Section III

AFTERBURNER SYSTEMS

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AFTERBURNER

DESCRIPTION

3-1. AFTERBURNER.

The engine afterburner system is provided as a means of producing additional engine thrust during takeoff, climb, and maximum performance flight. Additional thrust is provided by the injection and ignition of fuel in the engine exhaust section. A variable, two position exhaust nozzle is provided at the aft end of the exhaust duct to increase the duct opening during afterburning operation. The afterburner assembly consists of the afterburner duct and the variable area, two position exhaust nozzle. The exhaust nozzle assembly is composed of iris shutters, operated by pneumatic actuating cylinders. The cylinders, which are mounted around the aft outer circumference of the afterburner duct, are actuated by N_2 compressor bleed air metered by the exhaust nozzle control valve. The nozzle control valve is actuated by high-pressure fuel from the afterburner fuel control. During normal engine operation, the cylinders hold the nozzle iris in the closed position. During afterburning operation, the cylinders automatically open the nozzle to permit the less restricted passage of afterburning gases.

3-2. EXHAUST NOZZLE ACTUATORS.

Twelve double acting exhaust nozzle actuating cylinders are installed around the engine afterburner duct to actuate the exhaust nozzle shutters. The shutters are installed on the aft end of the afterburner duct to increase or

decrease the exhaust nozzle aperture. The nozzle must be closed during nonafterburning to prevent loss of engine thrust. The nozzle must be open during afterburning to prevent excessive engine temperature and pressure. The actuating cylinders are air-actuated by N_2 compressor bleed air directed by the exhaust nozzle control valve.

OPERATIONAL CHECKOUT

3-3. OPERATIONAL CHECKOUT, AFTERBURNER SYSTEM.

Information in regard to checkout of the afterburner system is a part of the engine ground run procedure. Refer to Section I for this information.

3-4. OPERATIONAL CHECKOUT, EXHAUST NOZZLE.

3-5. Equipment Requirements.

FIGURE	NAME	TYPE	ALTERNATE	USE AND APPLICATION
	Pressure Gage, 0-100 psi.	(6685-526-8474)		To read specified air pressure values.
	Controlled Air Pressure Source, 0 to 100 psi.			Pressure to actuate exhaust nozzle.

3-6. Procedure.

a. Gain access to the exhaust nozzle control valve through the engine accessory compartment left access door.

b. Remove the exhaust nozzle control valve. Refer to paragraph 3-35 for this procedure.

c. Connect controlled air pressure to the nozzle open line (upper line) and apply air pressure of 8 psi maximum. Exhaust nozzle shall open freely to the fully open position. Reduce air pressure to zero and disconnect air line.

d. Connect controlled air pressure to the nozzle closed line (lower line) and apply air pressure of 12 psi maximum. Exhaust nozzle shall close freely to the fully closed position.

e. Increase controlled air pressure on nozzle closed line to 20 psi maximum. The closed inside diameter of the exhaust nozzle shall be 25.58 inches to 25.62 inches.

NOTE

If adjustment is needed, refer to paragraph 3-11.

f. Connect increased controlled air pressure source of 90 to 100 psi maximum alternately to the open and closed lines. Open and closing action shall occur rapidly (less than one second). Reduce air pressure to zero.

g. Remove air pressure source and reinstall exhaust nozzle control. Conduct operation checkout of the engine afterburning system. Refer to paragraph 1-23 for this procedure.

SYSTEM ANALYSIS

3-7. SYSTEM ANALYSIS, AFTERBURNER.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
EXHAUST NOZZLE OPENS BUT AFTERBURNER DOES NOT IGNITE.		
Binding servo valve in igniter valve.	Remove igniter valve for bench check.	Install replacement item.

3-7. SYSTEM ANALYSIS, AFTERBURNER (CONT).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
EXHAUST NOZZLE OPENS BUT AFTERBURNER DOES NOT IGNITE (CONT).		
Igniter fuel discharge nozzle restricted.	Remove discharge nozzle.	Install replacement item.
Loose connections at igniter valve.		Check all tubing attachments at valve.
NOZZLE FAILS TO OPEN AFTER AFTERBURNER IGNITION.		
Exhaust nozzle control relay valve binding.	Remove valve for bench check.	Install replacement item.
Air supply line to nozzle control valve loose.		Tighten all nozzle control air lines.
Excessive drag in nozzle actuators and linkage.	Operate nozzle by manually opening and closing.	Check components for proper adjustment and cleanliness.
EXHAUST NOZZLE OPENS DURING NON-AFTERBURNING.		
Signal pressure leakage in nozzle control valve.	Remove control valve for bench check.	Install replacement item.
Failure of main stage of fuel pump.	Remove fuel pump for bench test.	Install replacement item.
Low burner pressure signal.	Check burner pressure line for damage and loose connections.	

REPLACEMENT

3-8. REPLACEMENT, AFTERBURNER.

For afterburner replacement procedure, see figure 3-1.

3-9. REMOVAL, EXHAUST NOZZLE ACTUATING CYLINDERS.

a. Remove engine from airplane. Refer to Section I for this procedure.

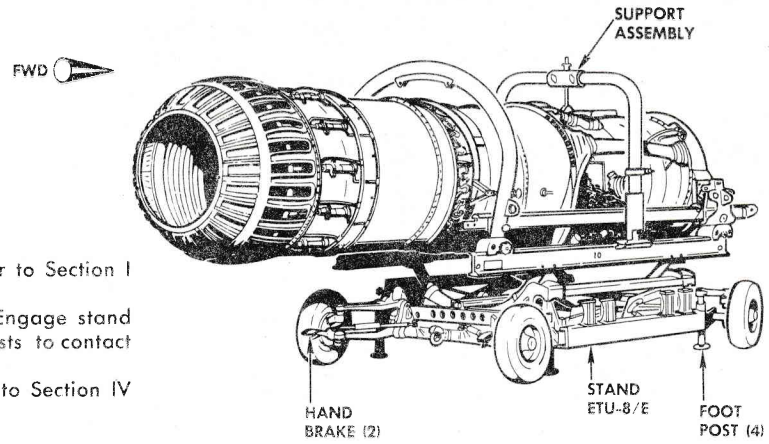
b. Remove shroud from engine. Refer to Section IV for this procedure.

c. Disconnect lines attached to the cylinders being removed. Cover lines and openings with plugs or polyethylene sheet.

d. Remove attachment bolts; remove cylinders.

