

Scandinavian Airlines System

PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
CHAPTER 76 TAB			76-11-09					
			201	AUG 22/00	N01			
			202	NOV 10/91	N01			
			203	AUG 22/00	N02			
			204	NOV 10/91	N01			
			205	NOV 10/91	N01			
			206	AUG 22/00	N01			
			207	AUG 22/00	N01			
			208	AUG 22/00	N03			
			209	AUG 22/00	N02			
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ENGINE CONTROLS (PW4000)			76-11-10					
EFFECTIVE PAGES SEE LAST PAGE OF LIST FOR NUMBER OF PAGES			401	AUG 22/00	N02			
76-CONTENTS			402	AUG 22/00	N03			
1	AUG 10/97	NSAS	403	AUG 10/95	N01			
2	BLANK		404	AUG 10/95	N03			
76-11-00			405	AUG 10/95	N04			
1	AUG 22/00	N02	406	AUG 10/95	N04			
2	AUG 10/95	N06	407	AUG 10/95	N04			
3	AUG 10/95	N08	408	AUG 10/95	N04			
4	AUG 10/95	N07	409	AUG 10/95	N04			
5	AUG 22/00	N07	410	AUG 10/95	N05			
6	AUG 10/95	N02	411	AUG 10/95	N06			
7	NOV 10/95	N01	412	APR 22/00	N04			
8	AUG 10/96	N03	413	AUG 10/95	N03			
9	AUG 22/00	N01	414	APR 22/00	N05			
10	AUG 10/95	N03	415	AUG 22/00	N05			
11	AUG 10/95	N04	416	APR 22/00	N04			
12	AUG 22/00	N01	417	AUG 22/00	N04			
13	DEC 22/01	N01	418	BLANK				
14	DEC 22/01	N02	76-21-00					
76-11-00			1	AUG 22/00	N01			
101	DEC 22/99	N01	2	MAY 10/88	N01			
102	NOV 10/92	N01						
103	MAY 10/96	N01						
104	AUG 10/94	N02						
76-11-00								
501	APR 22/99	N01						
502	APR 22/99	N01						
503	AUG 10/94	N02						
504	MAY 10/94	N02						
505	APR 22/99	N01						
506	AUG 22/00	N01						
507	AUG 22/00	N01						
508	AUG 22/00	N01						
76-11-01								
401	AUG 22/01	N01						
402	APR 22/99	N02						
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408	APR 22/99	N07						
409	APR 22/99	N07						
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AUG 22/09

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CHAPTER 76
EFFECTIVE PAGES
N PAGE 1
LAST PAGE

CHAPTER 76 - ENGINE CONTROLS

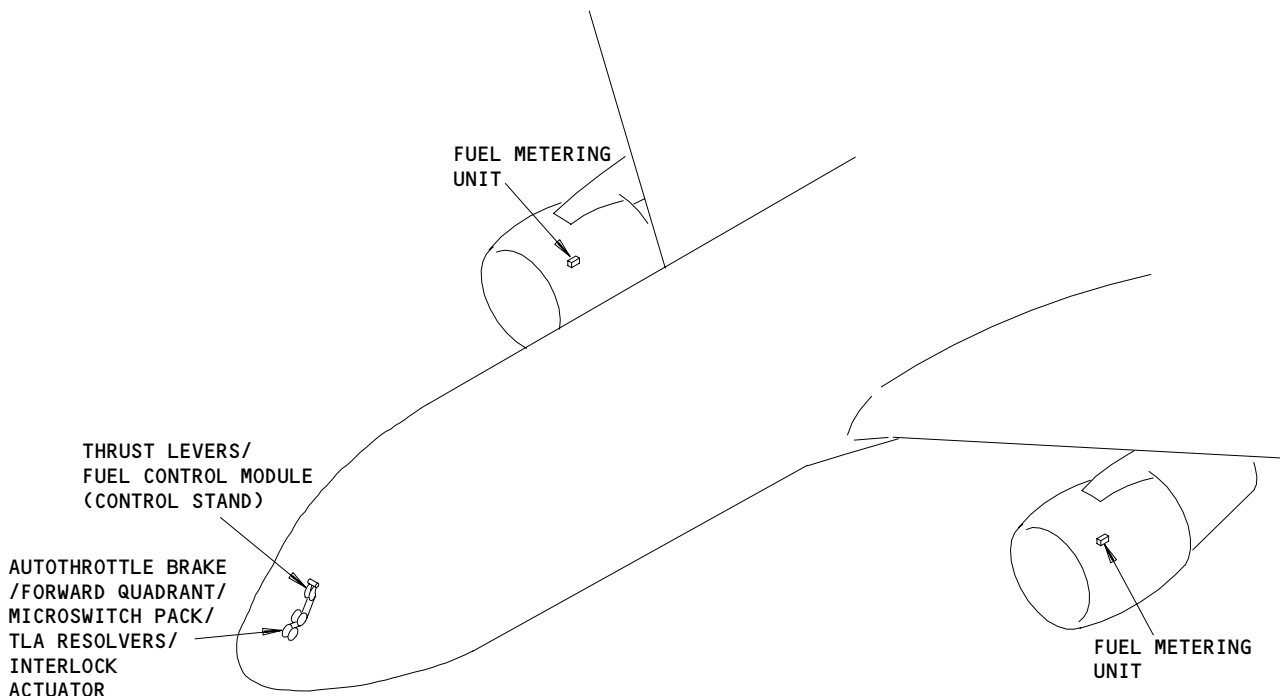
TABLE OF CONTENTS

<u>Subject</u>	<u>Chapter Section Subject</u>	<u>Page</u>	<u>Effectivity</u>
<u>POWER CONTROL</u>	76-10-00		
ENGINE CONTROL SYSTEM	76-11-00		
Description and Operation		1	ALL
General		1	
Component Details		5	
Autothrottle Pack Assembly		9	
Fuel Control Switch		12	
Fuel Metering Unit for the Fuel Control (Fuel Shutoff)		9	
In-Transit Annunciator for the Engine (Amber) Valve		12	
In-Transit Annunciator for the Wing Spar (Amber) Valve		12	
Thrust Levers		5	
Operation		12	
Functional Description		12	
Component Location		101	ALL
Component Index			
Component Location			
Adjustment/Test		501	ALL
CONTROL STAND LEVER'S RAILS, COVER, AND SEALS	76-11-10		
Removal/Installation		401	ALL
LEVER - THRUST	76-11-01		
Removal/Installation		401	ALL
MODULE - ENGINE FUEL CONTROL	76-11-09		
Maintenance Practices		201	ALL
<u>EMERGENCY SHUTDOWN</u>	76-20-00		
ENGINE FIRE EMERGENCY SHUTDOWN	76-21-00		
Description and Operation		1	ALL
General		1	
Component Details		1	
Operation		1	

ENGINE CONTROL SYSTEM - DESCRIPTION AND OPERATION

1. General

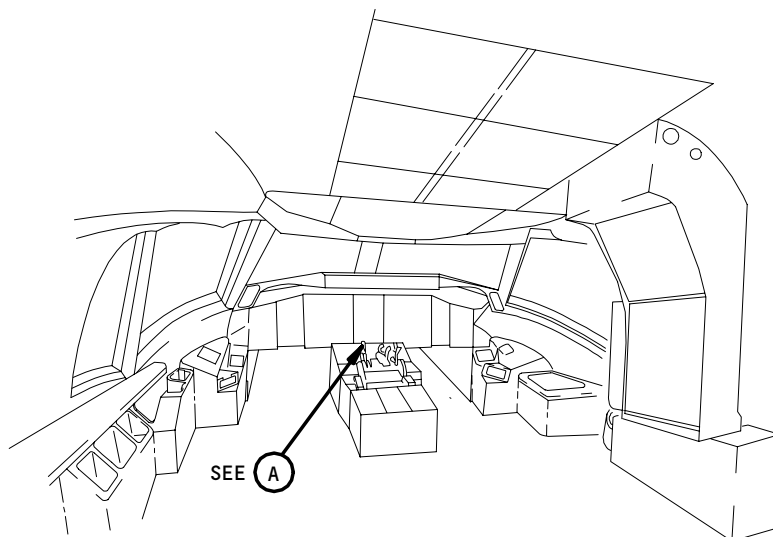
- A. This section describes the engine control system which consists of thrust control system and start control system.
- B. Further information on system components may be found in the following sections:
 - (1) Thrust Management System - Autothrottle Brake Pack and Servomotor (AMM 22-32-00/001)
 - (2) Fuel Control System - Thrust Lever Angle Resolver (AMM 73-21-00/001)
 - (3) Thrust Reverser Indication System - Thrust Lever Interlock Actuator (AMM 78-36-00/001).
- C. Thrust Control System (Fig. 1)
 - (1) The thrust control system controls both forward and reverse thrust. The thrust control system consists of thrust levers, autothrottle brake and resolvers for the thrust lever angle (TLA). The thrust levers are connected by control rods to the brake which is connected by a link to the TLA resolvers. The TLA resolvers provide signals of the thrust lever angle to the electronic engine control (EEC) which controls the engine fuel control. There are separate thrust levers, brakes and TLA resolvers for each engine.
- D. Start Control System (Fig. 2)



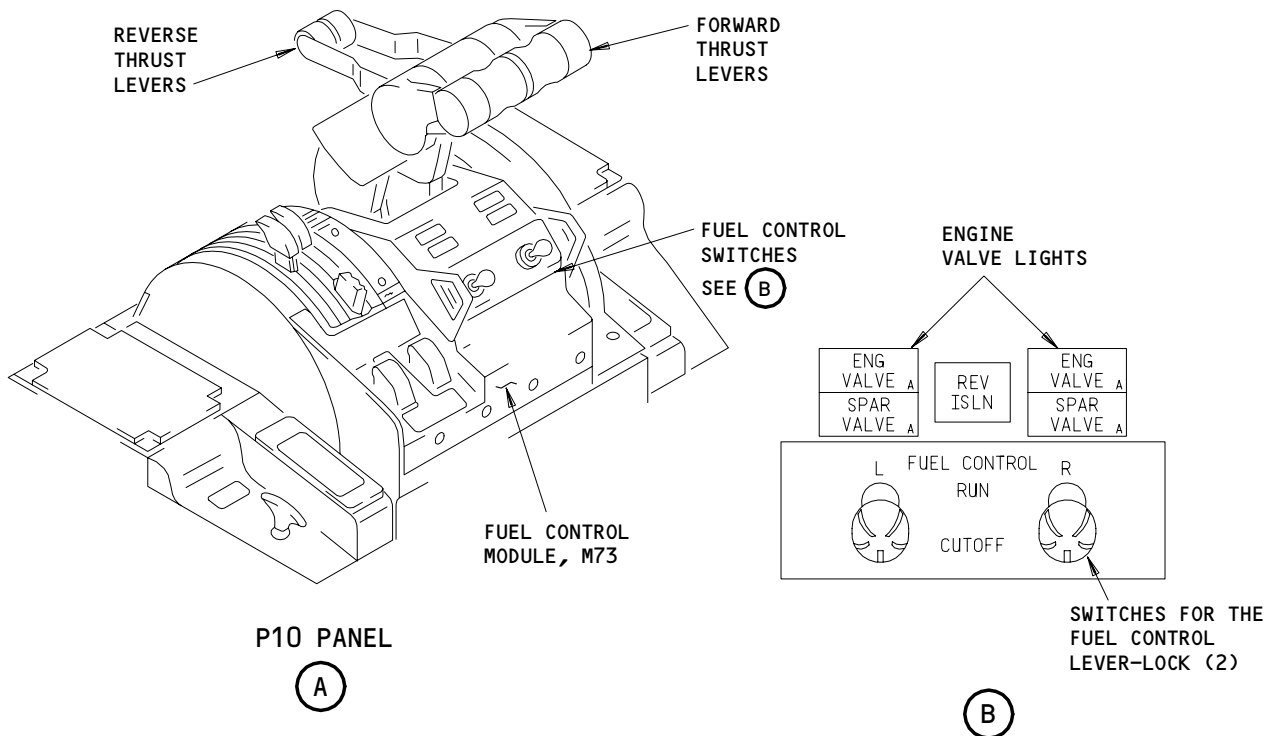
Engine Control System
Figure 1

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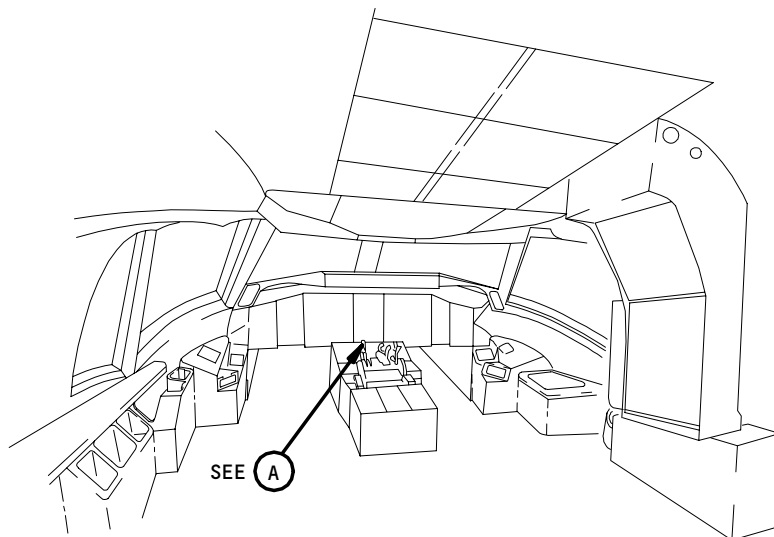
FLIGHT COMPARTMENT



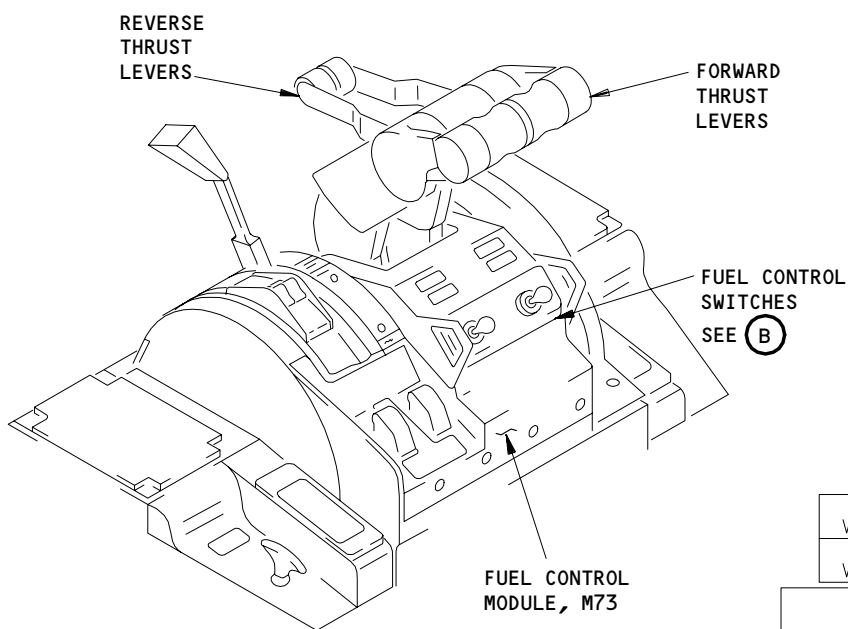
Thrust and Start Controls
Figure 2

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM LEVERS
AND TITANIUM THRUST LEVERS

76-11-00

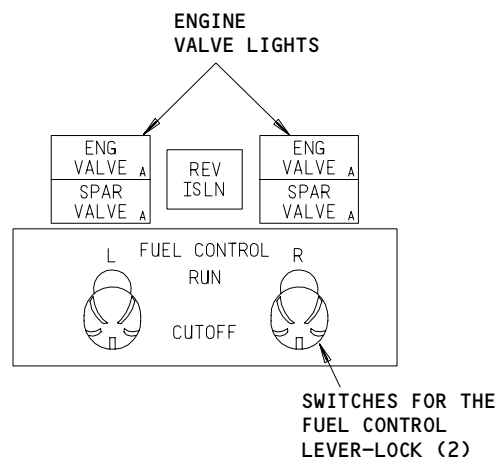


FLIGHT COMPARTMENT



P10 PANEL

(A)



(B)

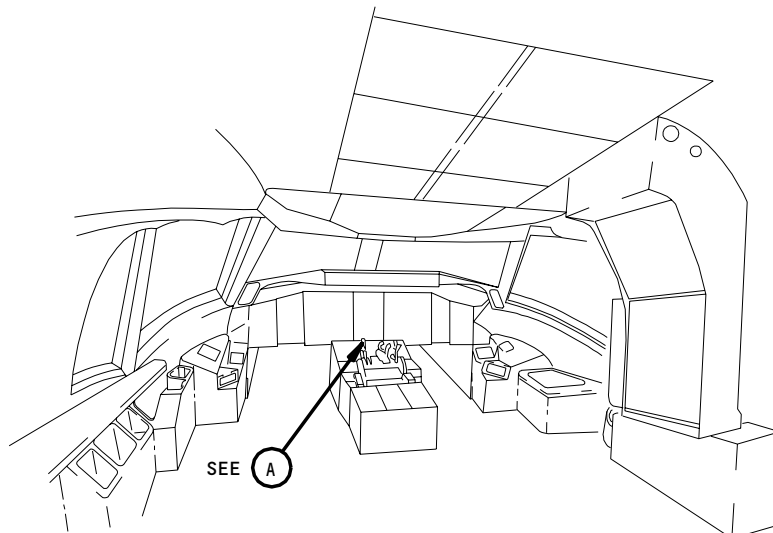
Thrust and Start Controls
Figure 2A

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM SWITCHES
AND TITANIUM THRUST LEVERS

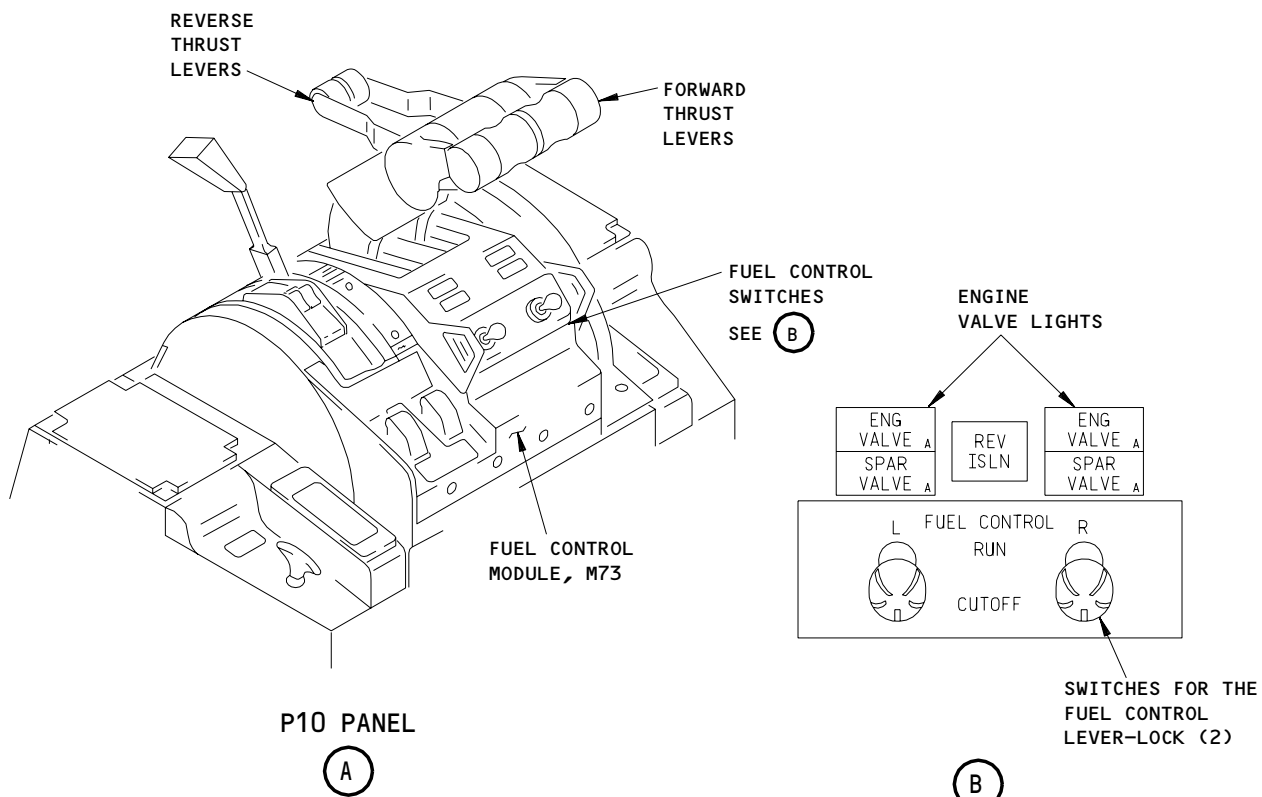
76-11-00

N08

Page 3
Aug 10/95



FLIGHT COMPARTMENT



P10 PANEL
A

B

Thrust and Start Controls
Figure 2B

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM SWITCHES
AND ALUMINUM THRUST LEVERS

76-11-00

N07

Page 4
Aug 10/95

- (1) The start control system provides controlled delivery of fuel to engine. Start control system is an electrical system, consisting of fuel control switches, fuel metering unit, and flight compartment indicator lights. There is a separate starting control system for each engine.

2. Component Details

A. Thrust Levers (Fig. 3)

- (1) The forward/reverse thrust lever connects directly to autothrottle brake pack with a control rod. The forward levers have a stop-to-stop travel of 56°. A mechanical interlock within the lever itself prevents moving forward thrust lever from idle when reverse thrust lever is not in stowed position.
- (2) The reverse thrust levers have a stop-to-stop travel of 88.5°. A mechanical interlock prevents moving reverse thrust levers from idle unless forward thrust levers are at idle position.
- (3) The thrust levers contain the following switches:
 - (a) The go-around switches for the left engine (S1, S7, S9) and go-around switches for the right engine (S2, S8, S10) are actuated by the go-around levers mounted on the forward thrust levers. The go-around switches advance the thrust lever to achieve a climb of 200 ft/min; placing the thrust management and autopilot in the go-around mode (AMM 22-32-00).
 - (b) The control switch for the left thrust reverser (S5) and the control switch for the right thrust reverser (S6) are actuated by the cam surface of each reverse thrust lever. Movement of the reverse thrust levers to the reverser deploy position initiates the control system for the thrust reverser (AMM 78-34-00).
 - (c) The autothrottle disengage switch for the left engine (S3) and the autothrottle disengage switch for the right engine (S4) disconnects the autothrottle giving the pilot full command of the thrust lever (AMM 22-32-00).
- (4) Mechanical Interlock for the Forward/Reverse Thrust Lever
 - (a) The lever interlock prevents movement of either the forward or the reverse thrust lever when the other lever is not at its fully stowed or idle stop position, respectively.
 - (b) A pawl pivoted from the forward thrust lever is actuated by a tab on the reverse lever link. With the forward thrust lever at its idle stop, actuation of the reverse lever deflects the pawl into a pocket in the adjacent stationary structure. This locks the forward thrust lever from further movement.
 - (c) With the forward thrust lever at any position other than at the idle stop, the pawl is trapped in its retracted position where it prevents movement of the reverse thrust lever.

