Section II

MAIN FUEL SYSTEM

Contents *Page*

DESCRIPTION

2-1. GENERAL.

The main fuel system is controlled and operated by the pilot through a Teleflex cable system from the cockpit. In the F-106B airplane, dual throttle quadrants are installed to provide the forward and aft pilot positions with individual throttles. The throttles are interconnected and attached to the Teleflex system to complete the hookup. The fuel system regulates the flow of fuel received from the supply system, and injects the proper amount into the engine. The main fuel system is made up of the following principal accessories with their connecting tubing and electrical wiring: fuel control, engine and afterburner fuel pump, fuel transfer valve, fuel flowmeter, fuel-oil cooler, fuel pressurizing and dump valve, and the engine fuel manifolds and nozzles. See figure 2-1 for a schematic illustration of the main engine fuel system. JP-4 fuel, Military Specification MIL-J-5624 is used in this airplane.

NOTE

It is permissible to use the lowest available grade of aviation gasoline, Military Specification MIL-G-5572 (no oil mix required); JP-5, Military Specification MIL-J-5624; or JP-6, Military Specification MIL-F-25656, as emergency fuels for one-time ferry missions. Where the tactical situation requires the use of these fuels, the engine military trim must be readjusted to meet the pressure ratios shown in figure 1-28 before the airplane can be flown. Since JP-5 freezes at −48.3°C (−55°F) and JP-6 at −40°C (−40°F), missions in which these fuels are used shall be restricted to altitudes where temperatures below these limits are not encountered. When using aviation gasoline, particular attention shall be given to engine tailpipe temperature during starting and throughout the flight.

2-2. NORMAL FUEL REGULATION.

Normal fuel regulation is accomplished by the fuel control unit and other components of the system, which automatically meter fuel according to engine requirements. Fuel requirements are determined by the position of the pilot's throttle, and engine operating conditions. These operating conditions, which affect fuel flow, are air inlet temperature, pressure altitude, compressor discharge pressure, and compressor rpm (as related to acceleration and deceleration). Subject to these conditions. the control is capable of accurately maintaining engine rpm during steady state operation by use of a permanent droop system in conjunction with a speed sensing governor. During starting and acceleration, the control senses compressor discharge pressure, engine inlet temperature, and engine rpm, and as a result, schedules fuel flow to permit the maximum rate of acceleration allowable within the engine temperature limits. During deceleration, the control schedules fuel flow as a function of burner pressure to insure sufficient flow to support combustion.

2-3. EMERGENCY FUEL REGULATION.

Emergency fuel regulation is provided for within the same control unit that controls normal fuel flow. Emergency fuel control is initiated by operation of a 28-volt dc solenoid, controlled by a switch on the pilot's throttle quadrant. The solenoid operates a flapper type valve in the fuel control. Closing of the flapper valve causes engine fuel pump discharge pressure to build up in the servo area of an emergency shuttle valve. This servo pressure repositions the shuttle valve that directs pump discharge pressure to an emergency transfer valve. The transfer valve repositions, closing off the fuel control normal operating system, and directs high-pressure fuel to the emergency system. A warning light is provided on the

pilot's instrument panel to indicate that the fuel control system is in the emergency operating condition.

CAUTION

Always retard throttle to idle when switching back from "EMER" to "NORMAL." This precaution will prevent compressor stall.

2-4. THROTTLE QUADRANT AND LINKAGE.

The throttle quadrant, shown in figure 2-2, provides a manual means of controlling the engine power output, through a system of Teleflex cable and linkage to the main fuel control unit. The throttle lever provides convenient mounting for switches controlling ignition, microphone, and speed brakes. Engine and afterburner operating ranges are identified on the quadrant, and detented slots guide the throttle movement.

NOTE

Applicable to F-106A airplanes 56-453, -454, 56-456 thru 57-245, 59-001 and subsequent, and F-106B airplanes 57-2508 thru 57-2515, 57-2542 and subsequent. The throttle lever is spring-loaded, inboard at the "IDLE" position, at a tension of 12 to 19.5 pounds.

Actuation of the engine starter system is provided by moving the throttle outboard from the "OFF" position. This movement actuates a switch which initiates the engine starting sequence. Afterburning system activation is provided by moving the throttle outboard from the military power operating range. The throttle must be retarded approximately 2½ degrees from the full forward position before it can be brought out of the afterburner range. Movement of the throttle into the afterburner range actuates a switch to initiate afterburning. A spring detent is provided to hold the throttle in the afterburning range. A switch is provided in the quadrant to actuate the landing gear warning system, when the throttle is retarded past a safe power range with the landing gear retracted at low altitude and airspeed. A spring assembly is provided in the linkage to prevent throttle creep in fore and aft directions.

2-5. THROTTLE LINKAGE, AFT (ENGINE) QUADRANT.

The aft throttle quadrant is located in the fuselage at sta. 526.25, left side, adjacent to the engine compressor. The quadrant is the aft terminus of the Teleflex cable from the pilot's throttle quadrant, and provides the connecting linkage to the main fuel control unit. Stops are provided at the aft quadrant for the off and full power positions of the throttle system.

2-6. ENGINE MAIN FUEL CONTROL UNIT.

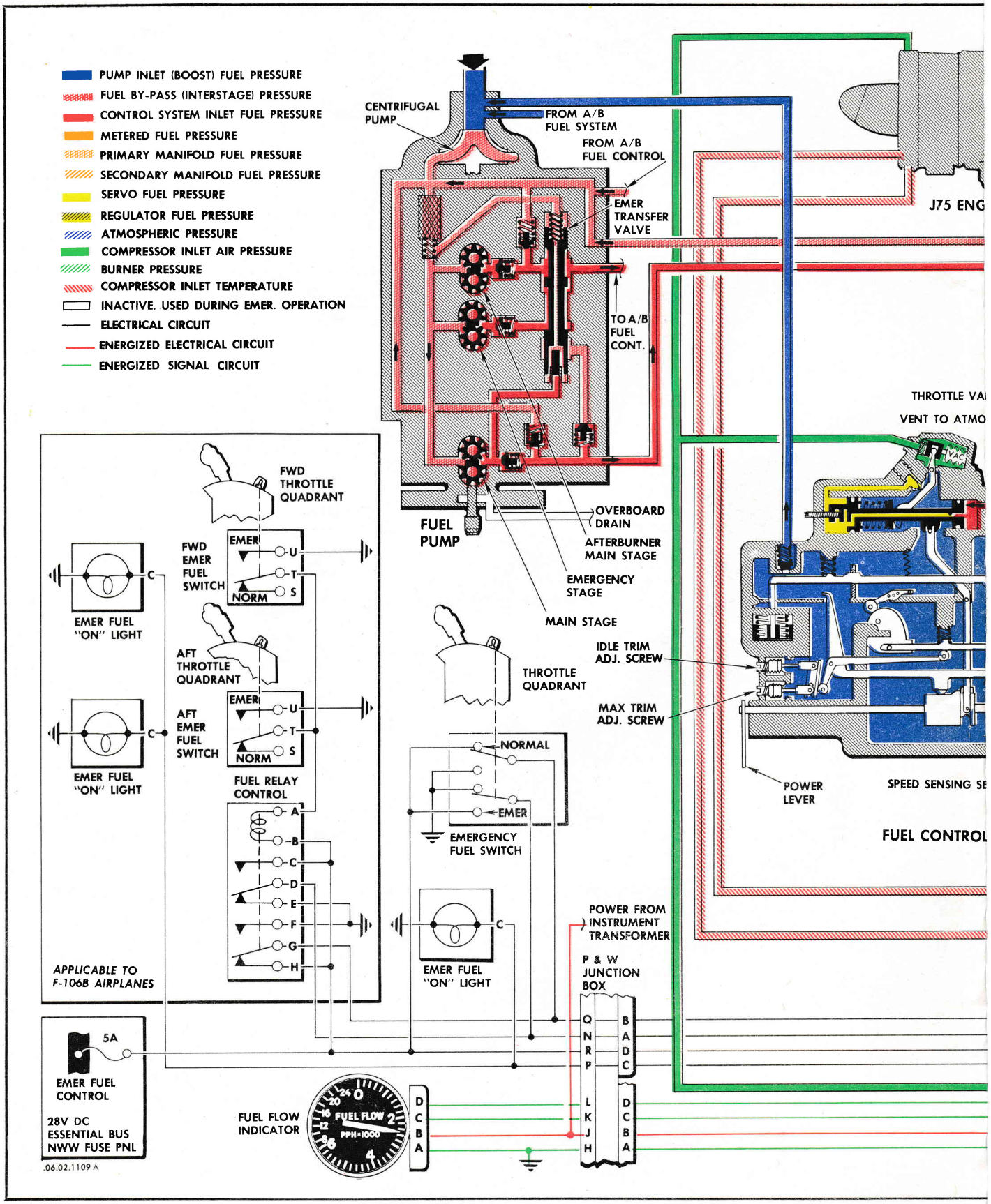
The main fuel control unit is a high-flow capacity metering unit incorporating both normal and emergency fuel control systems. The normal system consists of a shutoff and minimum pressure valve, compressor discharge pressure limiting valve, speed limiting rotor assembly, pressure regulating valve, speed sensing governor, temperature sensing bellows and servo, and the throttle valve. This system provides scheduled fuel flow for starting, acceleration and deceleration, together with all speed governing. The fuel flow schedule is altitude-compensated, and biased by changes in compressor inlet temperature. The normal system is controlled by mechanical linkage to the pilot's control quadrant. The emergency system is activated by an electrical solenoid, controlled by a switch on the pilot's throttle quadrant. The emergency system provides a means of bypassing the main system, in the event of failure of any part of the main system. Indicator lights are provided on the pilot's master warning light panel to indicate that the fuel control is operating on the emergency system. The electrical system is protected by a 5-amp fuse located on the nose wheel well fuse panel. Adjustment points for minor field adjustments are provided on the fuel control unit.

2-7. FUEL-OIL COOLER.

The fuel-oil cooler is a heat exchanger employing fuel flow as a coolant for engine oil. The cooler is installed on the left side of the engine and works in conjunction with the air-oil cooler in cooling engine oil. Oil flow through the cooler is regulated by a thermostatic valve located on the cooler inlet connection. The cooler is installed in the fuel system between the fuel control and the fuel pressurization and dump valve. All fuel for normal engine (nonafterburning) operation is routed through the cooler.

2-8. ENGINE AND AFTERBURNER FUEL PUMP.

