duct and starter air shutoff valve with clamp but do not tighten at this time.

NOTE: Visually check duct flange to ensure that misalignment does not exceed 0.060 inch (1.5 mm) offset.

(17) If required loosen starter scroll bolts to match scroll to starter duct. Tighten scroll bolts to a torque of 35 to 45 inch-pounds (3.9 to 5.0 N·m).

(18) Tighten bolts connecting link to duct and bracket.

(19) Tighten all clamps to torque specified on clamps and install safety pin on clamp tang.

(20) Connect sensing line to air filter and starter duct and install clamp.

C. Convert Left Burn-Thru Barrier and Fire Detector to Right

(1) Disconnect electrical connectors and ground connectors from upper and lower fire detectors.

(2) Remove bolts attaching burn-thru barrier to engine flanges H and J2.

CAUTION: CARE MUST BE TAKEN DURING REMOVAL NOT TO BEND ELEMENT WHEN CLEARING PNEUMATIC DUCTS AND OTHER EQUIPMENT OR STRUCTURE IN AREA.

(3) Remove burn-thru barrier being careful not to damage fire detectors or barrier.

CAUTION: AFTER INSTALLATION, MAKE SURE THAT BARRIER DOES NOT CONTACT ENGINE FAN CASE AND BORESCOPE COVER PLATE ATTACH BOLT HEADS.

CAUTION: MAINTAIN A MINIMUM CLEARANCE LIMIT OF 5/32 INCH (3.79 MM) BETWEEN THE FIRE DETECTOR SENSOR ELEMENTS AND ADJACENT ENGINE STRUCTURE.

(4) Position burn-thru barrier on left side of engine between engine flanges H and J2; install bolts attaching burn-thru barrier to brackets.

NOTE: Fire detector electrical connectors to be connected after electrical harness has been rotated.

NOTE: If contact exists, refer to CMM 71-30-02 for Elimination of Chafing and/or Repair.

(5) Remove duct support link from bottom of barrier and install on top of barrier.

D. Convert Left Electrical Harness to Right

(1) Disconnect electrical harness clamps as necessary to rotate harnesses at center of engine to left side of engine.

(2) Connect electrical harness with clamps to left side of engine.

CAUTION: MAKE CERTAIN TO OBSERVE COLOR CODE OF WIRE. IF NOT CONNECTED PROPERLY, FIRE WARNING SYSTEM WILL NOT TEST.

(3) Connect electrical connectors and ground connectors to upper and lower fire detector. Tighten electrical connectors to torque of 50 to 70 inch-pounds (5.6 to 7.8 N·m). Safety connectors with P05-288 lockwire.

E. Convert Left Engine Mount Cone Bolts to Right

(1) Remove forward upper cone bolt from right side of engine as follows:

(a) Remove nut and washer from attach bolt.

(b) Support cone bolt, remove attach bolt, and retainer washer.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(c) Remove cone bolt.

(2) Install forward upper cone bolt on left side of engine as follows:

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads (SUBJECT 71-20-01).

(a) Make certain retainer washer is on attach bolt.

WARNING: MOLYBDENUM DISULFIDE SILICONE LUBRICANT IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN MOLYBDENUM DISULFIDE SILICONE 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 MOLYBDENUM DISULFIDE SILICONE LUBRICANT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.

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.

(b) Apply coating of antiseize lubricant (MIL-L-25681) to attach bolt grip length, cone bolt threads only, and engine mount flange bushings.

(c) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt.

NOTE: Bolt threads must be clean and dry prior to installing nut.

NOTE: Attach bolt is installed with bolt head forward.

CAUTION: RUNNING TORQUE OF ATTACH BOLT NUT MUST NOT BE LESS THAN 50 INCH-POUNDS (5.6 N.M.).

(d) Install washer and nut on attach bolt. Tighten nut until cone bolt is free standing but readily moveable by hand. Nut torque shall not exceed 425 inch-pounds (48.0 N·m).

NOTE: Torque required to move cone bolt must not exceed 75 inch-pounds (8.5 N·m). A force of up to 26 pounds (11.7 kg) maximum, applied perpendicular to cone bolt axis and between thread runout and taper is equivalent.

(3) Remove forward lower cone bolt from right side of engine as follows:

(a) Remove nut and washer from attach bolt.

(b) Support cone bolt, remove attach bolt, and retainer washer.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(c) Remove cone bolt.

(4) Install forward lower cone bolt on left side of engine as follows:

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads.

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(a) Make certain retainer washer is on attach bolt.

(b) Apply coating of antiseize lubricant (MIL-L-25681) to attach bolt grip length, cone bolt threads only, and engine mount flange bushings.

(c) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt.

NOTE: Bolt threads must be clean and dry prior to installing nut.

NOTE: Attach bolt is installed with bolt head forward.

CAUTION: RUNNING TORQUE OF ATTACH BOLT NUT MUST NOT BE LESS THAN 50 INCH-POUNDS (5.6 N.M.).

(d) Install washer and nut on attach bolt. Tighten nut until cone bolt is free standing but readily moveable by hand. Nut torque shall not exceed 425 inch-pounds (48.0 N·m).

NOTE: Torque required to move cone bolt must not exceed 75 inch-pounds (8.5 N·m). A force of up to 26 pounds (11.7 kg) maximum, applied perpendicular to cone bolt axis and between thread runout and taper is equivalent.

(5) Remove aft cone bolt from right side of engine as follows:

(a) Remove cotter pin, nut, and washer from attach bolt.

(b) Support cone bolt and remove attach bolt.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(c) Remove cone bolt.

(d) Remove washer from attach bolt.

(6) Install aft cone bolt on left side of engine as follows:

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads (SUBJECT 71-20-01).

(a) Install countersunk washer on attach bolt with counter-sink facing bolt head.

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- USE IN AN AREA OPEN TO THE AIR.
- CLOSE THE CONTAINER WHEN NOT USED.
- DO NOT GET MOLYBDENUM DISULFIDE SILICONE LUBRICANT IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.

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.

(WARNING PRECEDES)

(b) Apply coating of antiseize lubricant (MIL-L-25681) to attach bolt grip length, cone bolt threads only, and engine mount flange bushings.

(c) Position centering spring between flange bushings with cross bar down; deflect side loops over shoulder of bushings.

(d) Position cone bolt between flange bushings insert attach bolt through flange bushings and cone bolt.

(e) Install washer and nut on attach bolt and tighten nut fingertight.

(f) Push nut and washer against flange bushing.

(g) Make certain countersunk washer under head of bolt is against bolt head and measure gap between washer and engine flange.

NOTE: Gap should be 0.005 to 0.010-inch (.13 to .25 mm).

(h) Install cotter pin.

F. Convert Left Fuel Bridle to Right

(1) Disconnect and remove fuel vapor vent line.

(2) Remove flange plate form fuel bridle.

(3) Install flange plate and new gasket on fuel bridle, right side of engine.

(4) Connect vapor vent line to flange plate and tee fitting.

(5) Install cap on elbow left side of engine.

G. Convert Left Bridle Blanking Caps to Right

(1) Remove bridle blanking caps from left of engine and install on right side of engine as follows:

(a) Pt_2

(b) Hydraulic supply

(c) Hydraulic pressure

(d) Hydraulic drain

(e) Pt_7

(f) Thrust reverser deploy

(g) Thrust reverser stow.

WJE 407, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-879, 891

H. Convert Apron Support Brackets and Snubber Attach Brackets

(1) Remove forward and aft snubber attach brackets from engine brackets.

(2) Install forward and aft snubber attach brackets on opposite side of engine.

(3) Remove apron support brackets from engine.

(4) Install apron support brackets on opposite side of engine.

WJE 401-404, 412, 414, 886, 887

I. Convert Apron Support Brackets and Snubber Attach Brackets

(1) Remove forward, center and aft snubber attach brackets from engine brackets.

(2) Install forward, center and aft snubber attach brackets on opposite side of engine.

NOTE: Forward cowl door center snubber and attach bracket are to be installed on right engine only.

WJE 401-404, 412, 414, 886, 887 (Continued)

(3) Remove apron support brackets from engine.

(4) Install apron support brackets on opposite side of engine.

WJE 405, 406, 408-411, 418, 880, 881, 883, 884, 892, 893

J. Convert Apron Support Brackets and Snubber Attach Brackets

(1) Remove forward, center and aft snubber attach brackets from engine brackets.

(2) Install forward, center and aft snubber attach brackets on opposite side of engine.

NOTE: Aircraft with forward cowl door center snubber and attach bracket are to be installed on right engine only.

(3) Remove apron support brackets from engine.

(4) Install apron support brackets on opposite side of engine.

WJE ALL

4. Convert Right Power Plant to Left Power Plant

A. Convert Right Thrust Reverser to Left

(1) Disconnect electrical connectors from upper and lower thrust reverser latch position switches.

(2) Remove channel supports attaching thrust reverser latch mechanisms to engine flange N.

(3) Disconnect thrust reverser hydraulic lines at T fittings.

(4) Disconnect feedback control link from interlock cam.

(5) Remove screws from right engine thrust reverser hoist attach point and install hoist adapter.

(6) Support thrust reverser with hoist adapter and remove mounting bolts.

(7) Carefully remove thrust reverser from engine at flange P.

(8) Place thrust reverser on suitable protective pad.

(9) Remove hoist adapter and install screws in thrust reverser hoist attach points.

(10) Remove screws from left engine thrust reverser hoist attach points and install hoist adapter.

(11) Hoist thrust reverser into approximate position; push thrust reverser forward and align with guide pin.

(12) Install thrust reverser mounting bolts and tighten to torque of 120 to 160 inch-pounds (13.4 to 18.0 N·m).

(13) Remove hoist adapter and install screws in thrust reverser hoist attach points.

(14) Disconnect push-pull control cable from interlock control crank.

(15) Remove jamnut from push-pull control cable; withdraw cable from telescopic support and engine flange N.

(16) Remove bolts attaching interlock mechanism to engine brackets; rotate interlock mechanism 180 degrees and install bolts attaching interlock mechanism to brackets.

(17) Remove bolt attaching interlock control crank to interlock mechanism; rotate crank 180 degrees and install bolt attaching crank to interlock mechanism.

(18) Remove bolt attaching interlock control crank roller to interlock control crank; position roller on opposite side of crank and install bolt attaching roller to interlock control crank.

(19) Remove bolts attaching telescopic support and cover plate to engine flange N; move support to lower hole and cover plate to top hole. Install attaching bolts and tighten to torque of 62 to 72 inch-pounds (6.9 to 8.1 N·m).

(20) Insert push-pull control cable through engine flange N and telescopic support; install jamnut on control cable and safety with P05-289 lockwire.

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

(21) Using RTV-88 silicone sealant, fill gap between flange N, spacer and telescopic support.

(22) Rotate interlock cam until rig pin (R-19) can be installed in interlock mechanism and interlock cam.

(23) Adjust rod end of feedback control link until connecting bolt can be freely removed and installed. Install bolt and safety nut with cotter pin.

(24) Install rig pin (4-2) in rig pin hole in power control crank (right side of engine).

(25) Install rig aid (R-24) between interlock stop and reverse power stop (left side of engine).

(26) While holding interlock control crank cam roller against cam surface of interlock cam, adjust rod end of push-pull control cable until connecting bolt can be freely removed and installed. Install bolt and safety nut with cotter pin.

(27) Connect thrust reverser hydraulic lines at T fittings.

(28) Install channel supports attaching thrust reverser latch mechanisms to engine flange N.

(29) Connect electrical connectors to upper and lower thrust reverser latch position switches. Safety connectors with P05-289 lockwire.

B. Convert Right Starter and Pneumatic Bleed Air Ducts to Left

(1) Disconnect sensing line from right starter duct and air filter, remove clamp.

(2) Remove clamp connecting starter duct to starter air shutoff valve.

(3) Remove clamp connecting starter duct to tee duct.

(4) Remove bolt connect support link to bracket at flange H.

(5) Support tee duct and remove clamp connecting tee duct to check valve.

(6) Remove clamps connecting dome caps to 8th-stage and 13th-stage air manifolds and remove dome caps.

(7) Install dome caps on left side of 8th-stage and 13th-stage air manifolds with clamps , orient clamp "T" bolt to maintain a maximum clearance with cowl door, and tighten to torque specified on clamps. Install safety pin on clamp tang.

(8) Install check valve, flow arrow pointing down, on right side of 8th-stage air manifold with clamp, orient clamp "T" bolt to maintain a maximum clearance with cowl door, and tighten to torque specified on clamp. Install safety pin on clamp tang.

(9) Install tee duct on check valve with clamp but do not tighten at this time.

(10) Position starter duct support between flange J and J1 at bottom of engine install bolts attaching support to flanges.

(11) Position left and right starter duct on engine and install clamps but do not tighten at this time.

(12) Adjust support links, side links to 3.90 inch (99.0 mm), center link to 3.30 inch (83.8 mm) and install links between engine flange brackets and ducts.

NOTE: Visually check duct flange to ensure that misalignment does not exceed 0.060 inch (1.5 mm) offset.

(13) If required loosen starter scroll bolts to match scroll to starter duct. Tighten scroll bolts to torque of 35 to 45 inch-pounds (3.9 to 5.0 N·m).

(14) Tighten bolts connecting links to ducts and brackets.

(15) Tighten all clamps to torque specified on clamps and install safety pin on clamp tang.

(16) Connect sensing line to air filter and left starter duct and install clamp.

C. Convert Right Burn-Thru Barrier and Fire Detector to Left

(1) Disconnect electrical connectors and ground connectors from upper and lower fire detectors.

(2) Remove bolts attaching burn-thru barrier to engine flanges H and J2.

CAUTION: CARE MUST BE TAKEN DURING REMOVAL NOT TO BEND ELEMENT WHEN CLEARING PNEUMATIC DUCTS AND OTHER EQUIPMENT OR STRUCTURE IN AREA.

(3) Remove burn-thru barrier being careful not to damage fire detectors or barrier.

CAUTION: AFTER INSTALLATION, MAKE SURE THAT BARRIER DOES NOT CONTACT ENGINE FAN CASE AND BORESCOPE COVER PLATE ATTACH BOLT HEADS.

CAUTION: MAINTAIN A MINIMUM CLEARANCE LIMIT OF 5/32 INCH (3.79 MM) BETWEEN THE FIRE DETECTOR SENSOR ELEMENTS AND ADJACENT ENGINE STRUCTURE.

(4) Position burn-thru barrier on right side of engine between engine flanges H and J2; install bolts attaching burn-thru barrier to brackets.

NOTE: Fire detector electrical connectors to be connected after electrical harness has been rotated.

NOTE: If contact exists, refer to CMM 71-30-02 for Elimination of Chafing and/or Repair.

(5) Remove duct support link from bottom of barrier and install on top of barrier.

D. Convert Right Electrical Harness to Left.

(1) Disconnect electrical harness clamps as necessary to rotate harnesses at center of engine to right side of engine.

(2) Connect electrical harness with clamps to right side of engine.

(3) Connect electrical connectors and ground connectors to upper and lower fire detector. Tighten electrical connectors to torque of 50 to 70 inch-pounds (5.6 to 7.8 N·m). Safety connectors with P05-288 lockwire.

E. Convert Right Engine Mount Cone Bolts to Left

(1) Remove forward upper cone bolt from left side of engine as follows:

(a) Remove nut and washer from attach bolt.

(b) Support cone bolt, remove attach bolt, and retainer washer.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(c) Remove cone bolt.

(2) Install forward upper cone bolt on right side of engine as follows:

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads (SUBJECT 71-20-01).

(a) Make certain retainer washer is on attach bolt.

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(b) Apply coating of antiseize lubricant (MIL-L-25681) to attach bolt grip length, cone bolt threads only, and engine mount flange bushings.

(c) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt.

NOTE: Bolt threads must be clean and dry prior to installing nut.

NOTE: Attach bolt is installed with bolt head forward.

CAUTION: RUNNING TORQUE OF ATTACH BOLT NUT MUST NOT BE LESS THAN 50 INCH-POUNDS (5.6 N.M.).

(d) Install washer and nut on attach bolt. Tighten nut until cone bolt is free standing but readily moveable by hand. Nut torque shall not exceed 425 inch-pounds (48.0 N·m).

NOTE: Torque required to move cone bolt must not exceed 75 inch-pounds (8.5 N·m). A force of up to 26 pounds (11.7 kg) maximum, applied perpendicular to cone bolt axis and between thread runout and taper is equivalent.

(3) Remove forward lower cone bolt from left side of engine as follows:

(a) Remove nut and washer from attach bolt.

(b) Support cone bolt, remove attach bolt, and retainer washer.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(c) Remove cone bolt.

(4) Install forward lower cone bolt on right side of engine as follows:

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads (SUBJECT 71-20-01).

(a) Make certain retainer washer is on attach bolt.

(b) Apply coating of antiseize lubricant (MIL-L-25681) to attach bolt grip length, cone bolt threads only, and engine mount flange bushings.

(c) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt.

NOTE: Bolt threads must be clean and dry prior to installing nut.

NOTE: Attach bolt is installed with bolt head forward.

CAUTION: RUNNING TORQUE OF ATTACH BOLT NUT MUST NOT BE LESS THAN 50 INCH-POUNDS (5.6 N.M.).

(d) Install washer and nut on attach bolt. Tighten nut until cone bolt is free standing but readily moveable by hand.

NOTE: Torque required to move cone bolt must not exceed 75 inch-pounds (8.5 N·m). A force of up to 26 pounds (11.7 kg) maximum, applied perpendicular to cone bolt axis and between thread runout and taper is equivalent.

(5) Remove aft cone bolt from left side of engine as follows:

(a) Remove cotter pin, nut, and washer from attach bolt.

(b) Support cone bolt and remove attach bolt.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(c) Remove cone bolt and centering spring.

(d) Remove washer from attach bolt.

(6) Install aft cone bolt on right side of engine as follows:

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads.

PAGEBLOCK 71-20-01/201 Config 2

(a) Install countersunk washer on attach bolt with counter-sink facing bolt head.

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(b) Apply coating of antiseize lubricant (MIL-L-25681) to attach bolt grip length, cone bolt threads only, and engine mount flange bushings.

(c) Position centering spring between flange bushings with cross bar down; deflect side loops over shoulder of bushings.

(d) Position cone bolt between flange bushings and centering spring insert attach bolt through flange bushings and cone bolt.

(e) Install washer and nut on attach bolt and tighten nut fingertight.

(f) Push nut and washer against flange bushing.

(g) Make certain countersunk washer under head of bolt is against bolt head and measure gap between washer and engine flange.

NOTE: Gap should be 0.005 to 0.010-inch (.13 to .25 mm).

(h) Install cotter pin.

F. Convert Right Fuel Bridle to Left

(1) Disconnect and remove fuel vapor vent line.

(2) Remove flange plate from fuel bridle.

(3) Install flange plate and new gasket on fuel bridle, left side of engine.

(4) Connect vapor vent line to flange plate and tee fitting.

(5) Install cap on elbow right side of engine.

G. Convert Right Bridle Blanking Caps to Left

(1) Remove bridle blanking caps from right of engine and install on left side of engine as follows:

(a) Pt_2

(b) Hydraulic supply

(c) Hydraulic pressure

(d) Hydraulic drain

(e) Pt_7

(f) Thrust reverser deploy

(g) Thrust reverser stow.

WJE 407, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-879, 891

H. Convert Apron Support Brackets and Snubber Attach Brackets

(1) Remove forward and aft snubber attach brackets from engine brackets.

(2) Install forward and aft snubber attach brackets on opposite side of engine.

(3) Remove apron support brackets from engine.

(4) Install apron support brackets on opposite side of engine.

WJE 401-404, 412, 414, 886, 887

I. Convert Apron Support Brackets and Snubber Attach Brackets

(1) Remove forward, center, and aft snubber attach brackets from engine brackets.

(2) Install forward, center and aft snubber attach brackets on opposite side of engine.

NOTE: Forward cowl door center snubber and attach bracket are to be installed on right engine only.

(3) Remove apron support brackets from engine.

(4) Install apron support brackets on opposite side of engine.

WJE 405, 406, 408-411, 418, 880, 881, 883, 884, 892, 893

J. Convert Apron Support Brackets and Snubber Attach Brackets

(1) Remove forward, center and aft snubber attach brackets from engine brackets.

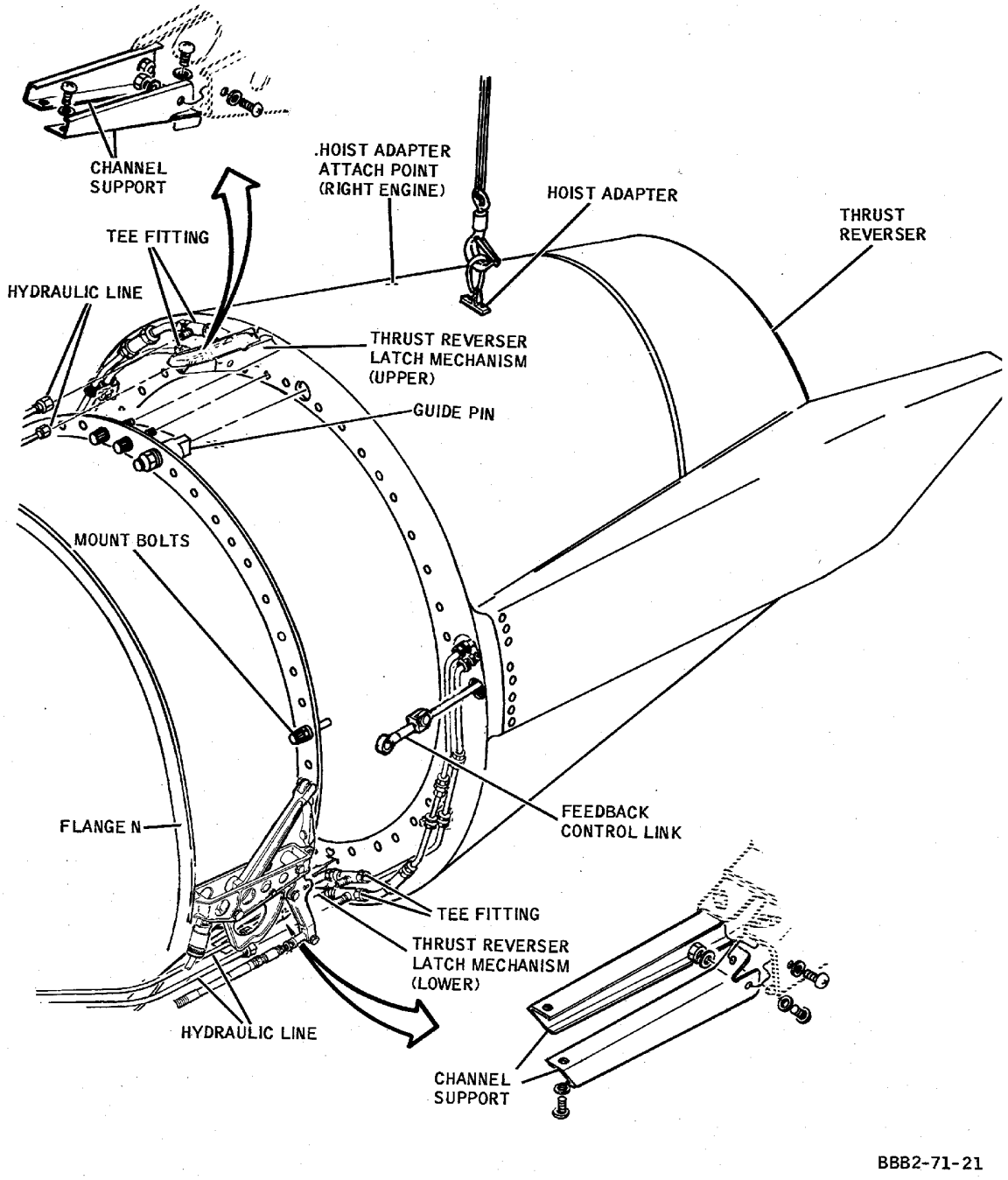
(2) Install forward, center and aft snubber attach brackets on opposite side of engine.

NOTE: Aircraft with forward cowl door center snubber and attach bracket are to be installed on right engine only.

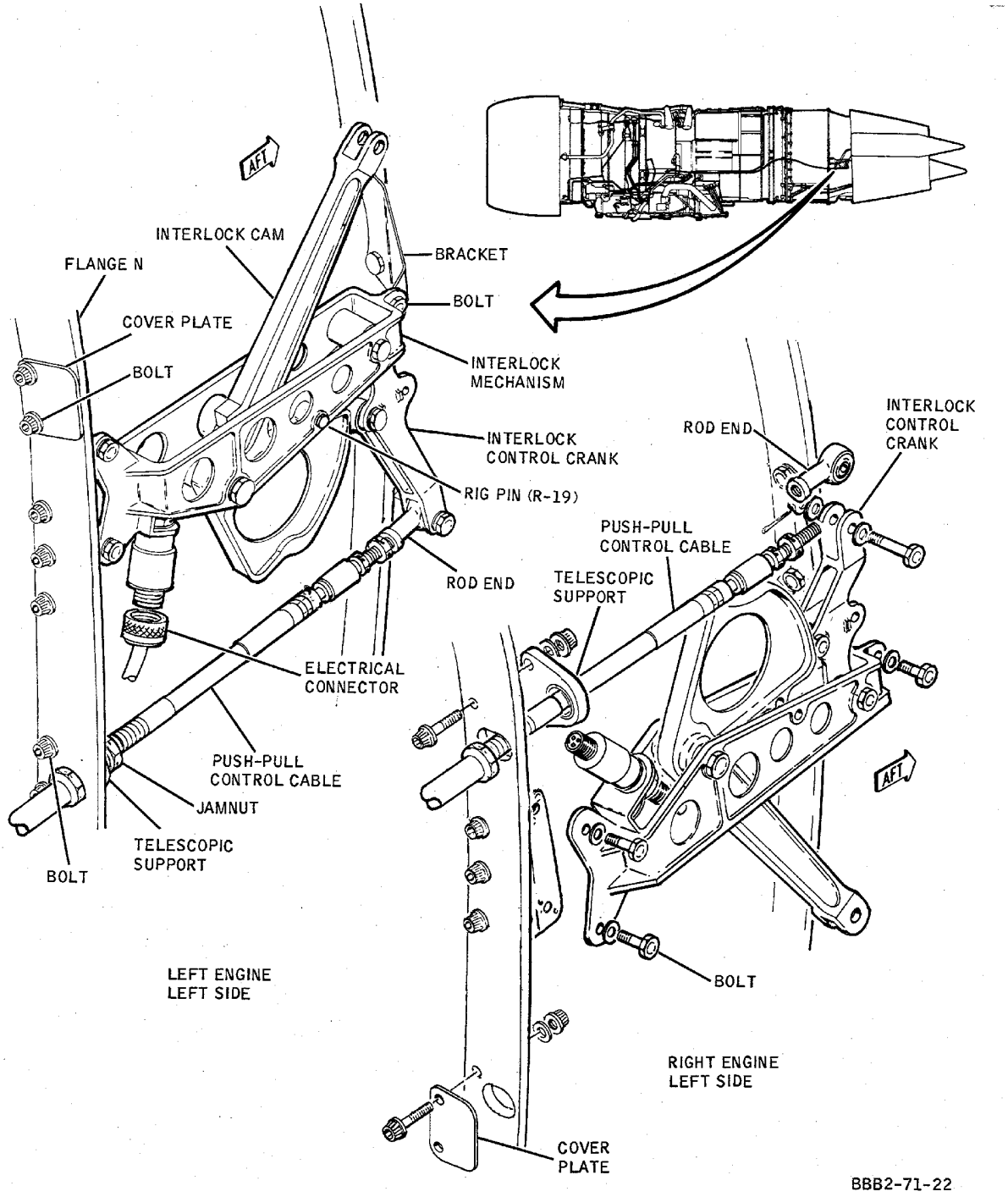
(3) Remove apron support brackets from engine.

(4) Install apron support brackets on opposite side of engine.

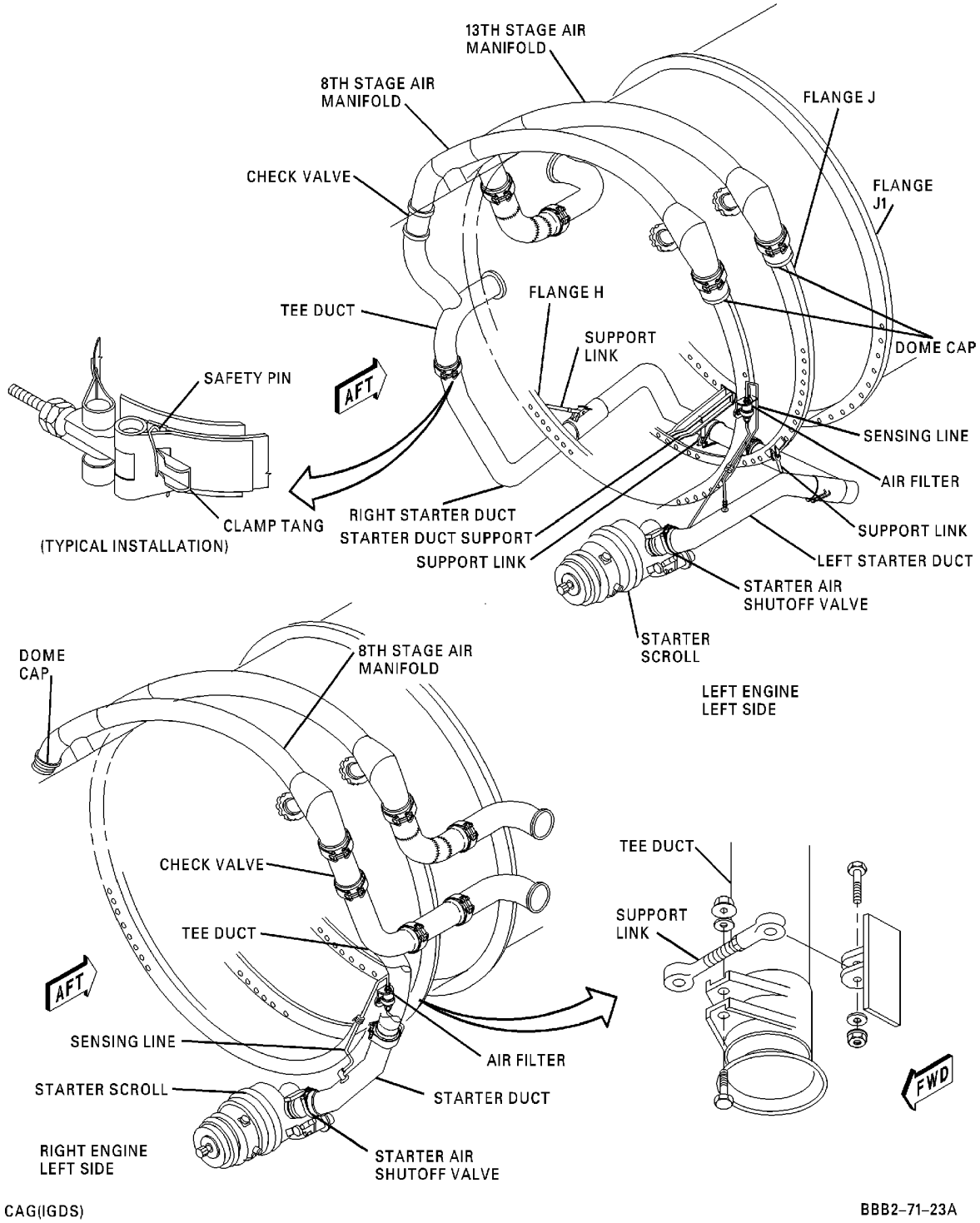
WJE ALL



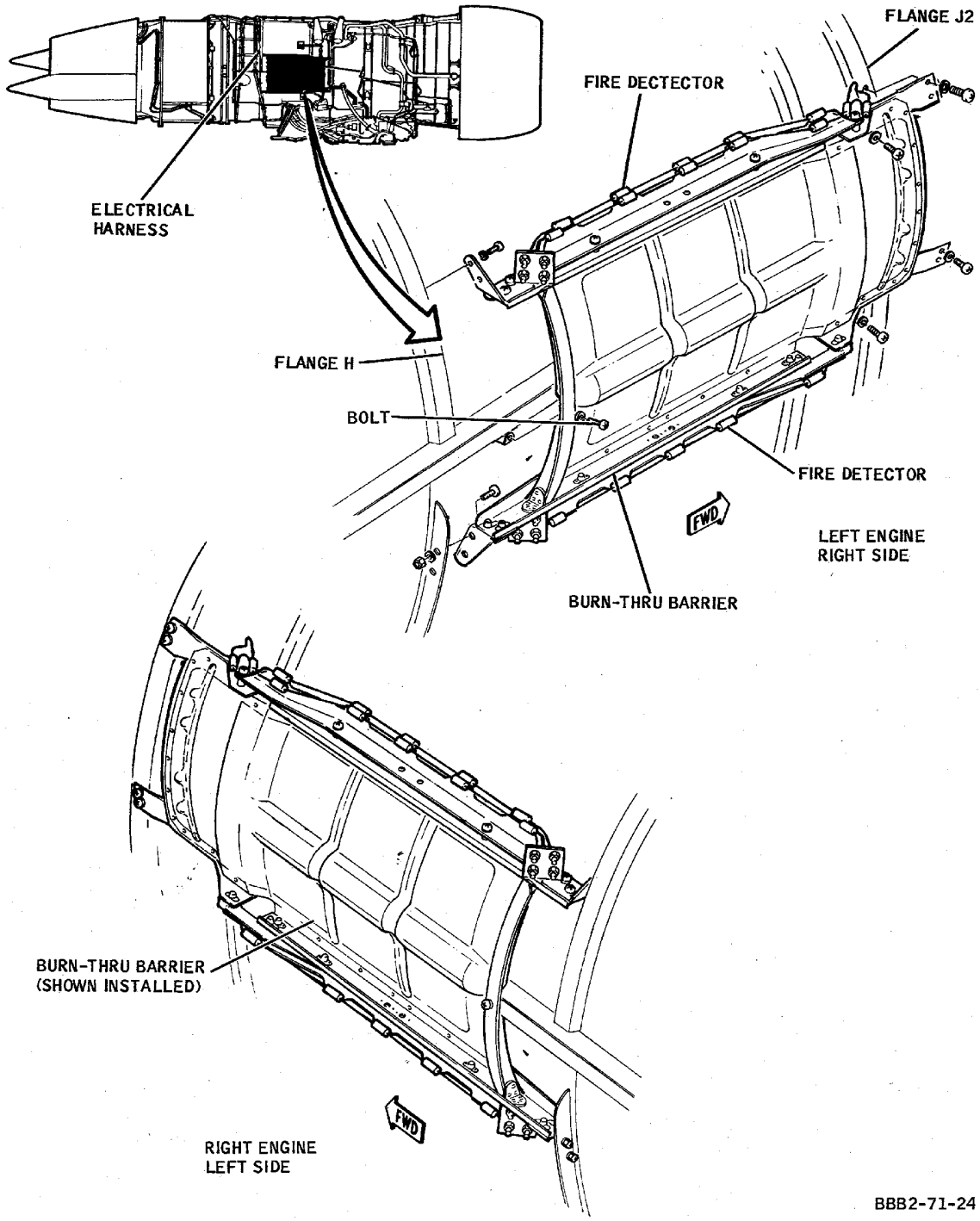
Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 1 of 8)



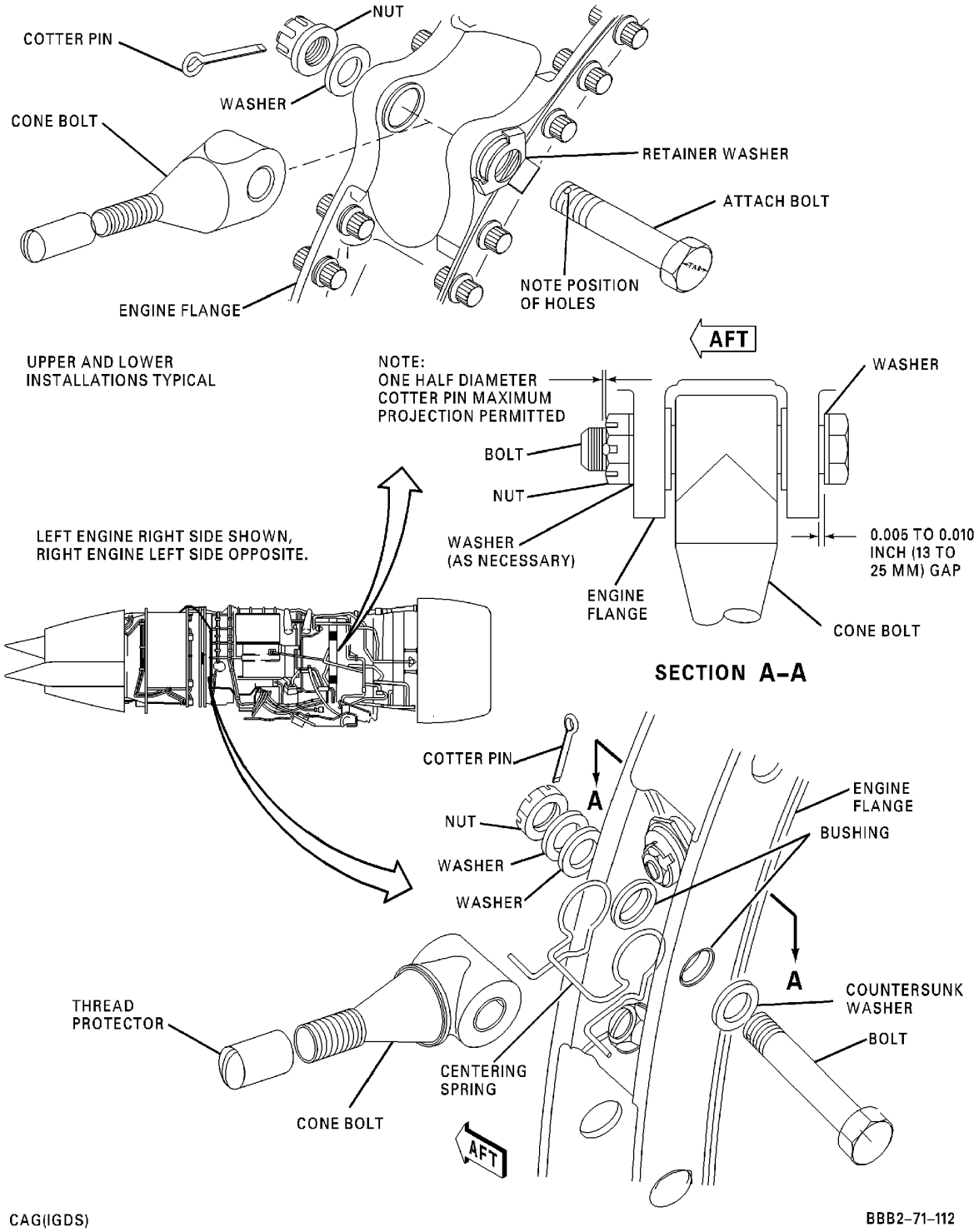
Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 2 of 8)



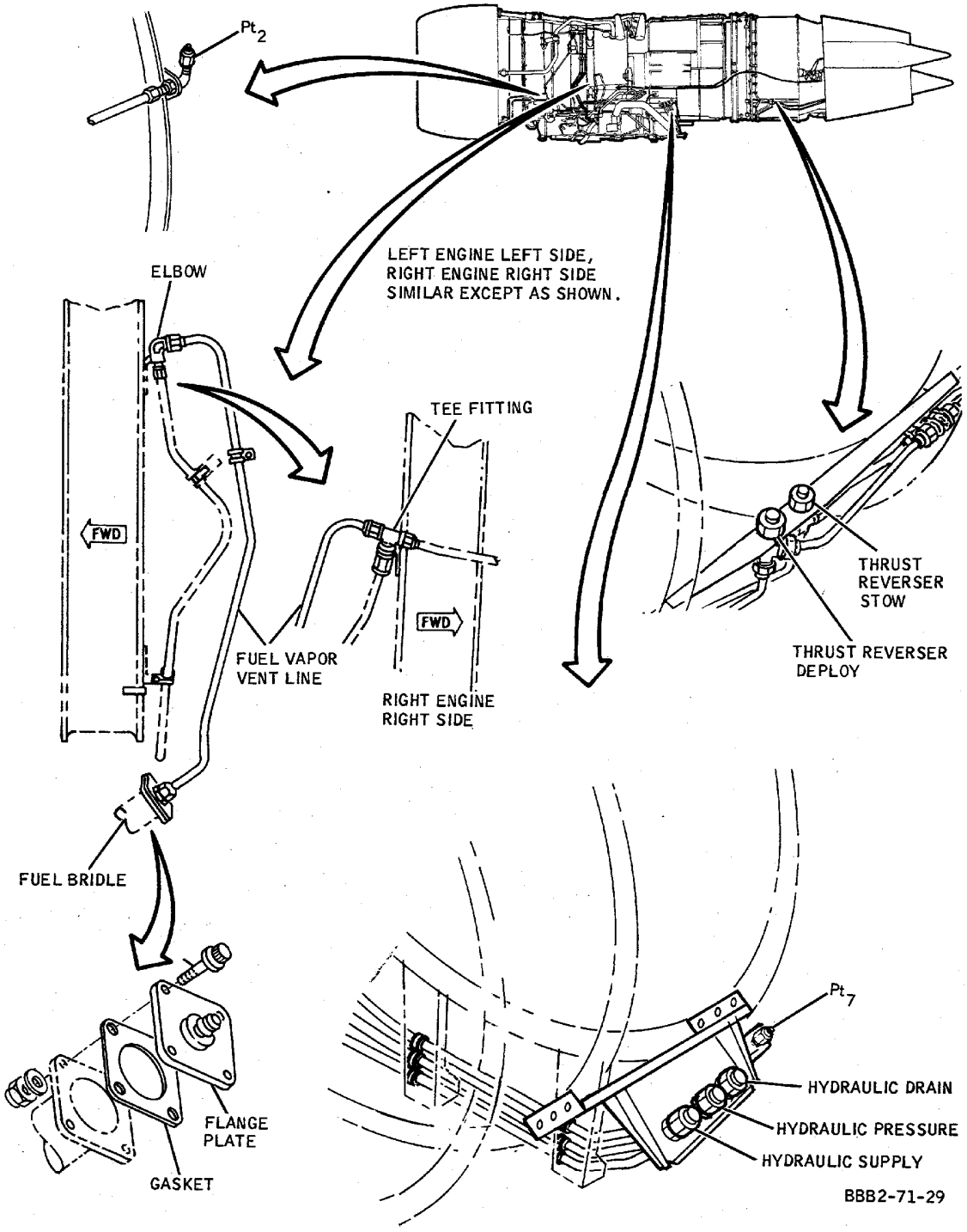
Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 3 of 8)



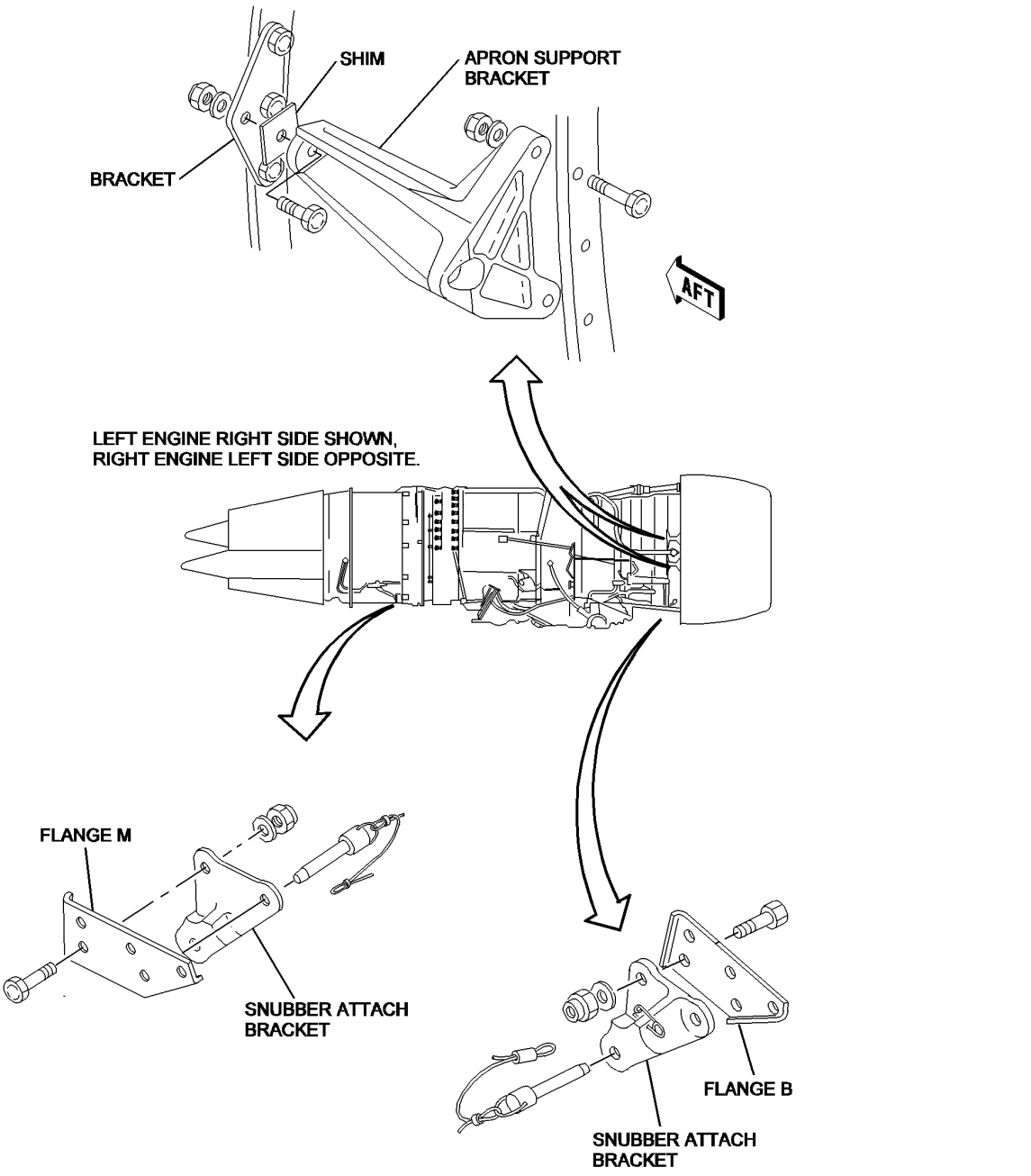
Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 4 of 8)



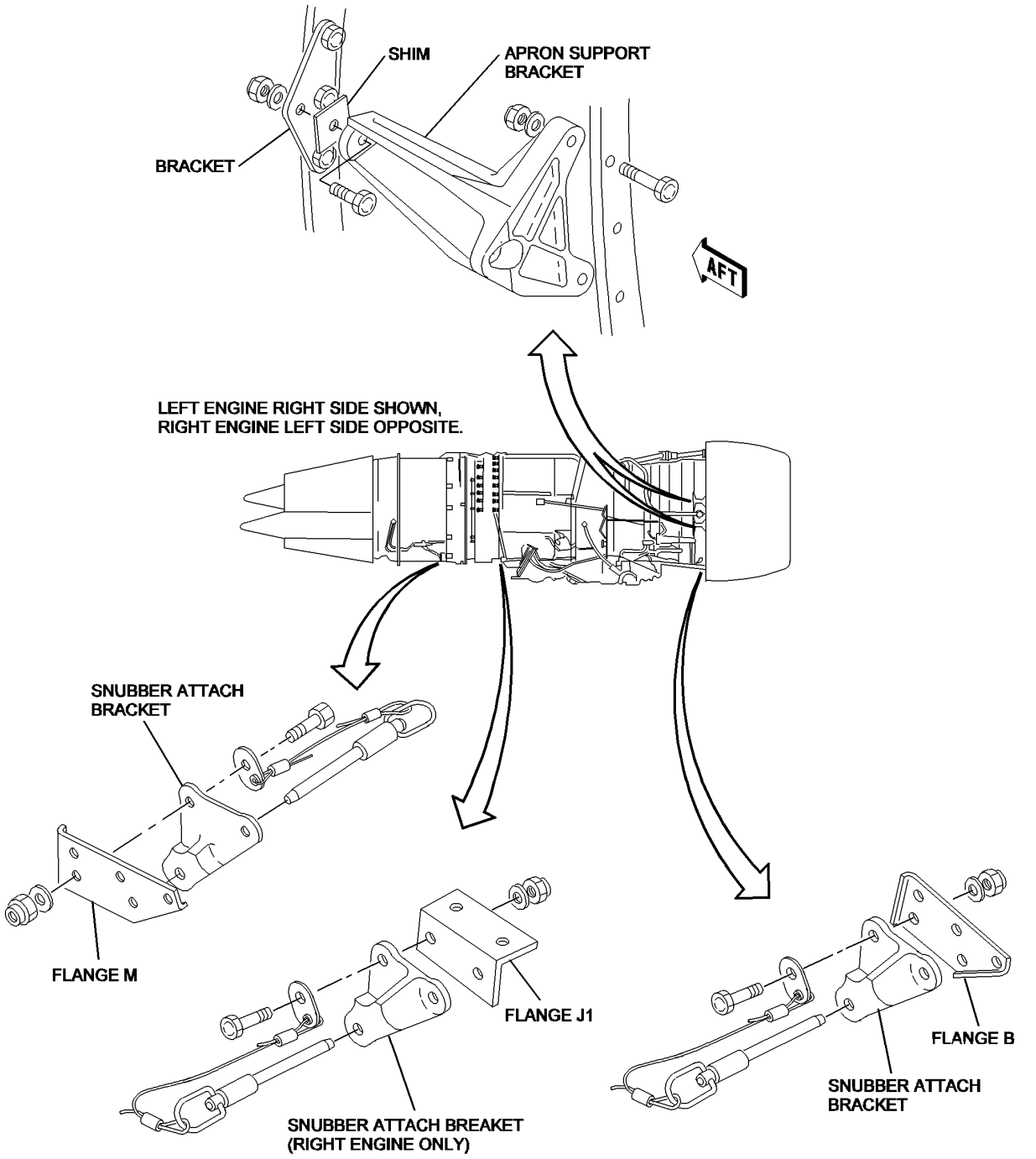
Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 5 of 8)



Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 6 of 8)



Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 7 of 8)



Power Plant Conversion
Figure 201/71-01-00-990-801 (Sheet 8 of 8)

ENGINE CONVERSION -217 TO -217A AND -217A TO 217 - MAINTENANCE PRACTICES

1. General

A. This maintenance practices provides special instructions for converting a JT8D-217 to a JT8D-217A and a JT8D-217A to JT8D-217. The information contained in this section was obtained from Pratt & Whitney Aircraft Service Bulletins No. 5399 and 5399A should be referred to for further description.

B. The replacement engine should be converted to the same configuration as the one it is replacing to be compatible with the existing N_1 amd N_2 instrument red lines, thrust rating computer (TRC), and performance chart.

C. The instructions apply only to those engines which were originally manufactured as JT8D-217 or JT8D-217A by Pratt & Whitney Aircraft. This procedure does not provide authority to convert JT8D-217 engines which were obtained by previous conversion of JT8D-209.

2. Equipment Changes

A. Replace Fuel Control

(1) When converting a JT8D-217 engine to a JT8D-217A replace fuel control part number 769606-7 with fuel control part number 769606-8. (FUEL CONTROL, SUBJECT 73-20-01, Page 201)

(2) When converting a JT8D-217A engine to a JT8D-217 replace fuel control part number 769606-8, with fuel control part number 769606-7. (FUEL CONTROL, SUBJECT 73-20-01, Page 201)

B. Redesignate Engine

(1) After all conversion requirement have been accomplished replace PWA-Data Plate with Data Plate for new model engine.

C. Trim Engine

(1) Perform engine trim procedure for new model engine. (GENERAL, SUBJECT 71-00-00, Page 501)

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-209 engine and one JT8D-217A engine with both engines to be operated at JT8D-209 thrust level. Thrust for takeoff to be set normally with ARTS on. Alternative, two JT8D-217A engines can be installed with both engines to be operated at JT8D-209 thrust level. When two JT8D-217A engines are operating at -209 thrust level, installed, the Automatic Reserve Thrust ART system must be OFF. Set JT8D-209 maximum takeoff EPR.

B. JT8D-209 and -217A engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-209 or -217A engine is installed on an MD-83, MD-87 or MD-88 aircraft, the JT8D-209 or -217A engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, 5th Stage Compressor Blade Modification, or its production equivalent.

C. Aircraft equipped with FMS, FMS is not certified to operate with JT8D-209 or -217/-217A engines or at JT8D-209 or -217 thrust levels. If intermix involves any of these conditions, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

2. Equipment Changes

A. Fuel Flow Indicating System

(1) Fuel flow indicating system for JT8D-209 engine or JT8D-217A engine may be used since maximum fuel flow of the JT8D-217A engine, operated at JT8D-209 thrust level, is essentially the same as maximum fuel flow of JT8D-209. Either the fuel flow transmitter or fuel flow indicator must be changed so that the indicator and transmitter are compatible.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GBA2	8DJ125LXV5	8DJ125LXW5	0-12000	0-6000
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000

0-12000 lbs/hr. range is adequate for the JT8D-209 engine.

0-12000 lbs/hr. range is also adequate for the JT8D-217A engine at -209 thrust levels.

0-16000 lbs/hr. range is adequate for both the JT8D-209 and -217A engines.

NOTE: Each indicator installed must be compatible with the respective transmitter installed.

B. EGT Indicating System

(1) When one JT8D-209 engine and one JT8D-217A engine are installed, the JT8D-217A engine must have a JT8D-217A EGT indicator installed to provide adequate increment between orange and red lines for the ART system. The JT8D-209 engine, having lower EGT limits, must have a JT8D-209 EGT indicator installed.

(2) When two JT8D-217A engines are installed, JT8D-217A EGT indicators must be used to ensure EGT limits are not exceeded.

Table 202

Engine Model	Compatible EGT Indicator P/N
JT8D-209	124.514-2
JT8D-217A	124.514-6

C. N1 Indicating System

(1) When one JT8D-209 engine and one JT8D-217A engine are installed, the JT8D-217A engine must have JT8D-217A N1 indicator installed to provide adequate increment between orange and red lines for ART system. The JT8D-209 indicator must be used with the JT8D-209 engine to ensure orange line limits are not exceeded.

(2) When two JT8D-217A engines are installed, JT8D-217A N1 indicators must be used.

Table 203

Engine Model	Compatible N1 Indicator P/N
JT8D-209	8DJ81LVL4
JT8D-217A	8DJ81WCW4

D. N2 Indicating System

(1) When one JT8D-209 engine and one JT8D-217A engine are installed, the JT8D-217A engine must have JT8D-217A N2 indicator installed to provide adequate increment between orange and red lines for ART system. The JT8D-209 engine having lower N2 limits must have a JT8D-209 N2 indicator installed.

(2) When two JT8D-217A engines are installed, JT8D-217A N2 indicators must be used to ensure N2 limits are not exceeded.

Table 204

Engine Model	Compatible N2 Indicator P/N
JT8D-209	8DJ81LSC4
JT8D-217A	8DJ81WCT4

E. Digital Flight Guidance Computer (DFGC)

(1) Since both engines are always to be operated at JT8D-209 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -209 operation, in order that thrust rating computer (TRC) provides JT8D-209 EPR's.

(2) DFGC pin option as follows:

(Connector J102B)

Table 205

Pin	97	98	99	100
Option Code	A	B	C	D
Ground/Open	Open	Ground	Ground	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-209 engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-209 EPR display as follows:

NOTE: This check ensures DFGC is configured for -209 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 1.86 (plus/minus 0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

F. Performance Management System (PMS)

(1) Since both engines are operated at JT8D-209 thrust level, the PMS must have applicable pins open for -209 operation in order for PMS to utilize correct thrust limit ratings.

Table 206

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Open	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(2) Functionally check PMS located on center pedestal, for proper JT8D-209 display as follows. (Ref. 34-64-00)

NOTE: This check ensures PMS is configured for -209 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

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

(PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D -209/217A

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-209.

G. Digital Flight Guidance Computer (DFGC)

(1) When an aircraft is again to be operated with two JT8D-217A engines at -217A thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217A operation, in order that thrust rating computer (TRC) provides JT8D-217A EPR's.

(2) DFGC pin option as follows:

(Connector J102B)

Table 207

Pin	97	98	99	100
Option Code	A	B	C	D

Table 207 (Continued)

Ground/Open	Open	Open	Ground	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-217A engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217A EPR display as follows:

NOTE: This check ensures DFGC is configured for -217A operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

H. Performance Management System (PMS)

(1) When an aircraft is again to be operated with two JT8D-217A engines at -217A thrust level, the PMS must have applicable pins grounded for -217A operation, in order for PMS to utilize correct thrust limit ratings.

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(2) Functionally check PMS located on center pedestal, for proper JT8D-217A display as follows.

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

(PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D -209/217A

NOTE: This check ensures PMS is configured for -217A operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

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

(PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D -209/217A

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217A.

I. Flight Management System (FMS)

(1) FMS is not certified to operate with JT8D-209 or -217 engines or at JT8D-209 or -217/-217A thrust levels. If intermix involves any of these conditions, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

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

(2) To make the FMS inoperative, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	15	B10-421	FLT MGMT SYSTEM DATA LOADER

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 415, 418, 863, 864, 866			
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC

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

NOTE: FMS/EFIS SWITCHING only applicable if dual FMS installed.

NOTE: MCDU for aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function. No action to be taken.

(3) For aircraft not equipped with IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU

NOTE: For aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do not pull MCDU-1 and MCDU-2 circuit breakers.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D -209/217A

(4) FMS must be placarded to inform the flight crew and maintenance personnel that the FMS is inoperative.

NOTE: It is the operator's discretion as to how this is done. Reference Douglas DC-9 Master Minimum Equipment List, Rev. 25, dated 15 November 1989.

J. Engine Trimming Procedures

(1) When one JT8D-209 engine and one JT8D-217A engine are installed both engines must be trimmed to JT8D-209 part power EPR (GENERAL, SUBJECT 71-00-00) page 501.

NOTE: JT8D-217A engines will satisfactorily produce JT8D-209 thrust when trimmed to JT8D-209 EPR.

(2) When two JT8D-217A engines are installed, the engines may be trimmed to either JT8D-209 or JT8D-217A part power EPR. To preclude excessive throttle stagger, both engines must be trimmed to the same part power EPR.(GENERAL, SUBJECT 71-00-00) page 501.

NOTE: JTD8-217A engines will satisfactorily produce JT8D-209 thrust when trimmed to either JT8D-209 or JT8D-217A EPR.

K. Placards Required for Engine Intermix

(1) Aircraft delivered with JT8D-209 engines:

(a) Install placard (P/N 7914599-915) on lower left-hand bezel of EPR gage(s) for JT8D-217A engine(s). Placard to read "217A".

(2) Aircraft delivered with JT8D-217A engines:

(a) Install placard (P/N 7914599-905) on lower left-hand bezel of EPR gage(s) for JT8D-209 engine(s). Placard to read 209.

(3) Install placard (P/N 7914599-904) on main instrument panel just to left of or below the Assumed Temperature Indicator. Placard to read ENGINE INTERMIX-TAKEOFF. DO NOT USE AUTOTHROTTLE. ADD .05 EPR to -217A. IF ABOVE 2000 FT PRESS ALT & OAT BELOW 0°C, SEE FLT MAN.

L. Automatic Reserve Thrust (ART) System

(1) When one JT8D-209 engine and one JT8D-217A engine are installed, ART system may be ON for this configuration.

(2) When two JT8D-217A engines, operating at -209 thrust level, are installed ART system must be OFF and following circuit breakers opened for this configuration.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(3) Install inop. ring (P/N S4933959-1) on circuit breakers.

M. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 209

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE

Table 209 (Continued)

EQUIPMENT CHANGES		
PART NUMBER	DESCRIPTION	ACTION
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201)

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

(f) Check lead. (IGNITION LEAD, SUBJECT 74-20-01)page 201.

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

N. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 210

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201).

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

(h) Check lead. (IGNITION LEAD, SUBJECT 74-20-01) page 201.

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(o) 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.

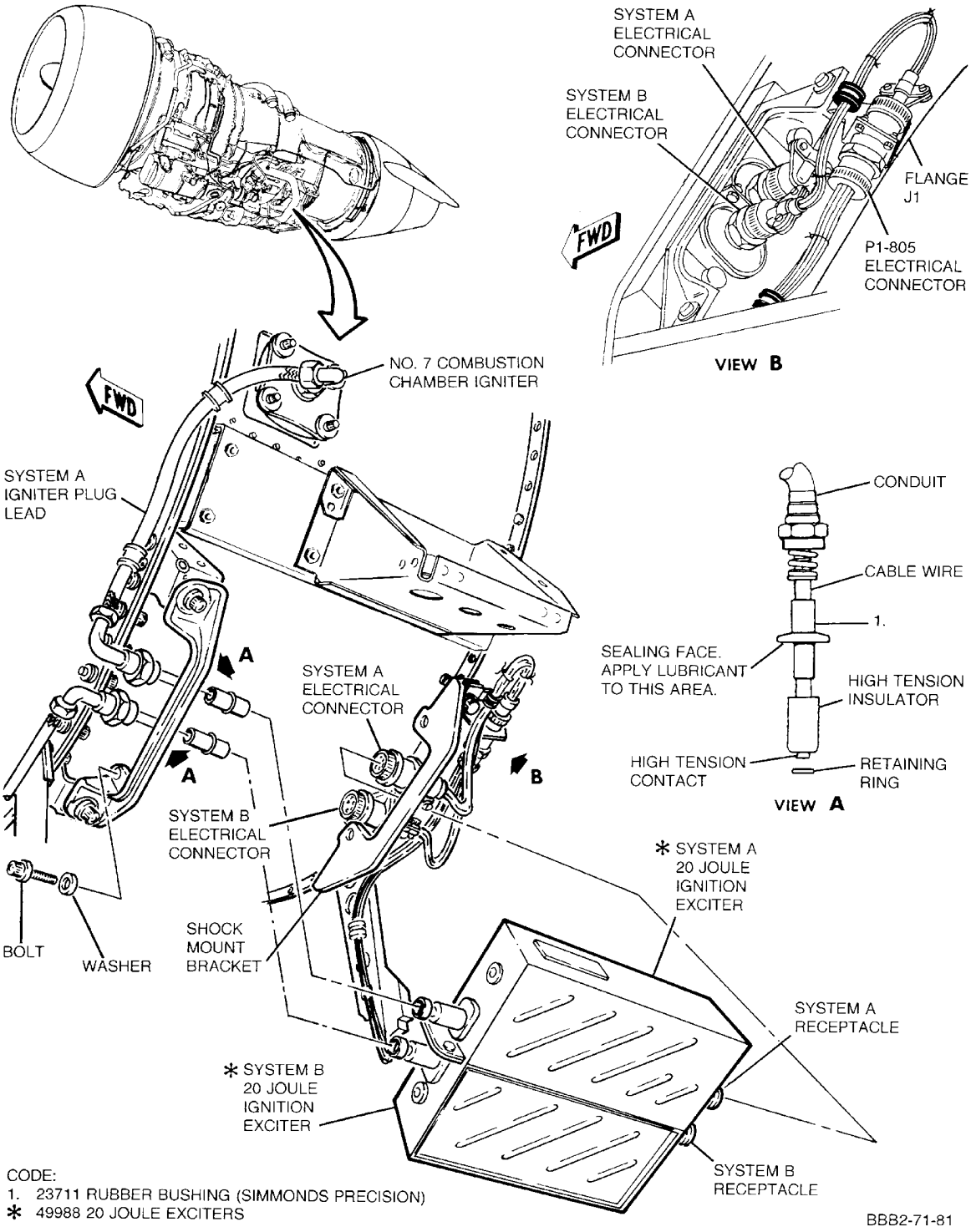
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

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.

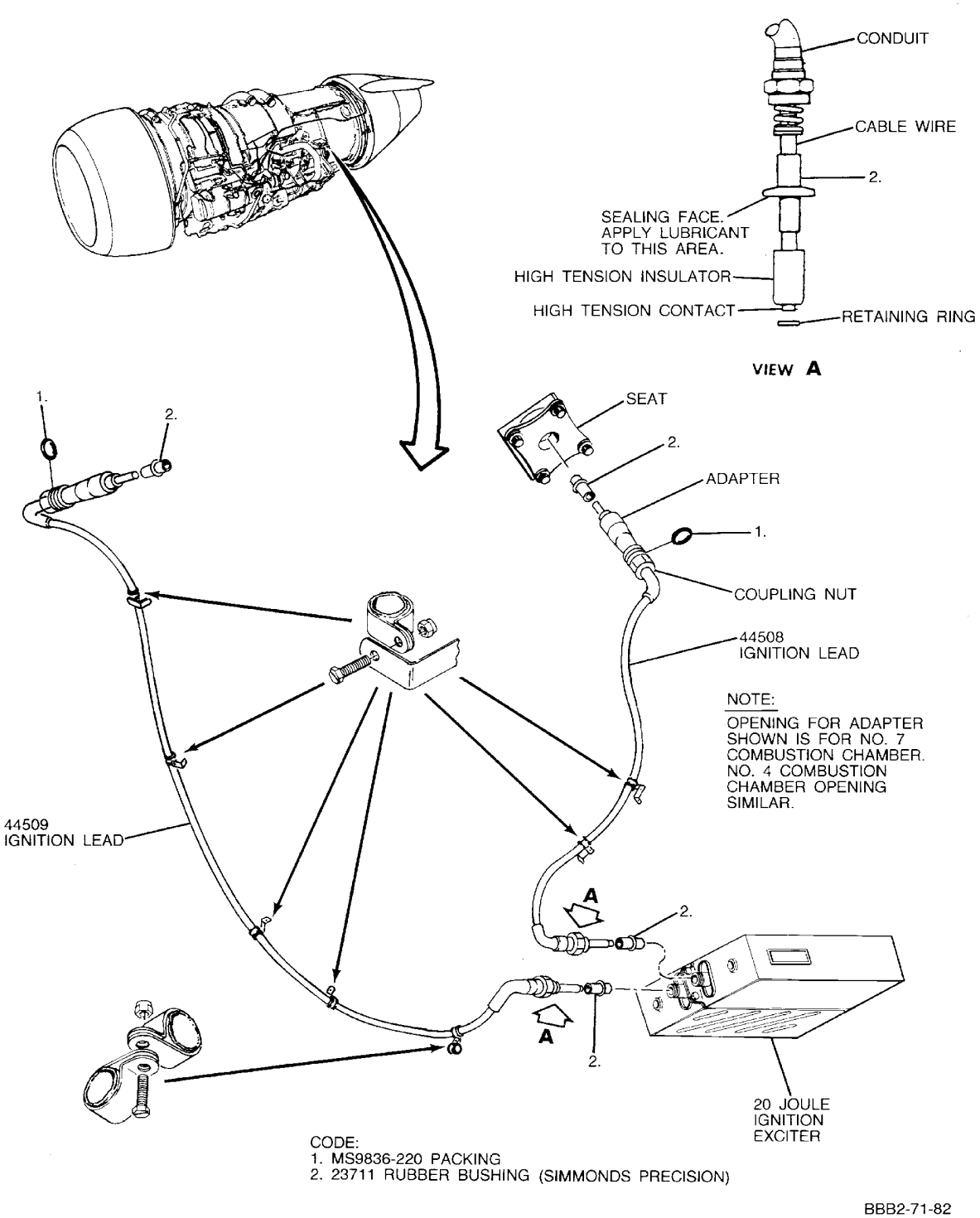
(r) Carefully insert exciter end of lead into ignition exciter, torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

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

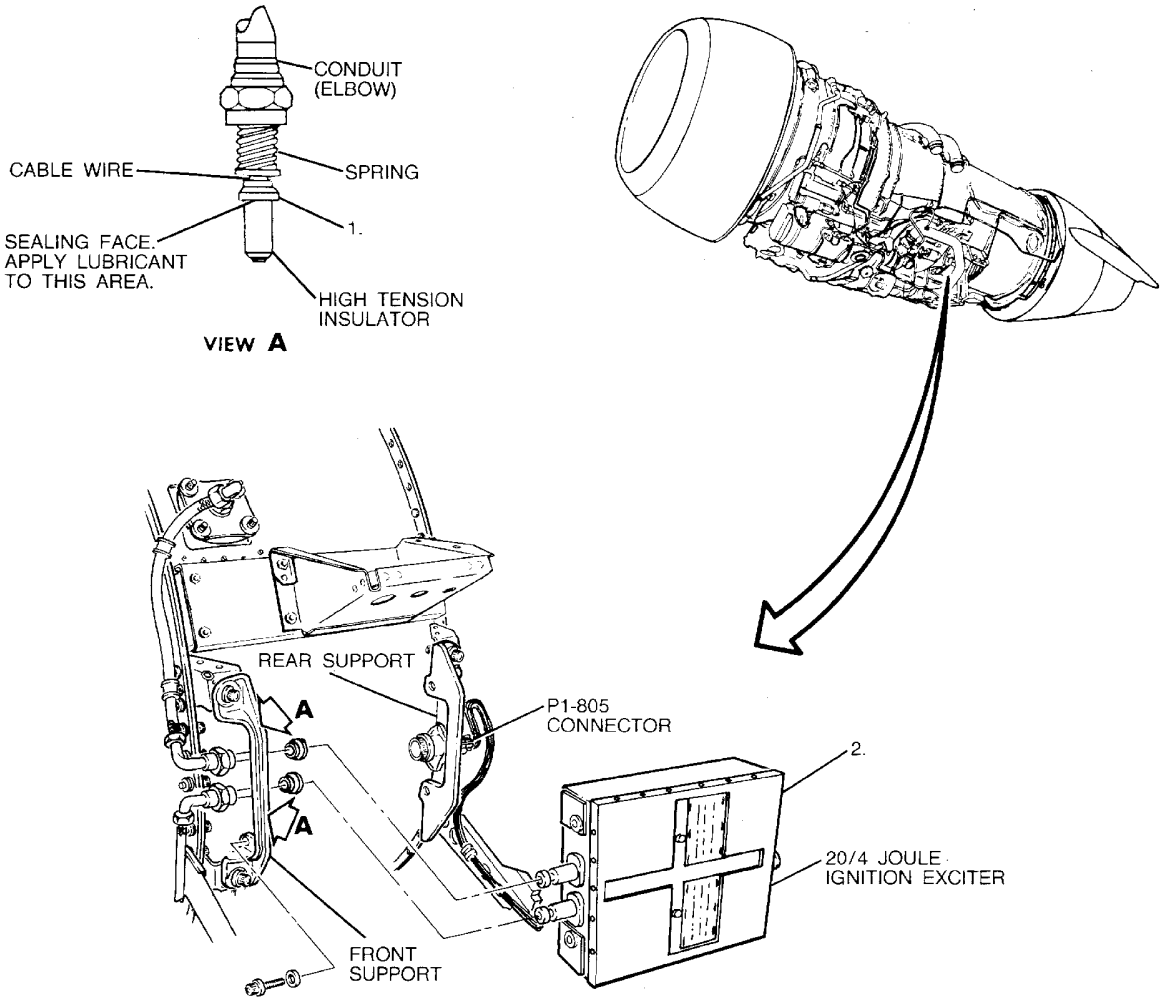


20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-835

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D -209/217A



20 Joule Ignition Leads -- Removal/Installation (Simmonds)
Figure 202/71-02-00-990-836

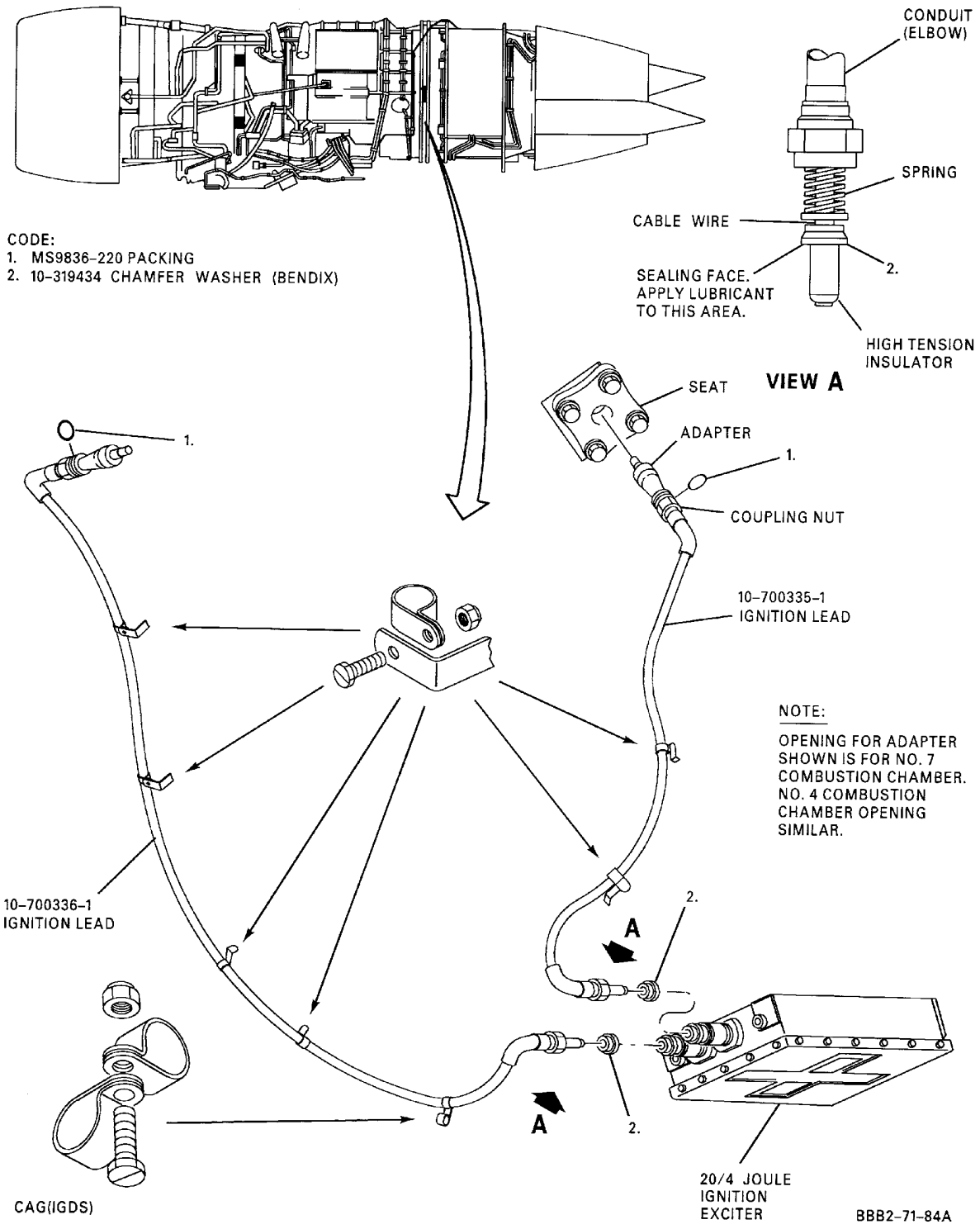


CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Leads--Removal/Installation (Simmonds)
Figure 203/71-02-00-990-837

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891;
JT8D -209/217A



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-838

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-219 engine and one JT8D-217A engine with both engines to be operated at JT8D-217A thrust level. Alternately, two JT8D-219 engines can be installed with both engines to be operated at JT8D-217A thrust level. Thrust for takeoff to be set normally with ARTS ON.

B. JT8D-217A engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-217A engine is installed on an MD-83, MD-87, or MD-88 aircraft, the JT8D-217A engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, or Service Bulletin 5752 5th Stage Compressor Blade Modification, or its production equivalent.

C. Aircraft equipped with FMS, FMS computers -921, -922, -923, -924, and -925 are not certified to operate with JT8D-217A engines. If intermix involves JT8D-217A engines the FMS must be made inoperative and INOP placards must be installed in the cockpit.

D. FMS computers -926/-927 are certified for use with the JT8D-217A engines; if -926/-927 computer is installed, engine intermix with a JT8D-217A engine is permitted.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

2. Equipment Changes

A. Fuel Flow Indicating System (Analog instruments)

(1) Fuel flow indicating system for JT8D-219 engine installation is same as fuel flow indicating system for the JT8D-217A engine installation. Maximum fuel flow of -219 engine when operated at -217A thrust levels is essentially same as maximum fuel flow of -217A engine.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000
0-16000 lbs/hr. range is adequate for both the JT8D-219 and -217A engines.				

B. EGT Indicating System (Analog instruments)

(1) This system is identical for -217A and -219 engines.

C. N_1 Indicating System (Analog Instruments)

(1) When one JT8D-217A engine and one JT8D-219 engine are installed, the JT8D-217A engine must have JT8D-217A N_1 indicator installed to provide adequate increment between orange and red lines for ART system.

(2) The -217A indicator must show -217A N_1 limits. JT8D-219 engine may be operated with either -217A or -219 indicating system.