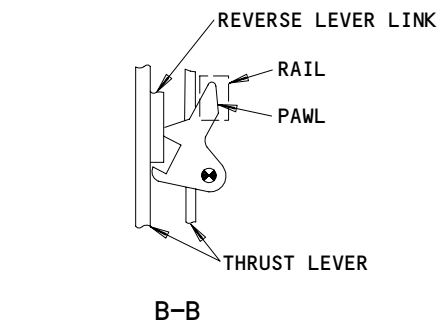
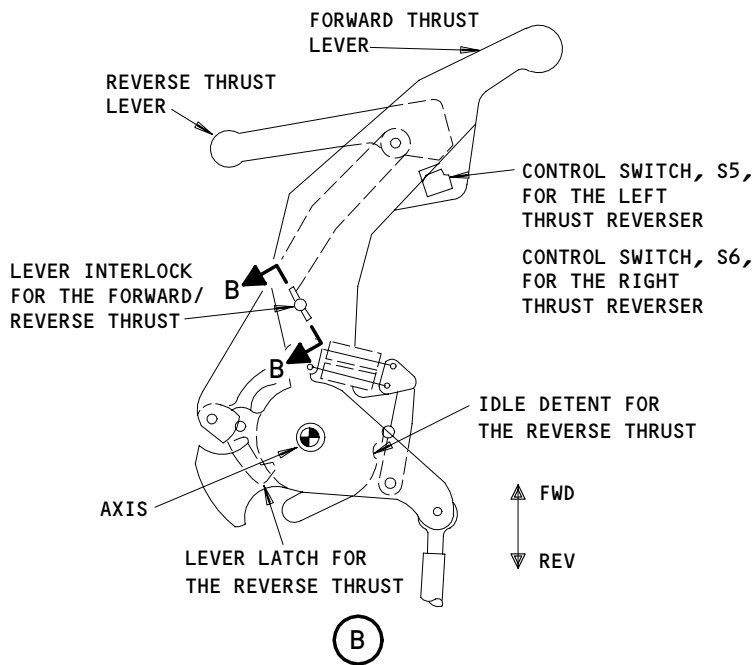
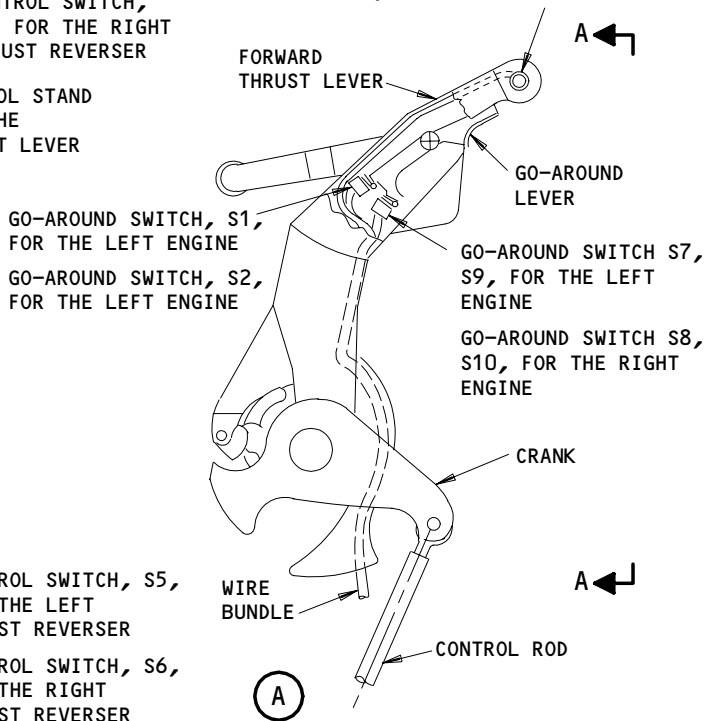
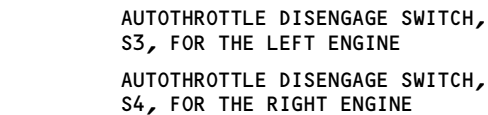
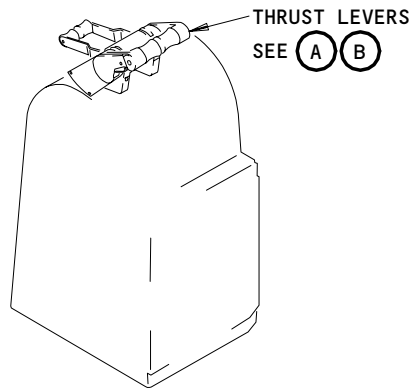
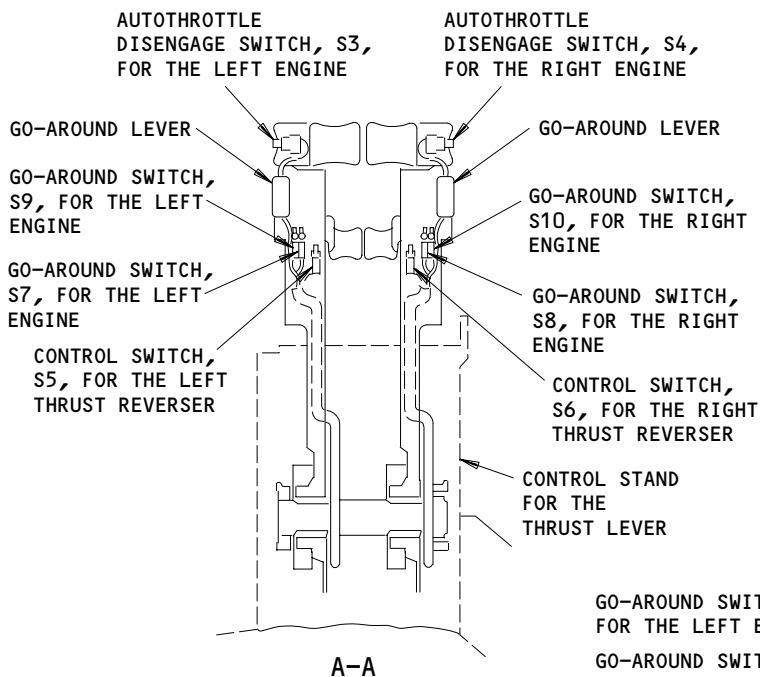
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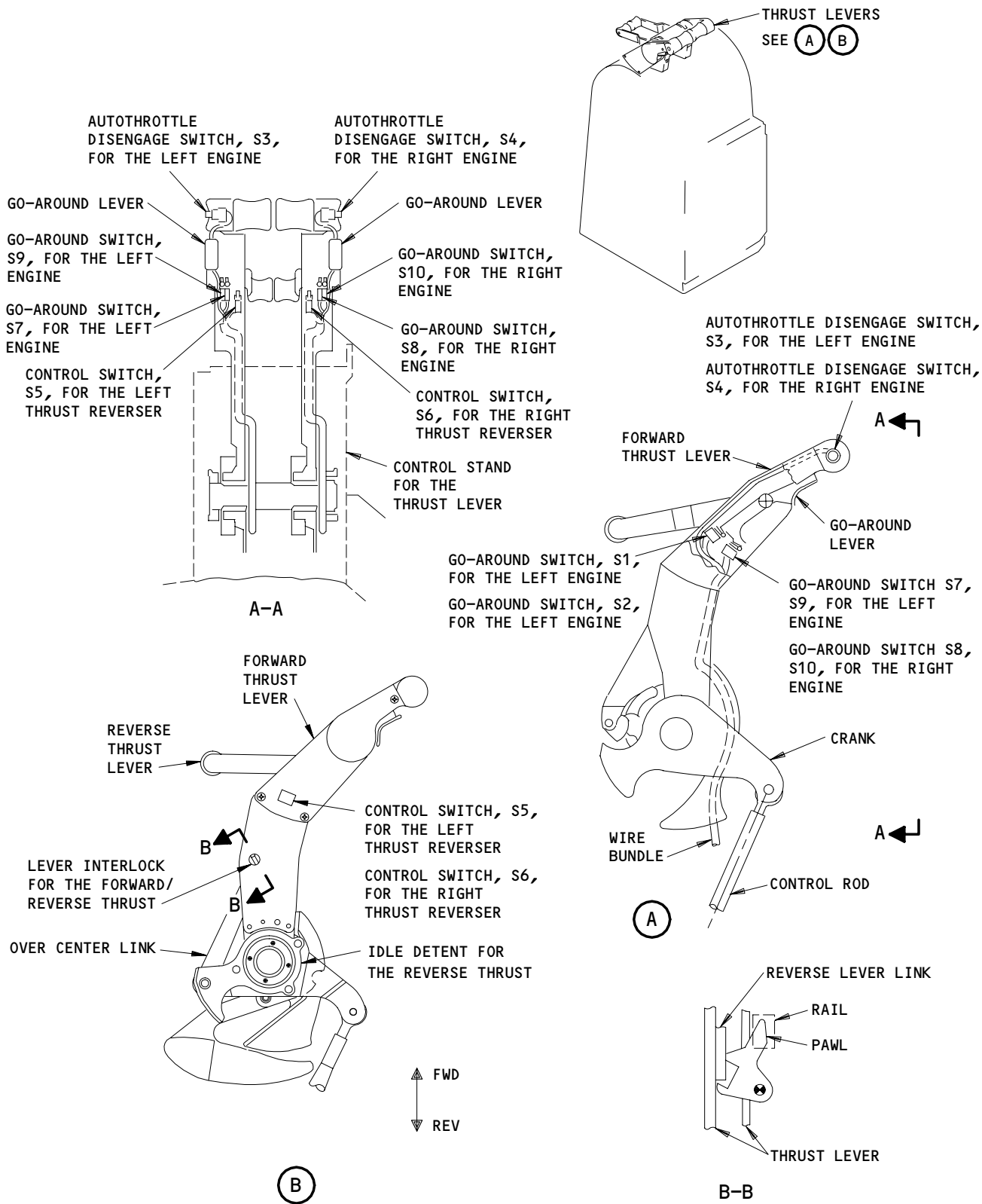
Page 5
Aug 22/00



Thrust Levers
Figure 3

EFFECTIVITY
AIRPLANES WITH TITANIUM THRUST LEVERS

76-11-00



Thrust Levers
Figure 3A

EFFECTIVITY
AIRPLANES WITH ALUMINUM THRUST LEVERS

76-11-00

- (5) Link for the Reverse Thrust Lever
- (a) The forward and reverse thrust levers both rotate the crank in the same direction. For example, following an aftward rotation of the forward thrust lever from maximum forward thrust to the idle stop, the act of lifting the reverse thrust lever and pulling it aft continues the aftward rotation of the crank. Since the aftward motion of the forward thrust lever is terminated by the idle stop, the forward thrust lever is disengaged from the crank so that the crank rotation can continue aftward with the reverse thrust lever for increasing reverse thrust. The link for the reverse thrust lever provides that function.
 - (b) AIRPLANES WITH TITANIUM THRUST LEVERS;
The reverse thrust lever is permanently attached to the crank via the lever link and latch. The latch, pivotally attached to both the crank and the link for the reverse thrust lever, engages a notch in the hub of the forward thrust lever locking the two lever systems together for the forward thrust operation. When the reverse thrust lever is lifted, the link for the reverse thrust lever rotates the latch out of the notch against a spring load allowing the reverse thrust lever and crank to continue rotation aftward alone. The latch is returned to the notch with the aid of the spring when the reverse thrust lever is returned to the stowed position.
 - (c) AIRPLANES WITH ALUMINUM THRUST LEVERS;
The reverse thrust lever is permanently attached to the crank via the over center link. The link for the reverse thrust lever locks the two lever systems together for the forward thrust operation. When the reverse thrust lever is lifted, the link for the reverse thrust lever rotates, allowing the reverse thrust lever and crank to continue rotation aftward alone. The link is returned to the locking position when the reverse thrust lever is returned to the stowed position.
- (6) Reverse Idle Detent
- (a) A spring-loaded lever for the reverse idle detent, containing the detent roller, is mounted pivotally on the thrust lever crank. The track containing the reverser idle detent is mounted on the hub of the forward thrust lever. Both the track and the roller travel together with the normal movement of the forward thrust lever, thus providing no detent function. However, with the forward thrust lever positioned at the idle stop, the detent track also becomes stationary while the detent roller assembly continues to travel with the rotation of the reverse thrust lever and crank. The roller drops into the detent at approximately 46° of reverse lever rotation from the stowed position.

EFFECTIVITY

ALL

76-11-00

N03

Page 8
Aug 10/96

- (7) Control Switch and Lever Actuating Cam for the Thrust Reverser
 - (a) AIRPLANES WITH TITANIUM THRUST LEVERS;
The pivot end of the reverse thrust lever is contoured to actuate a micro switch at 10° of lever rotation. The switch is mounted near the top of the forward thrust lever just below the switch actuating cam.
 - (b) AIRPLANES WITH ALUMINUM THRUST LEVERS;
The pivot end of the reverse thrust lever is contoured to actuate the switch at 10°-26° of lever rotation. The switch (S5, S6) is located in the cover of the thrust lever just below the leaf spring.
- B. Autothrottle Pack Assembly (Fig. 4)
 - (1) The autothrottle pack has a brake pack, autothrottle quadrant/microswitch pack and resolvers for the thrust lever angle for each engine. The brake pack provides autothrottle servo input to engine control system and provides thrust lever friction or braking. The resolver for the thrust lever angle transmits the signal from the thrust lever angle to the electronic engine control (EEC) which controls the fuel control. The resolver for the thrust lever angle is mechanically linked with the brake pack. Each autothrottle quadrant actuates switches in microswitch pack assembly. The switch contact outputs are intermixed and routed through an electrical connector to following airplane systems: Landing warning, autobrake landing, autobrake rejected takeoff, speedbrake retract, the directional control valve for the thrust reverser, EEC OFF and thrust management system (AMM 22-32-00).
 - (2) The autothrottle brake pack is located directly below the flight deck and is mechanically linked to the thrust levers. The autothrottle brake is incorporated in the thrust control linkage to provide thrust lever resistance for "pilot feel" and for the prevention of "throttle creep". The brake assembly housing includes the input crank arm (rod input from thrust levers), connects the linkage from the brake housing to the autothrottle quadrant/switch cam, the rig pin slot and the output crank, which drives a four-bar linkage to the dual channel resolver for the thrust lever.
- C. Fuel Metering Unit for the Fuel Control (Fuel Shutoff)
 - (1) The fuel metering unit contains the start and run solenoid, sequence valve, minimum pressurizing and shutoff valve, shutoff solenoid, and shutoff indicator switch. These components open and shutoff fuel flow to the engine and operate the indicator circuit for the engine fuel shutoff. Further information on fuel metering unit operation can be found in Fuel Control System (AMM 73-21-00).

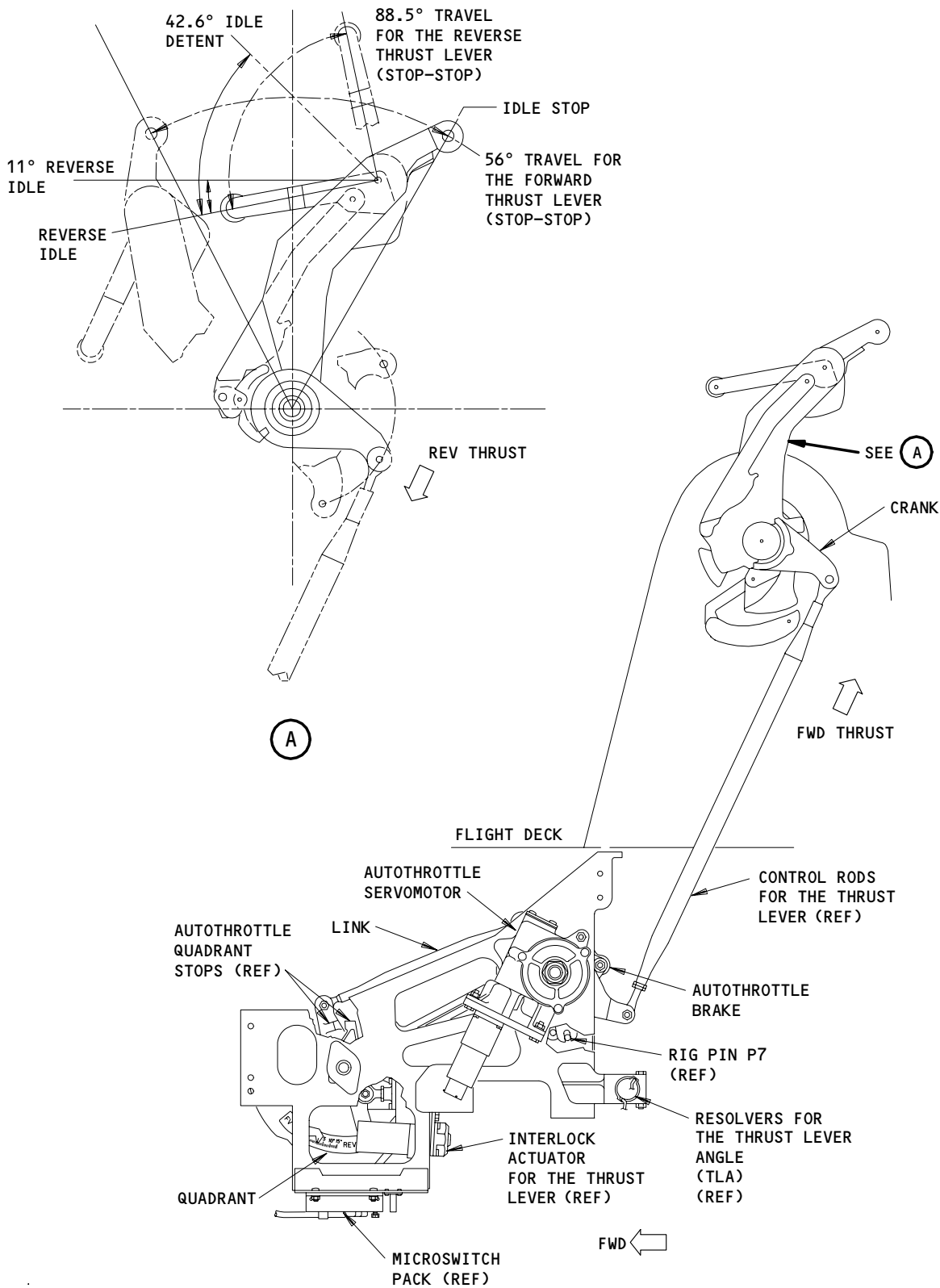
EFFECTIVITY

ALL

76-11-00

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Page 9
Aug 22/00



Thrust Lever/Autothrottle Clutch Pack
Figure 4

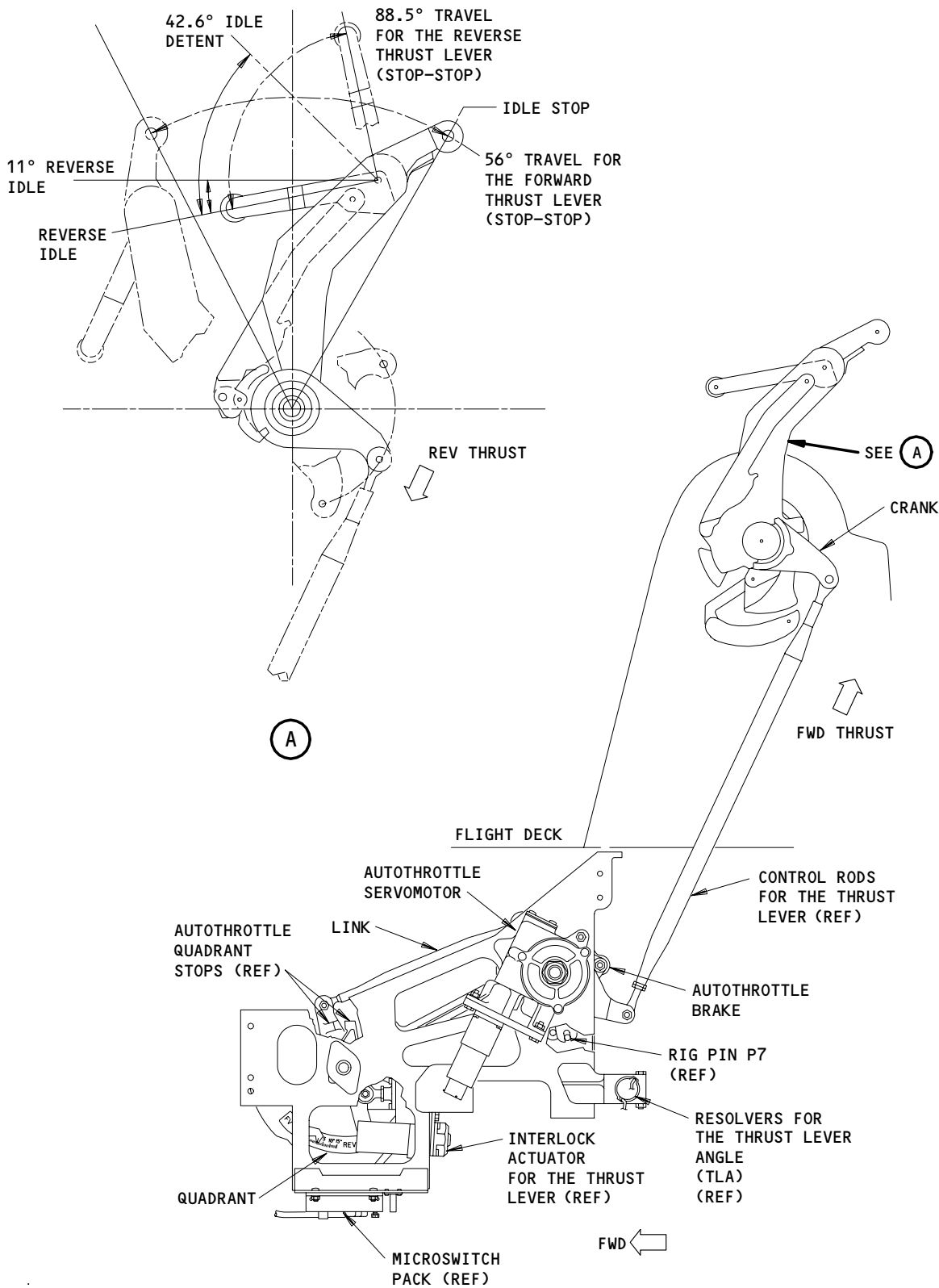
EFFECTIVITY
AIRPLANES WITH TITANIUM THRUST LEVERS

76-11-00

N03

Page 10
Aug 10/95

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Thrust Lever/Autothrottle Clutch Pack
Figure 4A

EFFECTIVITY
AIRPLANES WITH ALUMINUM THRUST LEVERS

76-11-00

- (2) The fuel shutoff for the fuel metering unit is controlled by the fuel control switches on the aisle stand in the flight compartment.
- D. Fuel Control Switch (Leverlock Switch)
 - (1) The fuel control switches are located on the fuel control module M73 on panel P10. The switches are a spring-loaded lever lock design which must be pulled up to disengage a detent, then moved to the required position. The switch lever will engage a detent at the new position. The switch has two positions; RUN and CUTOFF. There is one fuel control switch for each engine.
 - (2) The fuel control switch illuminates RED when an engine fire is detected.
- E. In-Transit Annunciator for the Engine Valve (Amber)
 - (1) The ENG VALVE amber light is located on the fuel control module M73 on panel P10. There is one light for each engine.
 - (2) Illumination of the ENG VALVE amber light indicates that the shutoff valve for the fuel metering unit is in transit or does not match the commanded position for the fuel control switch.
- F. In-Transit Annunciator for the Wing Spar Valve (Amber)
 - (1) The SPAR VALVE amber light is located on the fuel control module M73 on panel P10. There is one light for each engine (AMM 28-22-00).
 - (2) Illumination of the SPAR VALVE indicates that the fuel valve on wing spar is in transit or does not match the commanded position for the fuel control switch.

3. Operation

A. Functional Description

- (1) Thrust Levers/Autothrottle Brake
 - (a) In the forward thrust mode, the forward and reverse thrust levers are locked together by the lever interlock for the forward/reverse thrust. Forward lever force is transmitted through the interlock, thrust lever crank and control rod to the autothrottle brake.
 - (b) To move the reverse thrust lever, the forward thrust lever must be in the idle position. Lifting the reverse lever approximately 10 degrees causes the lever interlock for the forward/reverse thrust to lock the forward lever to the control stand and thereby prevent forward lever movement. Lifting the reverse lever also rotates the interlock, disengaging the forward lever from the thrust lever crank.

EFFECTIVITY

ALL

76-11-00

N01

Page 12
Aug 22/00

- (c) As the thrust lever crank rotates around the thrust lever axis, the control rod transmits this motion to the brake. A resistance is produced between the brake housing and brake rotor which gives the pilot tactile feel and prevents throttle creep. The thrust lever motion is transmitted via links on the brake to the input arm on the resolvers for the thrust lever angle (TLA) mounted below the brake and to the autothrottle quadrant which actuates switches in the microswitch pack.
- (2) Fuel Open And Shutoff Operation of the Fuel Metering Unit (Fig. 5)
 - (a) The fuel control switch is actuated by pulling the switch knob out to disengage the switch CUTOFF detent and moving it up and engaging the RUN detent.
 - (b) Moving the fuel control switches from CUTOFF to RUN position de-energizes the fuel/ignition control relays K168 and K169 and allows 28v dc power to the start and run solenoid for the fuel metering unit which becomes energized and opens a port to allow fuel pressure to translate and latch the sequence valve in the run position. The ENG VALVE light and EICAS message circuit is closed during the transision; the amber colored light is illuminated. The EICAS message ENG FUEL VALVE is supressed by 6 second time delay. The ENG VALVE light extinguishes when FMU is in the run position. Further information on the fuel metering unit operation can be found in the Fuel Control System (AMM 73-21-00).
 - (c) The fuel control switch is deactivated by pulling the switch knob out to disengage the switch RUN detent and moving it down and engaging the CUTOFF detent.
 - (d) Moving the fuel control switches from RUN to CUTOFF energizes the fuel/ignition control relays K168 and K169 and allows 28v dc power to the fuel metering unit shutoff solenoid. Energizing the shutoff solenoid positions the sequence valve to let the minimum pressure and shutoff valve close when the fuel pressure decreasesto 300 psi. The ENG VALVE light and EICAS message circuit is also closed during the transision. The ENG VALVE light extinguishes when the FMU is in the cutoff mode. Further information on the fuel metering unit operation can be found in the Fuel Control System (AMM 73-21-00).