The engine and afterburner fuel pump assembly consists of a centrifugal boost stage supplying three gear-type pumps. During normal operation, fuel from one of the pumps supplies the main fuel system requirements. The two remaining pumps supply the afterburner fuel system requirements. During periods of nonafterburner operation, fuel from the afterburner pumps is returned to the inlet of the gear type pumps. A transfer valve is provided to divert the output from one of the afterburner pumps to the main fuel system in case of main fuel system pump failure. Under this condition the remaining afterburner pump will supply fuel for limited afterburner operation.


PUMP INLET (BOOST) FUEL PRESSURE
FUEL BY-PASS (INTERSTAGE) PRESSURE
CONTROL SYSTEM INLET FUEL PRESSURE
METERED FUEL PRESSURE
PRIMARY MANIFOLD FUEL PRESSURE
SECONDARY MANIFOLD FUEL PRESSURE
SERVO FUEL PRESSURE
REGULATOR FUEL PRESSURE
ATMOSPHERIC PRESSURE
COMPRESSOR INLET AIR PRESSURE
BURNER PRESSURE
COMPRESSOR INLET TEMPERATURE
INACTIVE. USED DURING EMER. OPERATION
ELECTRICAL CIRCUIT
ENERGIZED ELECTRICAL CIRCUIT
ENERGIZED SIGNAL CIRCUIT
CENTRIFUGAL PUMP
FROM A/B FUEL SYSTEM
FROM A/B FUEL CONTROL
EMER TRANSFER VALVE
TO A/B FUEL CONT.
J75 ENG
THROTTLE VA
VENT TO ATMO
FUEL PUMP
OVERBOARD DRAIN
AFTERBURNER MAIN STAGE
EMERGENCY STAGE
MAIN STAGE
IDLE TRIM ADJ. SCREW
MAX TRIM ADJ. SCREW
POWER LEVER
SPEED SENSING SE
FUEL CONTROL
FWD THROTTLE QUADRANT
FWD EMER FUEL SWITCH
EMER
NORM
EMER FUEL "ON" LIGHT
AFT THROTTLE QUADRANT
AFT EMER FUEL SWITCH
FUEL RELAY CONTROL
THROTTLE QUADRANT
NORMAL
EMER
EMERGENCY FUEL SWITCH
EMER FUEL "ON" LIGHT
POWER FROM INSTRUMENT TRANSFORMER
P & W JUNCTION BOX
APPLICABLE TO F-106B AIRPLANES
5A
EMER FUEL CONTROL
28V DC ESSENTIAL BUS NWW FUSE PNL
FUEL FLOW INDICATOR
FUEL FLOW
PPH x 1000
.06.02.1109 A

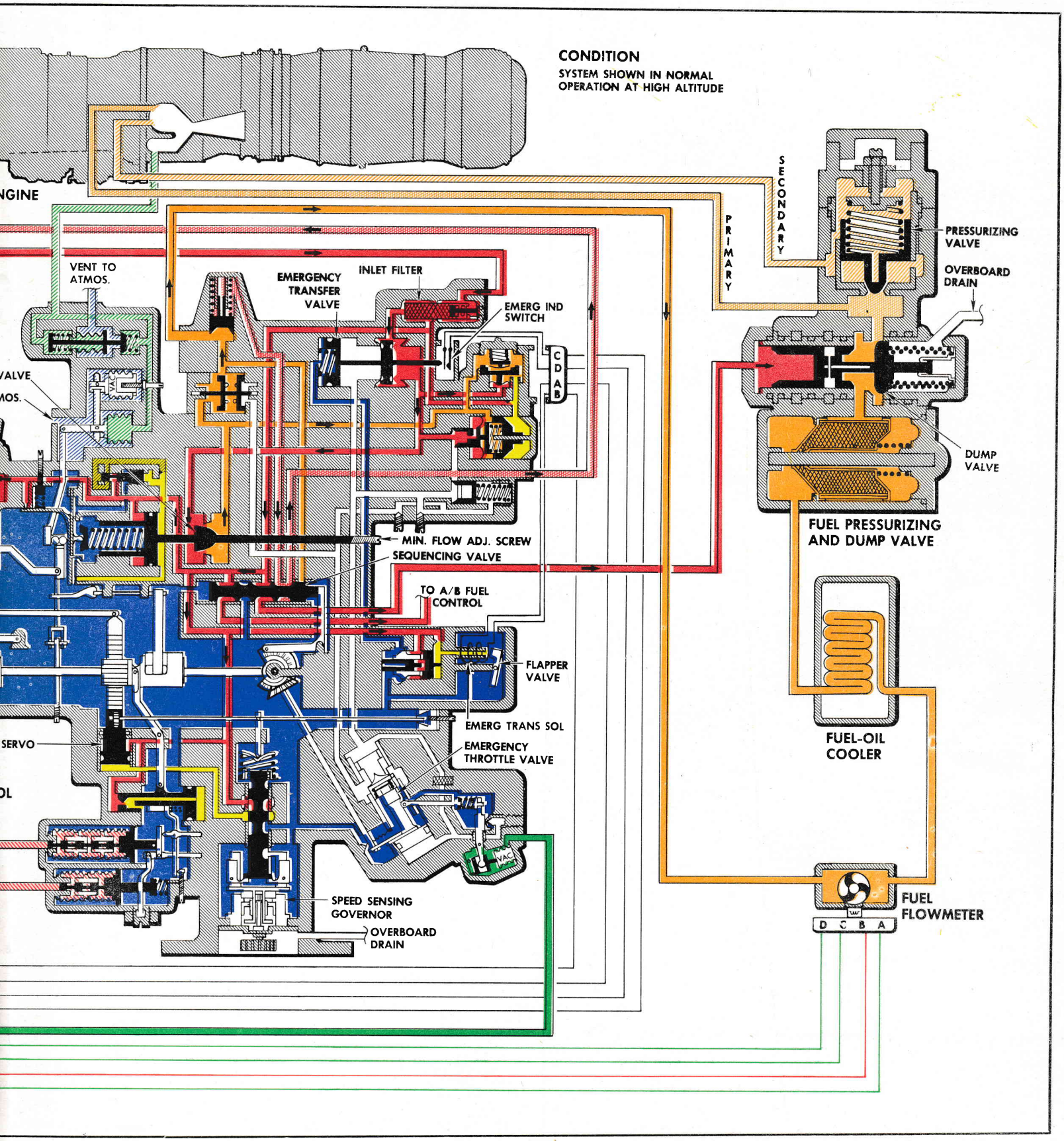


Figure 2-1. Engine Main Fuel System Schematic

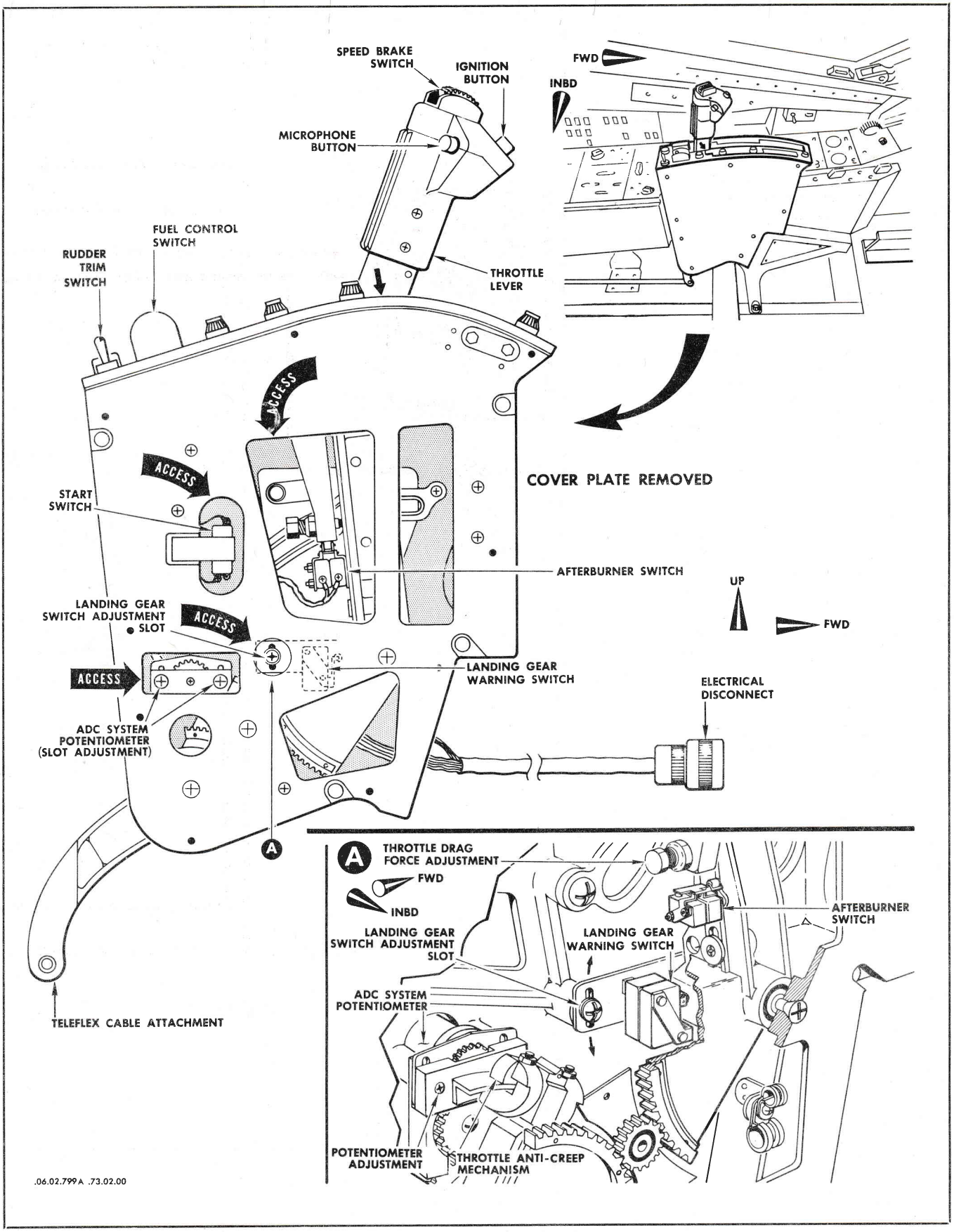


Figure 2-2. Throttle Quadrant

2-9. FUEL FLOWMETER.