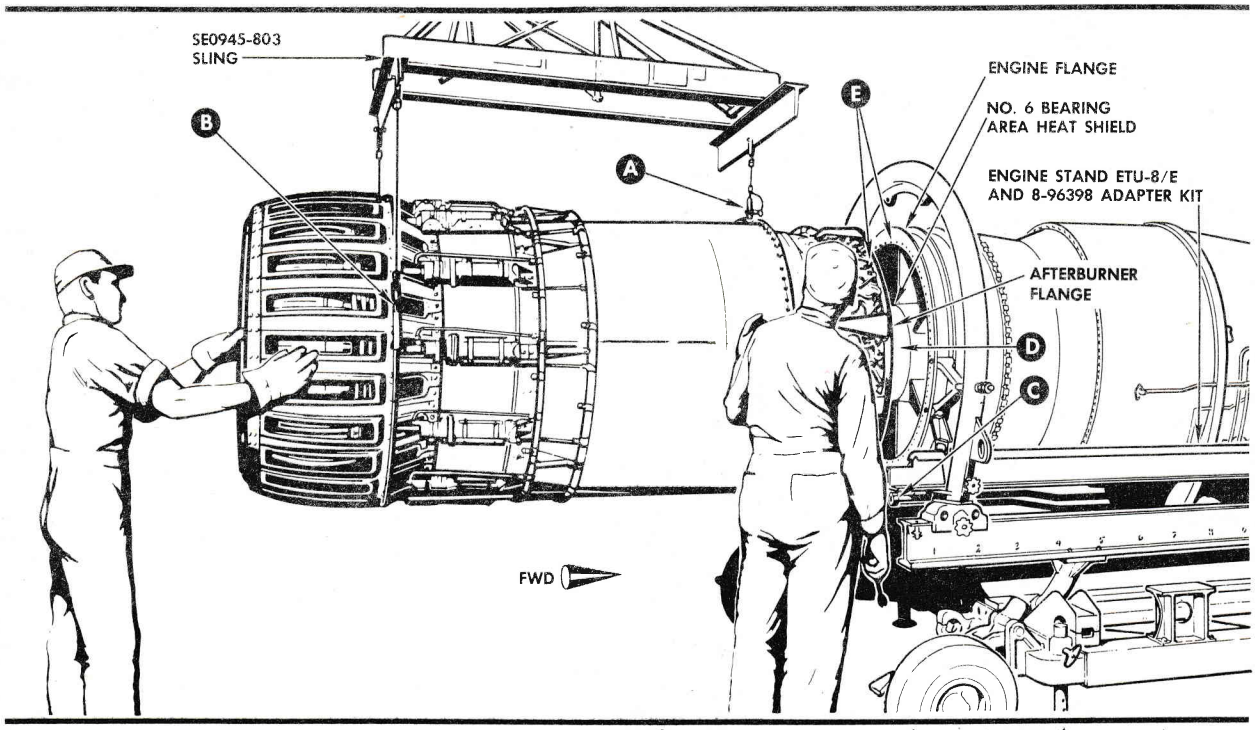
e. Remove the following parts and retain for installation on new cylinders.

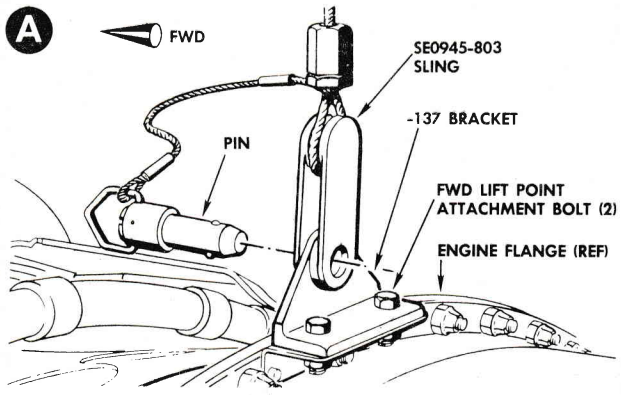
1. Remove the air supply tube from the cylinder.
2. Remove the cylinder air transfer bolt and the front mounting bracket from the cylinder.
3. Unfasten the two clamps and remove the heat-shield from the cylinder.



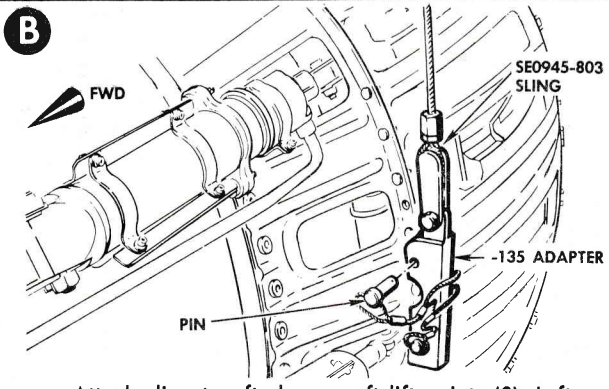
REMOVAL

a. Remove engine from airplane. Refer to Section I for engine replacement procedure.
b. Move engine away from airplane. Engage stand brakes and position stand foot posts to contact ground.
c. Remove shroud from engine. Refer to Section IV for shroud replacement procedure.





d. Using SE 0945-803 Sling, suspended from hoist, attach to afterburner forward lift point.



e. Attach sling to afterburner aft lift points (2). Left attachment shown; right attachment opposite. Remove slack from hoist cables.

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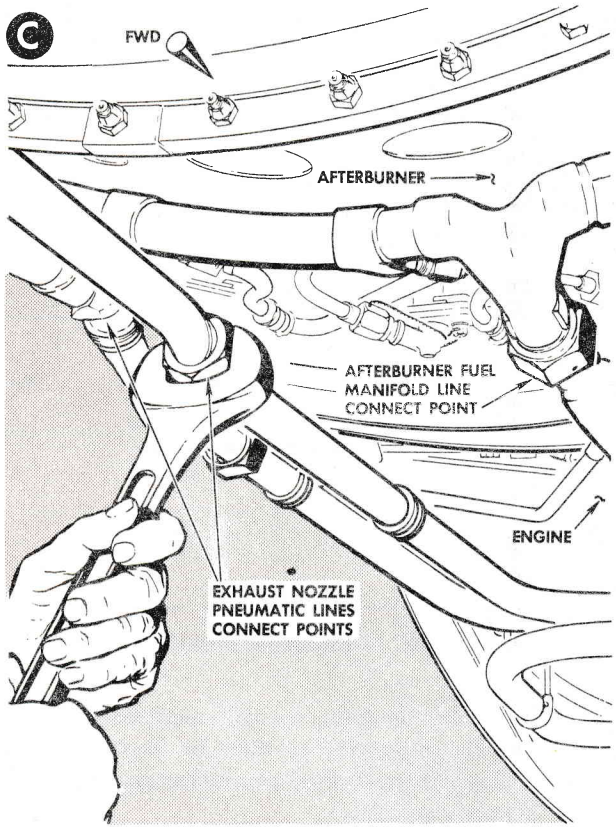
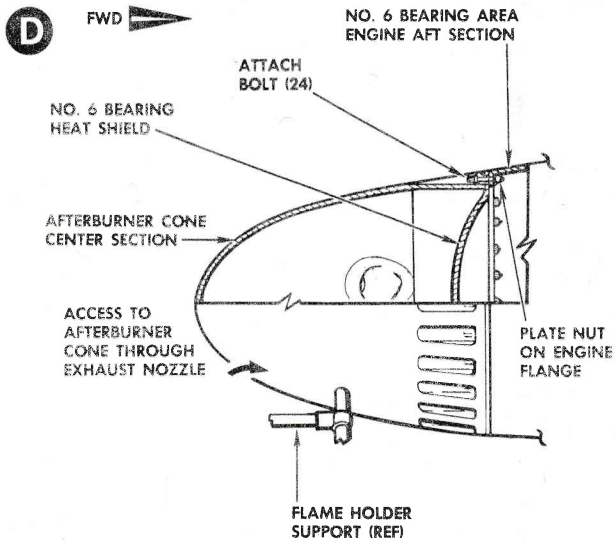
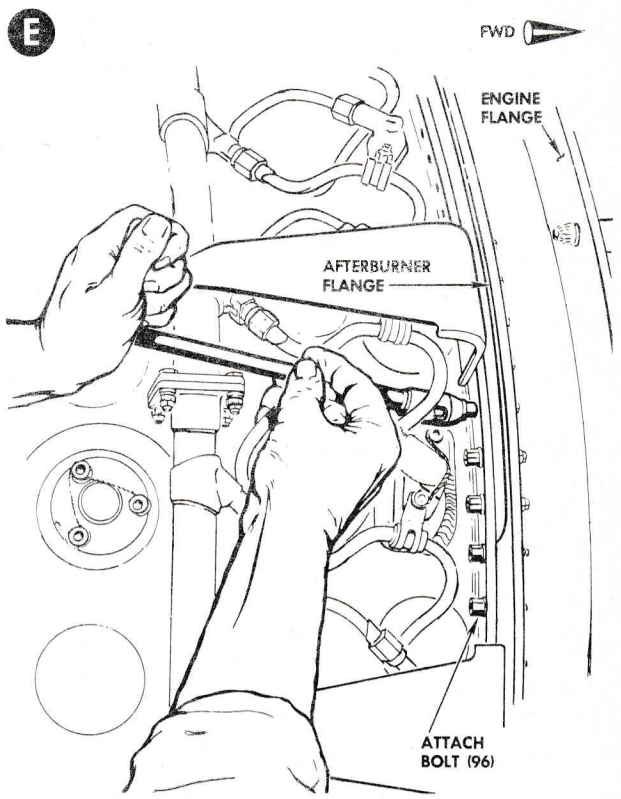
Figure 3-1. Replacement, Afterburner (Sheet 1 of 2)