Table 202

Engine Model	Compatible N_1 Indicator P/N
JT8D-217A	8DJ81WCW4
JT8D-219	8DJ81WDA4

D. N_2 Indicating System (Analog Instruments)

(1) This system is identical for -217A and -219 engines.

E. Electronic Engine Display Panel (EEDP)

(1) Both sides of the (EEDP) must have the applicable option pins strapped to display the -217A engine limits.

(2) EEDP pins as follows:

Table 203

Connector	P1-793	P1-794
Pin	M	M
Strap to pin	P	P

(3) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections for the JT8D-217A/-219 intermix. (POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 77-10-00/001 Config 1 or POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 77-10-00/001 Config 2)

F. Digital Flight Guidance Computer (DFGC)

(1) Since both engines are always to be operated at JT8D-217A thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217A operation, in order that thrust rating computer (TRC) provides JT8D-217A EPR's.

(2) DFGC pin option as follows:

Table 204

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Open	Ground	Open	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-217A engines installed.

NOTE: Pin (67) is only available in DFGC's which have a provision for selection of JT8D-219 thrust levels (DFGC's P/N 4034241-930 and subs).

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217A EPR display as follows:

NOTE: This check ensures DFGC is configured for -217A operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

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

G. Performance Management System (PMS)

(1) Since both engines are operated at JT8D-217A thrust level, the PMS must have applicable pins open for -217A operation in order for PMS to utilize correct thrust limit ratings.

Table 205

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(2) Functionally check PMS located on center pedestal, for proper JT8D-217A display as follows: (PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 2)

NOTE: This check ensures PMS is configured for -217A operation.

(a) On Control Display Unit (CDU), momentarily press STS/TEST key.

(b) Observe CDU display, verify STS/TEST page has displayed JT8D-217A.

WJE 401-412, 414, 880, 881, 883, 884; JT8D -217A/-219

H. Electronic Engine Display Panel (EEDP)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the following option pins will return the (EEDP) to the -219 engine limits configuration.

(2) EEDP pins as follows:

Table 206

Connector	P1-793	P1-794
Pin	L	L
Strap to pin	P	P

A self test (BIT) display of the EEDP shall be performed to ensure proper option pin connections for the JT8D-219. (POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 77-10-00/001 Config 1 or POWER - DESCRIPTION AND OPERATION, PAGEBLOCK 77-10-00/001 Config 2)

I. Digital Flight Guidance Computer (DFGC)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -219 operation, in order that thrust rating computer (TRC) provides JT8D-219 EPR's.

(2) DFGC Pin Option as follows:

Table 207

Connector	J102B-	--	--	--	J101A-
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Ground	Ground	Open	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-219 engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-219 EPR display as follows:

NOTE: This check ensures DFGC is configured for -219 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.08 (plus/minus 0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

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

J. Performance Management System (PMS)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the PMS must have applicable pins grounded for -219 operation, in order for PMS to utilize correct thrust limit ratings.

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(2) Functionally check PMS located on center pedestal, for proper JT8D-219 display as follows. (PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 2)

NOTE: This check ensures PMS is configured for -219 operation.

(a) On Control Display Unit (CDU), momentarily press STS/TEST key.

(b) Observe CDU display, verify STS/TEST page has displayed JT8D-219.

WJE 401-412, 414, 880, 881, 883, 884

K. Flight Management System (FMS)

(1) FMS computers -921, -922, -923, -924, and -925 are not certified to operate with JT8D-217A engines. If intermix involves JT8D-217A engines, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

WJE 401-412, 414, 880, 881, 883, 884 (Continued)

(2) FMS computers -926/-927 are certified for use with the JT8D-217A engines; if -926/-927 computer is installed, engine intermix with a JT8D-217A engine is permitted.

(3) To make the FMS inoperative, do the following:

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.

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

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 405-409, 411, 880, 881, 883, 884			
A	11	B10-445	FMS SWITCHING
WJE 401-404, 412, 414			
A	11	B10-445	FMS/EFIS SWITCHING
WJE 410			
A	12	B10-445	FMS SWITCHING

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414			
H	15	B10-421	FLT MGMT SYSTEM DATA LOADER

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC
WJE 405-411, 880, 881, 883, 884			
D	21	B10-419	FMC-1

UPPER EPC, R AC BUS

Row	Col	Number	Name
J	15	B10-421	FMS DATA LOADER

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414			
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC

UPPER EPC, RT AC

Row	Col	Number	Name
WJE 405-411, 880, 881, 883, 884			
B	15	B10-420	FMC-2

WJE 401-412, 414, 880, 881, 883, 884

NOTE: FMS/EFIS SWITCHING only applicable if dual FMS installed.

(4) For aircraft not equipped with IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do the following:

WJE 401-412, 414, 880, 881, 883, 884 (Continued)

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.

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

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414			
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU
WJE 405-411, 880, 881, 883, 884			
D	22	B10-424	MCDU-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 401-404, 412, 414			
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU

UPPER EPC, RT AC

Row	Col	Number	Name
WJE 405-411, 880, 881, 883, 884			
B	16	B10-425	MCDU-2

WJE 401-412, 414, 880, 881, 883, 884

NOTE: For aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do not pull MCDU-1 and MCDU-2 circuit breakers.

(5) FMS must be placarded to inform the flight crew and maintenance personnel that the FMS is inoperative.

NOTE: It is the operator's discretion as to how this is done. Reference Douglas DC-9 Master Minimum Equipment List, Rev. 25, dated 15 November 1989.

WJE 401-412, 414, 880, 881, 883, 884; JT8D -217A/-219

L. Engine Trimming Procedures

(1) When one JT8D-217A engine and one JT8D-219 engine are installed both engines must be trimmed to JT8D-217A part power EPR. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

NOTE: JT8D-219 engines will satisfactorily produce JT8D-217A thrust when trimmed to JT8D-217A EPR.

(2) When two JT8D-219 engines are installed, both engines may be trimmed to either JT8D-217A, -217C, or JT8D-219 part power EPR. To preclude excessive throttle stagger, both left and right engines must be trimmed to the same chart.

M. Placards Required for Engine Intermix (Analog Instruments)

(1) Aircraft delivered with JT8D-219 engines:

(a) Install placard (P/N 7914599-915) on lower left-hand bezel of EPR gage(s) for JT8D-217A engine(s). Placard to read 217A.

(2) Aircraft delivered with JT8D-217A engines:

(a) Install placard (P/N 7914599-916) on lower left-hand bezel of EPR gage(s) for JT8D-219 engine(s). Placard to read 219.

NOTE: These placards are not required if the JT8D-219 in-flight relight envelope is used for both engines.

N. Placards Required for Engine Intermix (Electronic Engine Display Panel)

(1) For the intermix of one JT8D-217A engine with one JT8D-219 engine, install the appropriate placards:

(a) Install the following placard (P/N 7914599-915) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-271A engine: "217A".

(b) Install the following placard (P/N 7914599-916) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-219 engine: "219".

NOTE: If two JT8D-219 engines are installed, no placards to identify the engines are required.

O. Automatic Reserve Thrust (ART) System

(1) ART system may be ON for an intermix of one JT8D-217A engine and one JT8D-219 engine or two JT8D-219 engines operating at -217A thrust level.

P. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 209

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201).

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

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

WARNING: HANDWIPE CLEANER IS AN AGENT THAT IS FLAMMABLE, A SENSITIZER, AN ASPHYXIANT, AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN HANDWIPE CLEANER 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 HANDWIPE CLEANER IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

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.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with handwipe cleaner.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

Q. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 210

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

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

WARNING: HANDWIPE CLEANER IS AN AGENT THAT IS FLAMMABLE, A SENSITIZER, AN ASPHYXIANT, AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN HANDWIPE CLEANER 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 HANDWIPE CLEANER IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

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.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with handwipe cleaner.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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.

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

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

(o) 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.

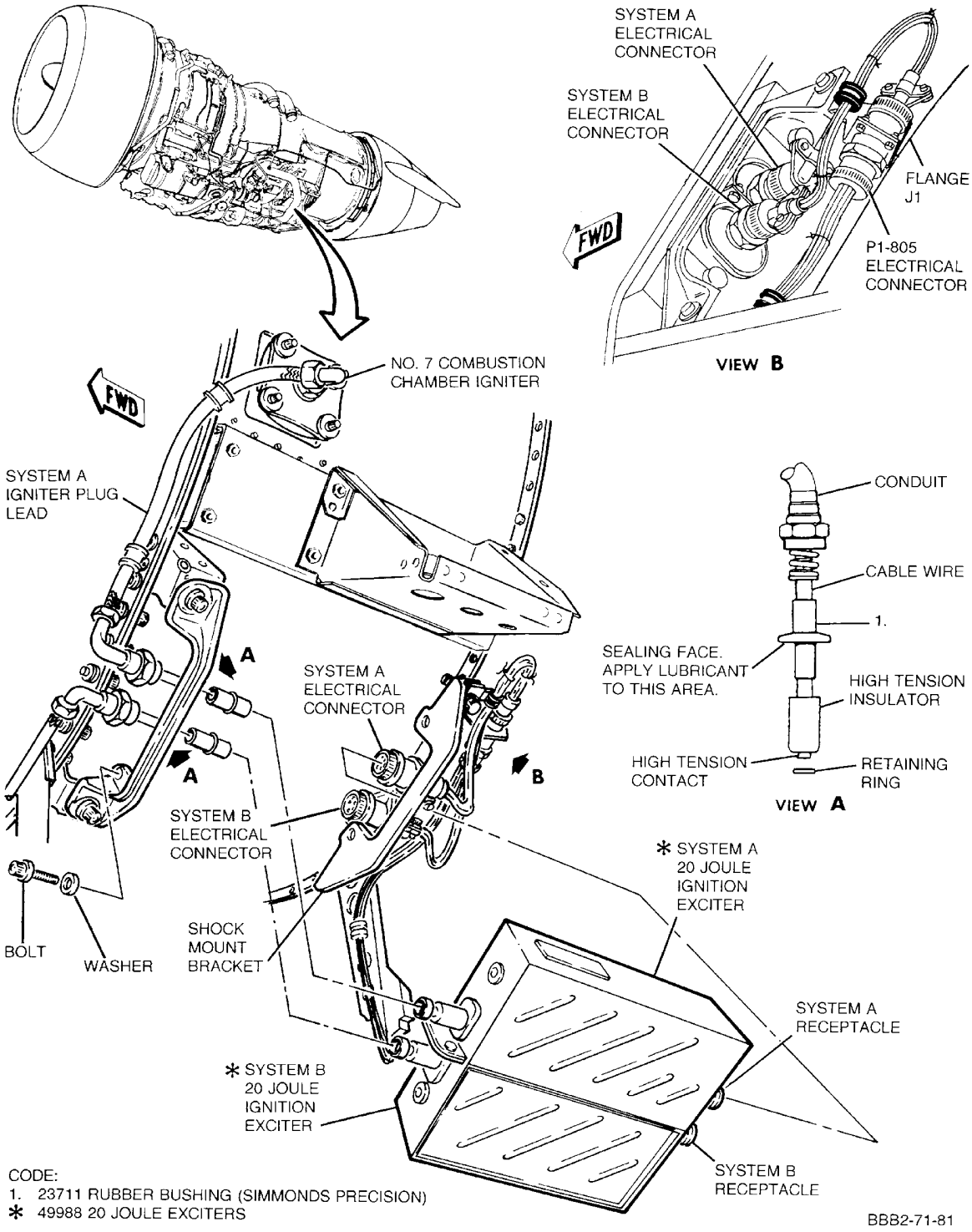
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

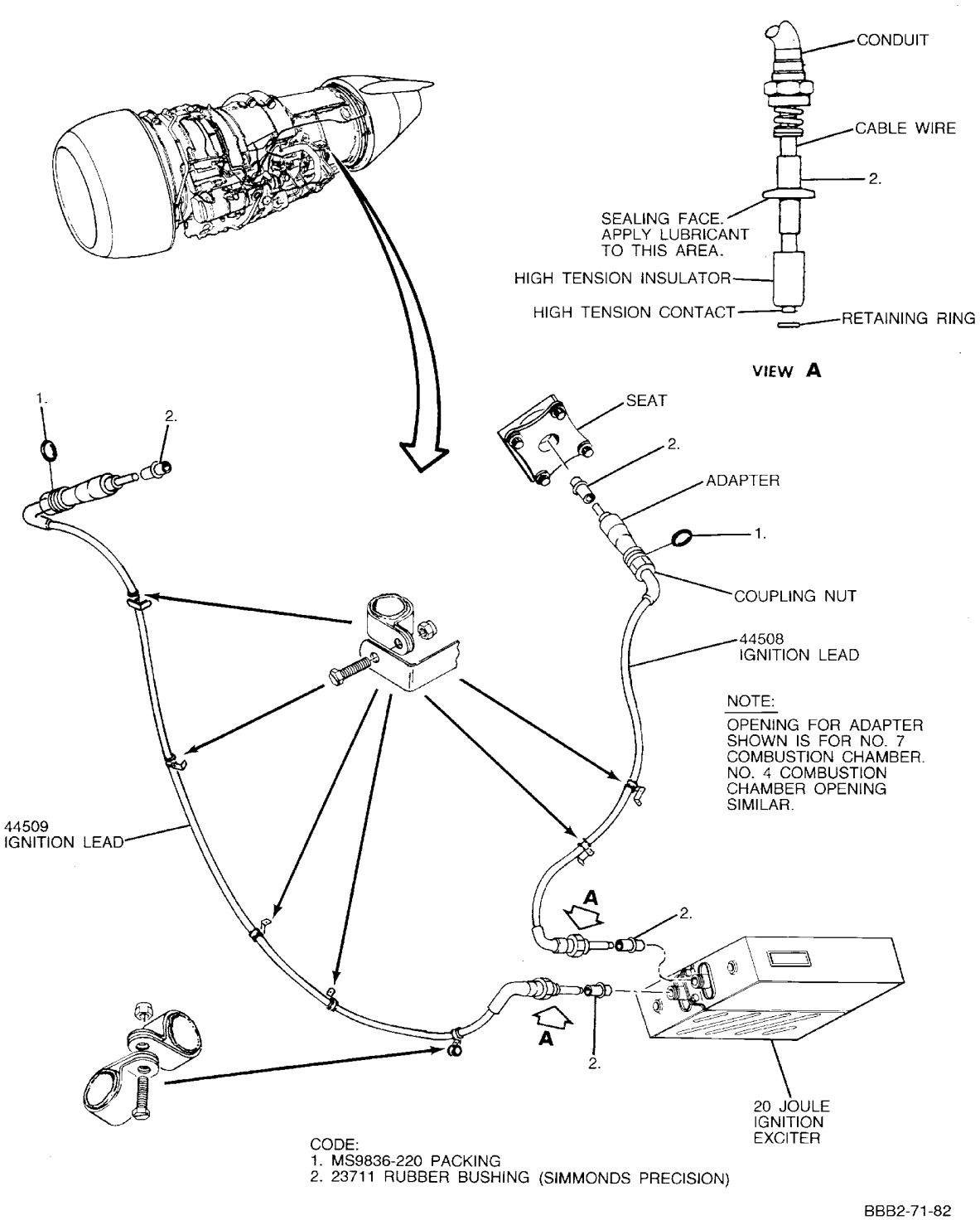
CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

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

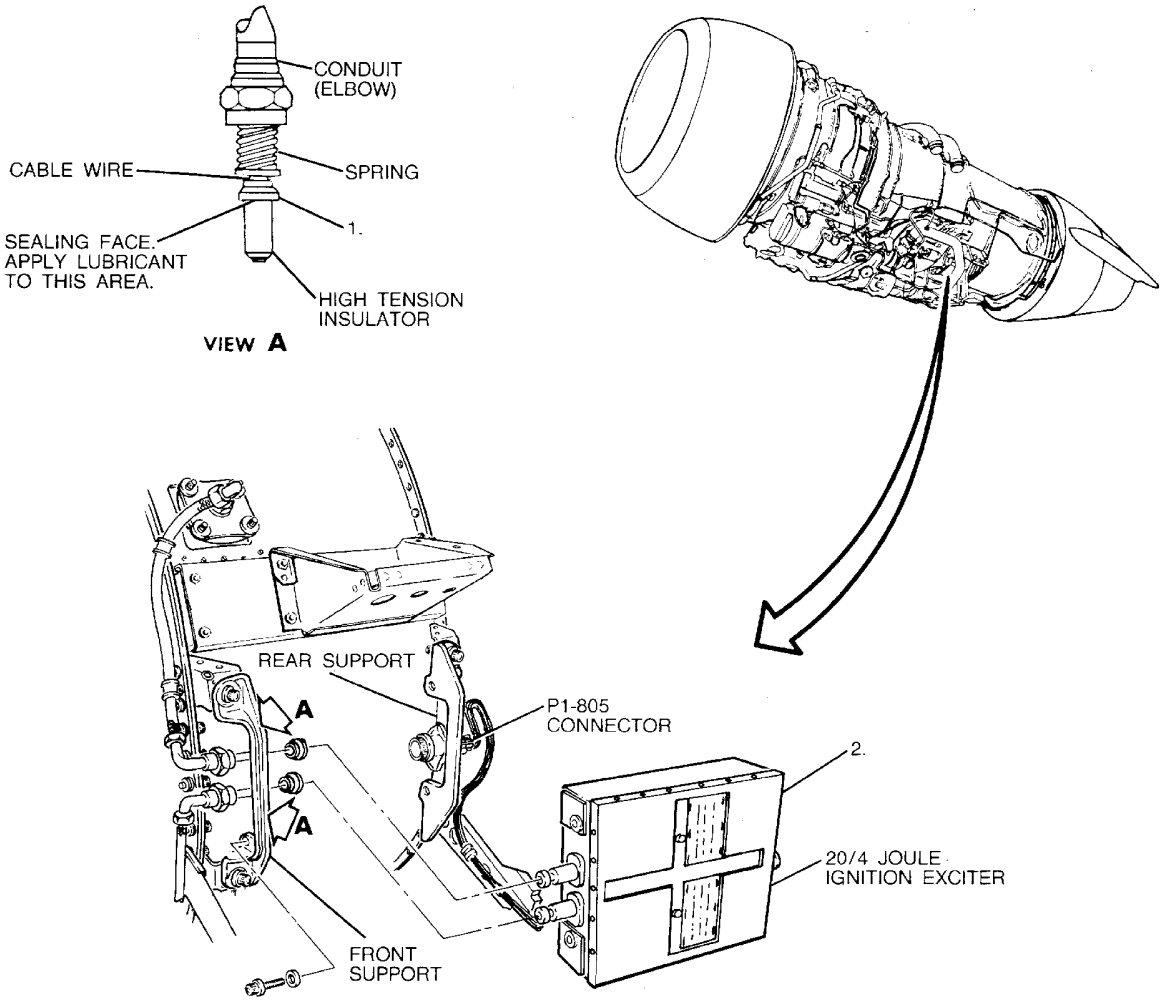
(s) Secure ignition lead attaching clips to engine flange torque bolts 36 to 40 inch-pounds (4.07 to 4.52 N·m).



20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-839



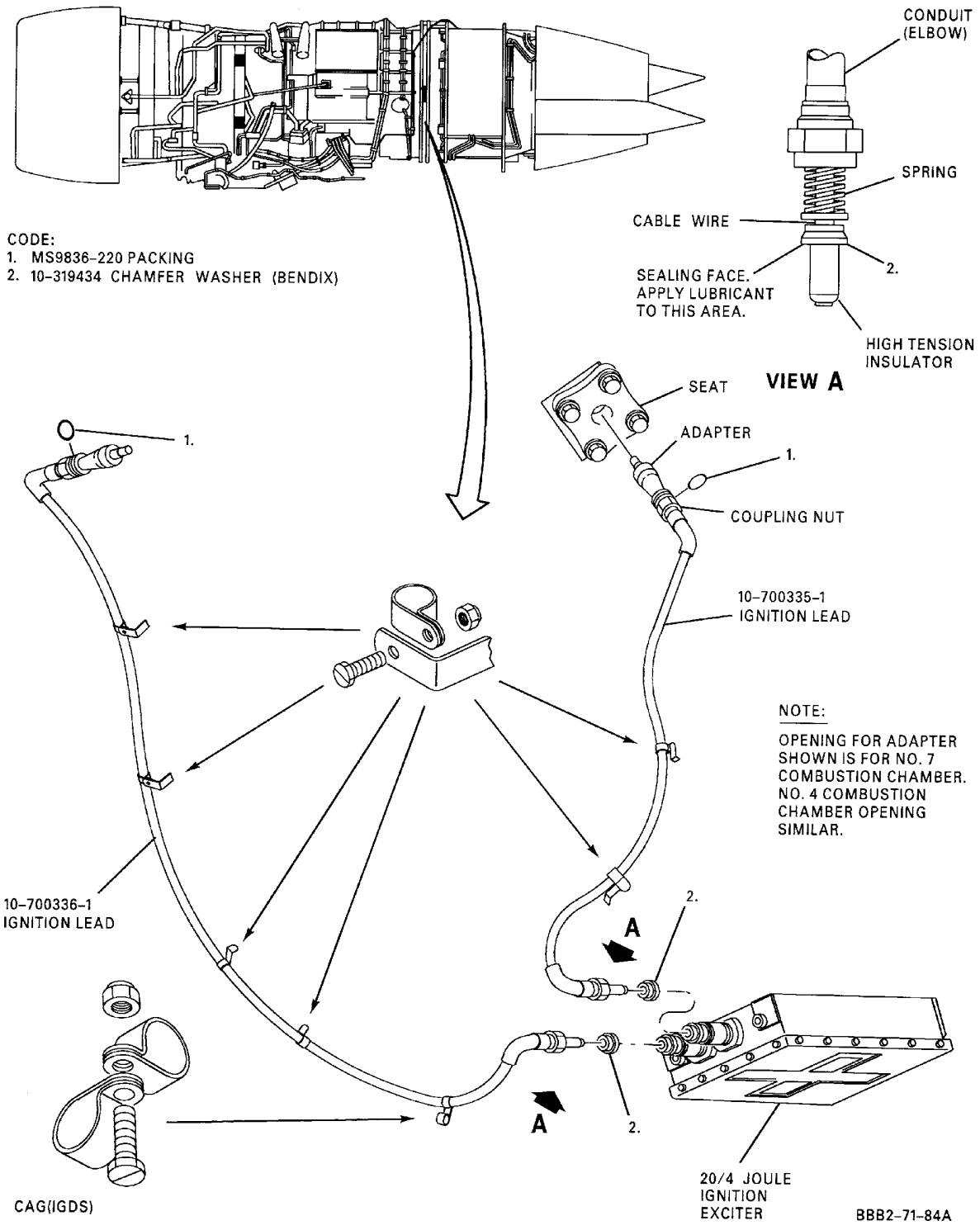
20 Joule Ignition Leads -- Removal/Installation
Figure 202/71-02-00-990-840



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Exciter -- Removal/Installation
Figure 203/71-02-00-990-841



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-842

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-209 engine and one JT8D-219 engine with both engines to be operated at JT8D-209 thrust level. Thrust for takeoff to be set normally with ARTS on. Alternative, two JT8D-219 engines can be installed with both engines to be operated at JT8D-209 thrust level. When two JT8D-219 engines are operating at -209 thrust level, installed, the Automatic Reserve Thrust ART system must be OFF. Set JT8D-209 maximum takeoff EPR.

B. JT8D-209 engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-209 engine is installed on an MD-83, MD-87 or MD-88 aircraft, the JT8D-209 engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, 5th Stage Compressor Blade Modification, or its production equivalent.

C. Aircraft equipped with FMS, FMS is not certified to operate with JT8D-209 or -217/-217A engines or at JT8D-209 or -217 thrust levels. If intermix involves any of these conditions, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

2. Equipment Changes

A. Fuel Flow Indicating System

(1) Fuel flow indicating system for JT8D-209 engine or JT8D-219 engine may be used since maximum fuel flow of the JT8D-219 engine, operated at JT8D-209 thrust level, is essentially the same as maximum fuel flow of JT8D-209. Either the fuel flow transmitter or fuel flow indicator must be changed so that the indicator and transmitter are compatible.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GBA2	8DJ125LXV5	8DJ125LXW5	0-12000	0-6000
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000

0 -12000 lbs/hr. range is adequate for the JT8D-209 engine.

0 -12000 lbs/hr. range is also adequate for the JT8D-219 engine at -209 thrust levels.

0 -16000 lbs/hr. range is adequate for both the JT8D-209 and -219 engines.

NOTE: Each indicator installed must be compatible with the respective transmitter installed.

B. EGT Indicating System

(1) When one JT8D-209 engine and one JT8D-219 engine are installed, the JT8D-219 engine must have a JT8D-219 EGT indicator installed to provide adequate increment between orange and red lines for the ART system. The JT8D-209 engine, having lower EGT limits, must have a JT8D-209 EGT indicator installed.

(2) When two JT8D-219 engines are installed, JT8D-219 EGT indicators must be used to ensure EGT limits are not exceeded.

Table 202

Engine Model	Compatible EGT Indicator P/N
JT8D-209	124.514-2
JT8D-219	124.514-6

C. N1 Indicating System

(1) When one JT8D-209 engine and one JT8D-219 engine are installed, the JT8D-219 engine must have JT8D-219 N1 indicator installed to provide adequate increment between orange and red lines for ART system. The JT8D-209 indicator must be used with the JT8D-209 engine to ensure orange line limits are not exceeded.

(2) When two JT8D-219 engines are installed, JT8D-219 N1 indicators must be used.

Table 203

Engine Model	Compatible N1 Indicator P/N
JT8D-209	8DJ81LVL4
JT8D-219	8DJ81WDA4

D. N2 Indicating System

(1) When one JT8D-209 engine and one JT8D-219 engine are installed, the JT8D-219 engine must have JT8D-219 N2 indicator installed to provide adequate increment between orange and red lines for ART system. The JT8D-209 engine having lower N2 limits must have a JT8D-209 N2 indicator installed.

(2) When two JT8D-219 engines are installed, JT8D-219 N2 indicators must be used to ensure N2 limits are not exceeded.

Table 204

Engine Model	Compatible N2 Indicator P/N
JT8D-209	8DJ81LSC4
JT8D-219	8DJ81WCT4

E. Digital Flight Guidance Computer (DFGC)

(1) Since both engines are always to be operated at JT8D-209 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -209 operation, in order that thrust rating computer (TRC) provides JT8D-209 EPR's.

(2) DFGC pin option as follows:

Table 205

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Ground	Ground	Ground	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-209 engines installed.

NOTE: Pin (67) only available in DFGC's which have a provision for selection of JT8D-219 thrust levels (DFGC's P/N 4034241-930 and subs).

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-209 EPR display as follows:

NOTE: This check ensures DFGC is configured for -209 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 1.86 (plus/minus 0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

F. Performance Management System (PMS)

(1) Since both engines are operated at JT8D-209 thrust level, the PMS must have applicable pins open for -209 operation in order for PMS to utilize correct thrust limit ratings.

Table 206

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Open	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(2) Functionally check PMS located on center pedestal, for proper JT8D-209 display as follows (Ref. 34-64-00):

NOTE: This check ensures PMS is configured for -209 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D - 209/219

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-209.

G. Digital Flight Guidance Computer (DFGC)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -219 operation, in order that thrust rating computer (TRC) provides JT8D-219 EPR's.

(2) DFGC Pin Option as follows:

Table 207

Connector	J102B-	--	--	--	J101A-
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Ground	Ground	Open	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-219 engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-219 EPR display as follows:

NOTE: This check ensures DFGC is configured for -219 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.08 (plus/minus 0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

H. Performance Management System (PMS)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the PMS must have applicable pins grounded for -219 operation, in order for PMS to utilize correct thrust limit ratings.

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(2) Functionally check PMS located on center pedestal, for proper JT8D-219 display as follows.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 1 or FLIGHT MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 3)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D - 209/219

NOTE: This check ensures PMS is configured for -219 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D - 209/219

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-219.

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

I. Flight Management System (FMS)

(1) FMS is not certified to operate with JT8D-209 or -217/-217A thrust levels or at JT8D-209 OR -217 thrust levels. If intermix involves any of these conditions, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

(2) To make the FMS inoperative, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

The following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	15	B10-421	FLT MGMT SYSTEM DATA LOADER

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 415, 418, 863, 864, 866			
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC

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

NOTE: FMS/EFIS SWITCHING (only applicable if dual FMS installed).

NOTE: MCDU for aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function. No action to be taken.

(3) For aircraft not equipped with IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

The following circuit breaker must be pulled and incop. ring (P/N S4933959-1) installed.

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU

NOTE: For aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do not pull MCDU-1 and MCDU-2 circuit breakers.

(4) FMS must be placarded to inform the flight crew and maintenance personnel that the FMS is inoperative.

NOTE: It is the operator's discretion as to how this is done. Reference Douglas DC-9 Master Minimum Equipment List, Rev. 25, dated 15 November 1989.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D - 209/219

J. Engine Trimming Procedures

(1) When one JT8D-209 engine and one JT8D-219 engine are installed both engines must be trimmed to JT8D-209 part power EPR. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8)

NOTE: JT8D-219 engines will satisfactorily produce JT8D-209 thrust when trimmed to JT8D-209 EPR.

(2) When two JT8D-219 engines are installed, the engines may be trimmed to either JT8D-209 or JT8D-219 part power EPR. To preclude excessive throttle stagger, both engines must be trimmed to the same part power EPR.(GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8)

NOTE: JT8D-219 engines will satisfactorily produce JT8D-209 thrust when trimmed to either JT8D-209 or JT8D-219 EPR.

K. Placards Required for Engine Intermix

(1) Aircraft delivered with JT8D-209 engines:

(a) Install placard (P/N 7914599-916) on lower left-hand bezel of EPR gage(s) for JT8D-219 engine(s). Placard to read "219".

(2) Aircraft delivered with JT8D-219 engines:

(a) Install placard (P/N 7914599-905) on lower left-hand bezel of EPR gage(s) for JT8D-209 engine(s). Placard to read 209.

(3) Install placard (P/N 7914599-923) on main instrument panel just to left of or below the Assumed Temperature Indicator. Placard to read ENGINE INTERMIX-TAKEOFF. DO NOT USE AUTOTHROTTLE. ADD .02 EPR to -219. IF ABOVE 4000 FT PRESS ALT & OAT BELOW 15°C, SEE FLT MAN.

L. Automatic Reserve Thrust (ART) System

(1) When one JT8D-209 engine and one JT8D-219 engine are installed, ART system may be ON for this configuration.

(2) When two JT8D-219 engines, operating at -209 thrust level, are installed ART system must be OFF and following circuit breakers opened for this configuration.

Open the following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

(3) Install inop. ring (P/N S4933959-1) on circuit breakers.

M. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 209

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201)

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

N. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 210

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201).

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(o) 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.

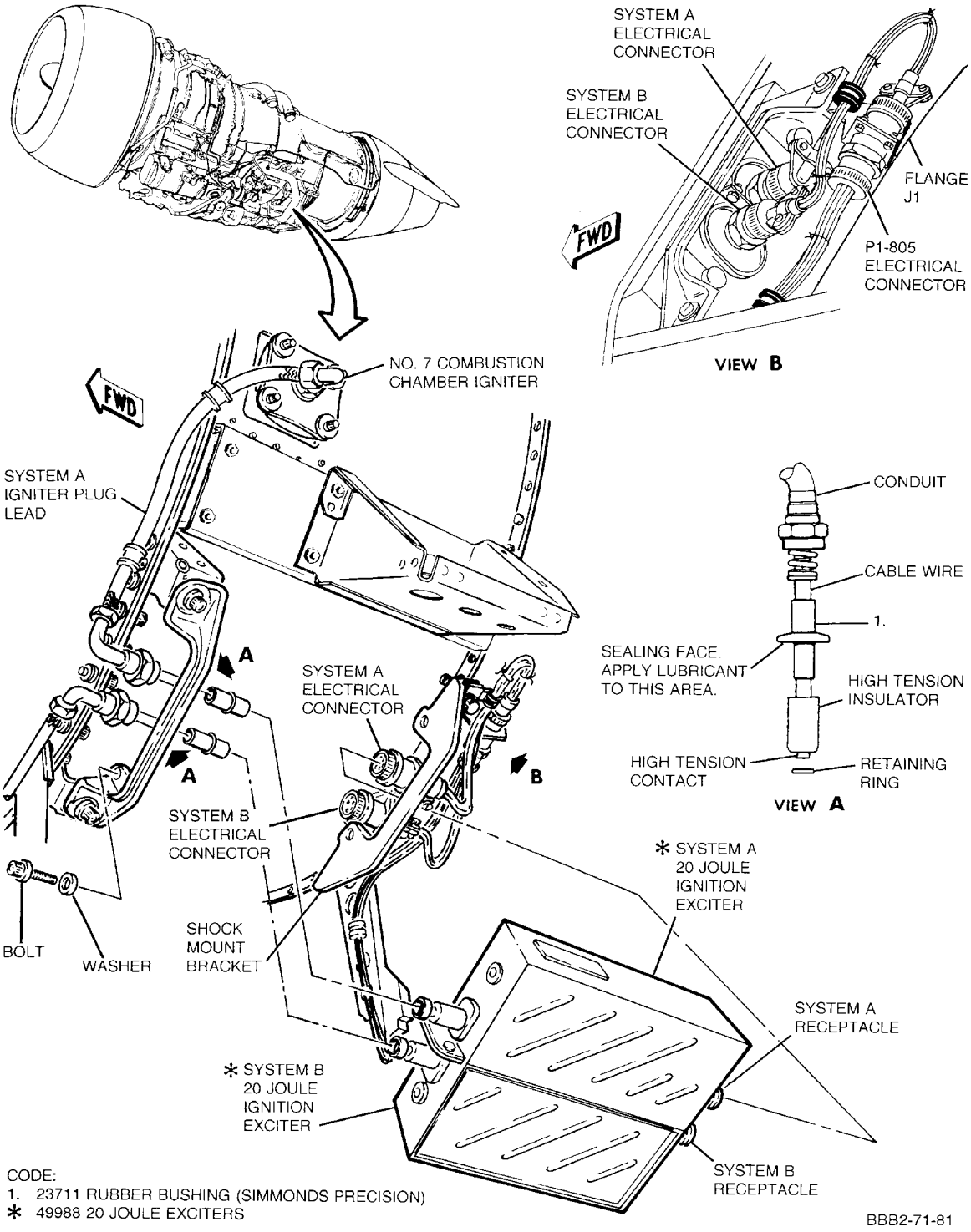
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

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.

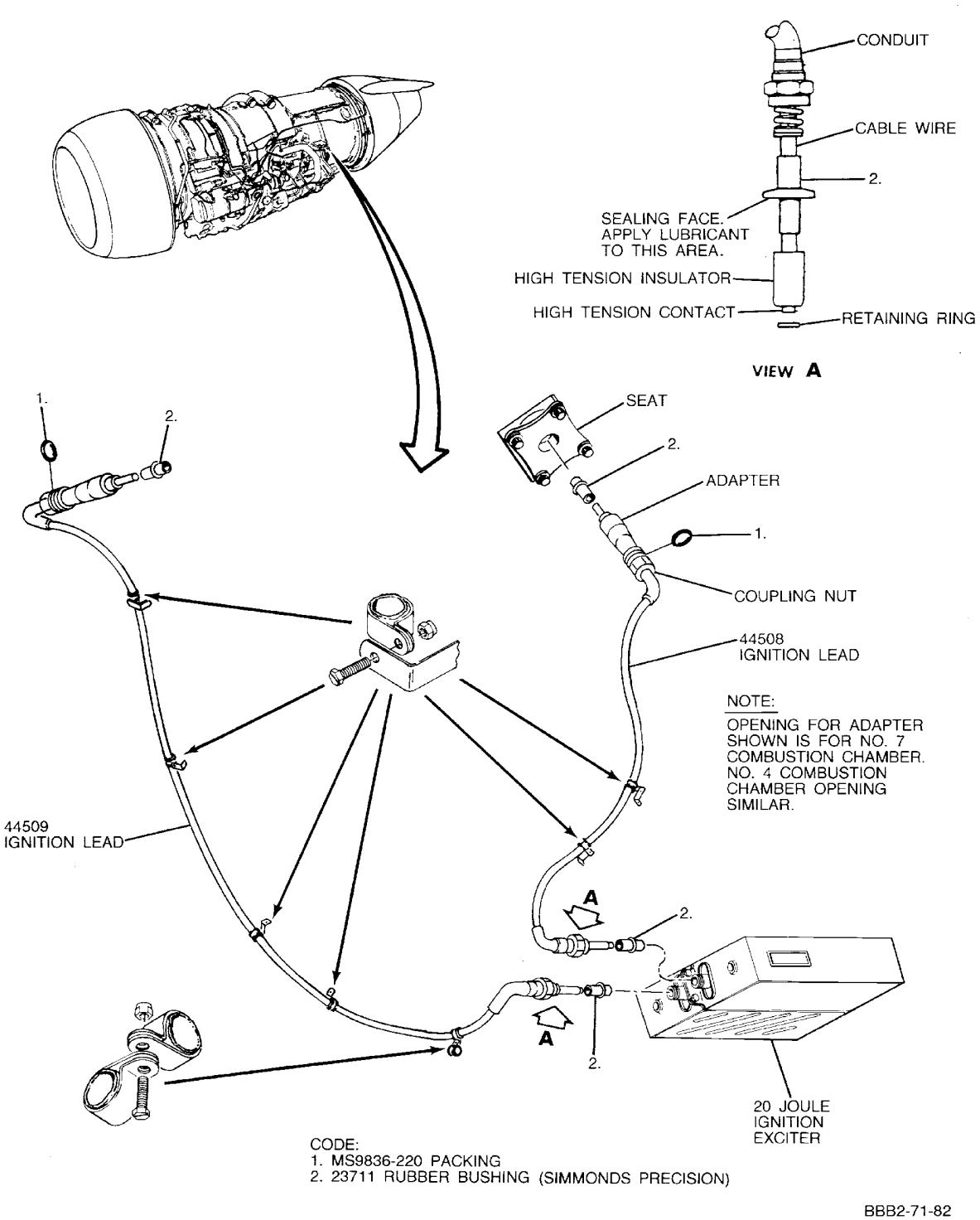
(r) Carefully insert exciter end of lead into ignition exciter, torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

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

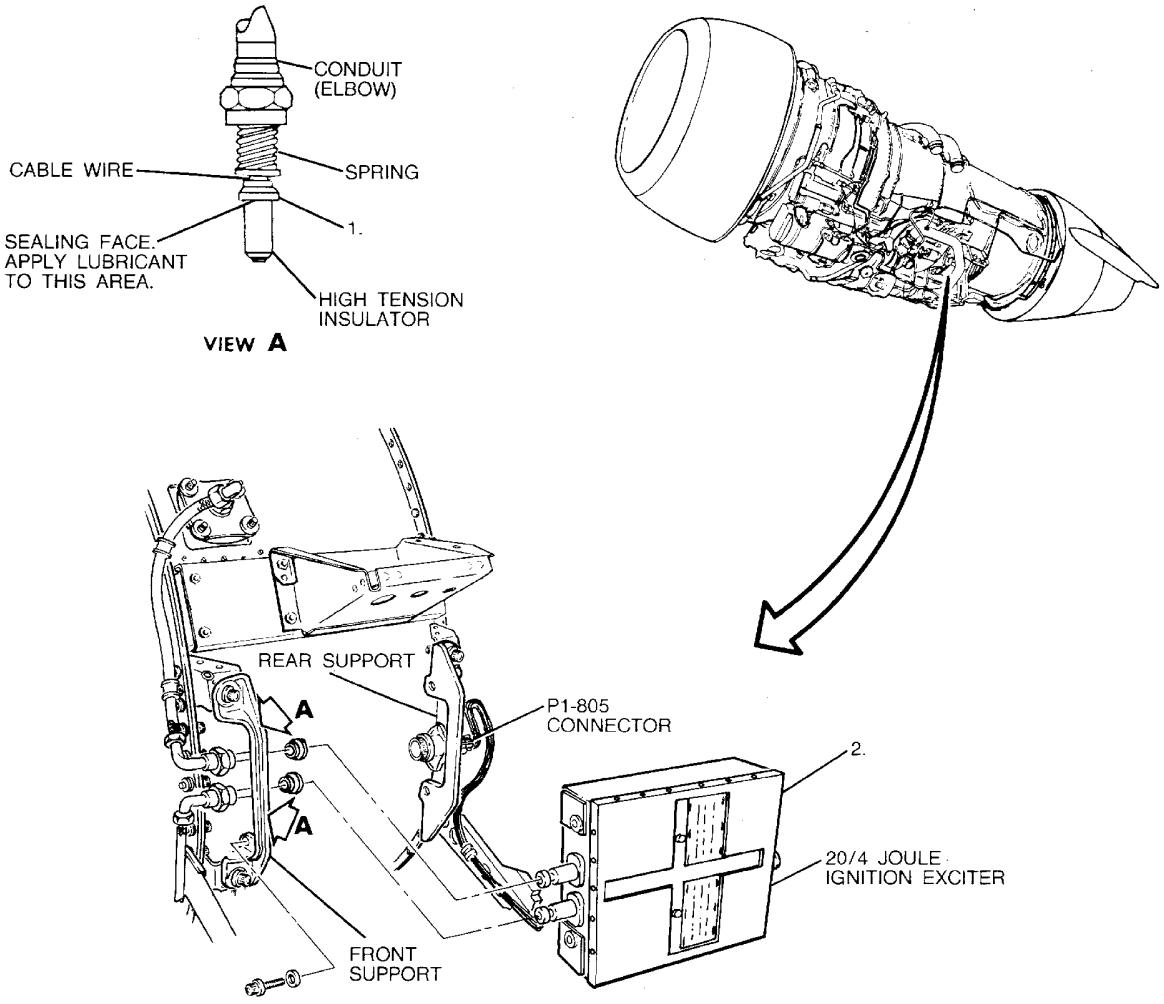


20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-817

EFFECTIVITY
WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891;
JT8D - 209/219



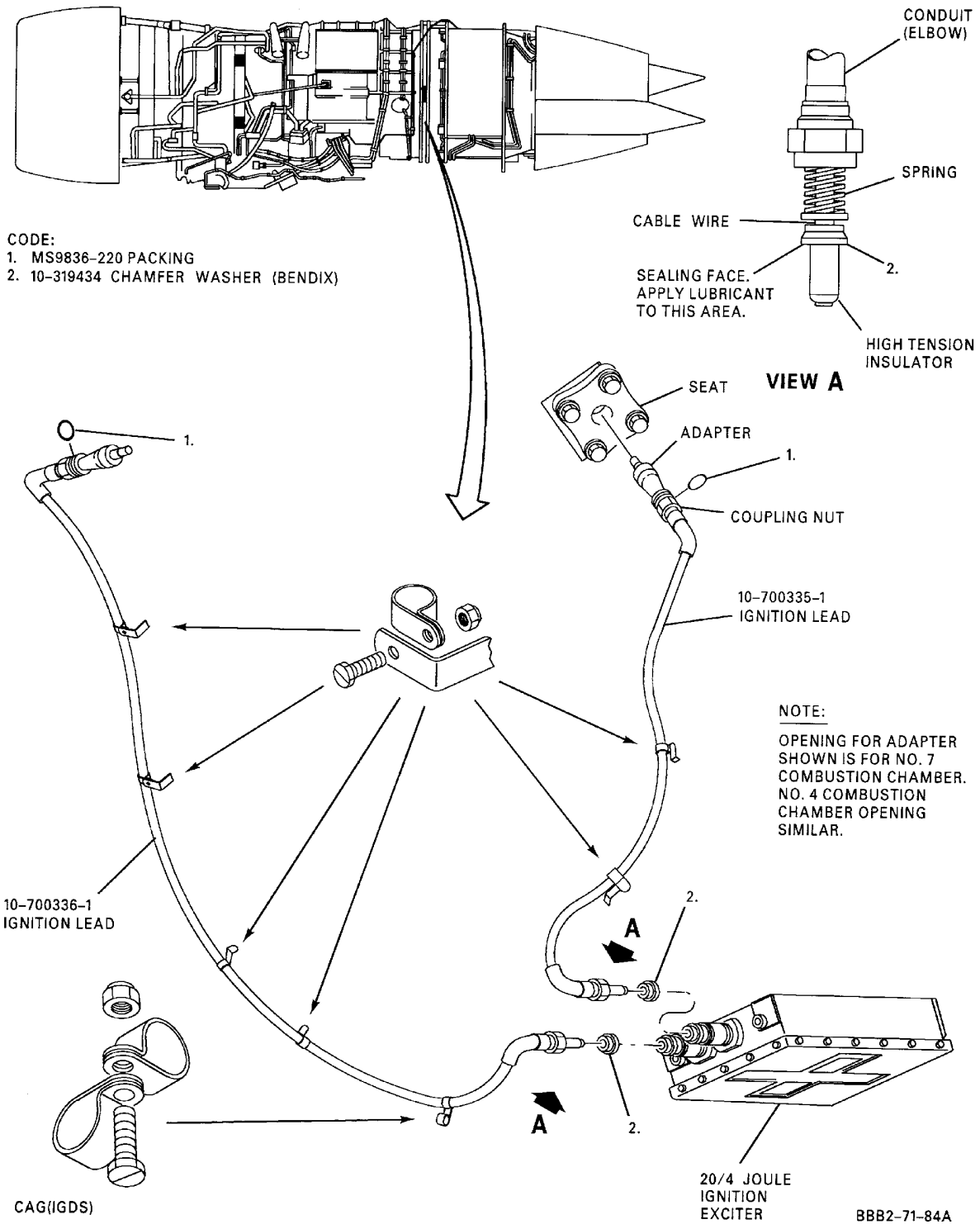
20 Joule Ignition Leads -- Removal/Installation
Figure 202/71-02-00-990-818



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Exciter -- Removal/Installation
Figure 203/71-02-00-990-819



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-820

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-217C engine and one JT8D-217A engine with both engines to be operated at JT8D-217A thrust level. Thrust for takeoff to be set normally with ARTS ON. Alternately, two JT8D-217C engines can be installed with both engines to be operated at JT8D-217A thrust level. When two JT8D-217C engines are operating at -217A thrust level, installed, the Automatic Reserve Thrust ART system may be ON.

WJE 875-879

B. JT8D-217A engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-217A engine is installed on an MD-83, MD-87, or MD-88 aircraft, the JT8D-217A engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, or Service Bulletin 5752, 5th Stage Compressor Blade Modification, or its production equivalent.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

WJE 875-879; JT8D-217A/-217C

2. Equipment Changes

A. Fuel Flow Indicating System

(1) Fuel flow indicating system for JT8D-217C engine installation is same as fuel flow indicating system for the JT8D-217A engine installation. Maximum fuel flow of -217C engine when operated at -217A thrust levels is essentially same as maximum fuel flow of -217A engine.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000

NOTE: 0-16000 lbs/hr range is adequate for both the JT8D-217C and -217A engines.

B. EGT Indicating System

(1) This system is identical for -217A and -217C engines.

C. N1 Indicating System

(1) This system is identical for -217A and -217C engines.

D. N2 Indicating System

(1) This system is identical for -217A and -217C engines.

E. Digital Flight Guidance Computer (DFGC)

(1) The JT8D-217A/-217C engines have identical EPR levels. Both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217A operation, in order that thrust rating computer (TRC) provides JT8D-217A EPR's.

(2) DFGC pin option as follows:

Table 202

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Open	Ground	Open	Open

NOTE: Pin (67) is only available in DFGC's which have a provision for selection of JT8D-219 thrust levels (DFGC's P/N 4034241-930 and subs).

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217A EPR display as follows:

NOTE: This check ensures DFGC is configured for -217A operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

F. Digital Flight Guidance Computer (DFGC)

(1) When an aircraft is again to be operated with two JT8D-217C engines at -217C thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217C operation, in order that thrust rating computer (TRC) provides JT8D-217C EPR's.

(2) DFGC Pin Option as follows:

(Connector J102B)

Table 203

Connector	J102B-	--	--	--	J101A-
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Open	Ground	Open	Open

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217C EPR display as follows:

NOTE: This check ensures DFGC is configured for -217C operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

WJE 875-879

G. Flight Management System (FMS)

(1) FMS is not certified to operate with JT8D-217A engines. If intermix involves JT8D-217A engines, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

(2) To make the FMS inoperative, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 877			
A	11	B10-445	FMS SWITCHING
WJE 875, 876, 878, 879			
A	11	B10-445	FMS/EFIS SWITCHING

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE 875-879			
H	15	B10-421	FLT MGMT SYSTEM DATA LOADER

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
WJE 875, 876, 878, 879			
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC

WJE 875-879

NOTE: FMS/EFIS SWITCHING (only applicable if dual FMS installed).

WJE 875, 876, 878, 879

(3) For aircraft not equipped with IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU

NOTE: For aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do not pull MCDU-1 and MCDU-2 circuit breakers.

WJE 875-879

(4) FMS must be placarded to inform the flight crew and maintenance personnel that the FMS is inoperative.

NOTE: It is the operator's discretion as to how this is done. Reference Douglas DC-9 Master Minimum Equipment List, Rev. 25, dated 15 November 1989.

WJE 875-879; JT8D-217A/-217C

H. Engine Trimming Procedures

(1) When one JT8D-217A engine and one JT8D-217C engine are installed both engines must be trimmed to JT8D-217A part power EPR. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7)

NOTE: JT8D-217C engines will satisfactorily produce -217A thrusts when trimmed to either JT8D-217A, -217C, or -219 EPR.

(2) When two JT8D-217C engines are installed, both engines may be trimmed to either JT8D-217A, -217C, or -219 part power EPR . To preclude excessive throttle stagger, both left and right engines must be trimmed to the same chart. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7)

I. Placards Required for Engine Intermix

(1) For the intermix of one JT8D-217A engine and one JT8D-217C engine, install the following placard (PN 7914599-953) to the lower left hand bezel of the EPR gage for the JT8D-217C engine: "217C".

(2) Install the following placard (PN 7914599-915) to the lower left hand bezel of the EPR gage for the JT8D-217A engine: "217A".

NOTE: These placards are not required if the JT8D-217C inflight relight envelope is used for both engines.

NOTE: If two JT8D-217C engines are installed, no placards to identify the engines are required.

J. Automatic Reserve Thrust (ART) System

(1) When one JT8D-217A engine and one JT8D-217C engine are installed, ART system may be ON for this configuration.

(2) When two JT8D-217C engines, operating at -217A thrust level, are installed ART system may be ON for this configuration.

K. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 204

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201)

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

(f) Check lead. (IGNITION LEAD, SUBJECT 74-20-01) page 201.

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

L. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 205

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: .* (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first(Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

(h) Check lead. (IGNITION LEAD, SUBJECT 74-20-01) page 201.

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(o) 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.

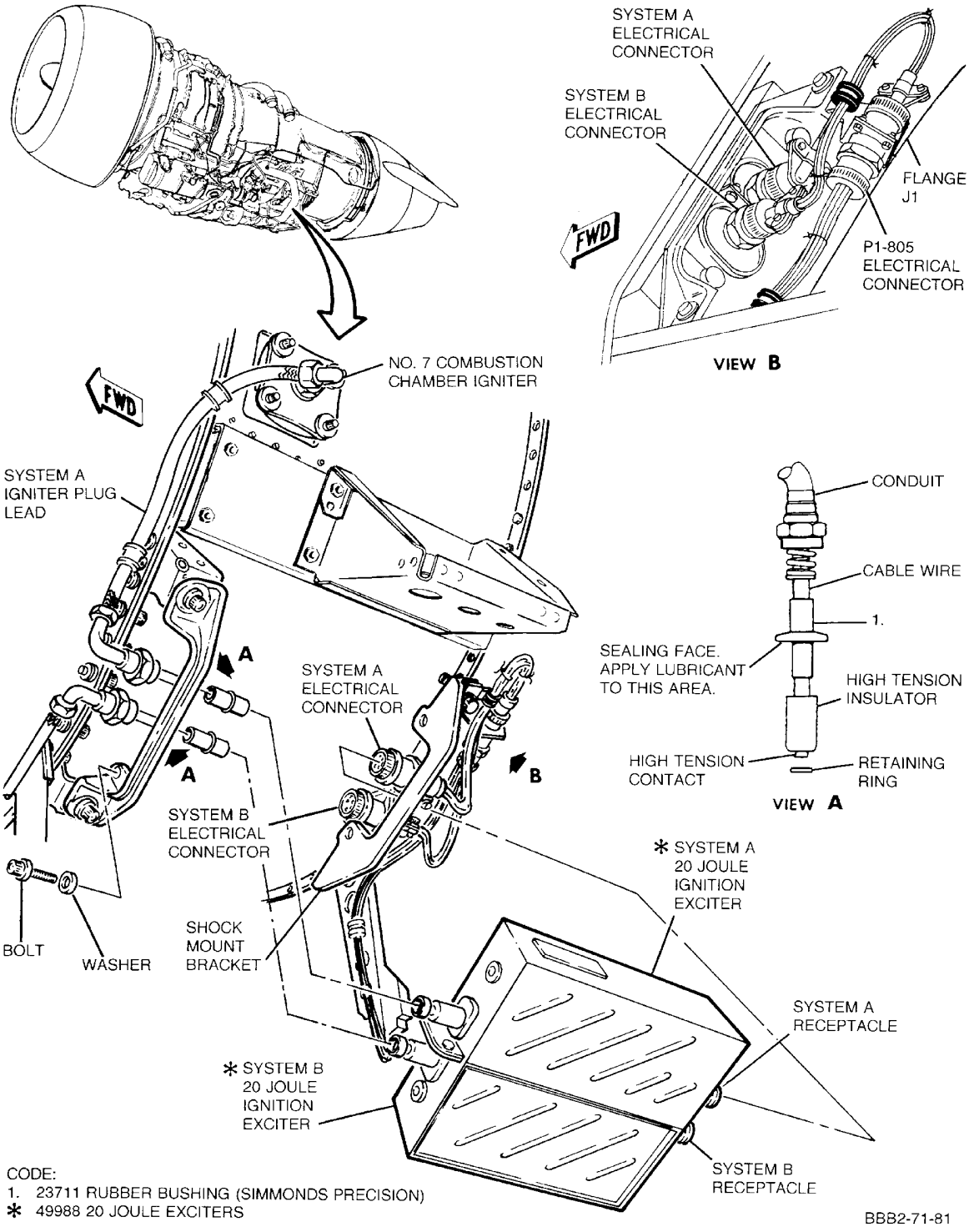
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

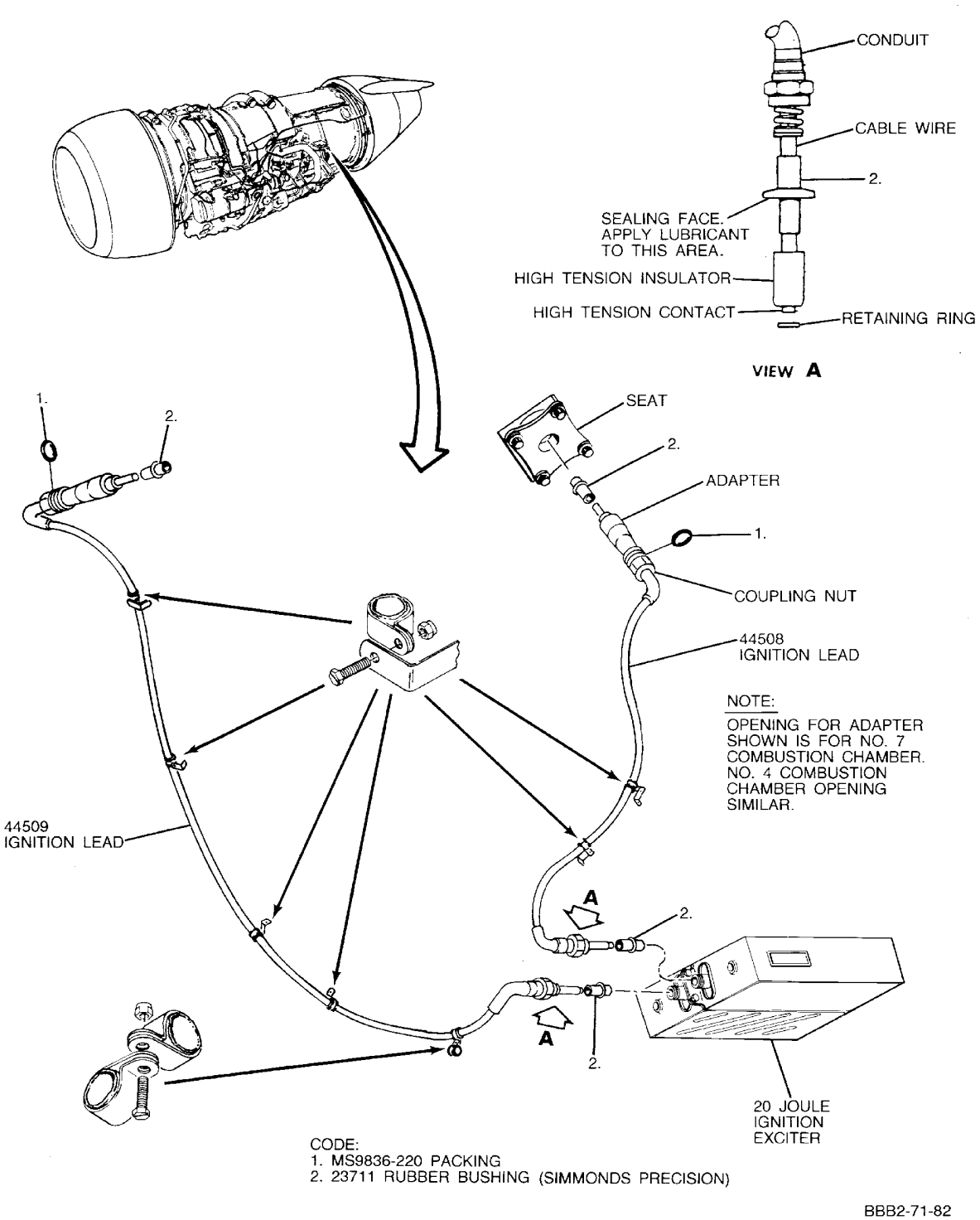
CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

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

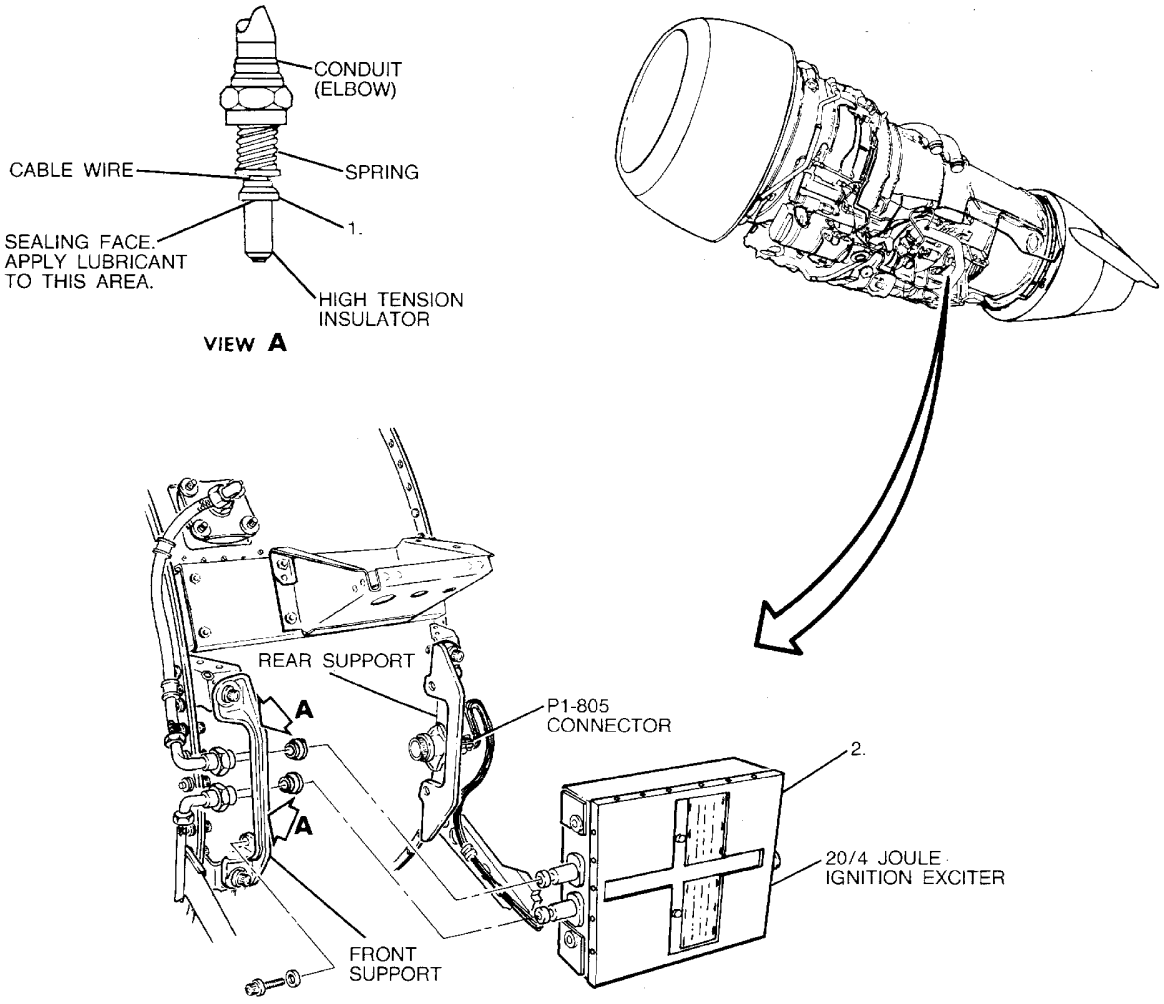
(s) Secure ignition lead attaching clips to engine flange torque bolts 36 to 40 inch-pounds (4.07 to 4.52 N·m).



20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-813



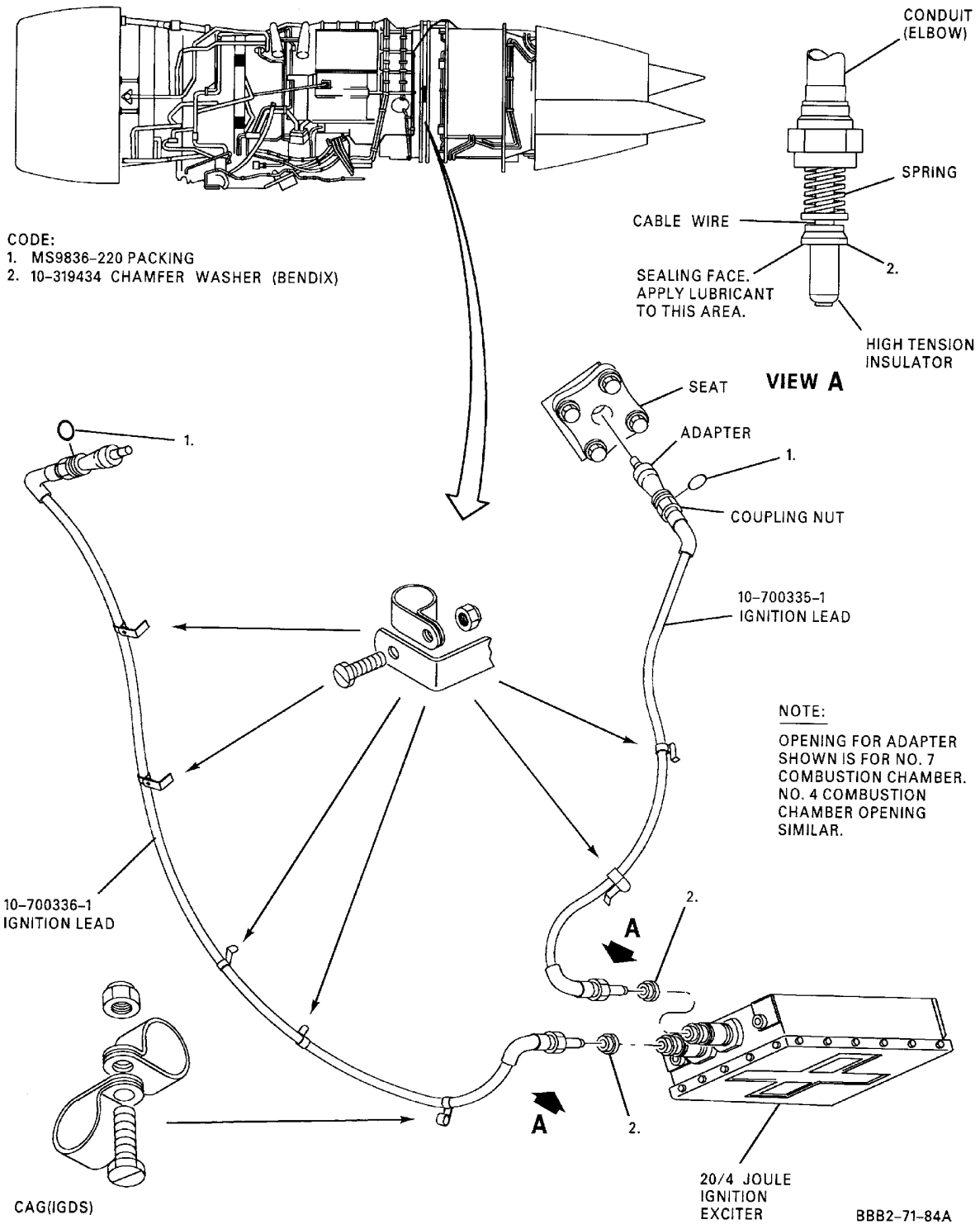
20 Joule Ignition Leads -- Removal/Installation
Figure 202/71-02-00-990-814



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Exciter -- Removal/Installation
Figure 203/71-02-00-990-815



20/4 Joule Ignition Leads -- Removal/Installation
Figure 204/71-02-00-990-816

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-219 engine and one JT8D-217C engine with both engines to be operated at JT8D-217C thrust level. Alternately, two JT8D-219 engines can be installed with both engines to be operated at JT8D-217C thrust level. Thrust for takeoff to be set normally with ARTS ON.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

2. Engine Limits

A. The engine limits for JT8D-219 engine are identical with those of the JT8D-217C engine except for the N_1 "orange line" (normal takeoff limit). When operating an intermix of one JT8D-217C engine and one JT8D-219 engine, JT8D-217C engines must be operated to -217C limits. JT8D-219 engines may be operated to either -219 to -217C limits when operating at JT8D-217C thrusts.

3. Equipment Changes

A. Fuel Flow Indicating System (Analog instruments)

(1) This system is identical for -217C and -219 engines.

B. EGT Indicating System (Analog instruments)

(1) This system is identical for -217C and -219 engines.

C. N_1 Indicating System (Analog instruments)

(1) The JT8D-217C indicator must show -217C N_1 limits. JT8D-219 may be operated with either -217C or -219 indicating system.

Table 201

Engine Model	Compatible N_1 Indicator P/N
JT8D-217C	8DJ81WCW4
JT8D-219	8DJ81WDA4

D. N2 Indicating System (Analog Instruments)

(1) This system is identical for -217C and -219 engines.

E. Electronic Engine Display Panel (EEDP)

(1) Both sides of the (EEDP) must have the applicable option pins strapped to display the -217C engine limits.

(2) EEDP pins as follows:

Table 202

Connector	P1-793	P1-794
Pin	M	M
Strap to pin	P	P

(3) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections for the JT8D-217C/-219 intermix. (POWER - MAINTENANCE PRACTICES, PAGEBLOCK 77-10-00/201)

F. Digital Flight Guidance Computer (DFGC)

(1) Since both engines are to be operated at JT8D-217C thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217C operation, in order that thrust rating computer (TRC) provides JT8D-217C EPR's.

(2) DFGC pin option as follows:

Table 203

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Open	Ground	Open	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-217C engines installed.

NOTE: Pin (67) is only available in DFGC's which have a provision for selection of JT8D-219 thrust levels (DFGC's P/N 4034241-930 and subs).

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217C EPR display as follows:

NOTE: This check ensures DFGC is configured for -217C operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

G. Performance Management System (PMS)

(1) Since both engines are operated at JT8D-217C thrust level, the PMS must have applicable pins open for -217C operation in order for PMS to utilize correct thrust limit ratings.

Table 204

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Ground	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

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

(2) Functionally check PMS located on center pedestal, for proper JT8D-217C display as follows: (PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 1)

NOTE: This check ensures PMS is configured for -217C operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed. (PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

(b) On Control Display Unit (CDU), momentarily press STS/TEST key

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217C.

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

H. Flight Management System (FMS)

(1) Since both engines are operated at JT8D-217C thrust level, the Flight Management Computer (FMC) must have applicable pins open/ground for -217C operation, in order for FMS to utilize correct thrust limit ratings.

(2) Check that circuit breakers are open as required. (ADVANCED FLIGHT MANAGEMENT COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-03/201 Config 1)

(3) Flight Management Computer (FMC) airframe/engine program pins as follows:

Table 205

Airframe/ Engines Configuration	Connector R50-442B (middle plug) Pin Option					
	Pins	11G	11F	11E	11D	11C
WJE 415, 417, 419, 421, 423, 863-866						
-217C		Open	Open	Ground	Open	Ground
WJE 418, 869, 871, 872						
-217C		Open	Open	Ground	Ground	Open

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

(4) Perform a Return To Service Check to ensures FMS is configured for -217C operation as follows: (ADVANCED FLIGHT MANAGEMENT COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-03/201 Config 1)

(a) Ensure that circuit breakers required for Return To Service Check of FMS are closed.

(b) Return To Service Check is activated upon power up. If self-test is satisfactory, Multipurpose Control Display Units (MCDU) MENU appears on title page at top line. MCDU is located on center pedestal.

(c)) Observe MCDU display, verify 1L and 1R displays proper airframe and engine configuration.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D-217C/-219

I. Electronic Engine Display Panel (EEDP)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the following option pins will return the EEDP to the -219 engine limits configuration.

(2) EEDP pins as follows:

Table 206

Connector	P1-793	P1-794
Pin	L	L
Strap to pin	P	P

NOTE: A self test (BIT) display of the EEDP shall be performed to ensure proper option pin connections for the JT8D-219. (POWER - MAINTENANCE PRACTICES, PAGEBLOCK 77-10-00/201)

J. Digital Flight Guidance Computer (DFGC)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -219 operation, in order that thrust rating computer (TRC) provides JT8D-219 EPR's.

(2) DFGC Pin Option as follows:

Table 207

Connector	J102B-	--	--	--	J101A-
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Ground	Ground	Open	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-219 engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217C EPR display as follows:

NOTE: This check ensures DFGC is configured for -217C operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (±1 degree) and EPR LIM displays 2.08 (±0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

K. Performance Management System (PMS)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the PMS must have applicable pins grounded for -219 operation, in order for PMS to utilize correct thrust limit ratings.

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

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

(2) Functionally check PMS located on center pedestal, for proper JT8D-219 display as follows. (PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 1)

NOTE: This check ensures PMS is configured for -219 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed. (PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1)

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-219.

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

L. Flight Management System (FMS)

(1) When an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the Flight Management Computer (FMC) must have applicable pins open/ground for -219 operation, in order for FMS to utilize correct thrust limit ratings.

(2) Check that circuit breakers are open as required. (ADVANCED FLIGHT MANAGEMENT COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-03/201 Config 1)

(3) Flight Management Computer (FMC) airframe/engine program pins as follows:

Table 209

Airframe/ Engines Configuration	Connector R50-442B (middle plug) Pin Options					
	Pins	**11G**	**11F**	**11E**	**11D**	**11C**
WJE 415, 417, 419, 421, 423, 863-866						
-219		Open	Ground	Ground	Open	Open
WJE 418, 869, 871, 872						
-219		Open	Ground	Ground	Ground	Ground

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

(4) Perform a Return To Service Check to ensure FMS is configured for -219 operation as follows: (ADVANCED FLIGHT MANAGEMENT COMPUTER - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-03/201 Config 1)

(a) Ensure that circuit breakers required for Return To Service Check of FMS are closed.

(b) Return To Service Check is activated upon power up. If self-test is satisfactory, Multipurpose Control Display Units (MCDU) MENU appears on title page at top line. MCDU is located on center pedestal.

(c) Observe MCDU display, verify 1L and 1R displays proper airframe and engine configuration.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D-217C/-219

M. Engine Trimming Procedures

(1) When one JT8D-219 engine and one JT8D-217C engine or two JT8D-219 engines are installed, both engines may be trimmed to either JT8D-217A, -217C, or -219 part power EPR. To preclude excessive throttle stagger, both left and right engines must be trimmed to the same chart. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8)

NOTE: JT8D-217C and JT8D-219 engines will satisfactorily produce -217C thrust when trimmed to either JT8D-217A, -217C, or -219 EPR.

N. Automatic Reserve Thrust (ART) System

(1) ART system may be on for an intermix of one JT8D-217C and one JT8D-219 engine or two JT8D -219 engines operating at -217C thrust level.

O. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

Placards Required for Engine Intermix

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 210

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201)

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

P. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 211

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(o) 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.

(p) 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).

(q) Remove protective caps from exciter connector.

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.

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

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

Q. Automatic Reserve Thrust (ART) System

(1) When one JT8D-209 engine and one JT8D-217 engine are installed, ART system may be ON for this configuration.

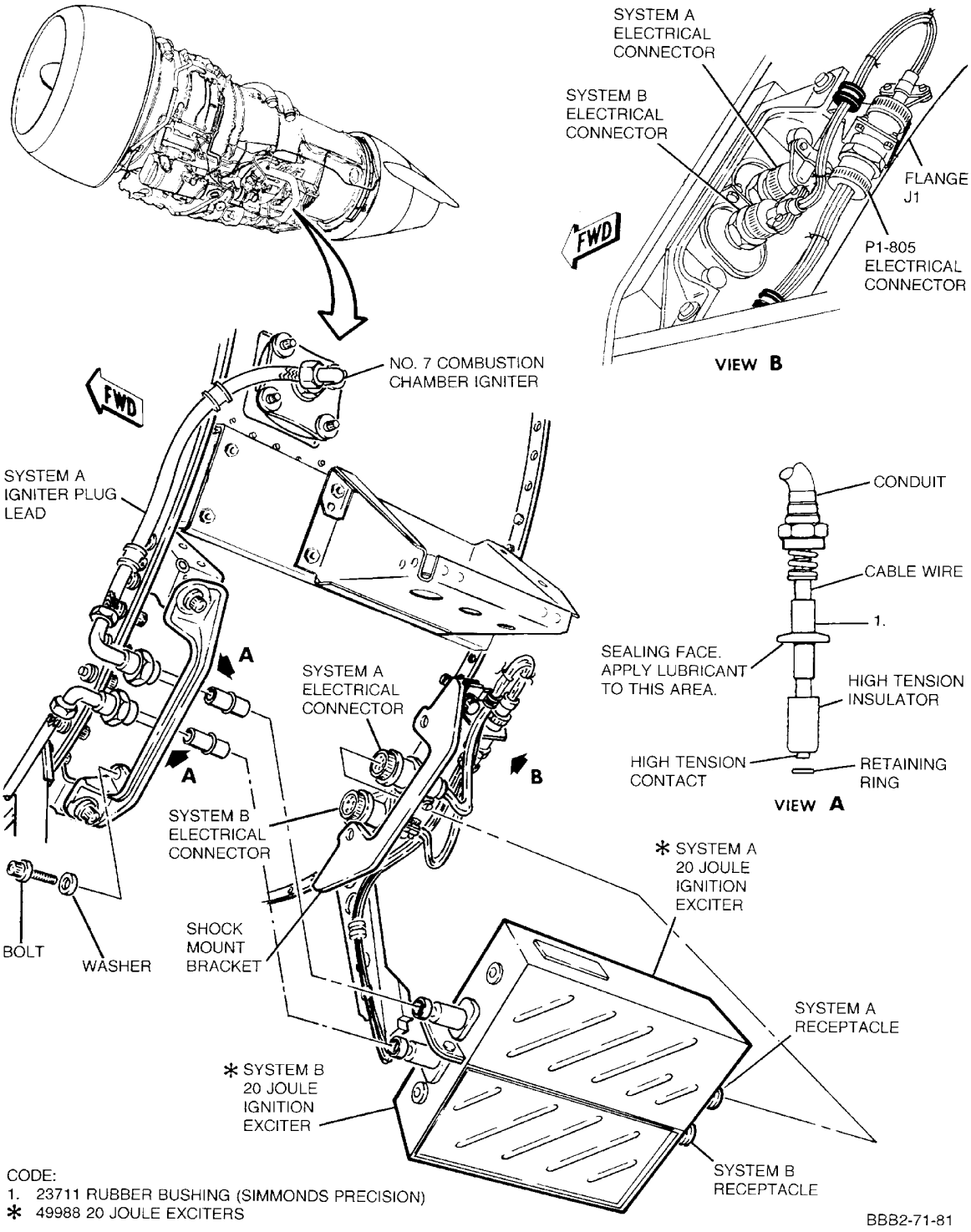
(2) When two JT8D-217 engines, operating at -209 thrust level, are installed ART system must be OFF.

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.