The fuel flowmeter is installed on the lower left side of the engine, adjacent to the engine oil tank. The flowmeter, located in the fuel system between the main fuel control unit and the fuel-oil cooler, measures the rate of fuel flow to the engine. The flowmeter transmits an autosyn signal to the fuel flow indicator on the pilot's instrument panel. The indicator registers fuel flow in pounds per hour.

2-10. FUEL PRESSURIZING AND DUMP VALVE.

The fuel pressurizing and dump valve is installed on the bottom center line of the engine, just aft of the fuel control unit. The fuel pressurizing-and-dump valve is installed in the fuel system between the fuel-oil cooler and the engine fuel discharge manifold. This valve controls fuel flow to the pilot and main orifices of the fuel nozzles in the engine combustion chambers. Fuel flow to the main orifice of the nozzles is restricted until fuel pressure has increased sufficiently to overcome combustion chamber pressure and spring tension of the pressurizing valve. During engine operation, the integral dump valve is held in the closed position by fuel pressure from the fuel control unit. The dump valve is spring-loaded to open the engine fuel manifold drain, and to close the inlet port to the pressurizing valve, when control fuel pressure decreases as the throttle is moved to the "OFF" position.

2-11. ENGINE FUEL SUPPLY STRAINER.

The engine fuel supply strainer, which is attached to the inlet port of the engine fuel pump, is an integral part of the airplane main engine fuel supply system. Refer to T.O. 1F-106A-2-5 for information on this component.

OPERATIONAL CHECKOUT

2-12. MAIN FUEL SYSTEM TESTS.

2-13. Equipment Requirements, Main Fuel System Tests.

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.
	Jumper Wire.			To connect electrical plug pins.

NOTE

Equipment called for in the engine ground run test procedure will also be required for the main fuel system leak test.

2-14. Procedure, Leak Test.

a. Prepare airplane for ground run; refer to paragraph 1-25.

b. Position engine ignition disarming switch in the main wheel well to the disarmed position.

c. Fuel valve selector "ENGINE."

d. Pilot's throttle "OFF."

e. Fuel control switch "NORMAL."

f. Fuel boost pumps, forward left and forward right "ON."

g. Check fuel lines from wing connections to engine and in fuel control area for leaks.

h. Connect external high pressure air source to fitting in left main wheel well. Starter air selector valve in left wheel well to be in the "CLOSED" position.

i. Energize starter; advance throttle to approximately "IDLE" position while still engaging starter.

j. Have observer make a quick check of all engine fuel components and tubing for fuel leaks.

k. Disengage starter, and return throttle to "OFF" position. Allow 5 minutes for fuel drainage before attempting start.

l. Install ignition fuse.

m. Make normal engine start (refer to paragraph 1-26 for this procedure); set throttle at "IDLE."

n. Make check of fuel system components and tubing for fuel leaks.

o. Make normal shutdown of engine.

2-15. Procedure, Fuel Control Circuit Test.

a. Remove the following fuses:

1. "FUEL CONT," nose wheel well fuse panel.
2. "MASTER WARN," cockpit RH fuse panel.

b. Disconnect P&W engine disconnect plug from engine junction box.

c. Connect 28-volt dc test light between pins C and Q of plug. Connect 28-volt dc test light between pins C and N of plug.

d. Install jumper wire between pins P and N of plug.

e. Install fuses removed in step "a."

f. With external 28-volt dc power connected to airplane and the fuel control switch in "NORMAL," test light between pins C and Q shall illuminate. Test light between pins C and N, "MASTER WARN" light, and the "EMERGENCY FUEL" light shall remain extinguished.

g. Actuate fuel control switch to "EMERGENCY." Test light between pins C and Q shall extinguish. Test light between pins C and N, "MASTER WARN" light, and "EMERGENCY FUEL" light shall illuminate.

h. Momentarily actuate "MASTER WARN" light to reset; "MASTER WARN" light shall extinguish.

i. Remove test lights and jumper wire; reconnect electrical plug to engine junction box.

REPLACEMENT

2-16. MAIN FUEL SYSTEM SAFETY PRECAUTIONS.

During replacement of the main 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 providing adequate ventilation.

c. Remove all equipment, which might cause sparks, from the work area.

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 fuel system component replacement, it will be necessary to conduct an operational checkout of the engine. Refer to Section I for engine operating procedure.

2-17. REMOVAL, MAIN FUEL CONTROL UNIT.

Observe the safety precautions outlined in paragraph 2-16 during removal of the main fuel control unit.

a. Gain access to the main fuel control through the engine accessory compartment access doors, left hydraulic pump access door, and the constant-speed remote gearbox access doors.

b. Lower the constant-speed remote gearbox to the hanging position. Refer to Section IX for this procedure.

c. Disconnect and remove throttle bell crank from fuel control.

d. Check that the fuel tank shutoff valves are in the closed position.

e. Provide fuel drainage receptacles.

f. Remove lines attached to the fuel control. Cover lines and openings with plugs or polyethylene sheet.

NOTE

Note the location of attachment clips and brackets so that they may be reinstalled in their proper locations.

g. Disconnect electrical connector from fuel control.

h. Remove bolts (4) attaching the inlet temperature sensing bulb to the lower left side of the compressor inlet guide vane and shroud.

NOTE

The inlet temperature bulb is an integral part of the fuel control, and shall not be detached from the control. Carefully coil the lead to avoid kinking. Wrap the temperature bulb in protective paper.

i. Provide support for fuel control; remove attachment nuts (6) holding fuel control to the N_2 accessory case. Move fuel control aft and remove. Discard mating flange seal.

2-18. INSTALLATION, MAIN FUEL CONTROL UNIT.

a. Install the main fuel control unit in essentially the reverse of the removal procedure. Use a new mating flange seal. Coat the main fuel control unit shaft and mating splines with grease, Military Specification MIL-G-3545, prior to installation.

b. Install fuel control on N_2 accessory case adapter. Ascertain that positive drive shaft spline engagement is being made during installation.

NOTE

The seal drain tubes (2) are to be torqued 90 to 100 inch-pounds. Do not over-torque.

c. Conduct fuel control flushing and soaking procedure. Refer to paragraph 1-84 for this procedure.

d. Conduct throttle control system rigging check. See figure 2-6 for this procedure.

e. Conduct engine operational checkout. Refer to paragraph 1-23 for procedure.

2-19. REMOVAL, ENGINE FUEL PUMP.

a. Gain access to the engine fuel pump through the accessory compartment left and right access doors.

b. Observe safety precautions as outlined in paragraph 2-16 during removal of the engine fuel pump.

c. Check that the fuel tank shutoff valves are in the closed position.

d. Remove cap and drain fuel inlet line or fuel strainer.

e. Remove fuel inlet line or strainer assembly whichever is installed.

f. Remove lines attached to fuel pump. Cover lines and openings with plugs or polyethylene sheet.

NOTE

Note location of attachment clips and brackets so that they may be reinstalled in their proper locations.

g. Provide support for fuel pump; remove attachment nuts holding fuel pump to the N_2 accessory case. Move fuel pump aft and remove. Discard mating flange seal.

NOTE

When removing the fuel pump, make sure that the fuel pump mounting bracket, which is supporting the pump at the diffuser case front flange, is not binding in the bracket supports.

CAUTION

Care must be taken when removing fuel pump so as not to allow pump to hang on spline drive gear. If this precaution is not observed, damage to the drive gear may occur.

2-20. INSTALLATION, ENGINE FUEL PUMP.

a. Prior to installation, thoroughly clean the shaft gear spline in the engine accessory case. When old lubricant and residue have hardened, it may be necessary to use a solvent spray gun and a sharpened soft wood stick to loosen and wash out this contamination.

b. Lubricate engine spline with plastilube Moly No. 3.

NOTE

Excessive amounts of lubricant are not necessary. An even coat can be applied to the spline surface with a small clean paste brush.

c. Install the engine fuel pump in essentially the reverse of the pump removal procedure. Use a new mating flange seal. Coat the pump shaft and mating splines with grease, Military Specification MIL-G-3545, prior to installation.

d. Ascertain that positive drive shaft spline engagement is made during pump installation. Check that the pump mounting brackets position properly into the support attachments to the front flange of the diffuser case.

CAUTION

Care must be taken when installing fuel pump so as not to allow pump to hang on spline drive gear.

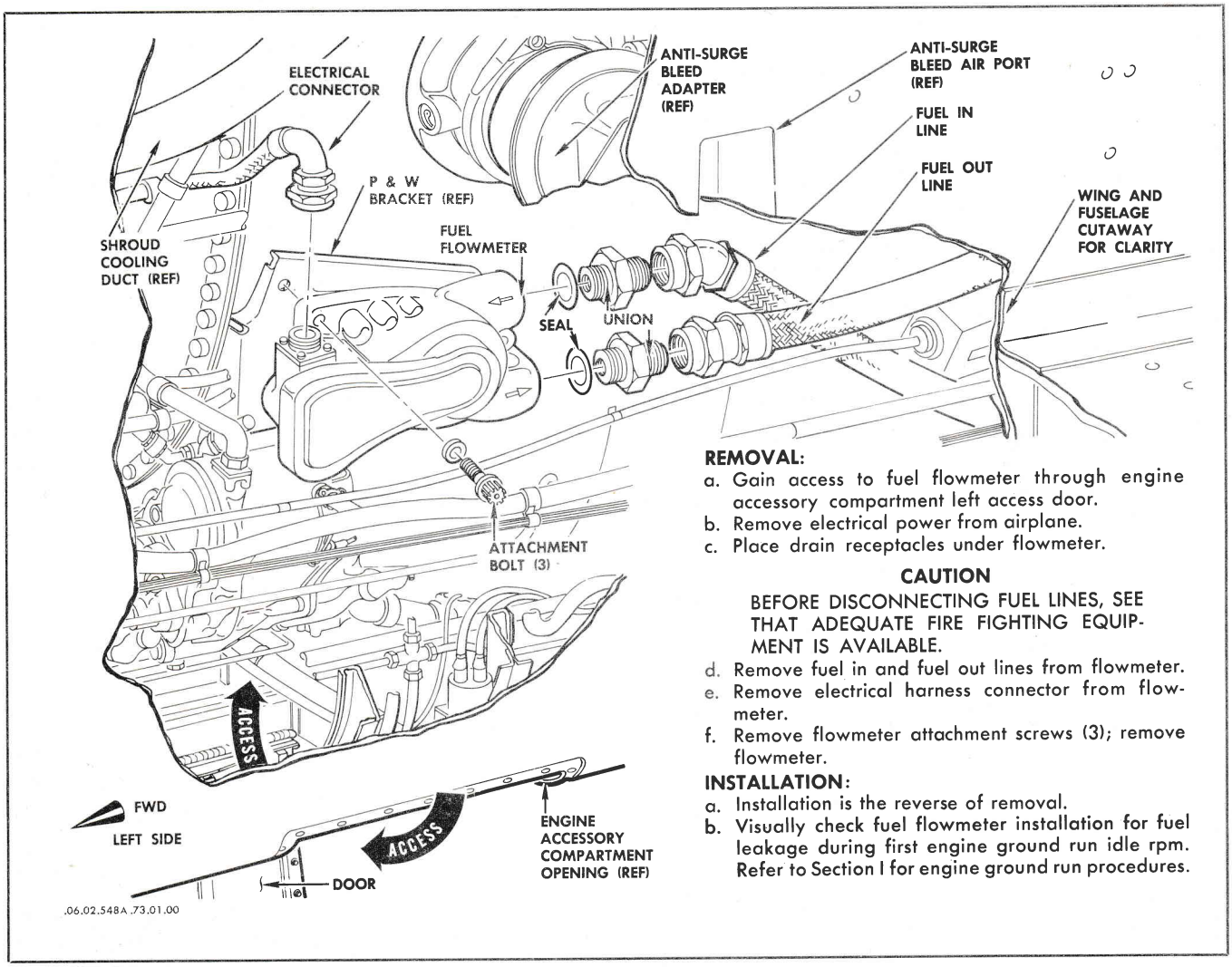
e. Conduct engine operational checkout. Refer to paragraph 1-23 for procedure.