f. Disconnect afterburner fuel manifold line and exhaust nozzle pneumatic lines (2).



g. Crawl into afterburner and remove the attachment bolts (24) securing the afterburner cone to the engine No. 6 bearing housing.



h. Remove the attachment bolts (96) securing afterburner to engine flange L.

i. Pull afterburner carefully away from aft end of engine.

INSTALLATION

a. Installation of the afterburner is essentially the reverse of the removal procedure.

b. Position heatshield on aft end of No. 6 bearing housing before positioning afterburner on aft end of engine.

c. Apply anti-seize compound, Ease-Off No. 990, to threads of afterburner cone attachment bolts (24) and afterburner outer flange attachment bolts (96). Torque all bolts 125 to 175 inch-pounds.

d. Safety-wire the afterburner fuel manifold and pneumatic line nuts.

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Figure 3-1. Replacement, Afterburner (Sheet 2 of 2)

4. Remove the cotterpin, spherical ball rod end, and ball rod end spacer from the rear end of the actuating rod.

3-10. INSTALLATION, EXHAUST NOZZLE ACTUATING CYLINDERS.

a. Position the adjusting spacer over the bushing projecting from the cylinder actuating rod. The tang on the bushing will fit into the slot in the spacer.

b. Insert the spherical ball rod through the spacer and thread into the actuating rod bushing.

c. Rotate the spherical ball rod to set the tang on the bushing to the dimension shown in figure 3-2.

d. Install the actuating cylinder heatshield with the thin tapered end toward the forward end of the cylinder. Secure the heatshield with two clamps, four bolts and locknuts.

e. Position the front mounting bracket on the cylinder and install the air transfer bolt through the mounting bracket and cylinder.

f. Install the air supply tube on the cylinder.

g. Position the actuating cylinder on the rear duct and finger tighten the air supply tube connectors and the front bracket securing bolts.

h. Position the nozzle assembly in the closed position, then secure the piston rod end to the nozzle actuating support with the nut, bolt and two tab washers. Bend tab washers over hex flats.

NOTE

The cylinder and the air supply tubes shall align with their mating connections with no evidence of cocking of the cylinder or air tube. If mis-alignment is evident, all of the cylinder mounting brackets, the air manifold brackets, and the support clips must be loosened. This will permit a limited repositioning of the air supply manifold.

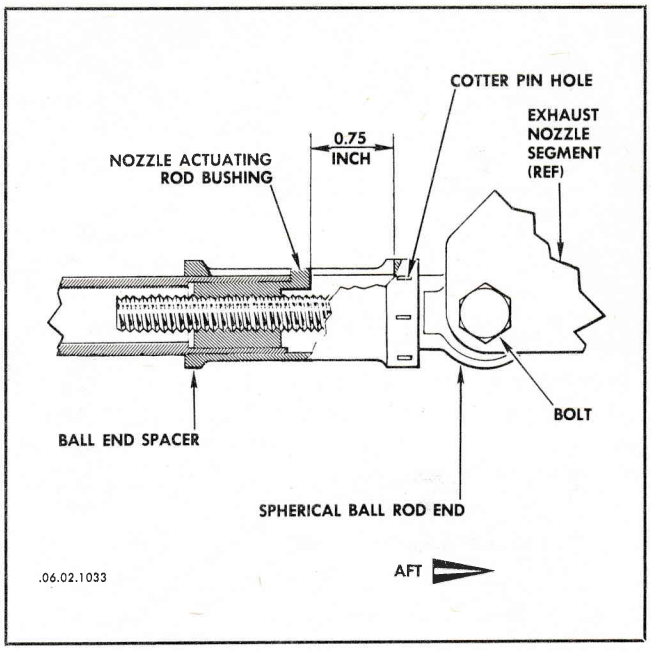


Figure 3-2. Afterburner Nozzle Adjustment

i. When alignment has been accomplished, tighten and lockwire the air supply tube connectors and front bracket securing bolts. Tighten all other bracket bolts and clips previously loosened.

j. Conduct exhaust nozzle operational checkout. Refer to paragraph 3-4 for procedure.

k. Conduct operational checkout of the afterburner system. Refer to paragraph 3-3 for procedure.

ADJUSTMENT

3-11. ADJUSTMENT, EXHAUST NOZZLE LINKAGE.

a. Remove engine from airplane. Refer to Section I for this procedure.

b. Remove shroud from engine. Refer to Section IV for this procedure.

c. Remove cotter pins from each actuator piston rod end.

d. Turn each piston rod end bushing forward or backward an equal number of turns as required to obtain correct nozzle diameter. Refer to paragraph 3-6 for nozzle diameter requirements.

e. Install rod end cotter pins.

NOTE

The slot in each rod end bushing must be facing outward after completion of adjustment.

f. Install engine shroud. Install engine in fuselage.

g. Perform an afterburner system operational checkout. Refer to Section I for these procedures.

SERVICING

3-12. SERVICING, AFTERBURNER.

No servicing of the afterburner is required other than checking to see that all parts of the exhaust nozzle are free of lubricants and accumulations of foreign materials.

3-13. AFTERBURNER INNER DIAMETER CHECK.

At specified intervals, it will be necessary to check the inner diameter of the afterburner from the afterburner fuel nozzles aft for possible deformation. This is necessary to prevent possible malfunction and failure of the afterburner. Check the afterburner inner area as follows:

a. Smooth section of afterburner liner.

1. Out-of-roundness shall not exceed 0.375 inch with no flat spots exceeding 0.375 inch penetration into gas path.

NOTE

Measurement for depth of protrusion may be made by using a steel tape. Measure the liner inner diameter at a protrusion free area adjacent to the protrusion being checked; measure diameter at the point of greatest protrusion. Subtract the second measurement from the first to get the protrusion depth.