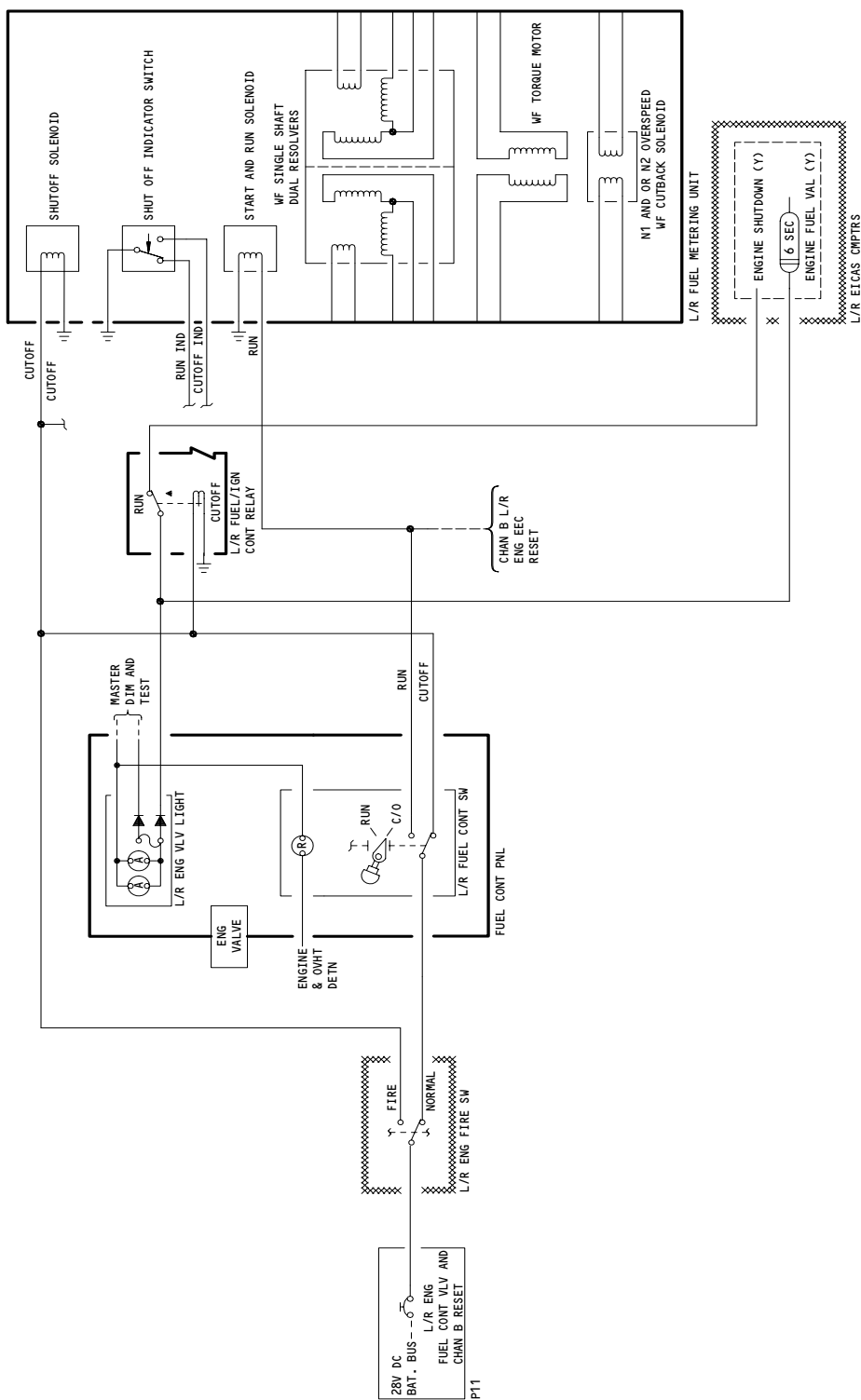
EFFECTIVITY

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76-11-00

N01

Page 13
Dec 22/01



Engine Fuel Condition Control/Engine Schematic (Example)
Figure 5

EFFECTIVITY

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76-11-00

N02

Page 14
Dec 22/01

ENGINE CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATORS - (FIM 78-36-00/101) L THRUST LEVER INTERLOCK, M01440 R THRUST LEVER INTERLOCK, M01441				
CIRCUIT BREAKERS- L ENG FUEL CONT VLV AND CHAN B RESET, C1419 R ENG FUEL CONT VLV AND CHAN B RESET, C1420	1	1	FLT COMPT, P11 11D25	*
COMPUTERS - (FIM 31-41-00/101) L EICAS, M10181 R EICAS, M10182		1	11D26	*
DIODE - (FIM 31-01-33/101) R45				
DIODE - (FIM 31-01-36/101) R297				
DIODES - (FIM 31-01-37/101) R43, R298				
LEVERS - THRUST, M985	2	1	FLT COMPT, P10	76-11-01
LIGHT - L ENG VLV, YAZL2	1	1	FLT COMPT, P10 FUEL CONT PANEL (MODULE), M73	*
LIGHT - R ENG VLV, YAZL4	1	1	FLT COMPT, P10 FUEL CONT PANEL (MODULE), M73	*
PANEL - FUEL CONT (MODULE), M73	1	1	FLT COMPT, P10	76-11-09
PACKS - (FIM 22-31-00/101) AUTOTHROTTLE BRAKE AUTOTHROTTLE MICROSWITCH				
RELAYS - (FIM 31-01-36/101) L FUEL/IGN CONT, K168 L ENG CH B EEC RESET, K1037				
RELAYS - (FIM 31-01-37/101) R FUEL/IGN CONT, K169 R ENG CH B EEC RESET, K1039				
RESOLVERS - (FIM 73-21-00/101) L ENG THROTTLE LEVER ANGLE, TS171 R ENG THROTTLE LEVER ANGLE, TS170				
SEALS - CONTROL STAND LEVERS COVERS, RAILS	1	1	FLT COMPT, P10	76-11-10
SWITCHES - (FIM 26-21-00/101) L ENGINE FIRE, S37 R ENGINE FIRE, S38				
SWITCH - L ENG FUEL CONT, YAZS1	1	1	FLT COMPT, P10, FUEL CONT PANEL (MODULE), M73	*
SWITCH - R ENG FUEL CONT, YAZS3	1	1	FLT COMPT, P10, FUEL CONT PANEL (MODULE), M73	*
UNIT - (FIM 22-32-00/101) AUTOTHROTTLE SERVO, M229				
UNITS - (FIM 73-21-00/101) L ENG FUEL METERING, M3108 R ENG FUEL METERING, M3108		1	416AR	
		1	426AR	

* SEE THE WDM EQUIPMENT LIST

Engine Control System - Component Index
Figure 101

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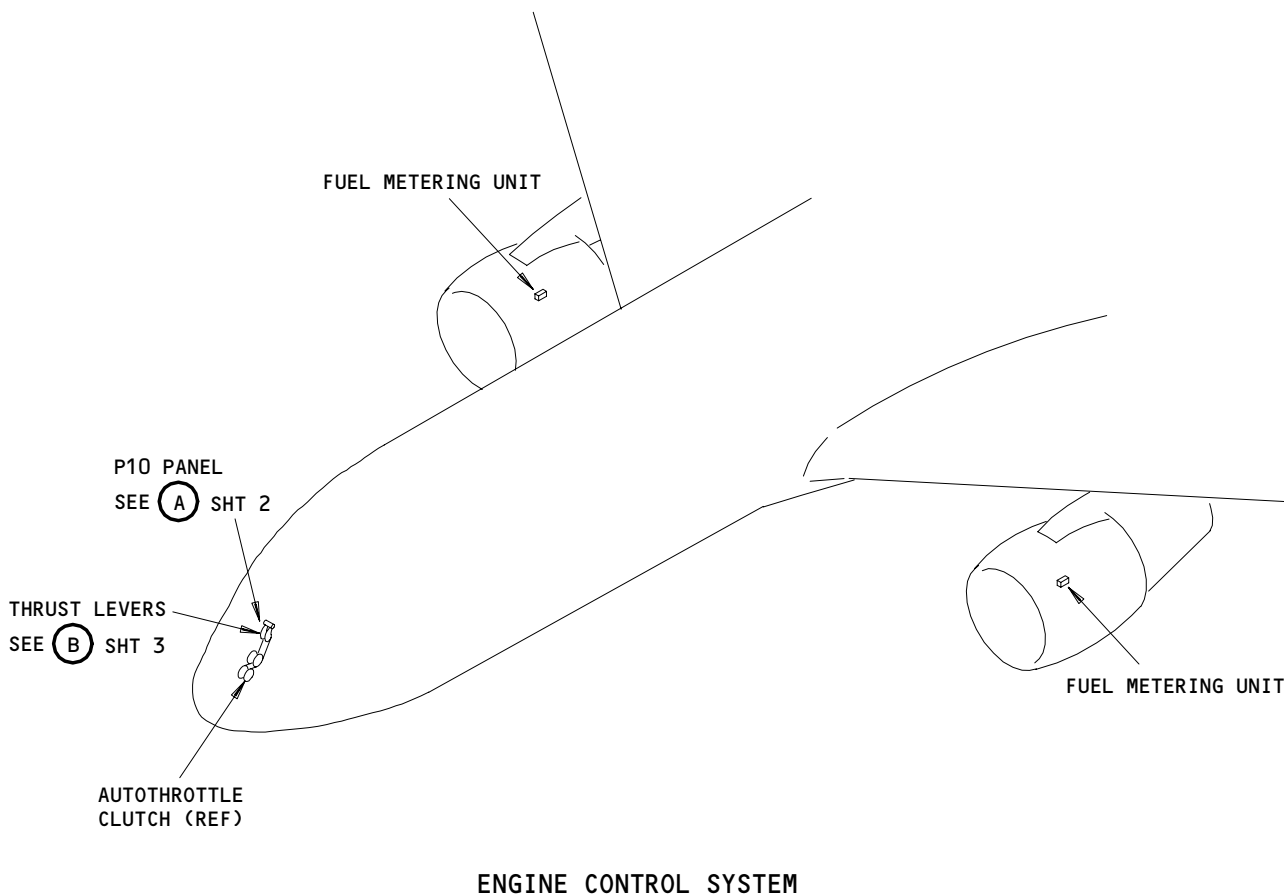
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Page 101
Dec 22/99

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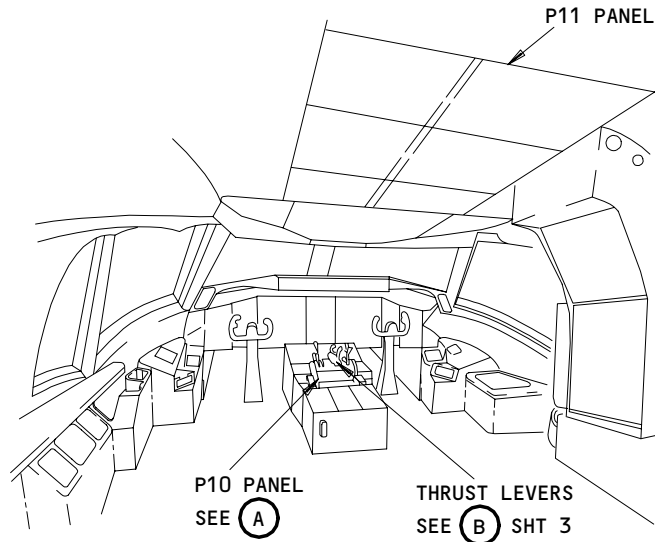


Engine Control System - Component Location
 Figure 102 (Sheet 1)

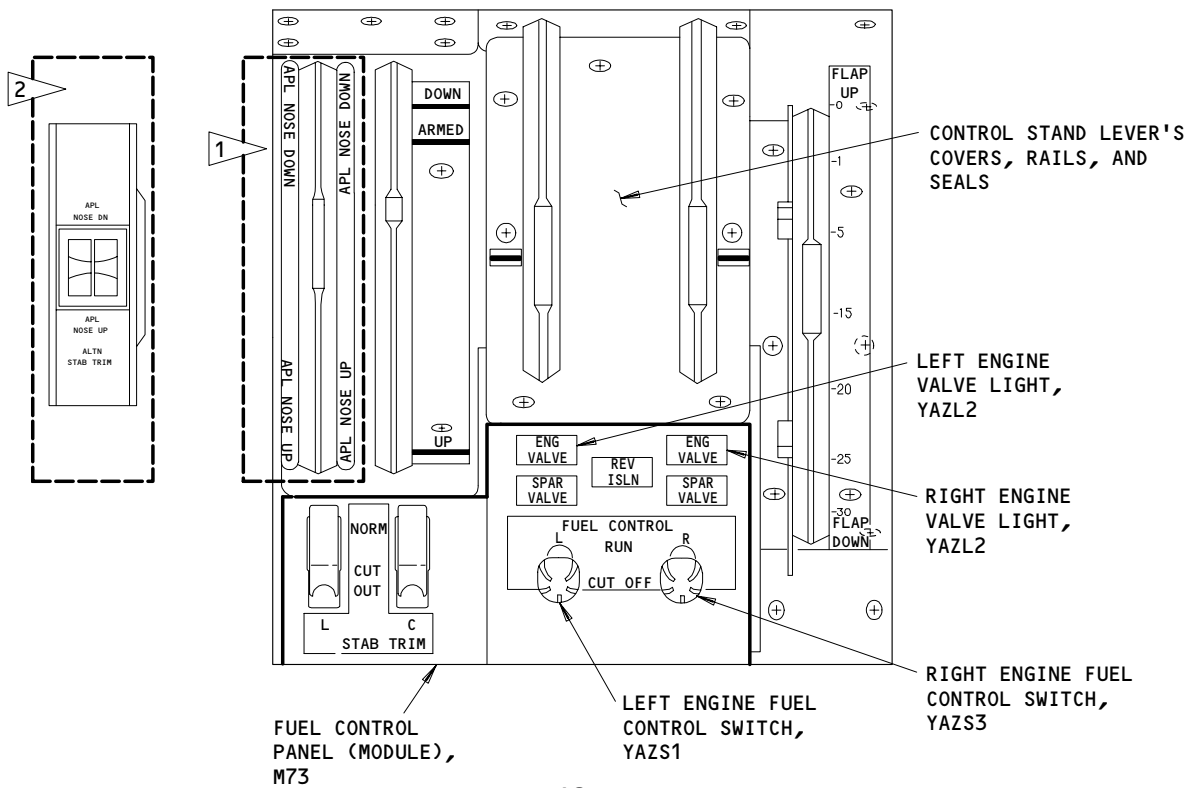
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76-11-00

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FLIGHT COMPARTMENT



P10 PANEL

(A)

- 1 AIRPLANES WITH STABILIZER TRIM LEVERS
- 2 AIRPLANES WITH ALTERNATE STABILIZER TRIM SWITCHES

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

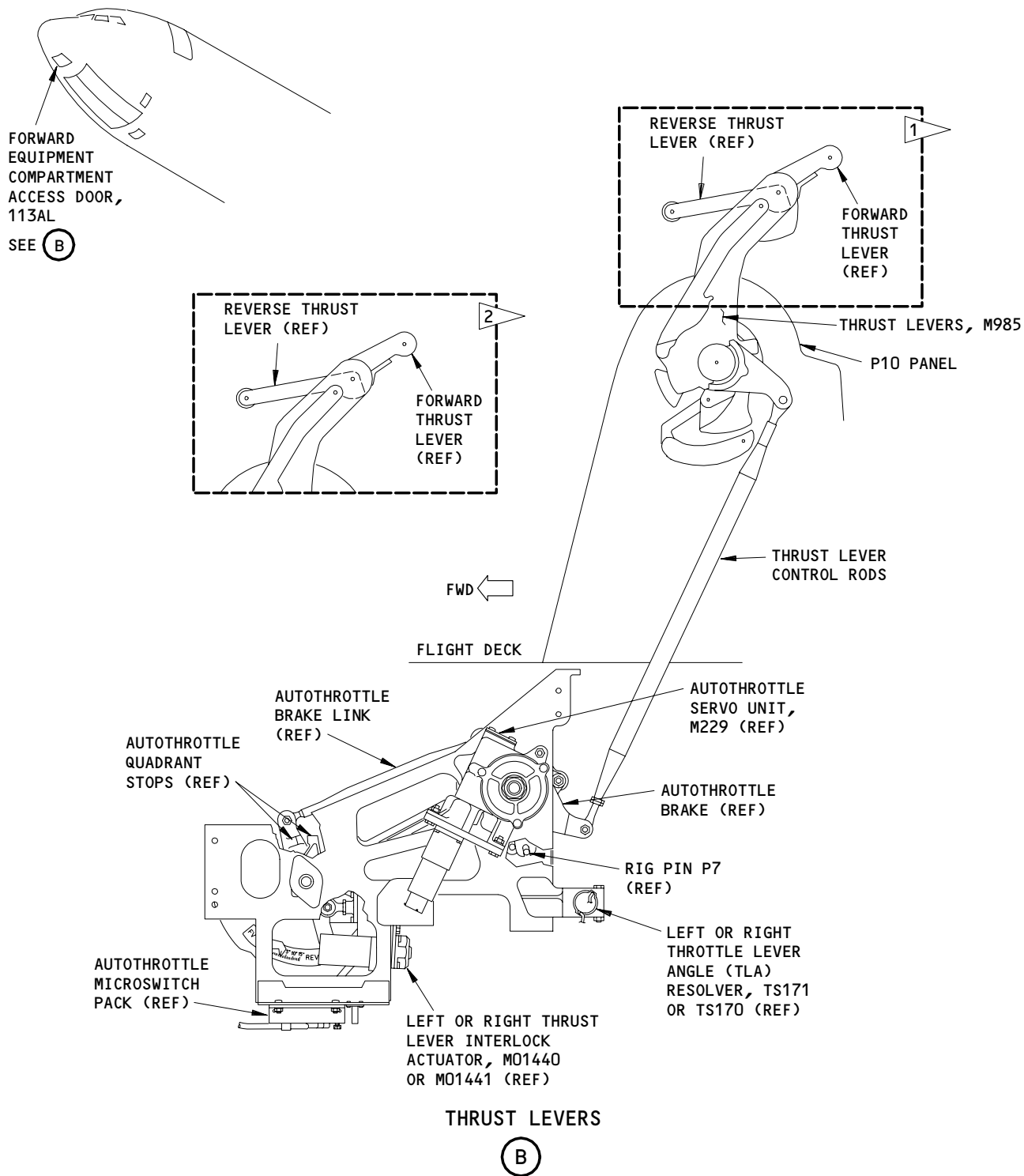
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76-11-00

N01

Page 103
May 10/96

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- 1 AIRPLANES WITH TITANIUM THRUST LEVERS
- 2 AIRPLANES WITH ALUMINUM THRUST LEVERS

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

EFFECTIVITY	
	ALL

76-11-00

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ENGINE CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains two tasks. The first task is the adjustment of the engine control system. The second task is a test of the engine control system.

TASK 76-11-00-825-001-N00

2. Adjust the Engine Control System

A. General

- (1) After the engine control system is adjusted, make sure you can see the rod end threads through the inspection holes in the control rods. The threads must not cover less than one half of the hole diameter.

B. Equipment

- (1) Rig Pin P7 – P/N A20004-23,
part of set A20004-XX (AMM 20-10-24/201)

C. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (3) AMM 78-31-00/201, Thrust Reverser System

D. Access

- (1) Location Zones
 - 110 Lower Forward Fuselage
 - 210 Control Cabin

- (2) Access Panels

- 113AL Forward Equipment Bay

E. Prepare to Adjust the Engine Control System

S 045-002-N00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 045-003-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

EFFECTIVITY

ALL

76-11-00

N01

Page 501
Apr 22/99

S 015-004-N00

- (3) Open the door, 113AL, to get access to the autothrottle brake pack (AMM 06-41-00/201).

F. Adjust the Engine Control System (Fig. 501).

S 865-019-N00

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

S 865-020-N00

- (2) Close these circuit breakers on the overhead circuit breaker panel, P11, to fully retract the interlock actuators:
 - (a) 11C35, L ENG T/L INTERLOCK
 - (b) 11L29, R ENG T/L INTERLOCK
 - (c) 11C36, R ENG T/L INTERLOCK ALTN

S 865-021-N00

- (3) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE TAGS:
 - (a) 11C35, L ENG T/L INTERLOCK
 - (b) 11L29, R ENG T/L INTERLOCK
 - (c) 11C36, R ENG T/L INTERLOCK ALTN

S 865-022-N00

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

S 825-005-N00

- (5) Control Rod Adjustment of the Thrust Lever
 - (a) Have a person in the flight compartment hold the forward thrust levers against the forward idle stop.

NOTE: You can do an alternative procedure to hold the thrust levers against the forward idle stop. Go into the forward equipment bay through the access door, 113AL. Pull down on the lower end of each control rod from the thrust lever to hold each thrust lever against the forward idle stop.

- (b) Install the Rig Pin P7 through the two autothrottle brakes and each side frame of the autothrottle assembly.
- (c) If you cannot install the Rig Pin, P7, easily, you must adjust the length of the control rods from the thrust levers.
 - 1) Loosen the jamnut on the lower end of the control rod.
 - 2) Remove the nut and the bolt that attach the rod end of the control rod to the autothrottle brake.
 - 3) Turn the rod end clockwise to decrease, or counterclockwise to increase, the length of the control rod.
 - 4) Install the rod end of the control rod on the autothrottle brake with the nut and the bolt.