2-21. REMOVAL, FUEL PRESSURIZING AND DUMP VALVE

a. Gain access to the fuel pressurizing and dump valve through the engine accessory compartment access doors.

b. Observe safety precautions as outlined in paragraph 2-16 during removal of the fuel pressurizing and dump valve.

c. Remove lines attached to valve assembly. Cover lines and openings with plugs or polyethylene sheet.



REMOVAL:

a. Gain access to fuel flowmeter through engine accessory compartment left access door.
b. Remove electrical power from airplane.
c. Place drain receptacles under flowmeter.

CAUTION

BEFORE DISCONNECTING FUEL LINES, SEE THAT ADEQUATE FIRE FIGHTING EQUIPMENT IS AVAILABLE.

d. Remove fuel in and fuel out lines from flowmeter.
e. Remove electrical harness connector from flowmeter.
f. Remove flowmeter attachment screws (3); remove flowmeter.

INSTALLATION:

a. Installation is the reverse of removal.
b. Visually check fuel flowmeter installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.

Figure 2-3. Replacement, Fuel Flowmeter

d. Remove the bolts (2) securing the dump valve overboard drain cover to the combustion chamber overboard fuel drain adapter.

e. Remove the valve attachment bolts (2); remove valve. Discard all gaskets.

2-22. INSTALLATION, FUEL PRESSURIZING AND DUMP VALVE.

a. Installation of the fuel pressurizing and dump valve is essentially the reverse of the removal procedure.

b. Use new gaskets on the fuel manifold inlet adapter ferrules. Place new gasket between the valve overboard drain cover and combustion chamber overboard full drain adapter.

c. Safety-wire all bolts and tube nuts.

d. Conduct engine operational checkout. Refer to paragraph 1-23 for this procedure.

2-23. REMOVAL, FUEL-OIL COOLER.

a. Remove engine from airplane. Refer to paragraph 1-42 for this procedure.

b. Provide drainage receptacles.

c. Remove lines attached to cooler. Cover lines and openings with plugs or polyethylene sheet.

d. Remove cooler attachment bolts; remove cooler.

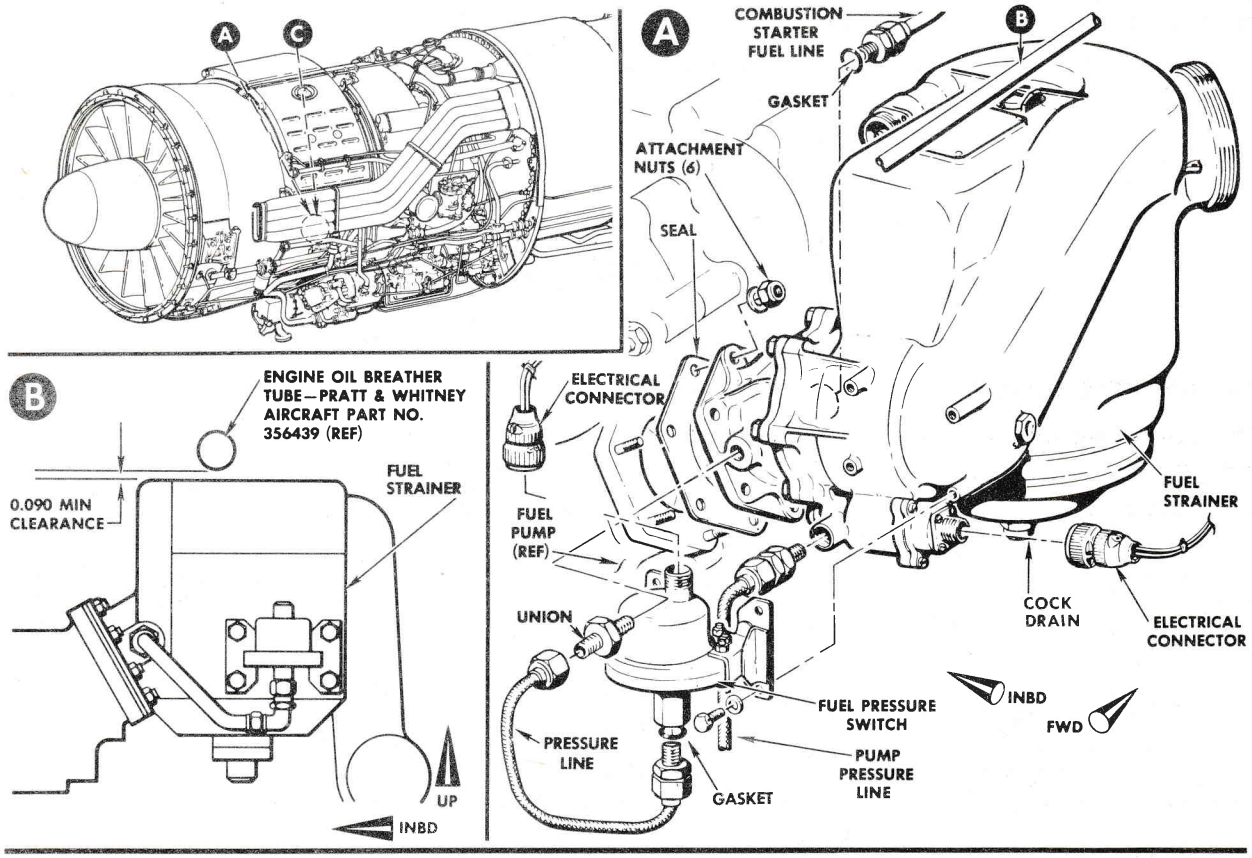
2-24. INSTALLATION, FUEL-OIL COOLER.

a. Install the fuel oil-cooler in essentially the reverse of the removal procedure.

b. Conduct leak check of installation at first engine run.

2-25. REPLACEMENT, FUEL FLOWMETER.

For replacement of the fuel flowmeter, see figure 2-3.



REMOVAL

CAUTION

OBSERVE ALL FUEL SYSTEM SAFETY PRECAUTIONS OUTLINED IN SECTION 1 OF T.O. 1F-106A-2-5.

a. Close fuel system shutoff valves. Placard cockpit switches stating maintenance is being performed on the system.
b. Drain fuel from lines adjacent to strainer at push-to-drain valves (2) in lines to fuel flow equalizer. Drain fuel from strainer drain cock.
c. Disconnect main fuel line from strainer inlet.
d. Disconnect combustion starter fuel line, pump pressure line, and electrical connectors from strainer assembly.

NOTE

APPROPRIATELY IDENTIFY CONNECTORS FOR STRAINER BYPASS SOLENOID AND FUEL PRESSURE SWITCH LEADS BY PAINTING OR TAGGING TO PRECLUDE REVERSING CONNECTORS WHEN REINSTALLING.

e. Remove attachment nuts (6) securing strainer to fuel pump; remove strainer and pressure switch assembly.
f. Remove fuel pressure switch and pressure line from strainer housing.
g. Cover fuel pump opening.

INSTALLATION

a. Installation of fuel strainer and pressure switch is essentially the reverse of the removal procedure.

CAUTION

CHECK ALL LINES FOR CHAFING AND THAT CLAMPS INSTALLED TO PREVENT CHAFING DO NOT CAUSE FLEX LINES TO BECOME RIGID.

NOTE

IF STRAINER INTERFERES WITH ENGINE OIL BREATHER TUBE AFTER INSTALLATION, OR, IF CLEARANCE BETWEEN TUBE AND STRAINER BODY IS LESS THAN 0.090 INCH (SEE DETAIL B), RELOCATE THE BREATHER TUBE BY ROTATING THE TUBE AS FOLLOWS:

1. LOOSEN TUBE COUPLING NUT AT ELBOW CONNECTOR ON DIFFUSER CASE.
2. LOOSEN BOLTS (3) SECURING ELBOW CONNECTOR TO DIFFUSER CASE. LEAVE BOLTS FINGER TIGHT, DO NOT REMOVE.
3. ROTATE BREATHER TUBE UP AND OUTWARD UNTIL 0.090 INCH MINIMUM CLEARANCE IS OBTAINED.
4. FINGER TIGHTEN TUBE COUPLING NUT WHILE MAINTAINING 0.090 INCH MINIMUM CLEARANCE AND ALLOW ELBOW TO ROTATE WITHIN BOLT HOLE CLEARANCE AGAINST BOLTS.
5. RETORQUE BOLTS (3) SECURING ELBOW CONNECTOR TO DIFFUSER CASE 125 TO 170 INCH-POUNDS. RETORQUE COUPLING NUT 300 TO 500 INCH-POUNDS. SAFETY-WIRE BOLTS AND COUPLING NUT.
6. VISUALLY CHECK FITTINGS FOR OIL LEAKAGE DURING FIRST ENGINE GROUND RUN IDLE RPM.

b. Safety-wire following: Pressure switch attachment bolts (4), fittings on pressure switch line, starter fuel line, strainer pump pressure line, and electrical connectors.
c. Leak check all components removed in accordance with procedures outlined in T.O. 1F-106A-2-5.
d. Conduct engine operational checkout.