2. Cracks occurring in this area may be repaired by Heliarc welding providing the cracks do not exceed 7 inches in length and are at least 2 inches apart. No stress relief required.

b. Corrugated section of afterburner liner.

1. One flat spot with 10 inches maximum circumferential and/or 14 inches maximum axial lengths, with the center of the flat spot not to extend into the gas path more than 0.300 inch from the normal position. If two flat spots are present, each must not exceed two thirds of the above limits.

2. Cracks occurring in this area may be repaired by Heliarc welding providing the cracks do not exceed 7 inches in length and are at least 2 inches apart.

3. Cracks in the flange progressing from the bolt holes outward are acceptable and need not be welded.

c. Any condition found that exceeds the limits given in steps "a" and "b," will require replacement of the afterburner.

AFTERBURNER FUEL SYSTEM

DESCRIPTION

3-14. AFTERBURNER FUEL CONTROL SYSTEM.

Afterburner fuel supply, provided by the engine fuel pump, is normally controlled by a switch installed in the cockpit throttle quadrant. The switch is actuated by moving the throttle lever outboard to the "AFTERBURNING" section of the throttle quadrant. This action electrically opens valves in the afterburner fuel control which permits fuel to flow into the afterburner fuel control. Signal fuel pressures issue from the fuel control causing the exhaust nozzle control and the afterburner igniter valve to function. At the same time metered fuel is being routed from the afterburner fuel control to the afterburner duct fuel discharge nozzles to complete the afterburning start cycle. Normal termination of afterburning is accomplished by moving the throttle lever out of the "AFTERBURNING" section of the throttle quadrant. The afterburner fuel control valves then close and terminate fuel flow into the afterburning system. Field adjustment of the afterburner fuel system components shall not be attempted. The units must be set with use of proper flow bench facilities. For a schematic illustration of the afterburner fuel system, see figure 3-3.

3-15. AFTERBURNER EMERGENCY CONTROL.

No provisions are made for emergency starting of the afterburner operation; however, emergency provisions are made for cutting off afterburning in case of electrical system failure. In case of normal electrical control system malfunction, retarding the throttle lever below military power position will terminate afterburning. After termination of afterburning in this manner, forward movement of the throttle lever will not reinstate afterburning. The cause of afterburner control system electrical malfunction must be corrected before the afterburner system

can again be used. During normal afterburner operation, a sudden noticeable decrease in afterburner thrust indicates that the main stage of the engine fuel pump has become inoperative. During this condition the two afterburner stages of the pump are supplying both the main and afterburner fuel systems. Engine operation should be terminated and the malfunction corrected.

3-16. ENGINE IDLE THRUST CONTROL SYSTEM.

Applicable to F-106A airplanes 56-453, -454, 56-456 thru 57-245, 58-759 and subsequent; and 57-246, 57-2453 thru 57-2506 after incorporation of TCTO 1F-106-557. Applicable to F-106B airplanes 57-2508 thru 57-2515, 57-2532 and subsequent; and 57-2516 thru 57-2531 after incorporation of TCTO 1F-106-557. The engine idle thrust control system is provided to reduce engine thrust during airplane taxiing operations. The system is electrically controlled and pneumatically actuated. Actuation of the switch on the cockpit left console panel to the "ON" position opens the exhaust nozzle and results in approximately 40% reduction in engine idle thrust. This reduced thrust permits reduced taxi speed and landing gear brake wear. The idle thrust control circuit is routed through the left main landing gear safety switch to provide thrust reduction on the ground only. The pneumatic portion of the system consists of a selector valve and a converter valve installed on the engine. These valves route N_2 compressor bleed air, as an actuating signal, to the exhaust nozzle control valve, which ports air pressure to the exhaust nozzle actuating cylinders. See figure 3-2 for a schematic illustration of this system.

3-17. EXHAUST NOZZLE CONTROL VALVE.

The exhaust nozzle control installed on the lower left side of the engine, is a two position pneumatic valve that is actuated by fuel pressure. At the time of afterburner actuation, high-pressure fuel from the afterburner fuel control positions the nozzle control valve to the "open" position which in turn routes N_2 compressor air to the exhaust nozzle actuators. Termination of afterburning removes the fuel pressure and permits the nozzle control valve to reposition. N_2 compressor bleed air is then routed to "closed" side of the exhaust nozzle actuators. The exhaust nozzle then returns to the closed position.

3-18. AFTERBURNER FUEL CONTROL UNIT.

The afterburner fuel control unit is an electrically actuated hydromechanical unit installed on the right side of the engine accessory section. The control unit meters afterburner fuel during afterburner operation. Operation of the control unit is initiated by an electrical actuator that moves a pilot valve. This action permits a high-pressure fuel signal to hydraulically position a second valve that permits high pressure fuel to close the control unit unloading valve. Metered fuel is then routed into the afterburner fuel manifold system. Actuation of the fuel control also provides fuel pressure to the afterburner igniter valve for actuation of afterburner ignition. Mechanical control provisions are incorporated within the control unit to allow termination of afterburning in the event of electrical actuator control malfunction. The mechanical control is linked to the pilot's throttle. Retarding the throttle lever will terminate afterburning. Afterburning cannot be reinitiated until the electrical malfunction has been corrected.

3-19. AFTERBURNER IGNITER VALVE.

The afterburner igniter valve, installed on the right side of the engine, is a hot streak igniter which injects a predetermined quantity of fuel into number three combustion chamber. This provides a momentary stream of burning fuel through the engine turbine section to ignite afterburner fuel. Fuel pressure from the afterburner fuel manifold initiates the igniter operating cycle, while engine compressor pressure motivates the igniter control piston. The resulting piston action supplies the spurt of fuel under pressure to the number three combustion chamber.

3-20. AFTERBURNER FUEL NOZZLES.

The afterburner front duct is equipped with 24 equally spaced fuel nozzles. Each nozzle is bolted to the duct outer surface with the tube portion of the nozzle projecting into the duct to the number six turbine bearing fairing. The nozzles are connected to a common manifold that encircles the front duct. Fuel is routed from the afterburner fuel control, through the manifold to the nozzles. Fuel is discharged into the afterburner duct through small holes drilled in each nozzle tube.