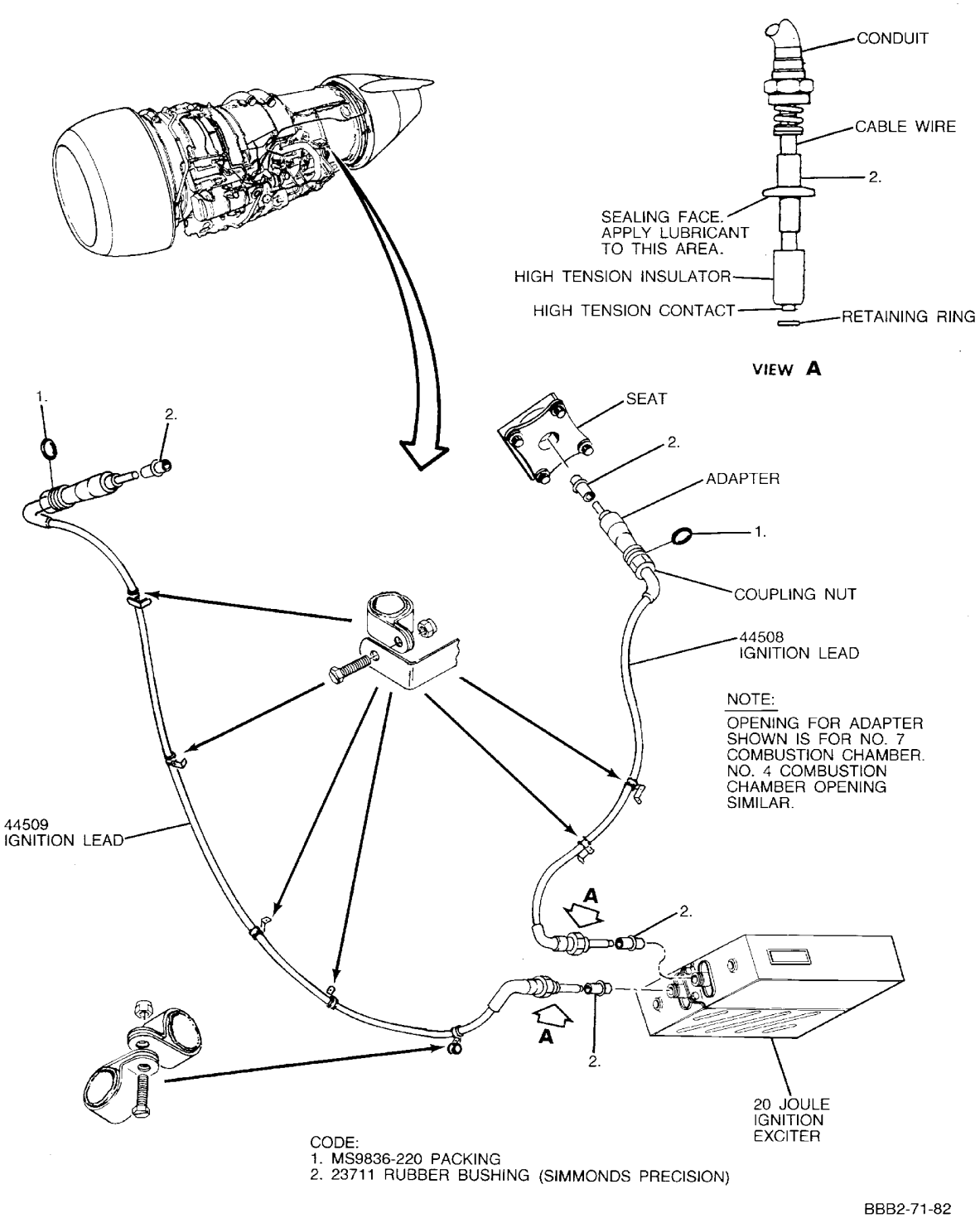
(a) Open these circuit breakers and install safety tags:

LOWER EPC, DC TRANSFER BUS

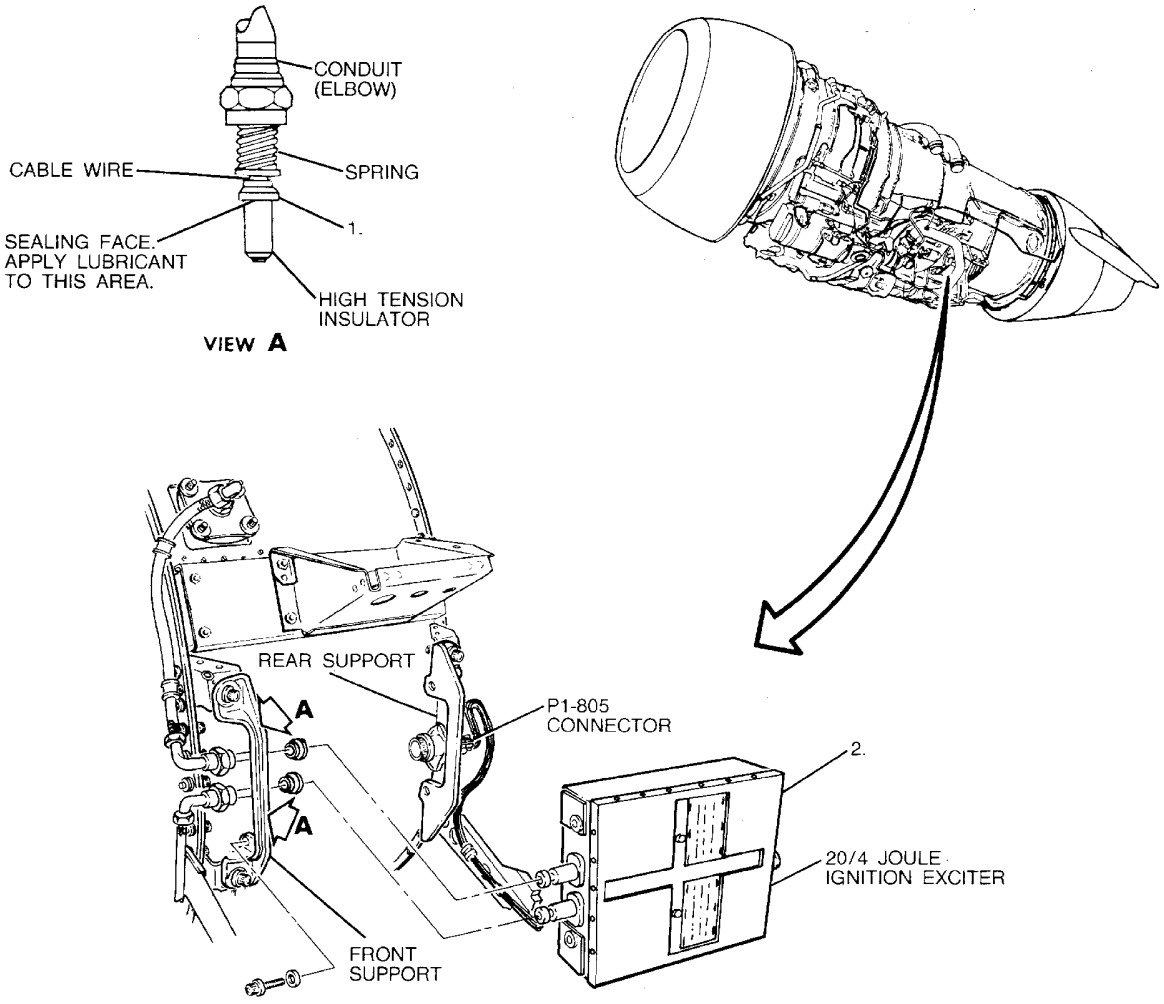
Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL



20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-809



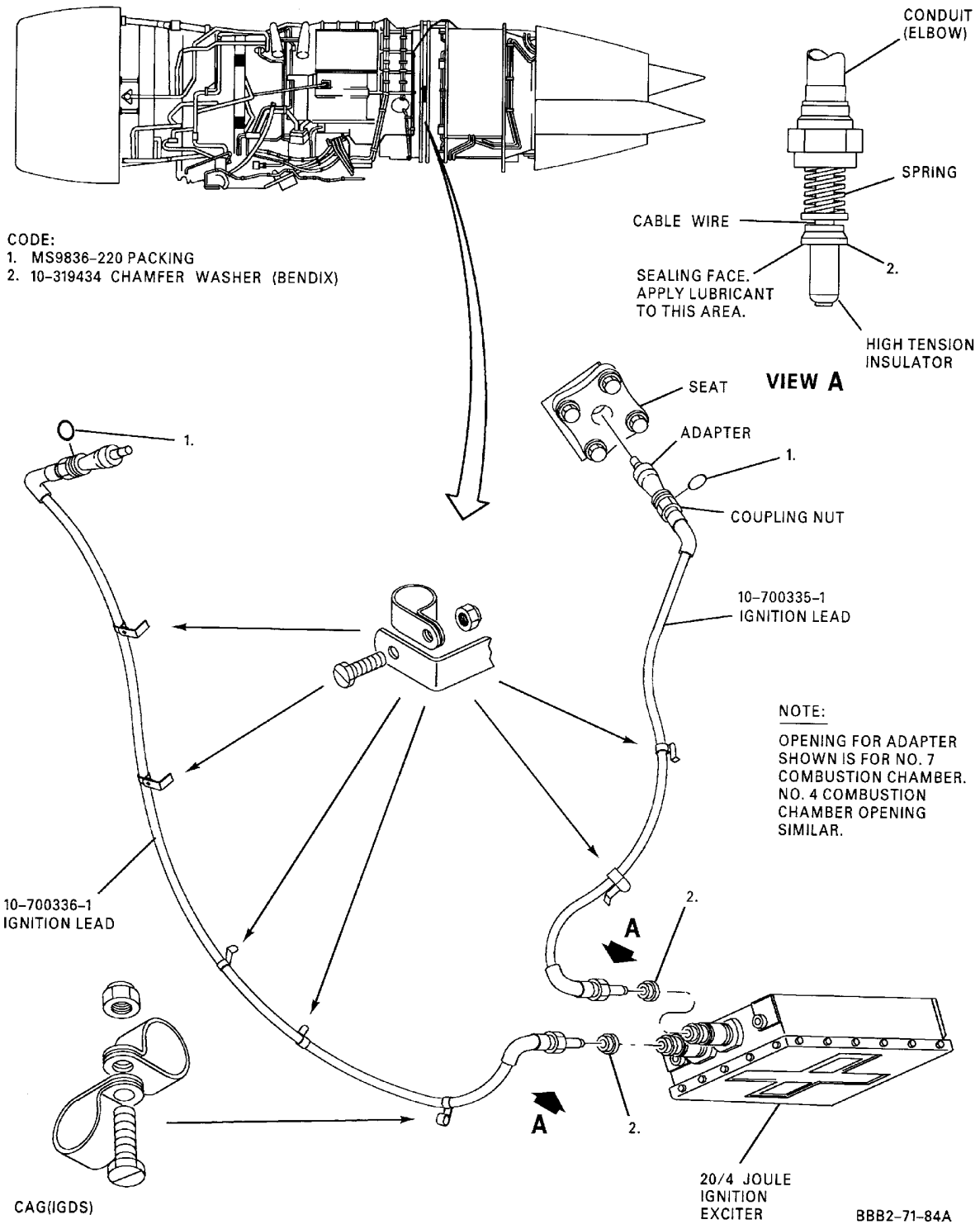
20 Joule Ignition Leads -- Removal/Installation (Simmonds)
Figure 202/71-02-00-990-810



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Leads--Removal/Installation (Simmonds)
Figure 203/71-02-00-990-811



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-812

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-217A engine and one JT8D-217C engine, one JT8D-217C and one JT8D-219 engine, one JT8D-217A engine and one JT8D-219 engine, or two JT8D-217C engines, with both engines to be operated at JT8D-217A thrust level. Alternately, two JT8D-219 engines can be installed with both engines to be operated at JT8D-217A thrust level. Thrust for takeoff is set normally with ARTS ON.

B. JT8D-217A engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-217A engine is installed on an MD-83, MD-87, or MD-88 aircraft, the JT8D-217A engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, or Service Bulletin 5752 5th Stage Compressor Blade Modification, or its production equivalent.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

2. Equipment Changes

A. Fuel Flow Indicating System (Analog instruments)

(1) The fuel flow indicating system for JT8D-217A, -217C, and JT8D-219 engine installations is identical.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000

0-16000 lbs/hr. range is adequate for the JT8D-219, -217C, and -217A engines.

B. EGT Indicating System (Analog instruments)

(1) This system is identical for -217A, -217C, and -219 engines.

C. N_1 Indicating System (Analog instruments)

(1) The JT8D-217A and JT8D-217C indicators must show -217A/-217C N_1 limits, which are the same. A JT8D-219 engine may be operated with either the -217A/-217C or -219 N_1 indicating system.

Table 202

Engine Model	Compatible N_1 Indicator P/N
JT8D-217A/-217C	8DJ81WCW4
JT8D-219	8DJ81WDA4

D. N_2 Indicating System (Analog Instruments)

(1) This system is identical for -217A, -217C, and -219 engines.

E. Electronic Engine Display Panel (EEDP)

(1) The engine limits for the JT8D-217A and JT8D-217C are identical. The EEDP will display either -217A or -217C depending on the option pin configuration.

(2) For an intermix of one -217A and one -219, the applicable option pins should be strapped to show the -217A limits EEDP pins as follows:

Table 203

Connector	P1-793	P1-794
Pin	N	N
Strap to pin	P	P

(3) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections "programmed" for the JT8D-217A intermix. (POWER - MAINTENANCE PRACTICES, PAGEBLOCK 77-10-00/201)

NOTE: Engine type "217A" will be displayed on the FUEL FLOW digits for 2 seconds before reverting to the predetermined FUEL FLOW Test Value.

NOTE: This is the normal configuration for an aircraft delivered with -217A engines installed.

(4) For an installation of two JT8D-217C engines or an intermix of one -217C and one -219, both sides of the EEDP should have applicable option pins strapped to display the -217C engine limits EEDP pins as follows:

Table 204

Connector	P1-793	P1-794
Pin	M	M
Strap to pin	P	P

(5) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections "programmed" for the JT8D-217C intermix. (POWER - MAINTENANCE PRACTICES, PAGEBLOCK 77-10-00/201)

NOTE: Engine type "217C" will be displayed on the FUEL FLOW digits for 2 seconds before reverting to the predetermined FUEL FLOW Test Value.

NOTE: This is the normal configuration for an aircraft delivered with -217C engines installed.

(6) For an intermix of one JT8D-217A and one JT8D-217C, the pin configuration given in either steps (Paragraph 2.E.(2)) or (Paragraph 2.E.(4)) will provide the required engine limits.

(7) When two JT8D-219 engines are operated at JT8D-217A thrust levels, the option pin configuration in either steps (Paragraph 2.E.(2)), (Paragraph 2.E.(4)) or (Paragraph 2.E.(8)) gives permissible engine limits.

(8) If an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the following option pins will return the EEDP to the -219 engine limits configuration EEDP pins as follows:

Table 205

Connector	P1-793	P1-794
Pin	L	L
Strap to pin	P	P

(9) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections "programmed" for the JT8D-219 intermix. (POWER - MAINTENANCE PRACTICES, PAGEBLOCK 77-10-00/201)

NOTE: Engine type "219" will be displayed on the FUEL FLOW digits for 2 seconds before reverting to the predetermined FUEL FLOW Test Value.

F. Digital Flight Guidance Computer (DFGC)

(1) The JT8D-217A/-217C engines have identical EPR levels. Both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217A operation, in order that thrust rating computer (TRC) provides JT8D-217A EPR's.

(2) DFGC pin option as follows:

Table 206

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Open	Ground	Open	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-217A or with two JT8D-217C engines installed.

NOTE: Pin (67) is only available in DFGC's which have a provision for selection of JT8D-219 thrust levels (DFGC's P/N 4034241-930 and subs).

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217A EPR display as follows:

NOTE: This check ensures DFGC is configured for -217A operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

(4) If an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -219 operation, in order that thrust rating computer (TRC) provides JT8D-219 EPR's.

(5) Use DFGC P/N 4034241-930 or subs

Table 207

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Ground	Ground	Open	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-219 engines installed.

(6) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-219 EPR display as follows:

NOTE: This check ensures DFGC is configured for -219 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.08 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891, 893

G. Performance Management System (PMS)

(1) If the intermix includes a JT8D-217A engine, the PMS must have applicable pins grounded for -217A operation in order for PMS to utilize correct engine performance.

(2) PMS Pin as follows:

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

WJE 405-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 880, 881, 883, 884, 891, 893

(3) Functionally check PMS located on center pedestal, for proper JT8D-217A display as follows: (PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 1 or FLIGHT MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 6 or PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 8)

NOTE: This check ensures PMS is configured for -217A operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed. (PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1 or PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 2)

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217A.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891, 893

(4) If the intermix does not include a JT8D-217A engine, the PMS must have applicable pins grounded for -217C operation, in order for PMS to utilize correct engine performance.

WJE 405-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 880, 881, 883, 884, 891, 893

NOTE: If operator so desires, the JT8D-217A PMS pin configuration may be used with two JT8D-217C engines installed. Paragraph Paragraph 2.G.(3) may be used for PMS function check.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891, 893

(5) PMS Pin as follows:

Table 209

Connectors	J1B	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Ground	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

WJE 405-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 880, 881, 883, 884, 891, 893

(6) Functionally check PMS, located on center pedestal, for proper JT8D-217C display as follows: (PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 1 or FLIGHT MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 6 or PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 8)

NOTE: This check ensures PMS is configured for -217C operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

(b) On Control Display unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217C.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891, 893

(7) When an aircraft is to be operated with two JT8D-219 engines at -219 thrust level, the PMS must have applicable pins grounded for -219 operation, in order for PMS to utilize correct thrust limit ratings.

(8) PMS pin as follows:

Table 210

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

WJE 405-411, 416, 420, 422, 424-427, 429, 861, 862, 868, 880, 881, 883, 884, 891, 893

(9) Functionally check PMS located on center pedestal, for proper JT8D-219 display as follows: (PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 1 or FLIGHT MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 6 or PERFORMANCE MANAGEMENT SYSTEM - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-00/201 Config 8)

NOTE: This check ensures PMS is configured for -219 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed. (PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 1 or PERFORMANCE MANAGEMENT CONTROL DISPLAY UNIT - MAINTENANCE PRACTICES, PAGEBLOCK 34-63-01/201 Config 2)

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-219.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891; JT8D -217A/-217C AND -219

H. Flight Management System (FMS)

(1) FMS is not certified to operate with JT8D-217A engines. If intermix involves JT8D-217A engines, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

WJE 405-411, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 880, 881, 883, 884

(2) To make the FMS inoperative, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

OVERHEAD EMERGENCY DC BUS

Row	Col	Number	Name
WJE 405-409, 411, 880, 881, 883, 884			
A	11	B10-445	FMS SWITCHING
WJE 410			
A	12	B10-445	FMS SWITCHING

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872			
H	15	B10-421	FLT MGMT SYSTEM DATA LOADER

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC
WJE 405-411, 880, 881, 883, 884			
D	21	B10-419	FMC-1

UPPER EPC, R AC BUS

Row	Col	Number	Name
J	15	B10-421	FMS DATA LOADER

WJE 405-411, 880, 881, 883, 884 (Continued)

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 415, 418, 863, 864, 866			
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC

UPPER EPC, RT AC

Row	Col	Number	Name
WJE 405-411, 880, 881, 883, 884			
B	15	B10-420	FMC-2

WJE 405-411, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 880, 881, 883, 884

NOTE: FMS/EMIS SWITCHING (only applicable if dual FMS installed)

(3) For aircraft not equipped with IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872			
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU
WJE 405-411, 880, 881, 883, 884			
D	22	B10-424	MCDU-1

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872			
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU

UPPER EPC, RT AC

Row	Col	Number	Name
WJE 405-411, 880, 881, 883, 884			
B	16	B10-425	MCDU-2

WJE 405-411, 415, 417-419, 421, 423, 863-866, 869, 871, 872, 880, 881, 883, 884

NOTE: For aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do not pull MCDU-1 and MCDU-2 circuit breakers.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891; JT8D -217A/-217C AND -219

(4) FMS must be placarded to inform the flight crew and maintenance personnel that the FMS is inoperative.

NOTE: It is the operator's discretion as to how this is done. Reference Douglas DC-9 Master Minimum Equipment List, Rev. 25, dated 15 November 1989.

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891, 893; JT8D -217A/-217C AND -219

I. Engine Trimming Procedures

(1) When one JT8D-217A engine is installed with one JT8D-217C or with one JT8D-219 both engines must be trimmed to JT8D-217A part power EPR. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

NOTE: JT8D-217C and JT8D-219 engines will satisfactorily procedure -217A thrusts when trimmed to either JT8D-217A, -217C or -219 EPR.

(2) When two JT8D-217C, one JT8D-217C and one JT8D-219, or two JT8D-219 engines are installed, both engines may be trimmed to either JT8D-217A, -217C, or -219 part power EPR. To preclude excessive throttle stagger, both left and right engines must be trimmed to the same chart. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 1 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

J. Placards Required for Engine Intermix

(1) For the intermix of one JT8D-217A engine with one JT8D-217C or with one JT8D-219 engine, install the appropriate placards:

(a) Install the following placard (P/N 7914599-915) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-217A engine: "217A" .

(b) Install the following placard (P/N 7914599-953) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-217C engine: "217C" .

(c) Install the following placard (P/N 7914599-916) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-219 engine: "219".

NOTE: These placards are not required if the JT8D-217C/-219 in-flight relight envelope is used for both engines.

NOTE: If two JT8D-217C, one -217C and one -219, or two -219 engines are installed, no placards to identify the engines are required.

(2) For the intermix of one JT8D-217A engine and one JT8D-217C engine with 4052504-925 FMC installed, install placard "VNAV NOT AUTHORIZED" on cockpit instrument panel (Ref. 31-11-02, Figure 1 and 31-11-03, Figure 1).

K. Placards Required for Engine Intermix (Analog Instruments)

(1) For the intermix of one JT8D-217A engine with one JT8D-217C or with one JT8D-219 engine, install the appropriate placards.

(a) Install the following placard (P/N 7914599-915) to the lower left hand bezel of the EPR gage for the JT8D-217A engine: "217A".

(b) Install the following placard (P/N 7914599-953) to the lower left hand bezel of the EPR gage for the JT8D-217C engine: "217C".

(c) Install the following placard (P/N 7914599-916) to the lower left hand bezel of the EPR gage for the JT8D-219 engine: "219".

NOTE: These placards are not required if the JT8D-217C/-219 in-flight relight envelope is used for both engines.

NOTE: If two JT8D-217C, one -217C and one -219, or two -219 engines are installed, no placards to identify the engines are required.

L. Placards Required for Engine Intermix (Electronic Engine Display Panel)

(1) For the intermix of one JT8D-217A engine with one JT8D-217C or with one JT8D-219 engine, install the appropriate placards:

(a) Install the following placard (P/N 7914599-915) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-217A engine: "217A" .

(b) Install the following placard (P/N 7914599-953) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-217C engine: "217C" .

(c) Install the following placard (P/N 7914599-916) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-219 engine: "219".

NOTE: These placards are not required if the JT8D-217C/-219 in-flight relight envelope is used for both engines.

NOTE: If two JT8D-217C, one -217C and one -219, or two -219 engines are installed, no placards to identify the engines are required.

M. Automatic Reserve Thrust (ART) System

(1) When any combination of one JT8D-217A engine, one JT8D-217C, and one JT8D-219 engine is installed, ART system may be ON for this configuration.

(2) When two JT8D-217C engines, or two JT8D-219 engines operating at -217A thrust level are installed, ART system may be ON for this configuration.

N. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 211

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*

Table 211 (Continued)

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201)

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

O. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 212

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(o) 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.

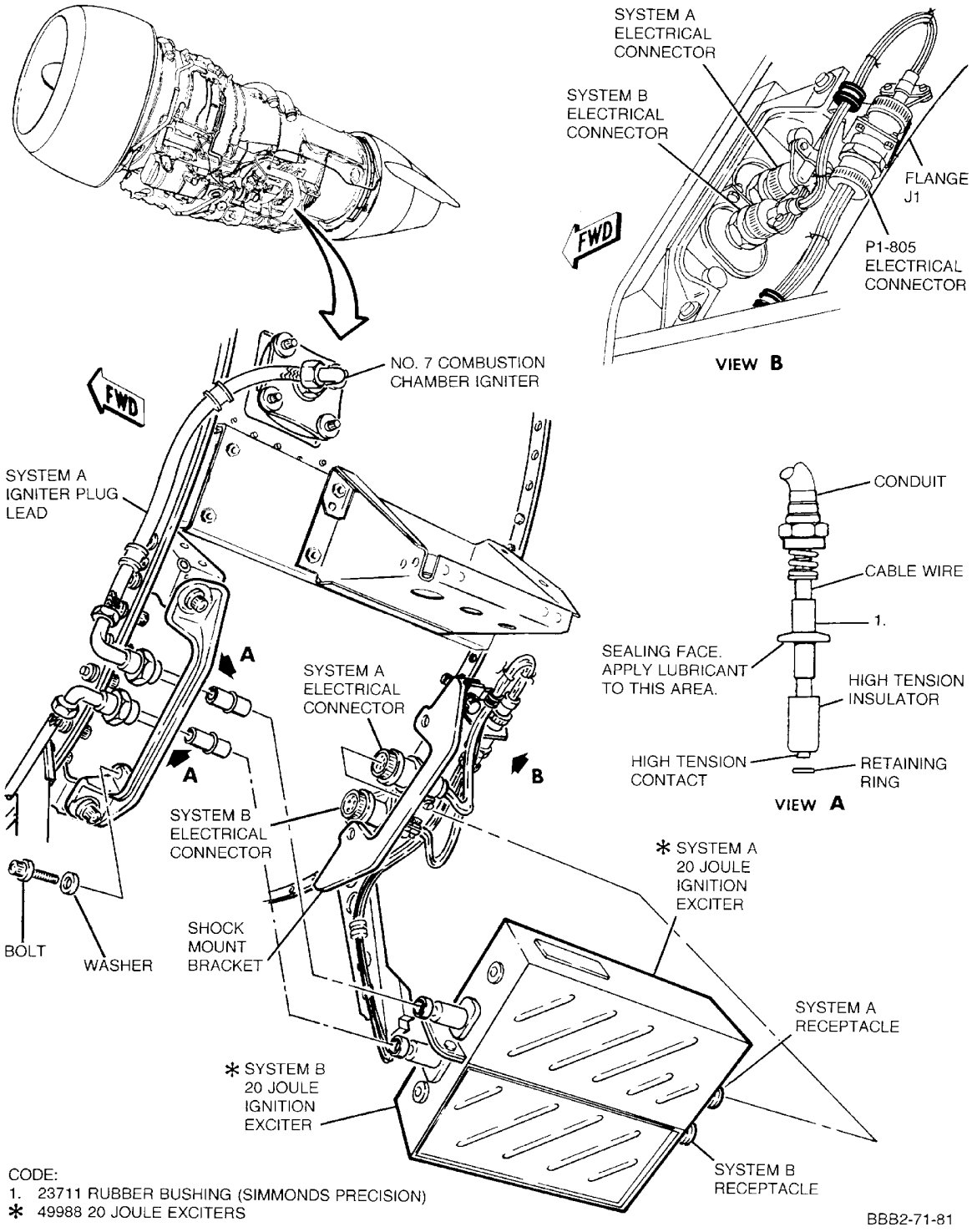
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

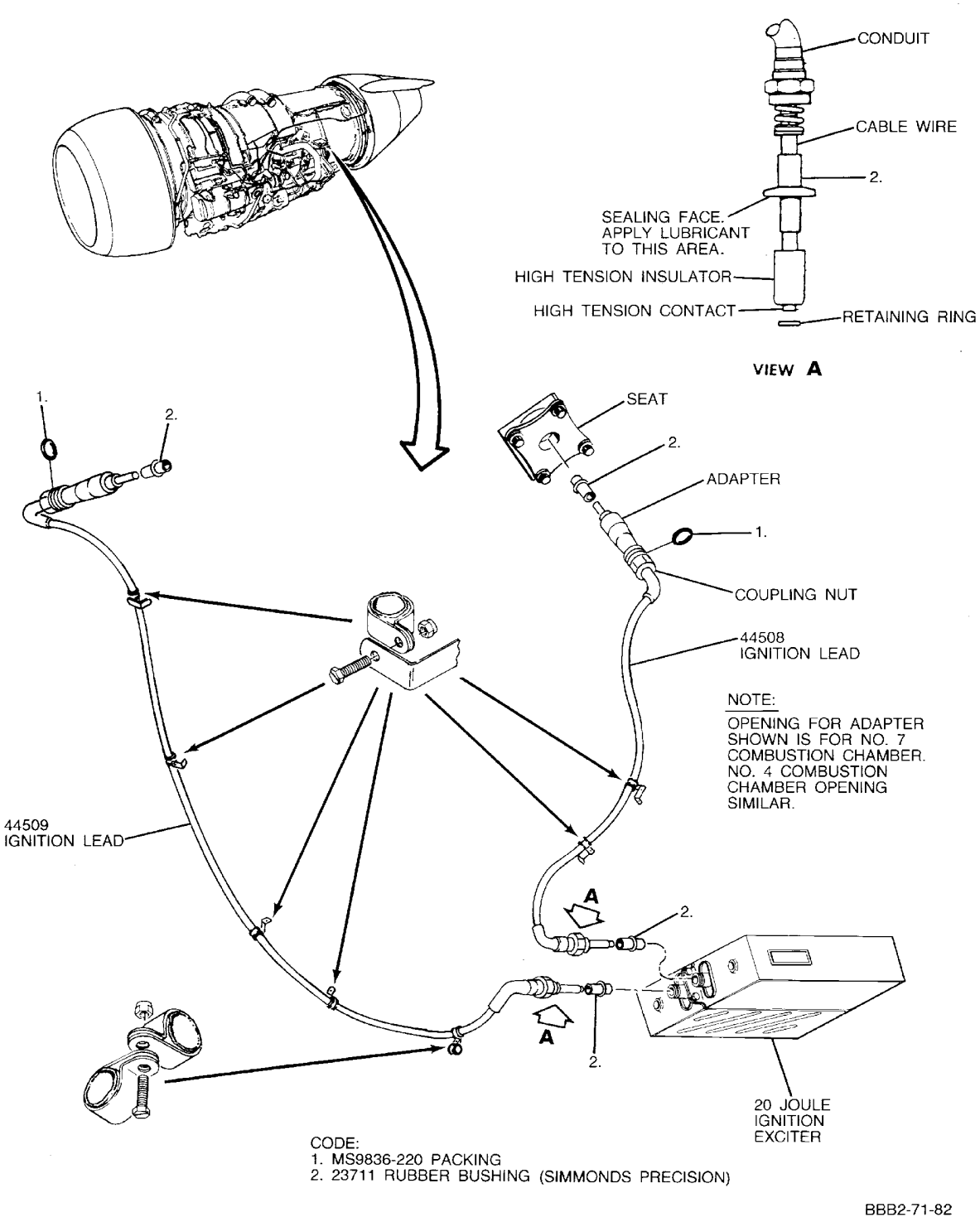
CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

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

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

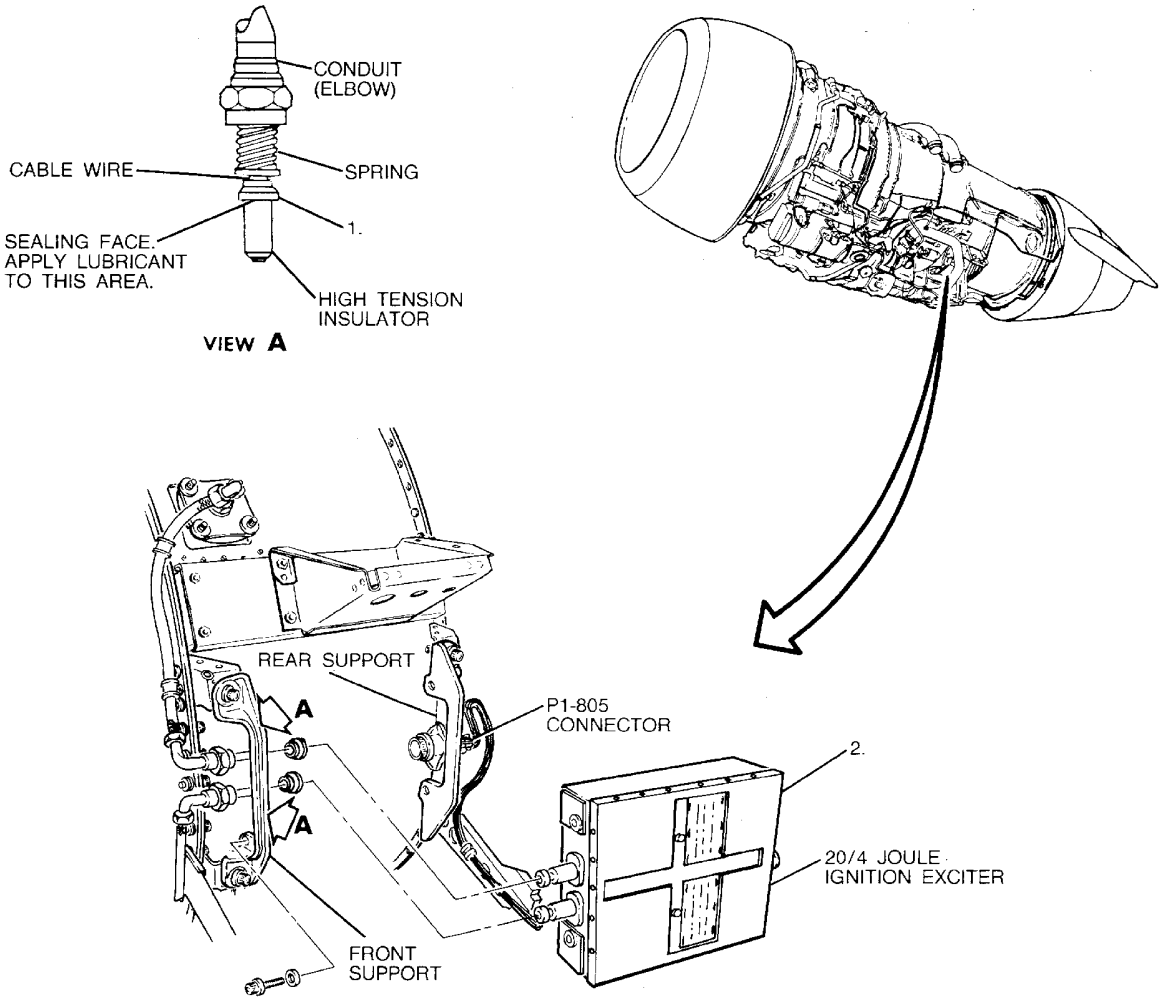


20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-821



20 Joule Ignition Leads -- Removal/Installation (Simmonds)
Figure 202/71-02-00-990-822

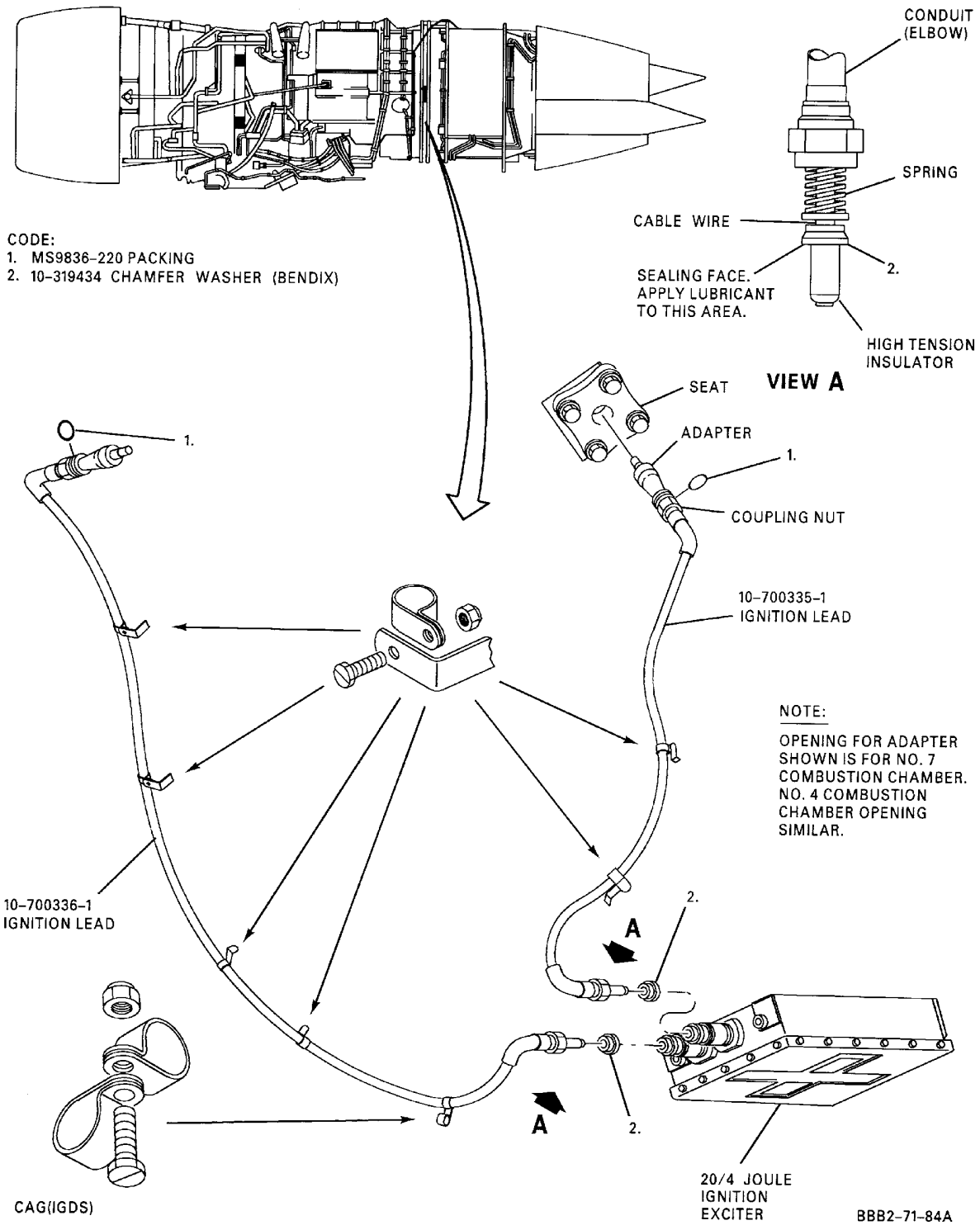
EFFECTIVITY
WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891, 893; JT8D -217A/-217C AND -219



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Exciter -- Removal/Installation
Figure 203/71-02-00-990-823



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-824

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-217A engine and one JT8D-217C engine, one JT8D-217C and one JT8D-219 engine, one JT8D-217A engine and one JT8D-219 engine, or two JT8D-217C engines, with both engines to be operated at JT8D-217A thrust level. Alternately, two JT8D-219 engines can be installed with both engines to be operated at JT8D-217A thrust level. Thrust for takeoff is set normally with ARTS ON.

B. JT8D-217A engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-217A engine is installed on an MD-83, MD-87, or MD-88 aircraft, the JT8D-217A engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, or Service Bulletin 5752 5th Stage Compressor Blade Modification, or its production equivalent.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

2. Equipment Changes

A. Fuel Flow Indicating System (Analog instruments)

(1) The fuel flow indicating system for JT8D-217A, -217C, and JT8D-219 engine installations is identical.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000

0-16000 lbs/hr. range is adequate for the JT8D-219, -217C, and -217A engines.

B. EGT Indicating System (Analog instruments)

(1) This system is identical for -217A, -217C, and -219 engines.

C. N_1 Indicating System (Analog instruments)

(1) The JT8D-217A and JT8D-217C indicators must show -217A/-217C N_1 limits, which are the same. A JT8D-219 engine may be operated with either the -217A/-217C or -219 N_1 indicating system.

Table 202

Engine Model	Compatible N_1 Indicator P/N
JT8D-217A/-217C	8DJ81WCW4
JT8D-219	8DJ81WDA4

D. N_2 Indicating System (Analog Instruments)

(1) This system is identical for -217A, -217C, and -219 engines.

E. Electronic Engine Display Panel (EEDP)

(1) The engine limits for the JT8D-217A and JT8D-217C are identical. The EEDP will display either -217A or -217C depending on the option pin configuration.

(2) For an intermix of one -217A and one -219, the applicable option pins should be strapped to show the -217A limits EEDP pins as follows:

Table 203

Connector	P1-793	P1-794
Pin	N	N
Strap to pin	P	P

(3) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections "programmed" for the JT8D-217A intermix. (COWLING, SUBJECT 71-10-00, Page 201)

NOTE: Engine type "217A" will be displayed on the FUEL FLOW digits for 2 seconds before reverting to the predetermined FUEL FLOW Test Value.

NOTE: This is the normal configuration for an aircraft delivered with -217A engines installed.

(4) For an installation of two JT8D-217C engines or an intermix of one -217C and one -219, both sides of the EEDP should have applicable option pins strapped to display the -217C engine limits EEDP pins as follows:

Table 204

Connector	P1-793	P1-794
Pin	M	M
Strap to pin	P	P

(5) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections "programmed" for the JT8D-217C intermix. (COWLING, SUBJECT 71-10-00, Page 201)

NOTE: Engine type "217C" will be displayed on the FUEL FLOW digits for 2 seconds before reverting to the predetermined FUEL FLOW Test Value.

NOTE: This is the normal configuration for an aircraft delivered with -217C engines installed.

(6) For an intermix of one JT8D-217A and one JT8D-217C, the pin configuration given in either Paragraph 2.E.(2) or Paragraph 2.E.(4) will provide the required engine limits.

(7) When two JT8D-219 engines are operated at JT8D-217A thrust levels, the option pin configuration in either Paragraph 2.E.(2), Paragraph 2.E.(4) or Paragraph 2.E.(8) gives permissible engine limits.

(8) If an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, the following option pins will return the EEDP to the -219 engine limits configuration EEDP pins as follows:

Table 205

Connector	P1-793	P1-794
Pin	L	L
Strap to pin	P	P

(9) A self test (BIT) of the EEDP shall be performed to ensure proper option pin connections "programmed" for the JT8D-219 intermix. (POWER, SUBJECT 77-10-00, Page 201)

NOTE: Engine type "219" will be displayed on the FUEL FLOW digits for 2 seconds before reverting to the predetermined FUEL FLOW Test Value.

F. Digital Flight Guidance Computer (DFGC)

(1) The JT8D-217A/-217C engines have identical EPR levels. Both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217A operation, in order that thrust rating computer (TRC) provides JT8D-217A EPR's.

(2) DFGC pin option as follows:

Table 206

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Open	Ground	Open	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-217A or with two JT8D-217C engines installed.

NOTE: Pin (67) is only available in DFGC's which have a provision for selection of JT8D-219 thrust levels (DFGC's P/N 4034241-930 and subs).

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217A EPR display as follows:

NOTE: This check ensures DFGC is configured for -217A operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.04 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

(4) If an aircraft is again to be operated with two JT8D-219 engines at -219 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -219 operation, in order that thrust rating computer (TRC) provides JT8D-219 EPR's.

(5) Use DFGC P/N 4034241-930 or subs

Table 207

Connector	J102B	--	--	--	J101A
Pin	97	98	99	100	67
Option Code	A	B	C	D	E
Ground/Open	Open	Ground	Ground	Open	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-219 engines installed.

(6) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-219 EPR display as follows:

NOTE: This check ensures DFGC is configured for -219 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (plus/minus 1 degree) and EPR LIM displays 2.08 (plus/minus 0.01).

(d) Release TEST button and observe RAT display ambient temperature and EPR LIM display fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

G. Performance Management System (PMS)

(1) If the intermix includes a JT8D-217A engine, the PMS must have applicable pins grounded for -217A operation in order for PMS to utilize correct engine performance.

(2) PMS Pin Configuration for Series 81, 82 and 83 aircraft as follows:

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

PMS Pin Configuration for Series 87 aircraft as follows:

Table 209

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Open	Open	Open	Ground	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(3) Functionally check PMS located on center pedestal, for proper JT8D-217A display as follows:

NOTE: This check ensures PMS is configured for -217A operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217A.

(4) If the intermix does not include a JT8D-217A engine, the PMS must have applicable pins grounded for -217C operation, in order for PMS to utilize correct engine performance.

NOTE: If operator so desires, the JT8D-217A PMS pin configuration may be used with two JT8D-217C engines installed. Paragraph 2.G.(3) may be used for PMS function check.

(5) PMS Pin Configuration for Series 81, 82 and 83 aircraft as follows:

Table 210

Connectors	J1B	--	--	--	--	J1A
Pins	48	49	50	51	52	31

Table 210 (Continued)

Ground/Open	Open	Ground	Ground	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(6) PMS Pin Configuration for Series 87 aircraft as follows:

Table 211

Connectors	J1B	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Open	Ground	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(7) Functionally check PMS, located on center pedestal, for proper JT8D-217C display as follows:

NOTE: This check ensures PMS is configured for -217C operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

(b) On Control Display unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217C.

(8) When an aircraft is to be operated with two JT8D-219 engines at -219 thrust level, the PMS must have applicable pins grounded for -219 operation, in order for PMS to utilize correct thrust limit ratings.

(9) PMS pin configuration for Series 81, 82 and 83 aircraft as follows:

Table 212

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Ground	Open	Ground	Ope	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(10) PMS Pin Configuration for Series 87 aircraft as follows:

Table 213

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Ground	Open	Ground	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

(11) Functionally check PMS located on center pedestal, for proper JT8D-219 display as follows:

NOTE: This check ensures PMS is configured for -219 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-219.

H. Engine Trimming Procedures

(1) When one JT8D-217A engine is installed with one JT8D-217C or with one JT8D-219, both engines must be trimmed to JT8D-217A part power EPR. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

NOTE: JT8D-217C and JT8D-219 engines will satisfactorily procedure -217A thrusts when trimmed to either JT8D-217A, -217C or -219 EPR.

(2) When two JT8D-217C, one JT8D-217C and one JT8D-219, or two JT8D-219 engines are installed, both engines may be trimmed to either JT8D-217A, -217C, or -219 part power EPR. To preclude excessive throttle stagger, both left and right engines must be trimmed to the same chart. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 8 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 7 or GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501 Config 5)

I. Placards Required for Engine Intermix (Analog Instruments)

(1) For the intermix of one JT8D-217A engine with one JT8D-217C or with one JT8D-219 engine, install the appropriate placards.

(a) Install the following placard (P/N 7914599-915) to the lower left hand bezel of the EPR gage for the JT8D-217A engine: "217A".

(b) Install the following placard (P/N 7914599-953) to the lower left hand bezel of the EPR gage for the JT8D-217C engine: "217C".

(c) Install the following placard (P/N 7914599-916) to the lower left hand bezel of the EPR gage for the JT8D-219 engine: "219".

NOTE: These placards are not required if the JT8D-217C/-219 in-flight relight envelope is used for both engines.

NOTE: If two JT8D-217C, one -217C and one -219, or two -219 engines are installed, no placards to identify the engines are required.

J. Placards Required for Engine Intermix (Electronic Engine Display Panel)

(1) For the intermix of one JT8D-217A engine with one JT8D-217C or with one JT8D-219 engine, install the appropriate placards:

(a) Install the following placard (P/N 7914599-915) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-217A engine: "217A" .

(b) Install the following placard (P/N 7914599-953) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-217C engine: "217C" .

(c) Install the following placard (P/N 7914599-916) to the EEDP bezel below the reverse unlock annunciator light and adjacent to the EPR display for the JT8D-219 engine: "219".

NOTE: These placards are not required if the JT8D-217C/-219 inflight relight envelope is used for both engines.

NOTE: If two JT8D-217C, one -217C and one -219, or two -219 engines are installed, no placards to identify the engines are required.

K. Automatic Reserve Thrust (ART) System

(1) When any combination of one JT8D-217A engine, one JT8D-217C, and one JT8D-219 engine is installed, ART system may be ON for this configuration.

(2) When two JT8D-217C engines, or two JT8D-219 engines operating at -217A thrust level are installed, ART system may be ON for this configuration.

L. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 214

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201)

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P5-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. 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.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

M. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 215

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P5-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings. (Figure 204)

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.

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

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. 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.

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

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

(o) 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.

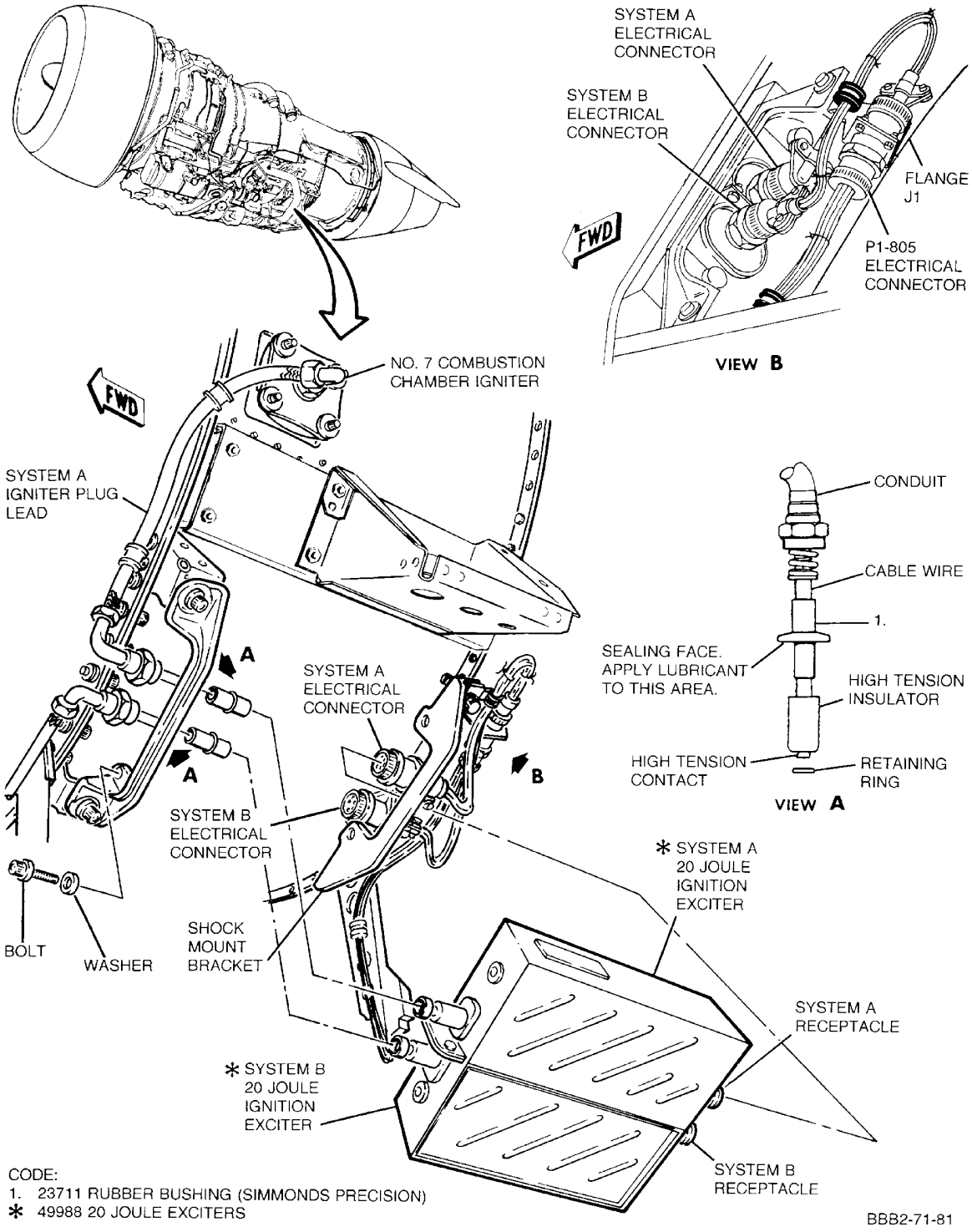
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

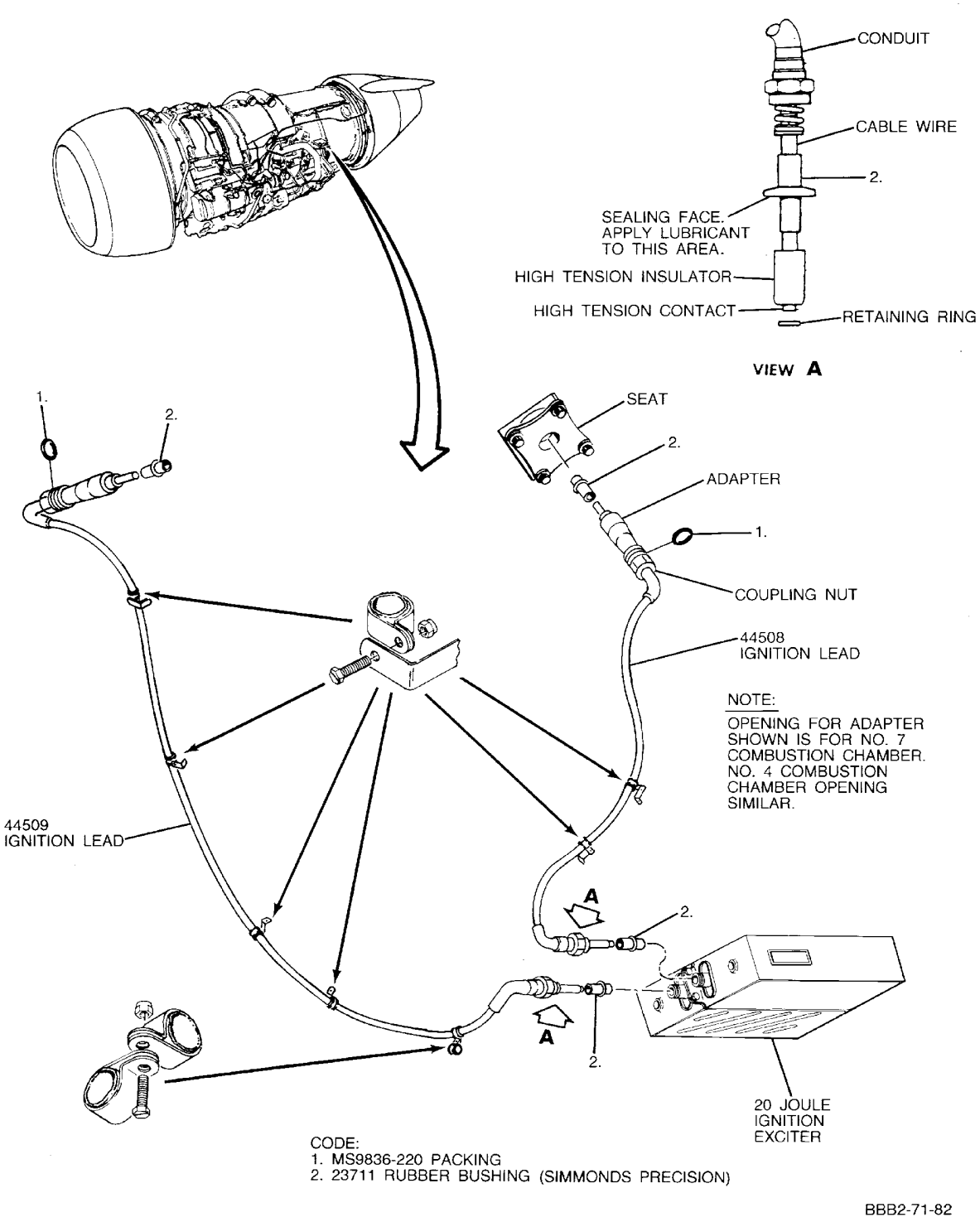
CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

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

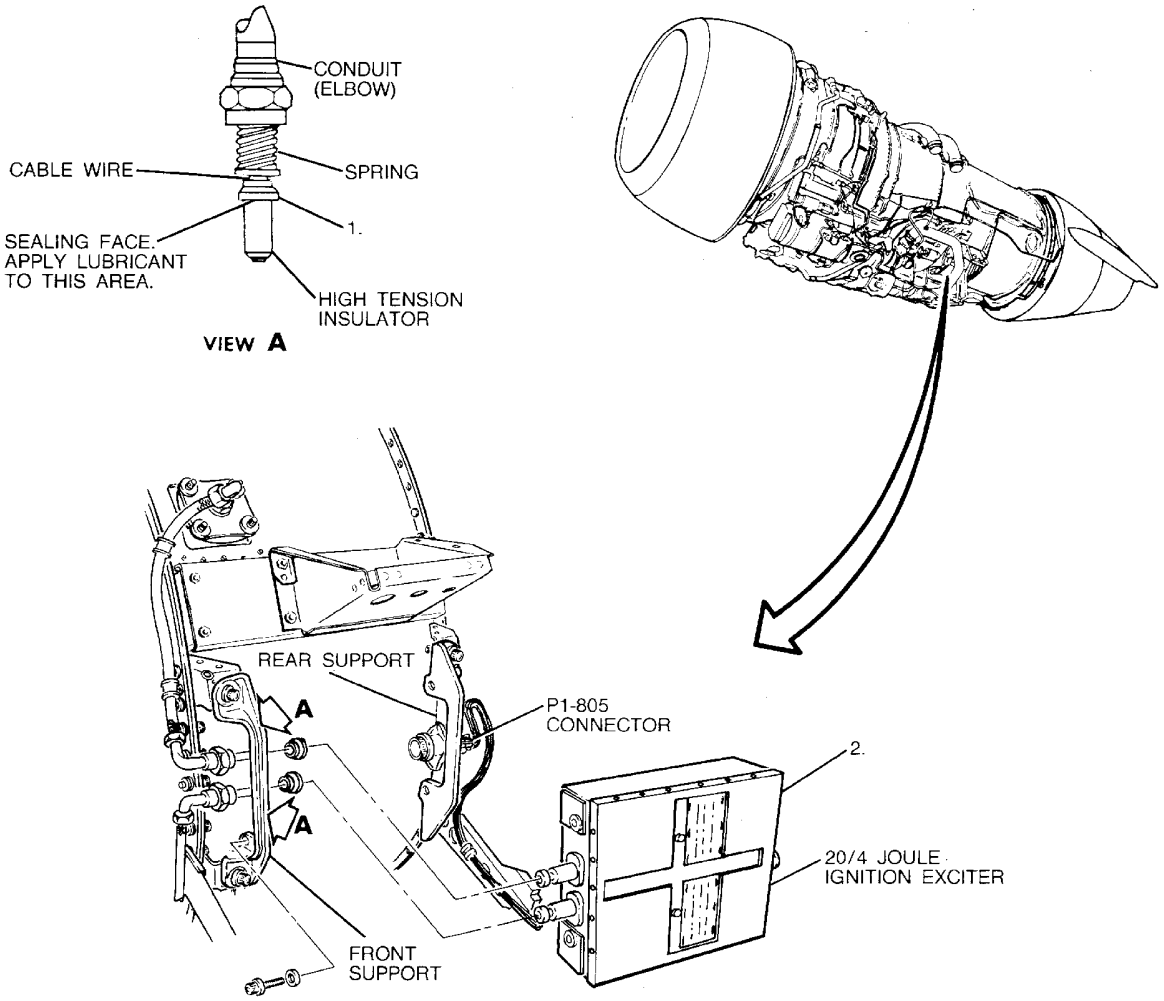
(s) Secure ignition lead attaching clips to engine flange torque bolts 36 to 40 inch-pounds (4.07 to 4.52 N·m).



20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-851



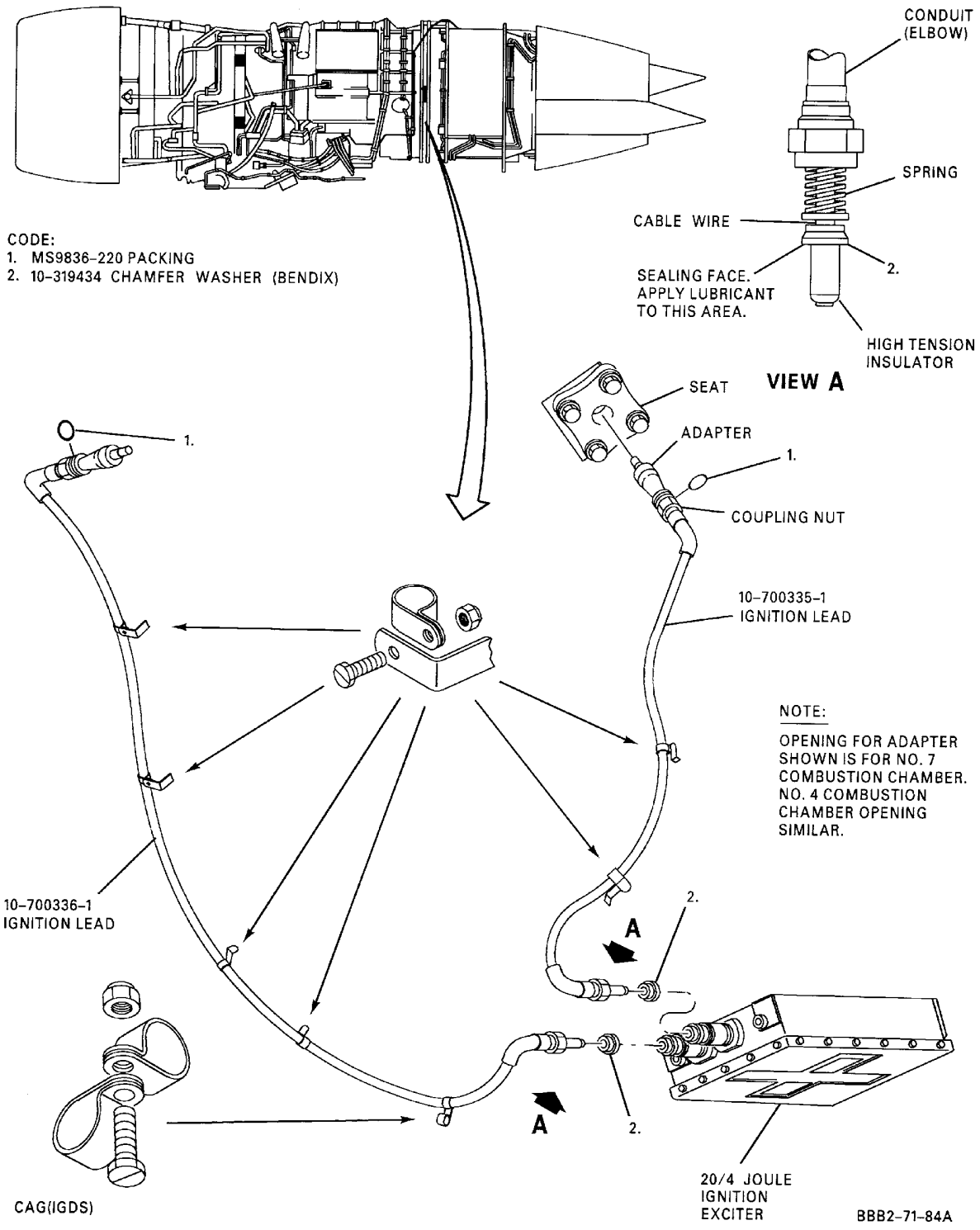
20 Joule Ignition Leads -- Removal/Installation (Simmonds)
Figure 202/71-02-00-990-852



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Exciter -- Removal/Installation
Figure 203/71-02-00-990-853



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-854

ENGINE INTERMIX - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides special intermix instructions for the installation of one JT8D-209 engine and one JT8D-217C engine with both engines to be operated at JT8D-209 thrust level. Thrust for takeoff to be set normally with ARTS on. Alternative, two JT8D-217C engines can be installed with both engines to be operated at JT8D-209 thrust level. When two JT8D-217C engines are operating at -209 thrust level, installed, the Automatic Reserve Thrust ART system must be OFF. Set JT8D-209 maximum takeoff EPR.

B. JT8D-209 and -217C engines may be intermixed, as described in these instructions and other applicable documents, on MD-81 and on MD-82 aircraft. If a JT8D-209 or -217C engine is installed on an MD-83, MD-87 or MD-88 aircraft, the JT8D-209 or -217C engine must incorporate Pratt and Whitney JT8D Service Bulletin 5618, 5th Stage Compressor Blade Modification, or its production equivalent.

C. Aircraft equipped with FMS, FMS is not certified to operate with JT8D-209 or -217/-217A engines or at JT8D-209 or -217 thrust levels. If intermix involves any of these conditions, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

NOTE: Any engine indicators and engine related systems not specifically noted in these instructions are unaffected and are to be operated in accordance with previously established procedures and within the established limits of the unaffected systems and components.

NOTE: These instructions do not provide FAA Approved Airplane Flight Manual or Flight Crew Operating Manual data. When modified as described herein, the aircraft shall be operated in accordance with applicable FAA Approved Flight Manual.

NOTE: Any other placards shall not be removed when installing or removing placards per these instructions.

2. Equipment Changes

A. Fuel Flow Indicating System

(1) Fuel flow indicating system for JT8D-209 engine or JT8D-217C engine may be used since maximum fuel flow of the JT8D-217C engine, operated at JT8D-209 thrust level, is essentially the same as maximum fuel flow of JT8D-209. Either the fuel flow transmitter or fuel flow indicator must be changed so that the indicator and transmitter are compatible.

Table 201

Transmitter P/N	Compatible Indicator P/N		Range	
	LBS Scale	KGS Scale	LBS Scale	KGS Scale
8TJ85GBA2	8DJ125LXV5	8DJ125LXW5	0-12000	0-6000
8TJ85GCG2	8DJ125LXX5	8DJ125LXY5	0-16000	0-8000

- 0-12000 lbs/hr. range is adequate for the JT8D-209 engine.
- 0-12000 lbs/hr. range is also adequate for the JT8D-217C engine at -209 thrust levels.
- 0-16000 lbs/hr. range is adequate for both the JT8D-209 and -217C engines.

NOTE: Each indicator installed must be compatible with the respective transmitter installed.

B. EGT Indicating System

(1) When one JT8D-209 engine and one JT8D-217C engine are installed, the JT8D-217C engine must have a JT8D-217C EGT indicator installed to provide adequate increment between orange and red lines for the ART system. The JT8D-209 engine, having lower EGT limits, must have a JT8D-209 EGT indicator installed.

(2) When two JT8D-217C engines are installed, JT8D-217C EGT indicators must be used to ensure EGT limits are not exceeded.

Table 202

Engine Model	Compatible EGT Indicator P/N
JT8D-209	124.514-2
JT8D-217C	124.514-6

C. N1 Indicating System

(1) When one JT8D-209 engine and one JT8D-217C engine are installed, the JT8D-217C engine must have JT8D-217C N1 indicator installed to provide adequate increment between orange and red lines for ART system. The JT8D-209 indicator must be used with the JT8D-209 engine to ensure orange line limits are not exceeded.

(2) When two JT8D-217C engines are installed, JT8D-217C N1 indicators must be used.

Table 203

Engine Model	Compatible N1 Indicator P/N
JT8D-209	8DJ81LVL4
JT8D-217C	8DJ81WCW4

D. N2 Indicating System

(1) When one JT8D-209 engine and one JT8D-217C engine are installed, the JT8D-217C engine must have JT8D-217C N2 indicator installed to provide adequate increment between orange and red lines for ART system. The JT8D-209 engine having lower N2 limits must have a JT8D-209 N2 indicator installed.

(2) When two JT8D-217C engines are installed, JT8D-217C N2 indicators must be used to ensure N2 limits are not exceeded.

Table 204

Engine Model	Compatible N2 Indicator P/N
JT8D-209	8DJ81LSC4
JT8D-217C	8DJ81WCT4

E. Digital Flight Guidance Computer (DFGC)

(1) Since both engines are always to be operated at JT8D-209 thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -209 operation, in order that thrust rating computer (TRC) provides JT8D-209 EPR's.

(2) DFGC pin option as follows:

Table 205 (Connector J102B)

Pin	97	98	99	100
Option Code	A	B	C	D
Ground/Open	Open	Ground	Ground	Ground

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-209 engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-209 EPR display as follows:

NOTE: This check ensures DFGC is configured for -209 operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (±1 degree) and EPR LIM displays 1.86 (±0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

F. Performance Management System (PMS)

(1) Since both engines are operated at JT8D-209 thrust level, the PMS must have applicable pins open for -209 operation in order for PMS to utilize correct thrust limit ratings.

Table 206

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Open	Open	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

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

(2) Functionally check PMS located on center pedestal, for proper JT8D-209 display as follows (PERFORMANCE/FLIGHT MANAGEMENT SYSTEM, SUBJECT 34-63-00, Page 201):

NOTE: This check ensures PMS is configured for -209 operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-209.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D - 209/217C

G. Digital Flight Guidance Computer (DFGC)

(1) When an aircraft is again to be operated with two JT8D-217C engines at -217C thrust level, both No. 1 and No. 2 DFGC's must have applicable option pins grounded for -217C operation, in order that thrust rating computer (TRC) provides JT8D-217C EPR's.

(2) DFGC Pin Option as follows:

Table 207 (Connector J102B)

Pin	97	98	99	100
Option Code	A	B	C	D
Ground/Open	Open	Open	Ground	Open

NOTE: This is the normal configuration for an aircraft delivered with two JT8D-217C engines installed.

(3) Functionally check Thrust Rating Indicator (TRI), located on center instrument panel, for proper JT8D-217C EPR display as follows:

NOTE: This check ensures DFGC is configured for -217C operation.

(a) Energize aircraft electrical buses.

(b) Ensure that circuit breakers required for functional check of DFGC and TRI are closed.

(c) Press TEST button on TRI and observe RAT displays PLUS 12 degrees (±1 degree) and EPR LIM displays 2.04 (±0.01).

(d) Release TEST button and observe RAT displays ambient temperature and EPR LIM displays fail flag and 2.00.

(e) NO MODE light should be on and all mode select button lights should be off.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

H. Performance Management System (PMS)

(1) When an aircraft is again to be operated with two JT8D-217C engines at -217C thrust level, the PMS must have applicable pins grounded for -217C operation, in order for PMS to utilize correct thrust limit ratings.

Table 208

Connectors	J1B-	--	--	--	--	J1A
Pins	48	49	50	51	52	31
Ground/Open	Open	Ground	Ground	Ground	Open	*[1]

*[1] When re-programming the PMS for engine configuration, if an improper number of program pins are wired to the PMCU connector, a PMS detected program pin configuration error will cause the PMS to be inoperative and "PRGM PIN CONFIG ERR" message will appear in data line 2 of the CDU. If this occurs, pin J1A(31) (ODD PARITY) will have to be changed from ground to open or open to ground.

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

(2) Functionally check PMS located on center pedestal, for proper JT8D-217C display as follows (PERFORMANCE/FLIGHT MANAGEMENT SYSTEM, SUBJECT 34-63-00, Page 201):

NOTE: This check ensures PMS is configured for -217C operation.

(a) Ensure that circuit breakers required for functional check of PMS are closed.

(b) On Control Display Unit (CDU), momentarily press STS/TEST key.

(c) Observe CDU display, verify STS/TEST page has displayed JT8D-217C.

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

I. Flight Management System (FMS)

(1) FMS is not certified to operate with JT8D-209 or -217 engines or at JT8D-209 or -217/-217A thrust levels. If intermix involves any of these conditions, the FMS must be made inoperative and INOP placards must be installed in the cockpit.

(2) To make the FMS inoperative, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
H	15	B10-421	FLT MGMT SYSTEM DATA LOADER

WJE 415, 417-419, 421, 423, 863-866, 869, 871, 872 (Continued)

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	21	B10-419	FLIGHT MANAGEMENT SYSTEM-1 AFMC

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
WJE 415, 418, 863, 864, 866			
F	9	B10-420	FLIGHT MANAGEMENT SYSTEM-2 AFMC

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

NOTE: FMS/EFIS SWITCHING (only applicable if dual FMS installed)

NOTE: MCDU for aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function. No action to be taken.

(3) For aircraft not equipped with IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, the following circuit breakers must be pulled and inop. rings (P/N S4933959-1) installed.

UPPER EPC, LEFT RADIO AC BUS

Row	Col	Number	Name
D	22	B10-424	FLIGHT MANAGEMENT SYSTEM-1 MCDU

UPPER EPC, RIGHT RADIO AC BUS

Row	Col	Number	Name
F	10	B10-425	FLIGHT MANAGEMENT SYSTEM-2 MCDU

NOTE: For aircraft with either IRS, ACARS, DFDAMU, or MCDU provided Status Test Panel function, do not pull MCDU-1 and MCDU-2 circuit breakers.

(4) FMS must be placarded to inform the flight crew and maintenance personnel that the FMS is inoperative.

NOTE: It is the operator's discretion as to how this is done. Reference Douglas DC-9 Master Minimum Equipment List, Rev. 25, dated 15 November 1989.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891; JT8D - 209/217C

J. Engine Trimming Procedures

(1) When one JT8D-209 engine and one JT8D-217C engine are installed both engines must be trimmed to JT8D-209 part power EPR. (GENERAL, SUBJECT 71-00-00, Page 501)

NOTE: JT8D-217C engines will satisfactorily produce JT8D-209 thrust when trimmed to JT8D-209 EPR.

(2) When two JT8D-217C engines are installed, the engines may be trimmed to either JT8D-209 or JT8D-217C part power EPR (GENERAL, SUBJECT 71-00-00, Page 501).To preclude excessive throttle stagger, both engines must be trimmed to the same part power EPR.

NOTE: JT8D-217C engines will satisfactorily produce JT8D-209 thrust when trimmed to either JT8D-209 or JT8D-217C EPR.

K. Placards Required for Engine Intermix

(1) Aircraft delivered with JT8D-209 engines:

(a) Install placard (P/N 7914599-953) on lower left-hand bezel of EPR gage(s) for JT8D-217C engine(s). Placard to read "217C".

(2) Aircraft delivered with JT8D-217C engines:

(a) Install placard (P/N 7914599-905) on lower left-hand bezel of EPR gage(s) for JT8D-209 engine(s). Placard to read 209.

(3) Install placard (P/N 7914599-947) on main instrument panel just to left of or below the Assumed Temperature Indicator. Placard to read ENGINE INTERMIX-TAKEOFF. DO NOT USE AUTOTHROTTLE. ADD .02 EPR to -217C. IF ABOVE 3200 FT PRESS ALT & OAT BELOW 10°C, SEE FLT MAN.

L. Automatic Reserve Thrust (ART) System

(1) When one JT8D-209 engine and one JT8D-217C engine are installed, ART system may be ON for this configuration.

(2) When two JT8D-217C engines, operating at -209 thrust level, are installed ART system must be OFF and following circuit breakers opened for this configuration.

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:

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
X	32	B1-825	LEFT ENG ART SOLENOID & CONTROL
Z	32	B1-826	RIGHT ENG ART SOLENOID & CONTROL

M. Power Plant 20 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20 joule ignition system to 20/4 joule system.

NOTE: 20 joule ignition cables can be used on the 20/4 joule system. Removal of 20 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20 joule to 20/4 joule ignition system procedures as follows:

(a) Equipment changes

Table 209

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	REMOVE
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	INSTALL

NOTE: * (20 joule) ignition cables are interchangeable with the (20/4) joule ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connectors from exciters. Install protective caps on connectors and mating receptacles on exciters. (Figure 201).

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

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

(e) 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.

(f) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(h) Remove electrical connector P1-805. Install protective caps on connector.

(i) Remove and retain support clamps, bracket and wire harness assembly.

(2) Install the 20/4 joule ignition exciter and leads as follows:

(a) Spread front and rear supports and insert exciter between supports, output (front) end first. (Figure 203)

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.

(b) Install exciter onto supports. Safety bolts with P05-289 lockwire.

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.

(c) Remove protective caps and connect (input) electrical connector PI-805 to exciter. Safety connector with P05-288 lockwire.

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

(d) Remove protective caps from ends of ignition lead.

(e) Slide rubber bushing off high-tension insulator at both ends of lead. Discard rubber bushings. (Figure 204)

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.

(f) Check lead. (IGNITION LEAD, SUBJECT 74-20-01, Page 201)

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(g) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(h) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(i) Slide new rubber bushing on high-tension insulator.

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

(j) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(m) 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.

(n) 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.

(o) Remove protective caps from exciter connector.

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

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

N. Power Plant 20/4 Joule Ignition System Conversion During Engine Intermix

NOTE: This procedure is to provide information necessary (if applicable) to convert 20/4 joule ignition system to 20 joule system.

NOTE: 20/4 joule ignition cables can be used on the 20 joule system. Removal of 20/4 joule cables may not be necessary. Cables are interchangeable.

NOTE: The following procedure is for an engine not installed on aircraft.

(1) Conversion of 20/4 joule to 20 joule ignition system procedures as follows:

(a) Equipment changes

Table 210

EQUIPMENT CHANGES		
PART NUMBER	**DESCRIPTION**	**ACTION**
10-700335-1 (20/4)	CABLE	*
10-700336-1 (20/4)	CABLE	*
10-353875-4 (20/4)	EXCITER	REMOVE
3938368-1 (20 joule)	HARNESS ASSY	INSTALL
44508 (20 joule)	CABLE	*
44509 (20 joule)	CABLE	*
49988 (20 joule)	EXCITERS	INSTALL

NOTE: * (20/4) joule ignition cables are interchangeable with the (20 joule) ignition cables per Pratt and Whitney Service Bulletin 5592.