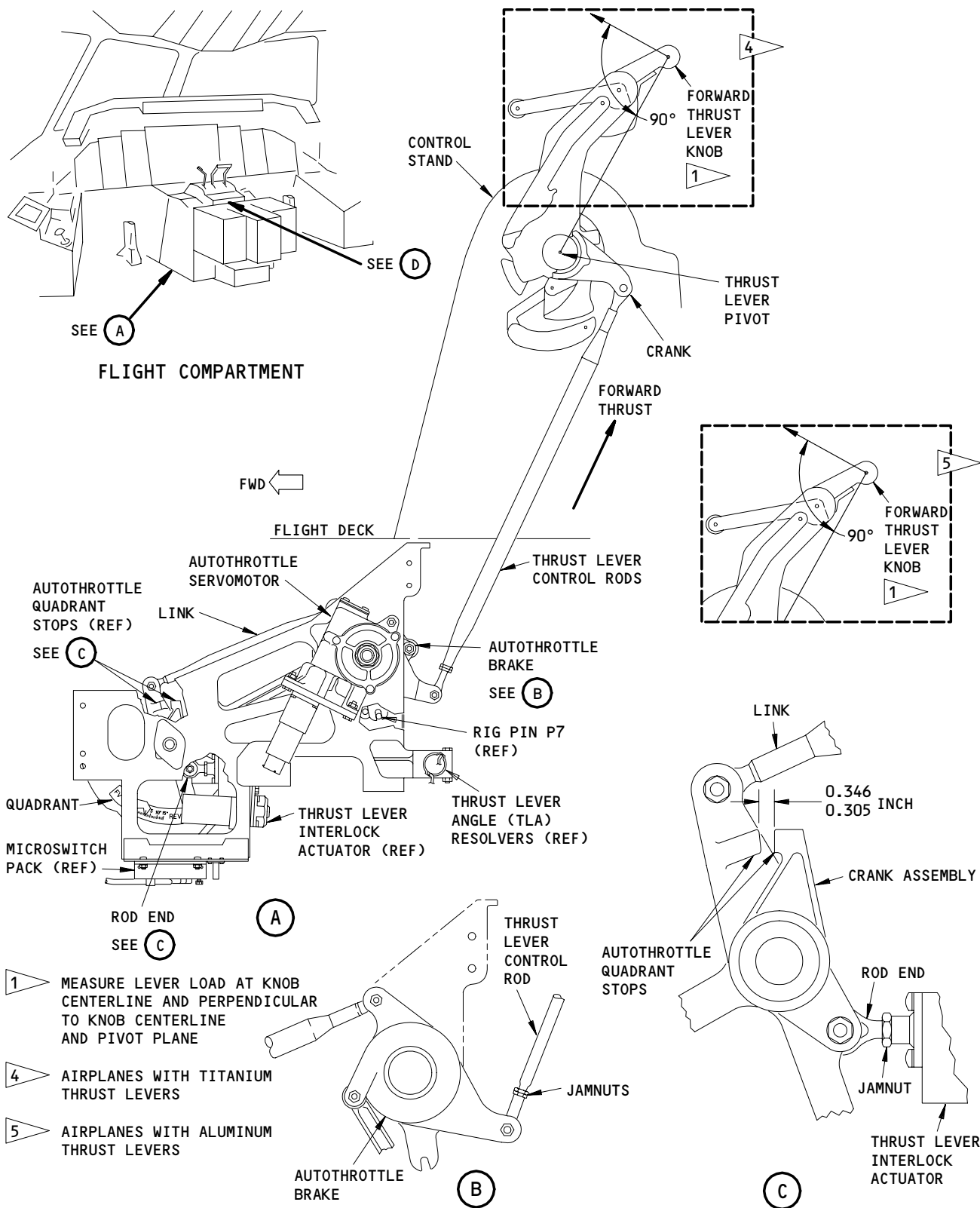
EFFECTIVITY

ALL

76-11-00

N01

Page 502
Apr 22/99



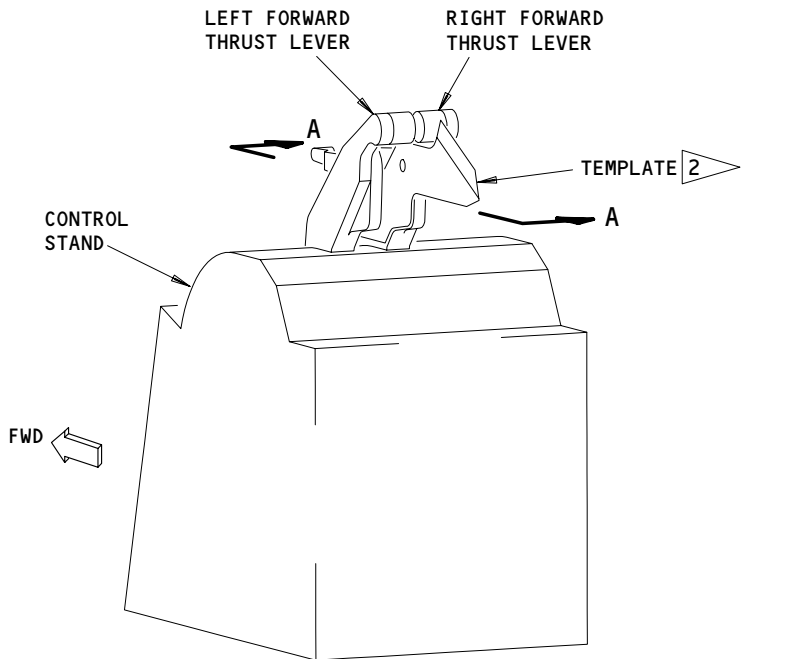
Thrust Lever Rigging and Load Test
Figure 501 (Sheet 1)

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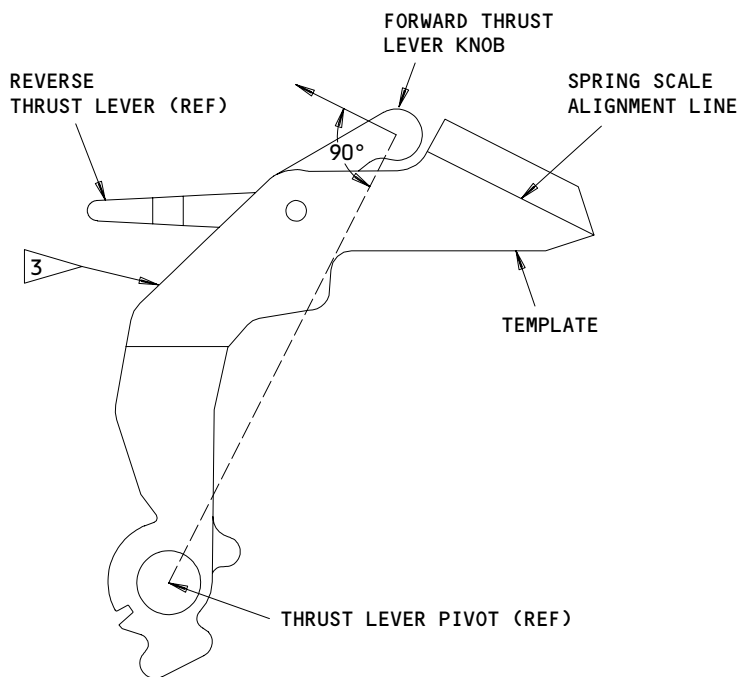
76-11-00

N02

Page 503
Aug 10/94



(D)



A-A

- 2 INSTALLED ON THRUST LEVER INBOARD SURFACE
- 3 ALIGN THE EDGES OF THE TEMPLATE WITH THE THRUST LEVER EDGES

Thrust Lever Rigging and Load Test
Figure 501 (Sheet 2)

EFFECTIVITY	ALL
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76-11-00

- 5) Make sure you can install the Rig Pin, P7, easily through the two autothrottle brakes and each side frame of the autothrottle assembly.

NOTE: Make sure you pull down on the lower end of each control rod from the thrust lever before you install the Rig Pin.

- 6) When you can install the Rig Pin, P7, easily, tighten the jamnut on the lower end of the control rod.
- (d) Measure the clearance between the autothrottle quadrant stops. The clearance between the autothrottle quadrant stops must be 0.305 to 0.346 inch.
- (e) If the clearance between the autothrottle quadrant stops is not correct, do this adjustment procedure:
 - 1) Remove the Rig Pin, P7, from the autothrottle assembly.
 - 2) Move the crank assembly to get access to the rod end of the interlock actuator for the thrust lever.
 - 3) Remove the nut and the bolt that attaches the rod end of the interlock actuator to the crank assembly.
 - 4) Cut the lockwire and loosen the jamnut on the rod end of the interlock actuator.
 - 5) Turn the rod end clockwise to decrease, or counterclockwise to increase, the clearance between the autothrottle quadrant stops.
 - 6) Tighten the jamnut on the rod end of the interlock actuator.
 - a) Install the lockwire on the jamnut.
 - 7) Attach the rod end of the interlock actuator to the crank assembly with the bolt and the nut.
 - 8) Pull down on the lower end of each control rod from the thrust lever to hold each thrust lever against the forward idle stop.
 - 9) Install the Rig Pin, P7, through the two autothrottle brakes and each side frame of the autothrottle assembly.
 - 10) Measure the clearance between the autothrottle quadrant stops. The clearance between the autothrottle quadrant stops must be 0.305 to 0.346 inch.
 - 11) If the clearance is not correct, do this adjustment procedure again until you get the correct clearance.
- (f) After you have the correct clearance between the autothrottle quadrant stops, remove the Rig Pin, P7.

S 865-023-N00

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:
 - (a) 11C35, L ENG T/L INTERLOCK

EFFECTIVITY

ALL

76-11-00

N01

Page 505
Apr 22/99

- (b) 11L29, R ENG T/L INTERLOCK
- (c) 11C36, R ENG T/L INTERLOCK ALTN

S 825-024-N00

- (7) Adjustment of these components is possible after the length of the control rod is adjusted.
 - (a) The thrust lever angle (TLA) resolver.
 - (b) The microswitch pack on the autothrottle.
 - (c) The interlock actuator below the thrust levers.

G. Put the Airplane Back To It's Usual Condition

S 415-006-N00

- (1) Close the door, 113AL (AMM 06-41-00/201).

S 445-007-N00

- (2) Do the activation procedure for the spoilers (AMM 27-61-00/201).

S 445-008-N00

- (3) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

TASK 76-11-00-735-009-N00

3. Engine Control System Test

A. General

- (1) This test measures the the load needed to operate the thrust levers. It also does a test of the fuel shutoff valve for the engine.

B. Equipment

- (1) Template - Force Alignment, Thrust Lever, B76003-4 (Part of B76003-1 Rigging Equipment - Engine Control System)
- (2) Spring Scale, 0-10 pound capacity

C. References

- (1) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (2) AMM 78-31-00/201, Thrust Reverser System
- (3) AMM 78-31-00/501, Thrust Reverser System

D. Access

- (1) Location Zones
 - 110 Lower Forward Fuselage
 - 210 Control Cabin
 - 410 Power Plant Nacelle Left
 - 420 Power Plant Nacelle Right

EFFECTIVITY

ALL

76-11-00

N01

Page 506
Aug 22/00

(2) Access Panels

- 113AL Forward Equipment Bay
- 413AL Left Fan Cowl Panel, Left Engine
- 414AR Left Fan Reverser, Left Engine
- 415AL Right Fan Cowl Panel, Left Engine
- 416AR Right Fan Reverser, Left Engine
- 423AL Left Fan Cowl Panel, Right Engine
- 424AR Left Fan Reverser, Right Engine
- 425AL Right Fan Cowl Panel, Right Engine
- 426AR Right Fan Reverser, Right Engine

E. Prepare to Do a Test of the Engine Control System

S 045-010-N00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO THE EQUIPMENT.

- (1) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

S 045-011-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

F. Do a Test of the Engine Control System

S 725-012-N00

- (1) Do these steps to measure the load needed to operate the thrust levers (Fig. 501):
- (a) Put the forward thrust lever in the idle position.
 - (b) Attach the template to the inboard surface of the thrust lever.

NOTE: Attach the template to the thrust lever with rubber bands or with double-sided adhesive tape.

- (c) Put the spring scale at the aft side of the forward thrust lever.
 - 1) The spring scale must touch the knob of the forward thrust lever at the center.

EFFECTIVITY

ALL

76-11-00

N01

Page 507
Aug 22/00

(d) Align the spring scale with the template B76003.

NOTE: The loads are measured at the center of the knob. The scale is held 90 degrees to the line that connects the knob and the pivot axis of the lever. The force alignment template is used to correctly align the spring scale.

(e) Use the scale to move the forward thrust lever through the full forward travel.

1) Measure the force that is necessary to move the thrust levers.

2) Make a record of the force value.

(f) Make sure the load is 2.5 to 4.5 pounds.

(g) Move the forward thrust lever to the idle position.

(h) Remove the scale and the template from the thrust lever.

G. Put the Airplane Back To Its Usual Condition.

S 445-014-N00

(1) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 715-015-N00

(2) Do this procedure: Thrust Reverser Operational Test - No Engine Operation (AMM 78-31-00/501).

S 445-016-N00

(3) Do the activation procedure for the spoilers (AMM 27-61-00/201).

EFFECTIVITY

ALL

76-11-00

N01

Page 508
Aug 22/00

THRUST LEVER - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task does the removal of the thrust levers. The second task does the installation of the thrust levers.

TASK 76-11-01-004-001-N00

2. Remove the Thrust Levers

A. Equipment

- (1) Rig Pin P7 - P/N A20004-23, part of set A20004-XX (AMM 20-10-24/201)

B. Consumable Materials

- (1) D00549, Anti-Seize Compound, C5A Fel-Pro Inc. (AMM 20-30-04/201)

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 76-11-00/501, Engine Control System
- (4) AMM 76-11-10/401, Control Stand Lever's Rails, Covers, and Seals
- (5) AMM 78-31-00/501, Thrust Reverser System

D. Access

- (1) Location Zones
 - 211 Control Cabin (Left)
 - 212 Control Cabin (Right)
- (2) Access Panels
 - 113AL Forward Equipment Bay

E. Prepare to Remove the Thrust Levers (Fig. 401)

S 044-002-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

EFFECTIVITY

ALL

76-11-01

N01

Page 401
Aug 22/01

S 044-003-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (2) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
 - (a) 6H15, CAPT SEAT
 - (b) 6J21, F/O SEAT

S 864-004-N00

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11E17, FLT CONT CMPTR PWR L
 - (b) 11E35, FLT CONT CMPTR PWR R
 - (c) 11E20, FLT CONT CMPTR PWR C
 - (d) 11E18, FLT CONT CMPTR SERVO L
 - (e) 11E36, FLT CONT CMPTR SERVO R
 - (f) 11E21, FLT CONT CMPTR SERVO C
 - (g) 11E16, MODE CONT PNL L
 - (h) 11E34, MODE CONT PNL R
 - (i) 11F14, TMC AC
 - (j) 11F15, TMC DC
 - (k) 11F16, TMC SERVO
 - (l) 11D14, L ENG T/R CONT
 - (m) 11L33, R ENG T/R CONT

S 864-005-N00

- (4) AIRPLANES WITH HYDRAULIC MOTOR-DRIVEN GENERATORS;
Open this circuit breaker on the overhead panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11D33, R ENG T/R CONT ALTN

S 014-006-N00

- (5) Open the access door 113AL (AMM 06-41-00/201).

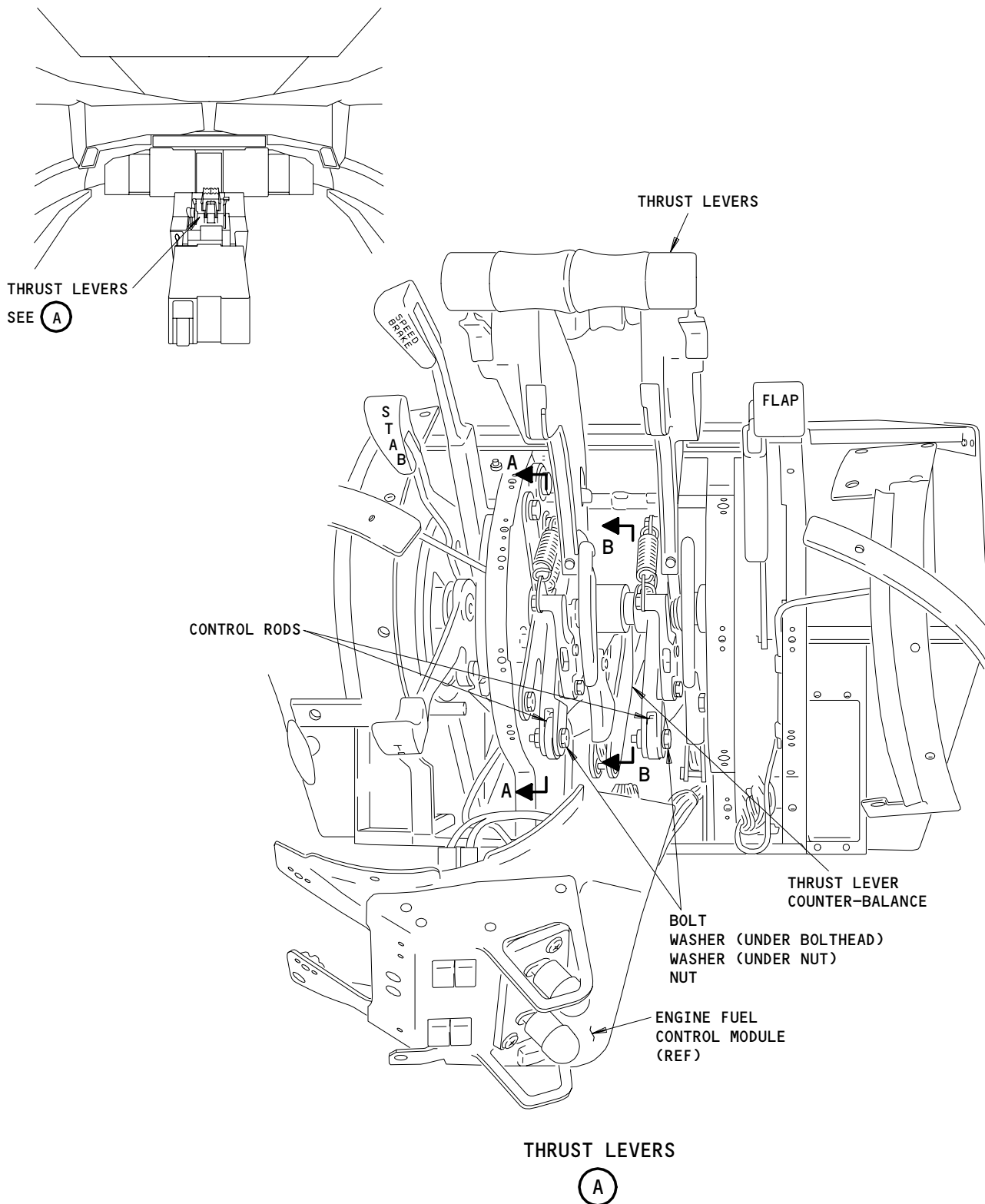
EFFECTIVITY

ALL

76-11-01

N02

Page 402
Apr 22/99



Thrust Lever Installation
Figure 401 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM CONTROL
LEVERS AND TITANIUM THRUST LEVERS

76-11-01

N01

Page 403
Aug 10/95

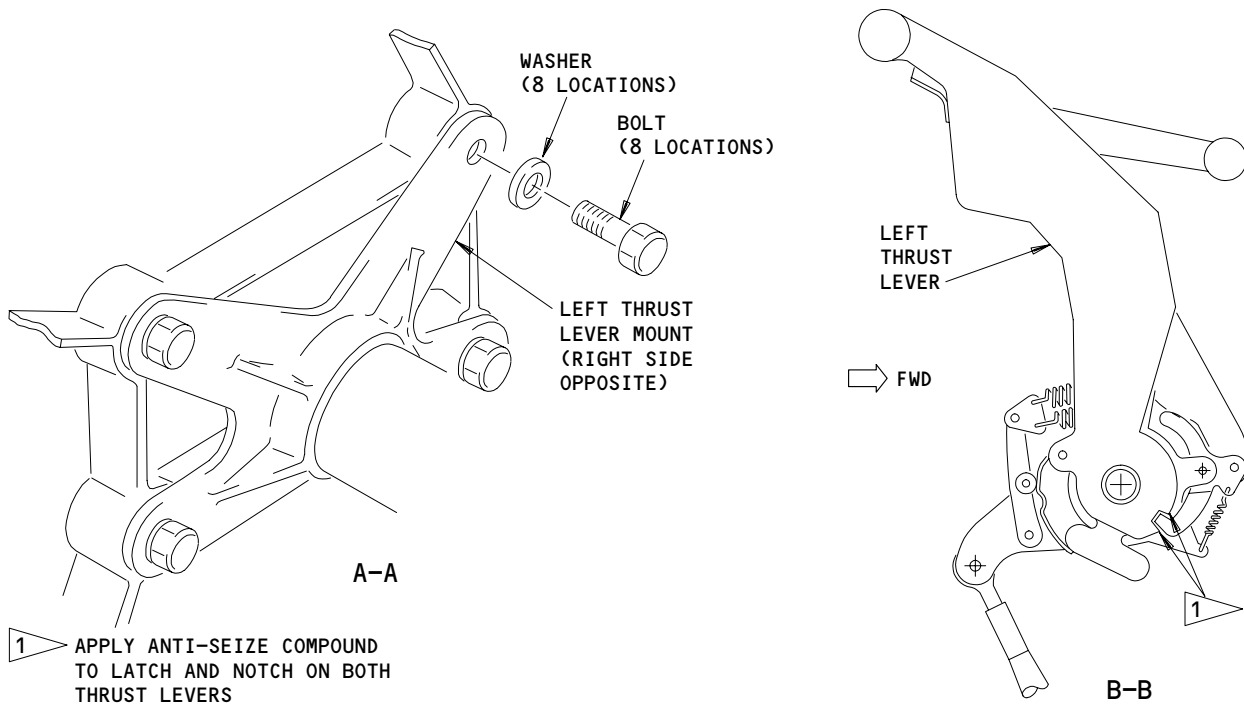
S 494-007-N00
(6) Install rig pin P7 through the autothrottle brakes and the support structure. (AMM 76-11-00/501).

S 034-008-N00
(7) Remove the bolts that connect the control rods of the thrust lever to the autothrottle brakes.

S 014-009-N00

CAUTION: BE VERY CAREFUL WHEN YOU REMOVE THE LIGHTPLATES, THRUST LEVERS, AND THE ENGINE FUEL CONTROL MODULE FROM THE CONTROL STAND. THIS WILL PREVENT DAMAGE TO ALL SWITCHES, LIGHTS, LIGHTPLATES, NUTPLATES, WIRE BUNDLES AND THE FINISH ON ALL PARTS.

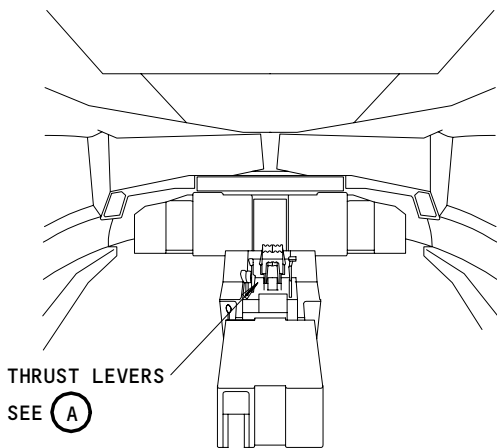
(8) Remove the rails, covers, and seals from the thrust levers on the control stand (AMM 76-11-10/401).



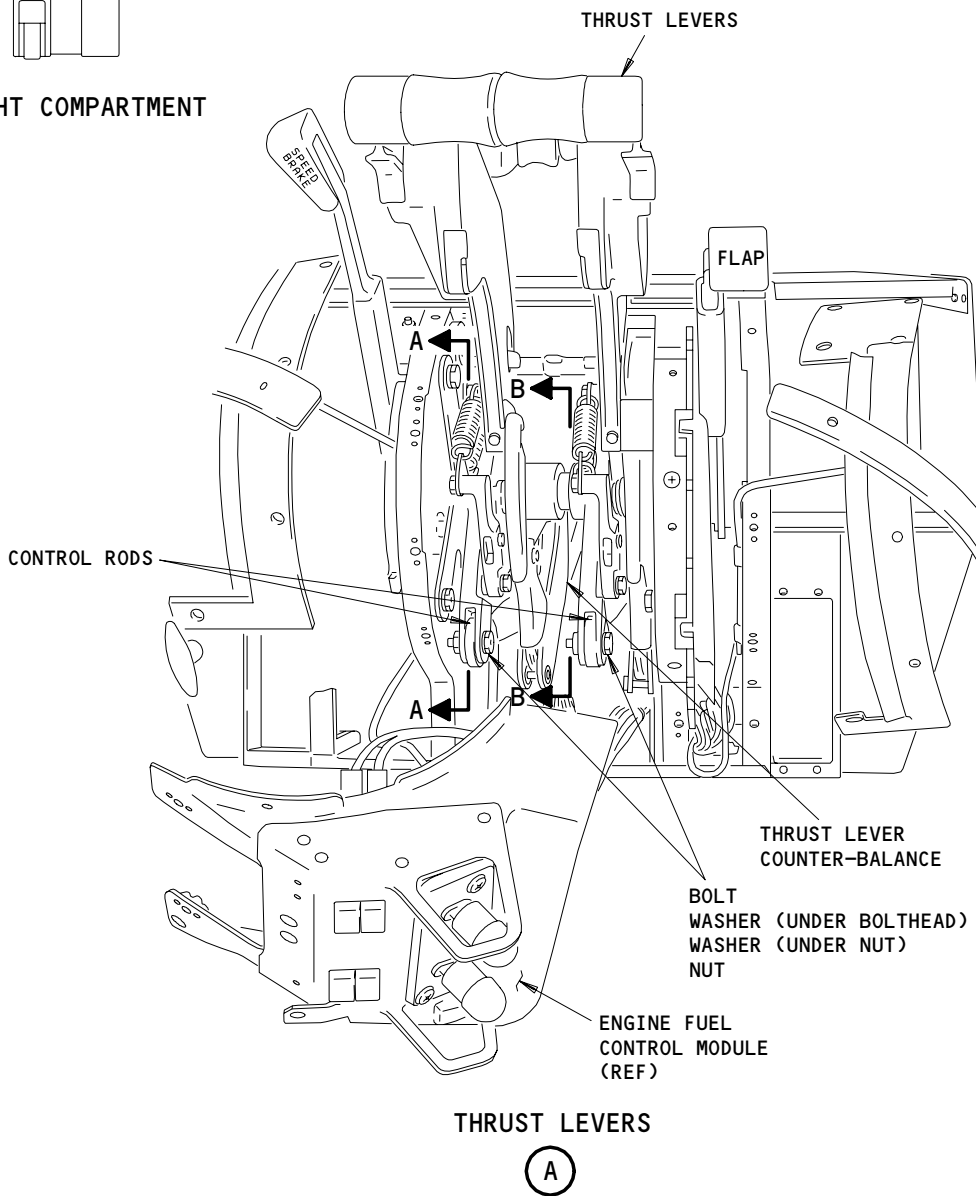
Thrust Lever Installation
Figure 401 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM CONTROL
LEVERS AND TITANIUM THRUST LEVERS

76-11-01



FLIGHT COMPARTMENT



Thrust Lever Installation
Figure 401A (Sheet 1)

EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER
TRIM CONTROL SWITCHES AND TITANIUM
THRUST LEVERS

76-11-01

N01

Page 405
Aug 10/95

S 864-010-N00
(9) Move the thrust levers to the forward position.