.06.02.293-17G

Figure 2-4. Replacement, Engine Fuel Supply Strainer and Fuel Pressure Switch

2-26. REPLACEMENT, ENGINE FUEL SUPPLY STRAINER, FUEL PRESSURE SWITCH, AND FUEL INLET ADAPTER.

For replacement of the engine fuel supply strainer, fuel pressure switch, and fuel inlet adapter, see figure 2-4.

2-27. REPLACEMENT, THROTTLE TELEFLEX CABLE.

For replacement of the throttle teleflex cable, see figure 2-5.

ADJUSTMENT

2-28. THROTTLE SYSTEM RIGGING.

2-29. Equipment Requirements.

FIGURE	NAME	TYPE	ALTERNATE	USE AND APPLICATION
2-6	Rigging Pin.	8-96076-11		To hold aft bellcrank at sta. 526.25 in rigged position.
2-6	Rigging Gage.	8-96095 (5220-591-8562)		To measure aft bellcrank travel.
	Spring Tension Scale.	0 to 20 pounds		To check throttle lever action.
	Spring Compression Scale.	0 to 20 pounds		To check throttle lever action.

2-30. Preparation, Throttle System Rigging.

For throttle system rigging preparation procedures, see figure 2-6.

2-31. Procedure, Throttle System Rigging.

For the throttle system rigging procedure, see figure 2-6.

2-32. MAIN FUEL CONTROL FIELD ADJUSTMENT.

For the main fuel control adjustment and the engine trim procedure, refer to Section I.

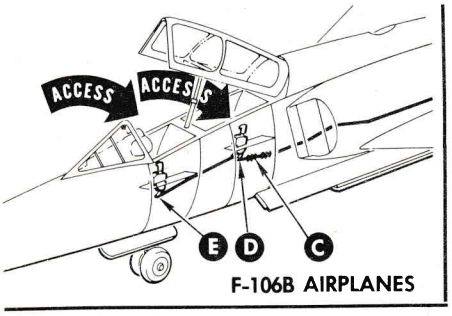
SERVICING

2-33. PRESERVATION, ENGINE FUEL CONTROL UNIT AND ENGINE FUEL SYSTEM.

For preservation information for the engine fuel control unit and the engine fuel system, refer to Servicing in Section I.

2-34. DEPRESERVATION, ENGINE FUEL CONTROL UNIT AND ENGINE FUEL SYSTEM.

For depreservation information for the engine fuel control unit and the engine fuel system, refer to Servicing in Section I.



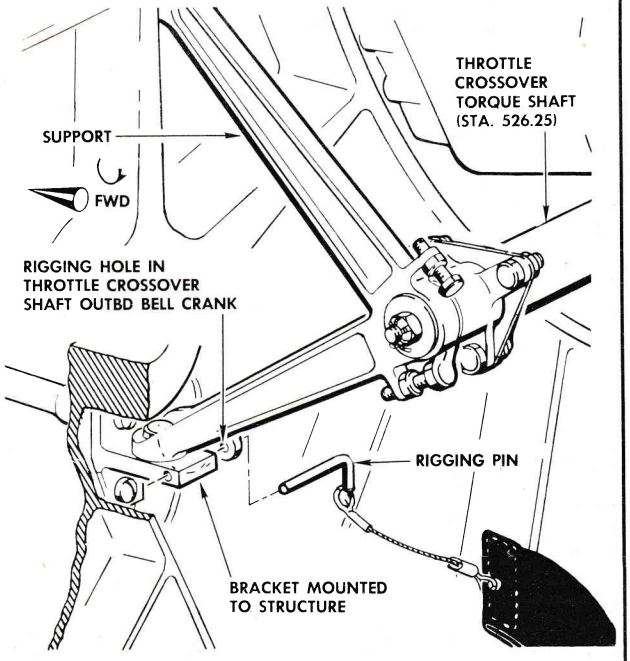
NOTE

DETAILS A AND F ARE ALSO APPLICABLE TO F-106B.

A

NOTE

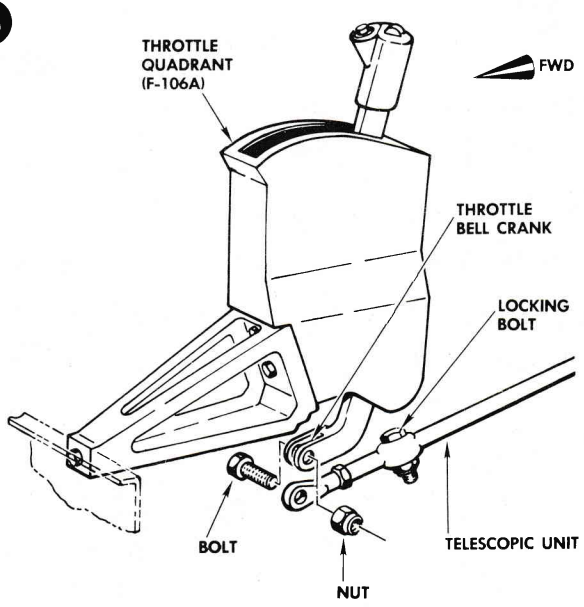
GAIN ACCESS TO THE AFT END OF THE TELEFLEX CABLE (STA. 526.25) THROUGH THE ENGINE ACCESS DOOR ON THE LOWER LEFT SIDE OF THE FUSELAGE.



REMOVAL

a. Place throttle quadrant(s) in "OFF" position.
b. Install rigging pin at Station 526.25.

B



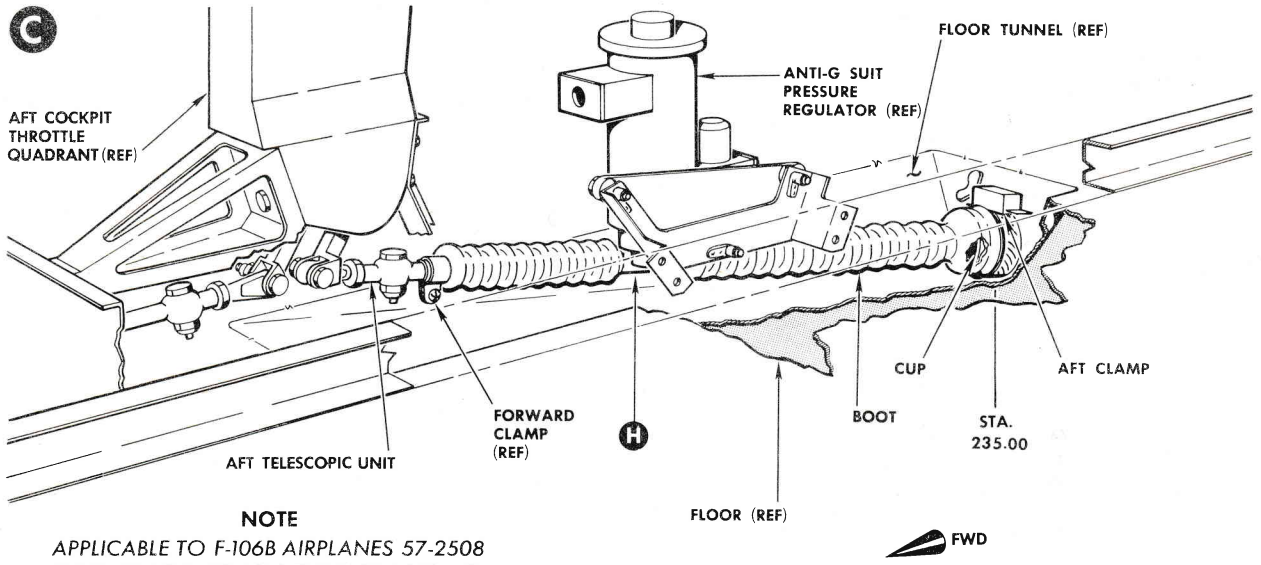
c. Remove bolt (F-106A) securing telescopic unit to the throttle quadrant.
d. Remove telescopic unit from teleflex cable by loosening locking bolt and rotating unit (left-hand threads).

CAUTION

HOLD HEAD OF LOCKING BOLTS WHEN LOOSENING OR TIGHTENING.

.06.02.1115-1A

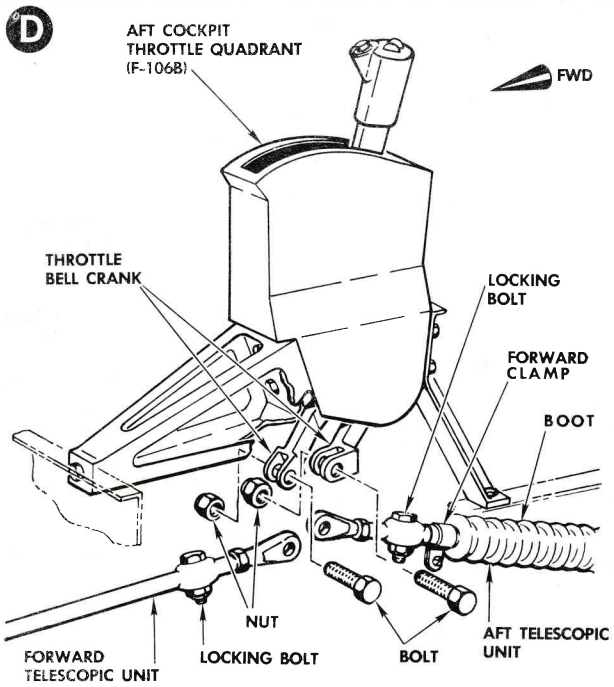
Figure 2-5. Replacement, Throttle Teleflex Cable (Sheet 1 of 3)



NOTE

APPLICABLE TO F-106B AIRPLANES 57-2508 THRU 57-2515; 57-2516 THRU 57-2522, 57-2524 AND SUBSEQUENT AFTER INCORPORATION OF TCTO 1F-106B-528.