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

(b) Disconnect (input) electrical connector from exciter. Install protective caps on connector and mating receptacle on exciter. (Figure 203)

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

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

(e) Disconnect leads from igniter plugs. Install protective caps on leads ends and cover opening in fan discharge duct. (Figure 202)

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

NOTE: Mark location of lead attaching clips to facilitate installation.

(2) Install the 20 joule ignition exciters, leads, and wire harness assembly and bracket as follows:

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.

(a) Install wire harness assembly to engine flange. Remove protective cap from electrical connector PI-805 and connect to wire harness. (Figure 201)

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

(b) Spread front and rear supports and insert exciters between supports, output (front) end first. (Figure 201)

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.

(c) Install exciters onto supports. Safety bolts with P05-289 lockwire.

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

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

(e) Remove protective caps from ends of ignition lead.

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

(g) Slide high-tension insulator and rubber bushing off cable wire at both ends of lead. Retain high-tension insulator for installation. Discard rubber bushings.(Figure 204)

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.

(h) Check lead. (IGNITION LEAD, SUBJECT 74-20-01, Page 201)

WARNING: 1,1,1, TRICHLOROETHANE IS VAPOR TOXIC. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR. AVOID CONTACT WITH SKIN AND EYES. CLEAN PARTS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

(i) Clean new rubber bushing with clean, lint-free cloth moistened with solvent, 1,1,1, trichloroethane.

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 DRYTOX 240 AC GREASE.

(j) Apply light coat of grease, (Krytox 240 AC), to sealing face (shoulder facing high-tension insulator) of rubber bushing.

(k) Slide new rubber bushing and high-tension insulator on cable wire, and secure in place by installing new retainer ring on high-tension contact. (Figure 202)

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

(l) Install new O-ring in O.D. groove of igniter plug coupling nut.

WARNING: CLEANING SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTATCT WITH EYES. CLEAN SEAT TRACKS IN WELL-VENTILATED AREA AND USE APPROVED SAFETY EQUIPMENT.

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

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

(o) 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.

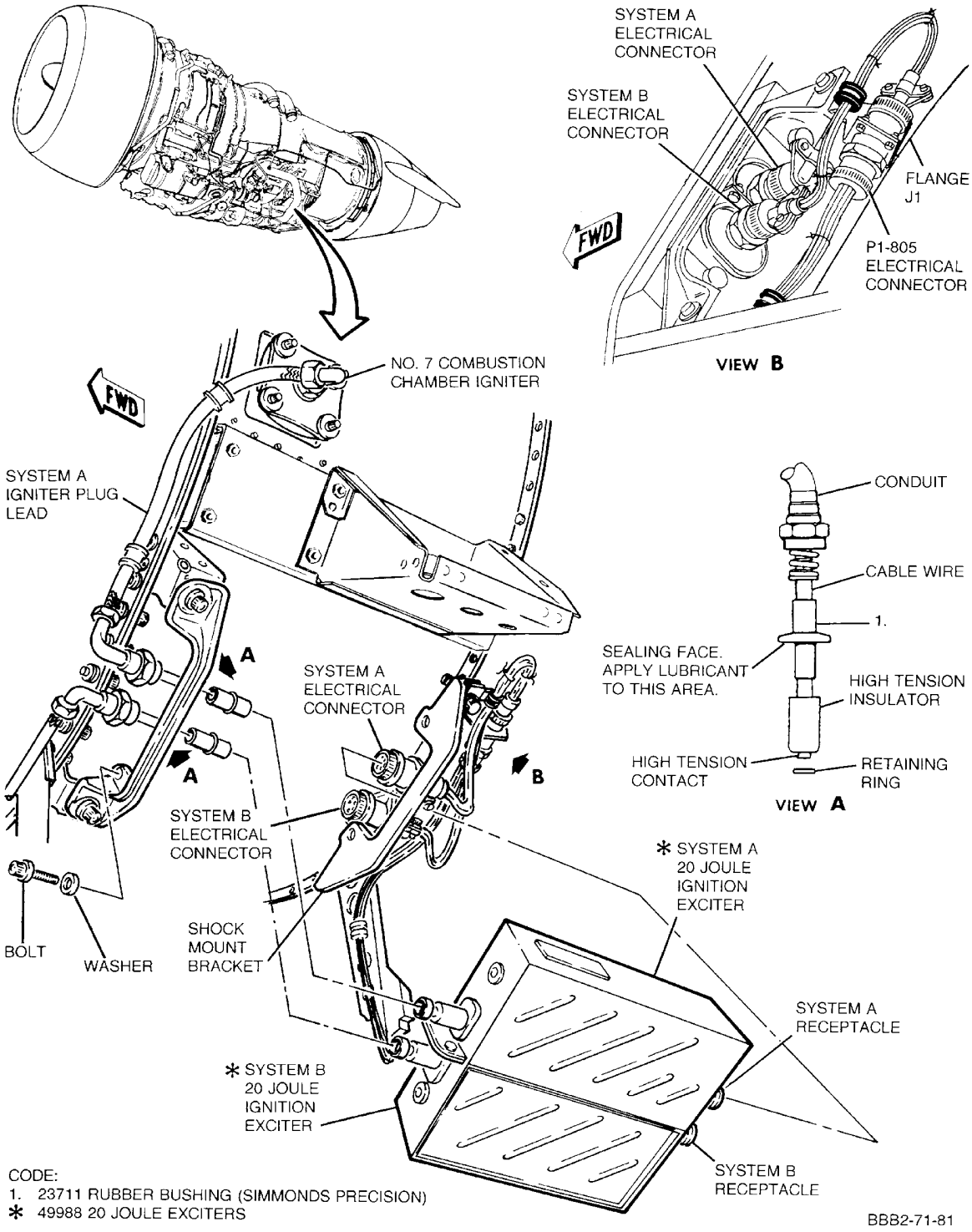
(p) Carefully insert plug end of lead into terminal well of igniter plug, and torque coupling nut 140 to 160 inch-pounds (15.82 to 18.08 N·m).

(q) Remove protective caps from exciter connector.

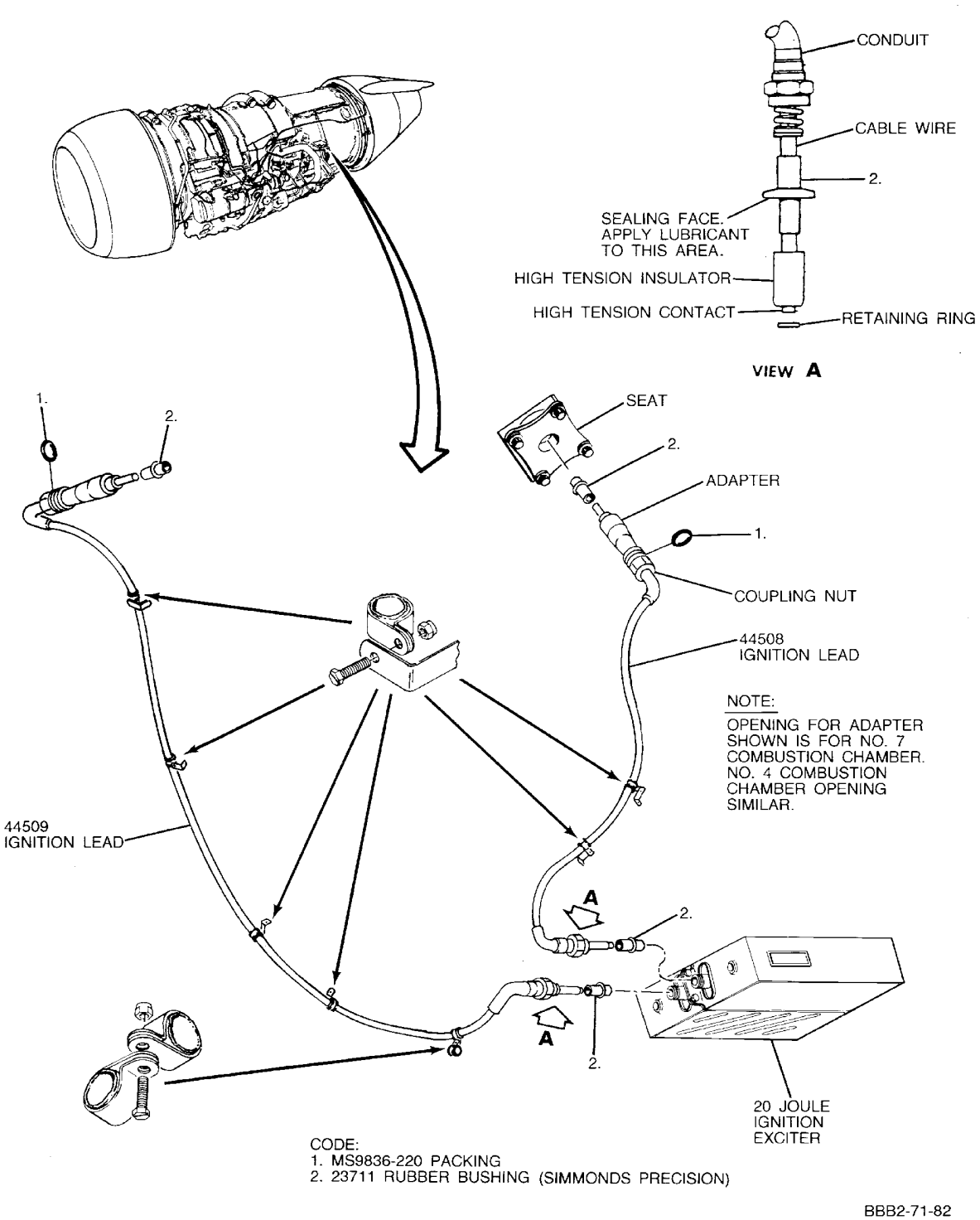
CAUTION: ENSURE THAT OUTPUT (HIGH TENSION) LEADS ARE CORRECTLY INSTALLED. INSUFFICIENT TORQUE ON LEAD NUTS AT EXCITER AND IGNITER ENDS CAN CAUSE IGNITION RADIATED NOISE WHICH CAN BE PICKED UP BY AIRCRAFT RADIO EQUIPMENT.

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

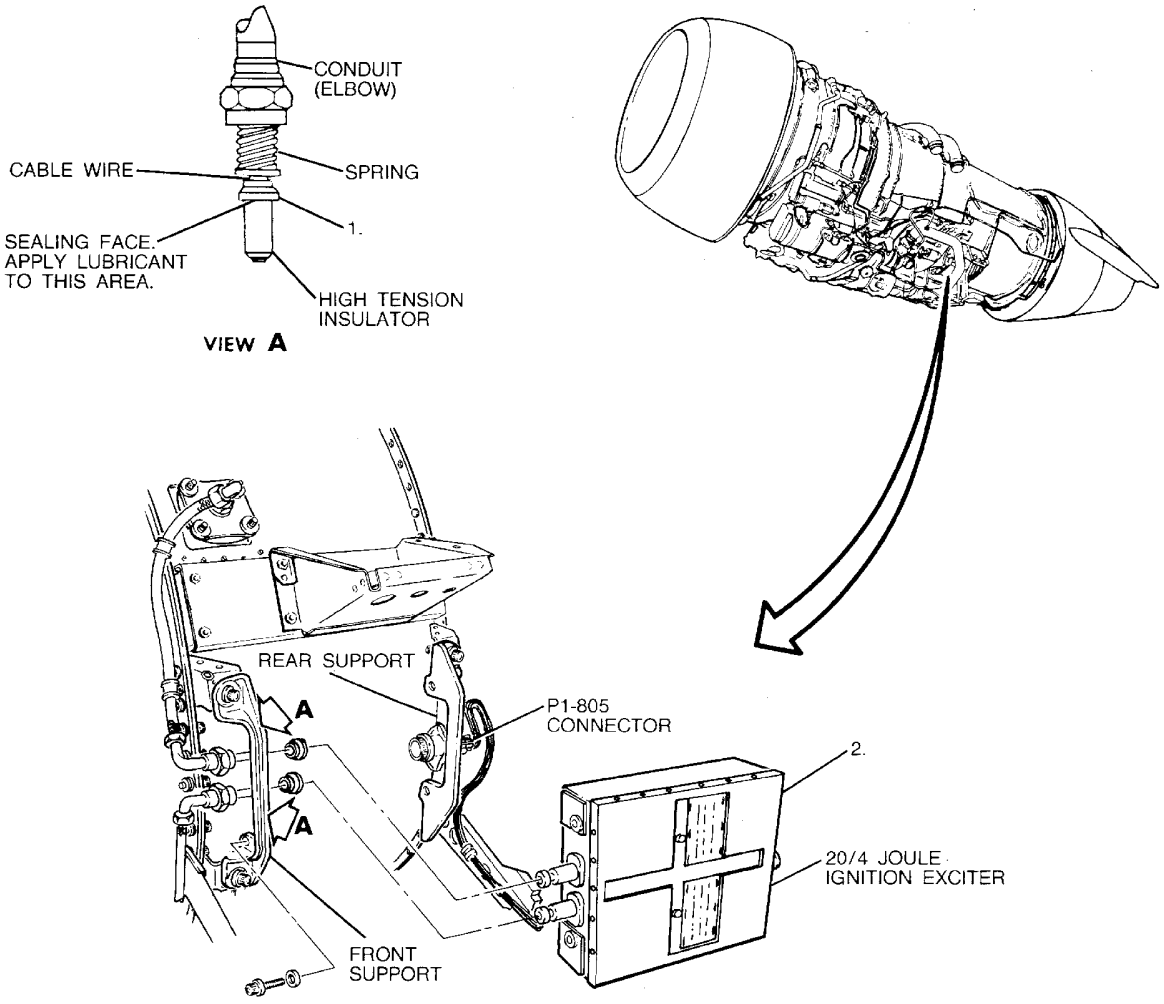
(s) Secure ignition lead attaching clips to engine flange torque bolts 36 to 40 inch-pounds (4.07 to 4.52 N·m).



20 Joule Ignition Exciter -- Removal/Installation
Figure 201/71-02-00-990-805



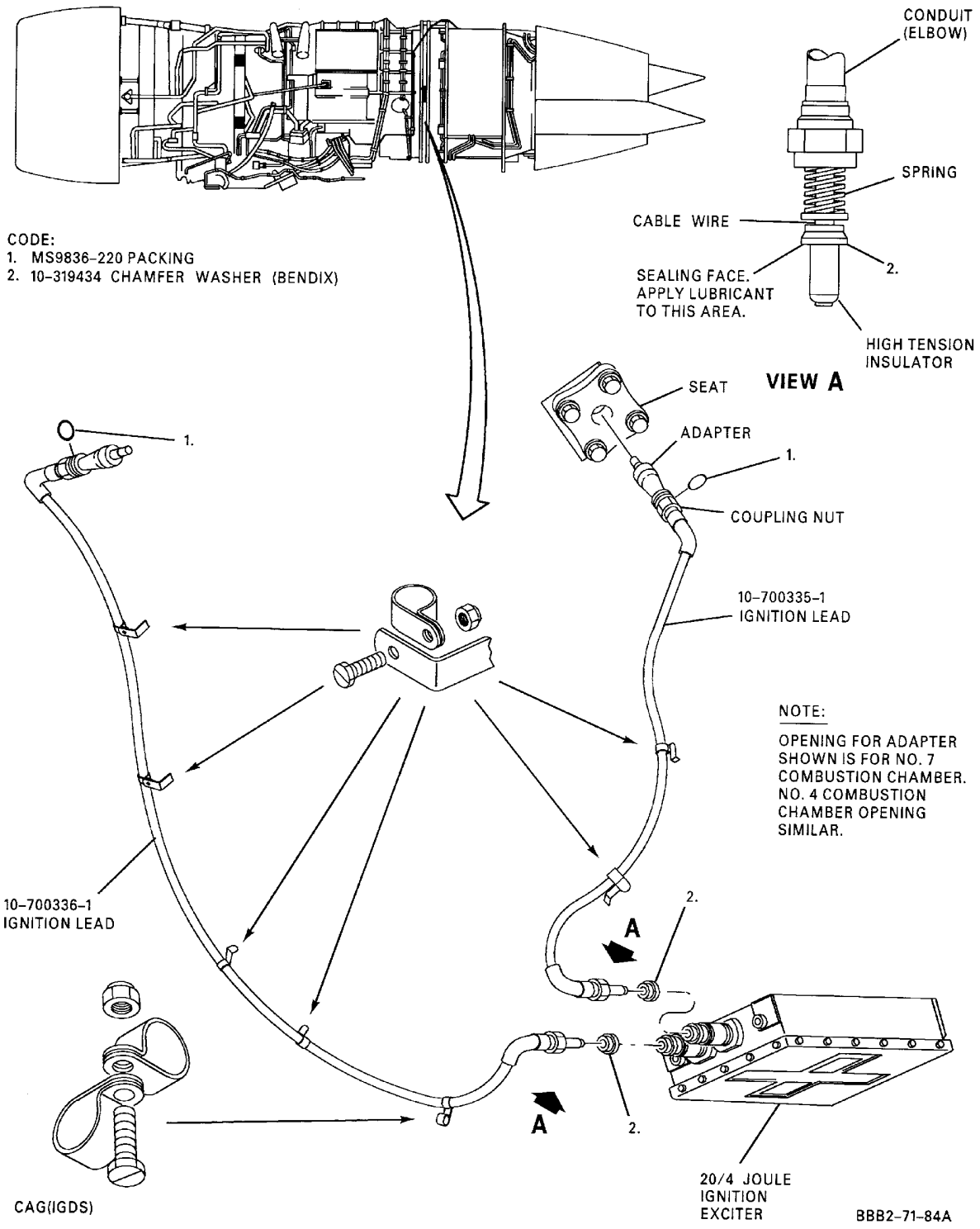
20 Joule Ignition Leads -- Removal/Installation (Simmonds)
Figure 202/71-02-00-990-806



CODE:
1. 10-319434 RUBBER BUSHING (BENDIX)
2. 10-353875-4 2014 EXCITER

BBB2-71-83

20/4 Joule Ignition Exciter -- Removal/Installation
Figure 203/71-02-00-990-807



20/4 Joule Ignition Leads -- Removal/Installation (Bendix)
Figure 204/71-02-00-990-808

COWLING - DESCRIPTION AND OPERATION

1. General

A. The cowling sections attach together around the outer diameter of the engine to form a completely enclosed nacelle. This provides protection for the exterior of the engine and accessories and smooth, unrestricted airflow around the engine during flight.

B. The cowling consists of six major sections: nose cowl, inlet bullet, upper cowl door, forward lower cowl door, aft lower cowl door, and pylon apron. (Figure 1).

C. The thrust reverser completes the aft portion of the cowling. For a detailed description of the thrust reverser, refer to Chapter 78.

2. Nose Cowl

A. Description

(1) The nose cowl is the foremost section of the engine cowling and provides maximum, uninterrupted airflow into the engine compressor for all engine operating conditions.

(2) The nose cowl is attached to the engine inlet case and is slanted slightly upward and inboard from the fuselage horizontal centerline.

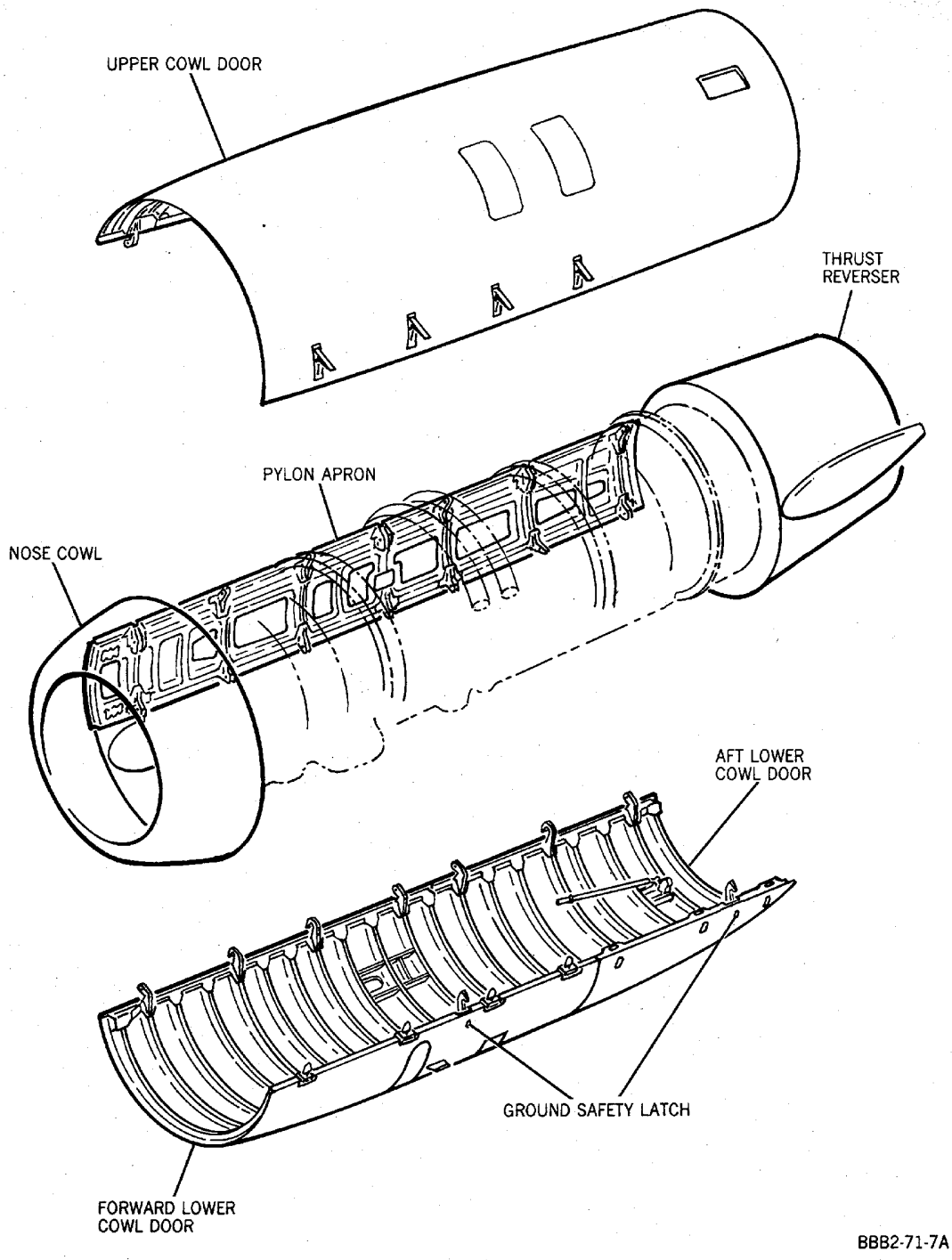
(3) The leading edge of the nose cowl is supplied anti-icing air from the engine high-pressure, 13th-stage bleed air manifold. An exit duct located in the lower portion of the nose cowl, vents excess anti-ice air overboard to prevent overpressurizing of the cowl.

WJE 407, 408, 411, 417, 419, 421, 423, 869, 871, 872

(4) Nose cowl overtemperature indicator, detects nose cowl overheating, a pop-out temperature indicator is installed inside the anti-ice air exit vent located at bottom of nose cowl. In the event of an overheat condition, as evidenced by excessive air temperature at exit, an indicator button shall pop out. This red colored button will be visible from the ground during walk-around inspection. The indicator button will pop out a minimum of 0.250 inch (6.35 mm) from nose cowl outer skin when the indicator sensing area is exposed to an exit air temperature of 435(±10)°F. (223.8(± -12.2)°C). Button can be manually reset, when the sensing area temperature is below 365(±10)°F (185(± -12.2)°C). Fingertip force required to reset button shall be 5 to 15 pounds (2.3 to 6.8 kg).

(5) Protrusion of this button indicates that the anti-ice system may have malfunctioned, and that maintenance action is required. Failure to take maintenance action subsequent to an overheat indication, could result in permanent damage to the nose cowl structure.

WJE ALL



Cowling -- General Location
Figure 1/71-10-00-990-801

3. Inlet Bullet

A. Description

(1) The inlet bullet, installed on the engine inlet accessory drive case, provides accessory protection, and smooth air-flow into the engine compressor.

(2) The inlet bullet is supplied anti-icing air from the engine low-pressure 8th-stage bleed air manifold, through the inlet accessory drive case housing. Excess anti-ice air is vented overboard through openings in the bullet to assure continuous flow.

4. Upper Cowl Door

A. Description

(1) The upper cowl door covers the upper portion of the engine, providing an unobstructed surface from the nose cowl to the thrust reverser.

(2) The tension latches, installed in the upper cowl door, incorporate a friction device to automatically retain each latch in the open position when desired. A ground safety latch prevents the lower cowl door from dropping open after the tension latches are released.

(3) Integral holdopen rods, stowed in the door, can be folded out and attached to engine-mounted brackets to support the door in an open position.

(4) An outlet duct in the door, permits compartment cooling air exit and ventilation to prevent accumulation of combustible air mixtures when the cowling is closed.

5. Forward and Aft Lower Cowl Doors

A. Description

(1) The lower cowl doors cover the lower portion of the engine, extending from the nose cowl to the thrust reverser.

(2) Integral holdopen rods, stowed in the doors, can be folded out and attached to engine-mounted brackets to support the doors in an open position. Snubber reels restrain door travel.

(3) The forward lower cowl door is equipped with eyebolts which form part of the tension latch system. The eyebolts can be adjusted to provide correct latch tension and proper door closure.

(4) An intake duct in the lower surface of the forward lower cowl door, admits ram air during flight for compartment ventilation.

(5) Drain masts, which protrude through the lower surface of the forward lower cowl door, provide overboard venting for the engine breather and drain systems. (Figure 2).

(a) The drain and vent system consists of plumbing and vents for collecting and carrying fluid leakage and vapors overboard from the engine, engine accessory drive pads and nacelle compartments.

(b) The nacelle vent and drain system has four separate overboard drain provisions and one vent provision. The drains consist of the Combustion Chamber Drain, the CSD Pad Seal Drain, the No. 4 Bearing Drain and the Accessory Drive Pads Drain. The Accessory Drive Drain consists of the oil tank scupper, starter pad, fuel pump pad and hydraulic pump pad drains.

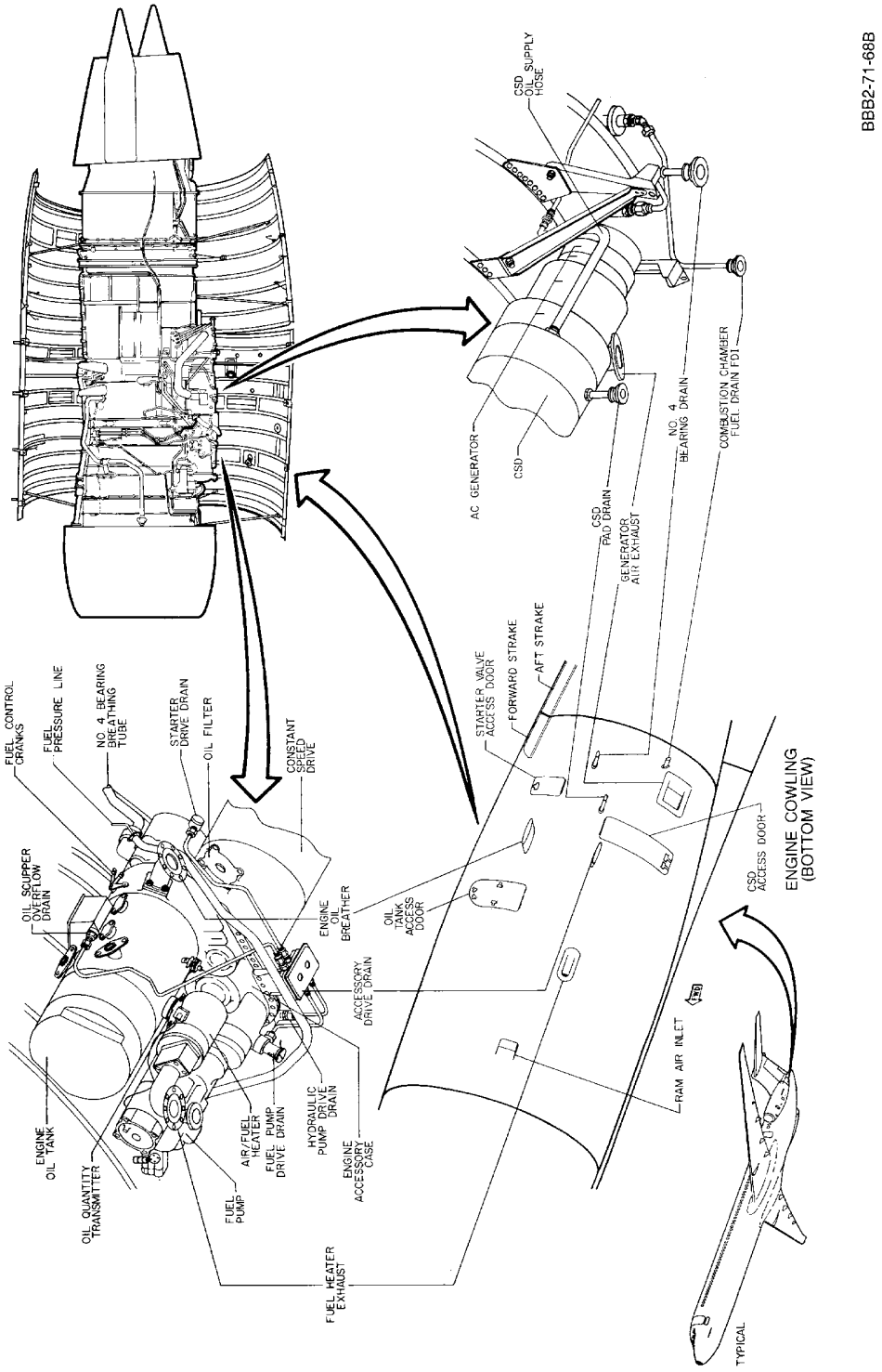
(c) The combustor chamber, CSD pad and No. 4 bearing drains are individually routed to funnel collectors attached to the cowl door. The drainage is routed overboard through the drain mast extending from the base of each funnel collector. This arrangement prevents re-entry or impingement on the nacelle.

(d) The accessory drive drains are routed to a collector mounted to the engine and are deposited overboard through a drain mast attached to the cowl door. The collector and drain mast are compartmented to isolate certain fluids. Hydraulic pump pad leakage is routed separately to an individual compartment within the collector. The fuel pump pad, oil tank scupper, and starter pad drains are routed to another collector compartment prior to being deposited overboard through the drain mast.

(e) An overboard vent is located in the lower forward cowl door to exhaust gearcase oil breather fumes. A flanged duct with a compressive seal is routed from the gearcase breather port to a mating flanged duct attached to the cowl door.

(f) Drain provisions are included in the nacelle doors to prevent fluid collection within the structure.

(6) Access doors in the forward lower cowl are provided in the door to facilitate servicing.



Engine -- Drain Masts Location
Figure 2/71-10-00-990-802

6. Pylon Apron

A. Description

(1) The pylon apron is the inboard portion of the cowling and forms a smooth fairing from the engine to the pylon structure. The apron attaches to the nose cowl and engine.

(2) Pin latches mounted on the apron upper and lower flanges engage the cowl door latch eyes, providing hinge points for the upper and forward and aft lower cowl doors.

COWLING - MAINTENANCE PRACTICES

1. General

A. This maintenance practices provides inspection/check and approved repair instructions for upper cowl door, lower cowl doors, pylon apron, nose cowl outer barrel and right-hand engine upper cowl door heat shield.

NOTE: Forward lower cowl door overlaps the aft lower cowl door and must be opened first.

2. Equipment and Materials

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

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.

Name and Number	Manufacturer
High Temperature Sealant, (RTV-106) C01-007	GE Company Silicone Products Div 260 Hudson River RD Waterford, NY 12188 USA FSCM-01139

3. Inspection/Check Cowling

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

A. Check Cowling

NOTE: Unless otherwise noted composite cowl panels shall be considered acceptable for flight provided that damage does not exceed following limits. Cowling that has damage exceeding limits should be repaired in accordance with DC-9 Structural Repair Manual, Chapter 54-06.

(1) Skin cracks which do not penetrate skin or holes which are not more than 2.5 inches in diameter.

(2) Skin cracks which penetrate skin but are maximum of 2.5 inches long and minimum separation between cracks 5.0 inches.

(3) Irregular holes through skin which are maximum of 2.5 inches in any direction and are maximum of 6.0 square inches in area and minimum separation between damage 5.0 inches. (For temporary repairs Ref. paragraph 3.)

(4) Loose or missing rivets, maximum of 2 in any pattern of 5 rivets. When available replace loose or missing rivets.

(5) Loss of non structural elements any amount as defined below:

(a) Bulb seals (except firewall seal).

(b) Rub or wear strips.

(c) Hold open rods and bracketry.

(d) Snubbing reelings and bracketry.

(6) Paint discoloration or blistering.

(a) If blistering and paint discoloration exist, remove a small area of paint to expose surface of laminate. If blistering of laminate is evident, tap test in accordance with DC-9 Structural Repair Manual 54-05 and 54-06, to determine extent of damage.

(b) If discoloration of paint is evident, without blistering, tap test in accordance with DC-9 Structural Repair Manual 54-05 and 54-06, to determine if delamination of laminate has occurred.

(c) Delamination of skin laminate not to exceed 6.0 square inches in area and minimum separation between damage 5.0 inches. Refer to Structural Repair Manual for repair of discolored paint and delaminated skin.

4. Inspection/Check for the Upper Cowl Door Heat Shield

A. Check Upper Cowl Door Heat Shield

(1) Using visual and tactile methods, check that the heat shield is securely fastened to the upper cowl door as follows: (SRM 54-04), (SRM 54-05), (SRM 54-06)

(a) Check that the heat shield is not loose.

(b) Check that the fasteners for the heat shield are not loose or missing.

(c) Check that the sealant is intact around the perimeter of the heat shield.

(d) Check that the sealant is not installed in the heat shield vent path near the inboard aft corner.

(e) Check that the sealant is intact at the frame inboard edge-to-heat shield surface.

(f) Check that the four cups in the heat shield surface are filled with sealant.

(2) Check the heat shield for surface damage as follows:

NOTE: Any degree of heat discoloration on the heat shield surface is acceptable, no corrective action is required.

(a) Check for dents on the heat shield as follows:

1) Dents with a depth of 0 in. (0 mm) to 0.080 in. (2.032 mm) are acceptable, provided the dent edges are rounded.

a) Sharp-edged dents are to be treated like cracks.

2) Dents with a depth of 0.081 in. (2.057 mm) to 0.125 in. (3.175 mm) can continue to be used. Provided the dent edges are rounded, but a degradation of the heat resistant properties has occurred.

3) Dents with a depth greater than 0.125 in. (3.175 mm) are to be repaired before flight. (SRM 54-04), (SRM 54-05), (SRM 54-06)

(b) Check for cracks on the heat shield as follows:

1) Cracks that are within 2 in. (50.80 mm) of the heat shield perimeter are to be repaired before flight. (SRM 54-04), (SRM 54-05), (SRM 54-06)

2) Cracks that are longer than 4 in. (101.60 mm) are to be repaired before flight. (SRM 54-04), (SRM 54-05), (SRM 54-06)

5. Approved Repair Cowling

A. Temporary Repair of Holes Through Skin

NOTE: The following repair is temporary, refer to DC-9 Structural Repair Manual, Chapter 54-05 and 54-06 for detailed repairs.

(1) Cut a piece of aluminum 2024 or 2219 (any temper) clad sheet a minimum of .040 inch thick that will extend approximately 2 inches beyond damage.

(2) Form aluminum doubler to contour cowling.

(3) Drill 5/32 inch rivet holes in aluminum sheet. Number of holes will depend on size of doubler, but should be uniformly laid out at approximately 1 inch spacing and 1/2 inch edge distance.

(4) Position aluminum doubler over damaged surface and drill skin through rivet holes.

(5) Secure doubler with 5/32 inch rivets.

6. Approved Repairs for the Upper Cowl Door Heat Shield

A. Repair of upper cowl door heat shield

(1) Repair the loose heat shield as follows:

(a) Replace loose fasteners with the appropriate fasteners. (SRM 54-04), (SRM 54-05), (SRM 54-06)

NOTE: Oversized fasteners may be used when replacing loose or missing fasteners.

(b) Install missing fasteners with the appropriate fasteners. (SRM 54-04), (SRM 54-05), (SRM 54-06)

NOTE: Oversized fasteners may be used when replacing loose or missing fasteners.

(2) Repair the loose or missing sealant as follows:

(a) Prepare the surface as required for the loose or missing sealant. (SRM 54-04), (SRM 54-05), (SRM 54-06)

WARNING: SILICONE RUBBER ADHESIVE (RTV-106) IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILICONE RUBBER ADHESIVE (RTV-106) 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 SILICONE RUBBER ADHESIVE (RTV-106) IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

(b) Apply the sealant.

1) Do not apply edge sealant at the heat shield vent path near the inboard aft corner.

(3) Repair the dent on the heat shield as follows:

(a) Pull dent out with the suction or mechanical method. (SRM 54-04), (SRM 54-05), (SRM 54-06)

(b) Prepare the surface for the high temperature sealant as required.Apply high temperature sealant over any holes created during dent repair.

WARNING: SILICONE RUBBER ADHESIVE (RTV-106) IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILICONE RUBBER ADHESIVE (RTV-106) 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 SILICONE RUBBER ADHESIVE (RTV-106) IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

1) Apply high temperature sealant over any holes created during dent repair.

(4) Repair the crack on the heat shield as follows:

(a) If crack or sharp edged dent is within 2 in. (50.80 mm) of heat shield perimeter or longer than 4 in. (102 mm) refer to SRM 54-04 for repair procedures.

(b) If crack or sharp edged dent is not within 2 in. (50.80 mm) of heat shield perimeter or shorter than 4 in. (102 mm), stop drill cracks with 0.125 in. (3.175 mm) diameter hole. (SRM 54-04)

WARNING: SILICONE RUBBER ADHESIVE (RTV-106) IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILICONE RUBBER ADHESIVE (RTV-106) 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 SILICONE RUBBER ADHESIVE (RTV-106) IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS.

1) Apply high temperature sealant to cover the crack or sharp edged dent.

a) Make sure to apply the high temperature sealant to a thickness of 1/16 in. (1.59 mm) to ⅛ in. (3.18 mm).

b) Make sure the high temperature sealant is spread at least 0.25 in. (6.35 mm) in all directions from the crack or dent.

NOSE COWL - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation and inspection/check instructions for the nose cowl.

B. The nose cowl is attached to the engine inlet case forward flange. Access to the nose cowl attaching bolts and anti-icing connections is through the upper and forward lower cowl doors.

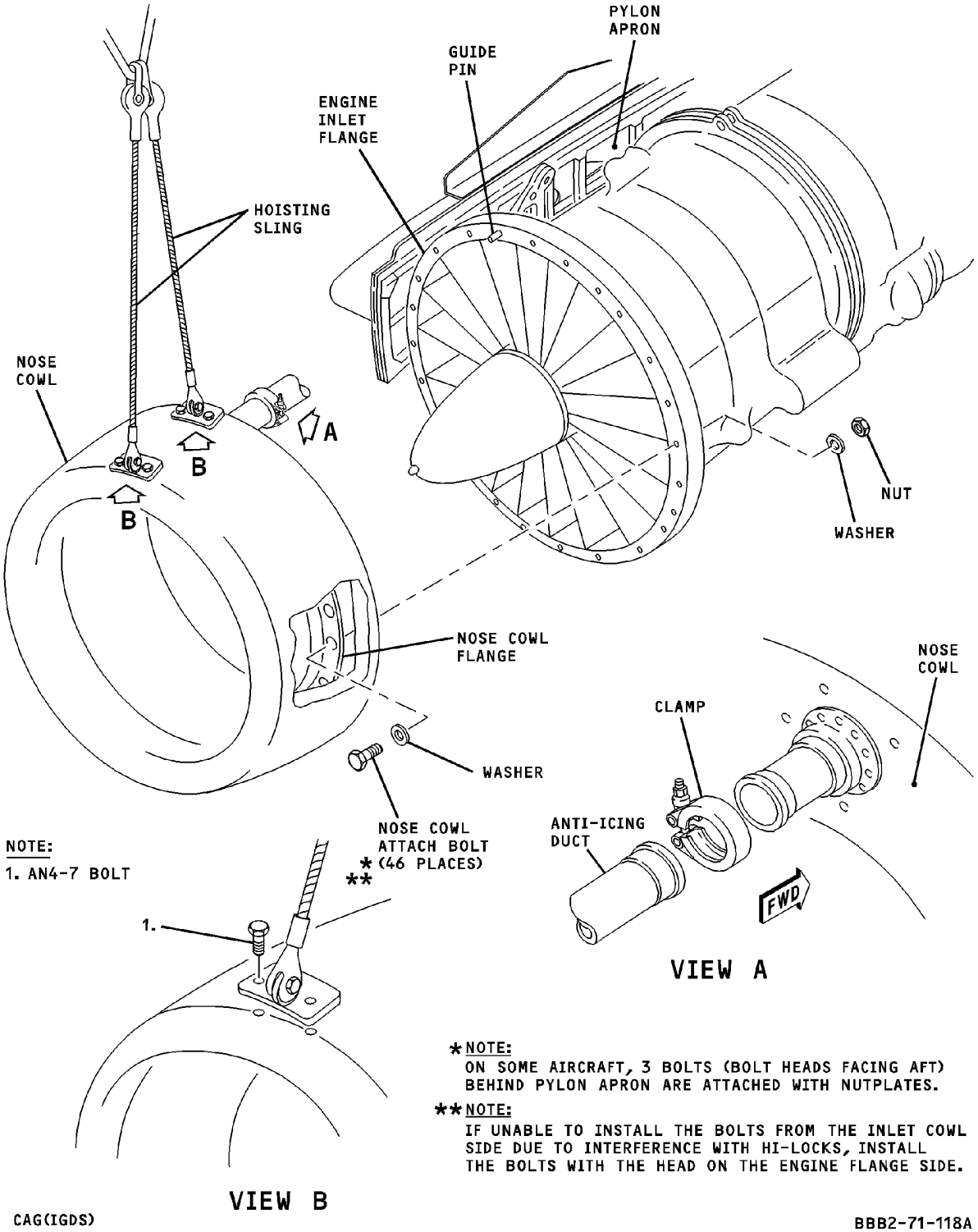
WARNING: TO PREVENT INJURY TO PERSONNEL, EXERCISE CARE TO AVOID STRAKES WHEN WORKING IN ENGINE AREA WITH COWL DOORS OPEN.

CAUTION: BEFORE WORKING IN NOSE COWL A 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.

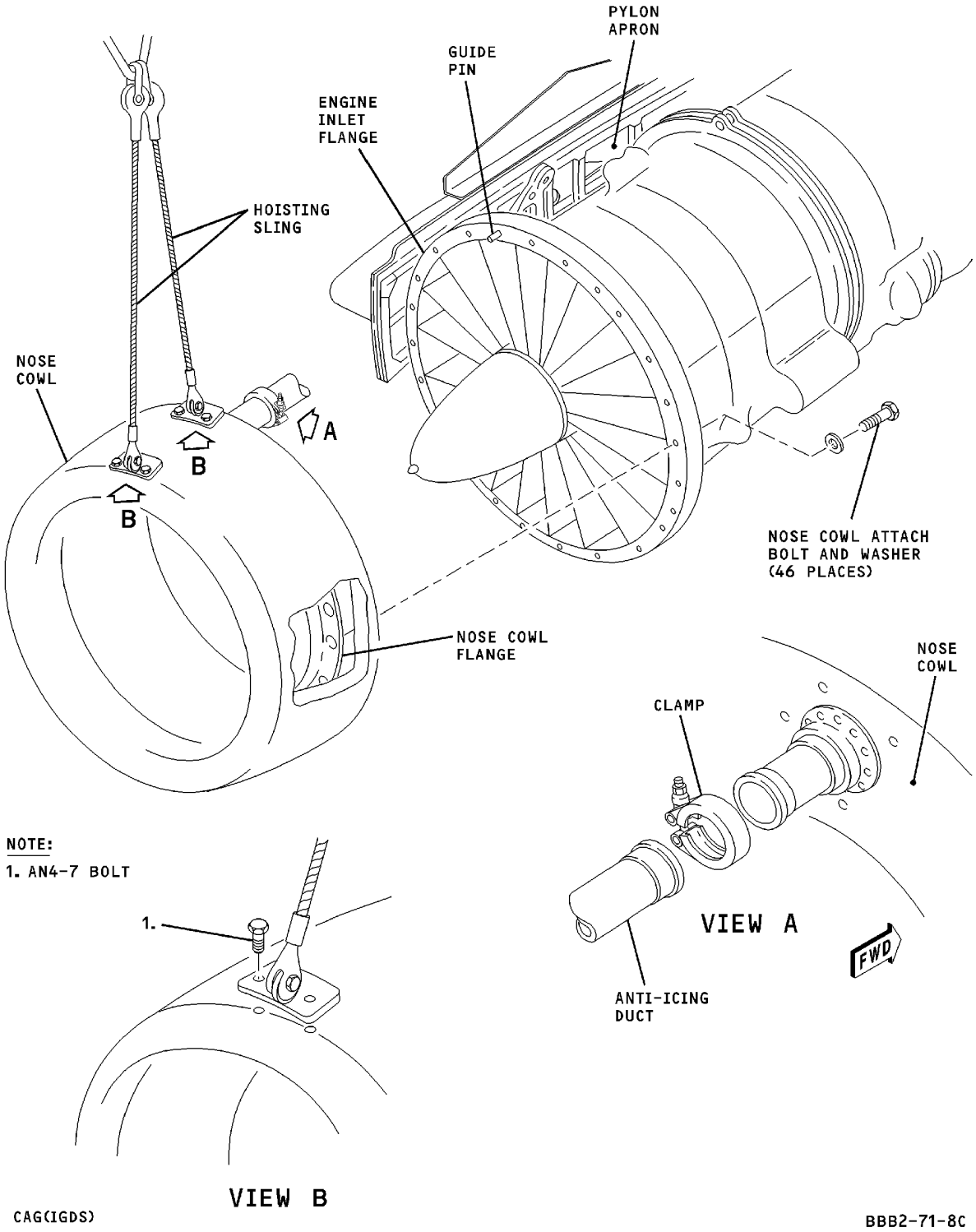
C. Removal/installation procedures for left and right nose cowls are identical.

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 886, 887, 891

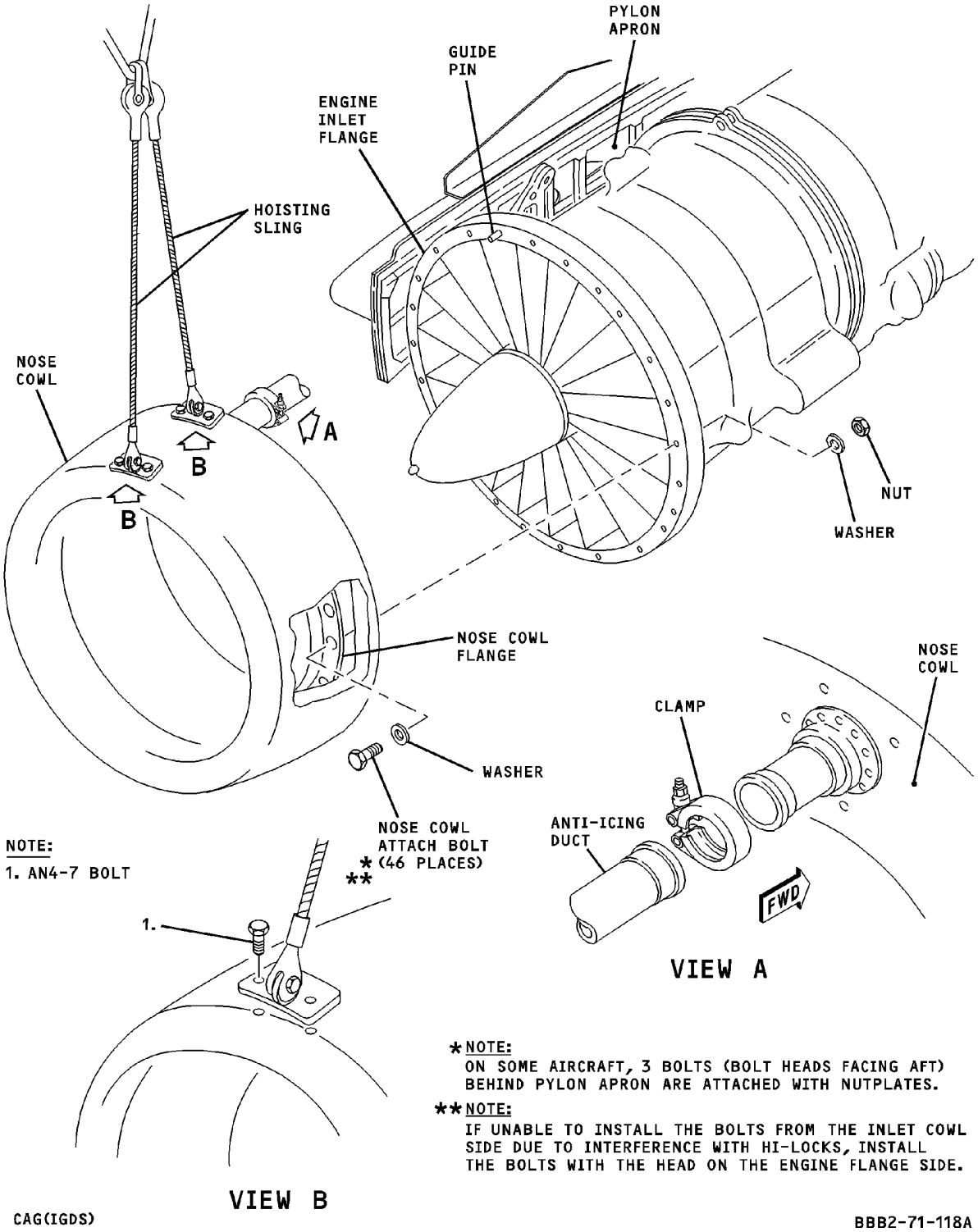
D. This maintenance practice provides removal/installation for nose cowl over temperature indicator for aircraft with the indicator system installed.



Nose Cowl -- Installation
Figure 201/71-10-01-990-818



Nose Cowl -- Installation (Aircraft without SB A71-61 incorporated)
Figure 202/71-10-01-990-801



Nose Cowl -- Installation (Aircraft with SB A71-61 incorporated)
Figure 203/71-10-01-990-802

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 886, 887, 891 (Continued)

2. Equipment and Materials

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

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
Sling - Engine Nose Cowl 5952163-1	The Boeing Company
Torque wrench (0-250 inch-pounds range) (0-28.2 N·m)	
Sealant, Aluminized, Polysulfide DMS 1819	Flamemaster 11120 Sherman Way Sun Valley, CA 91353-1458
WJE 412, 414, 873-879, 892, 893	
Heat gun, temperature range 750-1000 degrees F	Master Appliance Corp. Racine, WI 53403
Thermometer, range 0-1000 degrees F model HG-751B	Omega Engineering Inc. (www.omega.com)
NOTE: Operate the thermometer and heat gun per the applicable manufacturer's instructions. Set heat gun vents to full open.	
Thermocouple, range 0-1000 degrees F	Compatible to thermometer
WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 886, 887, 891	
Heat gun, temperature range 750-1000 degrees F model HG-751B	Master Appliance Corp. Racine, WI 53403
Thermometer, range 0-1000 degrees F model HH-26J	Omega Engineering Inc. (www.omega.com)
NOTE: Operate the thermometer and heat gun per the applicable manufacturer's instructions. Set heat gun vents to full open.	
WJE ALL	

3. Removal/Installation Nose Cowls

A. Remove Nose Cowl

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

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Open upper cowl door tension latches and stow fully open with all hooks visible.

(4) Support forward lower cowl door, release ground safety latch, and install both hold open rods.

(5) Loosen aft lower cowl door captive latch bolts to open door.

(6) Support aft lower cowl door, release ground safety latch, and allow door to hang vertically.

(7) Open upper cowl door, install both hold open rods, and make certain pins are properly engaged.

(8) Remove clamp which connects nose cowl anti-icing duct to engine-mounted anti-icing air duct.

(9) Remove clamp which connects nose cowl anti-icing duct to engine-mounted anti-icing air duct (Figure 201 or Figure 202 or Figure 203).

(10) Remove screws from nose cowl sling attach points and install sling. (Figure 201 or Figure 202 or Figure 203)

WARNING: NOSE COWL WEIGHS APPROXIMATELY 182 POUNDS (83 KG).

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-881, 883, 884, 886, 887, 891

(11) Support nose cowl and remove mounting bolts.

WJE 873, 874, 892, 893

Support nose cowl and remove mounting bolts, nuts, and washers (46 places).

NOTE: On some aircraft, 3 bolts (bolt heads facing aft) behind pylon apron are attached with nutplates.

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-881, 883, 884, 886, 887, 891

(12) On aircraft with SB A71-61 incorporated, support nose cowl and remove mounting bolts, nuts and washers (46 places).

NOTE: On some aircraft, 3 bolts (bolt heads facing aft) behind pylon apron are attached with nutplates.

WJE ALL

CAUTION: USE EXTREME CARE DURING REMOVAL TO AVOID DAMAGE TO APRON, INLET BULLET, COWL DOORS, OR NOSE COWL.

(13) Pull nose cowl straight forward to disengage guide pin.

(14) Remove nose cowl and place on suitable protective pad.

(15) Remove sling and install screws in nose cowl sling attach points.

B. Install Nose Cowl

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 opened 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

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).

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

(3) Remove screws from nose cowl sling attach points and install sling. (Figure 201 or Figure 202 or Figure 203)

WARNING: NOSE COWL WEIGHS APPROXIMATELY 182 POUNDS (83 KG).

(4) Hoist nose cowl into approximate position; push nose cowl straight aft making certain to clear inlet bullet and align cowl with guide pin.

WJE 401-412, 414-427, 429, 861-866, 868, 869, 871, 872, 875-881, 883, 884, 886, 887, 891

(5) Install nose cowl mounting bolts and tighten to torque of 140 to 160 inch-pounds (15.7 to 17.9 N·m).

WJE ALL

(6) On aircraft with SB A71-61 incorporated, install nose cowl mounting bolts (bolt head facing forward), nuts and washers (46 places). Tighten to torque of 200 to 230 inch-pounds (22.6 to 26.0 N·m). Torque stripe the nuts.

WJE 873, 874, 892, 893

Install nose cowl mounting bolts (bolt head facing forward), nuts, and washers (46 places). Tighten to torque of 200 to 230 inch-pounds (22.6 to 26.0 N·m).

WJE ALL

NOTE: When using alternate Part Number 3D0043-5 or 42FLW-524 nuts, make sure that there is a full bolt chamfer length protruding through the nut following installation.

NOTE: When using alternate Part Number NAS1805-5 nuts, it is required that the nuts have either DMS 1762, Type 2, dry film lubricant applied as given in the STANDARD OVERHAUL PRACTICES MANUAL (SOPM) PENETRANT METHODS OF INSPECTION 20-20-02 prior to installation, or the nuts installed wet with Fluid Resistant Primer.

NOTE: If unable to install the bolts from the inlet cowl side due to interference with hi-locks, install the bolts with the head on the engine flange side.

NOTE: On some aircraft, 3 bolts (bolt head facing aft) behind pylon apron are attached with nutplates. Tighten to torque of 140 to 160 inch-pounds (15.7 to 17.9 N·m).

NOTE: Install washers with chamfered side toward bolt head to ensure proper torque.

(7) Remove sling and install setscrews in nose cowl sling attach points.

NOTE: The four nut plates for the nose cowl hoist attach points are self-locking. Positive resistance should be felt during the setscrew installation process.

NOTE: Setscrews should be flush with nose cowl surface.

(8) Check anti-icing air duct alignment in nose cowl. (NOSE COWL ANTI-ICING AIR DUCTS - MAINTENANCE PRACTICES, PAGEBLOCK 75-10-05/201).

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 875-881, 883, 884, 891

NOTE: MD-87 Series aircraft nose cowl are interchangeable between right and left engines, but requires changing of strake. Strakes are to be installed on outboard side of nose cowl. (Figure 204).

NOTE: MD-81, 82 and 83 Series aircraft have no provisions for installation of strakes on nose cowls, and cannot be installed on MD-87 Series aircraft. If a Series 87 nose cowl is be used on Series 81, 82 or 83 aircraft, the strakes are to be removed and open holes plugged. (Figure 204).

NOTE: For complete instructions on strake Removal/ Installation procedures, refer to Component Maintenance Manual, Chapter 71-10-14.

WJE 886, 887

NOTE: MD-87 Series aircraft nose cowl are interchangeable between right and left engines, but requires changing of strake. Strakes are to be installed on outboard side of nose cowl. (Figure 204)

NOTE: For complete instructions on strake Removal/ Installation procedures, refer to Component Maintenance Manual, Chapter 71-10-14.

WJE ALL

(9) Install clamp which connects nose cowl anti-icing duct to engine-mounted anti-icing air duct and tighten to torque of 35 to 45 inch-pounds (4.0 to 5.1 N·m).

(10) 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

UPPER EPC, ENGINE - LEFT AC BUS

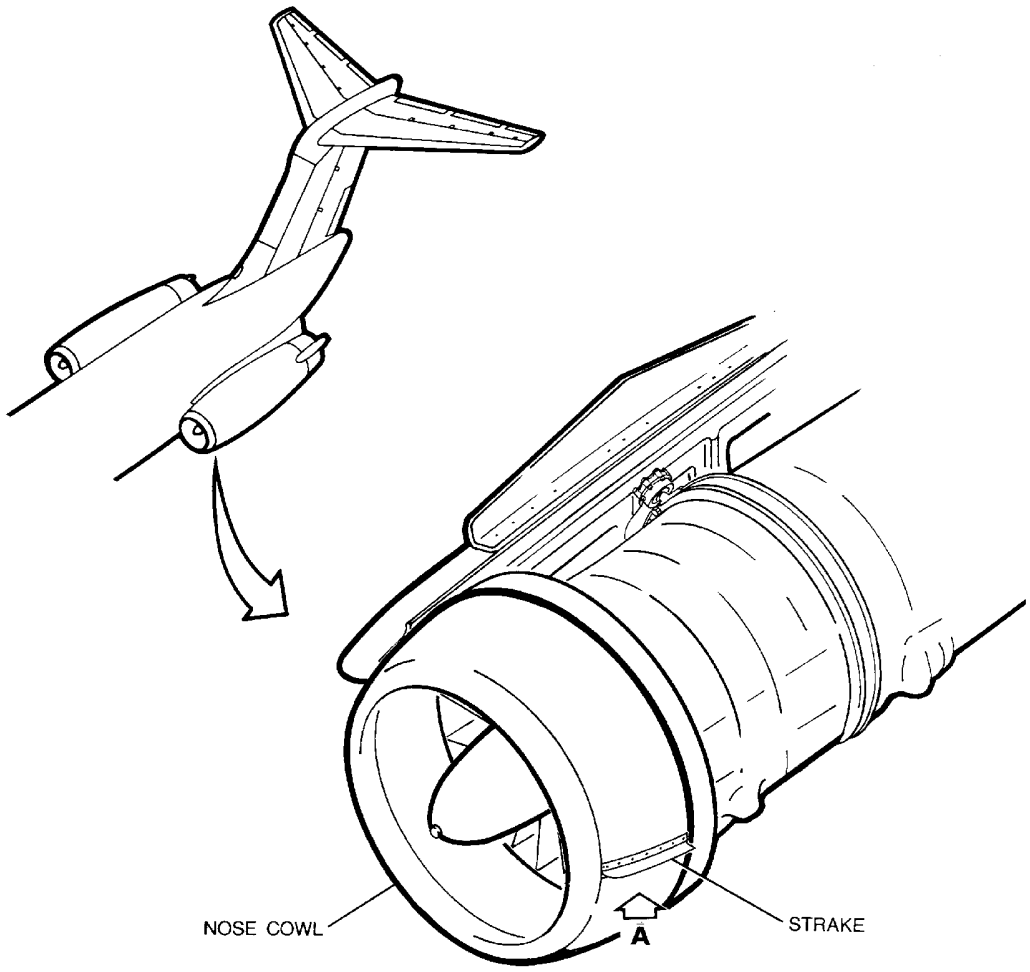
Row	Col	Number	Name
WJE ALL			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

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

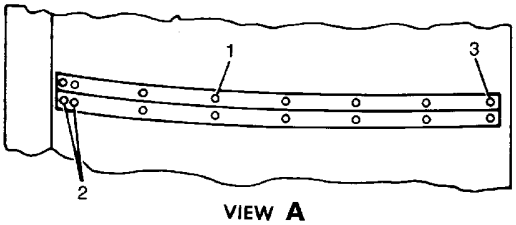
WARNING: MAKE CERTAIN THROTTLE/THRUST REVERSER LEVER POSITION CORRESPONDS WITH THRUST REVERSER DOOR POSITION AND THAT ALL PERSONNEL AND EQUIPMENT ARE WELL CLEAR OF THRUST REVERSER BEFORE OPERATION. ANY TIME THAT THRUST REVERSER CONTROL VALVE IS NOT IN DUMP POSITION, 3000 PSI (20,700 KPA) IS AVAILABLE 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.

(11) Remove safety pin from thrust reverser control valve. Stow safety pin.



NOTE: SET SCREWS USED TO PLUG OPEN HOLES IN NOSE COWL MS18066–57 (16 PLACES)

1. NAS8804–3 (10 PLACES)
2. NAS8804–5 (4 PLACES)
3. NAS8804–6 (2 PLACES)



VIEW A
(LEFT ENGINE SHOWN)
RIGHT ENGINE TYPICAL

BBB2-71-69

Nose Cowl Strake -- Installation
Figure 204/71-10-01-990-805

WJE ALL

4. Nose Cowl Over Temperature Indicator (If Installed)

A. Over temperature Indicator

(1) If over temperature indicator button is popped out, this indicates that the anti-ice system may have malfunctioned, and that maintenance action is required (Refer to Inspection/Check Nose Cowl Heat Damage).

5. Nose Cowl Over Temperature Indicator (If Installed) - Removal/Installation

A. Remove Over temperature Indicator

(1) Remove attaching screws from indicator and remove indicator through anti-ice air exit vent. (Figure 205)

(2) Remove shim from indicator and retain for use on new indicator.

NOTE: Shim is of the laminate type material so use care when removing shim from indicator not to separate any of the laminations.

B. Install Over temperature Indicator

(1) Prepare nose cowl opening for new indicator. Clean sealant from opening.

(2) Install shim on indicator and position indicator in nose cowl opening.

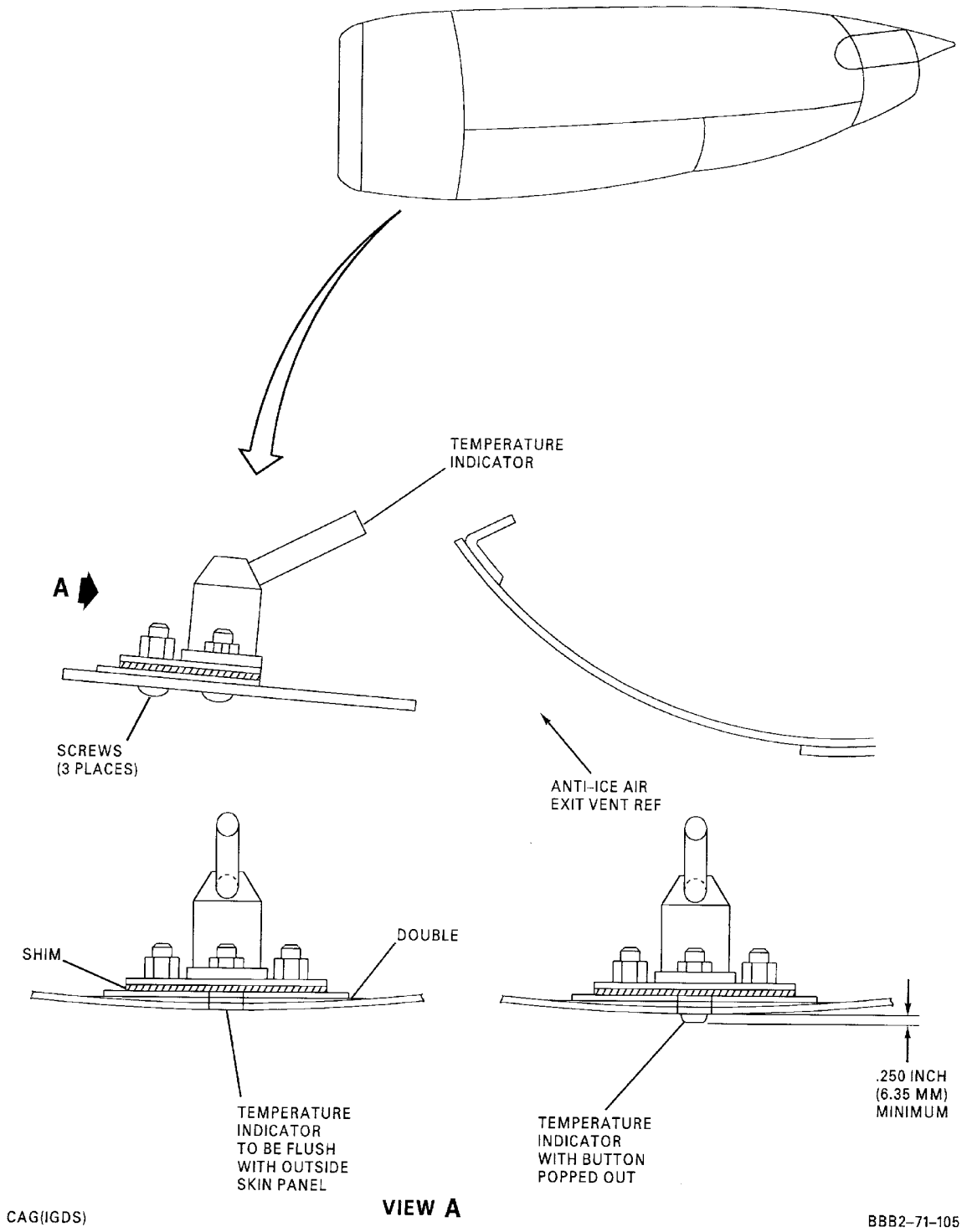
(3) Install screws and tighten, check indicator for being flush with outside skin. If not, proceed as follows:

(a) Add or remove 0.003 (0.0076 mm) laminate shim one at a time to attain a flush condition with indicator to outside skin.

(4) With indicator flush, remove screws and apply silicone primer as required to screws, and wet install screws with sealant.

(5) After installing indicator, fill gap between indicator and skin panel with silicone sealant to an aero-smooth condition.

NOTE: Take care during silicone sealant application not to apply sealant to area around or in indicator pin.



Nose Cowl Over Temperature Indicator -- Removal/Installation
Figure 205/71-10-01-990-806

6. Nose Cowl Over Temperature Indicator Test (If Installed)

A. Functional Test Over Temperature Indicator

(1) Gaining access through nose cowl anti-ice exit air vent, attach thermocouple to over temperature indicator sensing probe. (Figure 206)

NOTE: Clean the indicator probe to remove surface contaminants (such as paint). Use available hardware such as alligator clip, safety wire, spring clip, or bond thermocouple to the inside of a sleeve which fits over the indicator probe to hold the test thermocouple to the indicator probe.

(2) Connect thermocouple to thermometer.

(3) Use heat gun to apply heat to over temperature indicator probe. Hold the gun so the nozzle is approximately 2 to 3 inches from the indicator probe/thermocouple.

NOTE: Closely observe the increasing temperature on the thermometer. After the thermometer reaches the indicator actuation range, it may take two minutes for the probe to adequately heat and the indicator to actuate. Move the gun away from the indicator probe/thermocouple as required to maintain a maximum temperature of 450°F.

NOTE: Closely observe the increasing temperature on the thermometer. After the thermometer reaches the indicator actuation range, it may take two minutes for the probe to adequately heat and the indicator to activate. Move the gun away from the indicator probe/thermocouple as required to maintain a maximum temperature of 450°F.

(4) Over temperature indicator actuates (red indicator extends approximately 0.25 inch) at 425 to 450 degrees F (218.5-232.2C).

NOTE: If the indicator does not actuate within the prescribed range, replace the over temperature indicator.

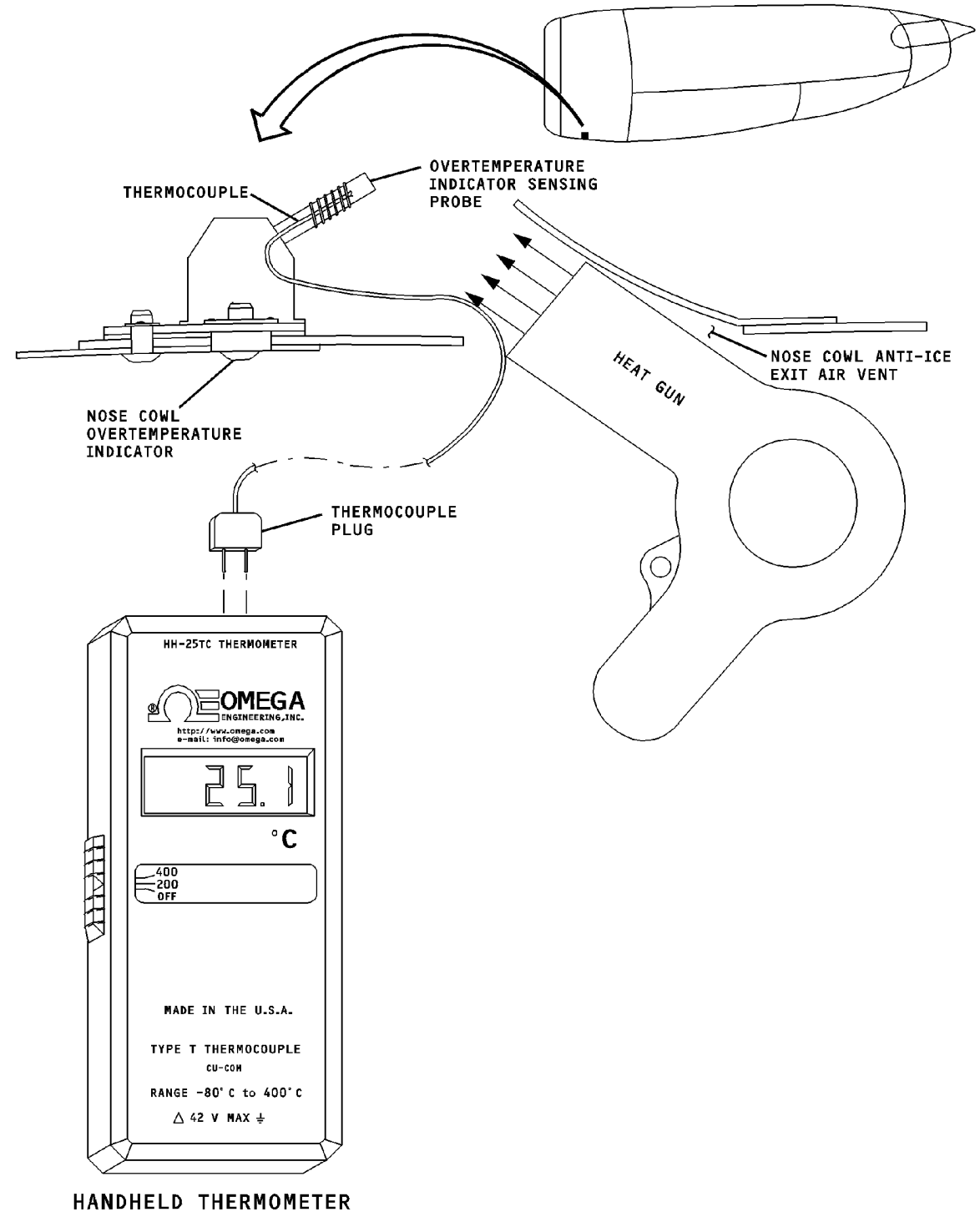
(5) Remove heated air blast from indicator probe and allow indicator to cool below 355 degrees F (179.4C).

CAUTION: OVER TEMPERATURE INDICATOR IS VERY HOT. WEAR APPROPRIATE HAND PROTECTION WHEN TOUCHING INDICATOR.

(6) Manually reset red indicator by pushing it inward until it is flush.

NOTE: If the indicator does not remain depressed, replace the over temperature indicator.

(7) Remove test equipment, tools and debris from nose cowl.



Engine Inlet Cowl Overheat Detector - Check
Figure 206/71-10-01-990-807

7. Inspection/Check Nose Cowl

A. Nose Cowl Damage Limits. (Figure 207) (Figure 208) (Figure 209)

NOTE: Nose cowl shall be considered acceptable for flight provided that any damage does not exceed the following limits and are repaired per paragraph 5. Nose cowl that has damage exceeding limits should be repaired in accordance with DC-9 Structural Repair Manual, Chapter 54.

(1) Nose Cowl Lip Skins may have:

(a) A single crack in any direction up to 2.50 inches in length, provided it is 12 inches from any other side crack.

(b) Two cracks up to 1 inch in length within an 8-inch circumference with 3 inches in-line separation or 1-inch parallel separation and 24 inches from any other skin crack.

(c) Any two intersecting cracks up to 1-inch maximum length each, provided that they are 24 inches from any other skin crack.

(2) Nose Cowl Inner Barrel Panels may have:

(a) Minor dents and depressions 2 inches in diameter or less, separated from other dents by at least 4 inches, and from fasteners, adjacent skin, splices, or frame members by at least 1 inch. Ratio of dent minor axis to depth must be greater than 30.

(b) Minor scratches which can be encompassed with a 3-inch diameter circle and do not exceed 20 percent of skin thickness.

(3) Check nose cowl inner barrel "DynaRohr" woven wire mesh for delamination:

(a) Check areas of nose cowl inner barrel by:

1) Visually checking area for ripples or rises in woven wire mesh.

2) Rubbing hand over any suspected areas.

NOTE: Delaminated areas will be easily compressed in an "oil canning" fashion.

3) If any delaminated areas are found, refer to DC-9 Structural Repair Manual Chapter 54 for further instructions or repairs.

4) Do a tap test of the inner barrel of the nose cowl. (Ref SRM 54-05 Tap Test)

a) If any delaminated panels are found refer to the DC-9 (MD-80) SRM chp 54 for further instructions or repairs.

B. Nose Cowl Lip Outer Skin Erosion Limits (Figure 207) (Figure 208)

(1) Minimum thickness for inlet cowl lipskin are as follows:

(a) Minimum thickness is 0.042 inch everywhere except at fastener locations.

(b) Minimum thickness is 0.052 inch at fastener locations including splices.

1) Width of 0.052 inch area is twice diameter circumferentially surrounding existing fasteners.

C. Nose Cowl Hoist Attach Point Setscrews Inspection Limits

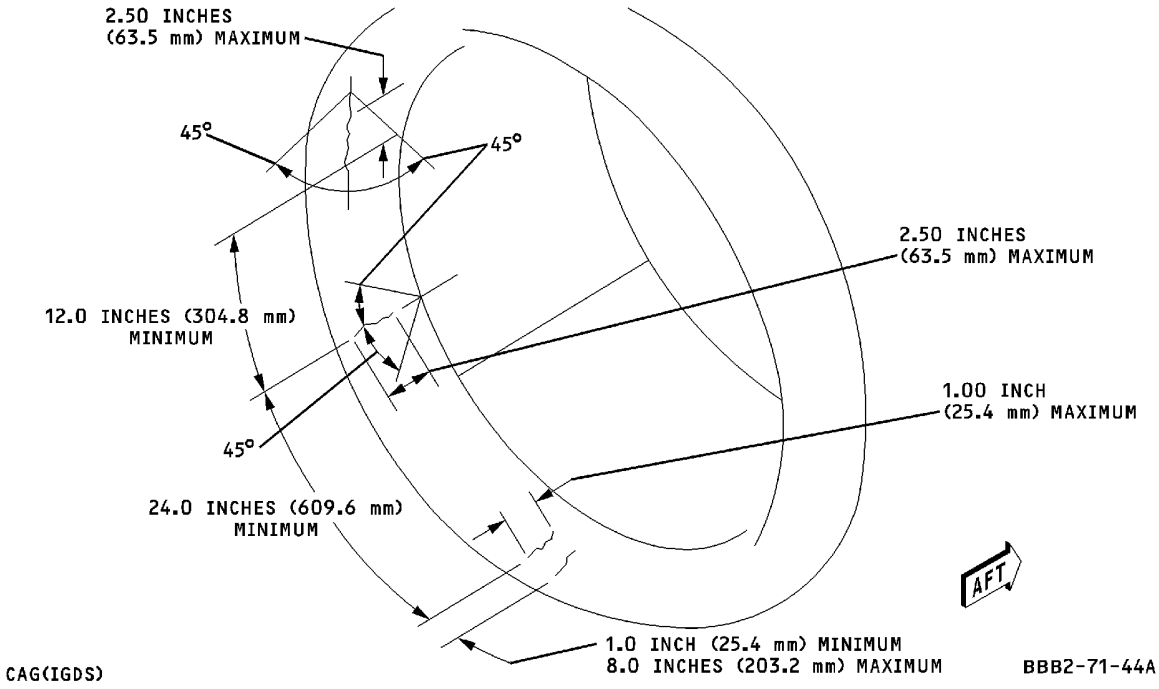
(1) Inspect the four nose cowl attach point setscrew and nut plates as follows:

(a) Attempt to remove the four setscrews.