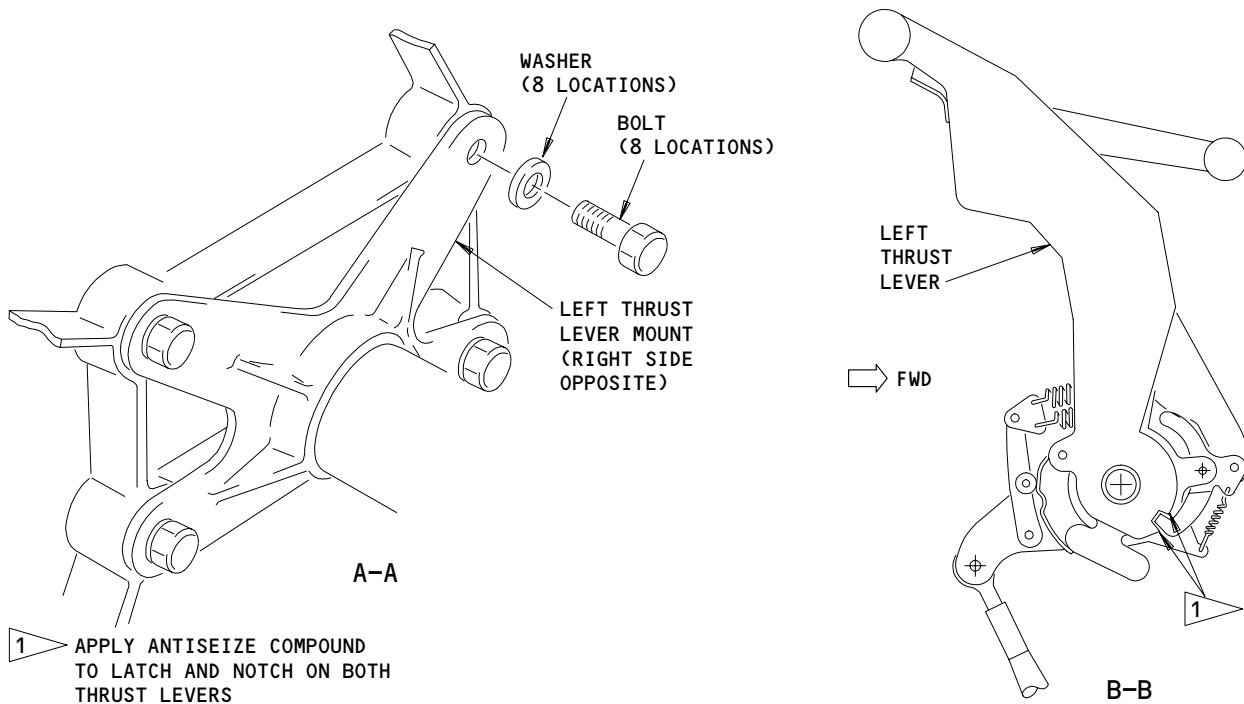
S 034-011-N00
(10) Disconnect the control rods from the thrust levers.

S 034-012-N00
(11) Remove the control rods from the control stands.

S 034-013-N00
(12) Remove the eight bolts that attach the thrust levers to the control stand structure.

F. Remove the Thrust Levers (Fig. 402)

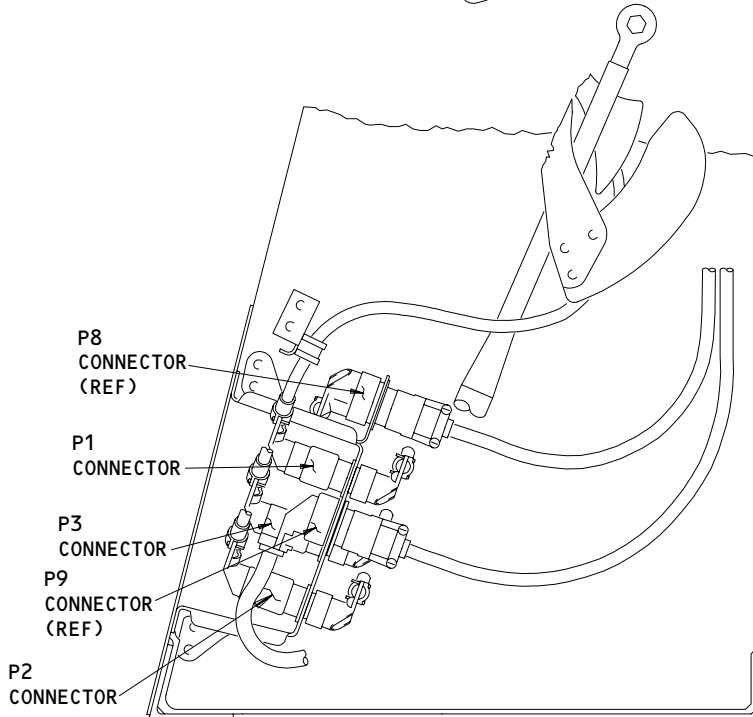
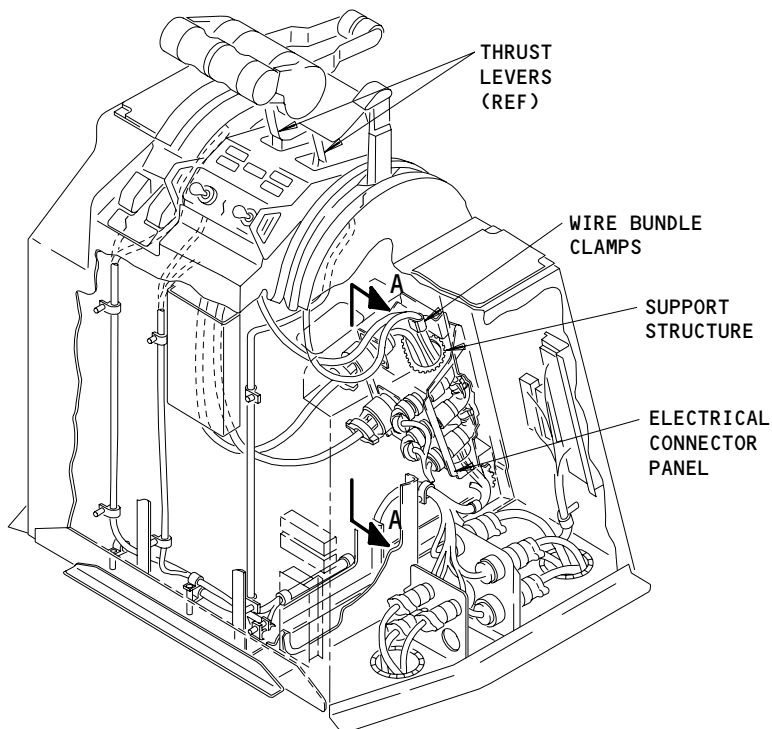
- S 024-014-N00
(1) Do these steps to remove the thrust levers:
 (a) Carefully lift up and forward to remove the thrust levers. Set the thrust levers on the control stand.
 (b) Remove the wire bundle clamps that attach the wire bundles to the support structure.
 (c) Disconnect electrical connectors (P1, P2 and P3) from the electrical connector panel.
 (d) Carefully put the connectors through the support hole. Make sure the wire bundles do not touch the structure (Fig. 402).



Thrust Lever Installation
Figure 401A (Sheet 2)

EFFECTIVITY
 AIRPLANES WITH ALTERNATE STABILIZER
 TRIM CONTROL SWITCHES AND TITANIUM
 THRUST LEVERS

76-11-01



ELECTRICAL CONNECTOR PANEL
A-A

Electrical Connector Installation
Figure 402

EFFECTIVITY

ALL

76-11-01

N02

Page 407
Aug 10/95

804169

TASK 76-11-01-404-017-N00

3. Install the Thrust Levers

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
- (2) AMM 20-10-24/201, Rig Pins
- (3) AMM 76-11-00/501, Engine Control System
- (4) AMM 76-11-10/401, Control Stand Lever's Rails, Covers, and Seals
- (5) AMM 78-31-00/501, Thrust Reverser System

B. Access

- (1) Location Zones
 - 211 Control Cabin (Left)
 - 212 Control Cabin (Right)
- (2) Access Panels
 - 113AL Forward Equipment Bay

C. Prepare to Install the Thrust Levers

S 644-018-N00

- (1) Apply antiseize compound to the left and right thrust levers.

S 434-020-N00

- (2) Pull the wire bundles tightly through the wire guide and counterbalance.

S 434-021-N00

- (3) Carefully put connectors (P1, P2, and P3) and the wire bundles through the support structure.
 - (a) Connect the connectors to the electrical connector panel.

S 434-022-N00

- (4) Install the wire bundle clamps to the support structure with the screws.

D. Install the thrust levers.

S 424-024-N00

- (1) Do these steps to install the thrust levers into the control stand:
 - (a) Move the thrust levers down and forward.

EFFECTIVITY

ALL

76-11-01

N07

Page 408
Apr 22/99

- (b) Use the eight bolts and washers to attach the thrust levers to the control stand.
- (c) Connect the control rods to the thrust levers with the bolt, washers and nut.

S 414-038-N00

CAUTION: BE VERY CAREFUL WHEN YOU INSTALL THE LIGHTPLATES, THRUST LEVERS, AND THE ENGINE FUEL CONTROL MODULE TO THE CONTROL STAND. THIS WILL PREVENT DAMAGE TO ALL SWITCHES, LIGHTS, LIGHTPLATES, NUTPLATES, WIREBUNDLES AND THE FINISH ON ALL PARTS.

- (2) Install the rails, covers, and seals on the control stand (AMM 76-11-10/401).

S 434-025-N00

- (3) Attach the control rods to the autothrottle brakes with the bolt, washer, bushing, and nut.

S 094-026-N00

- (4) Remove rig-pin P7.

S 414-037-N00

- (5) Close access door 113AL.

S 214-027-N00

- (6) Make sure the thrust lever assembly rotates freely and operates through its full range of travel.

E. Put the airplane back to its usual condition.

S 864-028-N00

- (1) Close these circuit breakers on the overhead panel, P11, and remove the DO-NOT-CLOSE tags:
 - (a) 11E17, FLT CONT CMPTR PWR L
 - (b) 11E35, FLT CONT CMPTR PWR R
 - (c) 11E20, FLT CONT CMPTR PWR C
 - (d) 11E18, FLT CONT CMPTR SERVO L
 - (e) 11E36, FLT CONT CMPTR SERVO R
 - (f) 11E21, FLT CONT CMPTR SERVO C
 - (g) 11E16, MODE CONT PNL L
 - (h) 11E34, MODE CONT PNL R
 - (i) 11F14, TMC AC
 - (j) 11F15, TMC DC
 - (k) 11F16, TMC SERVO
 - (l) 11D14, L ENG T/R CONT
 - (m) 11L33, R ENG T/R CONT

EFFECTIVITY

ALL

76-11-01

N07

Page 409
Apr 22/99

- S 864-029-N00
- (2) AIRPLANES WITH HYDRAULIC MOTOR-DRIVEN GENERATORS;
Close this circuit breaker on the overhead panel, P11, and remove the DO-NOT-CLOSE tag:
(a) 11D33, R ENG T/R CONT ALTN
- S 714-030-N00
- (3) Do a test of the engine control system (AMM 76-11-00/501).
- S 714-031-N00
- (4) Do a test of the thrust reverser (AMM 78-31-00/501).
- S 214-032-N00
- (5) Make sure the reverse thrust levers move freely to the full reverse position and the follower bearing rides smoothly on the detent cam.
- S 864-033-N00
- (6) Close these circuit breakers on the main power distribution panel, P6, and remove the DO-NOT-CLOSE tags:
(a) 6H15, CAPT SEAT
(b) 6J21, F/O SEAT
- S 444-034-N00
- (7) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

EFFECTIVITY

ALL

76-11-01

N06

Page 410
Apr 22/99

ENGINE FUEL CONTROL MODULE – MAINTENANCE PRACTICES

1. General

- A. This procedure has four tasks. The first task removes the light for the fuel control switch. The second task removes the module for the engine fuel control. The third task installs the module for the engine fuel control. The fourth task installs the light for the fuel control switch.

TASK 76-11-09-002-030-N00

2. Remove the Light for the Fuel Control Switch

A. Access

- (1) Location Zone
210 Control Cabin

B. Remove the Light for the Fuel Control Switch (Fig. 201).

S 862-002-N00

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11D25, L ENG FUEL CONT VLV
(b) 11D26, R ENG FUEL CONT VLV
(c) 11A35, IND LTS 3

S 012-039-N00

- (2) Turn the cap for the fuel control switch counterclockwise and remove the cap.

NOTE: Tools are not usually necessary to remove the cap.

S 022-040-N00

- (3) Carefully pull the light from the cap with the needle nose pliers.

TASK 76-11-09-022-006-N00

3. Remove the Engine Fuel Control Module

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 33-13-01/401, Lightplates
(3) AMM 76-11-10/401, Control Stand Lever's Rails, Covers, and Seals

B. Access

- (1) Location Zone
211/212 Flight Compartment

- (2) Access Panel
113AL Forward Equipment Bay

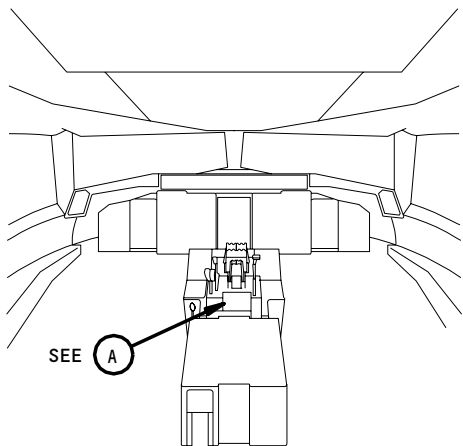
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ALL

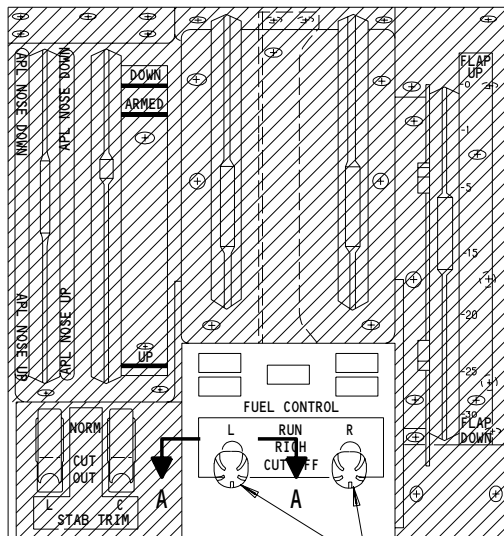
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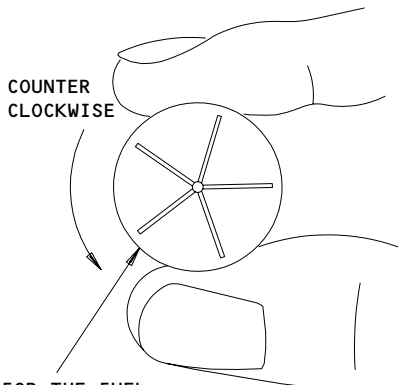
Page 201
Aug 22/00



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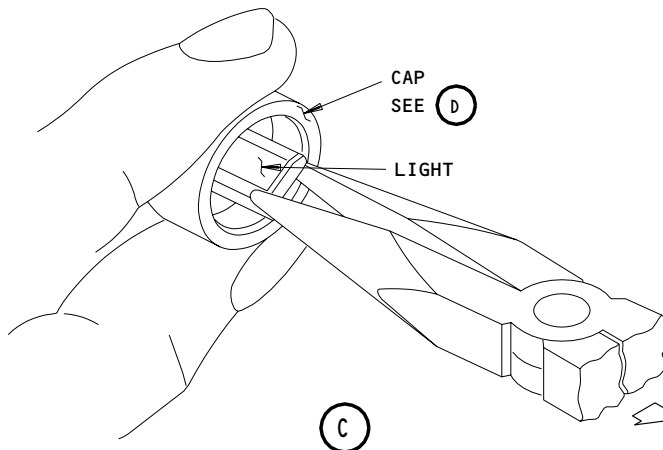


FUEL CONTROL SWITCH
SEE (B)

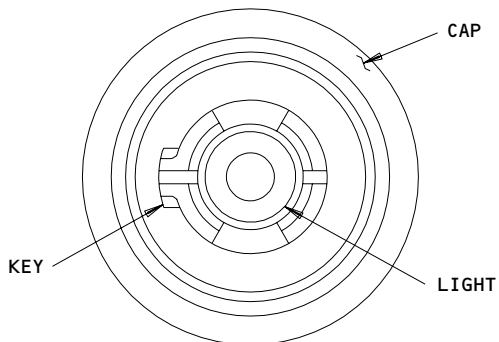


CAP FOR THE FUEL CONTROL SWITCH
SEE (C)

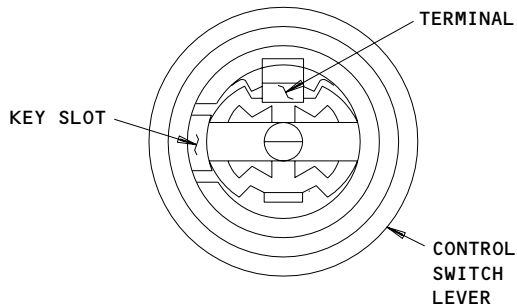
(B)



(C)



(D)



A-A

Fuel Control Switch Light Replacement
Figure 201

EFFECTIVITY

ALL

76-11-09

N01

Page 202
Nov 10/91

C. Prepare to remove the engine fuel control module.

S 012-007-N00

- (1) Open the access door, 113AL, for the forward equipment bay (AMM 06-41-00/201).

S 862-041-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEATS. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEATS MOVE ACCIDENTALLY.

- (2) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags to them:
- (a) 6E2, L SPAR FUEL VALVE
 - (b) 6E1, R SPAR FUEL VALVE
 - (c) 6H15, CAPT SEAT
 - (d) 6J21, F/O SEAT

S 862-009-N00

- (3) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags to them:
- (a) 11C12, STAB TRIM SHUTOFF L
 - (b) 11C13, STAB TRIM SHUTOFF CTR
 - (c) 11D11, L EEC TRIM CONT
 - (d) 11D12, R EEC TRIM CONT
 - (e) 11D25, L ENG FUEL CONT VLV AND CHAN B RESET
 - (f) 11D26, R ENG FUEL CONT VLV AND CHAN B RESET

D. Remove the Engine Fuel Control Module (Fig. 202).

S 032-042-N00

CAUTION: BE VERY CAREFUL WHEN YOU REMOVE AND MOVE THE LIGHTPLATES AND THE CONTROL STAND COMPONENTS. DAMAGE TO THE LIGHTPLATES, SWITCHES, NUTPLATES, WIRE BUNDLES OR THE FINISH ON THE PARTS CAN OCCUR.

- (1) Do this procedure: Remove the Rails, Covers and Seals from the Control Stand Levers (AMM 76-11-10/401).

S 032-011-N00

- (2) Remove the lightplate for the engine fuel control from the engine fuel control module (AMM 33-13-01/401).

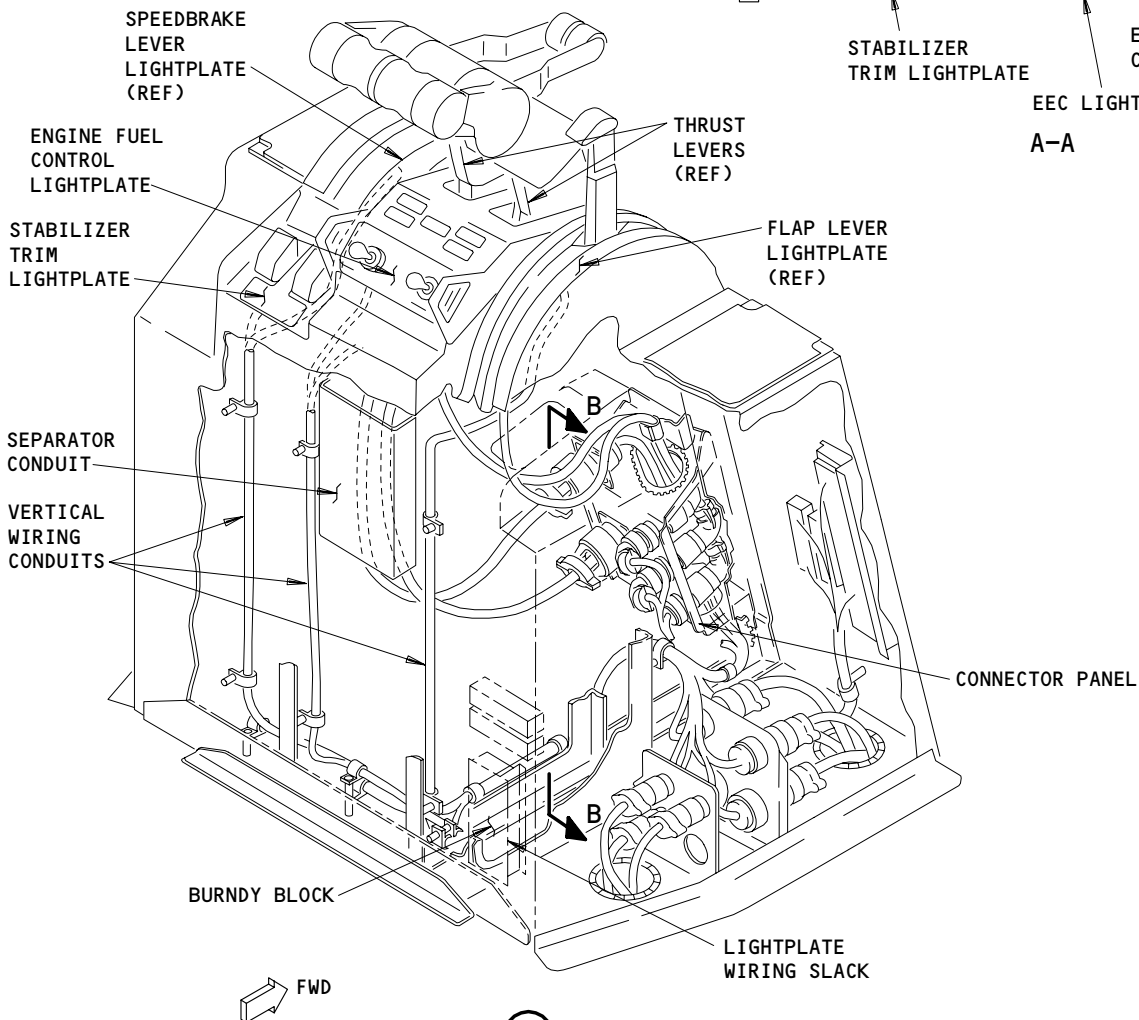
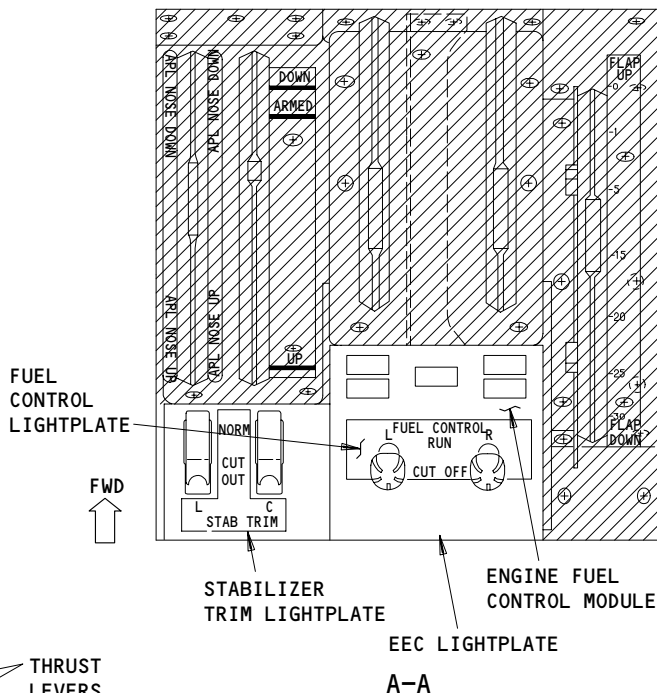
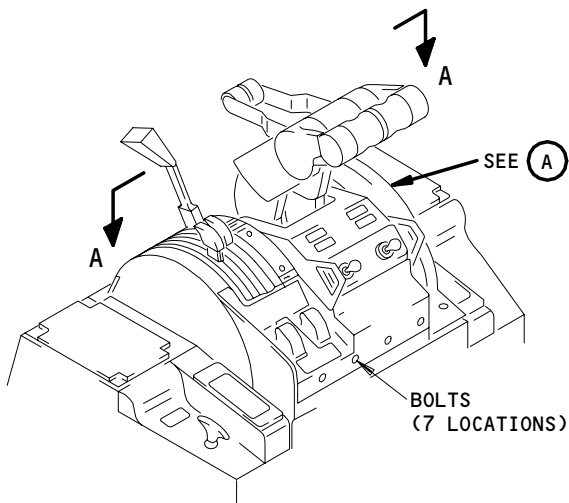
EFFECTIVITY