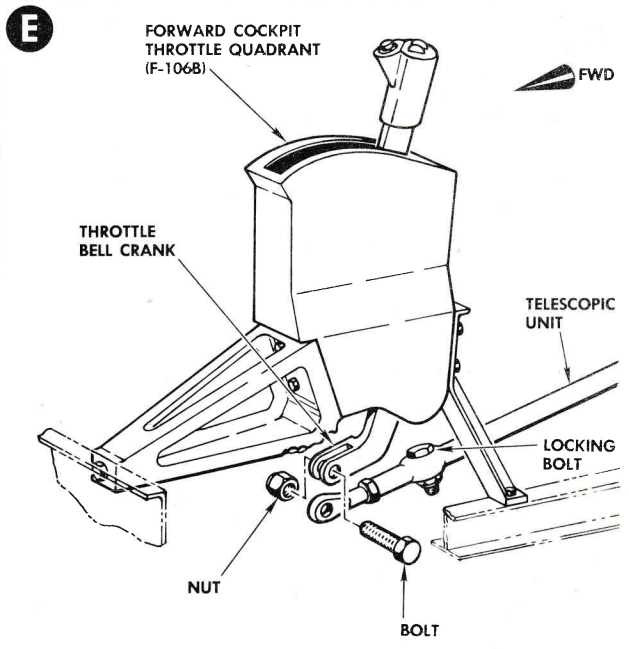
e. Loosen aft clamp securing boot to cup; pull boot free of cup.



f. Remove bolts (F-106B) securing telescopic units to the two bell cranks of aft throttle quadrant.

g. Remove telescopic units from ends of forward and aft teleflex cables by loosening locking bolts and rotating units (left-hand threads).

h. *Applicable to F-106B airplanes 57-2508 thru 57-2515; and 57-2516 thru 57-2522, 57-2524 and subsequent after incorporation of TCTO 1F-106B-528.*



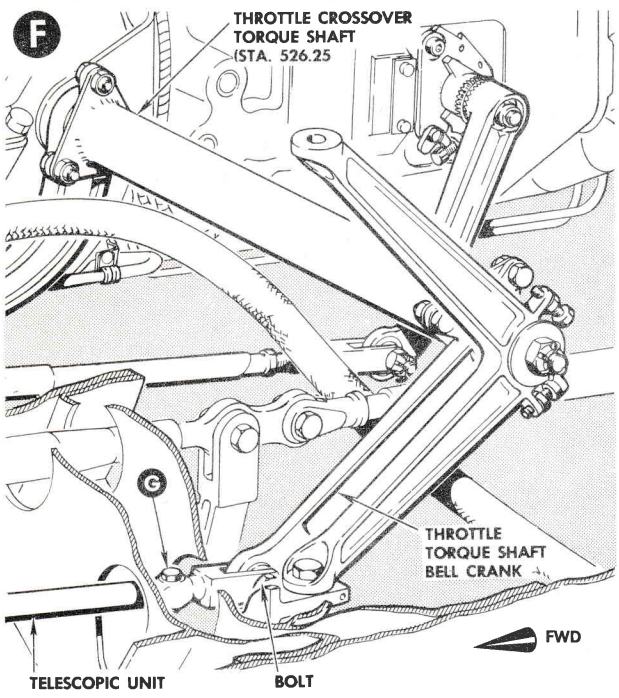
i. Remove bolt (F-106B) securing telescopic unit to forward throttle quadrant.

j. Remove teleflex cable (F-106B) from the conduit between the forward and aft throttle quadrants by slowly pulling forward.

k. Remove telescopic unit from forward end of teleflex cable by loosening locking bolt and rotating unit (left-hand threads).

.06.02.1115-2C

Figure 2-5. Replacement, Throttle Teleflex Cable (Sheet 2 of 3)



l. Remove bolt securing telescopic unit to throttle torque shaft bell crank.
m. Remove teleflex cable from conduit by slowly pulling to rear.
n. Remove telescopic unit from aft end of teleflex cable by loosening locking bolt and rotating unit (left-hand threads).

INSTALLATION

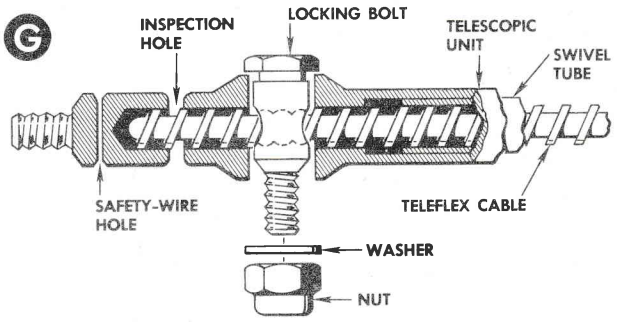
a. Before installation of teleflex cable assemblies, the cable conduit and the cable must be cleaned and lubricated as follows:
   1. After radius has been filed on both ends of the cable, wash thoroughly with cleaning solvent, Federal Specification P-S-661, or clean by vapor degreasing to remove all dirt or protective coating of corrosion preventive compound. Apply a light coat of grease, Specification MIL-G-3278, to cable.

NOTE

USE EVERY PRECAUTION TO PREVENT THE CLEANED CABLE FROM COMING IN CONTACT WITH DIRT AND GRIT PRECEDING AND DURING INSTALLATION IN THE CONDUIT.

   2. Blow compressed air through the conduit to remove chips and dirt then draw cable completely through conduit.
   3. Clean cable per step 1; do not lubricate cable with grease.
   4. Place cable in a container, cover cable with oil, Specification MIL-L-7808, and allow to soak for a minimum of 10 minutes. No further lubrication is required.

b. Installation of the teleflex cable is essentially the reverse of the removal procedure.

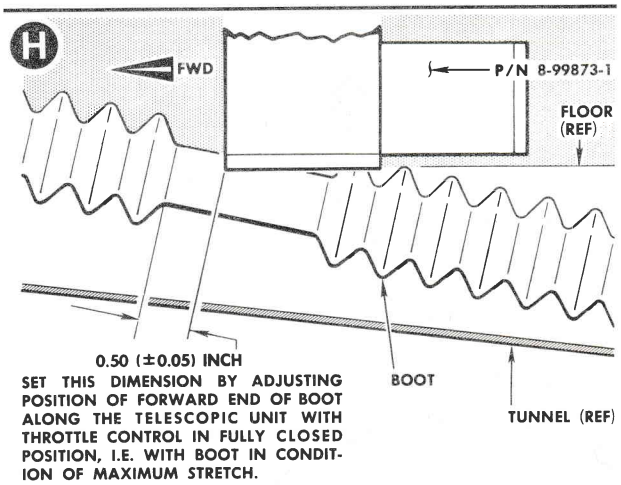


c. When installing telescopic units on cable, continue rotating unit until the cable has passed the inspection hole located one-half inch from the center of the locking bolt. An additional one-half inch of space is provided for the cable end for adjustment purposes.
d. On F-106A airplanes, install the cable attachment bolt at the throttle quadrant bell crank with the head inboard. See detail B.
e. Torque the nuts on the locking bolts to 20 to 25 inch-pounds.

CAUTION

THE CABLE LOCKING BOLTS MUST BE HELD WITH A WRENCH WHILE TORQUING THE NUTS. DO NOT OVERTORQUE NUTS.

f. Install cotter pin at aft telescopic unit attachment bolt and seal inspection holes in telescopic units by wrapping units with 2 turns of VBB-22 vinyl tape, manufactured by 3M Co., St. Paul 6, Minn.



NOTE

APPLICABLE TO F-106B AIRPLANES 57-2508 THRU 57-2515; 57-2516 THRU 57-2522, 57-2524 AND SUBSEQUENT AFTER INCORPORATION OF TCTO 1F-106B-528.

g. *Applicable to F-106B airplanes 57-2508 thru 57-2515; and 57-2516 thru 57-2522, 57-2524 and subsequent after incorporation of TCTO 1F-106B-528,* attach boot to cup at station 235.00 with aft clamp.
h. Position boot on telescopic unit within 0.50 (±0.05) inch of P/N 8-99873-1; then tighten forward clamp.
i. Remove rigging pins at station 526.25.
j. Conduct throttle rigging check procedure.

.06.02.1115.3C

Figure 2-5. Replacement, Throttle Teleflex Cable (Sheet 3 of 3)

2-35. CLEANING, MAIN FUEL CONTROL UNIT FILTER AND PUMP STRAINER.

For the main fuel control filter and the fuel pump strainer cleaning procedures, see figure 2-7.

2-36. CLEANING, FUEL PRESSURIZING AND DUMP VALVE FUEL SCREEN.

For the fuel pressurizing and dump valve fuel screen cleaning procedures, see figure 2-8.

2-37. CLEANING, ENGINE FUEL SUPPLY STRAINER.

For cleaning information for the engine fuel supply strainer, refer to T. O. 1F-106A-2-5.