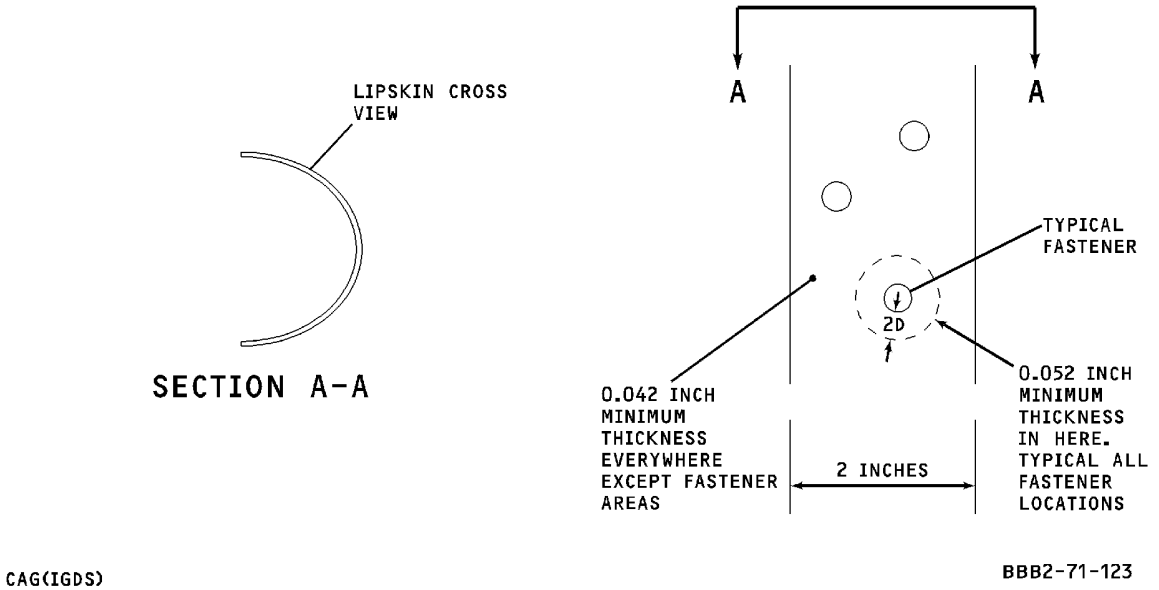
1) There should be a positive (self-locking) resistance felt during the removal process.

2) Replace the setscrews and nut plates if self-locking can not be determined.

(b) Make sure the four setscrews are flush with the nose cowl surface.

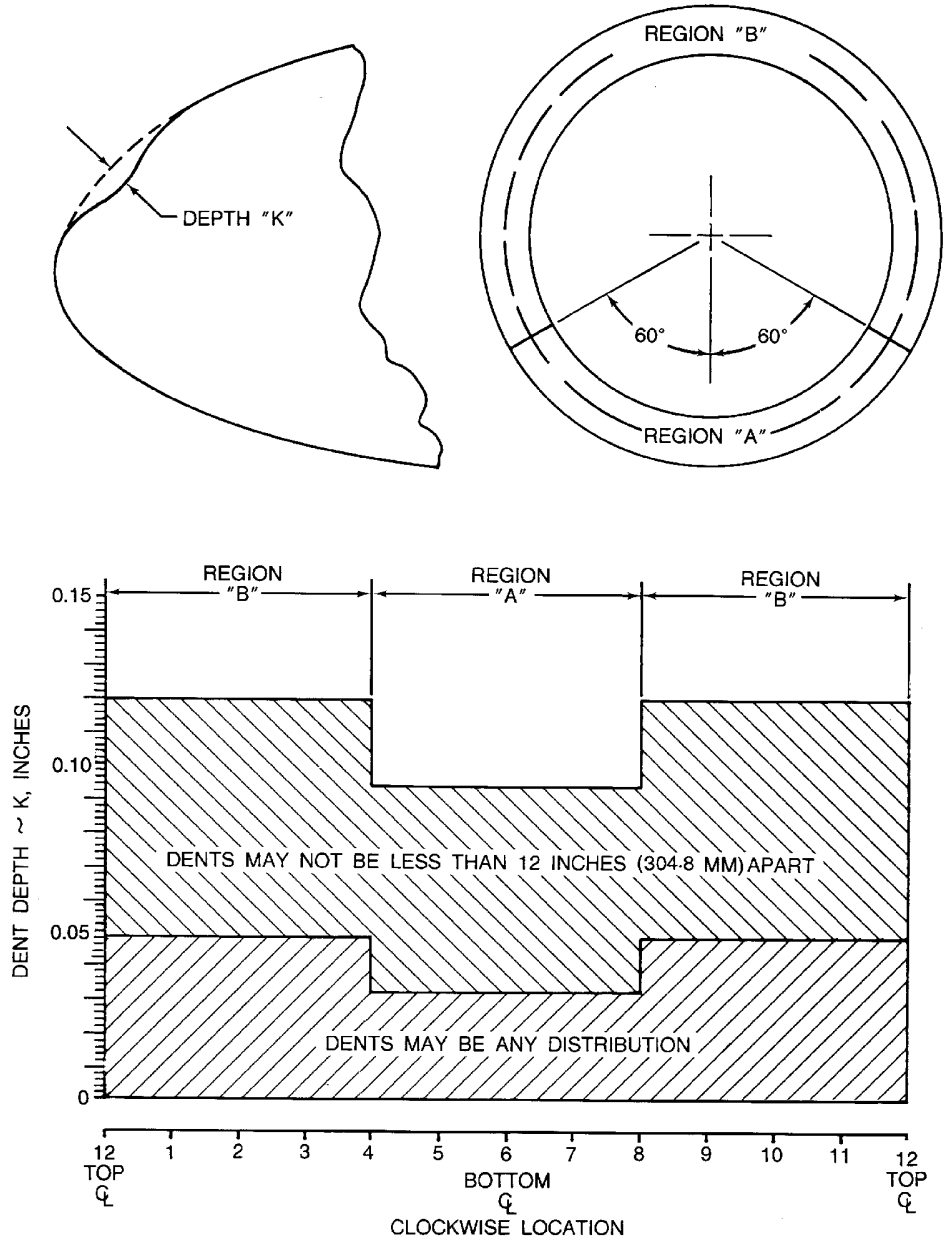


Nose Cowl Damage Limits
Figure 207/71-10-01-990-808



Nose Cowl Lip Outer Skin Erosion Limits
Figure 208/71-10-01-990-809

ESTIMATED MAXIMUM ALLOWABLE ENGINE INLET COWL LIP DENT DEPTH FOR NEGLIGIBLE EFFECT ON INLET CHARACTERISTICS



BBB2-71-67

Engine Nose Cowl Lip Dent Limits
Figure 209/71-10-01-990-810

8. Approved Repair Nose Cowl

A. Nose Cowl Subject to Minor Repair, Prior to Flight

(1) Perform dye penetrant inspection to determine end of crack.

(2) Stop drill crack using #40 or 1/8-diameter drill. Reinspect edge of cutout for complete crack removal.

(3) Enlarge to 3/16 diameter and reinspect.

(4) Cover with aerodynamic aluminized sealer.

(5) Repair must be inspected after each flight until repaired per DC-9 Structural Repair Manual, Chapter 54.

9. Inspection/Check Nose Cowl Heat Damage

CAUTION: IF NOT CORRECTED, HEAT RELATED DETERIORATION OF NOSE COWL COULD EXCEED MAXIMUM ALLOWABLE LIMITS AND REPLACEMENT OF NOSE COWL MAY BE NECESSARY.

A. Nose Cowl Heat Damage

NOTE: The following inspection/check is to provide information for possible heat damage due to excessive anti-ice air flow at high temperature which can cause: nose cowl inner barrel back skin delamination, outer barrel inner surface charring, inner barrel back skin and outer barrel inner surface discoloration, nose lip lower web deformation, and areas of nose lip skin discoloration.

(1) If nose cowl over temperature indicator has popped out, an anti-ice system malfunction maybe indicated and maintenance action is required. Proceed as follows:

(a) Open lower and upper cowl doors. (PAGEBLOCK 71-10-03/201 Config 1)

(b) Remove and retain nose cowl access doors. (Figure 210) as follows:

Table 202

Left Engine	Right Engine
7303C, 7305C	7402C, 7403C
7306C, 7309C	7406C, 7408C

(c) Visually check mixing tube and nozzle for proper alignment and adjust as required. (Figure 210) (NOSE COWL ANTI-ICING AIR DUCTS - MAINTENANCE PRACTICES, PAGEBLOCK 75-10-05/201)

(d) Inspect nose cowl for the following conditions using visual and tap test inspection methods (Ref. Structural Repair Manual 54-05 "Tap Test Technique").

Table 203

CONDITION 1 No Heat Damage		
(a)	Manually test anti-icing thermostatic air regulator valve failure indicator pin. (PAGEBLOCK 75-10-04/201)	
	1)	Check part number of anti-icing thermostatic air regulator valve and if P/N 7958524-501 and 503 valve is installed (proceed with check), if P/N 7958524-505 valve is installed, only manual pin test is required.
(b)	Check anti-ice thermostatic air regulator valve as follows:	
	1)	Remove valve. (PAGEBLOCK 75-10-04/201)

Table 203 (Continued)

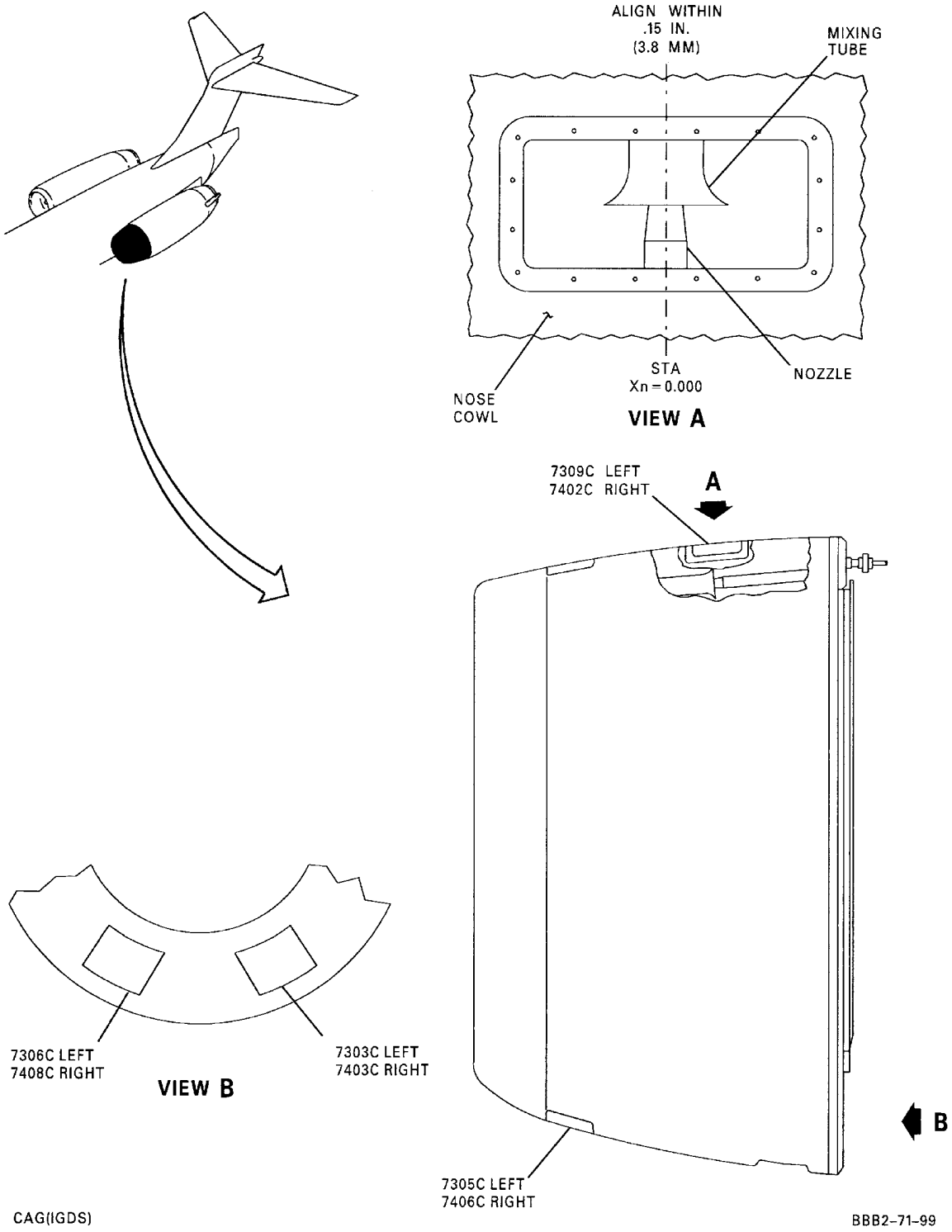
	2)	Visually check upstream side of stator plate and rotor blades for evidence of chafing. (Figure 213)	
		a)	If chafed, replace valve.
		b)	If not chafed, proceed
	3)	Visually check bimetallic spring for cracks and/or distortion (Ref. Garrett Overhaul Manual 30-10-04).	
		a)	If cracked and/or distorted, replace valve.
		b)	If not cracked and/or distorted, install valve.
CONDITION 2 Inner Barrel Backskin and/or Outer Barrel Inner Surface Discoloration			
(a)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
CONDITION 3 Inner Barrel Backskin Delamination Within Flyable Limits			
(a)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
NOTE: Nose cowl inner barrel delaminations can be repaired (Ref. SRM 54-04 "Miscellaneous Repairs").			
CONDITION 4 Inner Barrel Backskin Delamination Within Repair Limits			
(a)	Repair delaminated inner barrel of nose cowl (Ref. SRM 54-04 "Miscellaneous Repairs").		
(b)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 step (a) and (b).		
CONDITION 5 Inner Barrel Back Skin Delamination Exceeds Repair Limits			
(a)	Remove and replace nose cowl (Paragraph 3.).		
(b)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
CONDITION 6 Outer Barrel Inner Surface Charring Within Repair Limits			
(a)	Repair charred outer barrel (Ref. SRM 51-80-0 Composite Nacelle Repairs).		
(b)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
CONDITION 7 Outer Barrel Inner Surface Charring Exceeds Repair Limits			
(a)	Remove and replace nose cowl (Paragraph 3.).		
(b)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
CONDITION 8 Nose Lip Skin Discoloration Within Repair Limits			
(a)	Repair blotched nose lip skin (Ref. SRM 54-04 "Miscellaneous Repairs).		
(b)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
CONDITION 9 Lower Web Deformation Within Flyable Limits			
Option 1:			
(a)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).		
Option 2:			

Table 203 (Continued)

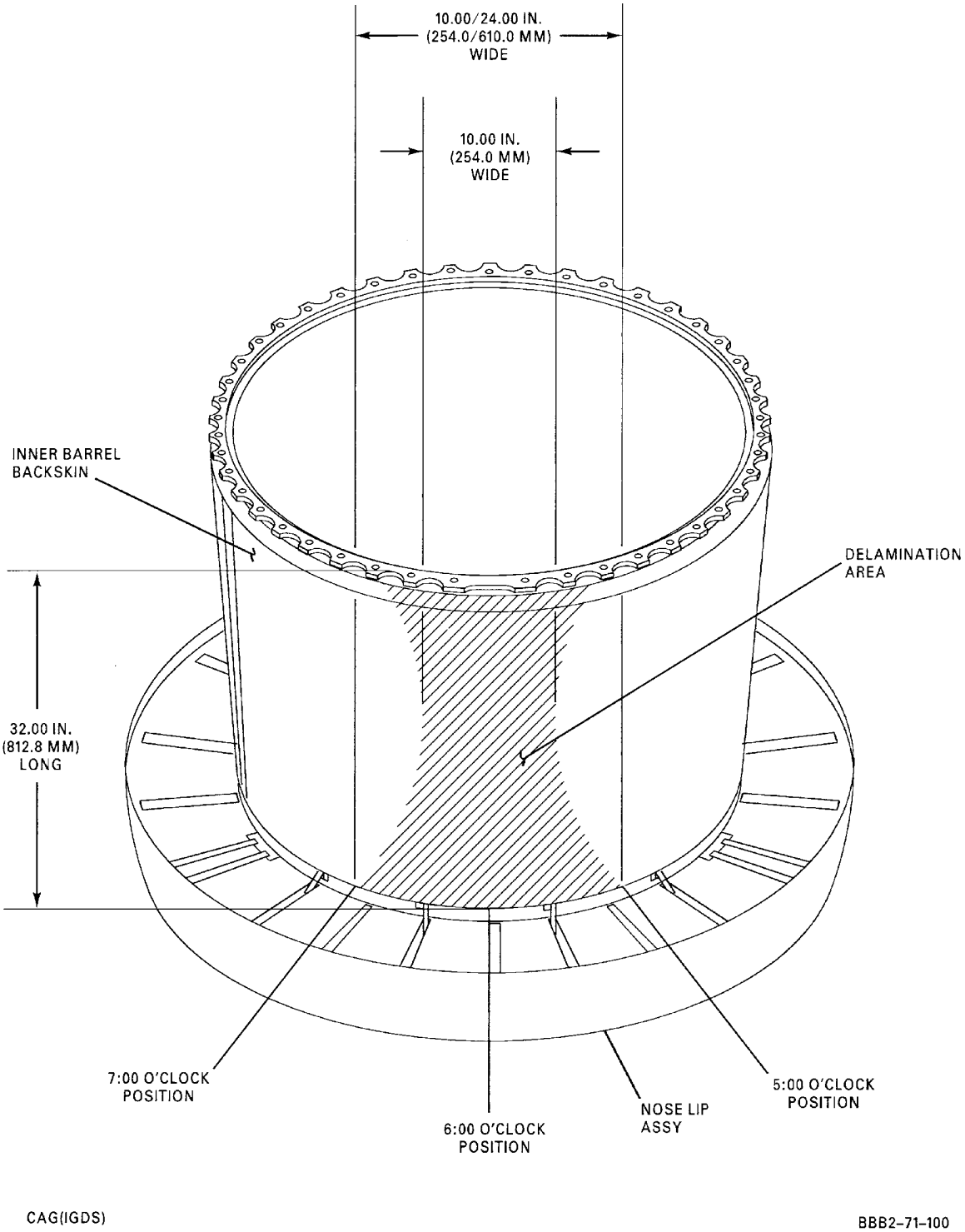
(c)	Repair deformed lower web. (Ref. SRM 54-04 "General Repairs").
(d)	Check anti-ice thermostatic air regulator valve (Refer to Condition 2 step (a).
CONDITION 10 Lower Web Deformation Exceeds Flyable Limits	
Option 1:	
(c)	Repair deformed lower web. (Ref. SRM 54-04 "General Repairs").
(d)	Check anti-ice thermostatic air regulator valve (Refer to Condition 1 steps (a) and (b).

(e) Close nose cowl access doors as follows:(Figure 209)

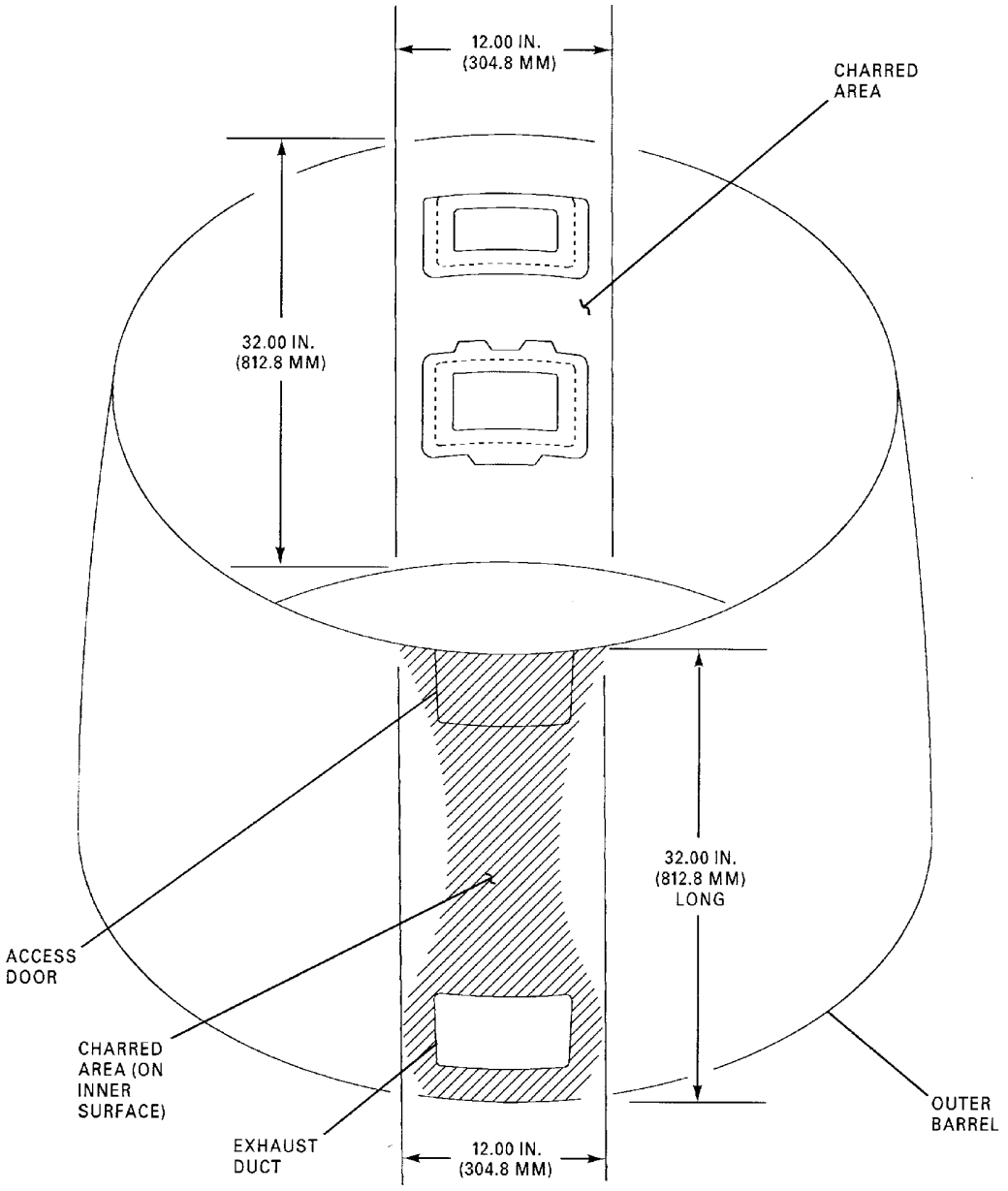
Left Engine	Right Engine
7303C, 7305C	7402C, 7403C
7306C, 7309C	7406C, 7408C



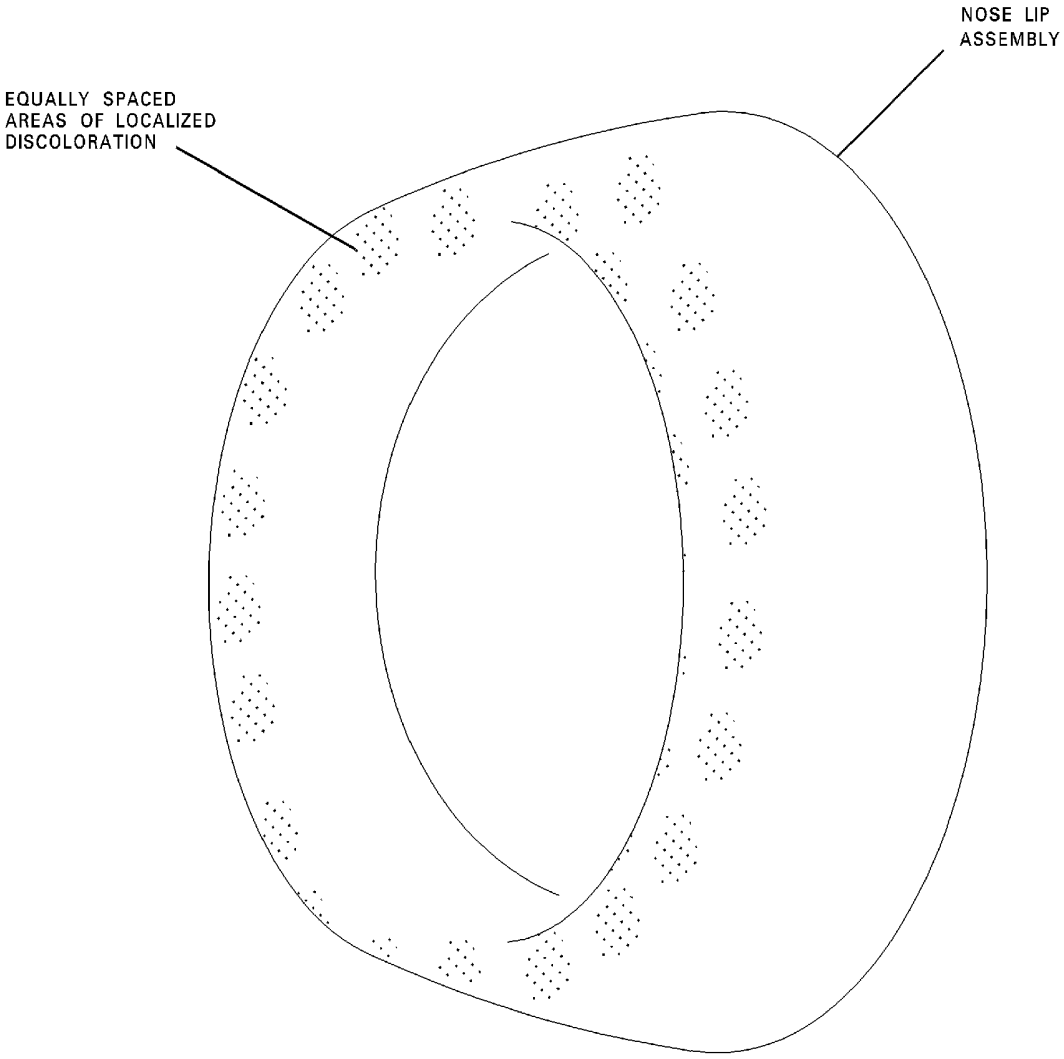
Nose Cowl Heat Damage -- Inspection/Check
Figure 210/71-10-01-990-812



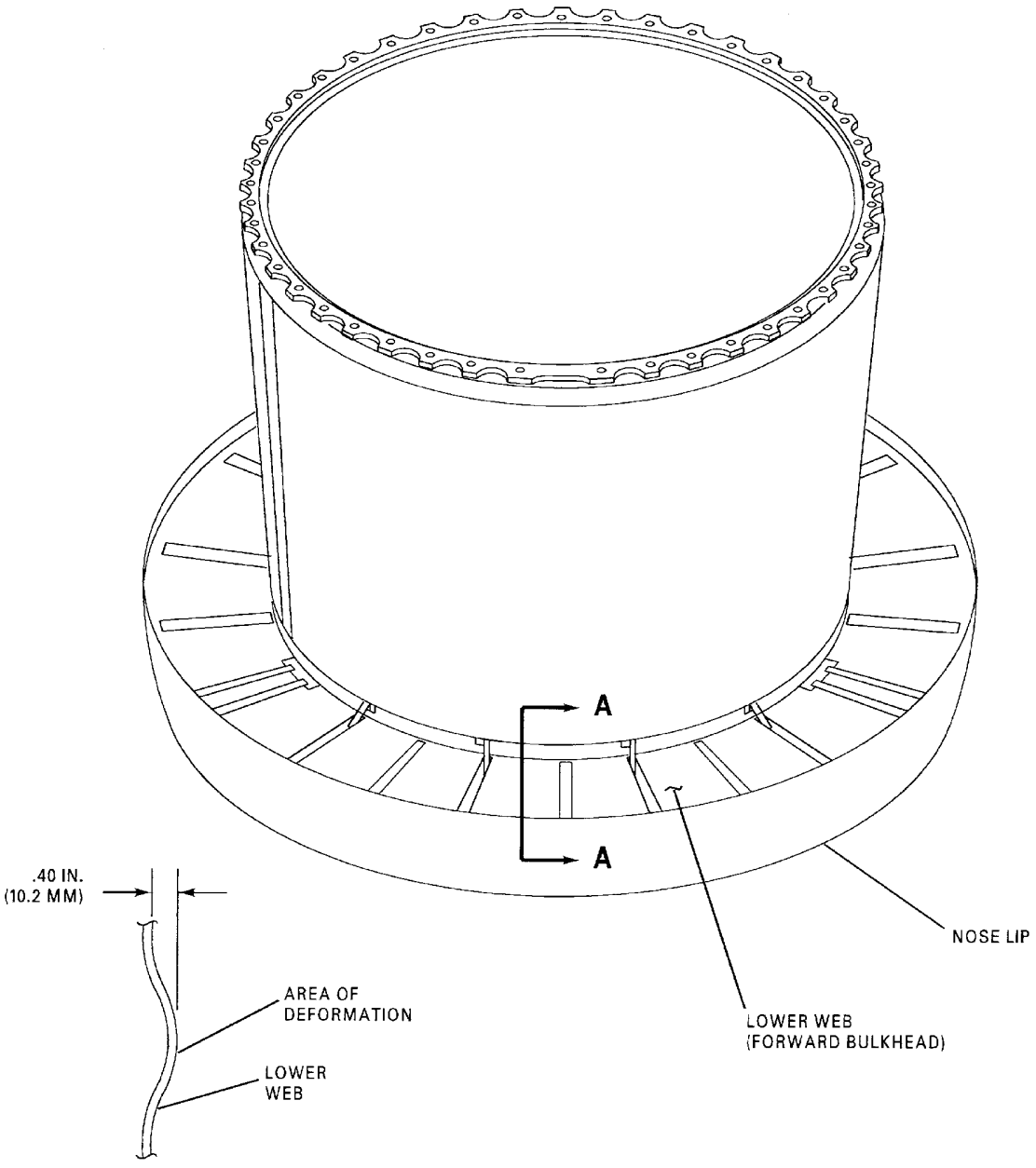
Nose Cowl Heat Damage -- Inner Barrel Backskin Inspection/Check
Figure 211/71-10-01-990-813



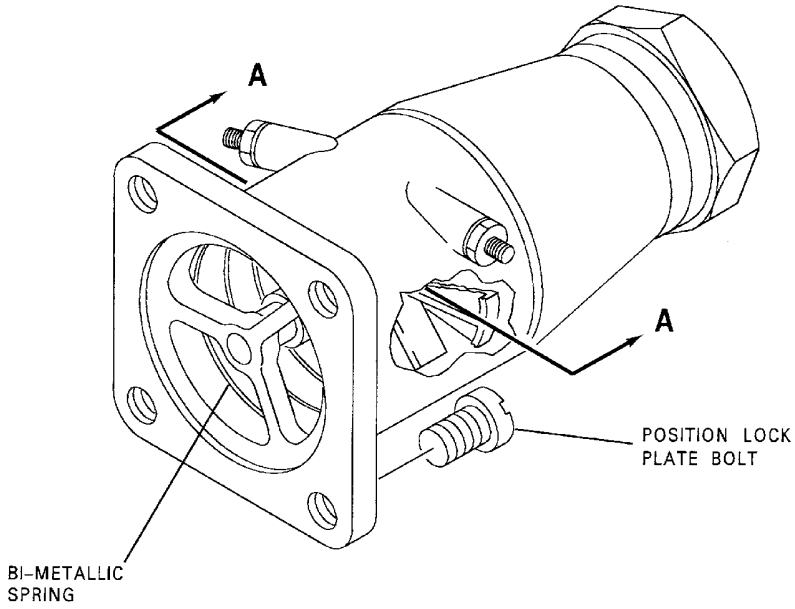
Nose Cowl Heat Damage -- Outer Barrel Inspection/Check
Figure 212/71-10-01-990-814

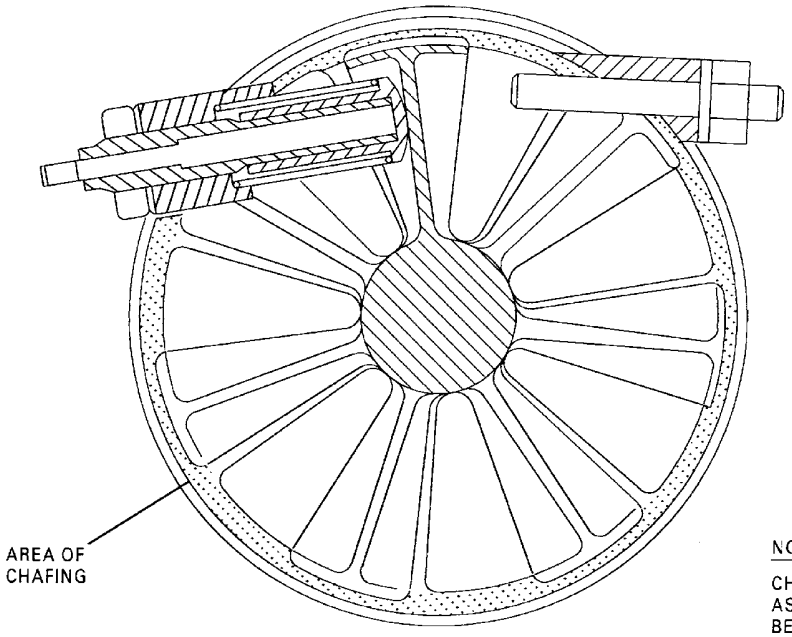


Nose Cowl Heat Damage -- Nose Lip Inspection/Check
Figure 213/71-10-01-990-815



Nose Cowl Heat Damage -- Lower Web Inspection/Check
Figure 214/71-10-01-990-816





NOTE:

CHAFING IS DESCRIBED AS EVIDENCE OF CONTACT BETWEEN STATOR PLATE AND ROTOR BLADES

SECTION A-A

CAG(IGDS)

BBB2-71-104

Anti-ice Thermostatic Air Regulator -- Inspection/Check
Figure 215/71-10-01-990-817

NOSE COWL - INSPECTION/CHECK

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-10-01-211-801

2. Detailed Inspection of the Internal Nose Cowl and Attachments

A. Prepare for the Detailed Inspection of the Internal Nose Cowl and Attachments

SUBTASK 71-10-01-010-001

(1) Open top and bottom main engine cowling and install hold open rods.

(2) Remove nose cowl access doors.

B. Detailed Inspection of the Internal Nose Cowl and Attachments

SUBTASK 71-10-01-211-001

(1) Do a detailed inspection of the internal nose cowl and attachments.

(a) Check inlet cowl for cracks, damage, evidence of overheating and condition.

C. Job Close-up

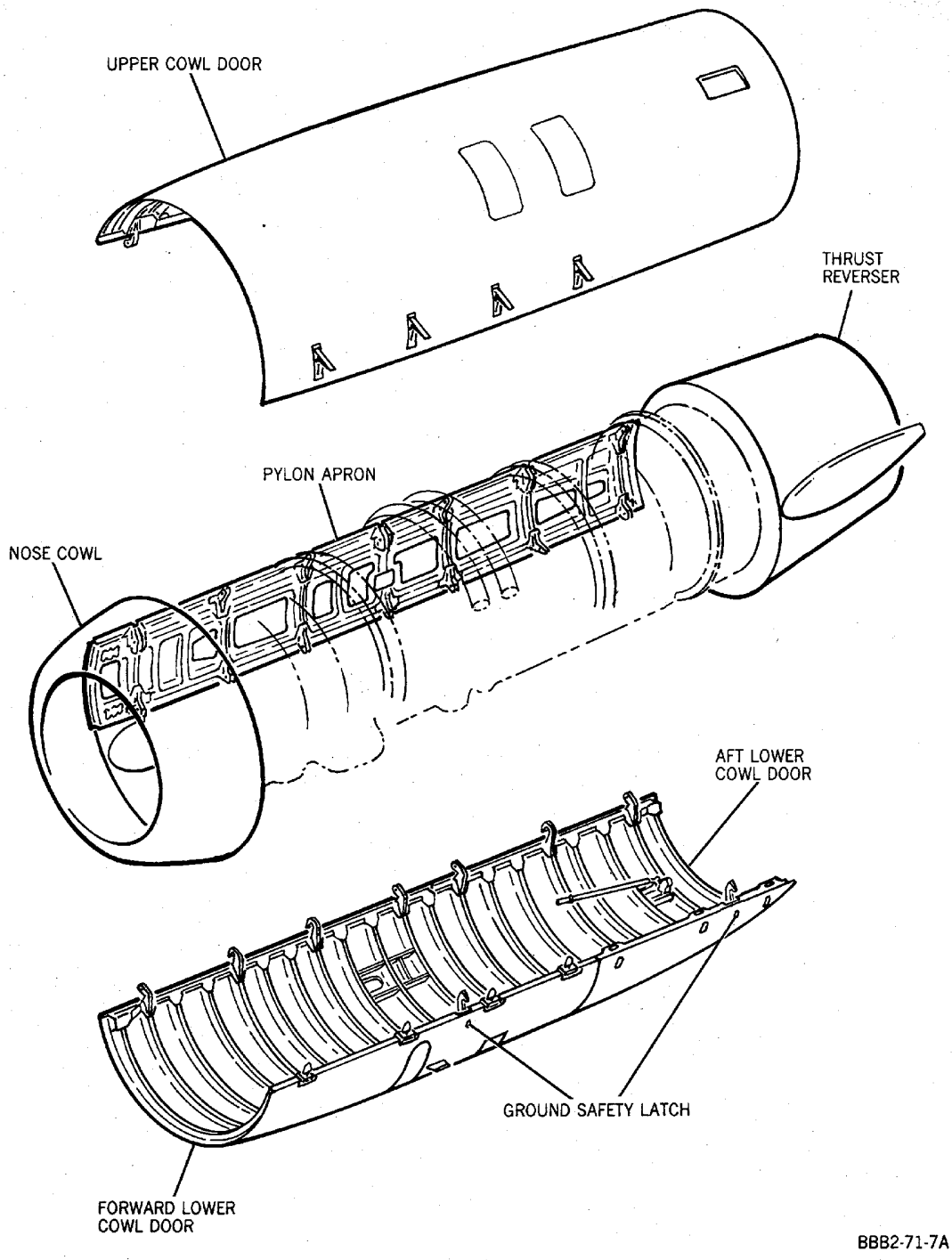
SUBTASK 71-10-01-410-001

(1) Install nose cowl access doors.

(2) Stow the top and bottom main engine cowling hold open rods.

(3) Close and latch the main engine cowling.

——— END OF TASK ———



ENGINE MAIN AND NOSE COWLS
Figure 601/71-10-01-990-843

TASK 71-10-01-280-801

3. Engine Nose Cowl Interior Inspection

A. Special Detailed Inspection of the Engine Nose Cowl Interior

SUBTASK 71-10-01-010-002

(1) Open cowlings and access panels.

SUBTASK 71-10-01-280-001

(2) Perform NDT, tap test inspection of the nose cowl interior per DC-9/MD-80 Structural Manual 54-05, Rev. 106, dated 15 August 2010, or later approved revision.

(a) Inspect inner barrel (perforated skin and back skin) to determine if there is degradation of the inner barrel acoustic panel skin-to-core attachment.

SUBTASK 71-10-01-410-002

(3) Install access panels and close cowling doors.

(4) Remove all the tools and equipment from the work area. Make sure the area is clean.

——— END OF TASK ———

TASK 71-10-01-720-801

4. Functional Check of the Nose Cowl Over Temperature Indicator

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-10-01 P/B 201 Config 1	NOSE COWL - MAINTENANCE PRACTICES

B. Functional Check of the Nose Cowl Over Temperature Indicator

SUBTASK 71-10-01-720-001

(1) Do a functional check of the engine nose cowl over temperature indication. (NOSE COWL - MAINTENANCE PRACTICES, PAGEBLOCK 71-10-01/201 Config 1)

——— END OF TASK ———

INLET BULLET - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation instructions and inspection/check for the inlet bullet.

B. The inlet bullet is attached to the engine inlet accessory drive case. Access to the inlet bullet is through the nose cowl inlet.

C. Removal/installation procedures for left and right inlet bullets are identical.

D. Suitable protective padding should be provided to prevent damage to the nose cowl inlet sections during removal/installation of inlet bullet.

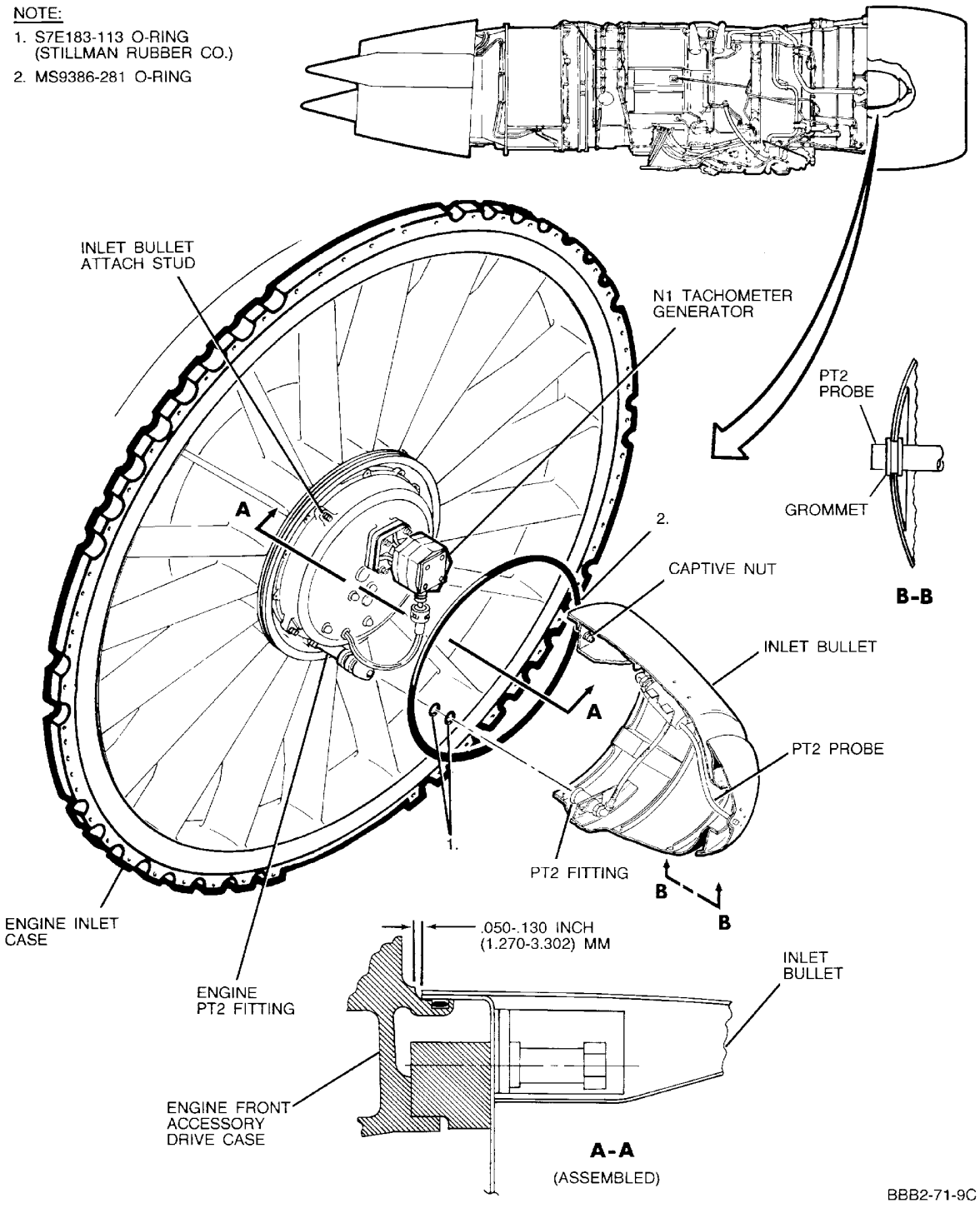
2. Equipment and Materials

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

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
Petrolatum, VV-P-236 DPM 675	
Torque wrench (0-300 inch-pounds range) (0-33.6 N·m)	
Alodine No. 1000	Amchem Products, Inc.
Alodine No. 1500 DPM 5089	Amchem Products, Inc.



Inlet Bullet -- Installation
Figure 201/71-10-02-990-801

3. **Removal/Installation Inlet Bullet**

A. Remove Inlet Bullet

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

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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Loosen captive self-locking nuts which attach inlet bullet to engine inlet accessory drive case.

(4) Carefully pull bullet forward to disengage $P_{t\ 2}$ fitting and remove bullet.

(5) Place bullet on protective pad to prevent damaging $P_{t\ 2}$ fitting.

(6) Remove O-rings from engine $P_{t\ 2}$ fitting and inlet accessory drive case.

B. Install Inlet bullet

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 opened 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

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).

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

WARNING: WHITE PETROLATUM IS AN AGENT THAT IS AN IRRITANT. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN WHITE PETROLATUM 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 BREATHE THE MIST.

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.

(WARNING PRECEDES)

(3) Lightly lubricate new O-rings with petrolatum, VV-P-236, and install on engine $P_{t\ 2}$ fitting on inlet accessory drive case.

(4) Lightly lubricate new O-ring with petrolatum, VV-P-236, and install on inlet accessory drive case.

(5) Position inlet bullet on inlet accessory drive case, carefully align $P_{t\ 2}$ fittings, and push bullet aft.

(6) Make sure that the bullet attach nut running torque value is 10 in-lb (1.1 N·m) - 60 in-lb (7 N·m).

(7) Tighten captive self-locking nuts to torque of 100 to 140 inch-pounds (11.2 to 15.7 N·m).

CAUTION: MAKE SURE INLET BULLET CAPTIVE NUT RETAINERS ARE NOT WORN. LOOSE RETENTION NUTS CAN BE INGESTED INTO THE ENGINE.

(8) Check gap between inlet bullet and engine front accessory drive case. (Figure 201)

WARNING: ALODINE 1500 COATING IS AN AGENT THAT IS POISONOUS, CORROSIVE, CARCINOGENIC, AN OXIDIZER, AND AN IRRITANT. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN ALODINE 1500 COATING 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 ALODINE 1500 COATING IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE DUST OR MIST.

WARNING: FR PRIMER IS AN AGENT THAT IS FLAMMABLE, POISONOUS, AN IRRITANT, AND CARCINOGENIC. MAKE SURE ALL PERSONS OBEY ALL OF THE PRECAUTIONS WHEN FR PRIMER 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 FR PRIMER IN THE EYES, ON THE SKIN, OR ON YOUR CLOTHES.
- DO NOT BREATHE THE GAS OR MIST.

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.

(9) Trim inlet bullet, if required, and apply brush coat of alodine solution and FR primer to bare surface.

(10) 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

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.

(11) Remove safety pin from thrust reverser control valve. Stow safety pin.

4. Inspection/Check - Engine Nose Bullet

A. Dent Limits - Bullet

(1) Dents in Engine Nose Bullet, may be hand worked to within limits outlined below.

(a) Maximum 0.120 inch (3.048 mm) depth with contour deviation not to exceed 0.06 inch (1.524 mm) per inch is a flyable limit.

1) Accomplish rework to within this flyable limit provided damage does not exceed:

a) 0.250 inch for 0.750-inch depth radius.

b) 0.200 inch for 0.500-inch depth radius.

2) Damage exceeding these limits require part replacement per DC-9 OHM 71-10-6 practices.

(b) Proximity to adjacent damage not less than 2.0 inches (50.8 mm).

(c) Scrapes or scratches penetrating clad material should be repaired using Alodine No. 1000 or Alodine No. 1500.

(d) No damage allowed to Pt2 probe or structural attach points.

(e) Check Pt2 probe grommet for serviceable condition. (Figure 201).

COWL DOORS - MAINTENANCE PRACTICES

1. General

A. This maintenance practices provides removal/installation, adjustment/test, inspection/check and approved repair instruc-tions for the upper, forward lower and aft lower cowl doors.

B. The cowl doors are mounted between nose cowl and the reverser. The cowl doors are hinged from the pylon apron and latched along the outside longitudinal split line.

WJE 875-879

(Figure 201)

WJE ALL

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

C. Before attempting removal or installation of cowl doors all limited access doors should be closed and locked. Forward lower cowl door overlaps aft lower cowl door and must be opened first and closed last.

D. During removal or installation of the forward lower cowl door, care should be taken to prevent damage to protruding drain masts.

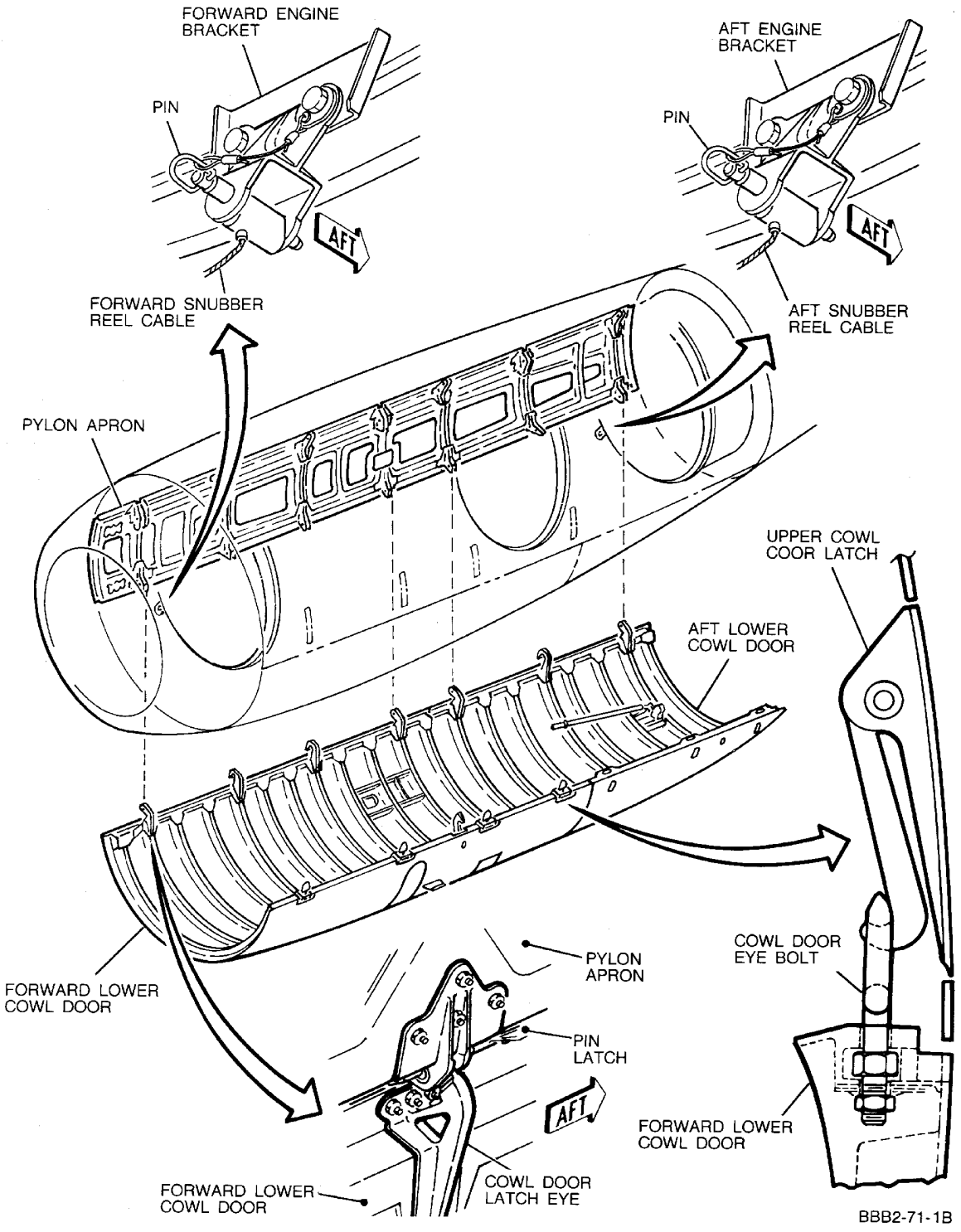
E. The removal, installation, adjustment, check and approved repair procedures for left and right engine cowl doors are identical.

2. Equipment and Materials

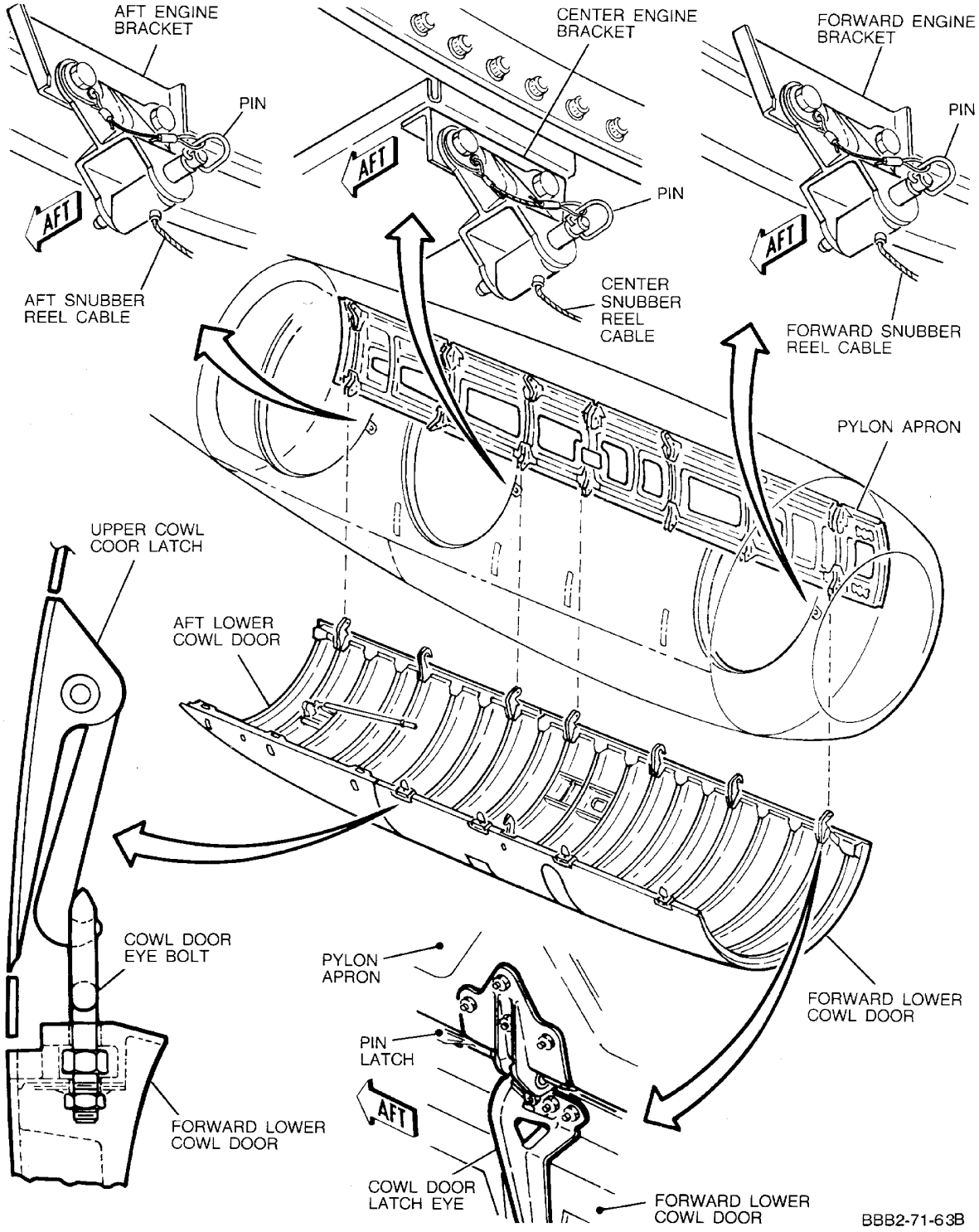
NOTE: Equivalent substitutes may be used instead of the following listed items.

Table 201

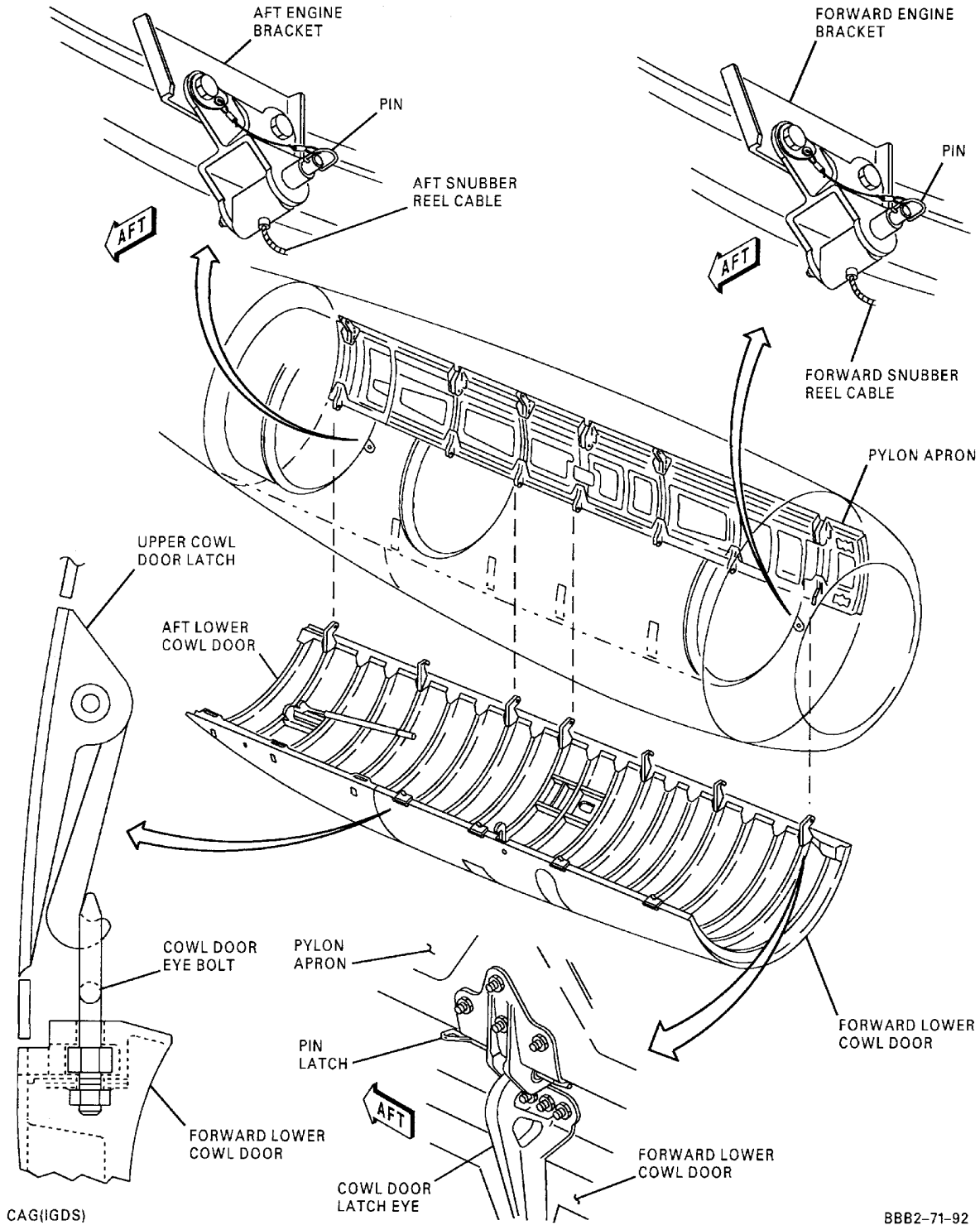
Name and Number	Manufacturer
Sling, upper cowl 5952168-1	Douglas Aircraft Co., Inc.
Push-pull gage, range 0 to 80 pounds 80D	John Chatillon & Sons, 85 Cliff St., New York 38, N.Y.
Adapter rubber tip	Locally fabricated
Strake protectors engine cowl 19801	Allied Associates Whittier, CA 90605
Torque wrench (0-200 inch-pounds range) (0-22.6 N·m)	
Paint, intumescent Flamarest 1600B (or) Coating compound, intumescent fire resistant, No. 170 and Topcoat for intumescent fire resistant coatings, No. 190	Avco Systems Division Flame Control Coatings, LLC 4120 Hyde Park Blvd. Niagra Falls, NY, 14305
Brush, soft bristle	Commercially available
Wipers, cotton, lint-free	Commercially available
Paper, Kraft, neutral MIL-P-17667, Type 1	Commercially available
Tape, masking Permacel P-703A	Permacel Div. of Johnson and Johnson
Methyl ethyl ketone TT-M-261	Commercially available
Paper, abrasive 150 to 240 grit	Commercially available



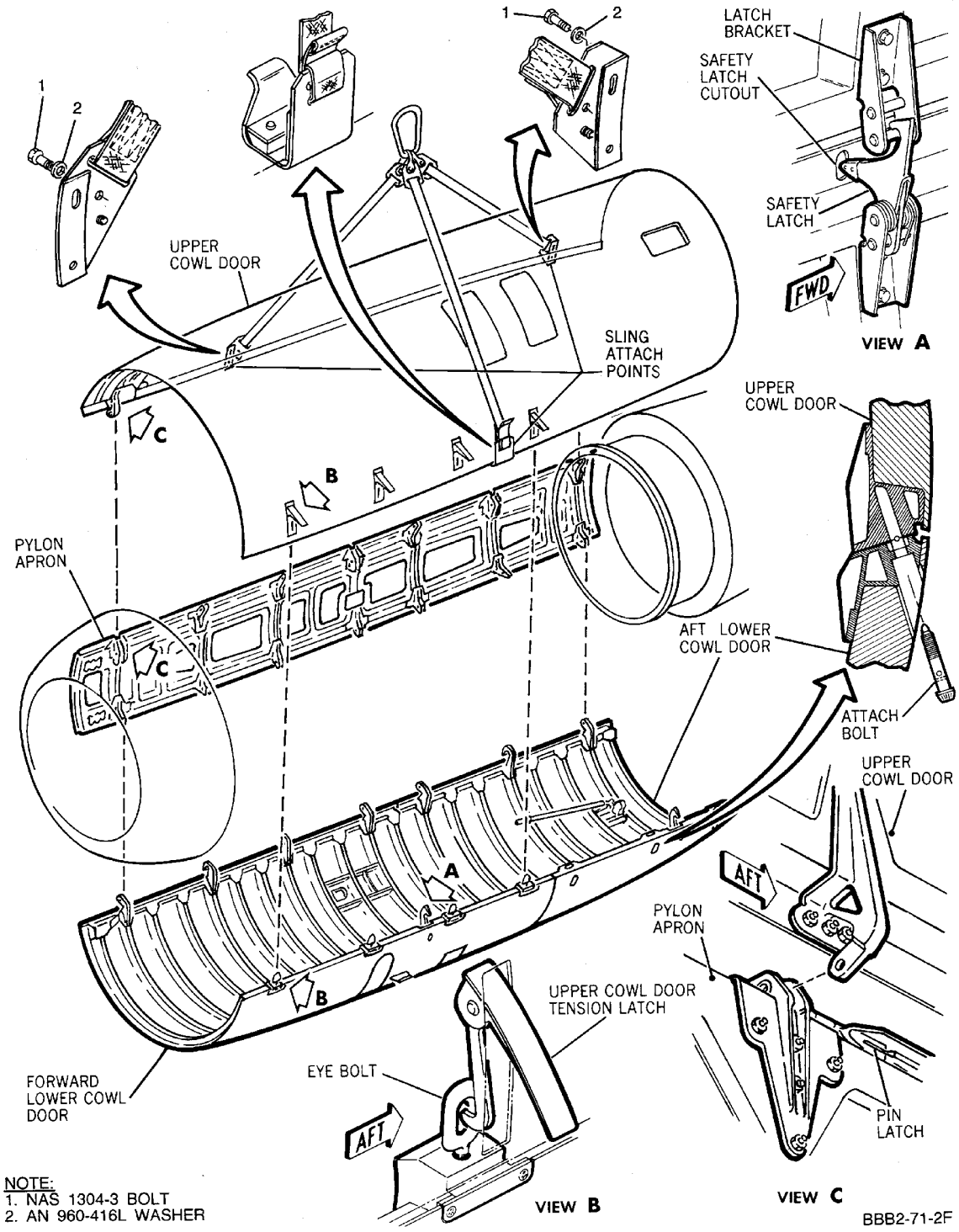
Left Lower Cowl Door -- Installation
Figure 201/71-10-03-990-805



Right Lower Cowl Door -- Installation
Figure 202/71-10-03-990-806



Right Lower Cowl Door -- Installation
Figure 203/71-10-03-990-807



NOTE:
1. NAS 1304-3 BOLT
2. AN 960-416L WASHER

Upper Cowl Door -- Installation
Figure 204/71-10-03-990-808

3. **Removal/Installation Cowl Doors**

A. Remove Forward Lower Cowl Door

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

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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Open upper cowl door tension latches and stow fully open with all hooks visible.

(4) Support forward lower cowl door, release ground safety latch, and allow door to hang vertically.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(5) Disconnect snubber reel cable(s) from engine bracket(s).

(6) Open apron forward and aft lower pin latches.

NOTE: With pin latches opened, door will remain engaged on apron frame bosses.

WARNING: FORWARD LOWER COWL DOOR WEIGHS APPROXIMATELY 99 POUNDS (45KG).

(7) Lift door up and inboard to disengage door hinge from pins on apron.

(8) Remove door and place in suitable protective rack.

B. Install Forward Lower Cowl Door

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 opened 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

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).

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

(3) Make certain apron forward and aft lower pin latches are fully opened.

WARNING: FORWARD LOWER COWL DOOR WEIGHS APPROXIMATELY 99 POUNDS (45KG).

(4) Position door; insert door hinges into apron frame bosses, lift door up, and outboard to engage door hinges.

(5) Carefully lower door, make certain hinges are engaged on apron, and allow door to hang vertically.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(6) Close apron forward and aft lower pin latches.

(7) Make certain pin latch triggers are flush with apron surface. A trigger protrusion exceeding 0.070-inch (1.78 mm) will indicate misalignment, improper installation, or a damaged latch.

WJE 407, 416, 420, 422, 424-427, 429, 861, 862, 868, 873-879, 891

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(8) Connect snubber reel cable to engine bracket.

WJE 401-404, 412, 414, 886, 887

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(9) Connect snubber reel cable(s) to engine bracket(s).

WJE 405, 406, 408-411, 415, 418, 421, 423, 863-866, 880, 881, 883, 884, 892, 893

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(10) Connect snubber reel cables to engine brackets.

WJE ALL

(11) Raise door until ground safety latch engages upper cowl door.

(12) Close upper cowl door tension latches, making certain each latch hook engages eyebolt properly.

(13) Check that all tension latch handles and triggers are flush with door surface. A protrusion exceeding 0.070-inch (1.78 mm) will indicate improper hook engagement. If adjustment is necessary. (Paragraph 4.)

(14) Remove tag from throttle/thrust reverser lever, and remove tag 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

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.

(15) Remove safety pin from thrust reverser control valve. Stow safety pin.

C. Remove Aft Lower Cowl Door

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

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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Open upper cowl door tension latches and stow fully open with all hooks visible.

(4) Support forward lower cowl door, release ground safety latch, and install both holdopen rods.

(5) Loosen aft lower cowl door captive latch bolts to open door.

(6) Support aft lower cowl door, release ground safety latch, and allow door to hang vertically.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(7) Disconnect snubber reel cable from engine bracket.

(8) Open apron forward and aft lower pin latches.

NOTE: With pin latches opened, door will remain engaged on apron frame bosses.

WARNING: AFT LOWER COWL DOOR WEIGHS APPROXIMATELY 65 POUNDS (30KG).

(9) Lift door up and inboard to disengage door hinge from pins on apron.

(10) Remove door and place in suitable protective rack.

D. Install Aft Lower Cowl Door

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 opened 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

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).

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

(3) Make certain apron forward and aft lower latches are fully opened.

WARNING: AFT LOWER COWL DOOR WEIGHS APPROXIMATELY 65 POUNDS (30KG).

(4) Position door; insert door hinges into apron frame bosses, lift door up, and outboard to engage door hinges.

(5) Carefully lower door, making certain hinges are engaged on apron, and allow door to hang vertically.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(6) Close apron forward and aft lower pin latches.

(7) Make certain pin latch triggers are flush with apron surface. A trigger protrusion exceeding 0.070-inch (1.78 mm) will indicate misalignment, improper installation, or a damaged latch.

CAUTION: SNUBBER REEL CABLE IS SPRING LOADED. RESTRAIN CABLE BEFORE REMOVING PIN. DO NOT ALLOW CABLE TO SNAP BACK INTO REEL OR POSSIBLE STRUCTURAL DAMAGE WILL OCCUR.

(8) Connect snubber reel cable to engine bracket.

(9) Raise door until ground safety latch engages upper cowl door.

(10) Tighten aft lower cowl door captive latch bolts to torque of 110 to 140 inch-pounds (12.4 to 15.8 N·m) to close door.

(11) Disconnect and stow holdopen rods and raise forward lower cowl door until ground safety latch engages upper cowl door.

(12) Close upper cowl door tension latches, making certain each latch hook engages eyebolt properly.

(13) Check that all tension latch handles and triggers are flush with door surface. A protrusion exceeding 0.070-inch (1.78 mm) will indicate improper hook engagement. If adjustment is necessary. Paragraph 4.

(14) Remove tag from throttle/thrust reverser lever, and remove tag 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 415-427, 429, 861-866, 868, 869, 871-874, 891 (Continued)

(Continued)

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
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.

(15) Remove safety pin from thrust reverser control valve. Stow safety pin.

E. Remove Upper Cowl Door

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

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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Open upper cowl door tension latches and stow fully open with all hooks visible.

(4) Support forward lower cowl door, release ground safety latch, and install both holdopen rods.

(5) Loosen aft lower cowl door captive bolts to open door.

(6) Support aft lower cowl door, release ground safety latch, and install both holdopen rods.

(7) Remove screws from door sling attach points and install sling. (Figure 204)

(8) Open all apron upper pin latches, making certain each latch is fully open.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

CAUTION: WHEN REMOVING UPPER COWL DOOR, RAISE A MINIMUM 40° TO CLEAR HOOK HING FITTINGS.

(9) With upper cowl door raised to 40° open position, hoist door to remove, taking care to prevent damage to hinges, apron, and engine components.

(10) Carefully lower door, remove sling, and install screws in door sling attach points.

(11) Place door in suitable protective rack.

F. Install Upper Cowl Door

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 opened 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

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).

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

(3) Make certain all apron upper pin latches are fully open.

(4) Remove screws from door sling attach points and install sling.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

CAUTION: DUE TO POSSIBLE UPPER COWL DOOR STANG FAIRING INTERFERENCE DURING INSTALLATION, ENGAGE AFT PORTION OF DOOR FIRST.

(5) Hoist door into approximate position and install door making certain all door latch eyes engage apron pin latches properly.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(6) Close all apron upper pin latches.

(7) Make certain all pin latch triggers are flush with apron surface. A trigger protrusion exceeding 0.070-inch (1.78 mm) will indicate misalignment, improper installation, or a damaged latch.

(8) Remove sling and install screws in door sling attach points, flush with door surface.

(9) Disconnect and stow hold open rods and raise aft lower cowl door until ground safety latch engages upper cowl door.

(10) Tighten aft lower cowl door captive latch bolts to close door.

(11) Disconnect and stow hold open rods and raise forward lower cowl door until ground safety latch engages upper cowl door.

(12) Close upper cowl door tension latches, making certain each latch hook engages eyebolt properly.

(13) Check that all tension latch handles and triggers are flush with door surface. A protrusion exceeding 0.070-inch (1.78 mm) will indicate improper hook engagement. If adjustment is necessary. (Paragraph 4.)

(14) Check gap between apron and upper cowl door for evidence of improper door alignment.

NOTE: Gap limits are 0.24 to 0.43-inch (6.0 to 10.92 mm).

NOTE: There is no provision for adjusting gap between upper cowl door to apron. If gap is out of limits, contact McDonnell Douglas Aircraft Corp. Customer Support for further instructions.

WJE 415-427, 429, 861-866, 868, 869, 871, 872, 891

(15) On aircraft with APU inhibit switch installed, perform adjustment and test of APU inhibit switch. (PAGEBLOCK 71-00-00/201)

NOTE: APU inhibit switch is installed on right engine only.

WJE ALL

(16) Remove tag from throttle/thrust reverser lever, and remove tag 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

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.

(17) Remove safety pin from thrust reverser control valve. Stow safety pin.

4. Adjustment/Test Cowl Doors and Latches

A. Adjust Cowl Door Latches

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

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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Loosen jamnut far enough to allow separation of serrated plates. (Figure 205)

(4) With hook engaged in eyebolt, position eyebolt until latch is flush with cowl door contour.

(5) Tighten jamnut until spring washer contacts serrated plates.

(6) Remove small access doors at each eyebolt.

NOTE: Adjustment of cowl door tension latches is accomplished by adjusting the lower cowl door eyebolts, one at a time.

(7) Adjust adjustment nut until force of 28 to 32 pounds (12.7 to 14.5 kg) is required to close latch.

NOTE: Force is measured with cowl doors closed and adjacent latches fully closed.

(8) Install small access doors on lower cowl door.

(9) Open cowl doors and tighten jamnuts to torque of 480 to 600 inch-pounds (53.8 to 67.2 N·m).

(10) Remove tag from throttle/thrust reverser lever, and remove tag 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

UPPER EPC, ENGINE - LEFT AC BUS

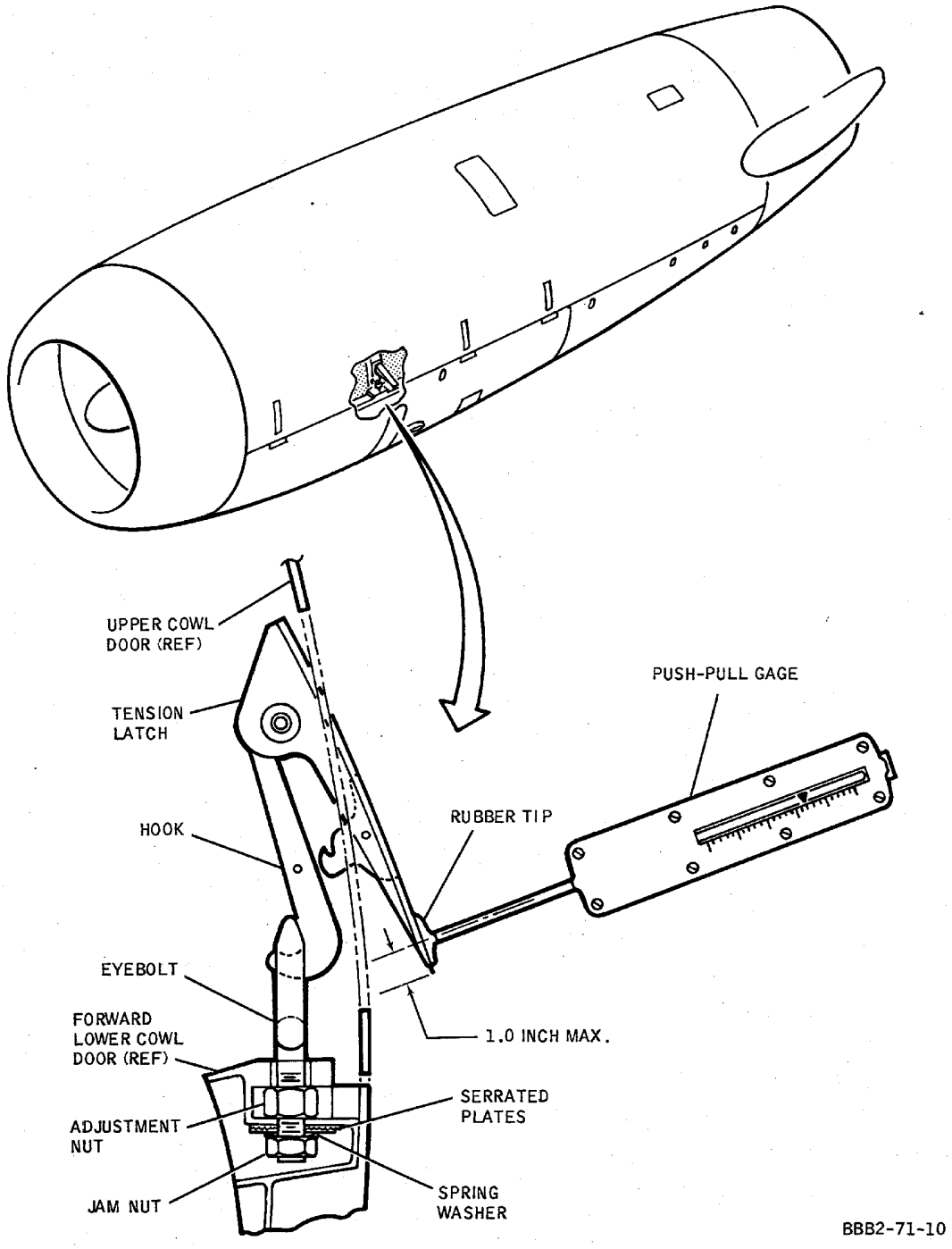
Row	Col	Number	Name
WJE ALL			
K	26	B1-424	LEFT ENGINE IGNITION

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.