ALL

76-11-09

N02

Page 203
Aug 22/00



(A)

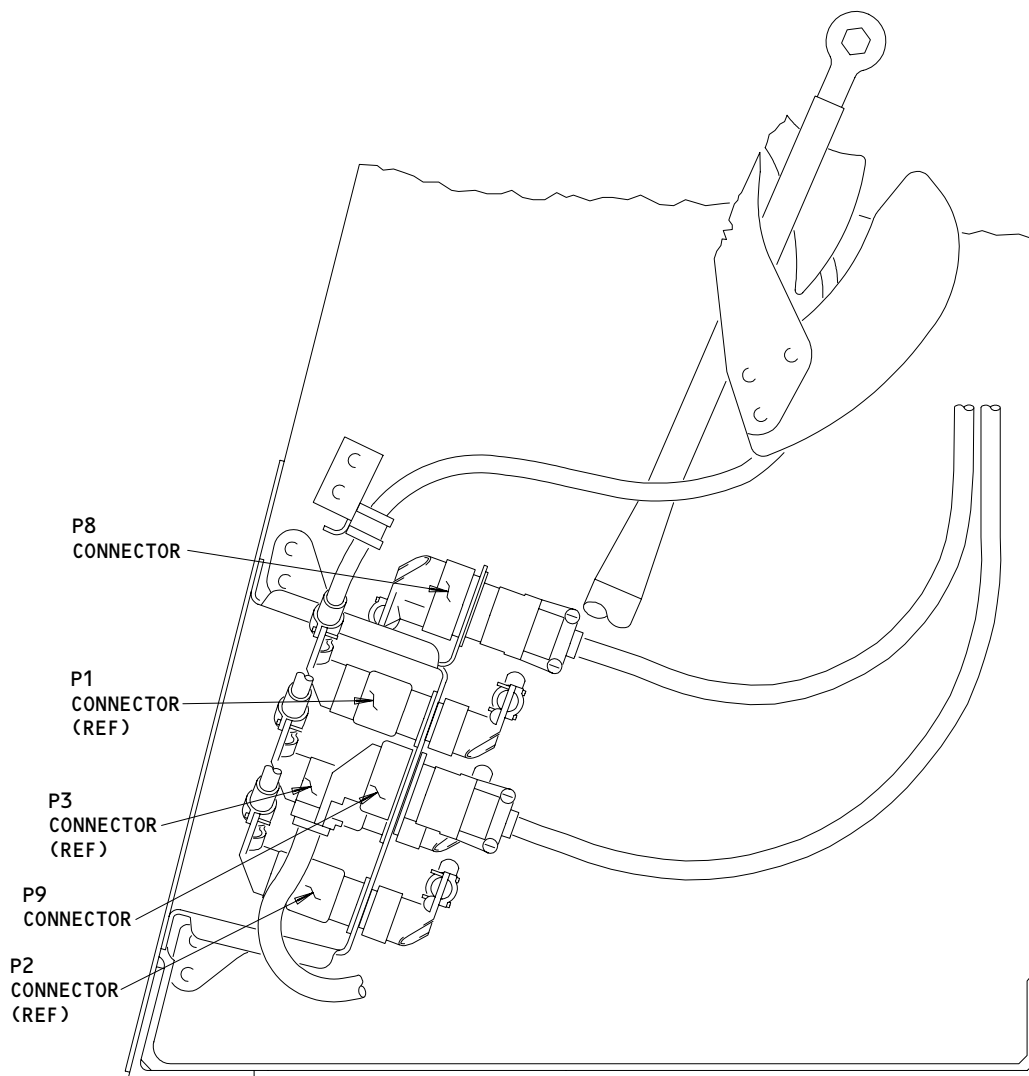
Engine Fuel Control Module Installation
Figure 202 (Sheet 1)

EFFECTIVITY	
ALL	

76-11-09

N01

Page 204
Nov 10/91



ELECTRICAL CONNECTOR PANEL
B-B

Engine Fuel Control Module Installation
Figure 202 (Sheet 2)

EFFECTIVITY	
	ALL

76-11-09

N01

Page 205
Nov 10/91

804147

- S 032-012-N00
- (3) Remove the lightplate for the stabilizer trim cutout from the engine fuel control module (AMM 33-13-01/401).

- S 032-013-N00
- (4) Disconnect the electrical connectors, P8 and P9, in the forward equipment bay behind access door 113AL.

- S 032-014-N00
- (5) Remove the seven bolts from the fuel control module.

- S 022-015-N00
- (6) Pull up on the fuel control module and move it rearward to remove it.

- S 032-016-N00
- (7) Carefully put the electrical connectors and the wire bundles between the thrust lever control rods and through the separator conduit.

TASK 76-11-09-422-017-N00

4. Install the Engine Fuel Control Module

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-41-00/501, Horizontal Stabilizer Trim Control System
- (4) AMM 28-22-00/501, Engine Fuel Feed System
- (5) AMM 33-13-01/401, Lightplates
- (6) AMM 33-16-00/501, Master Dim and Test
- (7) AMM 76-11-00/501, Engine Control System
- (8) AMM 76-11-10/401, Control Stand Lever's Rails, Covers, and Seals

B. Access

- (1) Location Zone
211/212 Flight Compartment

- (2) Access Panel
113AL Forward Equipment Bay

EFFECTIVITY

ALL

76-11-09

N01

Page 206
Aug 22/00

C. Install the Engine Fuel Control Module (Fig. 202).

S 422-045-N00

CAUTION: BE VERY CAREFUL WHEN YOU INSTALL OR MOVE THE LIGHTPLATES AND THE CONTROL STAND COMPONENTS. DAMAGE TO THE LIGHTPLATES, SWITCHES, NUTPLATES, WIRE BUNDLES OR THE FINISH ON THE PARTS CAN OCCUR.

- (1) Hold the fuel control module above the control stand and put the electrical connectors and the wire bundles down through the separator conduit.

S 432-019-N00

- (2) Put the electrical connectors between the thrust lever control rods and through to the disconnect panel.

S 422-020-N00

- (3) Move the fuel control module forward and down on the control stand until it is in the correct position.
 - (a) Attach the fuel control module to the control stand.

S 432-021-N00

- (4) Connect the electrical connectors, P8 and P9, to the panel in the forward equipment bay behind the access door, 113AL.

S 412-022-N00

- (5) Do this procedure: Install the Rails, Covers and Seals on the Control Stand Levers (AMM 76-11-10/401).

S 412-023-N00

- (6) Install the lightplate for the engine fuel control on the engine fuel control module (AMM 33-13-01/401).

S 412-024-N00

- (7) Install the lightplate for the stabilizer trim cutout on the engine fuel control module (AMM 33-13-01/401).

S 862-025-N00

- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11D25, L ENG FUEL CONT VLV AND CHAN B RESET
 - (b) 11D26, R ENG FUEL CONT VLV AND CHAN B RESET
 - (c) 11D11, L EEC TRIM CONT
 - (d) 11D12, R EEC TRIM CONT
 - (e) 11C12, L STAB TRIM SHUTOFF

EFFECTIVITY

ALL

76-11-09

N01

Page 207
Aug 22/00

(f) 11C13, CTR STAB TRIM SHUTOFF

S 862-026-N00

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

S 712-027-N00

(10) Do this procedure: Master Dim and Test - Operational Test (AMM 33-16-00/501).

NOTE: Make sure the pushbutton switch/lights and the annunciator lights on the P10 panel come ON bright.

S 712-028-N00

(11) Do this procedure: Engine Fuel Shutoff Valve Test (AMM 28-22-00/501).

S 712-029-N00

(12) Do this procedure: Stab Trim Switch Test (AMM 27-41-00/501).

S 412-031-N00

(13) Close the access door, 113AL, for the forward equipment bay (AMM 06-41-00/201).

S 712-032-N00

(14) Make sure the REV ISLN light comes ON when you open these circuit breakers:

NOTE: Examine one circuit breaker at a time. Open the circuit breaker and stop for 3 seconds. Make sure the REV ISLN light comes ON. Then close the circuit breaker and examine the other one.

(a) 11D13, L ENG T/R IND

(b) 11L33, R ENG T/R IND

S 862-033-N00

(15) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the main power distribution panel, P6:

(a) 6E2, L SPAR FUEL VALVE

(b) 6E1, R SPAR FUEL VALVE

(c) 6H15, CAPT SEAT

(d) 6J21, F/O SEAT

EFFECTIVITY

ALL

76-11-09

N03

Page 208
Aug 22/00

- S 862-034-N00
- (16) Remove the electrical power (AMM 24-22-00/201).

TASK 76-11-09-402-035-N00

5. Install the Light for the Fuel Control Switch

- A. References
 - (1) AMM 26-10-00/601, AFOLTS and Fail Light
- B. Access
 - (1) Location Zone
210 Control Cabin
- C. Install the Light for the Fuel Control Switch (Fig. 201).

- S 422-036-N00
- (1) Install a new light in the cap with light pressure from one finger.

NOTE: The light will make clicks when it is in the retainers.

- S 822-037-N00
- (2) Align the key in the cap with the key slot in the control switch lever.
- S 412-038-N00
- (3) Carefully push the cap down and turn it clockwise to put the cap on the control switch lever.
- S 862-043-N00
- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:
 - (a) 11D25, L ENG FUEL CONT VLV
 - (b) 11D26, R ENG FUEL CONT VLV
 - (c) 11A35, IND LTS 3
- S 712-005-N00
- (5) Do this procedure: AFOLTS System Check (AMM 26-10-00/601).

EFFECTIVITY

ALL

76-11-09

N02

Page 209
Aug 22/00

CONTROL STAND LEVER'S RAILS, COVER, AND SEALS - REMOVAL/INSTALLATION

1. General

- A. This procedure contains the data to remove and install the rails, covers, and seals on the control stand levers. This gives access to these components in the control stand: thrust levers, engine fuel control module, flap control lever, speedbrake control lever, stabilizer trim control levers or alternate stabilizer trim control switches, and the position switch for the reverse thrust levers.

TASK 76-11-10-004-001-N00

2. Remove the Rails, Covers, and Seals from the Control Stand Levers

A. References

- (1) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (2) AMM 78-31-00/201, Thrust Reverser System

B. Access

- (1) Location Zone
210 Control Cabin

C. Prepare to Remove the Rails, Covers, and Seals

S 044-002-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 044-003-N00

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE FLIGHT COMPARTMENT SEAT. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE SEAT MOVES ACCIDENTALLY.

- (2) Open these circuit breakers on the main power distribution panel, P6, and attach DO-NOT-CLOSE tags:
 - (a) 6H15, CAPT SEAT

EFFECTIVITY

ALL

76-11-10

N02

Page 401
Aug 22/00

(b) 6J21, F/O SEAT

S 044-004-N00

WARNING: DO THE THRUST REVERSER DEACTIVATION PROCEDURE TO PREVENT THE OPERATION OF THE THRUST REVERSER. THE ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this procedure: Thrust Reverser Deactivation for Ground Maintenance (AMM 78-31-00/201).

D. Procedure

S 024-006-N00

(1) Do these steps to remove the Rails, Covers, and Seals:

CAUTION: BE VERY CAREFUL WHEN YOU REMOVE AND MOVE THE LIGHTPLATES AND THE CONTROL STAND COMPONENTS. DAMAGE TO THE LIGHTPLATES, SWITCHES, NUTPLATES, WIRE BUNDLES OR THE FINISH ON THE PARTS CAN OCCUR.

(a) Remove the access panels on the lower left side and the lower right side of the control stand to get access to the lightplate wires (Fig. 401).

(b) Cut the wire ties which hold the loose wire for the lightplates on the flap, speedbrake, fuel control and stabilizer trim cutout switches. When you remove the necessary wire ties, make a record of the locations for the subsequent installation.

NOTE: It is necessary to have the loose wire to move the lightplates. The wire ties are near the burndy blocks on the lower right side at the rear of the control stand.

(c) Remove the two screws which are aft of the flap lever and which attach the aft cover.

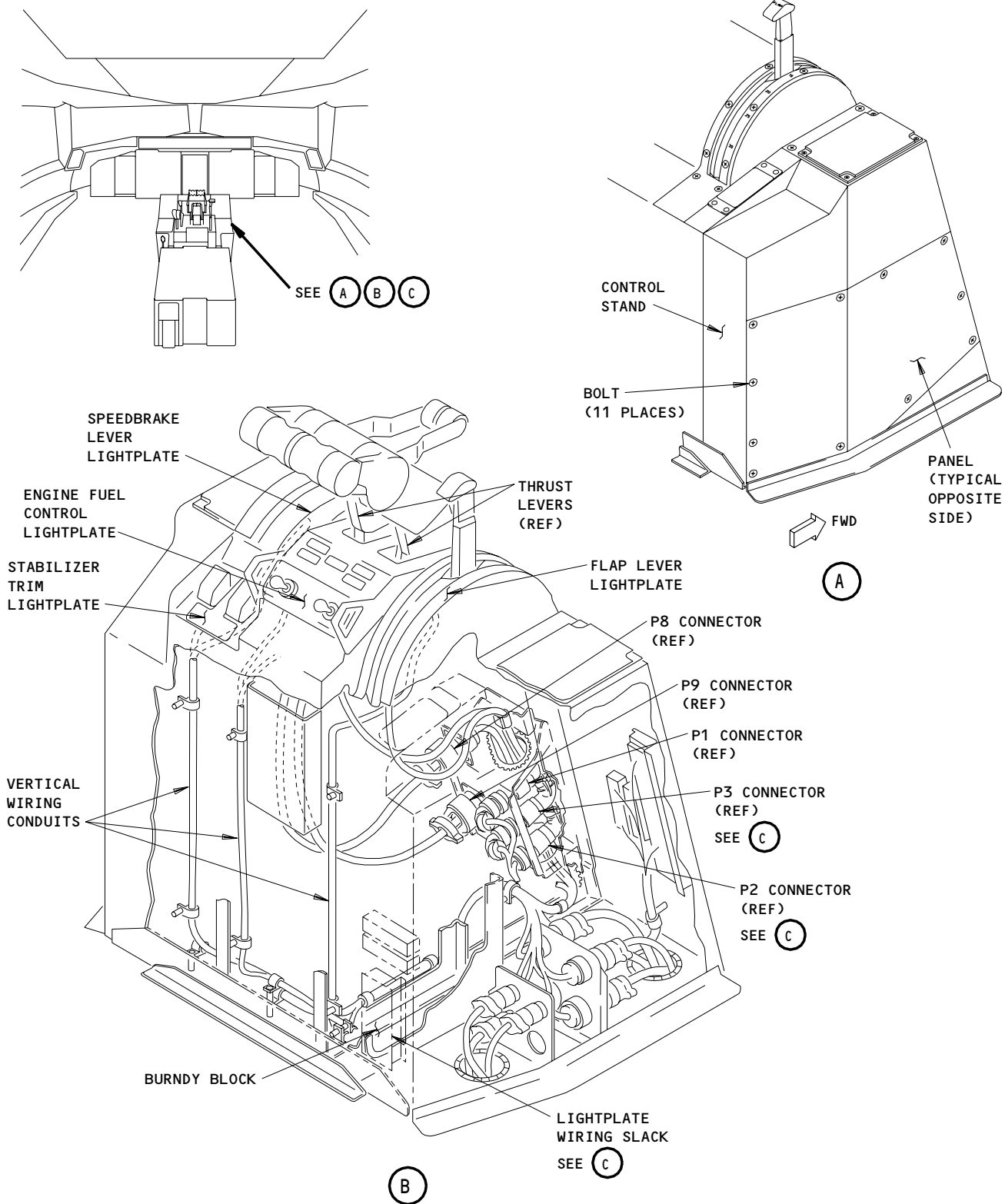
EFFECTIVITY

ALL

76-11-10

N03

Page 402
Aug 22/00



Control Stand/Lightplate Wiring
Figure 401 (Sheet 1)

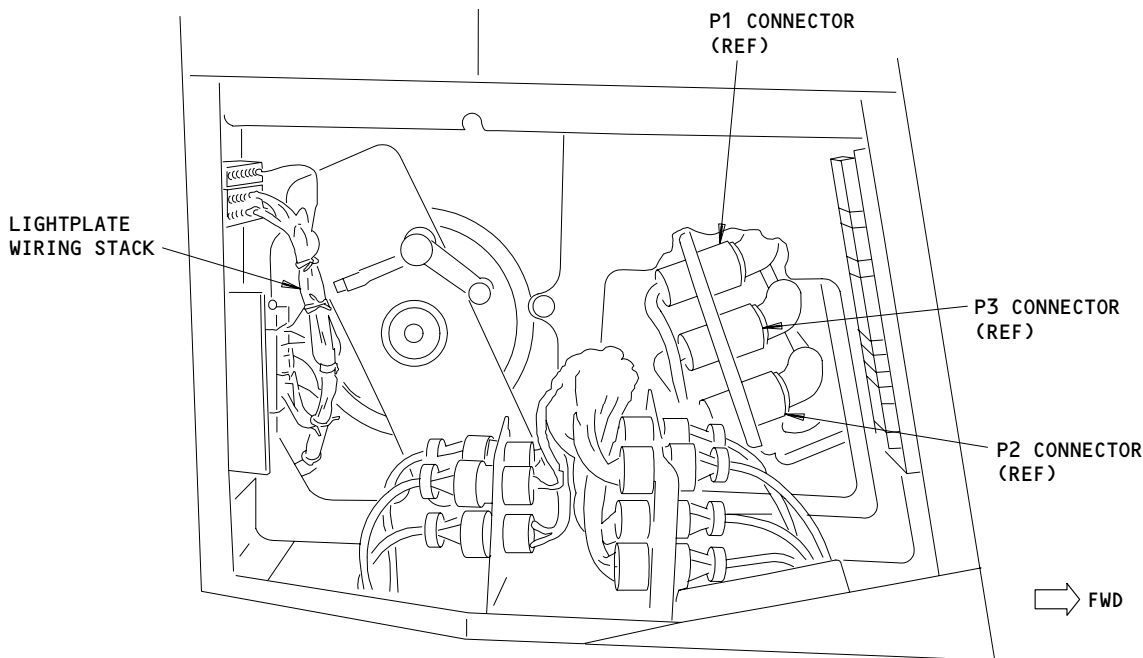
EFFECTIVITY	
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76-11-10

N01

Page 403
Aug 10/95

- (d) Remove the aft cover.
- (e) Do these steps to remove the flap lever lightplate (Fig. 402, Fig. 403):
 - 1) Pull the loose wire for the flap lever lightplate to the lightplate.
 - 2) Remove the two screws which attach the flap lever lightplate.
 - 3) Put the flap lever lightplate to the side.
- (f) Move the loose wire for the speedbrake, stabilizer trim cutout switches, and fuel control lightplates to the bottom of the vertical conduits.
- (g) Do these steps to remove the speedbrake lever lightplate:
 - 1) Remove the two screws from the speedbrake lever lightplate.
 - 2) Lift the lightplate as far as permitted by the loose wire and put the lightplate to the side.



(C)

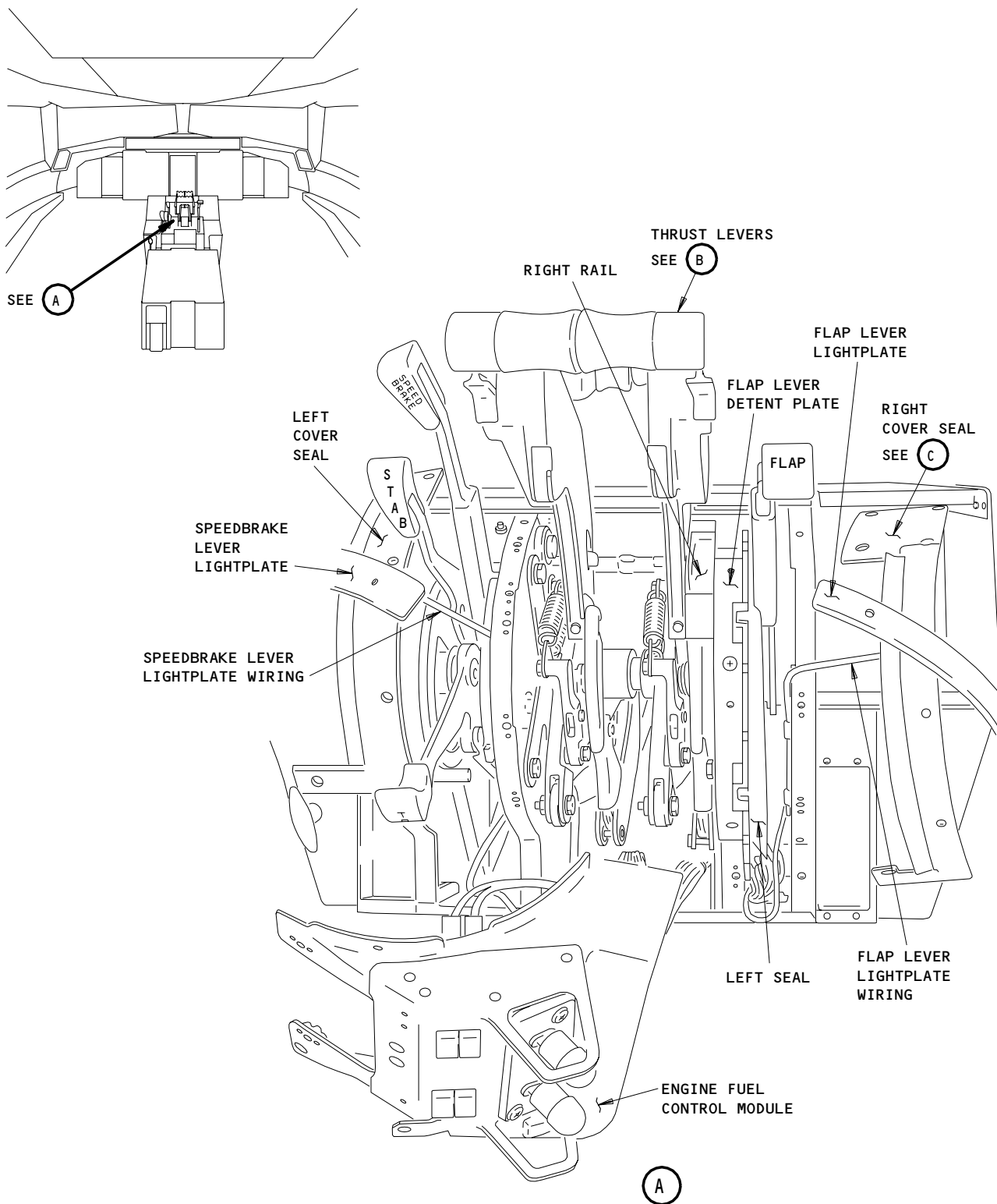
Control Stand/Lightplate Wiring Access
Figure 401 (Sheet 2)