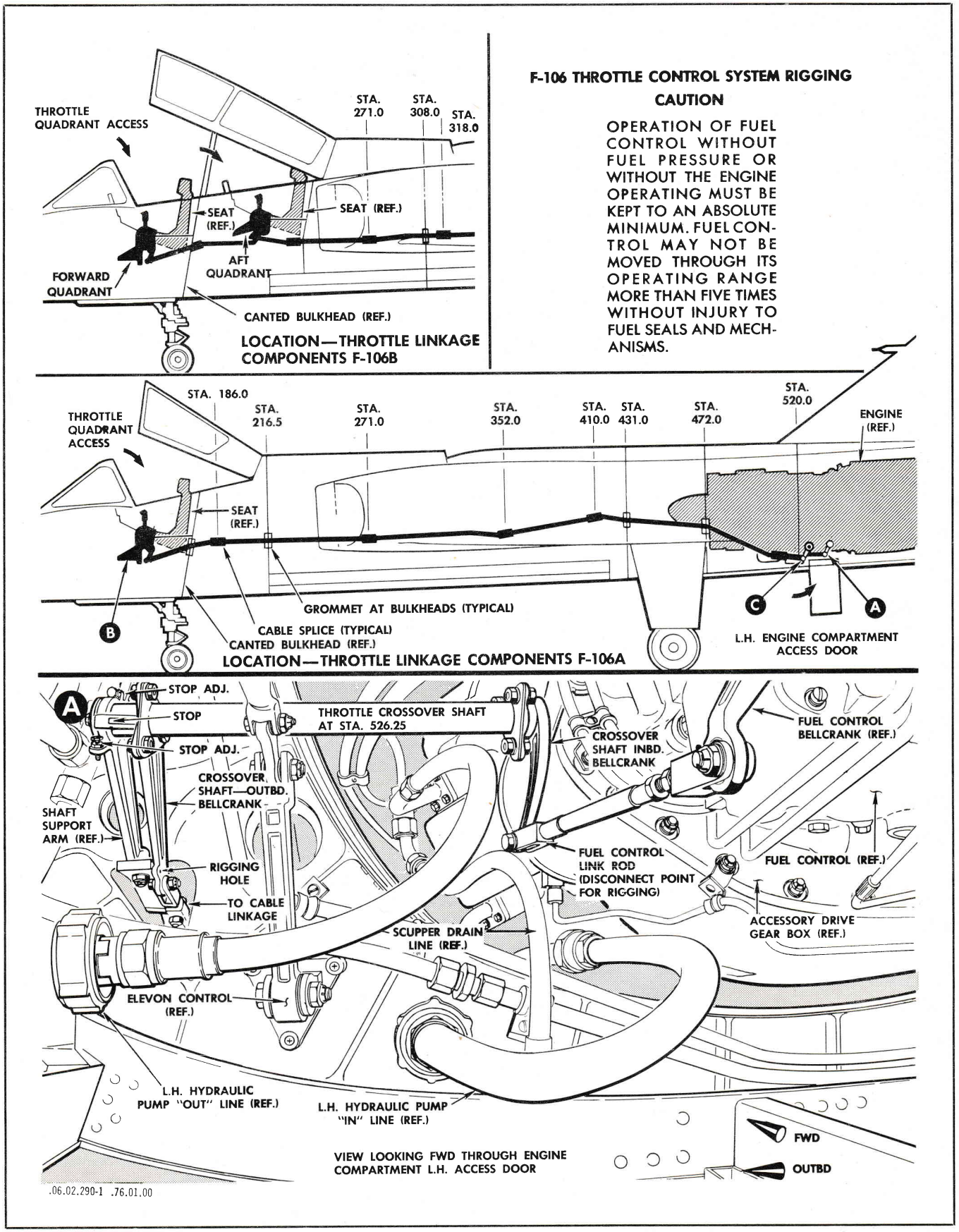
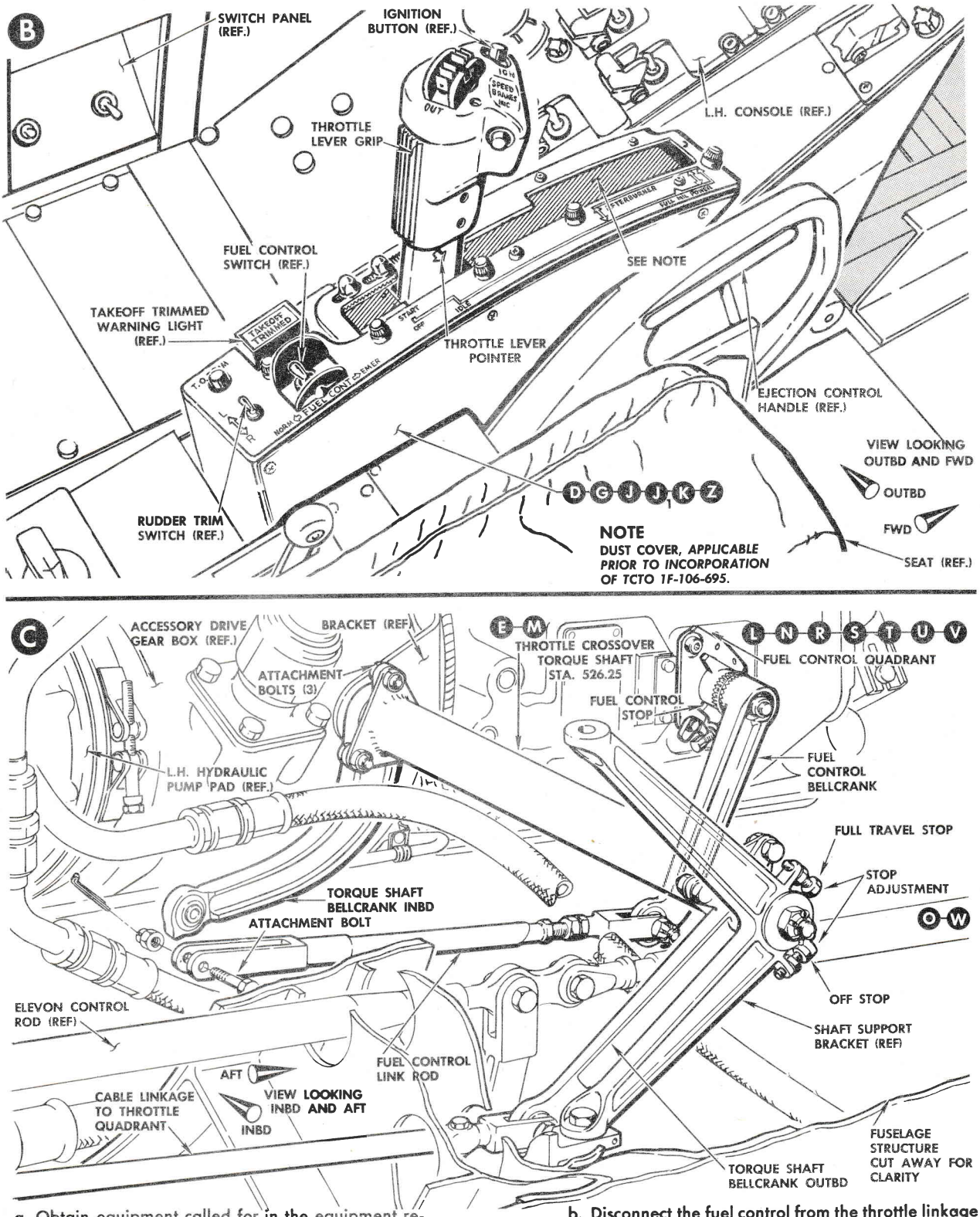


Figure 2-6. Throttle Control System Rigging (Sheet 1 of 8)

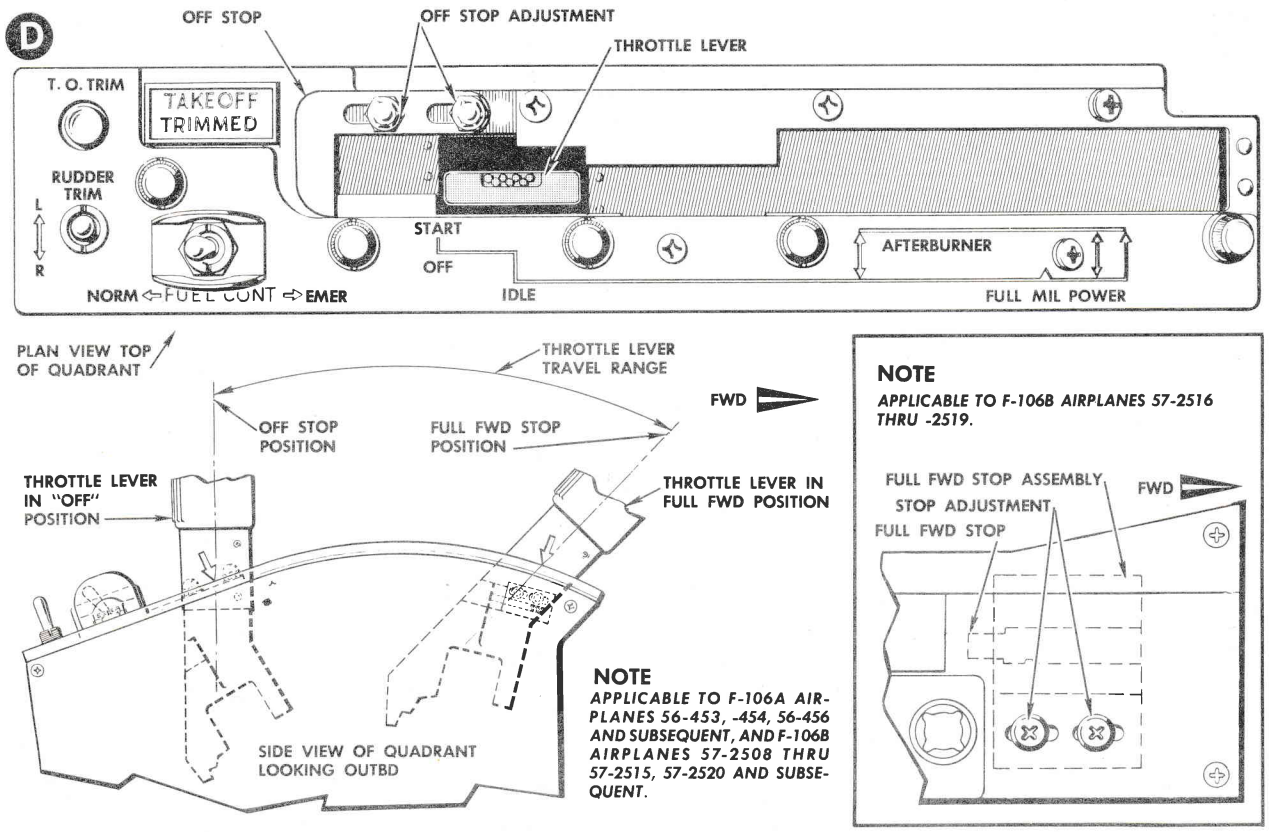


a. Obtain equipment called for in the equipment requirements list.

b. Disconnect the fuel control from the throttle linkage at the bellcrank on the inboard end of the throttle crossover shaft, at station 526.25.

.06.02.290-2D .76.01.00

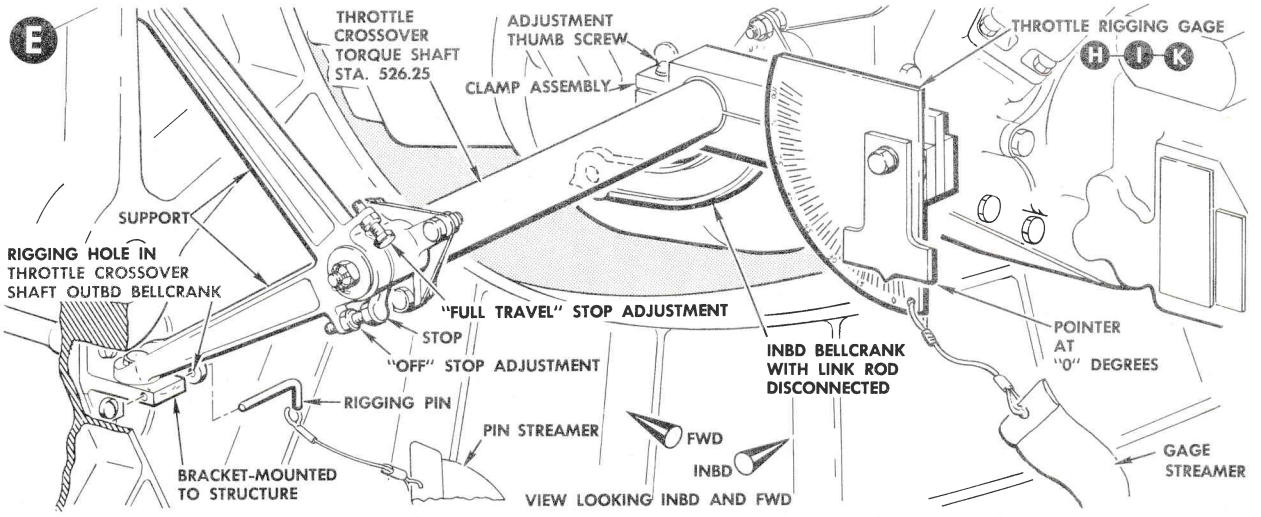
Figure 2-6. Throttle Control System Rigging (Sheet 2 of 8)



RIGGING PROCEDURE

a. Back off stops at the "OFF" and full forward positions on the throttle quadrant (forward and aft quadrants on F-106B) and at the aft bellcrank at station 526.25. See Detail "E" for the aft stops.

b. Place throttle levers in cockpit in the "OFF" position. On F-106B airplanes check forward throttle lever for free movement in and out of start position. Adjust linkage between quadrants as required to obtain free movement.