(11) Remove safety pin from thrust reverser control valve. Stow safety pin.



Cowl Door Latch -- Adjustment
Figure 205/71-10-03-990-809

WJE 405-411, 415-427, 429, 861-866, 868, 869, 871, 872, 880, 881, 883, 884, 891

5. Engine Cowl Door Strake Installation/Configurations

A. Lower Forward Cowl Door

(1) MD-81, 82, or 83 Series aircraft:

(a) Strakes are to be installed at aft portion of cowl door.

(Figure 208)

(2) MD-87 Series aircraft:

(a) Strakes are to be installed from leading edge to aft edge of cowl door.

(Figure 208)

NOTE: Strakes for left lower forward cowl door consists of three sections because of the oil tank access door.

NOTE: MD-81, 82, and 83 Series aircraft lower forward cowl doors cannot be used on series 87 aircraft. Series 81, 82, and 83 aircraft lower forward cowl doors have no strake mounting provisions.

NOTE: Because of different nacelle strake configurations between MD-81, 82, 83 and MD-87 aircraft, strakes are not interchangeable between these two aircraft.

NOTE: For complete instructions on strake Removal/Installation procedures, refer to Component Maintenance Manual, Chapter 71-10-12 for forward lower cowl door and 71-10-13 for aft lower cowl door.

B. Lower Aft Cowl Door

(1) MD-87 Series type aircraft lower aft cowl door is interchangeable with Series 81, 82, and 83 aircraft.

(2) When using MD-87 Series lower aft cowl door on 81, 82, or 83 Series aircraft, requires the removal of strake, and open holes must be plugged by using set screw MS18066-57.

(Figure 208)

NOTE: Because of different nacelle strake configurations between MD-81, 82, and 83 and MD-87 aircraft, strakes are not interchangeable between these two aircraft.

NOTE: For complete instructions on strake Removal/Installation procedures, refer to Component Maintenance Manual, Chapter 71-10-12 for forward lower cowl door and 71-10-13 for aft lower cowl door.

WJE ALL

6. Inspection/Check Cowl Doors

A. Intumescent Paint Limits

NOTE: Intumescent paint is no longer required except on aircraft with aramid/epoxy (kevlar material) engine cowls.

(1) Check intumescent paint forward of aft radial fireseal, engine flange "N", for scratches or cracks in paint. Inservice limits are not to exceed 1/16 inch (1.6 mm) width quantity or length of scratches or cracks are unlimited, providing paint has good adhesion.

(2) Intumescent paint aft of aft radial fireseal, engine flange "N", may exhibit paint separation or may be totally devoid of intumescent paint since they are outside of nacelle compartment fire zone.

B. Cowl Door Strake Damage Limits

(1) No damage that reduces planform area more than 3 percent.

(2) No edge waviness greater than 1/4 inch (6.4 mm) (high point to low point).

(3) No surface dents greater than 1/4 inch (6.4 mm) deep.

C. Check Cowl Door Strake Mismatch

WJE 401-406, 409-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 891-893

(1) Check strake mismatch between forward and aft cowl doors (Figure 206).

WJE 407, 408, 886, 887

(2) Check strake mismatch between forward and aft cowl doors (Figure 207).

WJE 401-406, 409-412, 414-427, 429, 861-866, 868, 869, 871-881, 883, 884, 891-893

(3) If allowable mismatch exceeds 0.2 inch (5.10 mm), forward strake can be moved up or down by loosening attaching screws. Then tighten screws.

NOTE: For complete instructions on strake Removal/ Installation procedures, refer to Component Maintenance Manual, Chapter 71-10-12 for forward lower cowl door and 71-10-13 for aft lower cowl door.

WJE 407, 408, 886, 887

(4) If allowable mismatch exceeds 0.09 inch (2.28 mm), strakes can be moved up or down by loosening attaching screws. Then tighten screws.

NOTE: For complete instructions on strake Removal/ Installation procedures, refer to Component Maintenance Manual, Chapter 71-10-12 for forward lower cowl door and 71-10-13 for aft lower cowl door.

WJE ALL

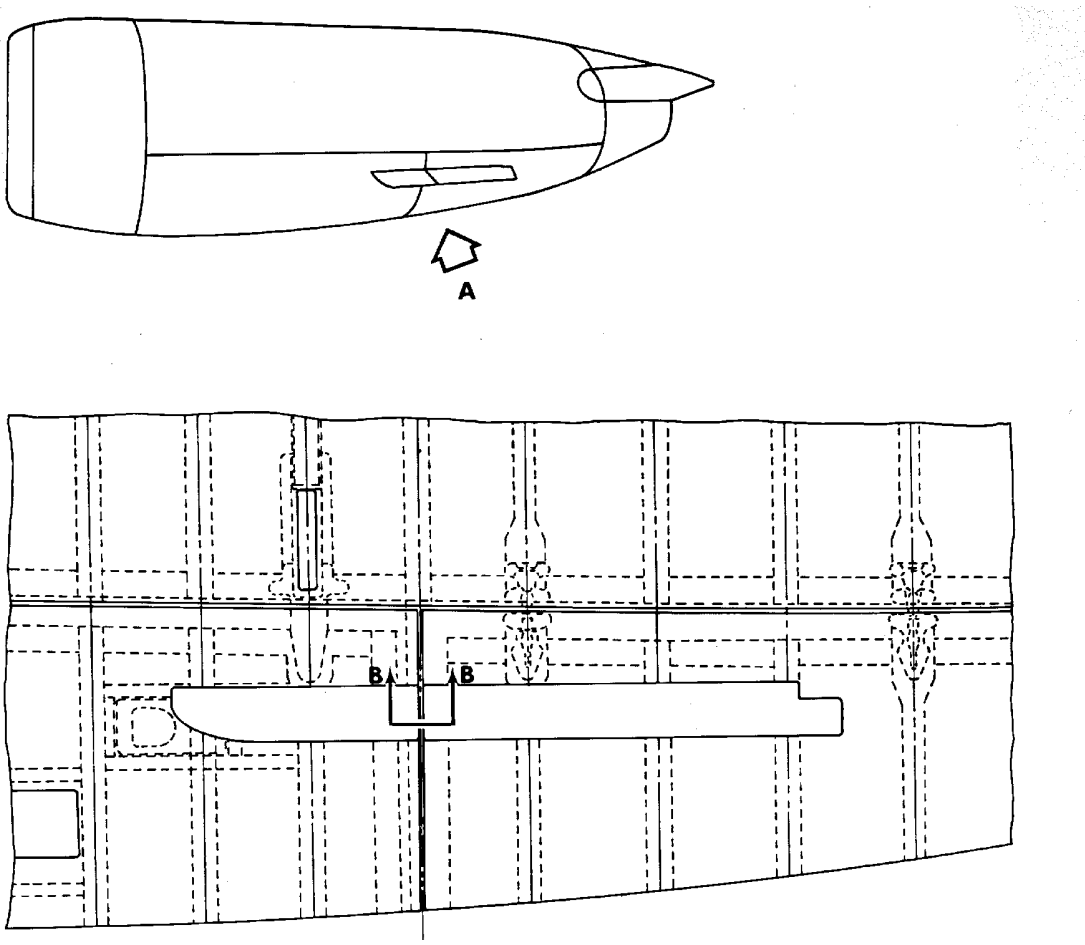
D. Inspect nacelle cowl component mismatch (step) as follows:

(1) The upper and lower engine access door-to-apron step can be 0.180 inch maximum with an average step of 0.125 inch.

(2) The access doors and apron-to-thrust reverser can be 0.062 inch, except ±0.125 inch maximum for 20 percent of the periphery.

(3) The lower forward access door-to-lower aft access door can be 0.062 inch, except ±0.125 inch maximum for 30 percent of the periphery.

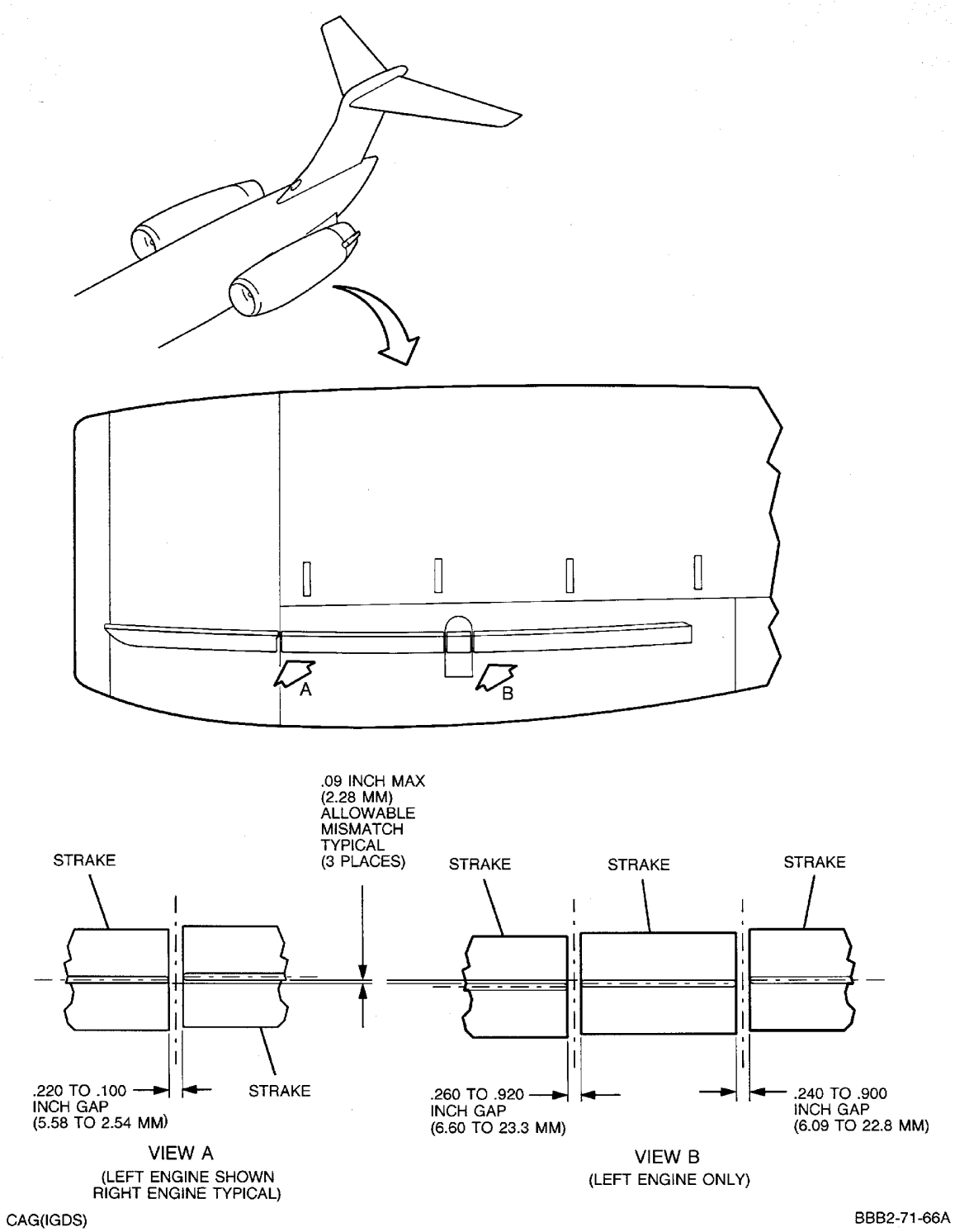
(4) The nose cowl-to-access doors can be 0.031 inch, except ±0.062 inch maximum for 20 percent of the periphery and ±0.094 maximum for 7 percent of the periphery.



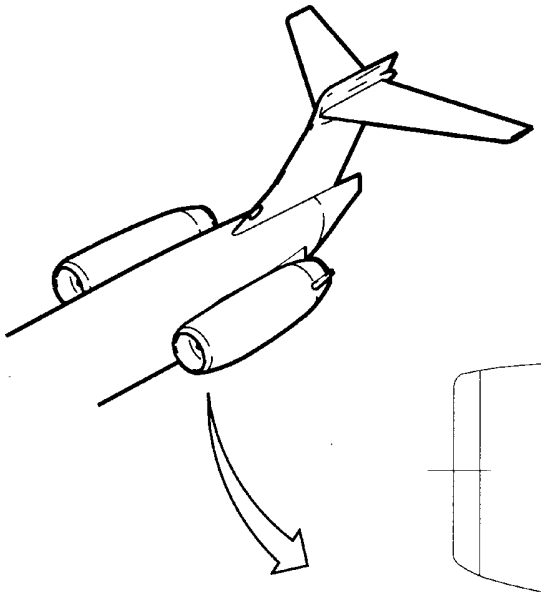
Cowl Door Strake Allowable Mismatch -- Check
Figure 206/71-10-03-990-810

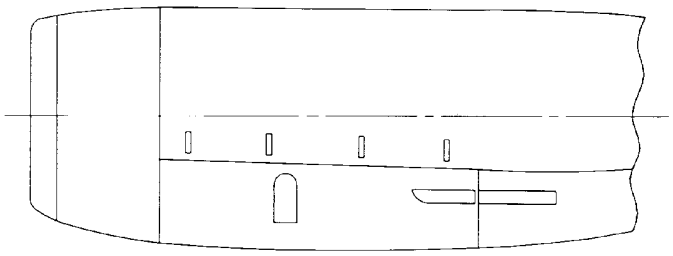
7. **Approved Repair Cowl Doors**

A. Repair Intumescent Paint, refer to MD-80 Structural Repair Manual, Chapter 51-80-0.

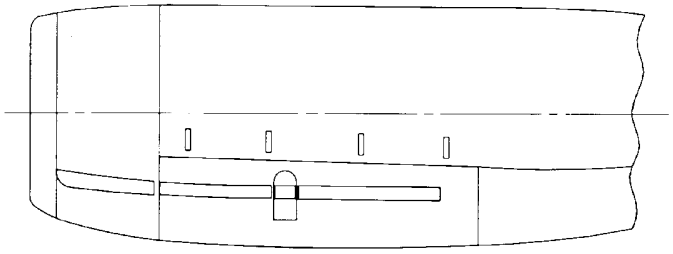


Cowl Door Strake Allowable Mismatch -- Check
Figure 207/71-10-03-990-811





MD-81, 82 AND 83 AIRCRAFT ONLY
(LEFT ENGINE SHOWN
RIGHT ENGINE TYPICAL)



MD-87 AIRCRAFT ONLY
(LEFT ENGINE SHOWN)

NOTE: 1. LEFT LOWER FORWARD COWL DOOR CONSISTS OF THREE SECTIONS BECAUSE OF OIL TANK ACCESS DOOR.

2. RIGHT LOWER FORWARD COWL DOOR HAS ONLY TWO SECTIONS.

NOTE: ANY OPEN HOLES MUST BE PLUGGED USING SET SCREW MS 18066-57.

CAG(IGDS)

BBB2-71-70

Engine Cowl Door Strake -- Installation/Configurations
Figure 208/71-10-03-990-812

COWL DOORS - INSPECTION/CHECK

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-10-03-211-801

2. Detailed Inspection of the Inner Surfaces of the Engine Cowl Doors and Seals

A. Prepare for a Detailed Inspection of the Inner Surfaces of the Engine Cowl Doors and Seals

SUBTASK 71-10-03-010-001

(1) Open the engine upper and lower cowl and install hold open rods.

B. Detailed Inspection of the Inner Surfaces of the Engine Cowl Doors and Seals

SUBTASK 71-10-03-211-011

(1) Do detailed inspection of the inner surfaces of the engine cowl doors and seals.

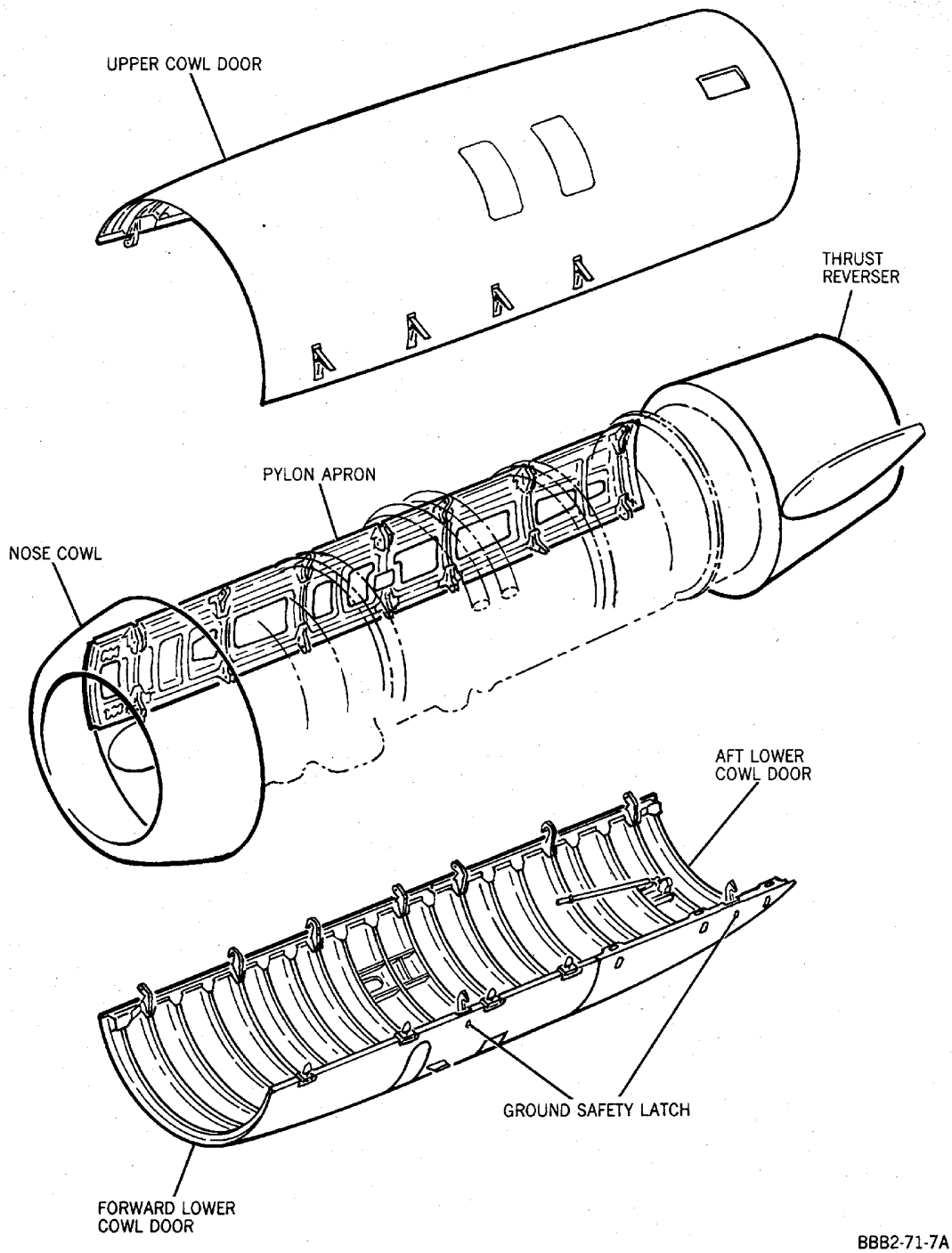
(a) Check inner surfaces of the cowl doors and seals for cracks, damage, evidence of overheating and condition.

C. Job Close-up

SUBTASK 71-10-03-410-001

(1) Make sure the engine upper and lower cowl hold open rods are stowed and the cowling is closed and latched.

END OF TASK



ENGINE UPPER AND LOWER COWL
Figure 601/71-10-03-990-813

TASK 71-10-03-211-803

3. Detailed Inspection of the Ground Safety Latch

A. Prepare for a Detailed Inspection of the Ground Safety Latch

SUBTASK 71-10-03-010-003

(1) Open the engine upper and lower cowl and install hold open rods.

B. Detailed Inspection of the Ground Safety Latch

SUBTASK 71-10-03-211-002

(1) Do a detailed inspection of the ground safety latch.

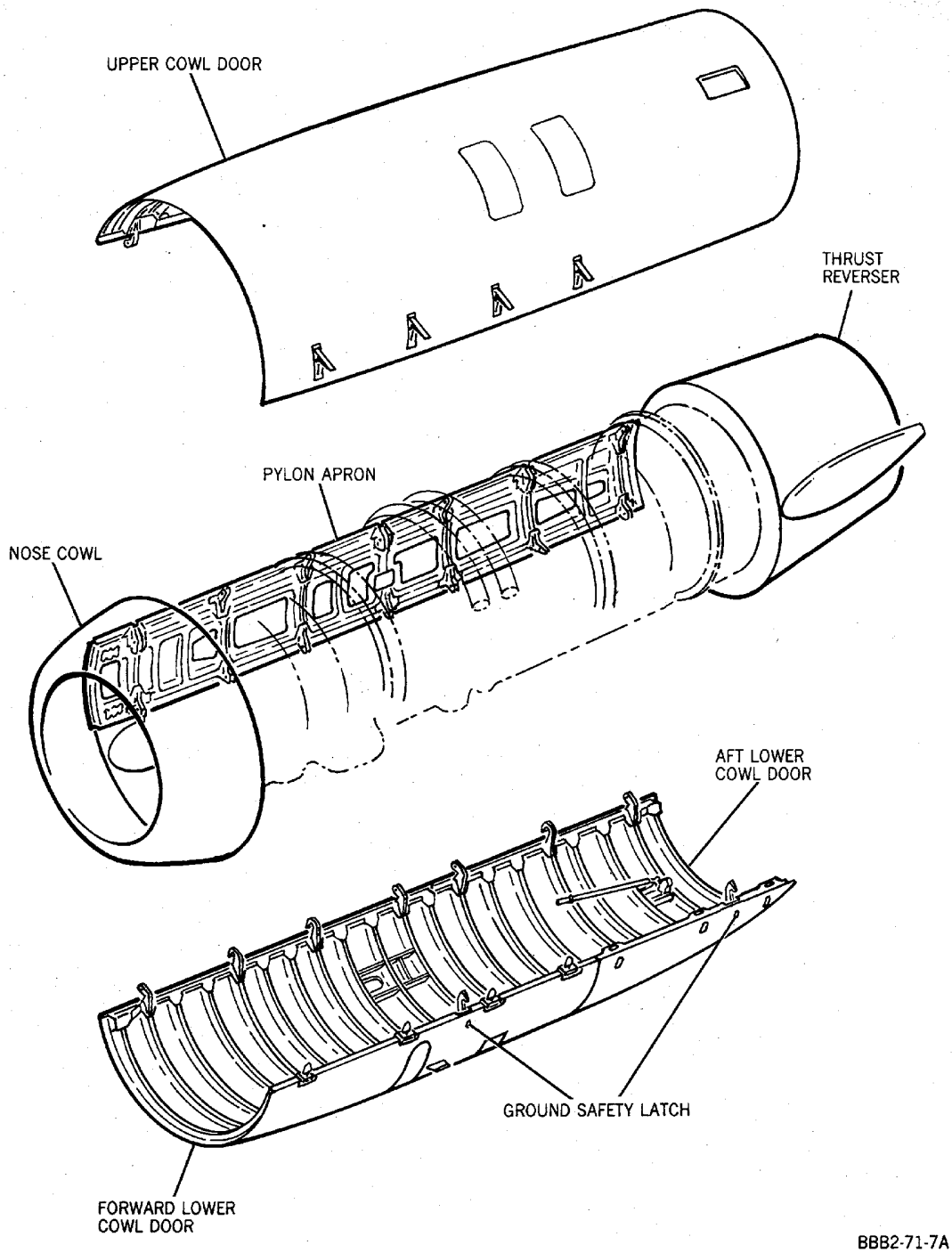
(a) Check for cracks, damage, evidence of overheating and condition.

C. Job Close-up

SUBTASK 71-10-03-410-003

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

——— END OF TASK ———



ENGINE UPPER AND LOWER COWL
Figure 602/71-10-03-990-816

TASK 71-10-03-211-805

4. Detailed Inspection of the Fan Cowl Hold Open Rod Storage and Attachments

A. Prepare for a Detailed Inspection of the Fan Cowl Hold Open Rod Storage and Attachments

SUBTASK 71-10-03-010-005

(1) Open the engine upper and lower cowl and install hold open rods.

B. Detailed Inspection of the Fan Cowl Hold Open Rod Storage and Attachments

SUBTASK 71-10-03-211-004

(1) Do a detailed inspection of the engine fan cowl hold open rods storage and attachments.

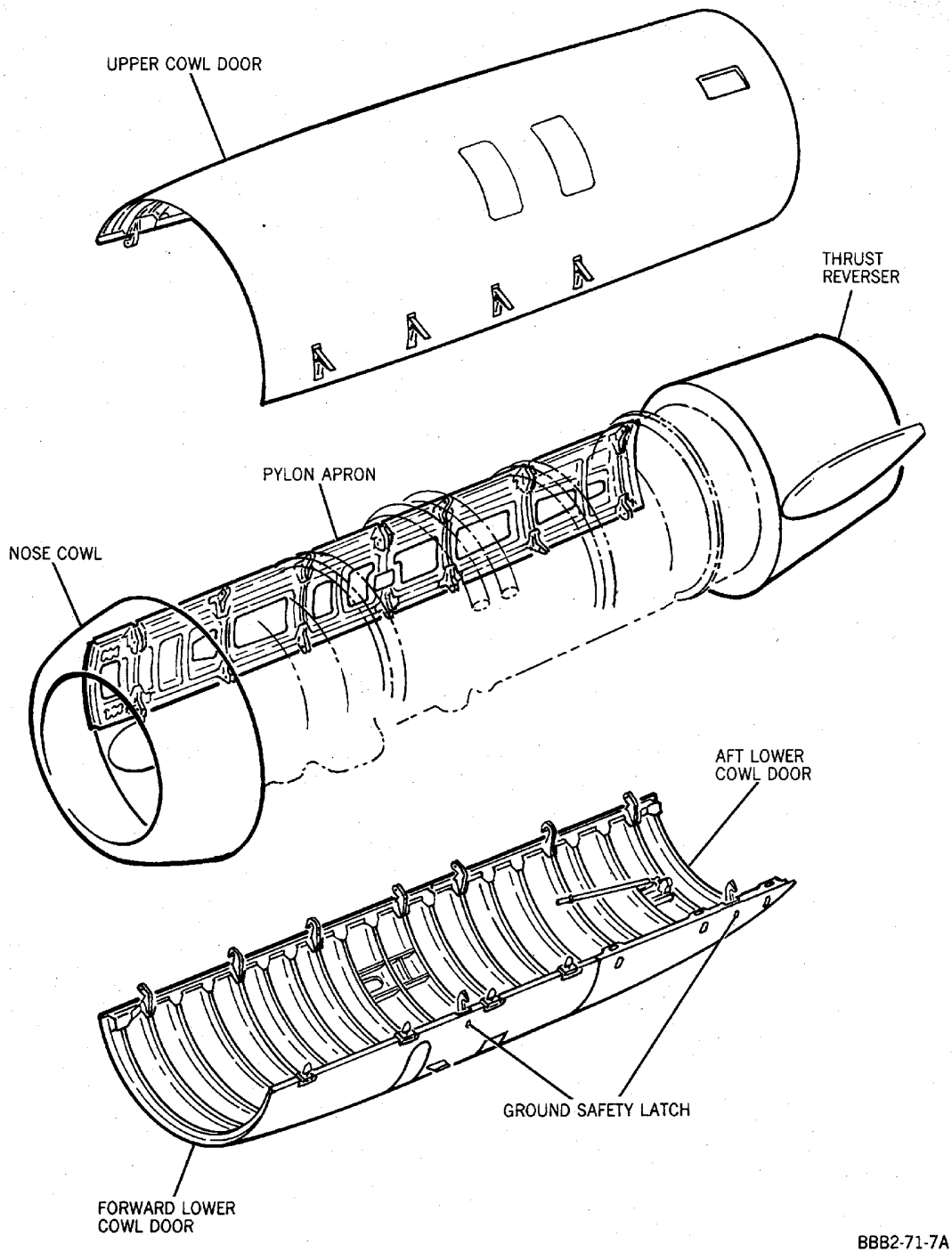
(a) Check for cracks, damage, evidence of overheating and condition.

C. Job Close-up

SUBTASK 71-10-03-410-005

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

——— END OF TASK ———



ENGINE UPPER AND LOWER COWL
Figure 603/71-10-03-990-817

TASK 71-10-03-211-808

5. Detailed Inspection of the Snubber Reels and Attachments

A. Prepare for a Detailed Inspection of the Snubber Reels and Attachments

SUBTASK 71-10-03-010-008

(1) Open the engine lower cowl doors and install hold open rods.

B. Detailed Inspection of the Snubber Reels and Attachments

SUBTASK 71-10-03-211-007

(1) Do a detailed inspection of the forward and aft engine cowl snubber reels and attachments.

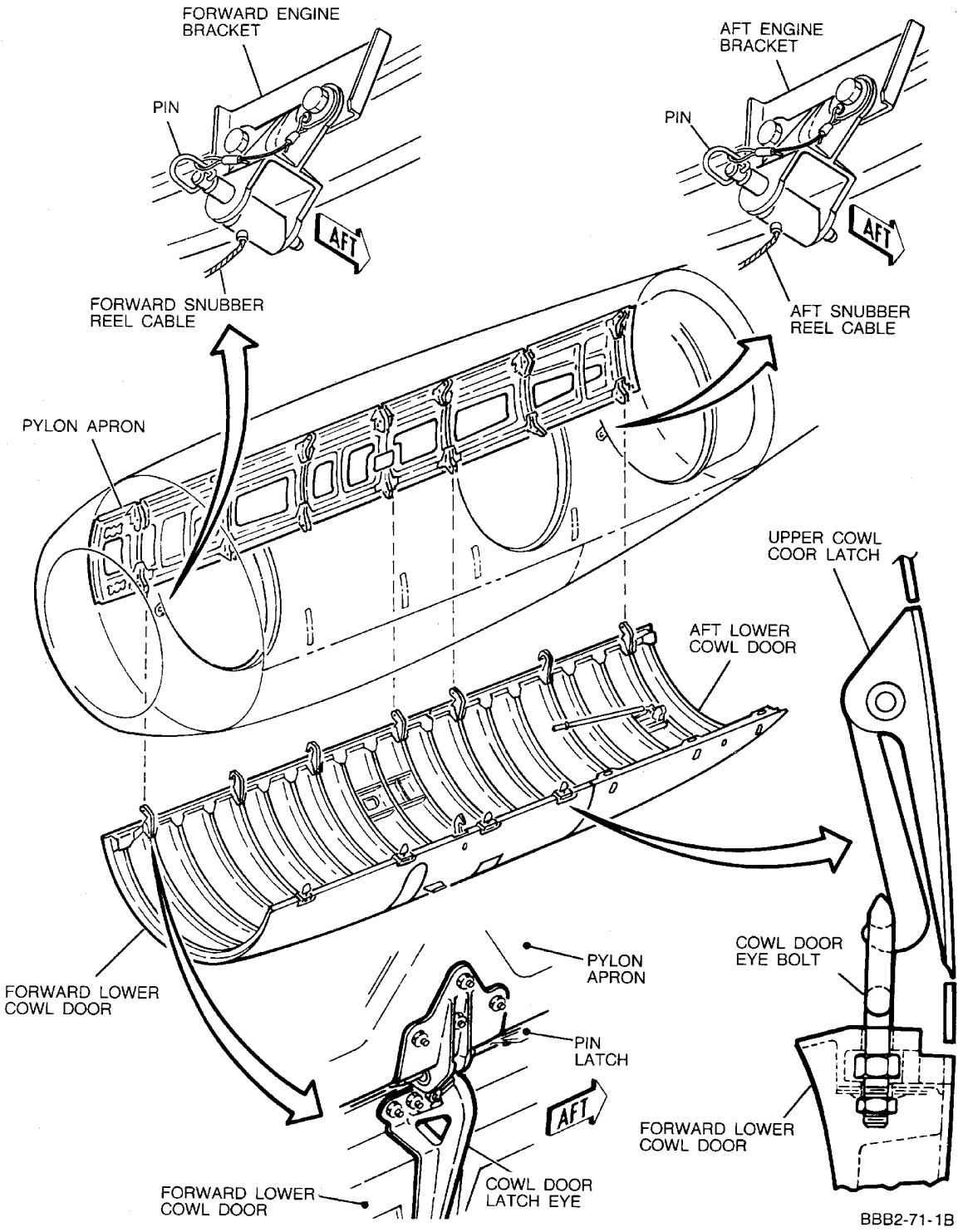
(a) Check for cracks, damage, evidence of overheating and condition.

C. Job Close-up

SUBTASK 71-10-03-410-008

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

——— END OF TASK ———



ENGINE LOWER COWL DOORS
Figure 604/71-10-03-990-820

TASK 71-10-03-211-809

6. Detailed Inspection of the Fan Cowl Hinge/Beams

A. Prepare for a Detailed Inspection of the Fan Cowl Hinge/Beams

SUBTASK 71-10-03-010-009

(1) Open the engine upper and lower cowl and install hold open rods.

B. Detailed Inspection of the Fan Cowl Hinge/Beams

SUBTASK 71-10-03-211-008

(1) Do a detailed inspection of the engine fan cowl hinge/beams.

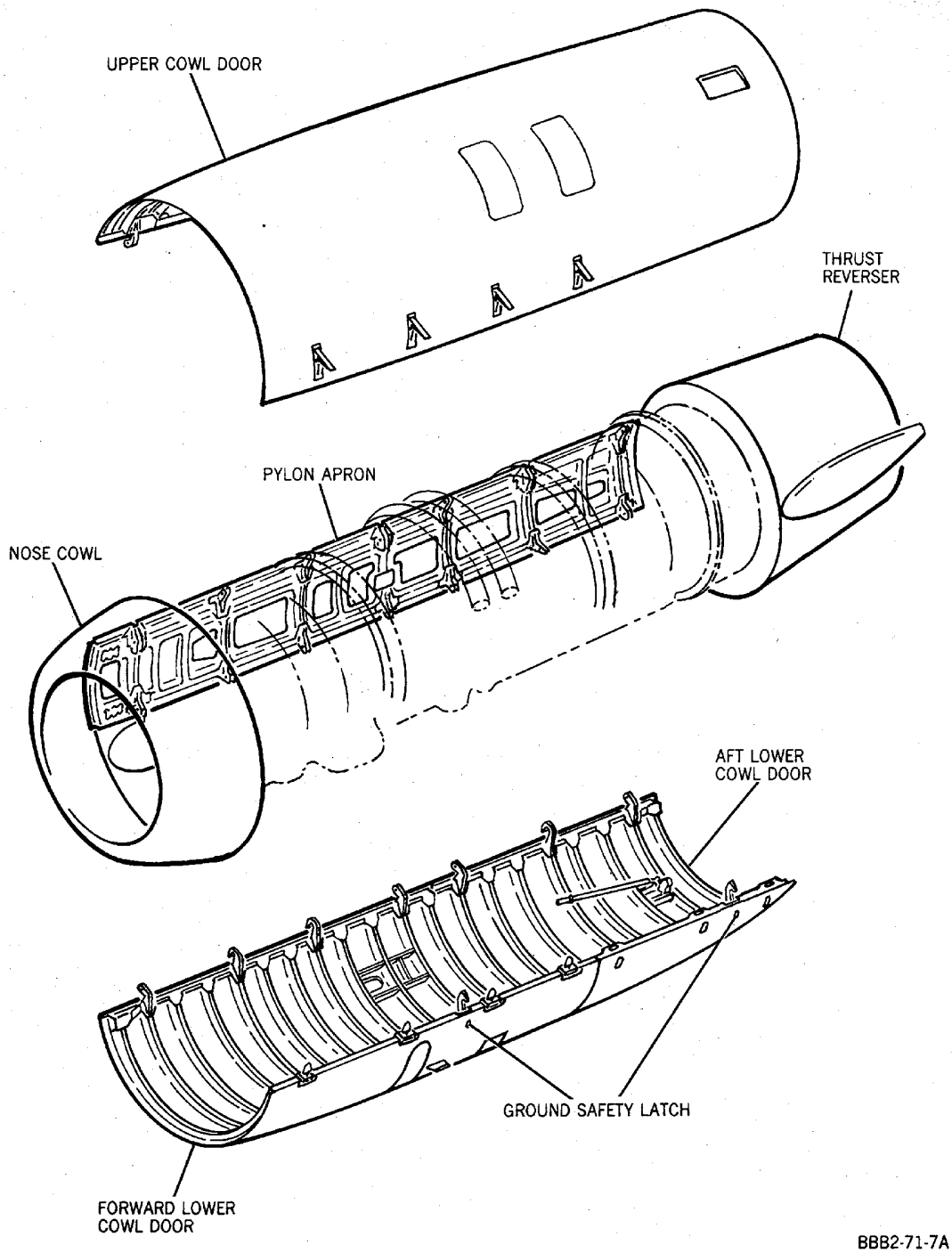
(a) Check for cracks, damage, evidence of overheating and condition.

C. Job Close-up

SUBTASK 71-10-03-410-009

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

——— END OF TASK ———



ENGINE UPPER AND LOWER COWL
Figure 605/71-10-03-990-821

TASK 71-10-03-211-811

7. Detailed Inspection of the Fan Cowl Latches and Attaching Hardware and Attachments

A. Prepare for a Detailed Inspection of the Fan Cowl Latches and Attaching Hardware and Attachments

SUBTASK 71-10-03-010-011

(1) Open the engine upper and lower cowl and install hold open rods.

B. Detailed Inspection of the Fan Cowl Latches and Attaching Hardware and Attachments

SUBTASK 71-10-03-211-010

(1) Do a detailed Inspection of the engine fan cowl latches and attaching hardware and attachments.

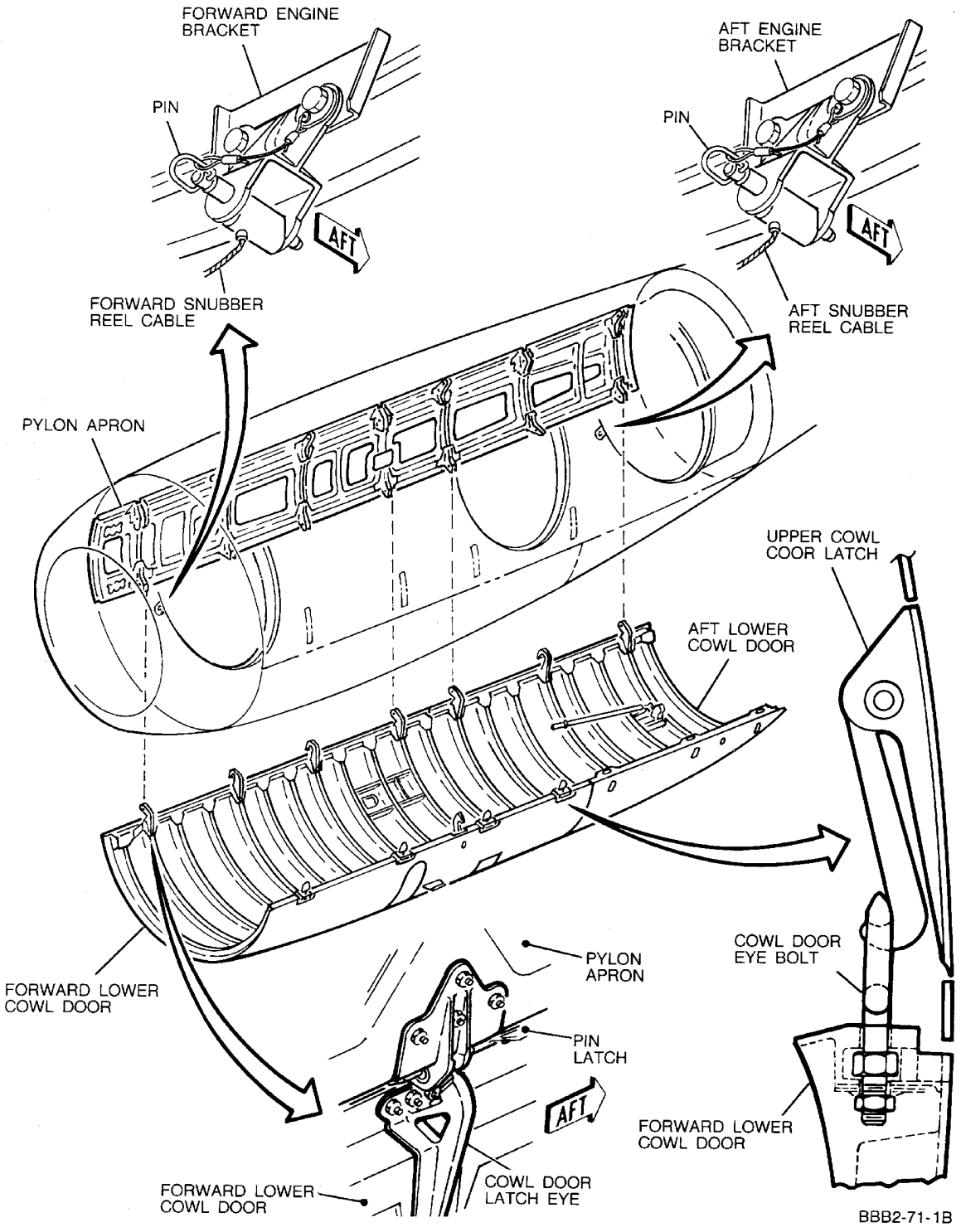
(a) Check for cracks, damage, evidence of overheating and condition.

C. Job Close-up

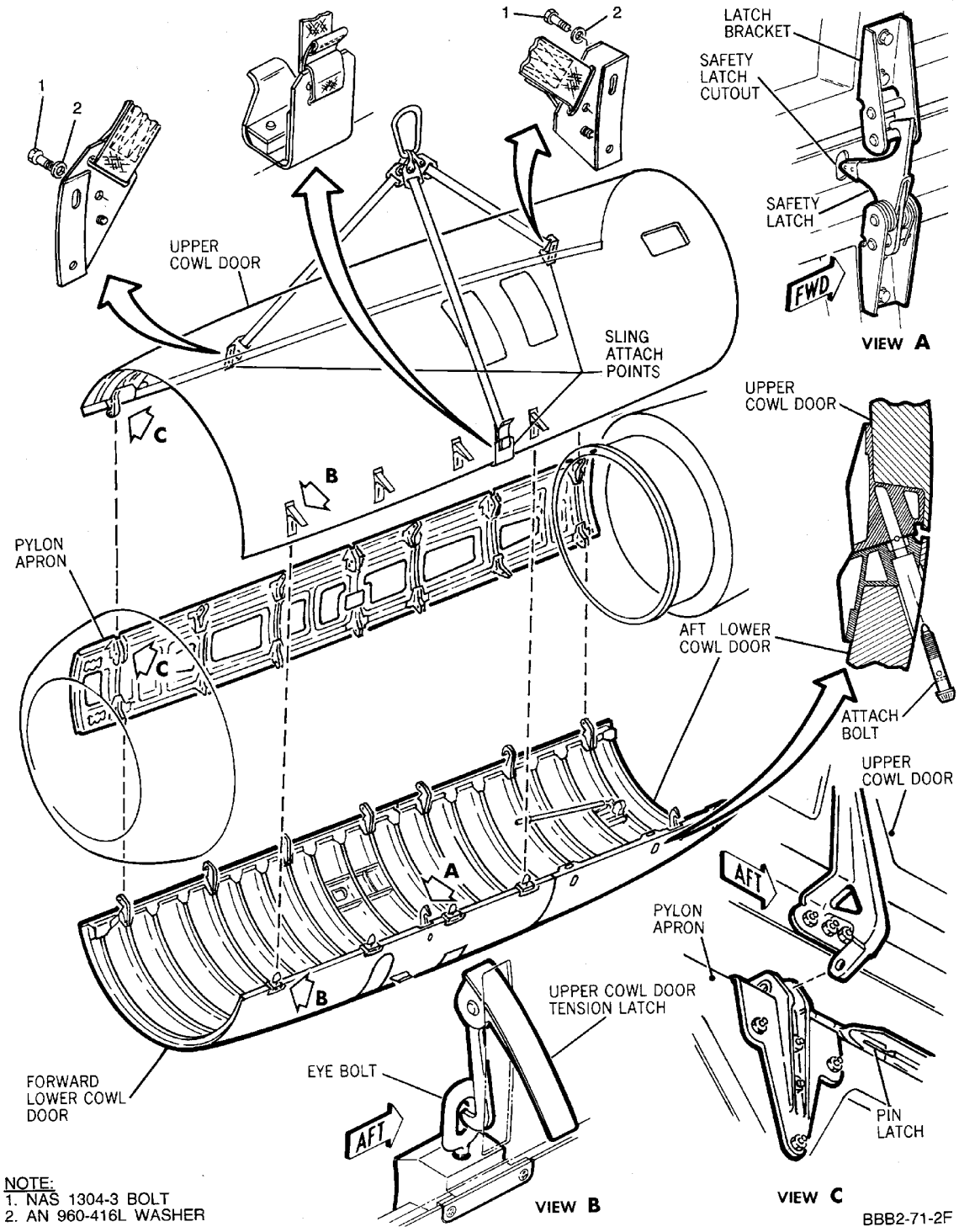
SUBTASK 71-10-03-410-011

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

——— END OF TASK ———



ENGINE LOWER COWL
Figure 606/71-10-03-990-823



NOTE:
1. NAS 1304-3 BOLT
2. AN 960-416L WASHER

ENGINE UPPER COWL
Figure 607/71-10-03-990-824

PYLON APRONS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation instructions for the pylon apron.

B. The pylon apron is attached to the inboard side of the engine. The engine and forward engine mount must be removed in order to remove the pylon apron.

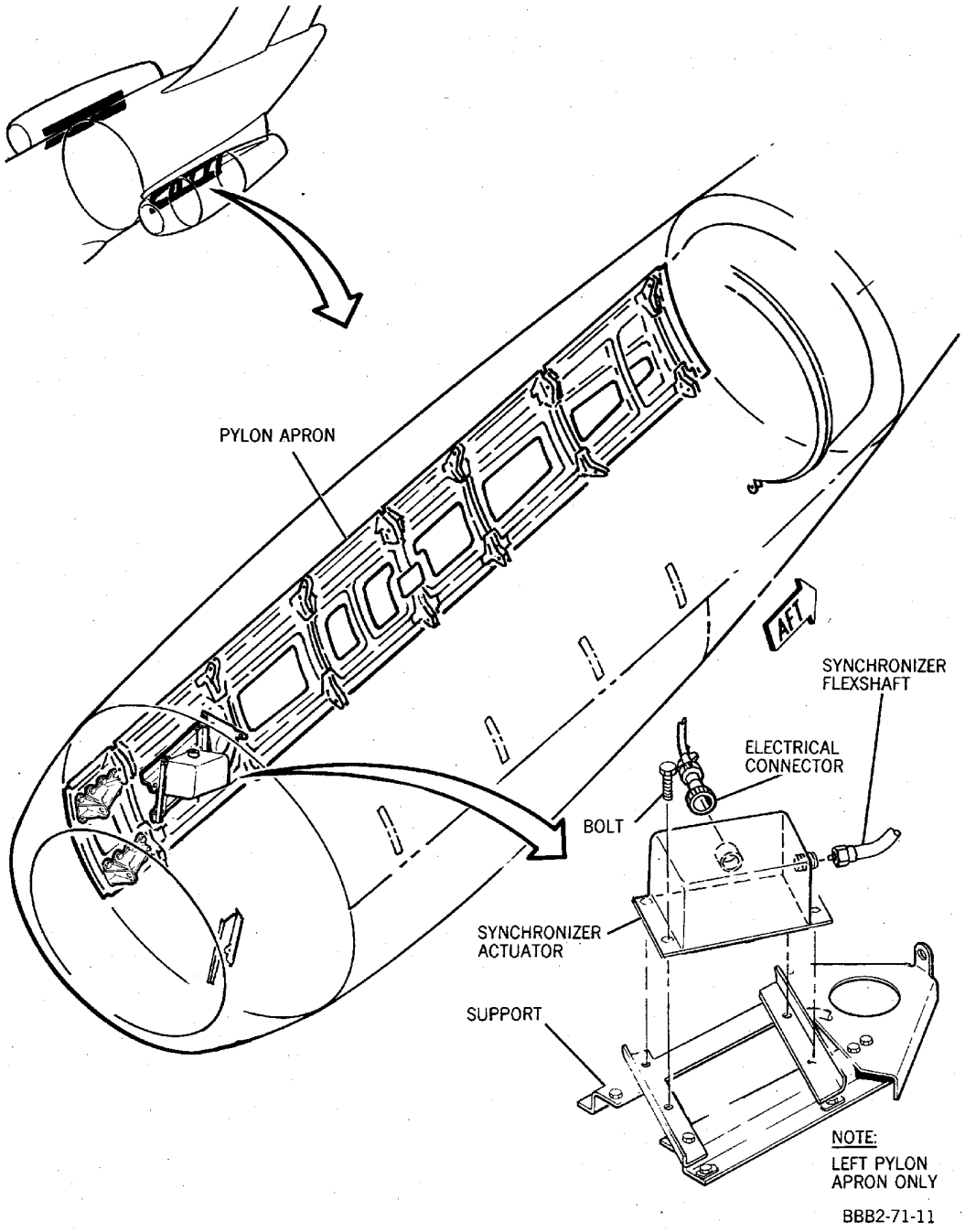
C. Removal and installation procedures for left and right pylon aprons are identical unless otherwise stated.

2. Equipment and Materials

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

Table 201

Name and Number	Manufacturer
Sling, Pylon Apron Douglas Aircraft Co. P/N 5955397-1	
Torque wrench (0 to 300 inch-pounds range) (0-33.6 N·m)	



Pylon Apron -- Removal/Installation
Figure 201/71-10-04-990-801

3. **Removal/Installation Pylon Aprons**

A. Remove Pylon Apron.

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

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name

WJE ALL

T	40	B1-726	ENGINE SYNC

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) Place thrust reverser control valve in dump position and install safety pin.

(3) Remove engine (determine cofiguration).

(GENERAL, SUBJECT 71-00-00) page 401.

(4) Remove forward engine mount.

(VIBRATION ABSORBER, SUBJECT 71-20-03) page 201.

(5) On left apron disconnect synchronizer actuator electrical connector.

(6) On left apron remove engine synchronizer actuator, if new pylon apron is to be installed.

(ENGINE SYNCHRONIZER, SUBJECT 76-11-02) page 201.

WARNING: PYLON APRON WEIGHS APPROXIMATELY 81 POUNDS (37 KG.).

(7) Remove pylon apron and place in suitable protective padded racks.

B. Install Pylon Apron.

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 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

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name

WJE ALL

T	40	B1-726	ENGINE SYNC

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 safety pin is installed.

WARNING: PYLON APRON WEIGHS APPROXIMATELY 81 POUNDS (37 KG.).

(3) Install pylon apron, on pylon front spar and engine aft mount.

(4) On left apron, install engine synchronizer actuator.

(ENGINE SYNCHRONIZER, SUBJECT 76-11-02) page 201.

(5) On left apron, connect electrical connector synchronizer actuator.

(6) Install forward engine mount.

(VIBRATION ABSORBER, SUBJECT 71-20-03)page 201.

(7) Install engine (determine configuration).

(GENERAL, SUBJECT 71-00-00) page 401.

(8) 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

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE ALL			
T	40	B1-726	ENGINE SYNC

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

(9) Remove safety pin from thrust reverser control valve. Stow safety pin.

PYLON APRONS - INSPECTION/CHECK

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-10-04-211-801

2. Detailed Inspection of the Engine Undercowl Pylon Apron Surface

A. Detailed Inspection of the Engine Undercowl Pylon Apron Surface

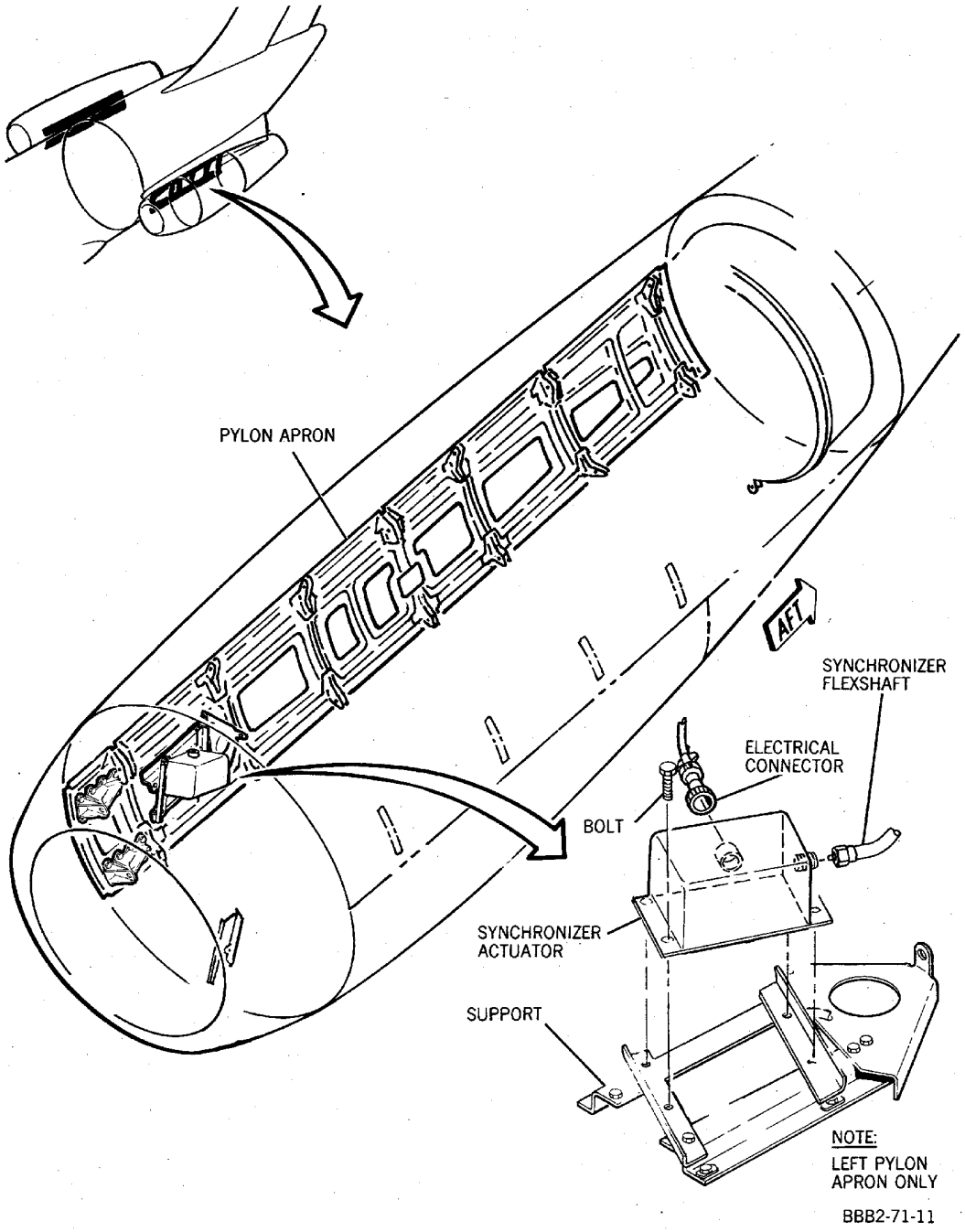
SUBTASK 71-10-04-211-001

NOTE: Inspect with engine removed.

(1) Do a detailed inspection of the engine undercowl pylon apron surface.

(a) Check for cracks, damage, evidence of overheating and condition.

——— END OF TASK ———



UNDERCOWL PYLON APRON
Figure 601/71-10-04-990-802

APU INHIBIT SWITCH - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation instructions for the APU inhibit switch.

B. The APU inhibit switch is mounted on a bracket located on inboard forward end of pylon apron at upper cowl door forward latch pin. Access is through upper cowl door.

NOTE: Forward lower cowl door overlaps the aft lower cowl door and must be opened first.

2. Equipment and Materials

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

Table 201

Name and Number	Manufacturer
Lockwire 0.020 corrosion resistant steel P05-288	

3. Removal/Installation APU Inhibit Switch

A. Remove APU Inhibit Switch

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.

(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
U	41	B1-2	ENGINE IGNITION RIGHT
U	42	B1-1	ENGINE IGNITION LEFT

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) Place thrust reverser control valve in dump position and install safety pin.

(3) Open upper cowl door tension latches and stow open with all hooks visible.

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

(4) Support forward lower cowl door, release ground safety latch, and install both holdopen rods.

(5) Loosen aft lower cowl door bolts to open door.

(6) Support aft lower cowl door, release ground safety latch, and install both holdopen rods.

(7) Open upper cowl door to full open position and install both holdopen rods.

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.

(8) Disconnect electrical connector P1-929 from APU inhibit switch and stow on bracket provided. (Figure 201).

(9) Cut and remove safety wire at APU inhibit switch jam nuts.

(10) Measure and record distance from face of APU Switch bracket to shoulder of switch roller.

(11) Remove APU inhibit switch.

B. Install APU Inhibit 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 certain throttle/thrust reverser lever is tagged and following circuit breakers are opened and tagged.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	40	B1-40	ENGINE START PUMP
U	41	B1-2	ENGINE IGNITION RIGHT
U	42	B1-1	ENGINE IGNITION LEFT

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 safety pin is installed.

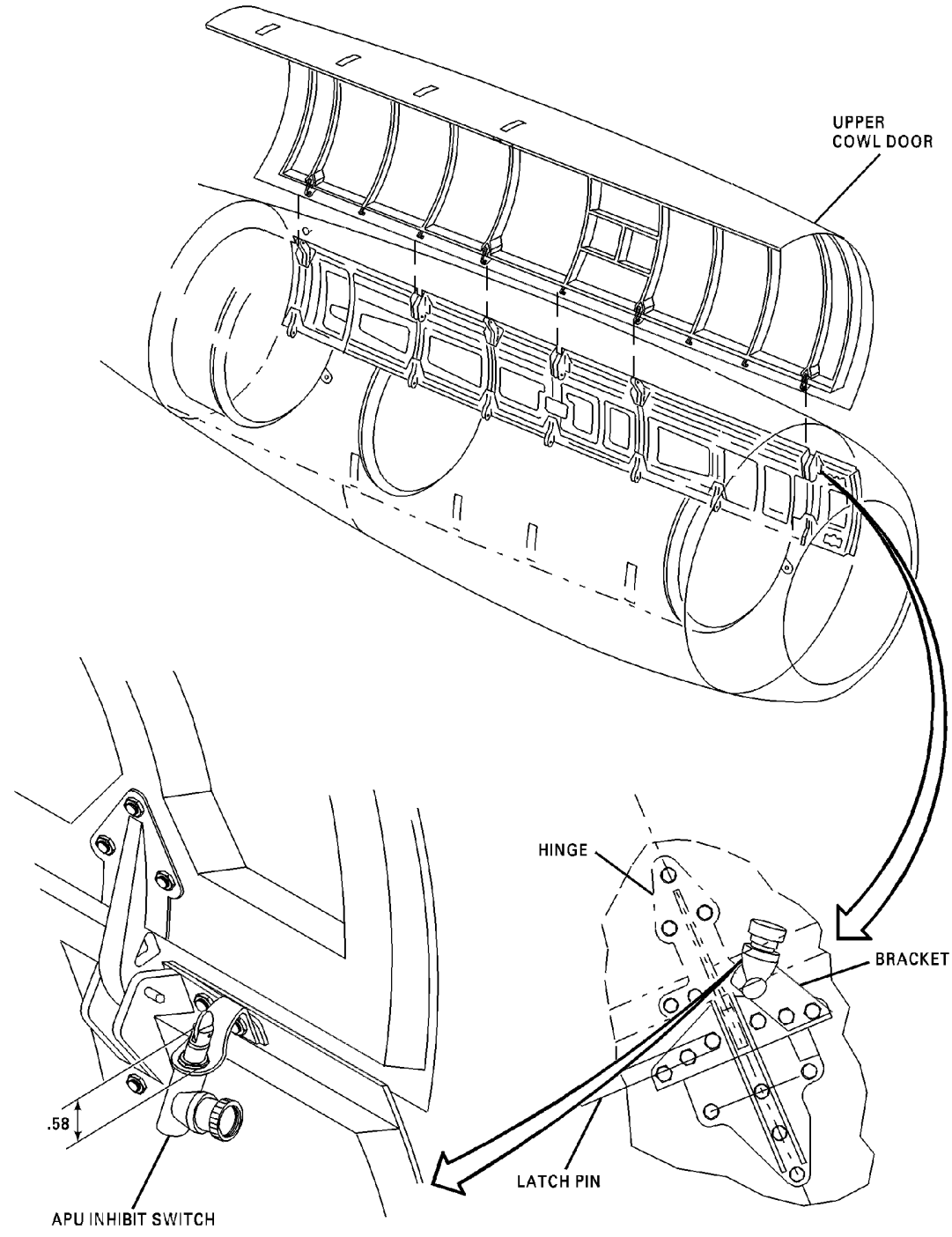
(3) Thread APU inhibit switch lower jam nut to bottom thread of switch. Install anti rotation washer on lower jam nut. Install APU inhibit switch in bracket with switch roller facing up. (Figure 201).

(a) Install lock washer and upper jam nut on switch.

(b) Adjust jam nuts on switch so that measurement from face of switch bracket to shoulder of switch roller is the same as that recorded in Paragraph 3.A.(10). If measurement was not recorded, then adjust jam nuts so that measurement is approximately 0.58 inches.

(c) Tighten both jam nuts and safety with P05-288 lockwire.

(d) Connect electrical connector P1-929.



APU Inhibit Switch -- Removal/Installation
Figure 201/71-10-10-990-801

4. Adjust and Test APU Inhibit Switch After Switch, Engine or Upper Cowl Door Replacement

CAUTION: DO NOT MAKE ANY ADJUSTMENTS TO INHIBIT SWITCH THAT WILL COMPLETELY DEPRESS SWITCH PLUNGER. PREMATURE INHIBIT SWITCH FAILURE CAN RESULT.

A. Perform APU Inhibit Switch Test

NOTE: Aircraft should be resting on landing gear to simulate aircraft on ground conditions.

(1) Verify right engine upper cowl door is properly adjusted and closed then perform following test.

CAUTION: DO NOT OPERATE APU ELECTRICAL OR PNEUMATIC SYSTEMS WHEN PERFORMING THIS TEST, DAMAGE TO APU COULD RESULT.

(a) Start APU. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 49-00-00/501 Config 3)

NOTE: This test is to insure that the APU will start when right engine upper cowl door is closed.

(b) If APU does not start, adjust APU inhibit switch jam nuts to raise switch in bracket to position where APU will start with right engine upper cowl door closed.

NOTE: Only small adjustments of inhibit switch in bracket should be necessary to obtain proper adjustment.

(c) With right engine upper cowl door closed verify that APU will start.

(2) With APU running perform following test.

NOTE: This test is to insure that APU inhibit switch will shut down APU when right engine upper cowl door is opened.

(a) Raise right engine upper cowl door a maximum of 5 inches, APU should shut down. If APU continues to run shut down APU.

(b) Adjust APU inhibit switch jam nuts to lower switch in bracket so that APU will shut down when right engine upper cowl door is opened a maximum of 5 inches.

(3) With APU shut down perform following test.

NOTE: This test is to insure that APU will not start while right engine upper cowl door is open.

(a) Raise right engine upper cowl door a minimum of 5 inches and no more than 7 inches. Activate APU start switch, APU should not start. If APU starts, shut down APU. (GENERAL - ADJUSTMENT/TEST, PAGEBLOCK 49-00-00/501 Config 3)

(b) Adjust APU inhibit switch jam nuts to lower switch in bracket to position where APU will not start when right engine upper cowl door is raised a minimum of 5 inches.

(4) Remove tools, equipment, loose hardware and debris from maintenance area.

(5) Disconnect and stow holdopen rods and raise right engine aft lower cowl door until ground safety latch engages upper cowl door.

(6) Tighten aft lower cowl door captive latch bolts to close door.

(7) Disconnect and stow holdopen rods and raise forward lower cowl door until ground safety latch engages upper cowl door.

(8) Close upper cowl door tension latches, making certain each latch hook engages eyebolt properly.

(9) Check that all tension latch handles and triggers are flush with door surface.

(10) 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
U	41	B1-2	ENGINE IGNITION RIGHT
U	42	B1-1	ENGINE IGNITION LEFT

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.

(11) Remove safety pin from thrust reverser control valve. Stow safety pin.

MOUNTS - DESCRIPTION AND OPERATION

1. General

A. The mounts provide a means of attaching the power plant to the pylon. Vibration isolators, attached to the pylon, minimize transfer of engine vibration to the fuselage structure.

B. A three-point mount system consisting of engine-mounted cone bolts, supports, and pylon-mounted vibration isolators, connect the engine to the pylon.

C. To facilitate engine conversion, each cone bolt and support can be installed in its respective position on the opposite side of the engine.

2. Cone Bolts

A. Description

(1) Three cone bolts are mounted on the engine; two on the forward mounting flange, and one on the aft mounting flange.

(2) The forward cone bolts are interchangeable.

(3) The aft cone bolt can be used in the aft position only.

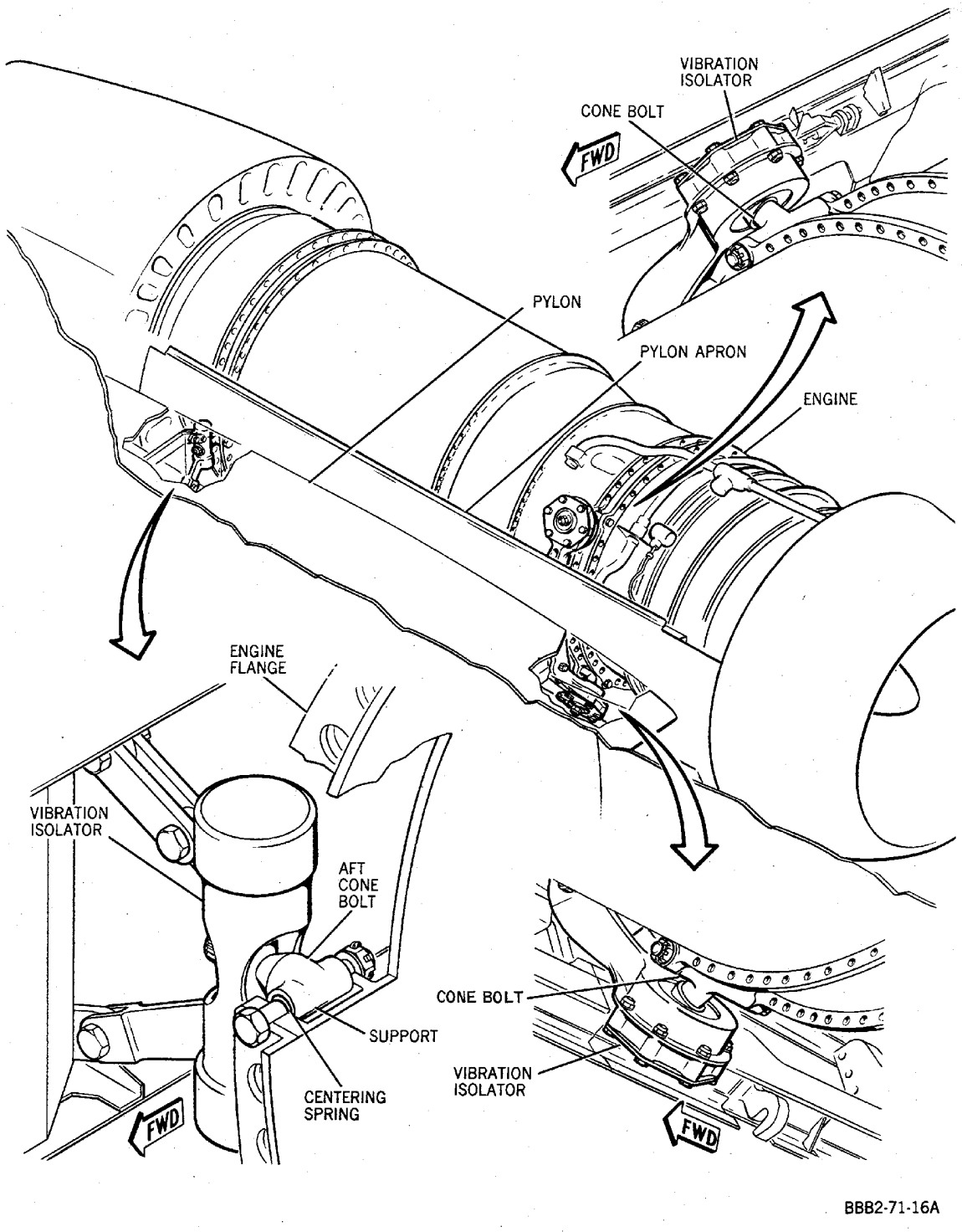
3. Vibration Isolators

A. Description

(1) The vibration isolators are attached to the pylon in positions which correspond to the engine-mounted cone bolts.(Figure 1)

(2) The two forward vibration isolators are installed in the mount yoke. A guide pin located on each isolator assures correct alignment with the cover plate which retains the isolator in the yoke. See Chapter 54 for vibration isolator mount yoke installation.

(3) The aft vibration isolator is attached directly to the pylon. Two links attached to the upper portion of the isolator provide support and alignment.



Mounts -- General Location
Figure 1/71-20-00-990-801

CONE BOLTS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation instructions for the engine cone bolts.

B. The cone bolts are attached to the engine flanges. Removal/ Installation, Cleaning/Painting, Check, and Approved Repairs procedures for the cone bolts on all engines are identical.

2. Equipment and Materials

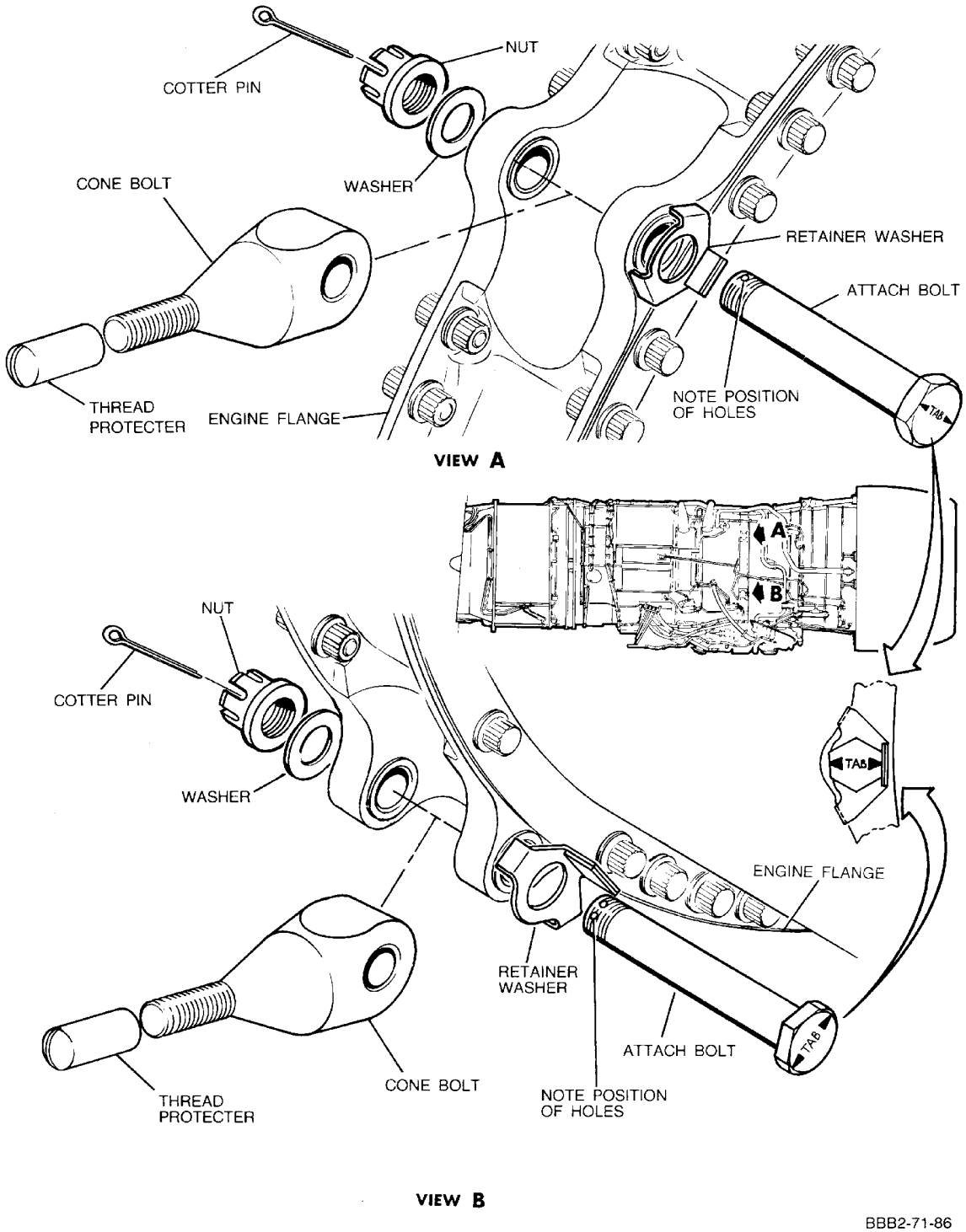
WARNING: REMOVAL/INSTALLATION PROCEDURES FOR CONE BOLTS ARE FOR OFF-AIRCRAFT (DEMOUNTED) ENGINES ONLY.

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

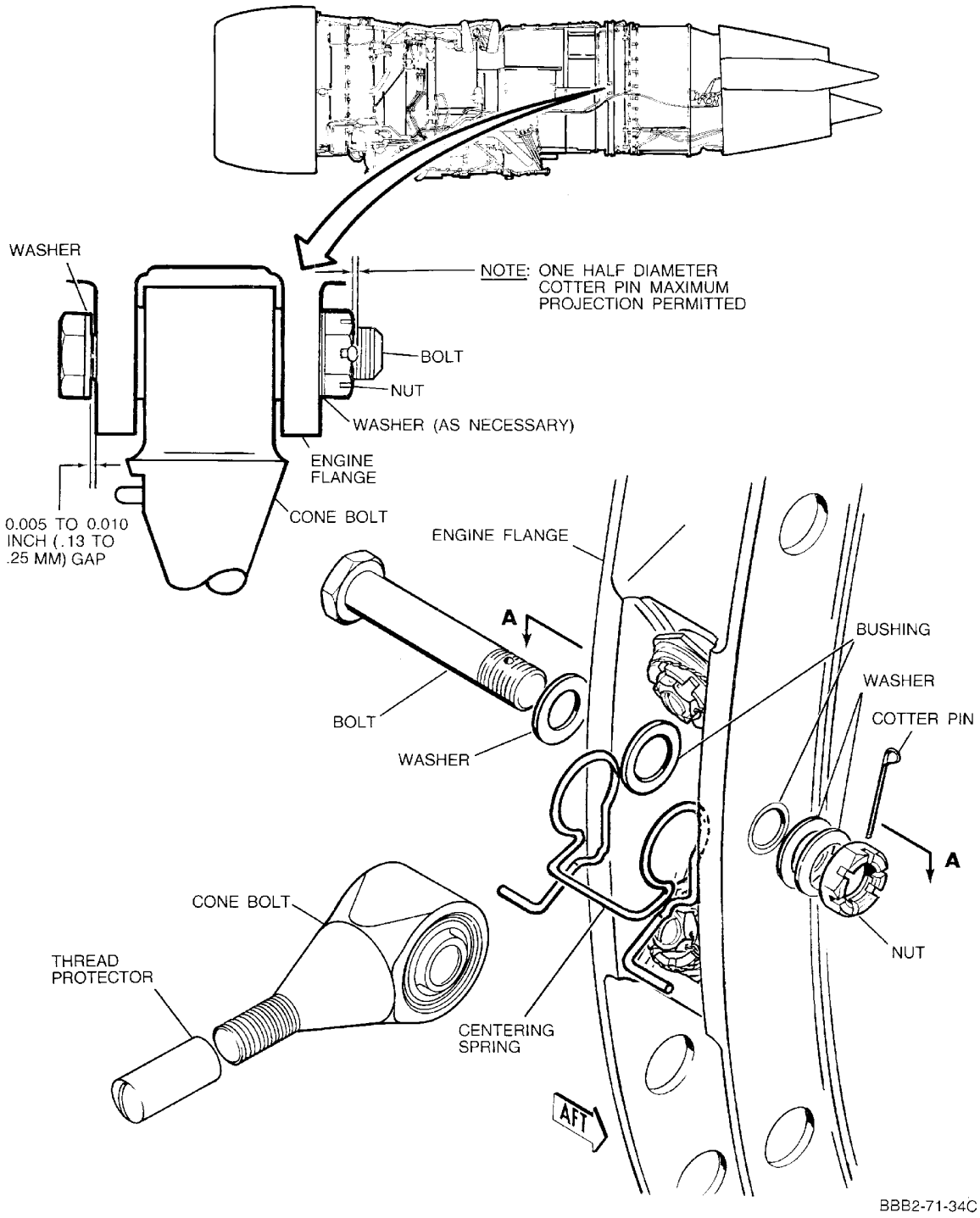
NOTE: It is possible that some materials in the Equipment and Materials List cannot be used for some or all of their necessary applications. Before you use the materials, make sure the types, quantities, and applications of the materials necessary are legally permitted in your location. All persons must 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
Lubricant oil, Molybdenum disulfide, silicone MIL-L-25681 DPM 5782	ANDEROL, Inc., East Hanover, NJ, #Royco 81 MS
Lubricant, dry film (Everlube) DMS QPL 1762 Type 2	
Torque wrench (0-600 inch pound range) (0-67.2 N·m)	
Thread protector, engine cone bolt 4916744-503 4916744-505 (2 required)	Boeing Aircraft Company, Inc.
Thread locking compound, Loctite No. 290 (DPM 6082-5)	Loctite Co.