EFFECTIVITY	
	ALL

76-11-10

N03

Page 404
Aug 10/95



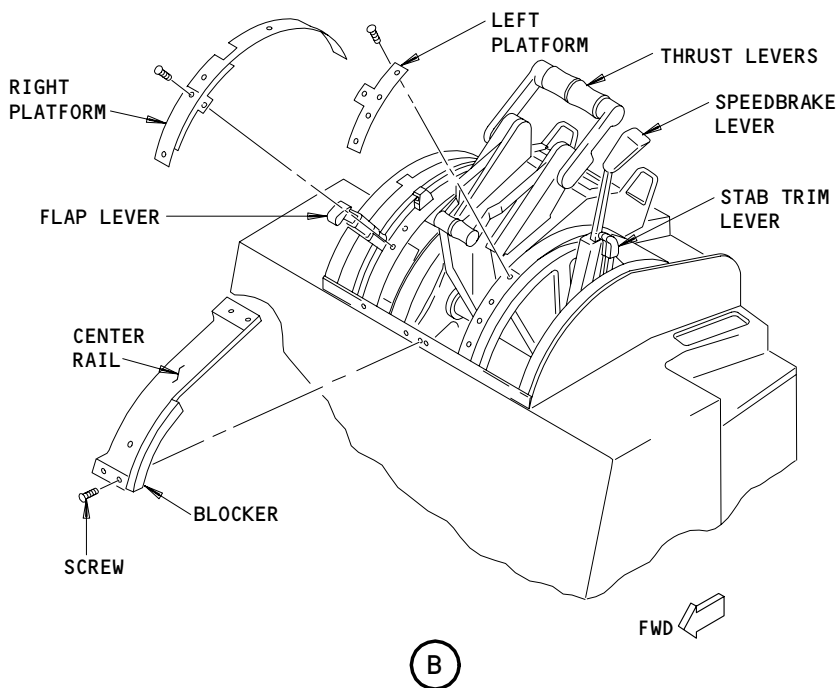
Control Stand Lightplate/Cover Seal Installation
Figure 402 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM CONTROL
LEVERS AND TITANIUM THRUST LEVERS

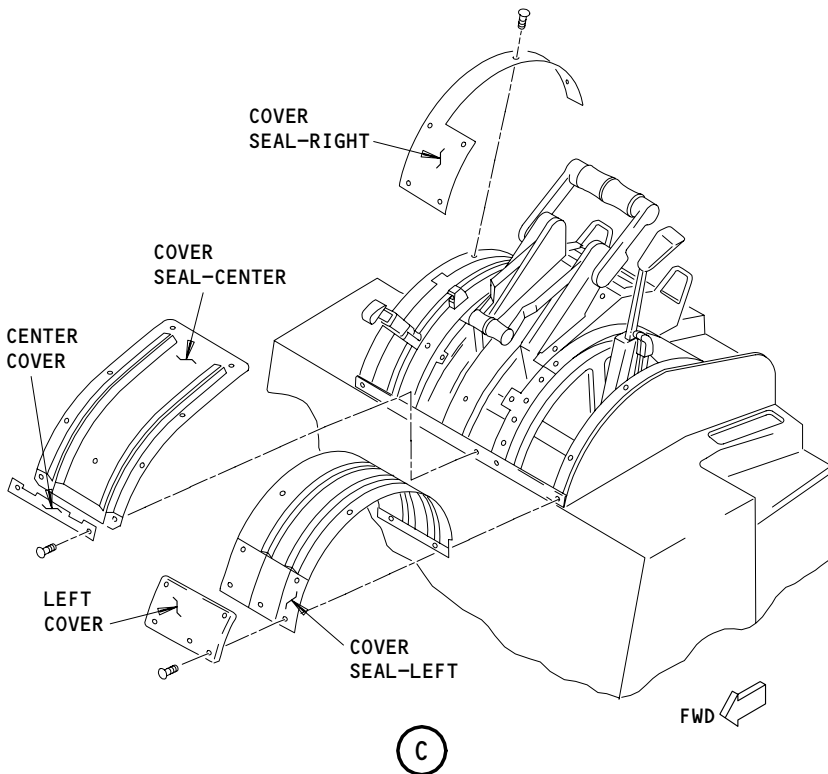
76-11-10

N04

Page 405
Aug 10/95



(B)



(C)

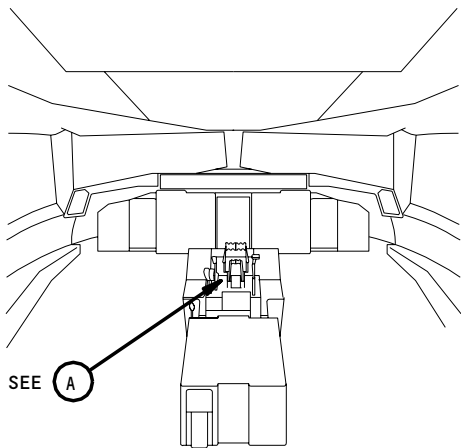
Control Stand Lightplate/Cover Seal Installation
Figure 402 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM CONTROL
LEVERS AND TITANIUM THRUST LEVERS

76-11-10

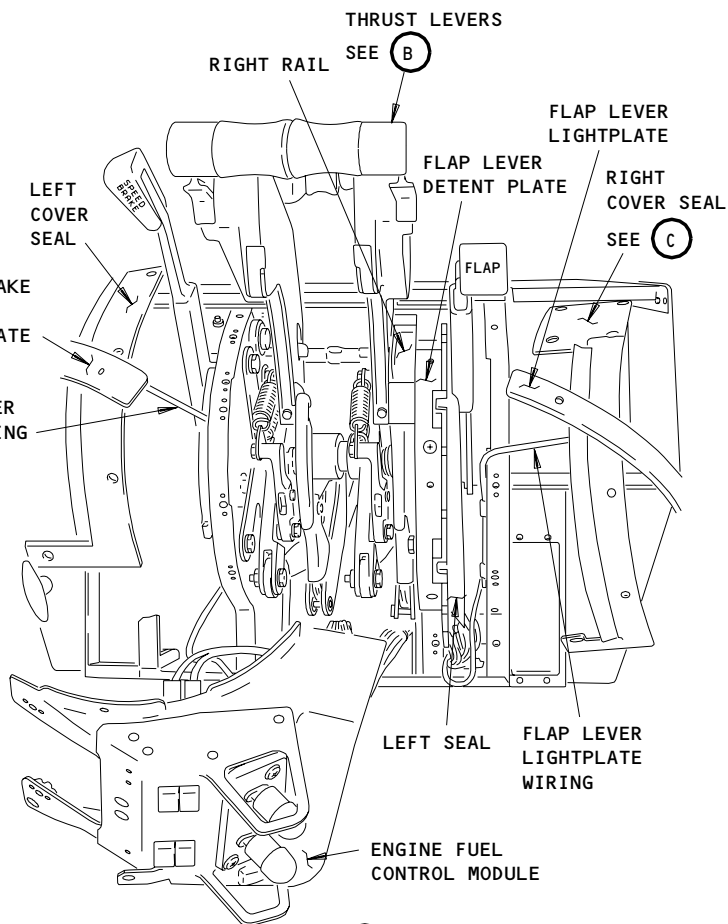
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Page 406
Aug 10/95

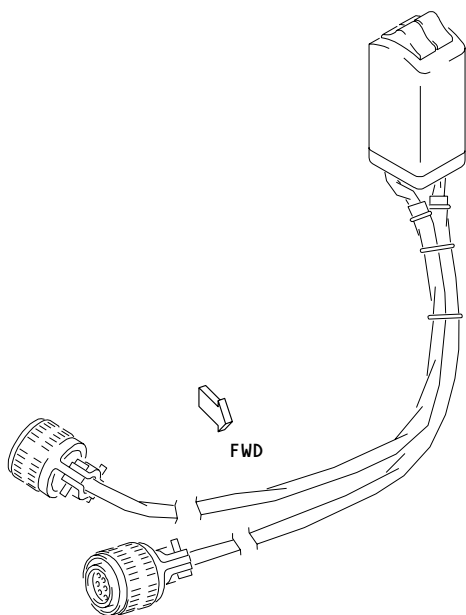


SEE (A)

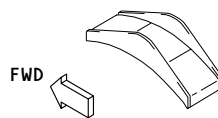
FLIGHT COMPARTMENT



(A)



ALTERNATE STABILIZER
TRIM SWITCH



ALTERNATE STABILIZER
TRIM SWITCH LIGHTPLATE

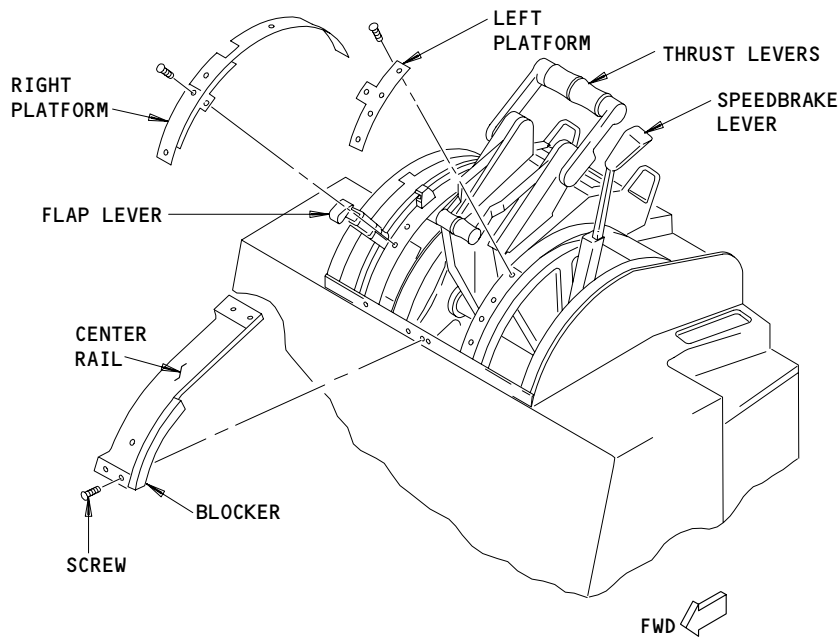
Control Stand Lightplate/Cover Seal Installation
Figure 402A (Sheet 1)

EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER TRIM
CONTROL SWITCHES AND TITANIUM THRUST
LEVERS

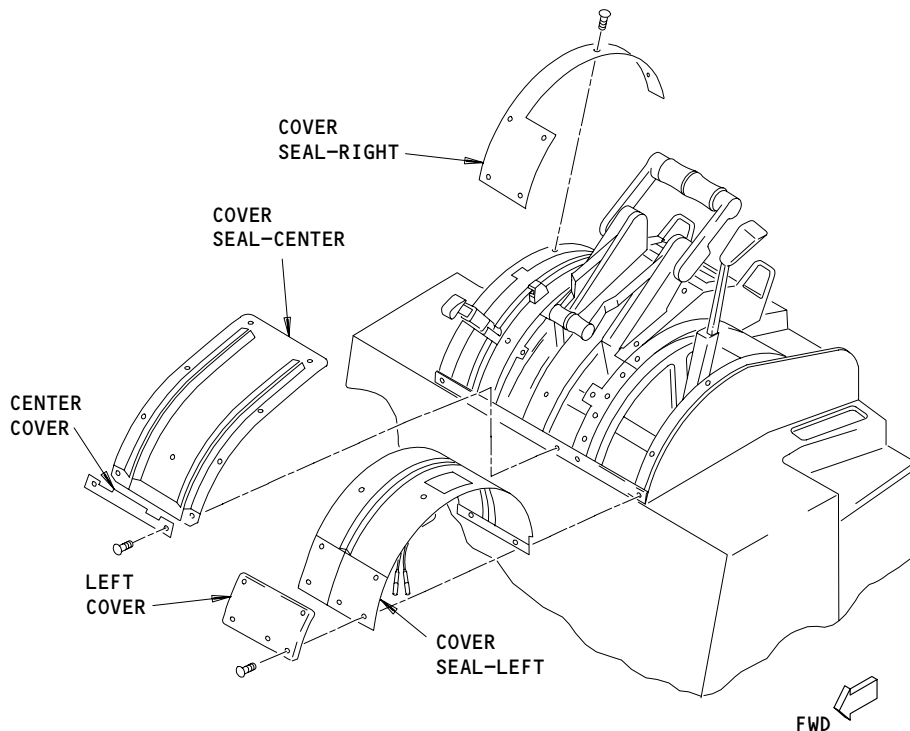
76-11-10

N04

Page 407
Aug 10/95



(B)



(C)

Control Stand Lightplate/Cover Seal Installation
Figure 402A (Sheet 2)

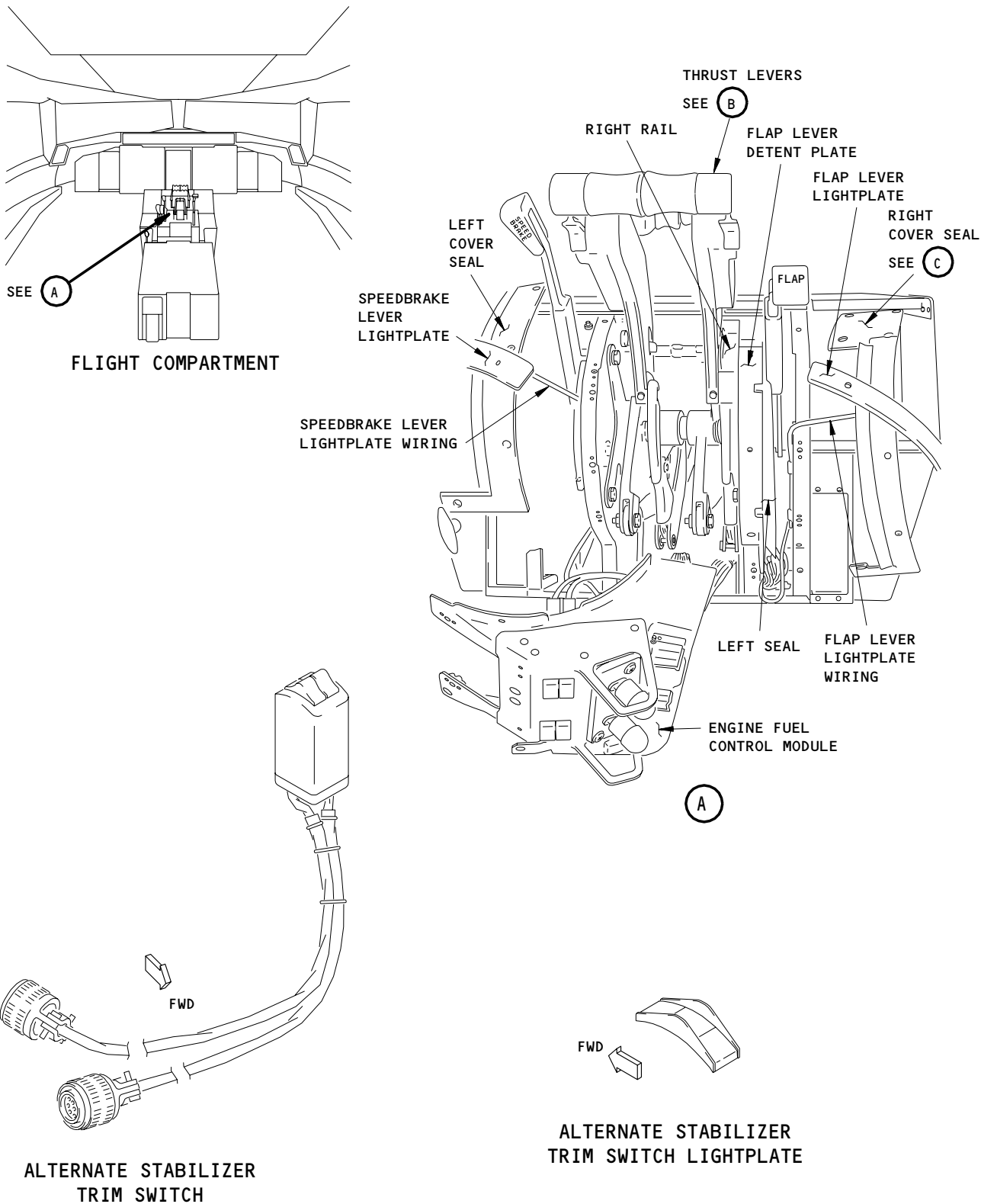
EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER TRIM
CONTROL SWITCHES AND TITANIUM THRUST
LEVERS

76-11-10

N04

Page 408
Aug 10/95

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Control Stand Lightplate/Cover Seal Installation
Figure 402B (Sheet 1)

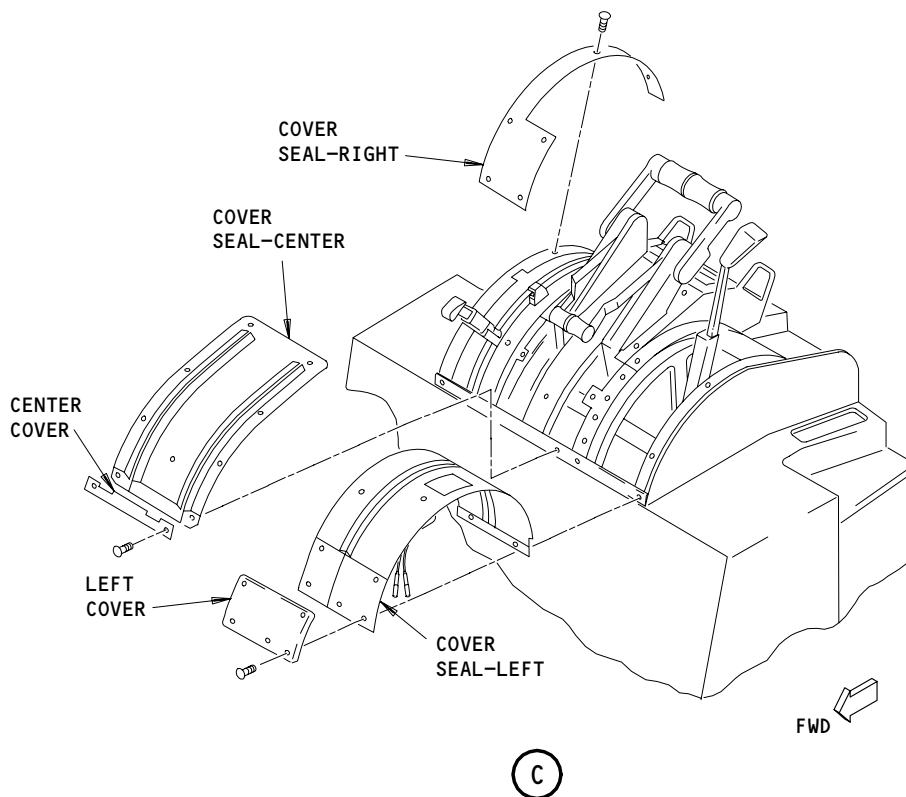
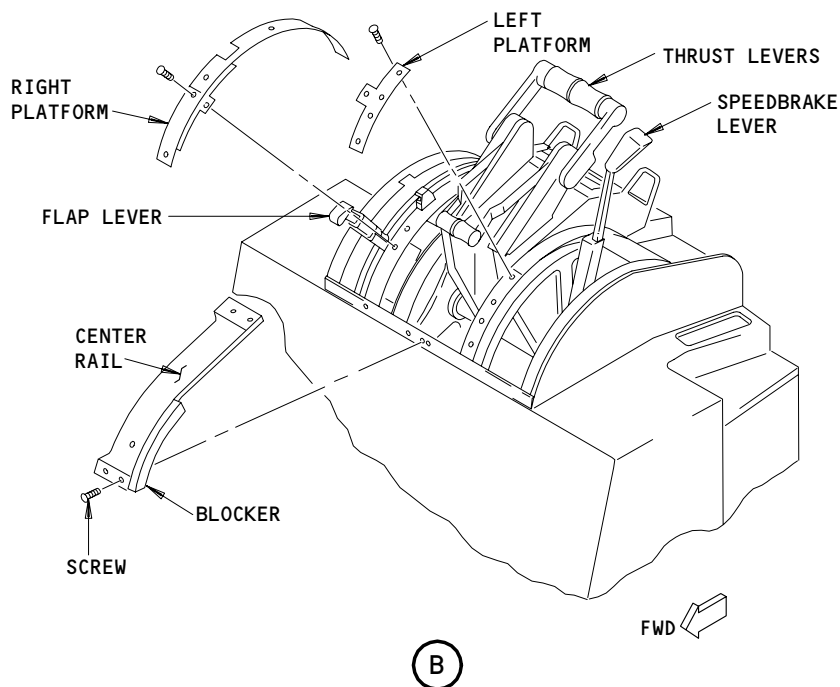
EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER TRIM
SWITCHES AND ALUMINUM THRUST LEVERS

76-11-10

N04

Page 409
Aug 10/95

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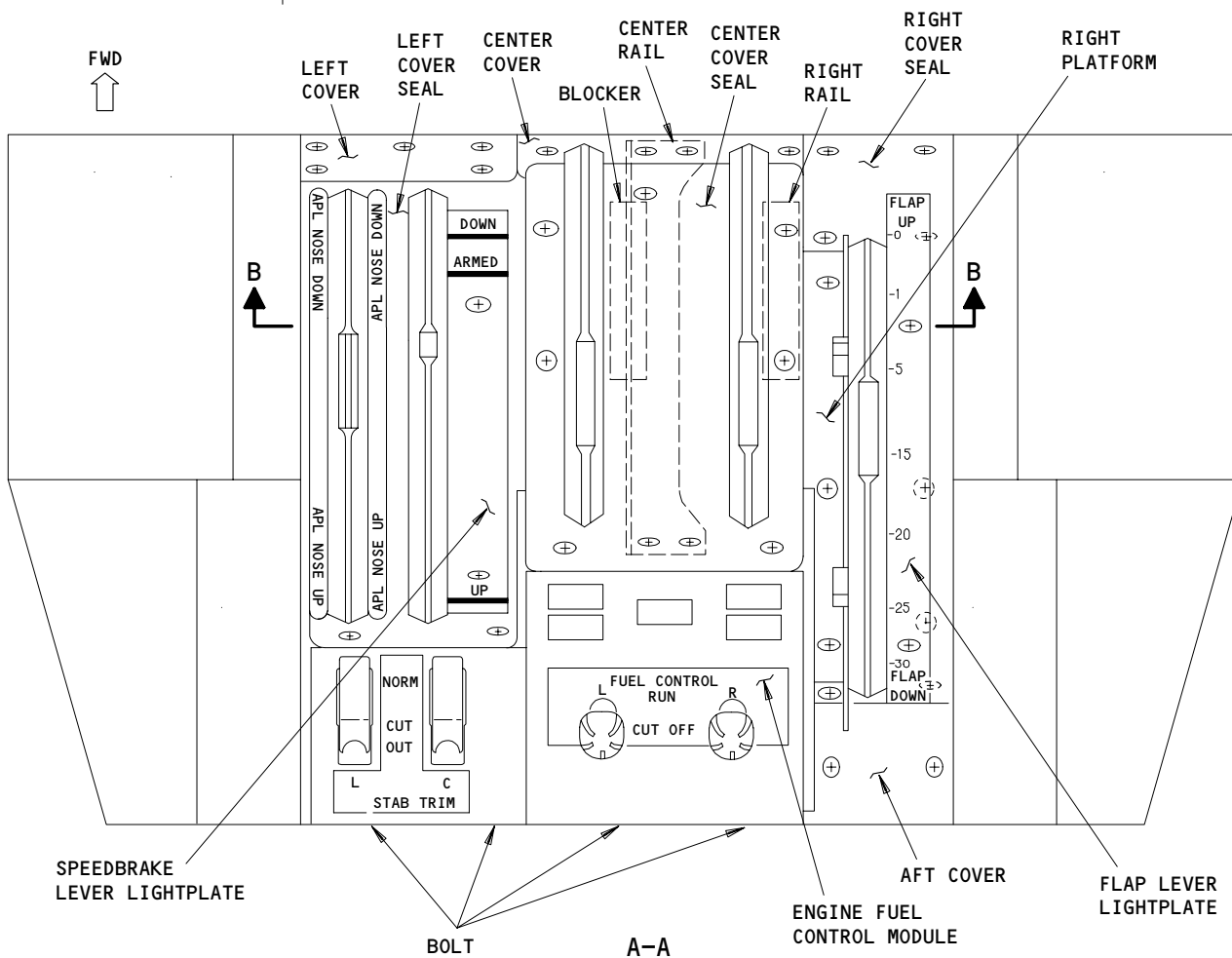
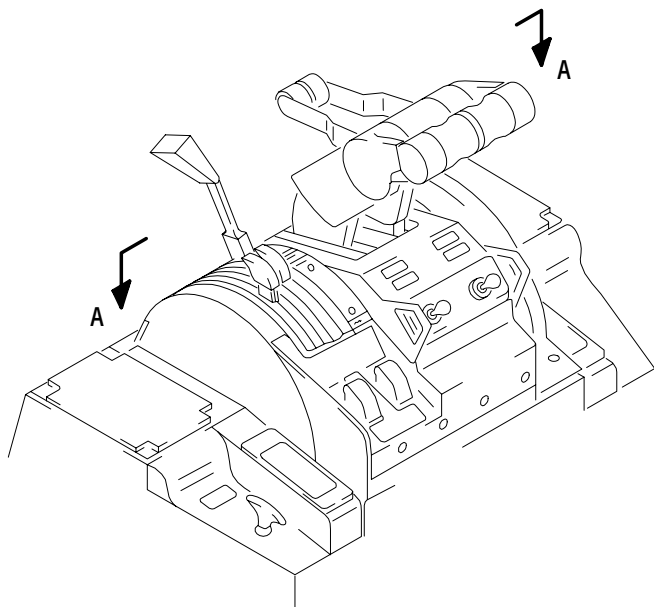
Control Stand Lightplate/Cover Seal Installation
Figure 402B (Sheet 2)

EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER TRIM
SWITCHES AND ALUMINUM THRUST LEVERS

76-11-10

N05

Page 410
Aug 10/95



Control Stand Lightplate/Cover Seal Clearances
Figure 403 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM CONTROL
LEVERS

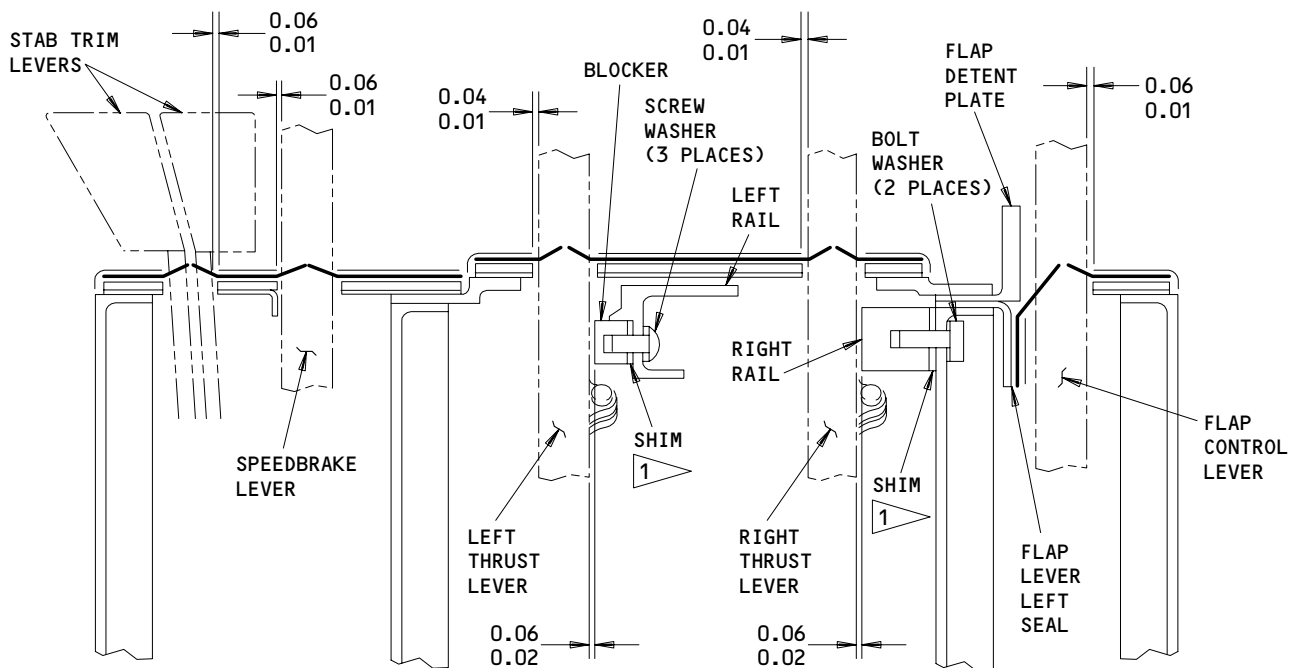
76-11-10

N06

Page 411
Aug 10/95

- (h) Remove the two screws and the center cover.
- (i) AIRPLANES WITH ALTERNATE STABILIZER TRIM CONTROL SWITCHES;
Do these steps to remove the alternate stabilizer trim control switch lightplate:
 - 1) Loosen the two captive screws on the lightplate.
 - 2) Lift the lightplate and disconnect it from the left cover seal.
 - 3) Put the lightplate to the side.
- (j) Remove the five screws and the left cover.
- (k) Remove the eight screws which attach the right cover seal and put the cover seal to the side.
- (l) AIRPLANES WITH STABILIZER TRIM CONTROL LEVERS;
Remove the five screws which attach the left cover seal and put the cover seal to the side.
- (m) AIRPLANES WITH ALTERNATE STABILIZER TRIM CONTROL SWITCHES;
Do these steps to remove the left cover seal.
 - 1) Remove the five screws which attach the left cover seal.
 - 2) Lift the left cover seal and disconnect the two quick-disconnect connectors.
 - 3) Put the cover seal to the side.

NOTE: You have sufficient access to remove the alternate stabilizer trim control switches (AMM 27-41-03/401) if it is necessary.



1 ONE COAT BMS 10-11 PRIMER, TYPE 1

ALL DIMENSIONS ARE IN INCHES

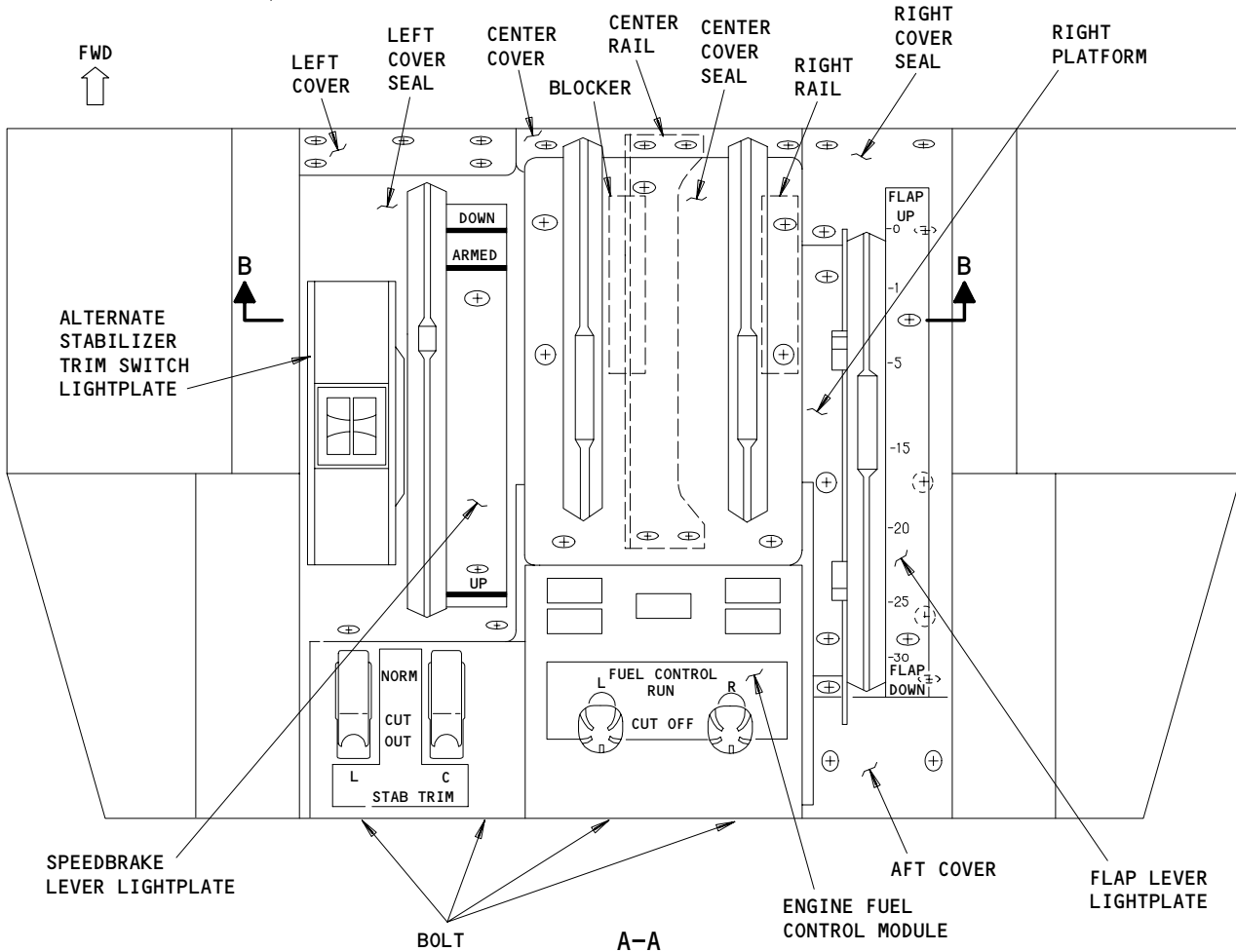
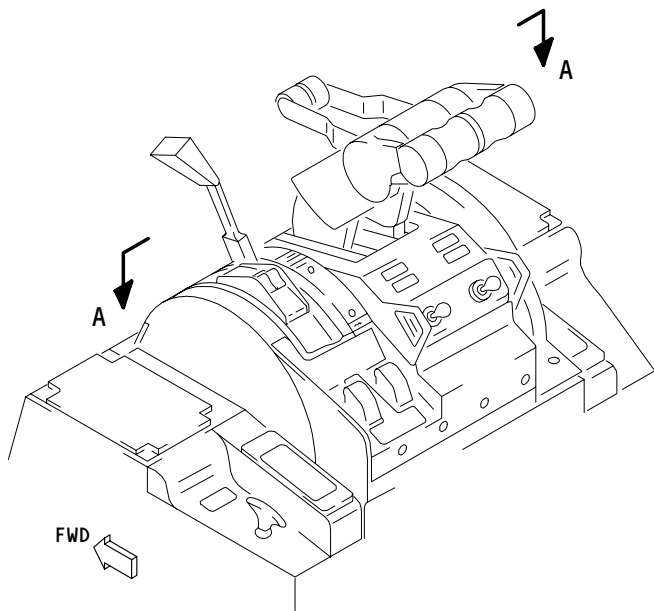
Control Stand Lightplate/Cover Seal Clearances
Figure 403 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH STABILIZER TRIM CONTROL
LEVERS

76-11-10

N04

Page 412
Apr 22/00



Control Stand Lightplate/Cover Seal Clearances
Figure 403A (Sheet 1)

EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER TRIM
CONTROL SWITCHES

76-11-10

N03

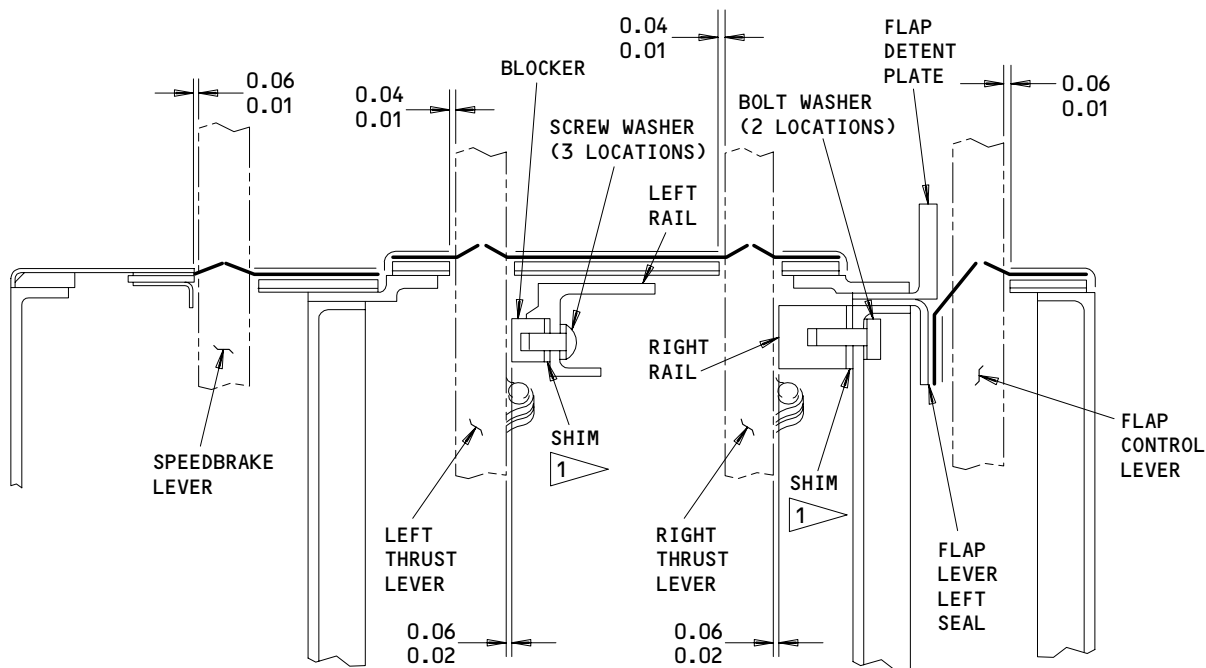
Page 413
Aug 10/95

- (n) Remove the two screws and the forward center cover.
- (o) Remove the three screws and the center cover seal.
- (p) Remove the three screws and the right platform.
- (q) Remove the one screw and the left platform.
- (r) Remove the four bolts and the center rail.

NOTE: You have sufficient access to remove the fuel control module (AMM 76-11-09/201) if it is necessary.

- (s) Remove the fuel control module (AMM 76-11-09/201).

NOTE: AIRPLANES WITH STABILIZER TRIM CONTROL LEVERS;
You have sufficient access to remove the stabilizer trim control levers (AMM 27-61-08/401) if it is necessary.



1 ONE COAT BMS 10-11 PRIMER, TYPE 1

B-B

NOTE: ALL DIMENSIONS ARE IN INCHES.

Control Stand Lightplate/Cover Seal Clearances
Figure 403A (Sheet 2)

EFFECTIVITY
AIRPLANES WITH ALTERNATE STABILIZER TRIM
CONTROL SWITCHES

76-11-10

N05

Page 414
Apr 22/00

A92462

(t) Remove the three screws, detent plate, and left seal below the detent plate for the flap lever.

NOTE: You have sufficient access to remove the flap control lever (AMM 27-51-25/401) if it is necessary.

(u) Remove the two bolts and the right rail.

NOTE: You have sufficient access to remove the thrust levers (AMM 76-11-01/401) if it is necessary.

TASK 76-11-10-404-007-N00

3. Install the Rails, Covers, and Seals on the Control Stand Levers

A. References

- (1) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (2) AMM 78-31-00/201, Thrust Reverser System

B. Access

- (1) Location Zone
210 Control Cabin

C. Procedure

S 424-008-N00

CAUTION: BE VERY CAREFUL WHEN YOU REMOVE AND TOUCH THE LIGHTPLATES AND THE CONTROL STAND COMPONENTS. DAMAGE TO THE LIGHTPLATES, SWITCHES, NUTPLATES, WIRE BUNDLES OR THE FINISH ON THE PARTS CAN OCCUR.

- (1) Install these components if they were removed:
 - (a) Install the right rail with two bolts and washers. Use shims to keep the correct clearance between the right thrust lever and the right rail (Fig. 403).
 - (b) Install the left seal and the detent plate for the flap lever with three screws.

EFFECTIVITY

ALL

76-11-10

N05

Page 415
Aug 22/00

(c) Install the fuel control module (AMM 76-11-09/201).

S 424-009-N00

- (2) Do these steps to install the rails, covers, and seals:
- (a) Install the center rail with four bolts. Use shims on the blocker to keep the correct clearance between the left thrust lever and the center rail blocker.
 - (b) Install the left platform with one screw (Fig. 402).
 - (c) Install the right platform with three screws.
 - (d) Install the center cover seal with three screws.
 - (e) AIRPLANES WITH STABILIZER TRIM CONTROL LEVERS;
Install the left cover seal with five screws.
 - (f) AIRPLANES WITH ALTERNATE STABILIZER TRIM CONTROL SWITCHES;
Do these steps to install the left cover seal.
 - 1) Put the left cover seal in position and connect the two quick-disconnect connectors.
 - 2) Install the left cover seal with five screws.
 - (g) Install the right cover seal with eight screws.
 - (h) Install the left cover with five screws.
 - (i) Install the forward center cover with two screws.

CAUTION: MANUALLY TIGHTEN THE SCREWS ON THE LIGHTPLATES. DAMAGE TO THE LIGHTPLATES CAN OCCUR IF YOU TIGHTEN THE SCREWS WITH POWER SCREWDRIVERS.

- (j) Carefully pull the loose wire for the speedbrake lightplate down through the left cover seal.
- (k) Install the speedbrake lightplate with two screws.
- (l) Carefully pull the loose wire for the flap lever lightplate down through the right cover seal.
- (m) Install the flap lever lightplate with two screws.
- (n) Install the aft cover with two screws.
- (o) AIRPLANES WITH ALTERNATE STABILIZER TRIM CONTROL SWITCHES;
Do these steps to install the lightplate for the alternate stabilizer trim control switches:
 - 1) Position the lightplate on the left cover seal. Make sure that the power connector on the lightplate is connected to the connector on the seal.

EFFECTIVITY

ALL

76-11-10

N04

Page 416
Apr 22/00

- 2) Tighten the captive screws to install the lightplate.
 - (p) Make sure the speedbrake, and flap levers move freely in the cover seals.
 - (q) AIRPLANES WITH STABILIZER TRIM CONTROL LEVERS;
Make sure the stabilizer trim control levers move freely in the cover seals.
 - (r) Move the loose wires from the stabilizer trim cutout switches lightplate and the fuel control lightplate to the burndy block.
 - (s) Safety the loose wires with wire ties if it is necessary.
 - (t) Install the access panels on the lower left side and the lower right side of the control stand (Fig. 401).
- D. Put the Airplane Back to Its Usual Condition

S 444-010-N00

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
 - (a) 6H15, CAPT SEAT
 - (b) 6J21, F/O SEAT

S 444-011-N00

- (2) Do the activation procedure for the thrust reverser (AMM 78-31-00/201).

S 444-012-N00

- (3) Do the activation procedure for the spoiler (AMM 27-61-00/201).

EFFECTIVITY

ALL

76-11-10

N04

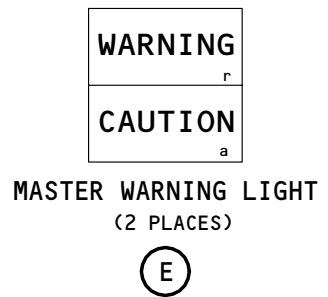
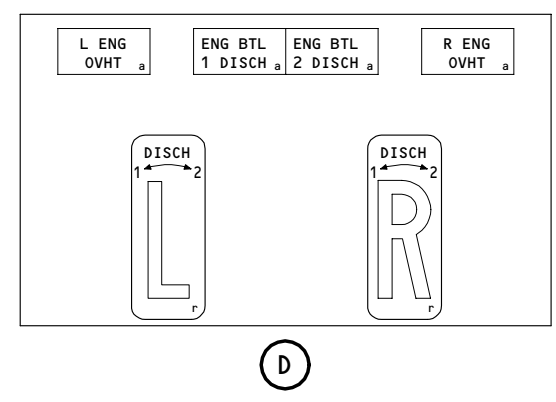
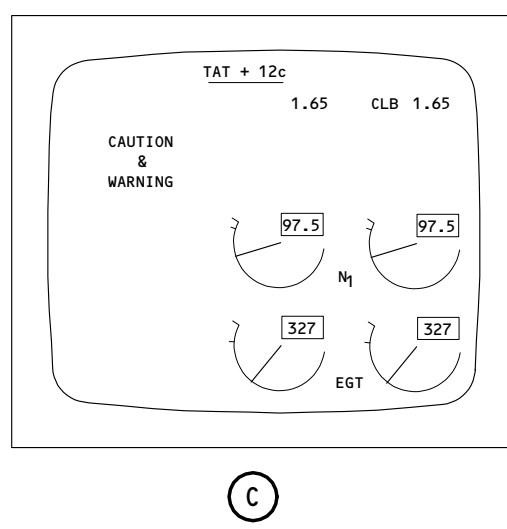
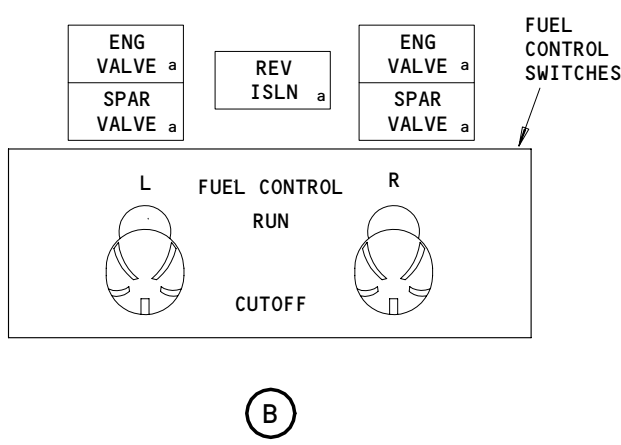
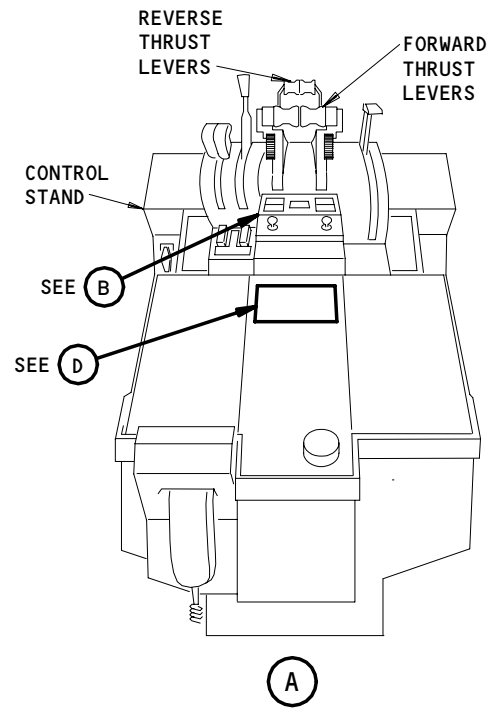
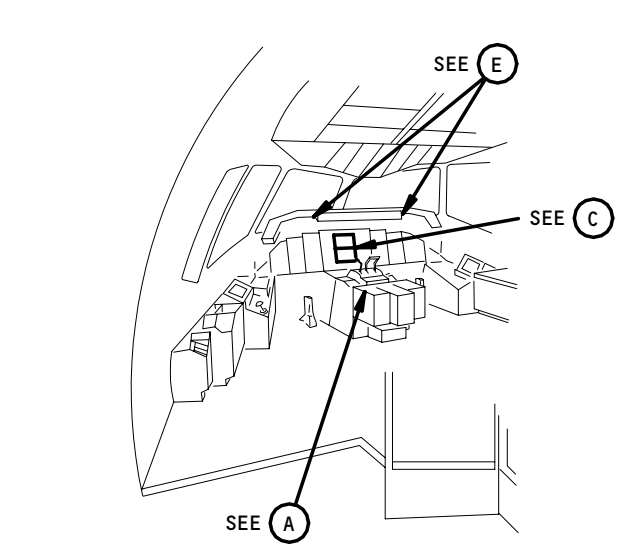
Page 417
Aug 22/00

ENGINE FIRE EMERGENCY SHUTDOWN – DESCRIPTION AND OPERATION

1. General
 - A. This section describes the fire emergency shutdown for the engine. For further information on engine controls see Engine Control System (AMM 76-11-00/001) which describes the thrust control system and the start control system.
2. Component Details (Fig. 1)
 - A. The fire emergency shutdown for the engine is controlled by the thrust lever, fuel control switch and the engine fire switches. The engine fire switches, thrust lever, and fuel control switch are located on the control stand.
 - B. The system for the fire emergency shutdown is part of the fire protection system for the airplane. For information on fire protection systems that affect the fire emergency shutdown for the engine refer to Engine Fire Detection (AMM 26-11-00/001) and Engine Fire Extinguishing (AMM 26-21-00/001).
 - C. An engine fire is indicated on Engine Indication and Crew Alerting System (EICAS) display, ringing of the fire warning bell, and illumination of the applicable fire switch, fuel control switch, and master warning lights.
3. Operation
 - A. Engine emergency shutdown is done by moving the thrust lever to idle position, fuel control switch to CUTOFF position, and pulling the applicable fire switch. Moving the thrust lever to idle position decelerates the engine while moving the fuel control switch to CUTOFF stops engine operation. Pulling the fire switch arms the engine fire extinguisher, silences the bell, depressurizes the hydraulic system and isolates the engine. Engine isolation de-energizes the generator control relay and closes the fuel, hydraulic fluid, and pneumatic valves. After engine isolation is accomplished, the fire switch is turned to the left or right to discharge the left or right extinguisher bottles.

EFFECTIVITY
ALL

76-21-00



Engine Fire Emergency Shutdown
Figure 1

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76-21-00

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