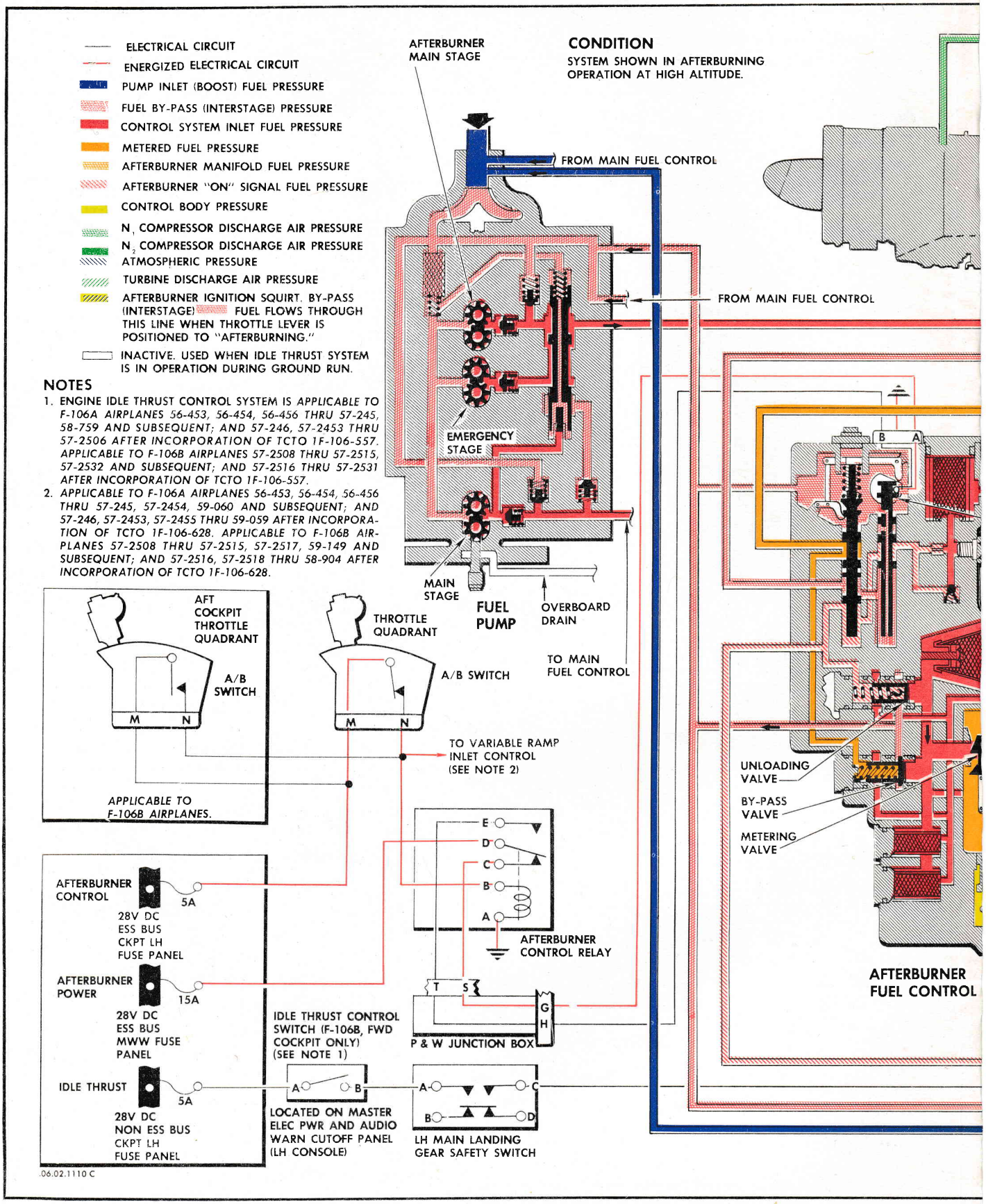
OPERATIONAL CHECKOUT

3-21. OPERATIONAL CHECKOUT, AFTERBURNER.

For afterburner operational check and engine run procedure, refer to Section I.

3-22. OPERATIONAL CHECKOUT, IDLE THRUST CONTROL.

For operational checkout of the idle thrust control system, refer to the engine ground run procedure in Section I.



NOTES

1. ENGINE IDLE THRUST CONTROL SYSTEM IS *APPLICABLE TO F-106A AIRPLANES 56-453, 56-454, 56-456 THRU 57-245, 58-759 AND SUBSEQUENT; AND 57-246, 57-2453 THRU 57-2506 AFTER INCORPORATION OF TCTO 1F-106-557. APPLICABLE TO F-106B AIRPLANES 57-2508 THRU 57-2515, 57-2532 AND SUBSEQUENT; AND 57-2516 THRU 57-2531 AFTER INCORPORATION OF TCTO 1F-106-557.*
2. *APPLICABLE TO F-106A AIRPLANES 56-453, 56-454, 56-456 THRU 57-245, 57-2454, 59-060 AND SUBSEQUENT; AND 57-246, 57-2453, 57-2455 THRU 59-059 AFTER INCORPORATION OF TCTO 1F-106-628. APPLICABLE TO F-106B AIRPLANES 57-2508 THRU 57-2515, 57-2517, 59-149 AND SUBSEQUENT; AND 57-2516, 57-2518 THRU 58-904 AFTER INCORPORATION OF TCTO 1F-106-628.*

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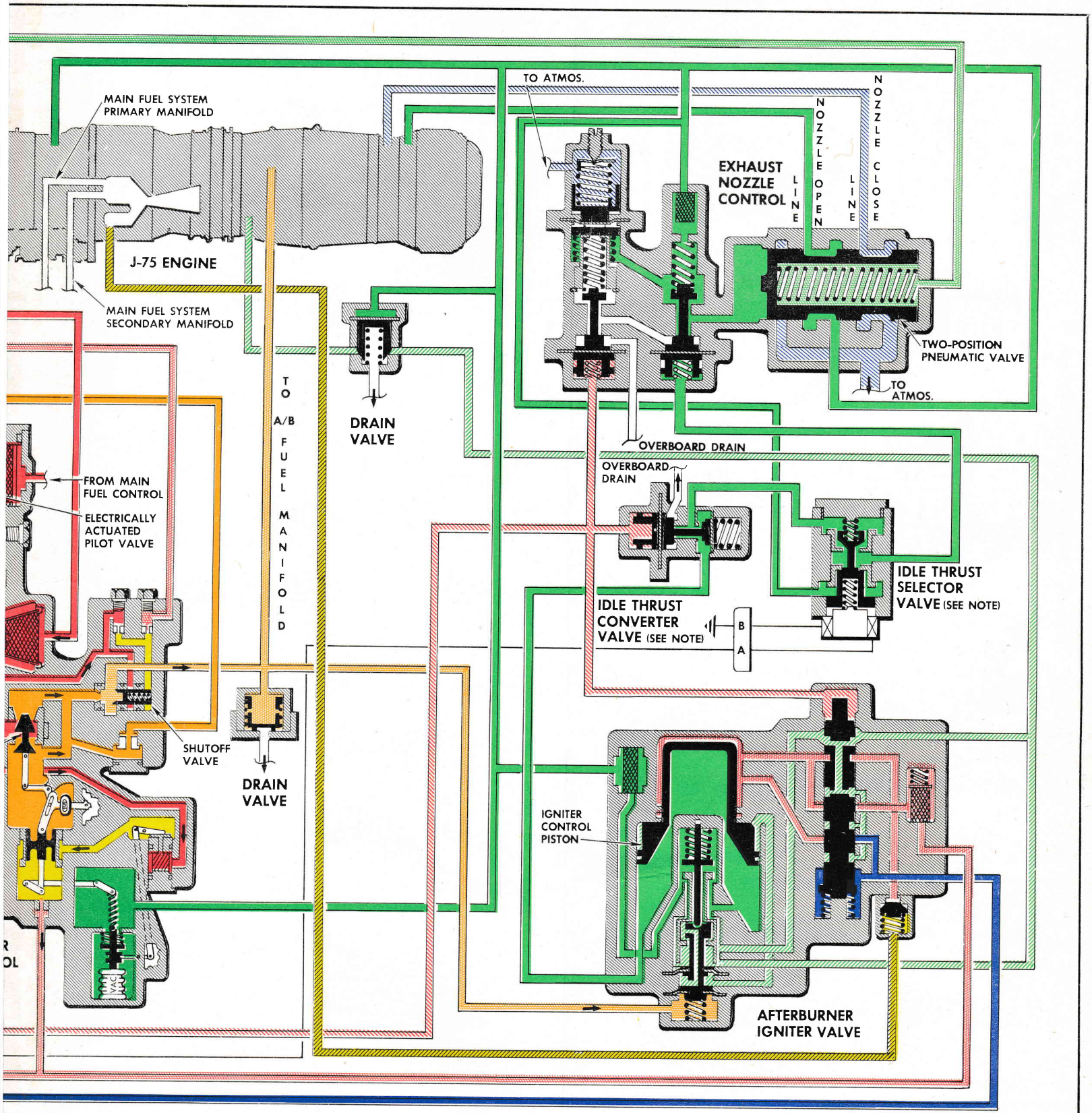