Forward Cone Bolt -- Removal/Installation
Figure 201/71-20-01-990-814



Aft Cone Bolt -- Removal/Installation
Figure 202/71-20-01-990-816

3. Removal/Installation Cone Bolts

CAUTION: DO NOT ATTEMPT REMOVAL OR INSTALLATION OF CONE BOLTS WITHOUT REMOVING ENGINE.

A. Remove Forward Upper Cone Bolt.

WJE 401-404, 412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-880, 891-893

NOTE: Remove engine before removing the cone bolt (GENERAL - REMOVAL/INSTALLATION, PAGEBLOCK 71-00-00/401 Config 1 or GENERAL - REMOVAL/INSTALLATION, PAGEBLOCK 71-00-00/401 Config 2).

WJE 405-412, 414, 417, 419, 421, 423, 865, 869, 871, 872, 881, 883, 884, 886, 887

NOTE: Remove engine before removing the cone bolt (GENERAL - REMOVAL/INSTALLATION, PAGEBLOCK 71-00-00/401 Config 2).

WJE ALL

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(1) Install thread protector on cone bolt.

(2) Remove nut, and washer from attach bolt.

(3) Support cone bolt, remove attach bolt.

(4) Remove cone bolt.

(5) Remove anti-rotation washer from attach bolt.

(6) Perform both a visual and nondestructive inspection of cone bolt, and cone bolt attach bolt (Paragraph 4.) and (Paragraph 5.).

B. Install Forward Upper Cone Bolt

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads refer to Paragraph 7..

CAUTION: MAKE CERTAIN CORRECT CONE BOLT IS USED FOR INSTALLATION.

(1) Install retainer washer (anti-rotation) on attach bolt under head of bolt (Figure 201).

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 1135, LUBRICANT/MOLYBDENUM DISULFIDE SILICONE (DPM 5782)

HAZMAT 1000, REFER TO MSDS

(2) Apply coating of anti-seize lubricant (MIL-L-25681) to attach bolt grip length and engine mount flange bushing faces.

NOTE: Attach bolt threads must be clean and dry prior to installing nut.

CAUTION: MAKE CERTAIN THAT ATTACH BOLT HEAD FLATS AND TAB MARKINGS ARE ALIGNED WITH TAB OF ANTI-ROTATION WASHER.

(3) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt such that cotter pin receptacle holes are positioned at approximately eleven o'clock and one o'clock.

NOTE: Attach bolt is installed with bolt head forward.

(4) Install the washer and nut on attach bolt until bolt is protruding 0.030 to 0.060 inch (0.76 to 1.52 mm) through nut.

(5) Check that the torque required to start rotation of nut is a minimum of 50 in-lb (5.6 N·m). Record actual running torque value measured.

NOTE: If the minimum torque required to start rotation of the nut was above 50 in-lb (5.6 N·m), the locking compound is not required in Paragraph 3.B.(7) and Paragraph 3.B.(8).

(6) Tighten nut until cone bolt is free standing but readily moveable by hand.

NOTE: Torque required to move cone bolt must not exceed 75 in-lb (8.5 N·m). A force of up to 26 lb (11.8 kg) maximum, applied perpendicular to cone bolt axis and between thread runout and taper is equivalent.

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 1236, COMPOUND/SEALING/LOCKING/ANAEROBIC (DPM 6082)

HAZMAT 1000, REFER TO MSDS

(7) If cotter pin hole alignment is accomplished and 1000 in-lb (113 N·m) of torque was not exceeded, apply locking compound (DPM 6082-5) to the threads of the attach bolt and install cotter pin.

(8) If cotter pin hole alignment cannot be accomplished, advance nut minimum amount to align either cotter pin hole with any notch, but not to exceed 1000 in-lb (113 N·m) of torque. Apply locking compound (DPM 6082-5) to the threads of the attach bolt and install the cotter pin and trim as required. Occasionally it may be necessary to select a new nut.

(9) Bend attach bolt retainer washer to come in contact with flat surface of attach bolt head to provide the anti-rotation feature of the washer. (Figure 201)

C. Remove Forward Lower Cone Bolt

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(1) Install thread protector on cone bolt.

(2) Remove nut, and washer from attach bolt.

(3) Support cone bolt, remove attach bolt.

(4) Remove cone bolt.

(5) Remove anti-rotation washer from attach bolt.

(6) Perform both a visual and nondestructive inspection of cone bolt, and cone bolt attach bolt (Paragraph 4.) and (Paragraph 5.).

D. Install Forward Lower Cone Bolt

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads (Paragraph 7.).

CAUTION: MAKE CERTAIN CORRECT CONE BOLT IS USED FOR INSTALLATION.

(1) Install retainer washer (anti-rotation) on attach bolt under head of bolt (Figure 201).

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 1135, LUBRICANT/MOLYBDENUM DISULFIDE SILICONE (DPM 5782)

HAZMAT 1000, REFER TO MSDS

(2) Apply coating of anti-seize lubricant (MIL-L-25681) to attach bolt grip length and engine mount flange bushing faces.

NOTE: Attach bolt threads must be clean and dry prior to installing nut.

CAUTION: MAKE CERTAIN THAT ATTACH BOLT HEAD FLATS AND TAB MARKINGS ARE ALIGNED WITH TAB OF ANTI-ROTATION WASHER.

(3) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt such that cotter pin receptacle holes are positioned at approximately eleven o'clock and one o'clock.

NOTE: Attach bolt is installed with bolt head forward.

(4) Install the washer and nut on attach bolt until bolt is protruding 0.030 in. (0.76 mm) to 0.060 in. (1.52 mm) through nut.

(5) Check that the torque required to start rotation of nut is a minimum of 50 in-lb (5.6 N·m). Record actual running torque value measured.

NOTE: If the minimum torque required to start rotation of the nut was above 50 in-lb (5.6 N·m), the locking compound is not required in Paragraph 3.D.(7) and Paragraph 3.D.(8).

(6) Tighten nut until cone bolt is free standing but readily moveable by hand.

NOTE: Torque required to move cone bolt must not exceed 75 in-lb (8.5 N·m). A force of up to 26 lb (11.8 kg) maximum, applied perpendicular to cone bolt axis and between thread runout and taper is equivalent.

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 1236, COMPOUND/SEALING/LOCKING/ANAEROBIC (DPM 6082)

HAZMAT 1000, REFER TO MSDS

(WARNING PRECEDES)

(7) If cotter pin hole alignment is accomplished and 1000 in-lb (113 N·m) of torque was not exceeded, apply locking compound (DPM 6082-5) to the threads of the attach bolt and install cotter pin.

(8) If cotter pin hole alignment cannot be accomplished, advance nut minimum amount to align either cotter pin hole with any notch, but not to exceed 1000 in-lb (113 N·m) of torque. Apply locking compound (DPM 6082-5) to the threads of the attach bolt and install the cotter pin and trim as required. Occasionally it may be necessary to select a new nut.

(9) Bend attach bolt retainer washer to come in contact with flat surface of attach bolt head to provide the anti-rotation feature of the washer. (Figure 201)

E. Remove Aft Cone Bolt

(1) Remove cotter pin, nut, and washer from attach bolt.

(2) Support cone bolt and remove attach bolt.

CAUTION: MAKE CERTAIN THREAD PROTECTOR IS INSTALLED TO PREVENT DAMAGE TO CONE BOLT THREADS.

(3) Remove cone bolt, separate and retain centering spring from cone bolt.

(4) Remove washer from attach bolt.

(5) Perform both a visual and magnetic particle inspection of cone bolt, and cone bolt attach bolt (Paragraph 4.), (Paragraph 5.) and (Paragraph 6.).

F. Install Aft Cone Bolt

NOTE: Prior to installing cone bolt to engine, remove thread protector and visibly check that cone bolt threads contain dry film lubricant. If dry film lubricant is visible, install thread protector and continue installation. If dry film lubricant is not visible on threads (Paragraph 7.).

CAUTION: MAKE CERTAIN CORRECT CONE BOLT IS USED FOR INSTALLATION.

(1) Install countersunk washer on attach bolt with countersink facing bolt head.

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 1135, LUBRICANT/MOLYBDENUM DISULFIDE SILICONE (DPM 5782)

HAZMAT 1000, REFER TO MSDS

(2) Apply coating of anti-seize lubricant (MIL-L-25681) on attach bolt grip length and engine mount flange bushing faces.

NOTE: Bolt threads must be clean and dry prior to installing nut.

(3) Position centering spring between flange bushings with cross bar down; deflect side loops over shoulder of bushings.

(4) Position cone bolt between flange bushings, insert attach bolt through flange bushings and cone bolt.

NOTE: Attach bolt is installed with bolt head forward.

(5) Install washer and nut on attach bolt and tighten nut fingertight.

(6) Push nut and washer against flange bushing.

(7) Make certain countersunk washer under bolt head is against bolt head and measure gap between washer and engine flange.

NOTE: Gap should be 0.005 in. (0.13 mm) to 0.010 in. (0.25 mm).

(8) Install cotter pin.

NOTE: One half diameter cotter pin maximum projection permitted (Figure 202).

4. Cleaning/Painting Cone and Attach Bolts

A. Clean Cone and Attach Bolts

CAUTION: STODDARD SOLVENT IS COMBUSTIBLE AND VAPOR MAY BE TOXIC. AVOID PROLONGED BREATHING OF VAPOR AND PROLONGED OR REPEATED CONTACT WITH SKIN. AVOID CONTACT WITH EYES. CLEAN PARTS IN WELL-VENTILATED AREA, AND USE APPROVED SAFETY EQUIPMENT.

(1) Clean all parts thoroughly with solvent.

(2) Rinse parts with clean solvent.

(3) Dry parts with clean wipers or clean dry air.

NOTE: Parts must be free of rust, corrosion, dirt, grease, oil, and other contaminants.

5. Check Cone and Attach Bolts

A. Visual Check Cone and Attach Bolts

(1) Visual check conical surface, end faces, and threads of cone bolts for nicks, scratches, burrs, corrosion, fretting and galling. Refer to Barry Controls Component Maintenance Manual 71-20-02.

(2) Check wear and condition of chrome plating on forward attach bolts.

(3) Check wear and condition of aft attach bolt.

(4) Reject parts with evidence of cracks.

(5) Reject parts having stripped or cross-threaded threads. Up to 10 percent of first three threads of cone bolt may be reworked to allow passage of nut, otherwise discard bolts.

B. Nondestructive Check

(1) Magnetic-particle check cone bolt (Ref. DC-9 Overhaul Manual 20-70-1) and fluorescent penetrant check attach bolt (Ref. DC-9 Overhaul Manual 20-70-2); and (Barry Controls Component Maintenance Manual 71-20-02.)

NOTE: After each engine removal, perform both a visual and magnetic-particle inspection on cone bolts, and fluorescent penetrant inspection on cone bolt through bolts.

NOTE: In the event of an unscheduled engine change at a remote location where nondestructive check is not possible, performing only a visual check with a 10X magnifying glass is acceptable to prevent an Aircraft On Ground.

6. Approved Repairs Cone and Attach Bolts

A. Repairs to Cone and Attach Bolts

(1) Plating, if necessary replate forward attach bolts with chromium plate in accordance with DC-9 Overhaul Manual 20-10-6.

(2) Repairs to cone bolts, if necessary to repair cone bolts refer to Barry Controls Component Maintenance Manual 71-20-02.

7. Dry Film Lubrication of Cone Bolts

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

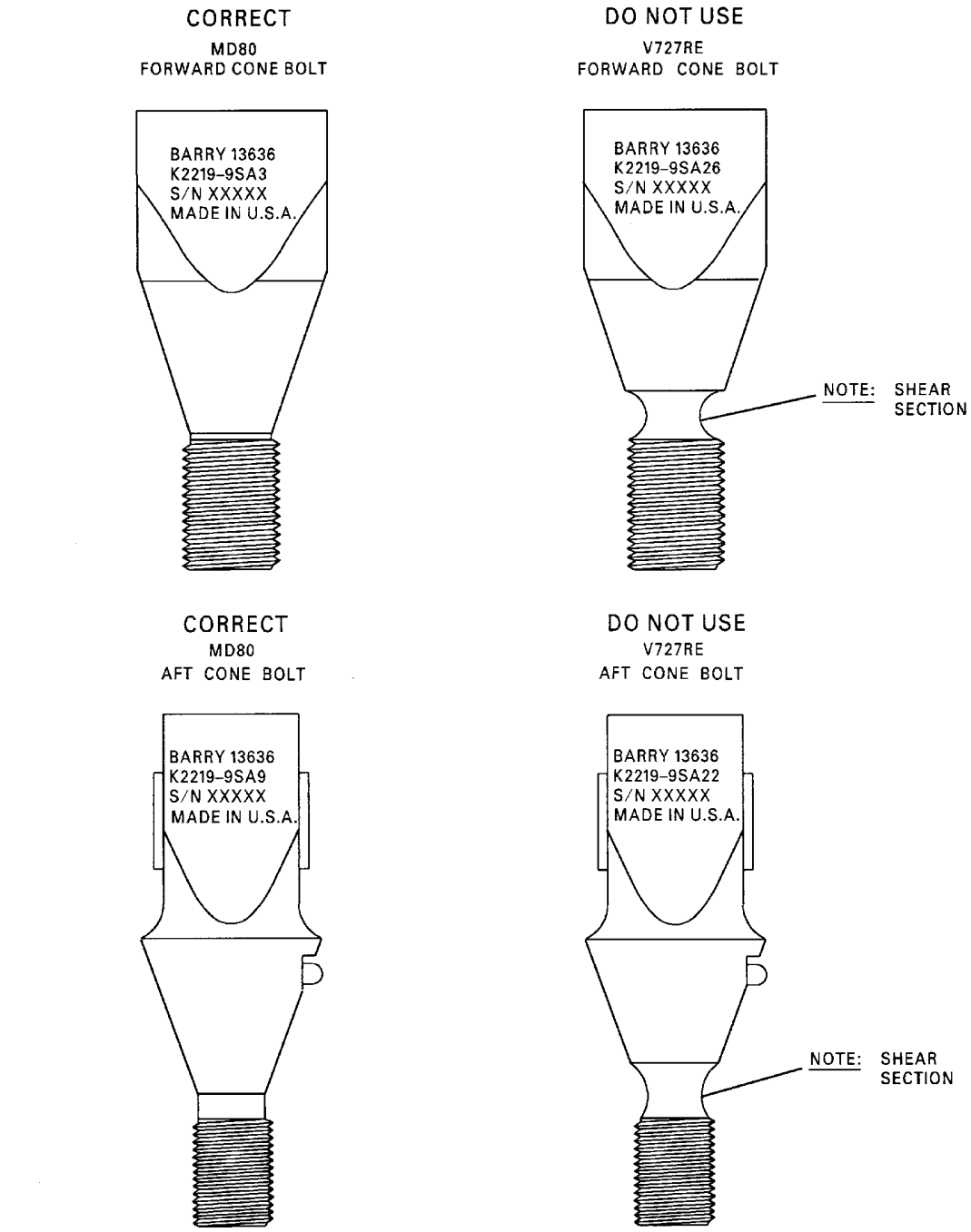
HAZMAT 1692, SOLID FILM HEAT CURED LUBRICANT (DMS 1762-TY2/EVERLUBE 620C DILUTED)

HAZMAT 1000, REFER TO MSDS

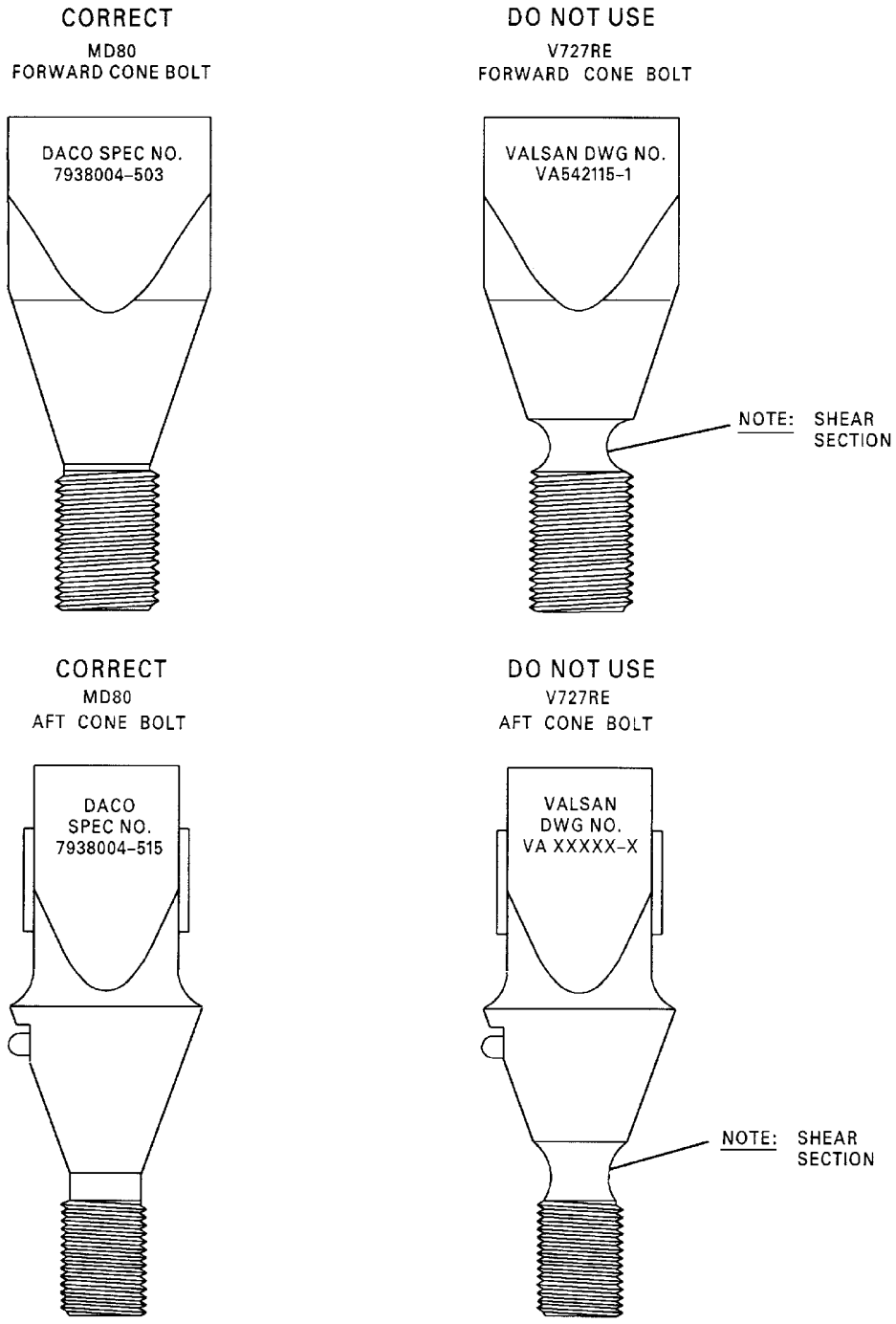
A. Application of Dry Film Lubricant (Everlube) to Cone Bolts

NOTE: Application of the dry film lubricant (Everlube) is only required on the cone bolt threads only. Application of this lubricant on the runout area is optional.

NOTE: The cone bolt manufacturer recommends that a special process be followed when re-applying the dry film lubricant (Everlube) to the cone bolts.



Cone Bolts
Figure 203/71-20-01-990-817



Cone Bolts (Opposite Side Shown)
Figure 204/71-20-01-990-818

CONE BOLTS - INSPECTION/CHECK

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-20-01-240-801

2. Special Detailed Inspection of the Cone Bolts

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
71-20-01 P/B 201 Config 2	CONE BOLTS - MAINTENANCE PRACTICES

B. Special Detailed Inspection of the Cone Bolts

NOTE: After each engine removal, both a visual and magnetic particle inspection must be performed on cone bolts and it is recommended that a fluorescent inspection be accomplished to the cone bolt through bolts.

SUBTASK 71-20-01-240-001

(1) Do a special detailed inspection of the cone bolts.

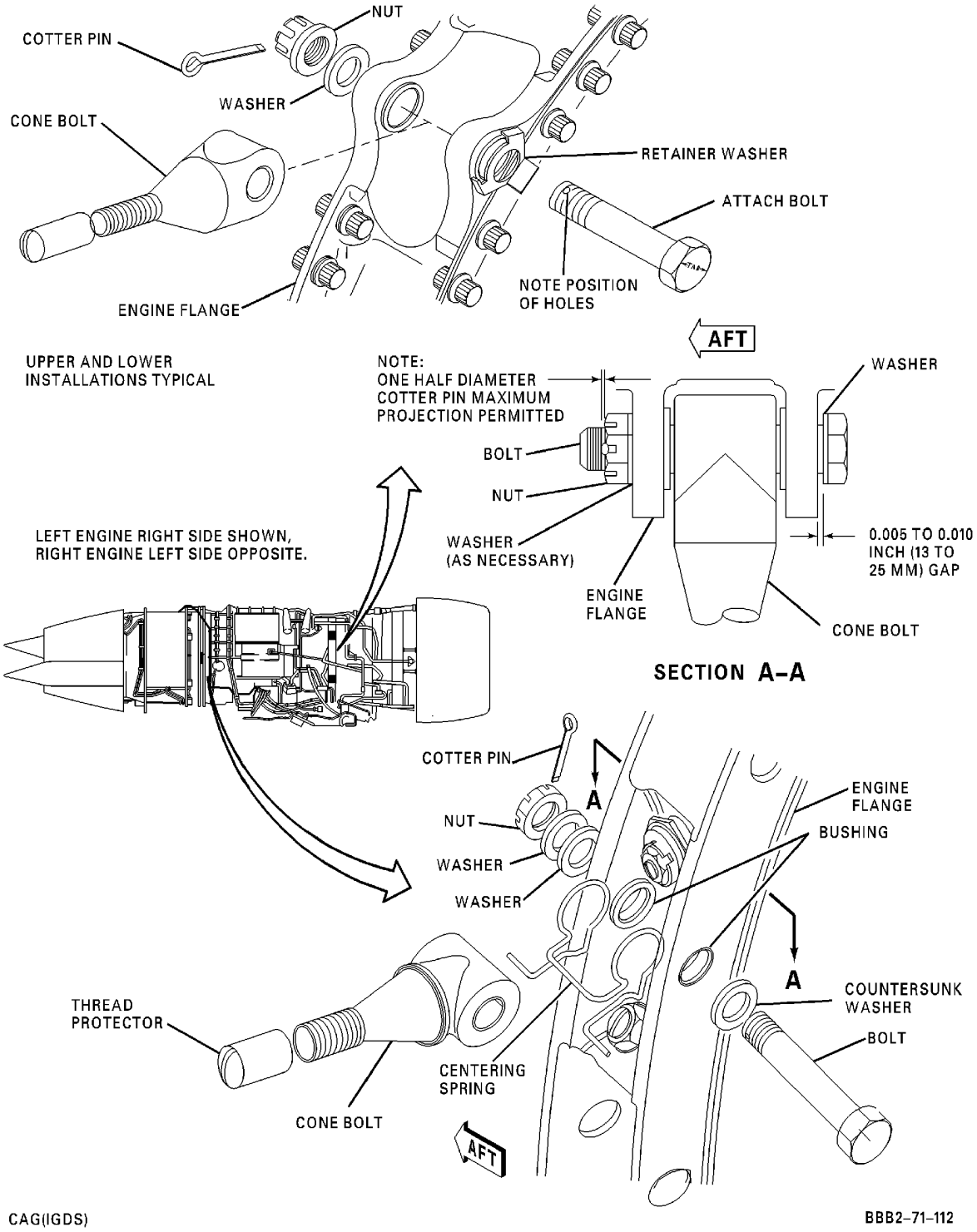
(a) Remove the forward cone bolts and attaching hardware from engine. (CONE BOLTS - MAINTENANCE PRACTICES, PAGEBLOCK 71-20-01/201 Config 2)

(b) Remove aft cone bolt. (CONE BOLTS - MAINTENANCE PRACTICES, PAGEBLOCK 71-20-01/201 Config 2)

(c) Send forward and aft cone bolts to shop for magnetic particle inspection. Refer to Boeing Component Maintenance Manual 71-20-04.

(d) Install serviceable forward and aft cone bolts. (CONE BOLTS - MAINTENANCE PRACTICES, PAGEBLOCK 71-20-01/201 Config 2)

——— END OF TASK ———



FORWARD AND AFT CONE BOLTS
Figure 601/71-20-01-990-819

VIBRATION ISOLATORS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation instructions for the vibration isolators.

B. The forward vibration isolators are installed in the mount yoke and the aft vibration isolator is attached to the aft pylon fitting.

C. Removal and installation procedures for left and right engine vibration isolators are identical.

D. Forward and aft vibration isolators can be inspected for serviceable condition with and without the engine removed. For specific inspection criteria.

(VIBRATION ISOLATORS, SUBJECT 71-20-02) page 601.

E. It is recommended that the vibration isolators be visually checked after each engine removal, paying particular attention to conical surface of inner cone assembly for scratches, nicks, burrs, galling, corrosion or wear. (Ref. Barry Controls Component Maintenance Manual 71-20-02)

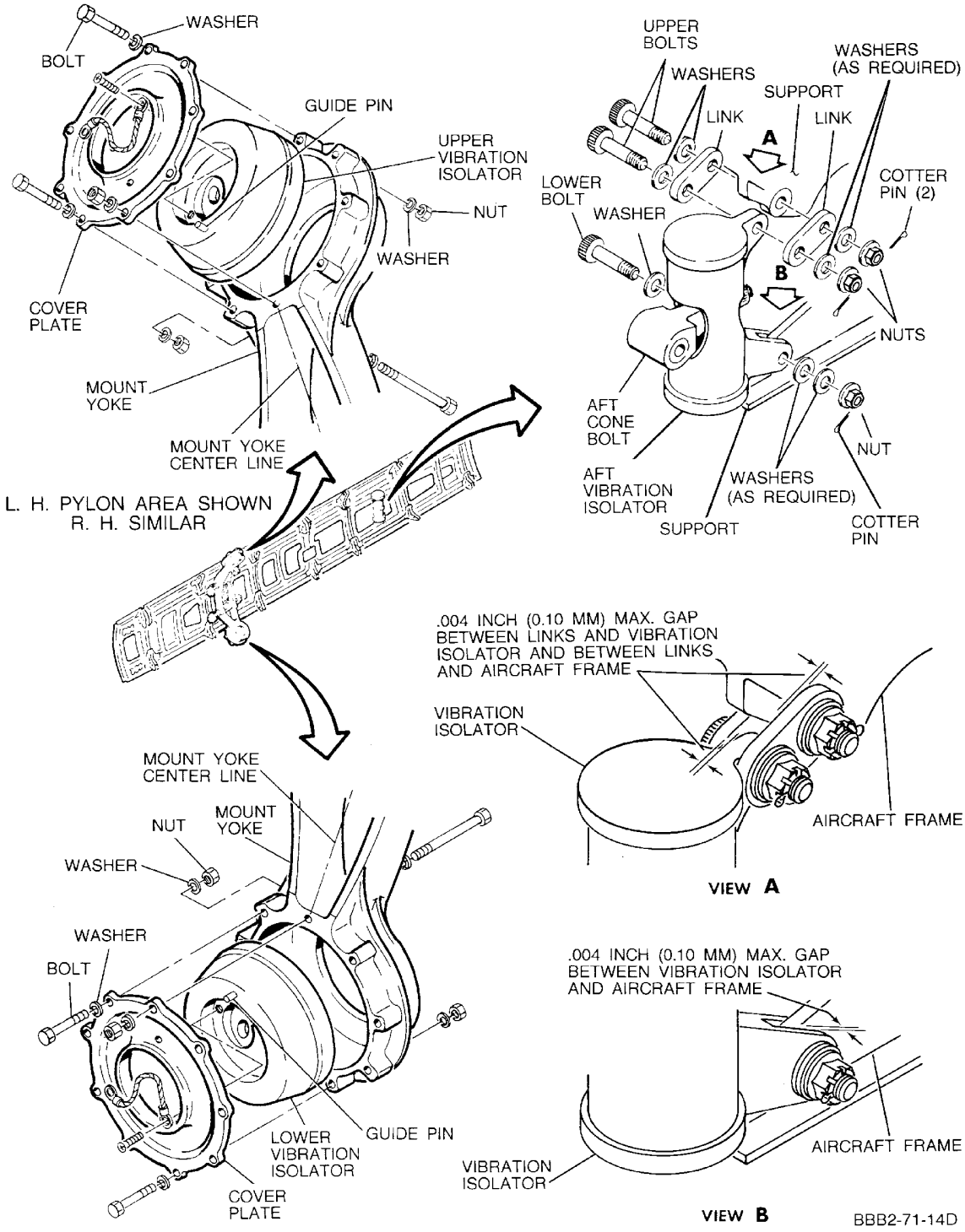
2. Equipment and Materials

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

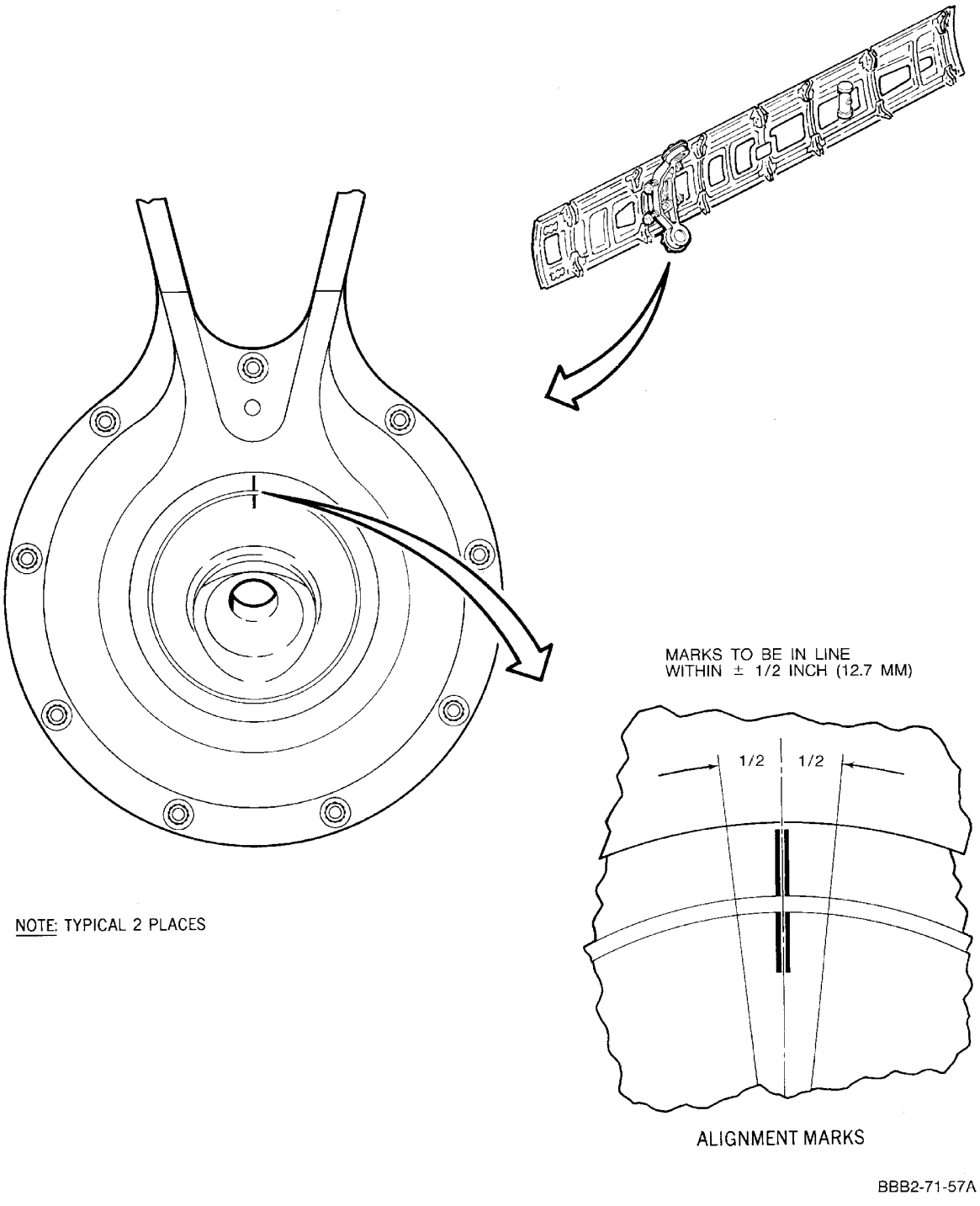
NOTE: Some materials in the Equipment and Materials list may not be permitted to be used in your location. Persons in each location must make sure they are permitted to use these materials. All persons must obey all applicable federal, state, local, and provincial regulations for their location.

Table 201

Name and Number	Manufacturer
Lubricant oil, Molybdenum disulfide, silicone MIL-L-25681	
Torque wrench (0-600 inch pound range) (0-67.2 N·m)	
Sling, upper cowl door (5952168-1)	DAC
Dynamometer (15,000 pound minimum) (6750 Kg) 2 required	
Protector, Fwd cone bolt (4916744-505)	DAC
Sling, Engine Handling (5916777-501)	DAC
Adapter, Jack Fuselage (4916701-1)	DAC
Jack, Aft Fuselage (15 Ton) (13500 Kg)	
Tag “Do Not Operate”	
Torque Wrench (100 - 700 foot pounds range) (135.6-949.2 N·m)	



Vibration Isolators -- Removal/Installation
Figure 201/71-20-02-990-801



Forward Vibration Isolators -- Allowable Mismatch
Figure 202/71-20-02-990-802

3. **Removal/Installation Vibration Isolators**

CAUTION: DO NOT ATTEMPT REMOVAL OR INSTALLATION OF VIBRATION ISOLATORS WITHOUT REMOVING ENGINE AS OUTLINED IN 71–00–00, PAGE 401.

A. Remove Forward Vibration Isolator

NOTE: Removal and installation procedures for forward upper and lower vibration isolators are identical.

(1) Remove vibration isolator cover plate bolts.

(2) Remove cover plate from mount yoke.

NOTE: Observe cover plate guide pin hole position to facilitate installation.

(3) Remove vibration isolator from mount yoke.

B. Install Forward Vibration Isolator

(1) Install vibration isolator in mount yoke, making certain isolator guide pin is positioned on mount yoke vertical centerline, and faces toward mount yoke pylon attach bolts.

(2) Place cover plate in approximate position and align guide pin hole with isolator guide pin.

CAUTION: DURING COVER PLATE INSTALLATION WASHERS MUST BE INSTALLED UNDER BOTH BOLT HEAD AND UNDER NUT TO ENSURE BOLTS DO NOT BOTTOM OUT.

CAUTION: TORQUE BOLTS ALTERNATELY AND DIAGONALLY OPPOSITE, TO PREVENT DEFORMING COVER PLATE.

(3) Install cover plate bolts, washers, and nuts and tighten to torque of 340 to 380 inch-pounds (38.4 to 42.9 N·m). (Figure 201)

NOTE: Second washer at either bolt head or under nut is acceptable to prevent a bottom out condition.

C. Remove Aft Vibration Isolator

(1) Remove lower bolt which connects isolator to pylon fitting.

(2) Support isolator and remove upper bolt which connects isolator links to pylon fitting.

(3) Remove isolator and links.

D. Install Aft Vibration Isolator

(1) Apply coating of antiseize lubricant (MIL-L-25681) on bolts.

(2) Align upper isolator links to pylon fitting and install bolt.

(3) If required, use peel-off laminated shims to maintain a maximum gap of 0.004 inch (0.10 mm) between links and isolator, and links and aircraft frame.

NOTE: This will prevent preloading, when torquing the attach bolts.

(4) Tighten bolt to torque of 288 to 414 inch-pounds (32.5 to 46.7 N·m).

NOTE: Bolt attaching upper links to isolator is not normally removed, however, torque value of this bolt is same as bolt attaching links to pylon fitting.

(5) Align isolator to lower pylon fitting, install bolt. If required, use peel-off laminated shims to maintain a maximum gap of 0.004 inch (0.10 mm) between isolator and aircraft frame.

(6) Tighten attach bolt to torque of 270 to 300 inch-pounds (30.5 to 33.9 N·m).

(7) Measure gap between upper and lower isolator and attaching links. Maximum gap should be 0.004 inch (0.10 mm). (Figure 201)

(8) Install cotter pins in upper and lower isolator attach bolts.

4. **Alternate Removal/Installation Forward Vibration Isolators**

NOTE: This procedure must be accomplished only under controlled conditions, i.e. in a protected area (hangar) where the aircraft is shielded from wind, rain, etc.

NOTE: This procedure is not authorized for use with fuselage-attached engine hoist (bootstrap) equipment.

NOTE: This procedure can be used on only one engine at a time for either the upper or lower forward engine vibration isolator. If both forward vibration isolators are to be changed in the same visit, complete the replacement of the lower forward vibration isolator first, then replace the upper forward vibration isolator.

NOTE: The aft vibration isolator and one of the forward vibration isolators must remain installed at all times during this procedure.

A. Remove Forward Vibration Isolator

WARNING: MAKE CERTAIN FOLLOWING CIRCUIT BREAKERS ARE OPEN BEFORE ATTEMPTING MAINTENANCE PROCEDURES, OR INJURY TO PERSONNEL COULD RESULT.

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

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
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			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP

WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893 (Continued)

(Continued)

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE ALL			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION
S	34	B1-181	LEFT FUEL TEMP
WJE ALL			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
T	21	B1-10	RIGHT OIL QUANTITY
WJE ALL			
T	22	B1-12	RIGHT OIL TEMP
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE ALL			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP

WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893 (Continued)

(Continued)

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE ALL			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-866, 868, 891			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY
WJE ALL			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE ALL			
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE ALL			
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

UPPER EPC, LEFT AC BUS

Row	Col	Number	Name
H	17	B1-662	RIGHT AUX HYDRAULIC PUMP CONTROL

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

NOTE: Numbering on circuit breaker panels denotes engine position.

(2) Make certain that following listed levers are in indicated positions.

Table 202

(a) Throttle	Idle
(b) Thrust reverser lever	Forward thrust
(c) Fuel shutoff lever	Off
(d) Fire control handle	Pulled.

(3) Open fuselage 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 arm in dump position and install safety pin.

(5) Make certain the applicable Pneumatic Crossfeed Lever is in the CLOSED position.

(a) Attach a “Do Not Operate” tag to the applicable Pneumatic Crossfeed Lever. Write on the tag: PNEUMATIC CROSSFEED LEVER TO REMAIN IN THE CLOSED POSITION - ENGINE MAINTENANCE IN PROGRESS.

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

(6) Remove upper cowl door as follows:

(a) Open forward lower and aft cowl door and install hold-open rods.

(b) For operators with the APU inhibit wiring on the right engine, disconnect the electrical connector.

(c) Position all upper cowl door tension latch handles and triggers flush with door surface.

(d) Remove screws from upper cowl door sling attach points and install sling.

(e) Open all apron upper pin latches, making certain each latch is fully open.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

(f) With upper cowl door in closed position, hoist door to remove, taking care to prevent damage to latch eyes, pylon apron, and engine components.

(g) Carefully lower door, remove sling, and install screws in door sling attach points.

(h) Place door in suitable protective rack.

(7) Install engine hoisting equipment (4 tons capacity), and JT8D engine handling beam with two dynamometers.

(Figure 203)

WARNING: THE ENGINE WEIGHS APPROXIMATELY 5900 POUNDS. MAKE CERTAIN ENGINE REMOVAL/INSTALLATION SUPPORT EQUIPMENT IS ADJUSTED TO GIVE EVEN FORE AND AFT SUPPORT TO ENGINE. UNEVEN SUPPORT CAN CAUSE A SHIFT OF ENGINE WEIGHT AND RESULT IN DAMAGE TO THE CONE BOLTS, MOUNT YOKES, VIBRATION ISOLATORS, OR INJURY TO PERSONNEL.

(8) At this point, and for the remainder of this procedure, ensure the following:

(a) That no activities are being performed on the aircraft which could cause movement of the aircraft or engine.

(b) All personnel are removed from aircraft and entrances are placarded against entry.

(c) No external maintenance, such as tire/strut servicing, aircraft washing, etc., are being performed during this procedure.

(9) Place tail jack under aft pressure bulkhead location and snug up to aircraft to prevent movement.

(10) All necessary precautions must be taken to ensure that no relative movement occurs at the engine/aircraft interface while this maintenance action is in progress which could place undue stress on cone bolts, yokes or vibration isolators.

CAUTION: NO SLIPPAGE IS ALLOWED IN HOISTING EQUIPMENT. IF HOISTING EQUIPMENT SHOWS SIGNS OF SLIPPAGE, DISCONTINUE PROCEDURE.

(11) Take up the weight of the engine until sag is removed from vibration isolators. The dynamometers should read approximately 3480 pounds on the fwd and 2420 pounds on the aft.

NOTE: The percentage of engine weight take-up with respect to the forward and aft dynamometers is approximately 59 percent (forward) and 41 percent (aft).

(12) Provide continuous monitoring of the dynamometer scales to ensure that lifting load readings do not exceed the lesser of two (2) values: The engine sling capacity limit, or 12,000 pounds (fwd mount) and 6,000 pounds (aft mount).

(13) Remove cotter pin if installed with new nut.

(14) Loosen cone bolt attach bolt nut sufficient to prevent galling of cone bolt faces, and to ease the process of removing vibration isolator.

(15) Loosen cone bolt nut on isolator to be replaced and check dynamometer reading. Adjust engine weight, if necessary, to ensure load is removed from cone bolt.

(16) Remove and discard cone bolt nut. Do not remove cone bolt or cone bolt attach bolt and nut.

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTOR BE INSTALLED ON EACH CONE BOLT, TO PREVENT DAMAGE TO THREADS. CONE BOLTS WITH DAMAGE THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

(17) Install cone bolt thread protector.

(18) Remove isolator cover plate bolts and remove cover plate.

NOTE: Note position of cover plate guide pin hole to facilitate reinstallation.

(19) Carefully remove vibration isolator from mount yoke.

(20) If necessary, cone bolt may be removed and replaced at this time.

(CONE BOLTS, SUBJECT 71-20-01) page 201.

B. Install Forward Vibration Isolator

(1) Install cone bolt thread protector on cone bolt.

(2) If cone bolt was removed, install cone bolt.

(CONE BOLTS, SUBJECT 71-20-01) page 201.

NOTE: If cone bolt was replaced, tighten the cone bolt attach bolt nut until cone bolt is free-standing but readily moveable by hand.

CAUTION: IT IS IMPERATIVE THAT THREAD PROTECTOR BE INSTALLED ON EACH CONE BOLT, TO PREVENT DAMAGE TO THREADS. CONE BOLTS WITH DAMAGE THREADS CANNOT BE REWORKED TO A SERVICEABLE CONDITION.

(3) Install vibration isolator in mount yoke. Ensure isolator guide pin is positioned on mount yoke vertical centerline, and faces toward mount yoke pylon attach bolts.

NOTE: With vibration isolator partially installed, it may be necessary to back off thread protector slightly to allow isolator to fully seat in yoke.

(4) Place cover in position and align guide pin hole with isolator guide pin.

CAUTION: TORQUE BOLTS ALTERNATELY AND DIAGONALLY OPPOSITE, TO PREVENT DEFORMING COVER PLATE.

(5) Install cover plate bolts, washers, and nuts. Tighten to torque of 340 to 380 inch-pounds.

NOTE: Washers are installed under both bolts and under nuts to ensure that bolts do not bottom out. A second washer at either bolt head or under nut is acceptable to prevent a bottom-out condition.

NOTE: Where cover plate bolt installation is restricted by close proximity of pylon apron, it is acceptable to install bolts from opposite direction.

(6) Make certain that cone bolt is properly engaged, remove thread protector, ensure adequate lubrication remains on threads, and install washer and nut fingertight only.

NOTE: If split aluminum thread protectors have been used, aluminum shavings should be removed from cone bolt threads using a stainless steel brush only.

CAUTION: IF USING AN EXTENSION WITH TORQUE WRENCH TO TIGHTEN FWD CONE BOLT NUT, TORQUE VALUE CORRECTIONS MUST BE COMPUTED IN ACCORDANCE WITH FORMULA (REF. CHAPTER 70).

CAUTION: CONE BOLT THREADS MUST BE CLEAN AND DRY WHEN PERFORMING RUNNING TORQUE OF CONE BOLT NUTS.

CAUTION: RUNNING TORQUE OF FORWARD CONE BOLT NUT MUST NOT BE LESS THAN 90 INCH-POUNDS (10.2 N.M.).

CAUTION: IF THERE IS ANY DOUBT AS TO INTEGRITY OF NUT SELF LOCKING FEATURE, IT SHOULD BE DISCARDED TO PROVIDE HIGHEST MARGIN OF SAFETY.

(7) Perform running torque with new cone bolt nut on forward cone bolt. Running torque must not be less than 90 inch-pounds (10.2 N·m).

(8) Apply coating of anti-seize compound (MIL-L-25681) on threads only of dry lubricated cone bolt.

(9) Tighten cone bolt nut to final torque of 425 to 650 foot-pounds (5100 to 7800 inch-pounds) (576.3 to 881.4 N·m).

(10) On aircraft before incorporation of SB 71-51 (attach bolt with self-locking nut); tighten attach bolt nut per Forward Cone Bolt Installation Instruction.

(CONE BOLTS, SUBJECT 71-20-01) page 201.

(11) On aircraft with SB 71-51 incorporation (attach bolt with castellated nut); tighten attach bolt nut and install cotter pin per Forward Cone Bolt Installation Instruction "Engine Installed".

(CONE BOLTS, SUBJECT 71-20-01) page 201.

(12) Inspect mount bolt installation, including cone bolt nut and attach bolt and nut.

(13) Verify that cotter pin is installed in castellated nut and attach bolt, if applicable.

(14) Remove engine support equipment and tail jack.

(15) Remove hoisting and sling equipment.

(16) Install upper cowl door as follows:

(a) Make certain all pylon apron upper pin latches are fully open.

(b) Remove screws from upper cowl door sling attach points and install sling.

WARNING: UPPER COWL DOOR WEIGHS APPROXIMATELY 150 POUNDS (68KG).

(c) Hoist door into approximate position and install door making certain all door latch eyes engage apron pin latches properly.

CAUTION: DO NOT FORCE PIN LATCHES. IF PINS WILL NOT ENGAGE PROPERLY, CHECK DOOR ALIGNMENT.

(d) Close all pylon apron upper pin latches.

(e) Make certain all pin latch triggers are flush with pylon apron surface.

(f) Remove sling and install screws in upper cowl door sling attach points, flush with door surface.

(g) For operators with APU inhibit switch on right engine, install electrical connector on APU inhibit switch. Perform adjustment and test per .

WJE 417, 419

(APU INHIBIT SWITCH, SUBJECT 71-10-10) page 201.

WJE ALL

(17) Remove tags and close following circuit breakers.

LOWER EPC, DC TRANSFER BUS

Row	Col	Number	Name
U	36	B1-195	GENERATOR CONTROL APU
U	37	B1-194	GENERATOR CONTROL RIGHT
U	38	B1-193	GENERATOR CONTROL LEFT
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			
W	35	B1-323	FIRE DETECTORS APU LOOP A
W	36	B1-324	FIRE DETECTORS APU LOOP B
W	37	B1-59	FIRE DETECTORS RIGHT ENGINE LOOP A
W	38	B1-191	FIRE DETECTORS RIGHT ENGINE LOOP B
W	39	B1-282	FIRE DETECTORS LEFT ENGINE LOOP A
W	40	B1-281	FIRE DETECTORS LEFT ENGINE LOOP B
X	41	B1-95	FIRE EXTINGUISHING CONTROL BOTTLE 1
X	42	B1-96	FIRE EXTINGUISHING CONTROL BOTTLE 2

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
S	21	B1-9	LEFT OIL QUANTITY
S	22	B1-11	LEFT OIL TEMP
S	23	B1-137	LEFT OIL STRAINER CLOGGING CAUTION
S	24	B1-151	LEFT CSD OIL PRESS LOW CAUTION
WJE ALL			
S	25	B1-179	LEFT CSD OIL TEMP
S	26	B1-150	RIGHT CSD DISC
S	28	B1-262	LEFT REVERSER ACCUM SHUT-OFF
S	29	B1-218	LEFT REVERSER ACCUM LOW CAUTION
S	30	B1-73	LEFT REVERSER UNLOCK ADVISORY
S	31	B1-452	LEFT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
S	32	B1-288	LEFT START VALVE OPEN ADVISORY
S	33	B1-141	LEFT INLET FUEL PRESS LOW CAUTION

WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893 (Continued)

(Continued)

LOWER EPC, ENGINE - LEFT DC BUS

Row	Col	Number	Name
S	34	B1-181	LEFT FUEL TEMP
WJE ALL			
S	35	B1-122	LEFT FUEL FILTER PRESS DROP CAUTION
S	36	B1-49	LEFT FUEL HEAT ON ADVISORY
S	37	B1-45	LEFT ANTI-ICE VALVE CAUTION
S	40	B1-835	APPROACH IDLE CONTROL

LOWER EPC, ENGINE - RIGHT DC BUS

Row	Col	Number	Name
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
T	21	B1-10	RIGHT OIL QUANTITY
WJE ALL			
T	22	B1-12	RIGHT OIL TEMP
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
T	23	B1-138	RIGHT OIL STRAINER CLOGGING CAUTION
T	24	B1-152	RIGHT CSD OIL PRESS LOW CAUTION
WJE ALL			
T	25	B1-180	RIGHT CSD OIL TEMP
T	26	B1-149	LEFT CSD DISC
T	28	B1-263	RIGHT REVERSER ACCUM SHUT-OFF
T	29	B1-219	RIGHT REVERSER ACCUM LOW CAUTION
T	30	B1-74	RIGHT REVERSER UNLOCK ADVISORY
T	31	B1-453	RIGHT REVERSE THRUST ADVISORY
WJE 405, 407-409, 411, 416, 420, 422, 424-427, 429, 861, 862, 868, 873, 874, 880, 881, 883, 884, 891-893			
T	32	B1-289	RIGHT START VALVE OPEN ADVISORY
T	33	B1-142	RIGHT INLET FUEL PRESS LOW CAUTION
T	34	B1-182	RIGHT FUEL TEMP
WJE ALL			
T	35	B1-123	RIGHT FUEL FILTER PRESS DROP CAUTION
T	36	B1-50	RIGHT FUEL HEAT ON ADVISORY
T	37	B1-46	RIGHT ANTI-ICE VALVE CAUTION
WJE 415, 416, 418, 420, 422, 424-427, 429, 861-866, 868, 891			
T	39	B1-836	ENGINE SYNC FAILURE ADVISORY
WJE ALL			
T	40	B1-726	ENGINE SYNC

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	26	B1-424	LEFT ENGINE IGNITION
K	27	B1-75	LEFT FUEL FLOW

(Continued)

UPPER EPC, ENGINE - LEFT AC BUS

Row	Col	Number	Name
K	28	B1-47	FUEL HEAT LEFT CONTROL
K	28	B1-294	FUEL HEAT LEFT TIMER
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
K	30	B1-43	ANTI-ICING VALVE LEFT ENGINE COWL
K	31	B1-53	ANTI-ICING VALVE LEFT ENGINE LEFT
K	32	B1-55	ANTI-ICING VALVE LEFT ENGINE RIGHT

UPPER EPC, ENGINE - RIGHT AC BUS

Row	Col	Number	Name
WJE ALL			
L	26	B1-425	RIGHT ENGINE IGNITION
L	27	B1-76	RIGHT FUEL FLOW
L	28	B1-48	FUEL HEAT RIGHT CONTROL
L	29	B1-295	FUEL HEAT RIGHT TIMER
WJE 401-412, 414-416, 418, 420, 422, 424-427, 429, 861-864, 866, 868, 873-881, 883, 884, 886, 887, 891-893			
L	30	B1-44	ANTI-ICING VALVE RIGHT ENGINE COWL
L	31	B1-54	ANTI-ICING VALVE RIGHT ENGINE LEFT
L	32	B1-56	ANTI-ICING VALVE RIGHT ENGINE RIGHT

UPPER EPC, FUEL - LEFT AC BUS

Row	Col	Number	Name
WJE ALL			
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

UPPER EPC, LEFT AC BUS

Row	Col	Number	Name
H	17	B1-662	RIGHT AUX HYDRAULIC PUMP CONTROL

UPPER EPC, LEFT INSTR BUS

Row	Col	Number	Name
		B1-5	LEFT ENGINE OIL PRESSURE
B	12	B1-63	LEFT HYDRAULIC OIL QUANTITY

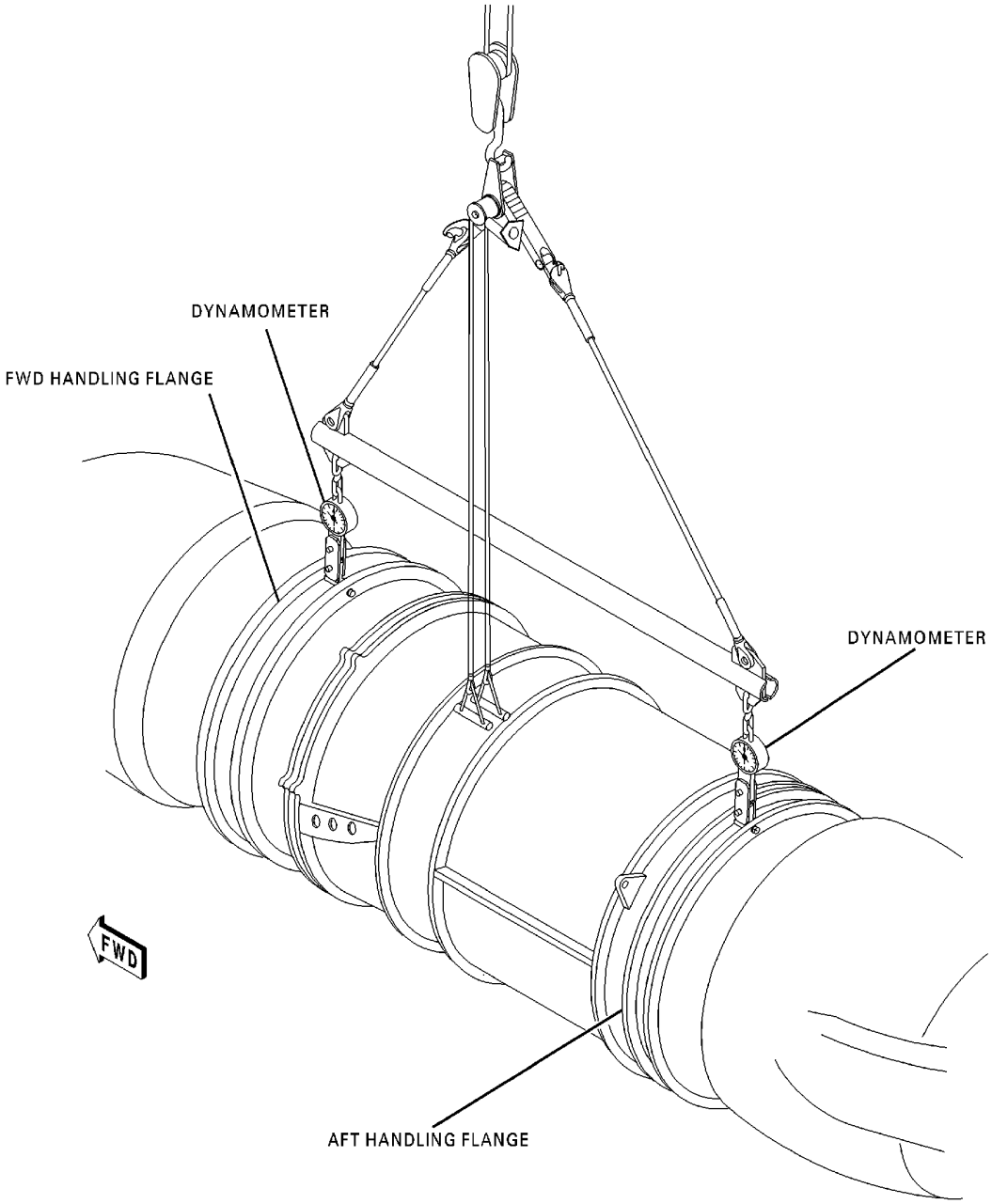
UPPER EPC, RIGHT INSTRUMENT BUS

Row	Col	Number	Name
A	1	B1-6	RIGHT ENGINE OIL PRESSURE
A	5	B1-64	RIGHT HYDRAULIC OIL QUANTITY

(18) Place fire control handle in normal position.

(19) Remove the “Do Not Operate” tag from the applicable Pneumatic Crossfeed Lever.

(20) Stow and latch lower cowl door rods and close lower cowl doors.



Engine Hoisting Equipment
Figure 203/71-20-02-990-804

VIBRATION ISOLATORS - CHECK

1. General

A. The following procedures consist of required checks of engine vibration isolators with and without engines installed.

B. During the following checks of the forward and aft vibration isolators. reference should be made to Barry Controls Component Maintenance Manual 71-20-02.

2. Checks With Engine Installed

A. Forward Vibration Isolator and Engine Mount

(1) Check for contact (snubbing) between the inner core assembly and outer retainer, which is defined as zero gap. If contact exists, replace the units within 100 flight hours from time of discovery (Figure 601).

NOTE: Snubbing condition may result in degradation of vibration isolation performance. Increased levels of cabin vibration may be observed.

(2) Condition of resilient elements is acceptable as long as there is no contact between the inner core and retainer. The retainer may exhibit signs of metal to metal contact (indentations), which is considered normal during certain flight conditions provided a gap is observed during this inspection.

(3) Check allowable rotational mismatch alignment marks. Isolators exceeding these mismatch limits should be removed at next engine change or 3000 flight hours unless snubbing is observed (Figure 602).

NOTE: If alignment marks do not exist install marks in mounts present position, using epoxy primer or equivalent. Paint similar to Figure 602.

B. Aft Vibration Isolator and Engine Mount

(1) Visually check condition of upper and lower insert assemblies.

(a) Check for contact between insert assembly inner core and outer ring. If contact exists, replace isolator within 100 flight hours (Figure 603).

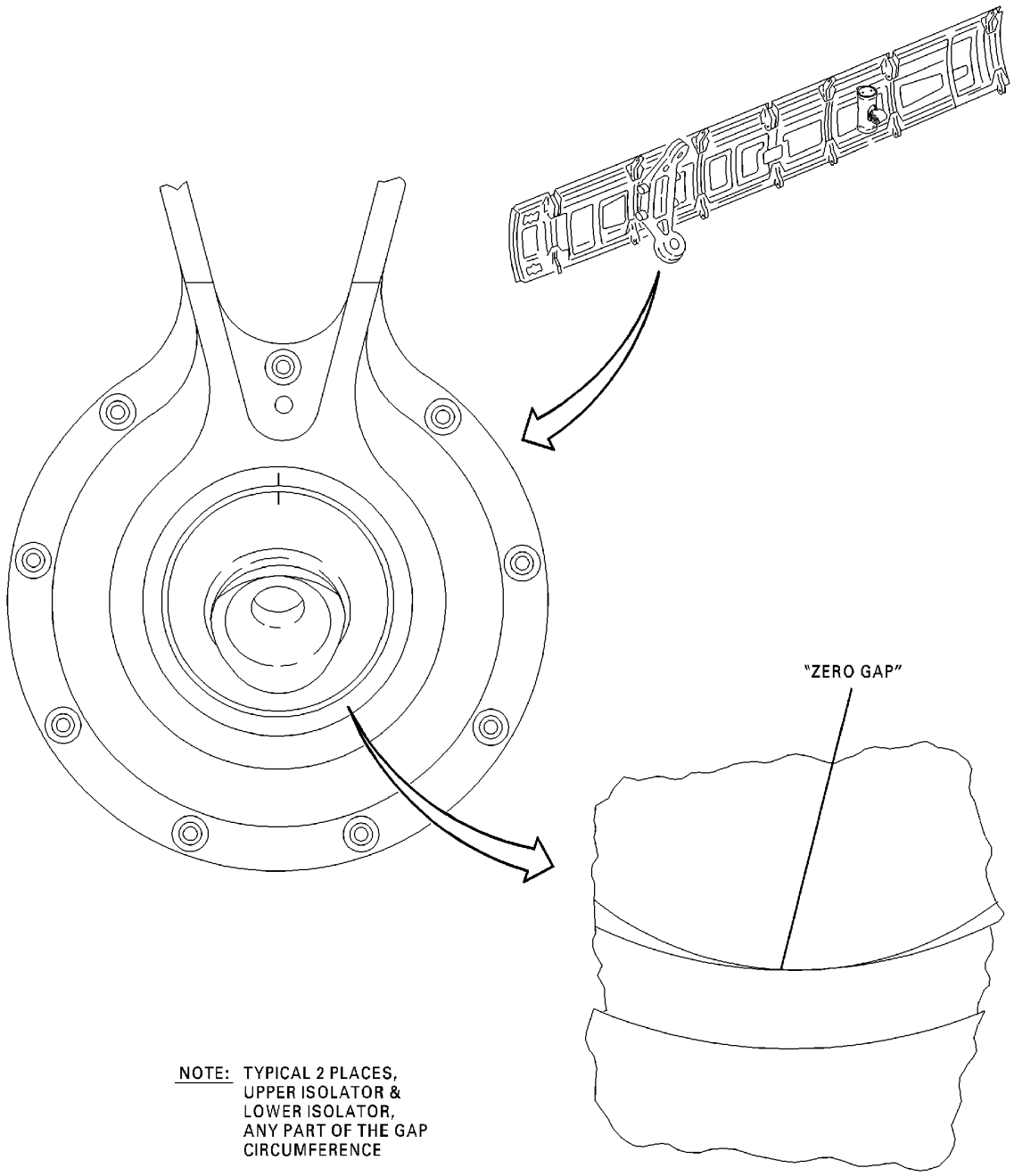
NOTE: Snubbing condition may result in degradation of vibration isolation performance. Increased levels of cabin vibration may be observed.

(2) Check condition and position of resilient elements in relation to inner core and outer retainer ring . If evidence of resilient element axial migration or damage is evident, replaced isolator within the next 100 flight hours (Figure 604).

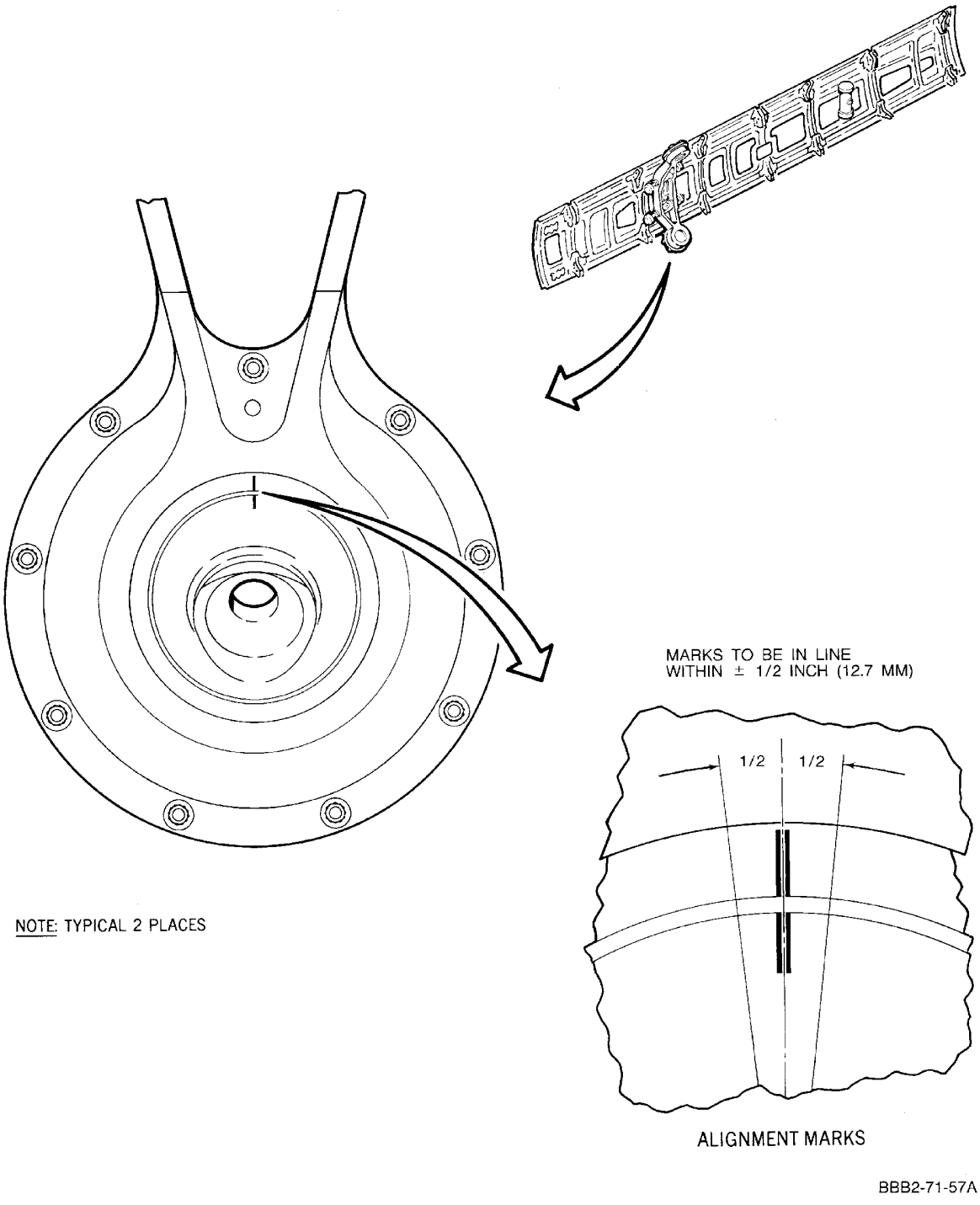
NOTE: Axial migration is defined as the movement of the resilient elements out of the inner core and outer retainer ring.

NOTE: Resilient element damage can be detected though visual evidence of material missing from the resilient elements (a hole in the cushion) surrounded by cut or broken wire bundles.

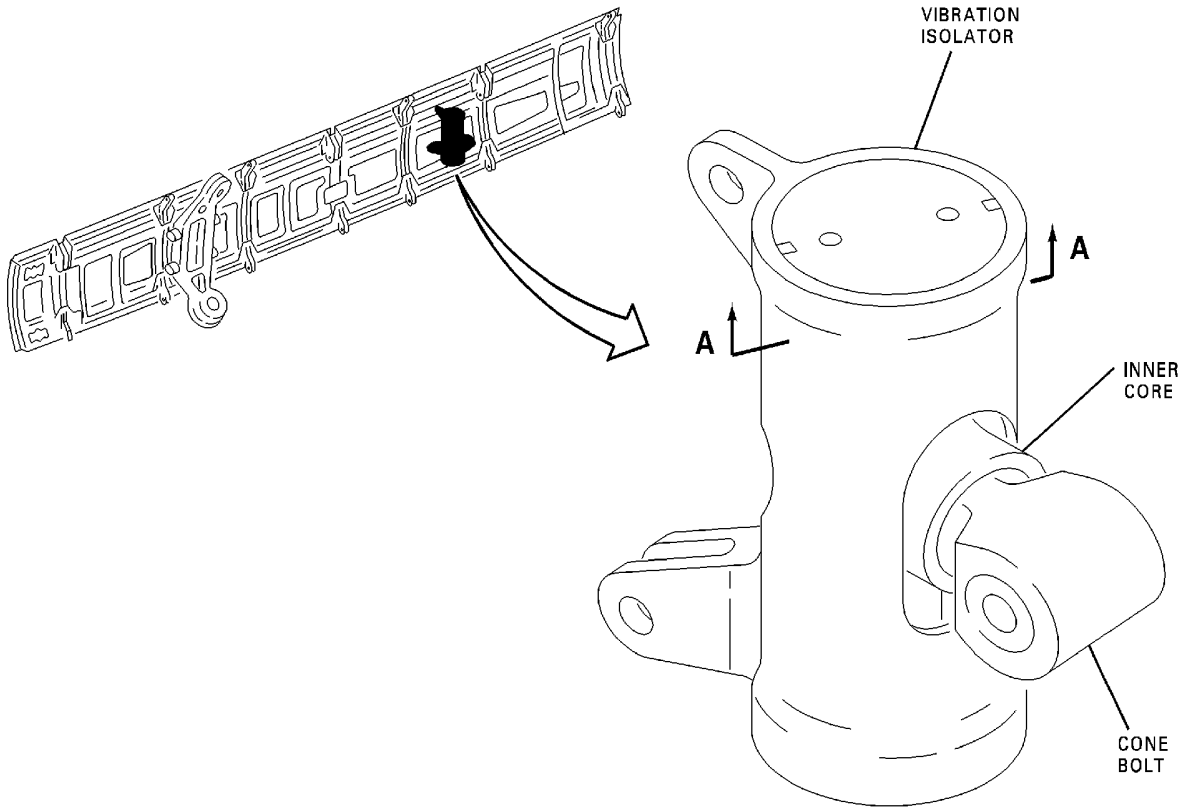
NOTE: If an aircraft has excessive mismatch at the pylon to apron trailing edge with the engine cowling closed and latched, it may be evidence of an aft engine mount vibration isolator internal failure.

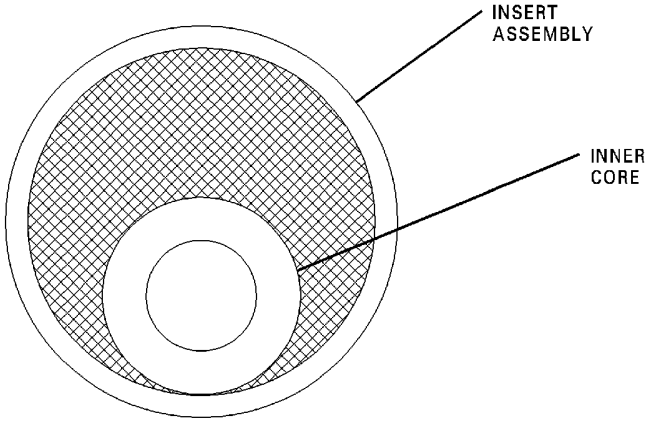


Forward Vibration Isolators -- Check Contact (Snubbing)
Figure 601/71-20-02-990-806



Forward Vibration Isolators -- Allowable Mismatch
Figure 602/71-20-02-990-807





VIEW A

INNER CORE IN CONTACT WITH INSERT ASSEMBLY

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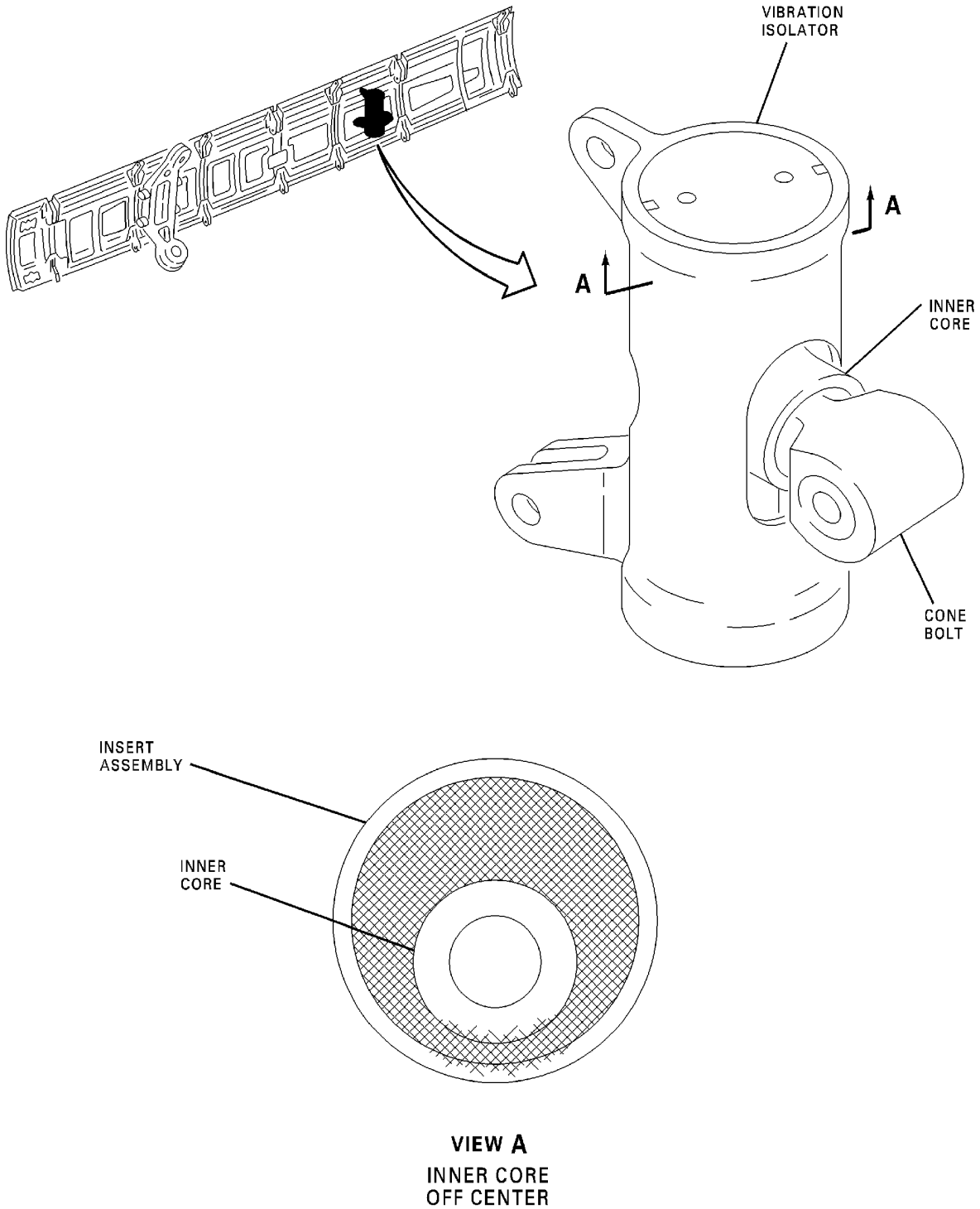
Aft Vibration Isolators -- Inner Core Contact
Figure 603/71-20-02-990-808



Aft Vibration Isolators -- Axial Migration
Figure 604/71-20-02-990-809

3. **Check With Engine Removed**

A. Forward Vibration Isolator and Engine Mount

(1) Check condition of resilient elements. If either is depressed at any point around its periphery so that clearance between element retainer and inner core assembly is less than 0.030 inch (0.76 mm), change isolator (Figure 605).

(2) Check for deformation of the resilient material. Replace if severe deformation, such as pieces of the element squeezing out from between the housings and breaking apart, exists. Slight squeeze-out and/or a few broken element strands are acceptable for further service.

NOTE: The "Resilient Elements" are the "Brillo Pad" looking pieces that separate the inner core assembly from the outer retainer.