Figure 3-3. Engine Afterburner Fuel System Schematic

3-23. CIRCUIT TEST PROCEDURE, AFTERBURNER CONTROL.

3-24. Equipment Requirements.

FIGURE	NAME	TYPE	ALTERNATE	USE AND APPLICATION
Refer to T.O. 1F-106A-2-10.	Test Light, 28-volt dc (2).			To test circuit continuity.
	Generator Set (Gas).	8-96026-801 AF/M32A-13 (6115-583-9365)	8-96026 AF/M32M-2 (6115-617-1417)	To energize electrical systems on aircraft equipped with special quick disconnect receptacle.
	Generator Set (Elec).	8-96025-803 AF-ECU-10/M (6125-583-3225)	8-96025-805 A/M24M-2 (6125-628-3566)	
			8-96025 AF/M24M-1 (6125-620-6468)	
	Generator Set.		MC-1 (6125-500-1190)	To energize electrical systems (except AWCIS) on aircraft equipped with standard AN receptacle and on others by using adapter cable 8-96052.
			MD-3 (6115-635-5595)	
	Adapter Cable.	8-96052 (6115-557-8548)		To connect MC-1 and MD-3 units to aircraft equipped with special quick disconnect receptacle.

3-25. Procedure.

a. Disconnect electrical plug from P&W engine junction box. Place throttle lever in off position.

b. Connect 28-volt dc test lights between plug pins as follows:

1. Pin T and structure.
2. Pin S and structure.

c. Check that afterburner fuses are installed as follows:

Afterburner Control Fuse *All F-106B airplanes.*	Nose wheel well fuse panel.
Afterburner Control Fuse *All F-106A airplanes.*	Cockpit left fuse panel.
Afterburner Power Fuse	Main wheel well fuse panel.

d. Connect 28-volt dc power to airplane external power receptacle.

e. Move throttle to full forward position. Test lights shall be as follows:

1. Light at pin T — Illuminated.
2. Light at pin S — Extinguished.

f. Move throttle lever to "AFTERBURNING." Test lights shall be as follows:

1. Light at pin T — Extinguished.
2. Light at pin S — Illuminated.

Lights shall remain in this condition throughout full "AFTERBURNER" range.

g. Move throttle lever to "OFF." Test lights shall be as follows:

1. Light at pin T — Illuminated.
2. Light at pin S — Extinguished.

h. For F-106B airplanes, repeat step "e" through "g" using aft cockpit throttle.

i. Remove electrical power and test lights. Install electrical plug to engine junction box.

3-26. CIRCUIT TEST PROCEDURE, ENGINE IDLE THRUST CONTROL.

3-27. Equipment Requirements.

FIGURE	NAME	TYPE	ALTERNATE	USE AND APPLICATION
Refer to T.O. 1F-106A-2-10	Generator Set (Gas).	8-96026-801 AF/M32A-13 (6115-583-9365)	8-96026 AF/M32M-2 (6115-617-1417)	To energize electrical systems on aircraft equipped with special quick disconnect receptacle.
	Generator Set (Elec).	8-96025-803 AF/ECU-10/M (6125-583-3225)	8-96025-805 A/M24M-2 (6125-628-3566)	
			8-96025 AF/M24M-1 (6125-620-6468)	
	Generator Set.		MC-1 (6125-500-1190)	To energize electrical systems (except AWCIS) on aircraft equipped with standard AN receptacle and on others by using adapter cable 8-96052.
			MD-3 (6115-635-5595)	
	Adapter Cable.	8-96052 (6115-557-8548)		To connect MC-1 and MD-3 units to aircraft equipped with special quick disconnect receptacle.
	Multimeter.	AN/PSM-6 (6625-643-1686)	Equivalent	To measure voltage and resistance.

3-28. Procedure.

a. Gain access to engine electrical disconnects at upper right side of engine.

b. Connect external power to airplane.

c. Disconnect Convair engine electrical disconnect plug.

d. Install engine idle thrust fuse in cockpit left fuse panel.

e. Actuate cockpit "IDLE THRUST CONT" switch to "ON."

f. Check for 28-volts dc between plug pins H and L.

g. Check for 13 to 15 ohms resistance between pins H and L of plug.

h. Position cockpit switch to "OFF."

i. Reconnect electrical plug; remove electrical power from airplane.

SYSTEM ANALYSIS

3-29. SYSTEM ANALYSIS, AFTERBURNER FUEL SYSTEM.

For information in regard to troubleshooting of the afterburner fuel system, refer to paragraph 3-7.

REPLACEMENT

3-30. AFTERBURNER FUEL SYSTEM SAFETY PRECAUTIONS.

During replacement of the afterburner fuel system components, it will be necessary to disconnect fuel lines. The following precautions must be taken at all times:

a. Provide fuel drainage receptacles and suitable fire extinguishers.

b. Check that the airplane is properly grounded and parked in an area to provide adequate ventilation.

c. Remove all equipment from the work area vicinity that might cause sparks.

d. Remove electrical power from the airplane before disconnecting fuel lines.

WARNING

Wear suitable plastic gloves and coveralls and avoid prolonged skin contact with JP-4 fuel, Military Specification MIL-J-5624. Do not breathe an excess amount of fuel fumes.

After completion of afterburner fuel system component replacement, it will be necessary to conduct an operational checkout of the engine. Refer to Operational Checkout in Section I.

3-31. REMOVAL, AFTERBURNER FUEL CONTROL UNIT.

a. Observe safety precautions outlined in paragraph 3-30 during removal of the afterburner fuel control.

b. Gain access to the afterburner fuel control through the engine accessory compartment access doors.

c. Provide drainage receptacles before disconnecting lines.

d. Remove lines and electrical connector attached to the fuel control. Cover openings with plugs or polyethylene sheet. Note location of clips and brackets to aid reinstallation.

NOTE

When removing the fuel pump-to-afterburner fuel control (discharge) tube, remove the 3 nuts from the elbow mounted on the fuel pump and the 4 allen screws from the elbow mounted on the fuel control and lift off the tube and elbows.

When removing the fuel pump-to-afterburner fuel control (by-pass) tube remove the screws securing the tube elbow to the afterburner fuel control; then pull tube from the elbow mounted on the fuel pump.

e. Remove nuts (2) at the slotted bracket on the bottom of the fuel control; remove control. Discard old seals.

3-32. INSTALLATION, AFTERBURNER FUEL CONTROL.

a. Install the afterburner fuel control in essentially the reverse of the removal procedure.

b. Use new seals.

c. Conduct afterburner system operational checkout. Refer to engine run operation in Section I.

3-33. REMOVAL, AFTERBURNER IGNITER VALVE.

a. Gain access to the afterburner igniter valve through the engine accessory compartment access doors.

b. Observe safety precautions listed in paragraph 3-30.

c. Provide receptacle for fuel drainage and remove engine fuel inlet filter if installed.

d. Remove lines attached to igniter. Cover lines and openings using plugs or polyethylene sheet. Note location of clips for reinstallation.

e. Remove igniter valve.

3-34. INSTALLATION, AFTERBURNER IGNITER VALVE.

a. Install the afterburner igniter valve in essentially the reverse of the removal procedure.

NOTE

Five different types of igniter valves are used on J75 engines. These igniter valves are listed below and are to be used for replacement only within the groups designated.

IGNITER PART NO.	GROUP	REMARKS
306100 371178	1	Igniter valves may be interchanged within Group 1 only.
353178 377597	2	Igniter valves may be interchanged within Group 2 only.
388610	3	May be used to replace Group 2 igniter valves.

b. Conduct afterburner system operational checkout. Refer to engine run operation in Section I.

3-35. REMOVAL, EXHAUST NOZZLE CONTROL VALVE.

a. Observe safety precautions outlined in paragraph 3-30 during removal of the exhaust nozzle control valve.

b. Gain access to the exhaust nozzle control valve through the engine accessory compartment access doors.

c. Provide a drainage receptacle prior to disconnecting lines.

d. Disconnect lines attached to control valve. Cover openings with plugs or polyethylene sheet.

e. Remove control attachment bolts (4); remove control. Discard old seals.

3-36. INSTALLATION, EXHAUST NOZZLE CONTROL VALVE.

a. Install the exhaust nozzle control valve in essentially the reverse of the removal procedure.

b. Use new seals.

c. Conduct afterburner system operational checkout. Refer to engine run procedure in Section I.

3-37. REMOVAL, EXHAUST NOZZLE CONTROL SELECTOR VALVE.

a. Gain access to exhaust nozzle control selector valve through the engine accessory compartment access doors.

b. Accomplish requirements of paragraph 3-30.

c. Disconnect tubes and electrical connection attached to selector valve.

d. Remove the valve attachments bolts (2); remove valve.

3-38. INSTALLATION, EXHAUST NOZZLE CONTROL SELECTOR VALVE.

a. Installation of exhaust nozzle control selector valve is essentially the reverse of the removal procedure.

b. Conduct idle thrust control operational checkout. Refer to engine run procedure in Section I.

3-39. REMOVAL, EXHAUST NOZZLE CONTROL CONVERTER VALVE.

a. Gain access to exhaust nozzle control converter valve through the engine accessory compartment access doors.

b. Accomplish requirements of paragraph 3-30.

c. Disconnect tubes attached to converter valve.

d. Remove the valve attachment nuts (2); remove valve.

3-40. INSTALLATION, EXHAUST NOZZLE CONTROL CONVERTER VALVE.

a. Installation of the exhaust nozzle control converter valve is essentially the reverse of the removal procedure.

b. Conduct idle thrust control operational checkout. Refer to engine run procedure in Section I.

3-41. REPLACEMENT, EXHAUST NOZZLE ACTUATING CYLINDERS.

For replacement of the exhaust nozzle actuating cylinders refer to paragraph 3-9.

SERVICING

3-42. SERVICING, AFTERBURNER FUEL SYSTEM.

The afterburner fuel system will not require special servicing other than cleaning of the fuel filters at specified intervals.

3-43. CLEANING, AFTERBURNER FUEL CONTROL INLET SCREEN.

For the afterburner fuel control inlet screen cleaning procedures, see figure 3-4.

3-44. CLEANING, AFTERBURNER FUEL BYPASS SCREEN.

For the afterburner fuel control fuel bypass screen cleaning procedures, see figure 3-4.

3-45. CLEANING, AFTERBURNER IGNITER VALVE FUEL SCREEN.

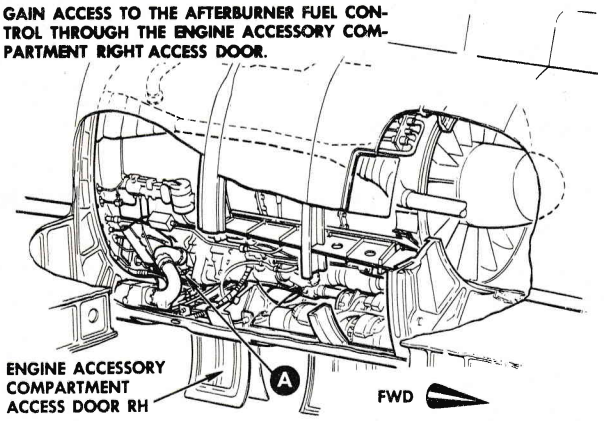
For the afterburner igniter valve fuel screen cleaning procedures, see figure 3-5.

3-46. CLEANING, AFTERBURNER IGNITER VALVE AIR SCREEN.

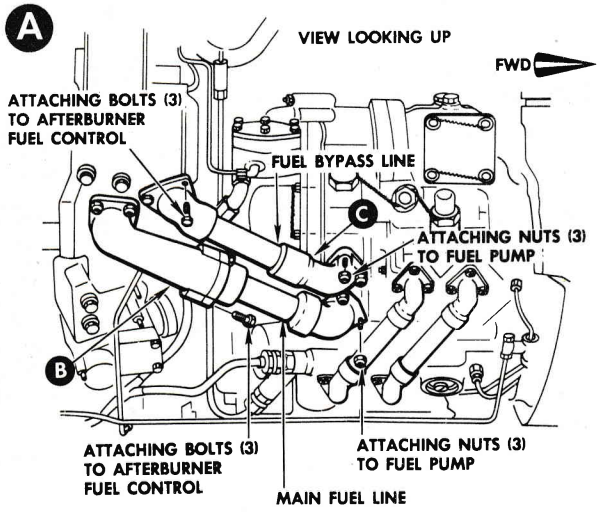
For the afterburner igniter valve air screen cleaning procedures, see figure 3-5.

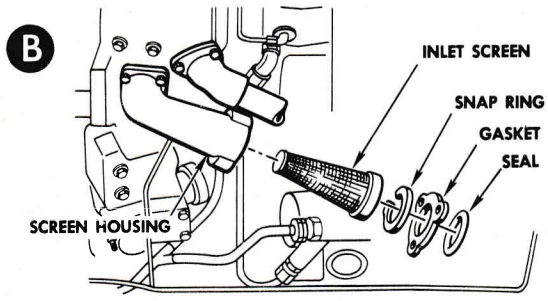
NOTE

GAIN ACCESS TO THE AFTERBURNER FUEL CONTROL THROUGH THE ENGINE ACCESSORY COMPARTMENT RIGHT ACCESS DOOR.