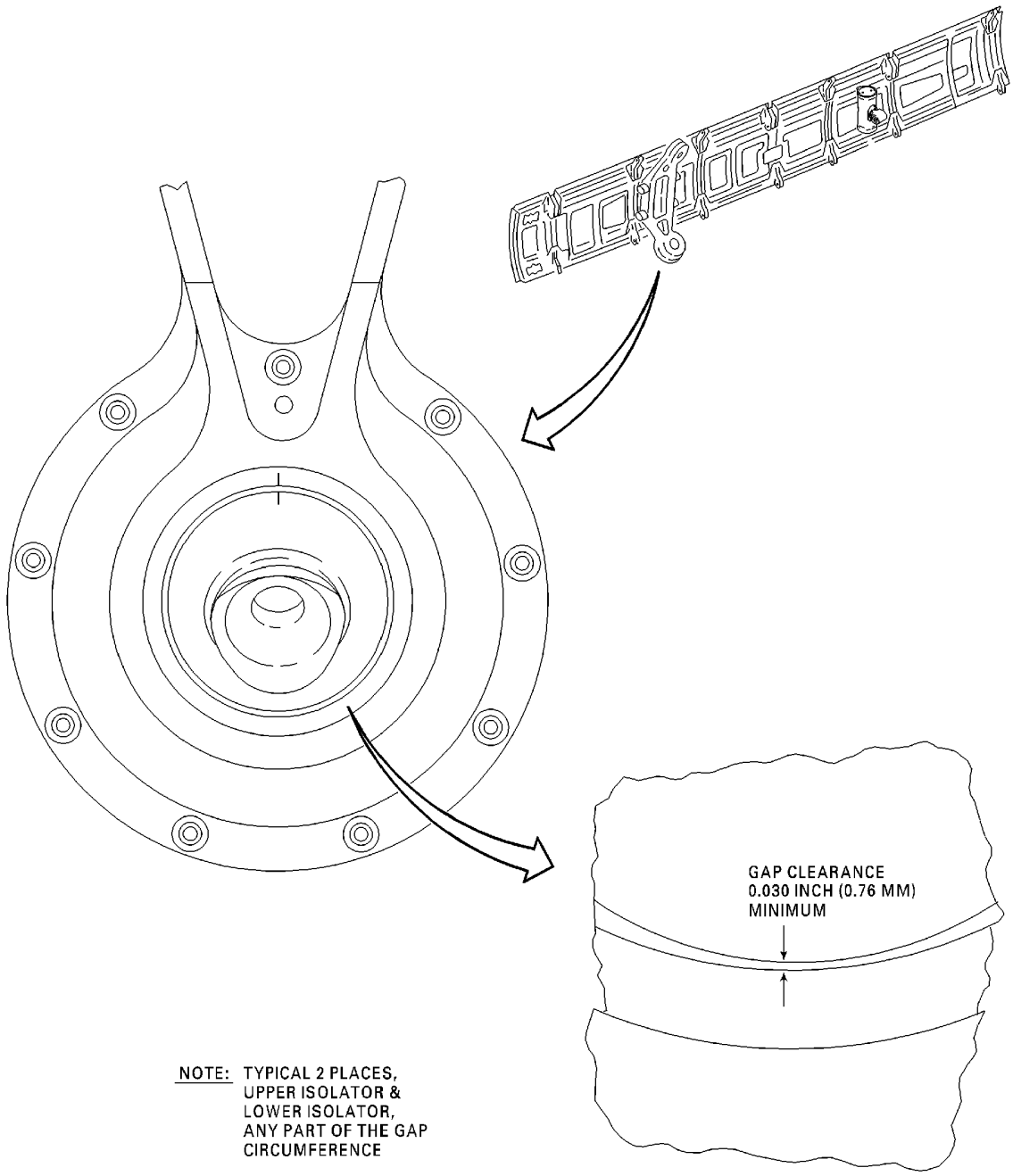
B. Aft Vibration Isolator and Engine Mount

(1) Check position of inner resilient elements in relation to inner core. If evidence of resilient elements axial migration or damage is evident, replace isolator (Figure 604).

NOTE: Axial migration shall be defined as the movement of the resilient elements out of the inner core and outer retainer ring.

NOTE: Resilient element damage can be detected though visual evidence of material missing from the resilient elements (a hole in the cushion) surrounded by cut or broken wire bundles.

(2) Check for signs of contact between insert assembly inner core and outer ring. If signs of contact exist or indication of set of the resilient elements, remove aft isolator from aircraft (Figure 603) (PAGEBLOCK 71-20-02/201).



Forward Vibration Isolators -- Allowable Gap Clearance
Figure 605/71-20-02-990-815

VIBRATION ISOLATORS - INSPECTION/CHECK

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-20-02-211-801

2. Detailed Inspection of the Vibration Isolators

A. Prepare for a Detailed Inspection of the Vibration Isolators

SUBTASK 71-20-02-010-001

(1) Open the engine upper and lower engine cowl and install hold open rods.

B. Detailed Inspection of the Vibration Isolators

NOTE: Check vibration isolators with engine installed.

NOTE: Removal of the vibration isolators is not required.

SUBTASK 71-20-02-211-001

(1) Do a detailed inspection of engine forward and aft engine isolators as follows.

(a) Inspect forward vibration isolator and engine mount.

1) Check for contact (snubbing) between the inner core assembly and outer retainer, which is defined as zero gap. (Figure 601)

NOTE: If contact exists, replace the units within 100 flight hours from time of discovery.

NOTE: Snubbing condition may result in degradation of vibration isolation performance. Increased levels of cabin vibration may be observed.

2) Condition of resilient elements is acceptable as long as there is no contact between the inner core and retainer. The retainer may exhibit signs of metal to metal contact (indentations), which is considered normal during certain flight conditions provided a gap is observed during this inspection.

3) Check allowable rotational mismatch alignment marks. (Figure 602)

NOTE: Isolators exceeding these mismatch limits should be removed at next engine change or 3000 flight hours unless snubbing is observed.

(b) Inspect aft vibration isolator and engine mount.

1) Visually check condition of upper and lower insert assemblies.

a) Check for contact between insert assembly inner core and outer ring. (Figure 603)

NOTE: If contact exists, replace isolator within 100 flight hours.

NOTE: Snubbing condition may result in degradation of vibration isolation performance. Increased levels of cabin vibration may be observed.

2) Check condition and position of resilient elements in relation to inner core and outer retainer ring. (Figure 604)

NOTE: If evidence of resilient element axial migration or damage is evident, replace isolator within the next 100 flight hours.

NOTE: Axial migration is defined as the movement of the resilient elements out of the inner core and outer retainer ring.

NOTE: Resilient element damage can be detected though visual evidence of material missing from the resilient elements (a hole in the cushion) surrounded by cut or broken wire bundles.

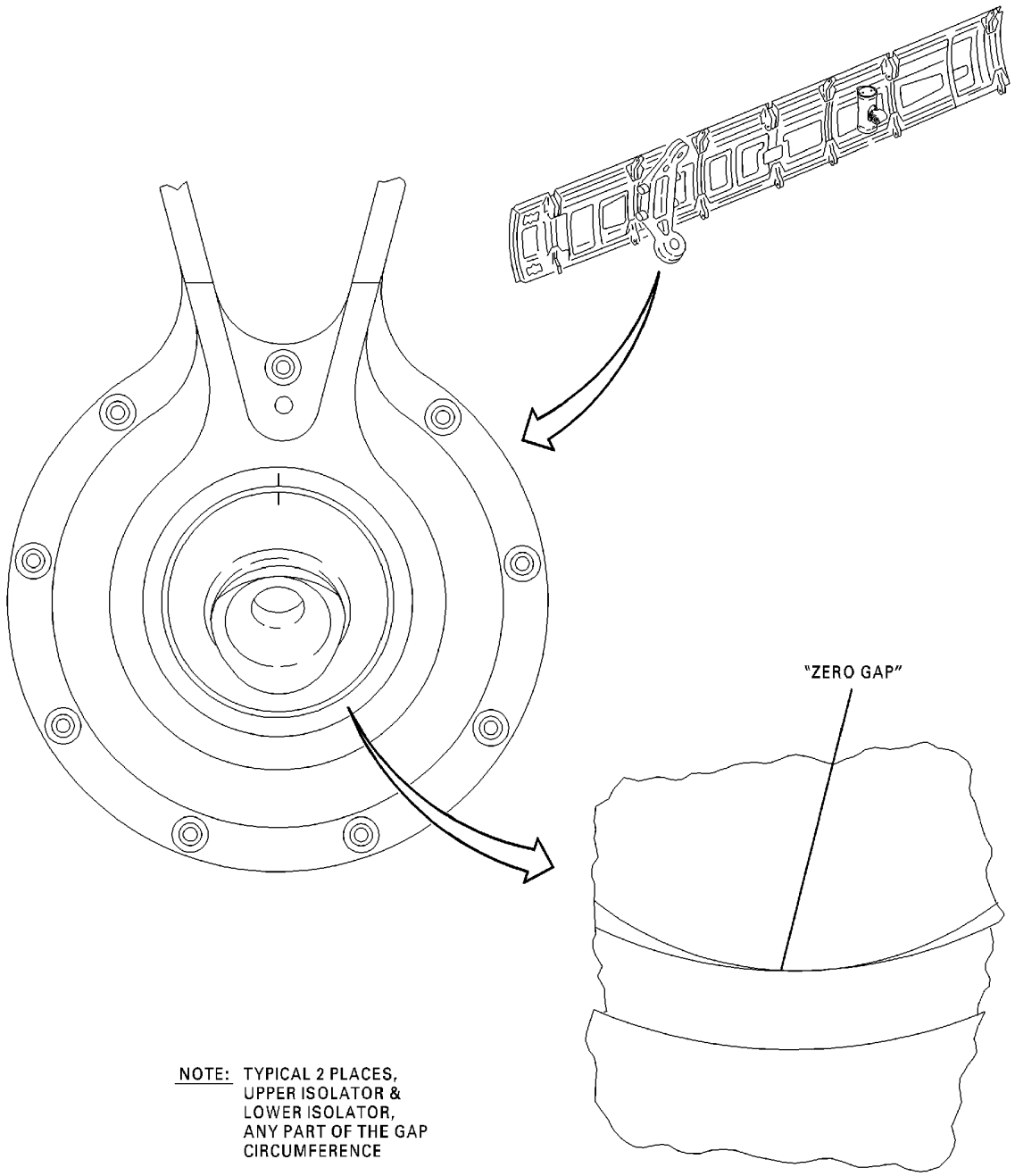
NOTE: If an aircraft has excessive mismatch at the pylon to apron trailing edge with the engine cowling closed and latched, it may be evidence of an aft engine mount vibration isolator internal failure.

C. Job Close-up

SUBTASK 71-20-02-410-001

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

——— END OF TASK ———



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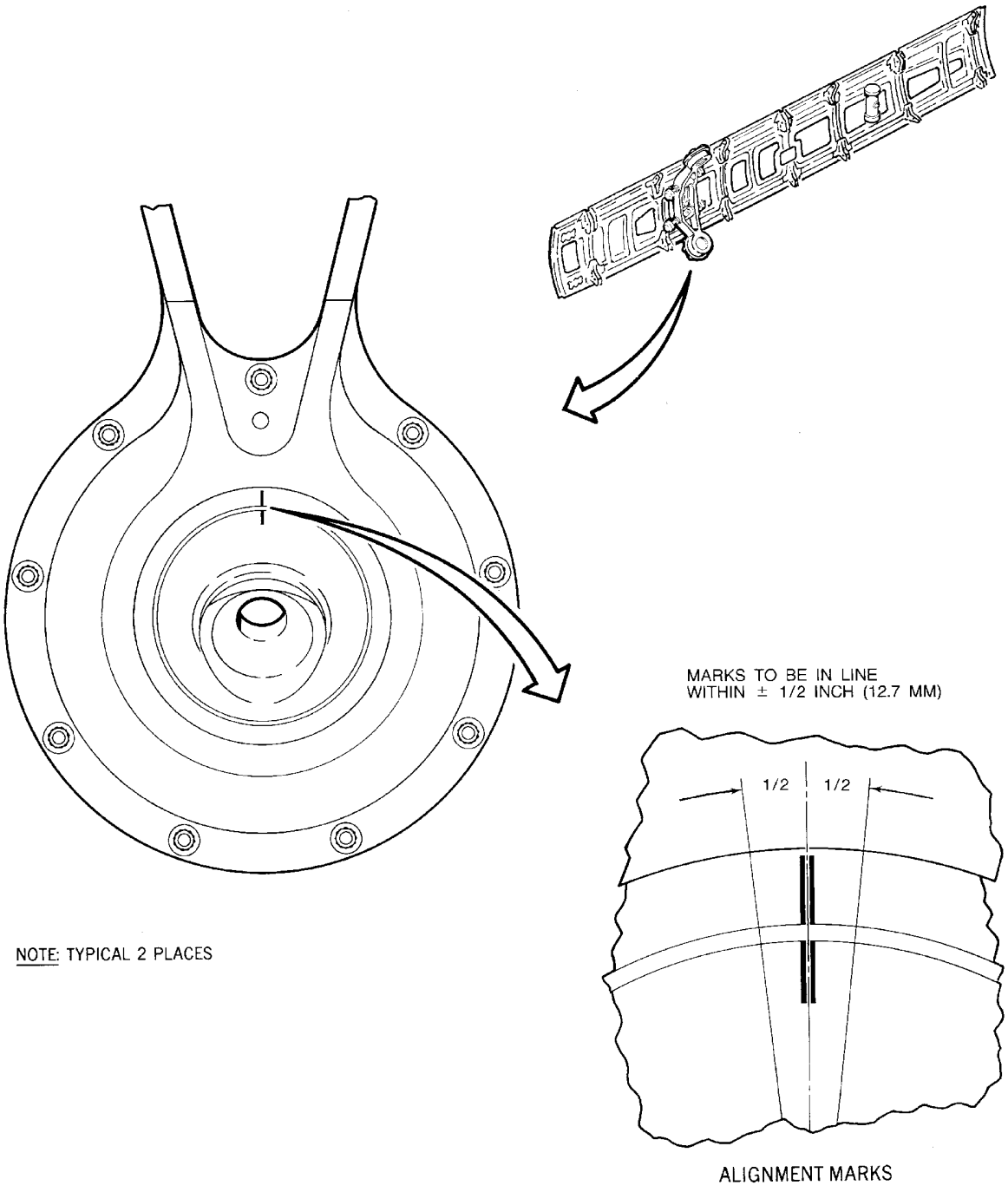
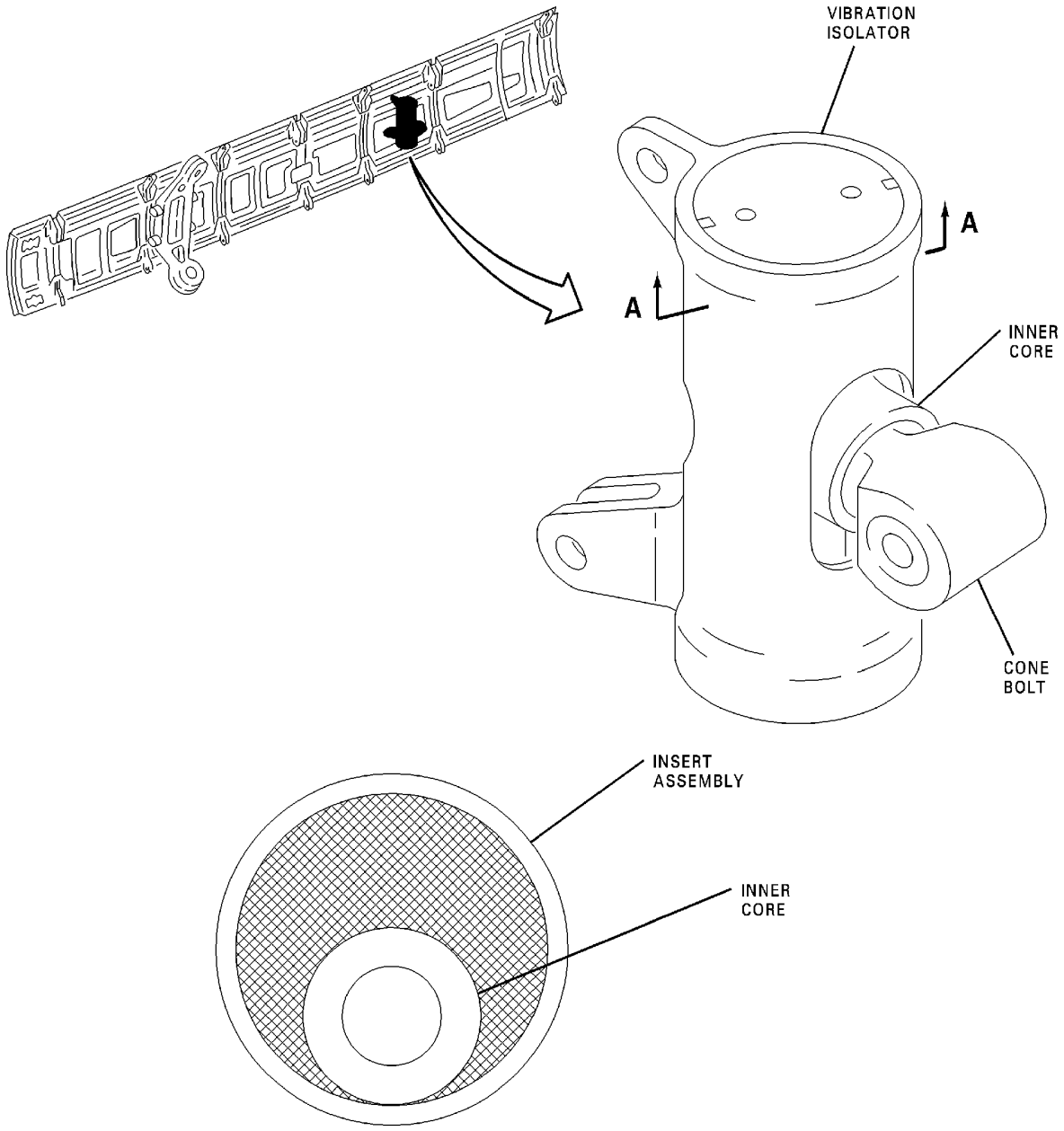
FORWARD VIBRATION ISOLATORS -- CHECK CONTACT (SNUBBING)
Figure 601/71-20-02-990-817



FORWARD VIBRATION ISOLATORS -- ALLOWABLE MISMATCH WITH ENGINE INSTALLED
Figure 602/71-20-02-990-818



VIEW A
INNER CORE IN CONTACT WITH INSERT ASSEMBLY

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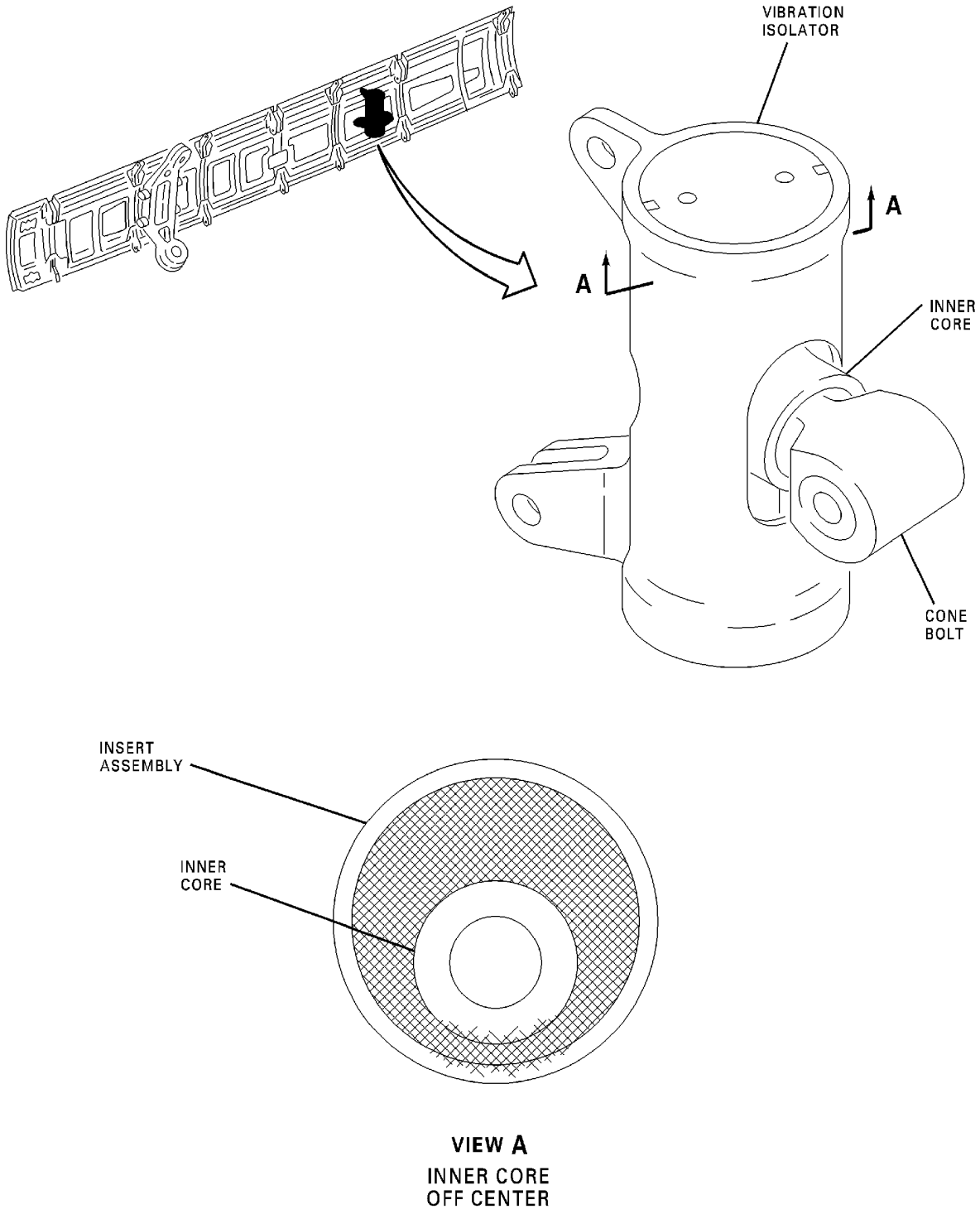
AFT VIBRATION ISOLATORS -- INNER CORE CONTACT
Figure 603/71-20-02-990-819



AFT VIBRATION ISOLATORS -- AXIAL MIGRATION
Figure 604/71-20-02-990-820

PYLON VIBRATION ABSORBERS - MAINTENANCE PRACTICES

1. General

A. This maintenance practice provides removal/installation instructions for the pylon vibration absorbers, forward engine mount yoke, and yoke attach bolts.

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

B. The pylon vibration absorbers are mounted on forward and aft sides of the pylon yoke. All four absorbers may be removed and replaced without removing the engine. Access is through upper and lower cowl doors.

NOTE: Forward lower cowl door overlaps the aft lower cowl door and must be opened first.

C. Removal and installation of upper forward and aft absorbers, and lower forward and aft absorbers is identical except for the following:

(1) Vibration absorbers for pylon upper attach bolt are equipped with longer beams. The upper forward vibration absorber has the longest beam and is pre-tuned to 121 CPS. The upper aft vibration absorber has an intermediate beam and is pretuned to 165 CPS.

(2) Vibration absorbers for pylon lower attach bolt are equipped with shorter beams and are pre-tuned to 181 CPS. (Figure 201)

D. Refer to DC-9 Overhaul Manual Chapter 71-20-3 for pylon vibration absorber repair.

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

E. The pylon vibration absorbers are mounted on forward and aft sides of the pylon yoke. All three absorbers may be removed and replaced without removing the engine. Access is through upper and lower cowl doors.

NOTE: Forward lower cowl door overlaps the aft lower cowl door and must be opened first.

F. Removal and installation of upper forward and aft absorbers, and lower forward absorber is identical except for the following:

(1) The upper aft vibration absorber has the shorter beam and is pretuned to 176 CPS.

(2) The forward vibration absorbers have the longest beams and are pretuned to 111 CPS. (Figure 201)

G. Removal and installation of upper forward and aft absorbers, and lower forward and aft absorbers is identical except for the following:

(1) Figure 201 provides coverage for aircraft with three vibration absorbers on each pylon, and the pre-tuned CPS value for each vibration absorber. The replacement absorber must have the same as the one being replaced.

2. Equipment and Materials

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

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
KIT9960	
Lubricant oil, molybdenum disulfide, silicone MIL-L-25681 DPM 5782 P03-005	
Torque wrench (0-1000 inch-Pounds range) (0-112 N·m)	
Lockwire .032 corrosion-resistant steel P05-289	
Sealant silicone, RTV-88 with RTV-9910 catalyst DMS 1799	General Electric

3. **Removal/Installation Pylon Vibration Absorbers**

A. Remove Vibration Absorbers

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

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).

(2) Place thrust reverser control valve in dump position and install safety pin.

(3) Remove nut, bolt, and washer attaching safety cable and clips to pylon apron brackets (Figure 201).

CAUTION: MAKE CERTAIN 7/8 INCH (22.23 MM) HEXAGON SURFACE OF BEAM IS USED FOR WRENCHING TO PREVENT POSSIBLE DAMAGE TO PART.

(4) Cut P05-289 lockwire and turn absorber beam out of pylon yoke attach bolt.

CAUTION: DO NOT DISASSEMBLE VIBRATION ABSORBER. EACH ABSORBER IS PRETUNED TO A SPECIFIC FREQUENCY FOR UPPER AND LOWER INSTALLATION.

(5) Remove absorber, safety cable, and clips as a unit.

(6) Remove retaining washer from end of pylon attach bolt.

(7) Check internal threads of pylon attach bolt for damage.

B. Install Vibration Absorbers

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 opened 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

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).

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

CAUTION: DO NOT ATTEMPT TO OVERHAUL VIBRATION ABSORBER AT FIELD MAINTENANCE LEVEL. MAKE CERTAIN THAT ABSORBERS INSTALLED ON PYLON UPPER AND LOWER ATTACH BOLTS ARE IN CORRECT LOCATION TO ENSURE THAT CORRECT CPS IS PROVIDED.

(3) Make sure that the CPS provided is correct (Paragraph 1.).

Apply antiseize lubricant (P03-005) to threads and bearing surface on shoulder of absorber beam.

(4) Position retaining washer with lug engaged in slot on end of pylon attach bolt (Figure 201).

CAUTION: DO NOT DISASSEMBLE VIBRATION ABSORBER. EACH ABSORBER IS PRETUNED TO A SPECIFIC FREQUENCY FOR UPPER AND LOWER INSTALLATION.

(5) Position vibration absorber.

CAUTION: MAKE CERTAIN 7/8 INCH (22.23 MM) HEXAGON SURFACE OF BEAM IS USED FOR WRENCHING TO PREVENT POSSIBLE DAMAGE TO PART.

(6) Tighten absorber beam to torque of 690 to 750 inch-pounds (77.3-84 N·m) and safety to retaining washer with .032 corrosion-resistant steel lockwire.

NOTE: Torque values are given for standard torque wrench. When adapters are used refer to (SUBJECT 20-30-01) page 201.

(7) Hole through absorber weights for safety cable must be within 35 degrees of pylon apron brackets (Figure 201).

(8) If required loosen nut attaching absorber weight to beam, rotate weight to desired position, and tighten nut to torque of 425 to 475 inch-pounds (47.6 to 53.2 N·m).

(9) Insert safety cable through absorber weight, and install bolt and washer attaching clip to one apron bracket.

(10) Install bolt and washer attaching clip to second apron bracket.

(11) Pull safety cable taut through absorber weight and clip, and mark cable at clip.

(12) Swage sleeve on cable 3/8 of an inch (9.53 mm) from mark, allowing cable a maximum of 3/8 of an inch (9.53 mm) cable slack.

(13) 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 405-408, 410, 411, 877, 880, 884, 886, 887, 892, 893 (Continued)

(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 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

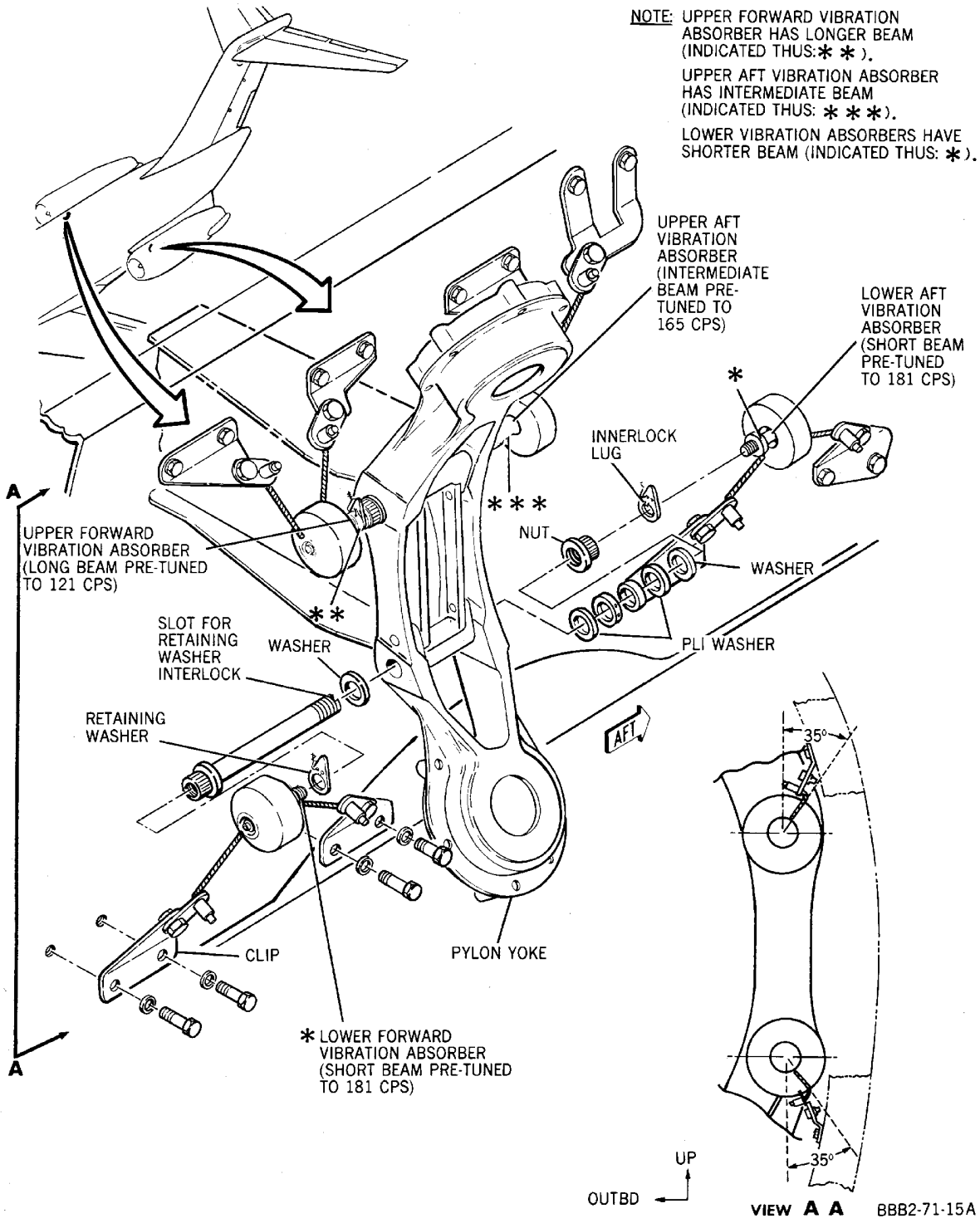
Row	Col	Number	Name
WJE ALL			
K	26	B1-424	LEFT ENGINE IGNITION

UPPER EPC, ENGINE - RIGHT AC BUS

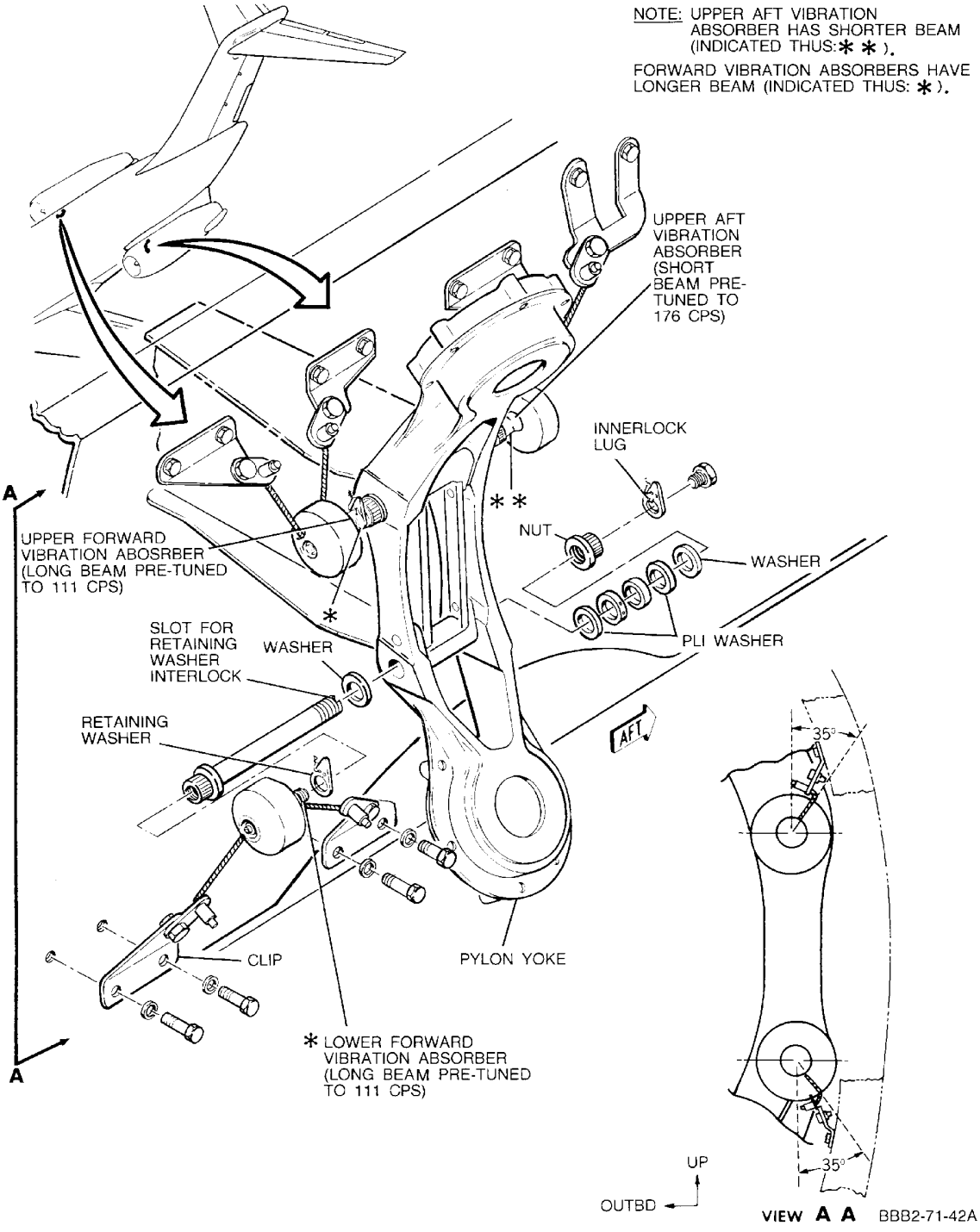
Row	Col	Number	Name
L	26	B1-425	RIGHT ENGINE IGNITION

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.

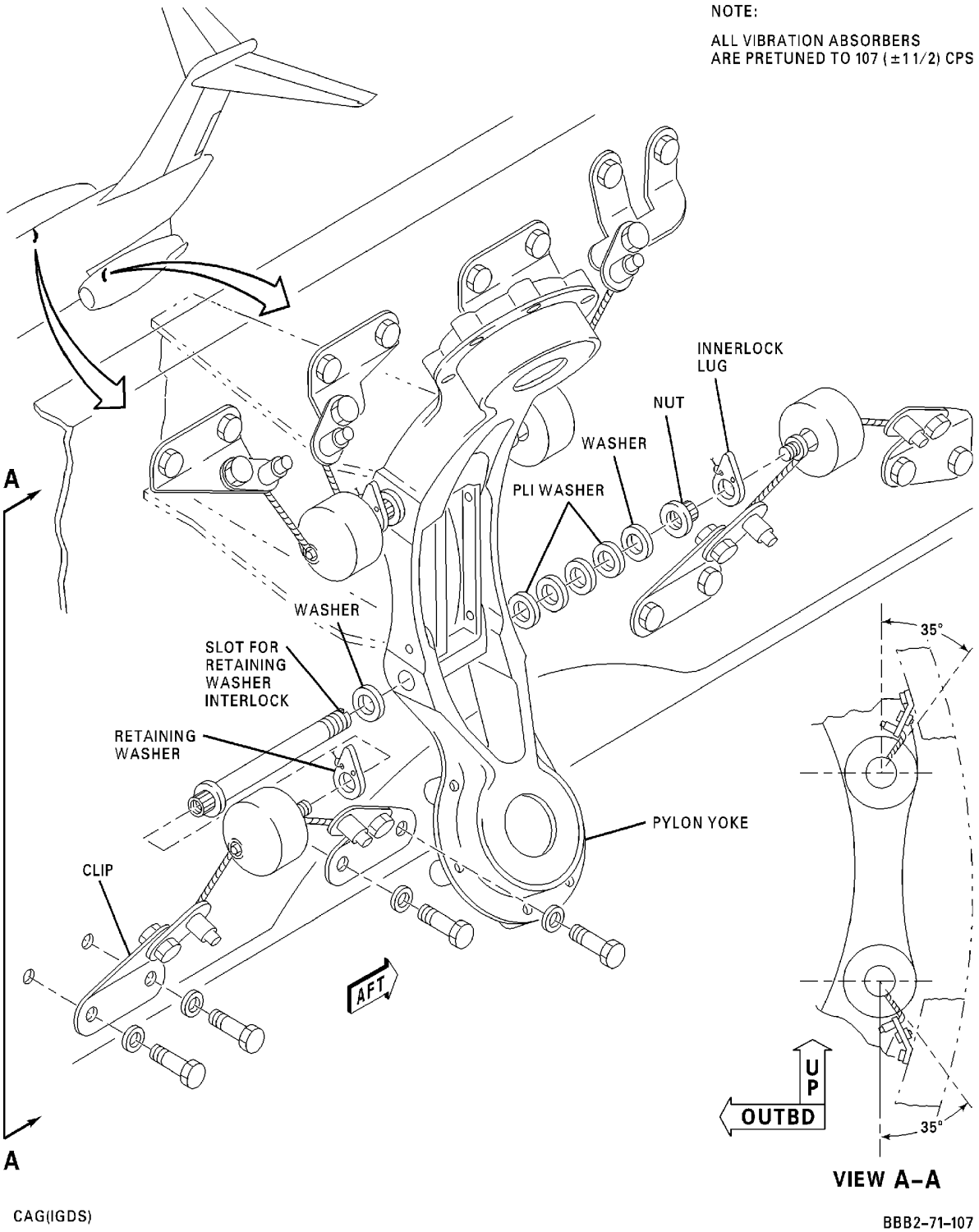
(14) Remove safety pin from thrust reverser control valve. Stow safety pin.



Pylon Vibration Absorbers -- Removal/Installation
Figure 201/71-20-03-990-807 (Sheet 1 of 3)



Pylon Vibration Absorbers -- Removal/Installation
Figure 201/71-20-03-990-807 (Sheet 2 of 3)



Pylon Vibration Absorbers -- Removal/Installation
Figure 201/71-20-03-990-807 (Sheet 3 of 3)

4. Removal/Installation Pylon Yoke Attach Bolt

A. Remove Pylon Yoke Attach Bolt

NOTE: Removal and replacement of upper and lower attach bolts is identical. Bolts must be removed from forward side of pylon yoke.

(1) Remove power plant (GENERAL, SUBJECT 71-00-00).

CAUTION: DO NOT DISASSEMBLE VIBRATION ABSORBER. EACH ABSORBER IS PRETUNED TO A SPECIFIC FREQUENCY.

(2) Remove vibration absorbers from end of bolt (Paragraph 3.).

(3) Remove nut and washers from end of pylon yoke attaching bolt (Figure 201).

CAUTION: REMOVE AND INSTALL ONE PYLON YOKE ATTACH BOLT AT A TIME TO ENSURE YOKE STAYS IN ALIGNMENT.

(4) Remove bolt by applying pressure with a suitable tool which will not damage hole in pylon yoke.

B. Install Pylon Yoke Attach Bolt

WARNING: SILICONE SEALANT IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILICONE SEALANT IS USED.

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) Install countersunk washer with countersink matching shoulder on bolt head and apply silicone sealant to both faying surfaces of washer.

(2) Install bolt with anti-seize lubricant (P03-005), ensure slots in bolt are oriented to outboard side of yoke, wipe off excess lubricant.

(3) Install PLI washer, apply a faying surface seal of silicone sealant to side of washer next to yoke. Wipe off excess sealant to avoid filling voids in PLI washer. For proper PLI washer installation refer to (SUBJECT 20-10-14) page 201.

NOTE: The PLI washer contains an inner ring, an outer ring and two flat washers. One of the flat washers is countersunk. The countersink must be installed adjacent to the mount (P/N 5935710-1).

(4) Install nut and tighten to proper preload.

(5) Install vibration absorbers. Refer to Paragraph 3.B..

(6) Install power plant (SUBJECT 71-00-00).

5. Removal/Installation Forward Engine Mount Yoke

A. Remove Forward Mount Yoke

(1) Remove power plant (SUBJECT 71-00-00).

CAUTION: DO NOT DISASSEMBLE VIBRATION ABSORBER. EACH ABSORBER IS PRETUNED TO A SPECIFIC FREQUENCY.

(2) Remove vibration absorbers (Paragraph 3.A.).

(3) Remove nuts and washers from end of forward mount yoke attach bolts (Figure 201).

WARNING: GET SUFFICIENT AID FROM PERSONS AND EQUIPMENT TO SUPPORT FORWARD MOUNT YOKE WHEN ATTACH BOLTS ARE REMOVED. FORWARD MOUNT YOKE WEIGHS APPROXIMATELY 85.5 LBS (38.8 KG). THIS WILL HELP PREVENT INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(4) Hold and support forward mount yoke in position and remove attach bolts and washers.

(5) Remove bolts by applying pressure with suitable tool that will not damage holes in forward mount yoke.

(6) Remove forward mount yoke from pylon.

B. Install Forward Mount Yoke

(1) Make certain to check forward mount yoke and attachment hardware prior to installation of mount yoke to pylon, refer to (Paragraph 6.).

(2) Install forward mount yoke as follows:

WARNING: GET SUFFICIENT AID FROM PERSONS AND EQUIPMENT TO SUPPORT FORWARD MOUNT YOKE WHEN ATTACH BOLTS ARE REMOVED. FORWARD MOUNT YOKE WEIGHS APPROXIMATELY 85.5 LBS (38.8 KG). THIS WILL HELP PREVENT INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Hold forward mount yoke in position and align yoke with pylon.

(b) Attach forward mount yoke to pylon with attach bolts.

WARNING: SILICONE SEALANT IS AN AGENT THAT IS A LOW HAZARD. MAKE SURE ALL PERSONS OBEY THE PRECAUTIONS WHEN SILICONE SEALANT IS USED.

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.

(c) Install countersunk washer with countersink matching shoulder on bolt head and apply silicone sealant to both faying surfaces of washer.

(d) Install bolt with anti-seize lubricant (P03-005), ensure slots in bolt are oriented to outboard side of yoke, wipe off excess lubricant.

(e) Install PLI washer, apply a faying surface seal of silicone sealant to side of washer next to yoke. Wipe off excess sealant to avoid filling voids in PLI washer. For proper PLI washer installation, refer to (SUBJECT 20-10-14) page 201.

NOTE: The PLI washer contains an inner ring, an outer ring and two flat washers. One of the flat washers is countersunk. The countersink must be installed adjacent to the mount (P/N 5935710-1)

(f) Install nut and tighten to proper preload.

(3) Install vibration absorbers, refer to Paragraph 3.B..

(4) Install power plant (SUBJECT 71-00-00).

6. Check Forward Engine Mount Yoke

A. Check Forward Mount Yoke

(1) Remove the vibration isolators from the forward mount yoke (VIBRATION ISOLATORS - MAINTENANCE PRACTICES, PAGEBLOCK 71-20-02/201, page 201).

(2) Check all areas of yoke for nicks, scratches, cracks, corrosion, fretting, galling, chipped plating, and wear (Figure 202).

NOTE: Use a strong light and a 10X magnifying glass to perform this check.

(3) Check threaded parts for crossed or damaged threads.

(4) Perform a fluorescent penetrant check of the forward mount yoke attach bolts before bolts are used again, use sensitivity level 3 (P05-236) (SUBJECT 70-00-00).

(5) If forward mount yoke is damaged more than maximum allowable limits and repairs are not possible, replace forward mount yoke.

(6) Install the vibration isolators in the forward mount yoke (VIBRATION ISOLATORS - MAINTENANCE PRACTICES, PAGEBLOCK 71-20-02/201, page 201).

INSPECT/CHECK	MAXIMUM SERVICEABLE LIMITS	REMARKS
NICKS, GOUGES, SCRATCHES OR SMALL, BURRS	MORE THAN 0.02 IN. (0.51 mm) DEEP IS NOT PERMITTED.	REPLACE THE MOUNT YOKE
CORROSION	NO MORE THAN 20 % OF THE SURFACE.	REPLACE THE MOUNT YOKE
CORROSION	MORE THAN 0.02 IN. (0.51 mm) DEEP IS NOT PERMITTED.	REPLACE THE MOUNT YOKE
CRACKS	NOT PERMITTED.	REPLACE THE MOUNT YOKE

TABLE 201

CAG(IGDS)

BBB2-71-126

Forward Engine Mount Yoke - Visual Check
Figure 202/71-20-03-990-813

ENGINE TO PYLON BURN-THRU BARRIER - MAINTENANCE PRACTICES

1. General

A. This maintenance practices provides on aircraft inspection/check of engine to pylon burn-thru barrier and removal/installation of barrier.

B. The burn-thru barrier is mounted on inboard side of engine between flanges J_2 and H under the 8th-stage and 13th-stage bleed air ducts. (Figure 201).

C. Engine must be removed in order to remove burn-thru barrier from engine case. For engine removal/ installation, refer to GENERAL, SUBJECT 71-00-00, Page 401.

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
Torque wrench (0-200 inch-pounds range)(0-22.6 N·m)	
Primer, silicone, 1200	Dow Corning Corp. Midland, MI 48640
Sealant, silicone, RTV-88 base with RTV-9910 catalyst	General Electric Co. City of Industry, CA 91745
High temperature anti-seize compound (MIL-A-907)	
Petrolatum lubricant (VV-P-236)	
Lockwire 0.020 corrosion resistant steel P05-288	

3. Removal/Installation of Burn-Thru Barrier

A. Remove Burn-Thru Barrier

NOTE: Engine must be removed in order to remove burn-thru barrier from engine case. For engine removal/ installation, refer to GENERAL, SUBJECT 71-00-00, Page 401.

(1) For removal of burn-thru barrier complete with frame and panel, proceed as follows:

(a) Remove 8th-stage and 13th-stage bleed air ducts (Figure 201).

(b) Remove electrical connectors and ground connectors from upper and lower fire detector elements (Figure 202).

CAUTION: CARE MUST BE TAKEN DURING REMOVAL NOT TO BEND ELEMENT WHEN CLEARING PNEUMATIC DUCTS AND OTHER EQUIPMENT OR STRUCTURE IN AREA.

(c) Remove upper and lower fire detector element and support, remove as a complete unit.

(d) Install protective caps on connector and receptacle.

(e) On right engine; remove thrust reverser push-pull control cable support bracket.

(f) Remove burn-thru barrier (Figure 202).

(2) For removal of burn-thru barrier panel only, proceed as follows:

(a) Remove 8th-stage and 13th-stage bleed air ducts (Figure 201).

(b) Remove duct support link and bracket (Figure 203).

(c) Remove burn-thru barrier panel.

B. Install Burn-Thru Barrier

(1) For installation of burn-thru barrier complete with frame and panel, proceed as follows:

CAUTION: AFTER INSTALLATION, MAKE SURE THAT BARRIER DOES NOT CONTACT ENGINE FAN CASE AND BORESCOPE COVER PLATE ATTACH BOLT HEADS.

(a) On inboard side of engine and with the 8th-stage and 13th-stage bleed air ducts removed, install burn-thru barrier frame between engine flanges J_2 and H (Figure 202).

NOTE: If contact exists, refer to CMM 71-30-02 for Elimination of Chafing and/or Repair.

CAUTION: CARE MUST BE TAKEN DURING INSTALLATION NOT TO BEND ELEMENT WHEN CLEARING PNEUMATIC DUCTS AND OTHER EQUIPMENT OR STRUCTURE IN THE AREA.

CAUTION: MAINTAIN A MINIMUM CLEARANCE LIMIT OF 5/32 INCH (3.97 MM) BETWEEN THE FIRE DETECTOR SENSOR ELEMENTS AND ADJACENT ENGINE STRUCTURE.

(b) Install fire detectors on upper and lower support frames of burn-thru barrier.

(c) Remove protective caps from fire detector element end fittings and make certain that the interface between each element and fitting and its mounting bracket is clean.

(d) Connect electrical connector plugs to same colored elements. Tighten connector plugs to torque of 50 to 70 inch-pounds (5.6 to 7.9 N·m) and safety plugs and element end fittings with P05-288 lockwire.

(e) Connect upper and lower ground wires.

(f) On right engine install thrust reverser push-pull control cable support bracket.

(2) Install 8th-stage and 13th-stage bleed air ducts and clamps (without Dubl-Lock if applicable) as follows:

NOTE: To aid seating of clamp, inside of retainer segment may be lubricated with light coating of high temperature anti-seize (MIL-A-907) or petrolatum lubricant (VV-P-236) or equivalent, being careful not to allow lubricant to contact T-bolt.

(a) Position clamp over mating flange of duct.

CAUTION: DO NOT EXCEED MAXIMUM TORQUE VALUE OF 120 INCH-POUNDS (13.5 N·M), AS SPECIFIED ON CLAMP.

(b) Place T-bolt in trunnion of clamp and tap clamp lightly with non-metallic mallet while tightening clamp to torque value specified on clamp (110 to 120 inch-pounds) (12.4 to 13.5 N·m).

NOTE: Tapping should be around circumference of any accessible clamp surface in order to aid in the distribution of the load as the clamp is tightened.

(3) Install 8th-stage and 13th-stage bleed air ducts and clamps (Dubl-Lock if applicable) as follows:

NOTE: To aid seating of clamp, inside of retainer segment may be lubricated with light coating of high temperature anti-seize (MIL-A-907) or petrolatum lubricant (VV-P-236) or equivalent, being careful not to allow lubricant to contact T-bolt.

(a) Position clamp over mating flange of duct.

CAUTION: DO NOT EXCEED MAXIMUM TORQUE VALUE OF 120 INCH-POUNDS (13.5 N·M), AS SPECIFIED ON CLAMP.

(b) Position Dubl-Lock tang in opening beneath head of T-bolt and tighten nut using torque wrench until tang locks. Do not exceed torque value stamped on clamp. While tightening nut, tap clamp with non-metallic mallet around circumference or any accessible clamp surface in order to aid distribution of the load.

(c) After Dubl-Lock tang has engaged, continue to tighten nut until torque value specified on clamp is reached. While tightening nut to specified torque value, tap clamp with non-metallic mallet around circumference or any accessible clamp surface until value is achieved and install safety pin.

(4) Maintain 3/16 inch minimum clearance between bleed air ducts, clamps, and burn-thru barrier. Duct support links may be adjusted to obtain clearance.

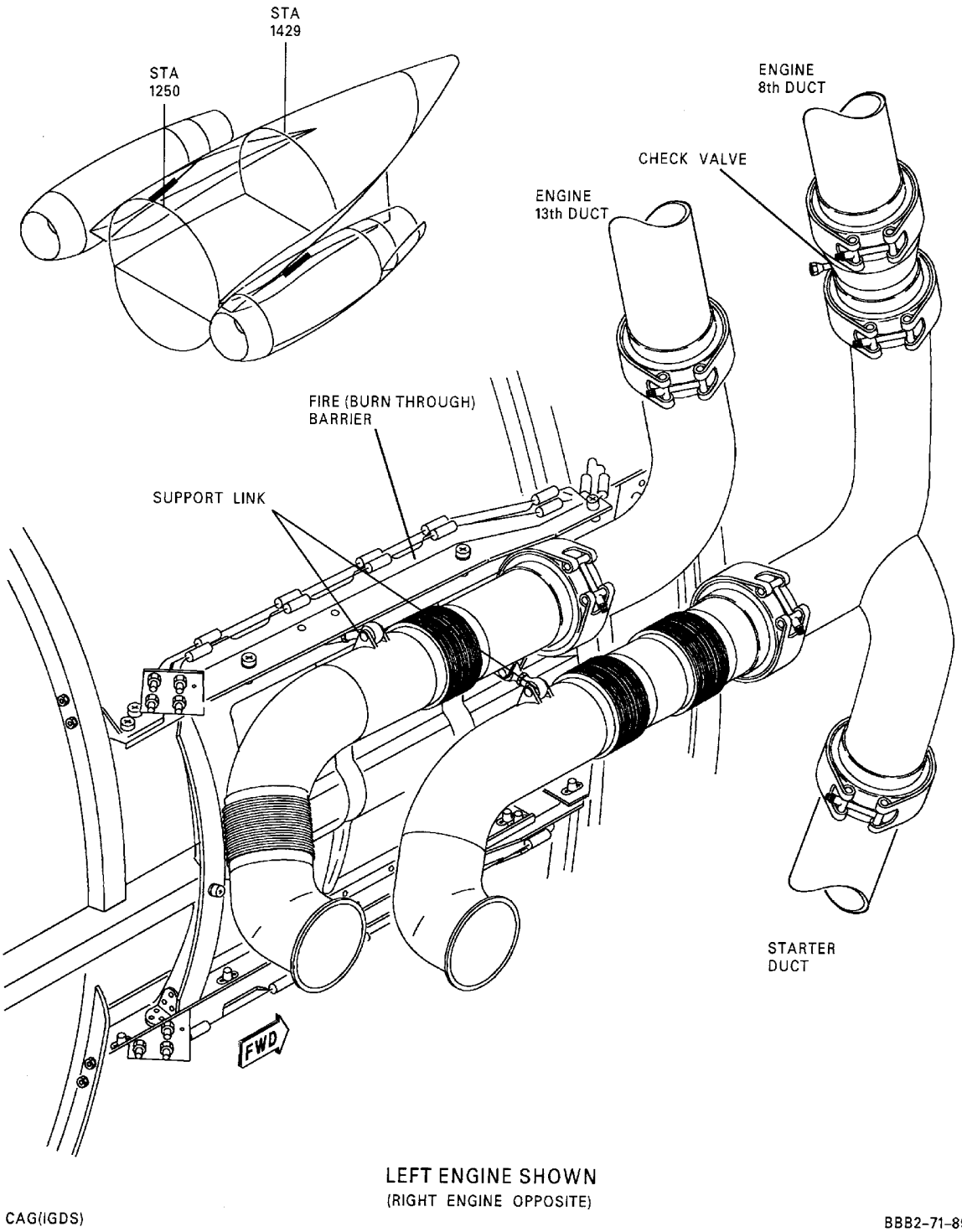
(5) For installation of burn-thru barrier panel only, proceed as follows:

(a) On inboard side of engine and with the 8th-stage and 13th-stage bleed air ducts removed, position burn-thru barrier panel in frame (Figure 203).

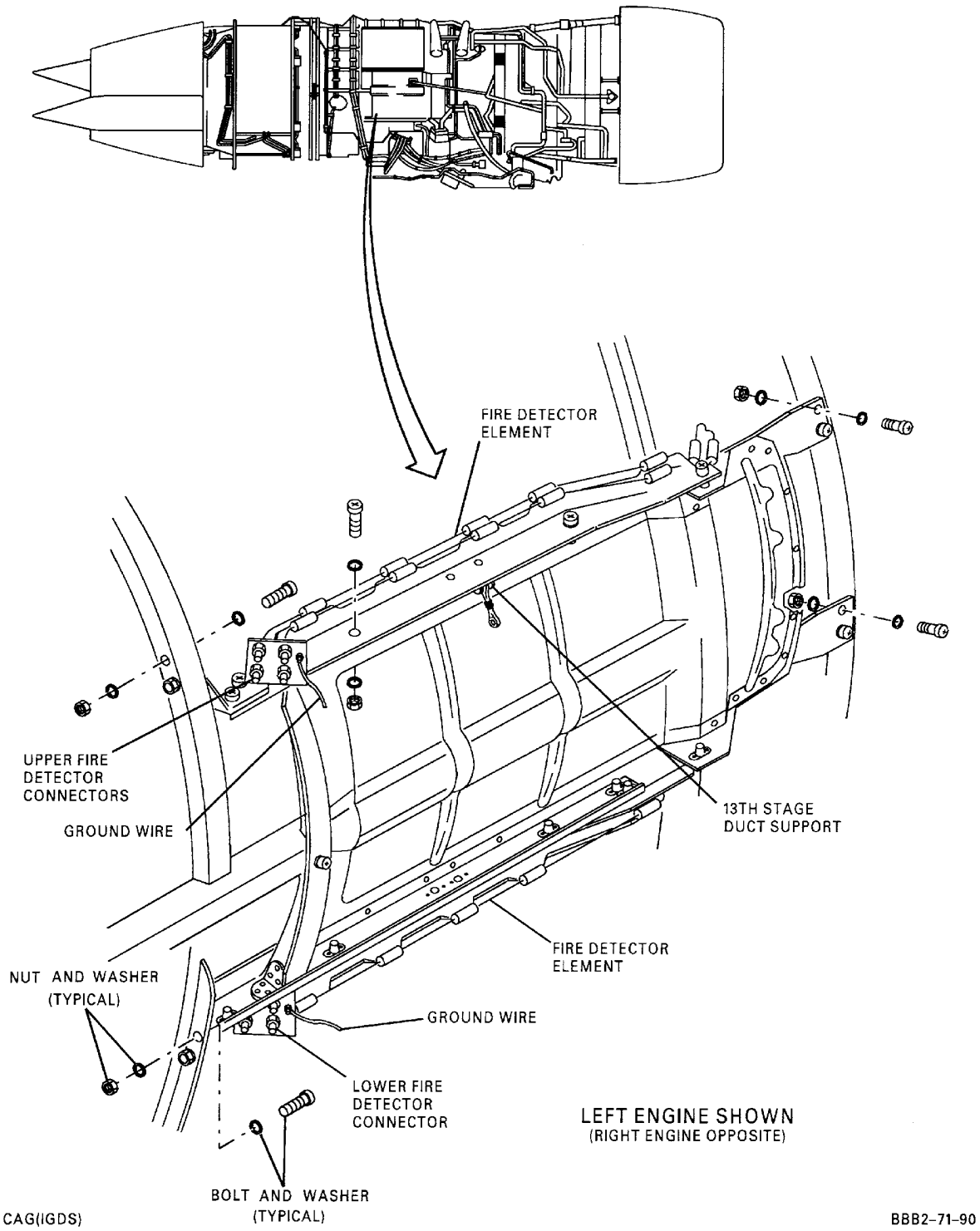
(b) Apply silicone primer as required to screws, and wet install screws and washers with sealant. Torque screws to 45 to 50 inch-pounds (5.0 to 5.6 N·m).

(c) Install duct support link and bracket.

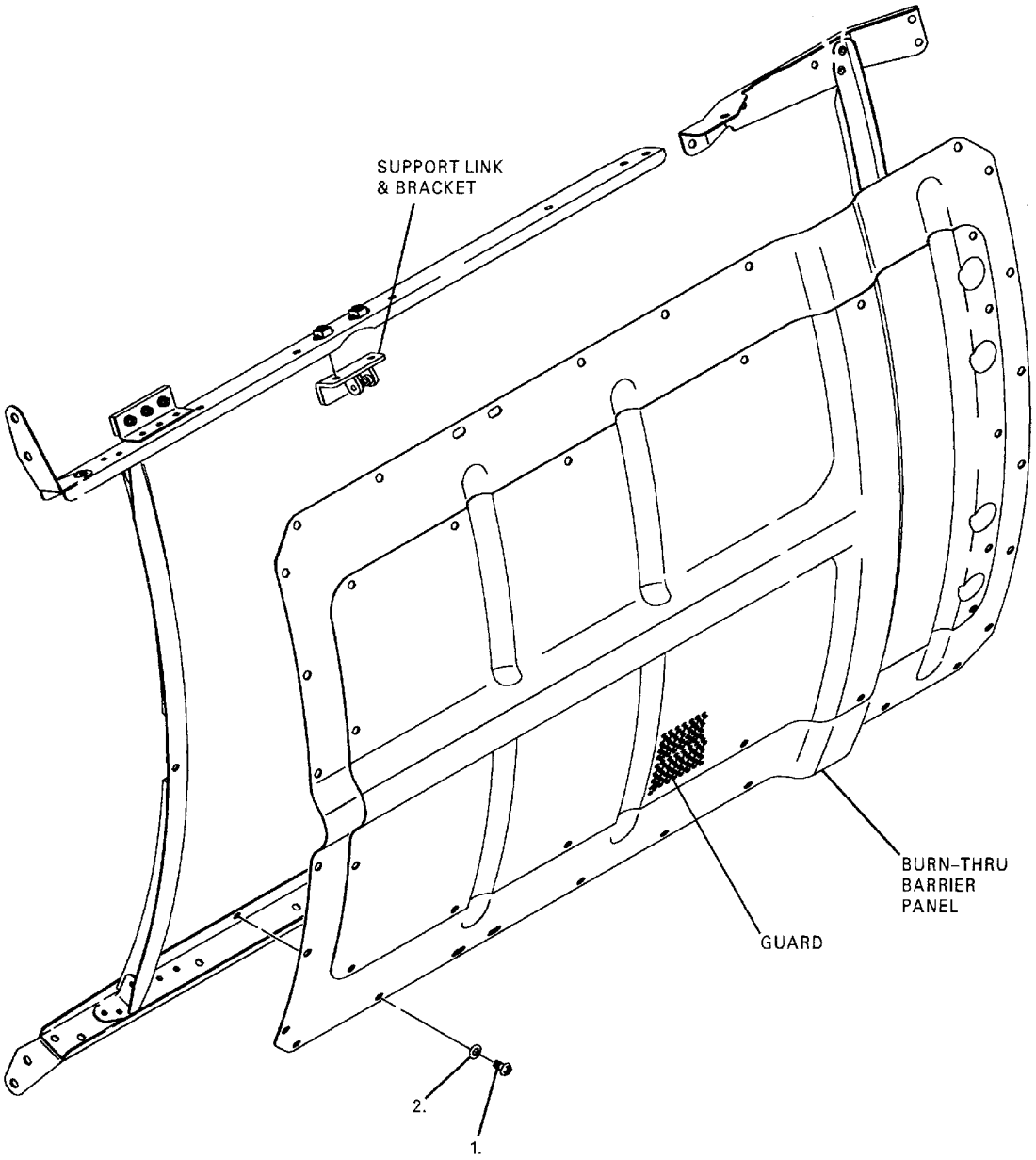
(d) Install 8th-stage and 13th-stage bleed air ducts as outlined in steps (2) or (3) as applicable.



8th And 13th Stage Bleed Air Duct Removal/Installation
Figure 201/71-30-02-990-802



Burn-Thru Barrier and Fire Detector Removal/Installation
Figure 202/71-30-02-990-803



CODE:

1. NAS 623-3-2 SCREW
2. AN960C10L WASHER

CAG(IGDS) BBB2-71-91

Burn-Thru Barrier Panel/Guard Removal/Installation
Figure 203/71-30-02-990-804

4. Inspection/Check and Approved Repairs of Burn-Thru Barrier

A. Inspection/check or repairs to barrier are to be in accordance with DC-9 Component Maintenance Manual, Chapter 71-30-02.

POWERPLANT DRAIN SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure contains MSG-3 task card data.

TASK 71-70-01-710-801

2. Operational Check of the Drain Lines and Drain Mast

A. Operational Check of the Drain Lines and Drain Mast

SUBTASK 71-70-01-710-001

(1) Do an operational check of the drain lines and drain mast.

(a) Open engine cowling.

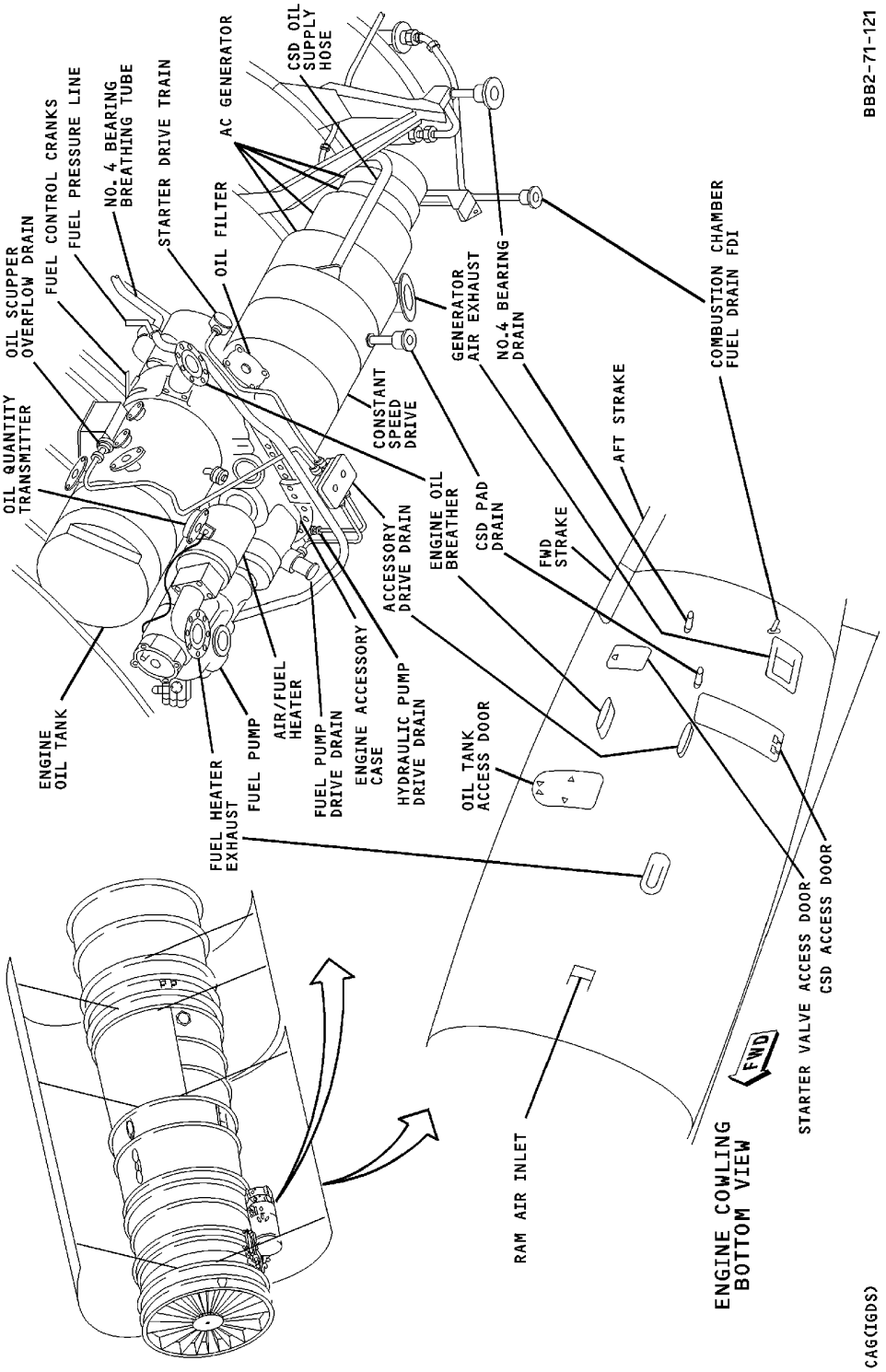
(b) Make sure drain lines are clear by blowing compressed air through them. (Figure 501)

B. Job Close-up

SUBTASK 71-70-01-410-001

(1) Stow the engine upper and lower cowl hold open rods, close and latch cowling.

END OF TASK



POWERPLANT DRAIN SYSTEM
Figure 501/71-70-01-990-803

POWERPLANT DRAIN SYSTEM - CHECK

1. **Inspect Powerplant Drain System**

   NOTE: The following procedures apply to both right hand and left hand engines.

   A. Check gearbox accessory components drive seals for leakage. (Figure 601)

   B. Check all oil pressure, and other related components, switches, gauges, valves, breather, scavenge, cooler, drain, and sensing tubes for evidence of leakage and security. (Figure 602)

   C. If any fuel/oil leaks are found, refer to Table 601to determine allowable leakage.

      NOTE: If leakage is outside of Engine Fuel and Oil leak limits, the problem shall be corrected and engine tested. (ENGINE, CHAPTER 72)

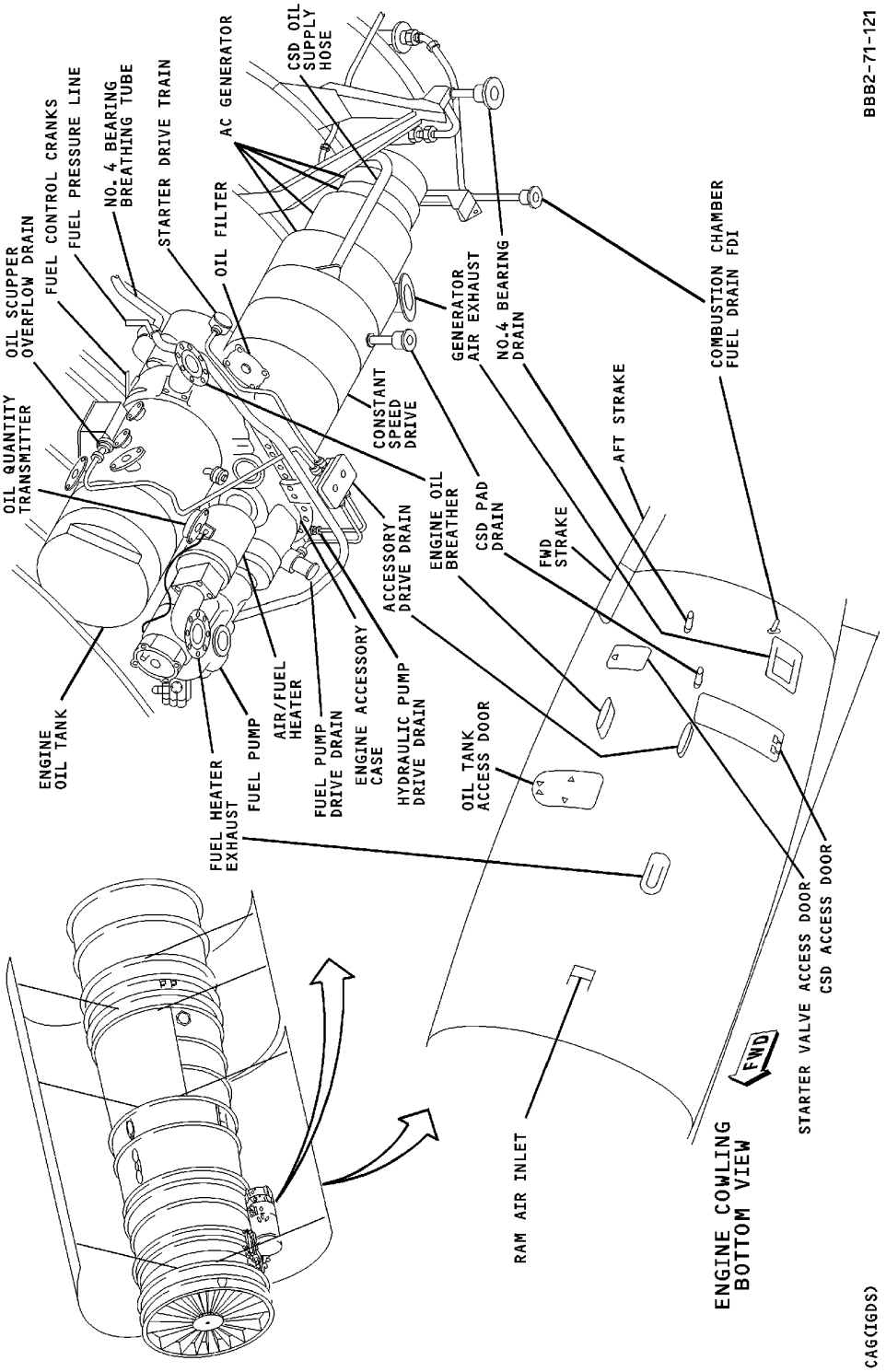
2. **Operational Check of Engine Drain Lines and Mast**

   A. Open engine cowling (determine configuration). (GENERAL, SUBJECT 71-00-00, Page 401)

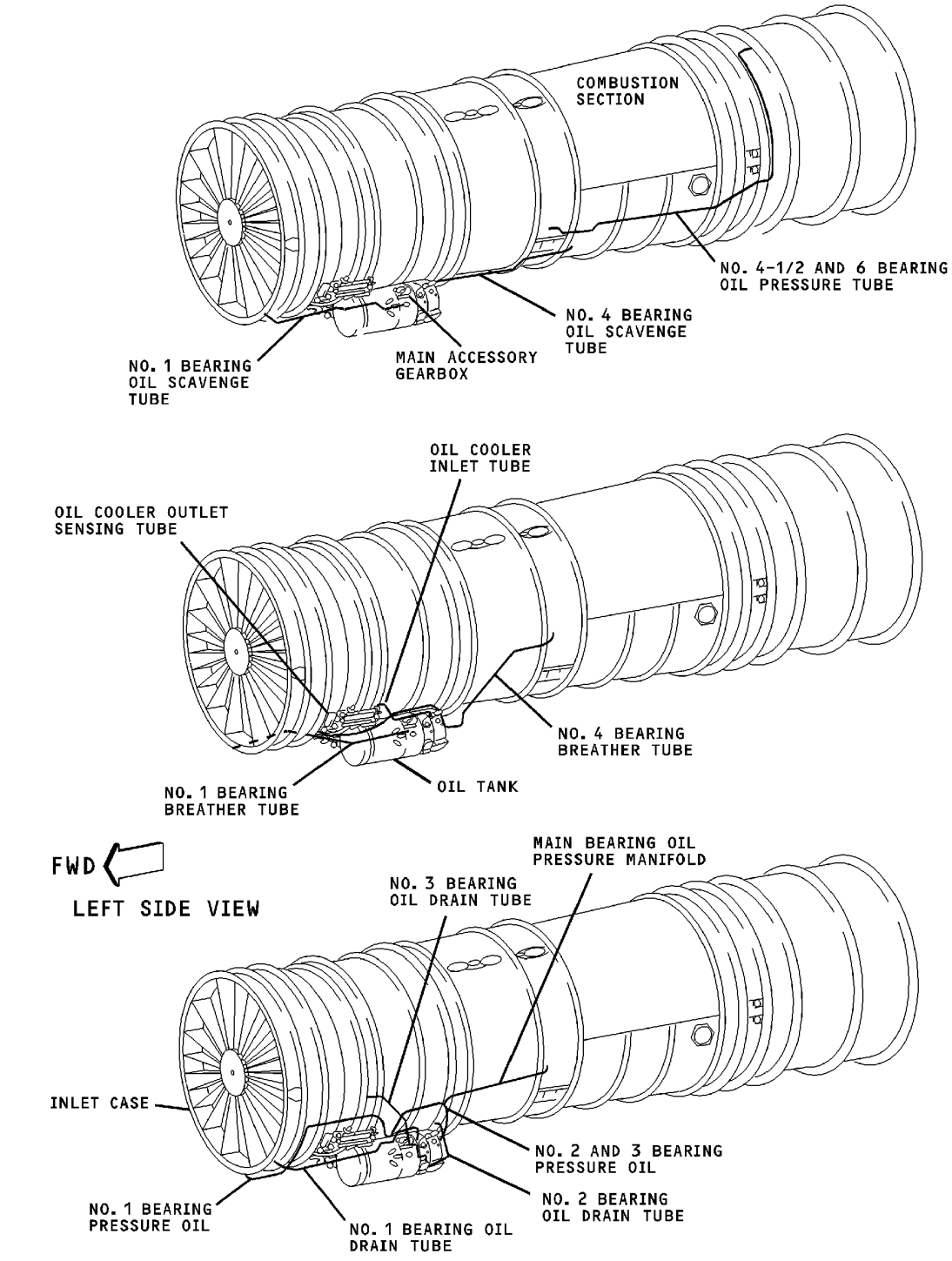
   B. Make sure drain lines are clear by blowing compressed air through it.

Table 601 Engine Fuel and Oil Leaks - Limits

Location	Fluid	Allowable Leakage
Gearbox Starter Drive Overboard Drain	Oil	10 cc/hr
Gearbox Hydraulic Pump Drive Overboard Drain	Oil	10 cc/hr
Gearbox Hydraulic Pump Drive Overboard Drain	Hydraulic fluid	10 drops per minute
Fuel Pump Drive Overboard Drain	Oil	10 cc/hr
Fuel Pump Drain	Fuel	60 cc/hr
Fuel Control Drain	Fuel	None
P & D Valve	Fuel	None
Exhaust Case - No. 6 Bearing Sump	Oil	Oil wetness not resulting in oil puddling within 20 minutes after engine shutdown.



Powerplant Drain System
Figure 601/71-70-01-990-801



External Oil Tubes
Figure 602/71-70-01-990-802