CLEANING, AFTERBURNER FUEL CONTROL SCREENS





CLEANING, AFTERBURNER FUEL CONTROL INLET SCREEN.

a. Remove attachment nuts and bolts holding the main fuel line (inboard line, see Detail A) to the fuel pump and the afterburner fuel control; remove fuel line.
b. Remove snap ring from the screen housing; remove screen.

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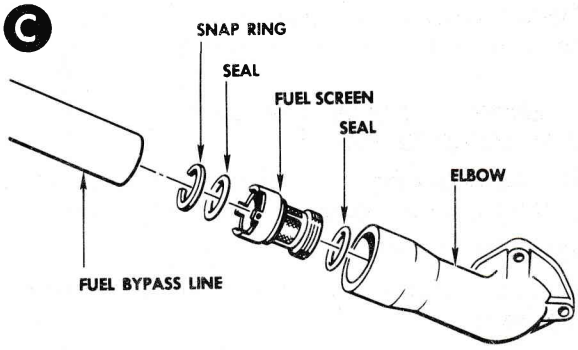
NOTE

SOME SCREENS WILL BE INSTALLED USING SHIMS FOR PROPER POSITIONING OF THE SCREENS. THESE SHIMS MUST BE REPLACED AS REMOVED TO PRESERVE THE PROPER FUNCTION OF THE SCREEN.

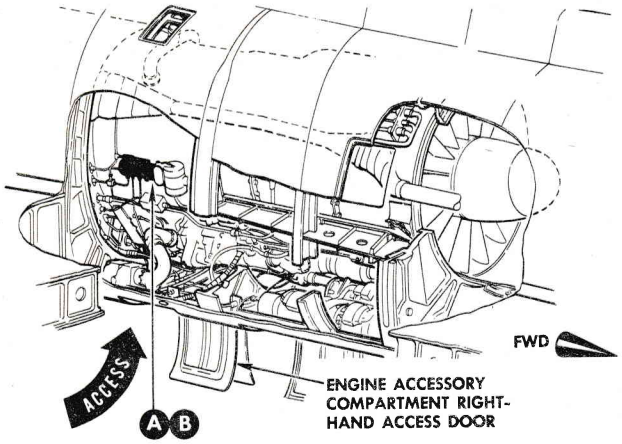
c. Check screen for contamination. Replace screen if it is cracked, bent, or otherwise damaged.
d. Clean screen using solvent, Federal Specification P-S-661; blow dry using compressed air.
e. Use new seals when installing screen and fuel line.
f. Install screen and fuel line. Safety-wire bolts.
g. Visually check fuel control inlet screen installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.



CLEANING, AFTERBURNER FUEL BYPASS SCREEN.

a. Remove attachment nuts and bolts holding fuel bypass line (outboard line, see Detail A) to the fuel pump and the afterburner fuel control; remove fuel line.
b. Separate the tube elbow from the tube.
c. Remove snap ring holding fuel screen inside the tube elbow; remove screen and two (2) seals.
d. Check screen for contamination. Replace screen if it is cracked, bent, or otherwise damaged.
e. Clean screen using solvent, Federal Specification P-S-661; blow dry using compressed air.
f. Install new seals (2) in the grooves of the screen housing. Install screen assembly in the tube elbow and secure with snap ring.
g. Install elbow on tube; install tube assembly on fuel pump and afterburner fuel control. Safety-wire bolts.
h. Visually check fuel bypass screen installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.

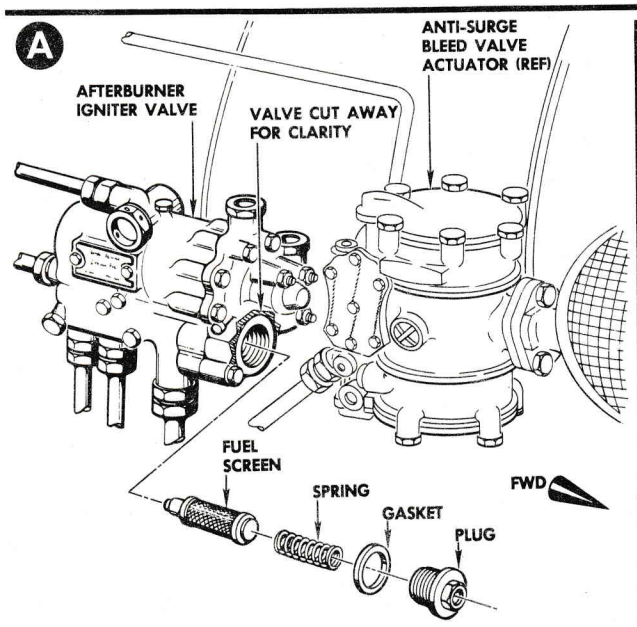
Figure 3-4. Cleaning, Afterburner Fuel Control Screens



CLEANING, AFTERBURNER IGNITER VALVE SCREENS

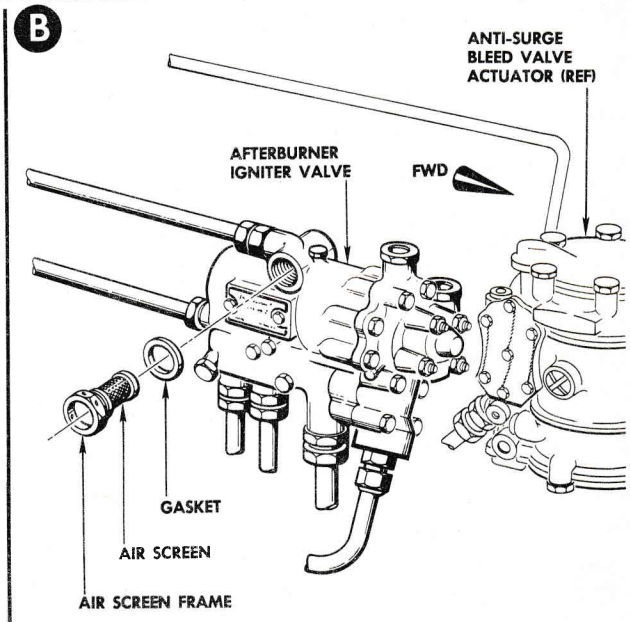
NOTE

GAIN ACCESS TO THE IGNITER VALVE THROUGH THE ENGINE ACCESSORY COMPARTMENT RIGHT-HAND ACCESS DOOR.



CLEANING, AFTERBURNER IGNITER VALVE FUEL SCREEN

a. Cut safety wire and remove large hex head plug from the cover end of the valve. Remove screen and spring from valve.
b. Check screen for contamination. Replace screen if it is cracked, bent, or otherwise damaged.
c. Clean screen using solvent, Federal Specification P-S-661; blow dry using compressed air.
d. Install screen and spring in valve. Install new gasket and hex head plug. Safety-wire plug.
e. Visually check igniter valve fuel screen installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.



CLEANING, AFTERBURNER IGNITER VALVE AIR SCREEN

a. Cut safety wire and unscrew large hex head air screen frame. Screen is located near the air supply tube which is connected to the valve; remove screen.
b. Check screen for contamination. Replace screen if it is cracked, bent, or otherwise damaged.
c. Clean screen using solvent, Federal Specification P-S-661; blow dry using compressed air.
d. Install screen in valve assembly. Install new gasket and frame. Safety-wire frame.
e. Visually check igniter valve air screen installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.

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Figure 3-5. Cleaning, Afterburner Igniter Valve Screens