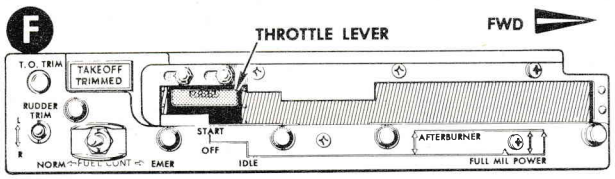
c. Install 8-96076-11 rigging pin between throttle crossover shaft outboard bellcrank and fuselage structure at station 526.25.

d. Install throttle rigging gage 8-96095 on throttle crossover shaft. Adjust gage pointer to align with 0° mark on gage. Tighten gage adjustment screw.

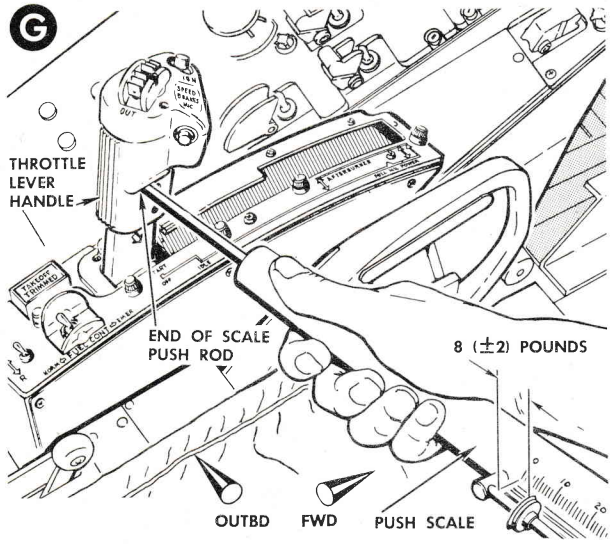
e. Remove rig pin in bellcrank at station 526.25.

.06.02.290-3D

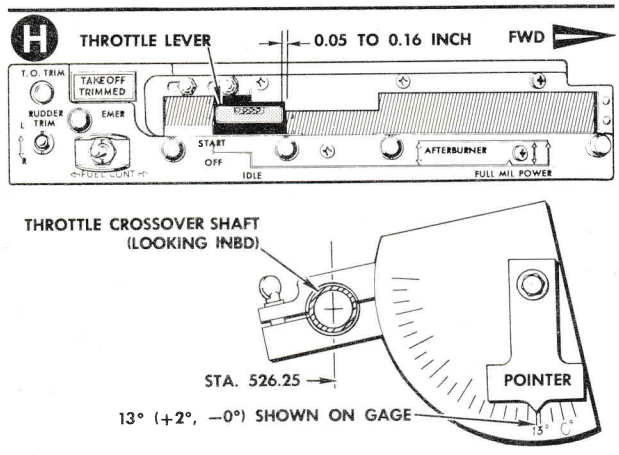
Figure 2-6. Throttle Control System Rigging (Sheet 3 of 8)



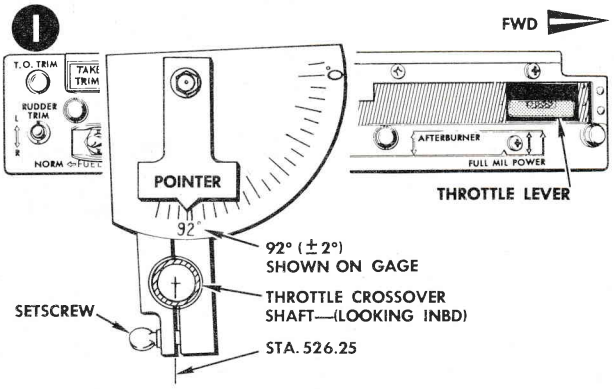
f. Move throttle lever outboard from "OFF" to "START" position. Listen for positive actuation of starter switch in the forward quadrant. Lever will return to "OFF" position when released. On F-106B airplanes, switch is located in forward quadrant only.



g. Measure force required to move throttle from "OFF" to "START," using spring compression type scales. Force required shall be 8 (±2) pounds measured at base of throttle lever grip.

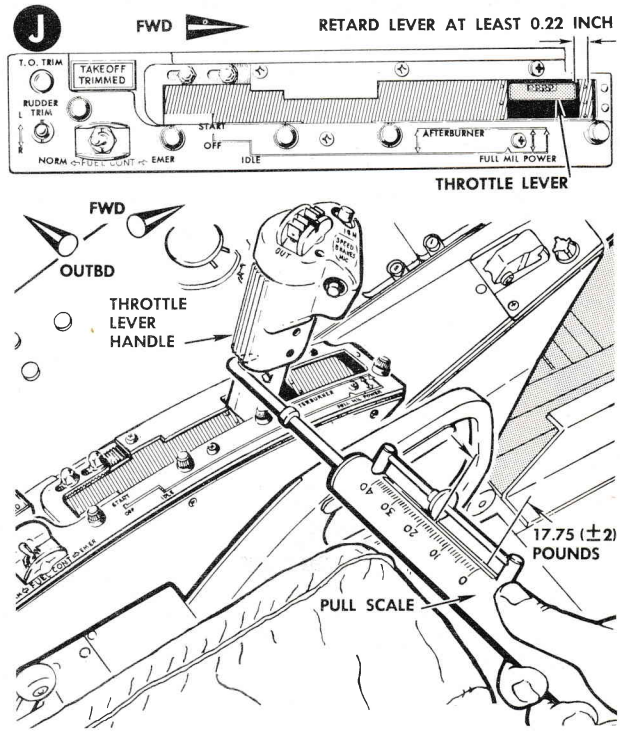


h. Move throttle lever or levers from "OFF" position until lever is within 0.05 to 0.16-inch from quadrant "IDLE" stop; gage reading shall be 13°(+2°, −0°).



i. Move throttle forward to "FULL MILPWR." Check rigging gage at station 526.25 for 92° (±2°) travel from the "OFF" position. Listen for deactuation of landing gear warning switch in throttle quadrant when "FULL MILPWR" is reached. On F-106B airplanes, switch is in forward quadrant only.

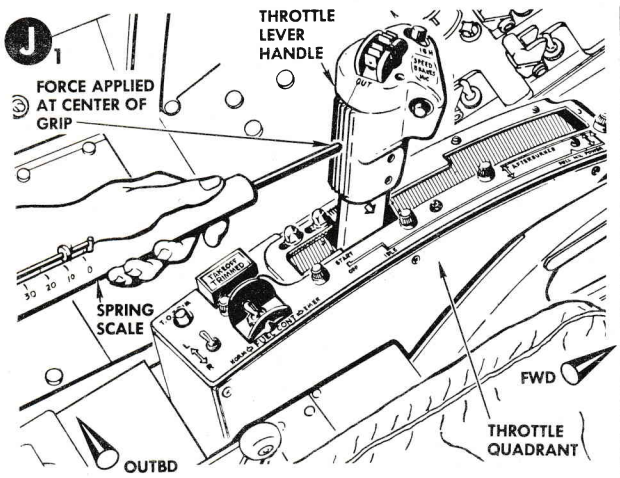
j. Move throttle lever or levers forward enough to see that 97° to 100° travel, as indicated on rigging gage at station 526.25, is obtainable without teleflex cable bottoming out.



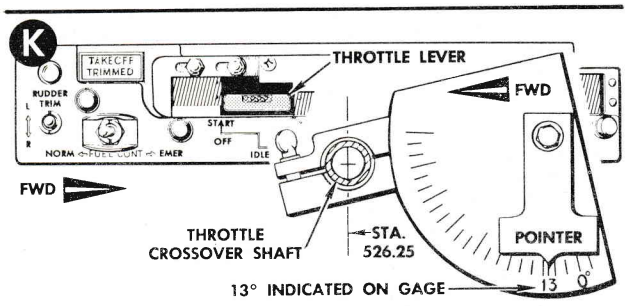
k. Move throttle lever or levers individually outboard to "AFTERBURNER;" listen for "AFTERBURNER" switch actuation. Move lever forward as far as possible. It shall not be possible to move throttle out of "AFTERBURNER" sector until throttle has been retarded at least 0.22 inch. Force required to move throttle in or out of "AFTERBURNER" sector, using springscales, shall be 17.75 (±2) pounds. Scales to be applied at the base of throttle lever grip.

.06.02.290-4 D

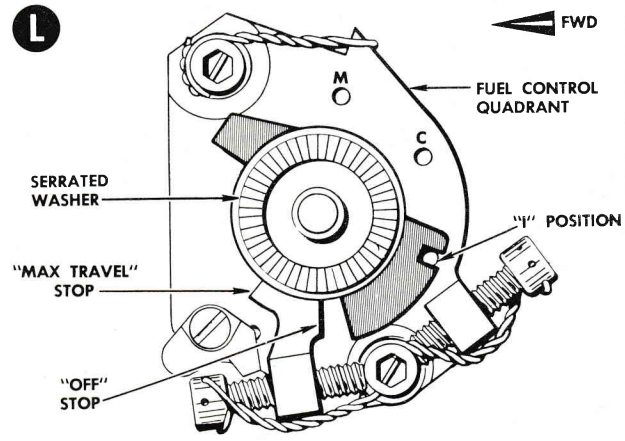
Figure 2-6. Throttle Control System Rigging (Sheet 4 of 8)



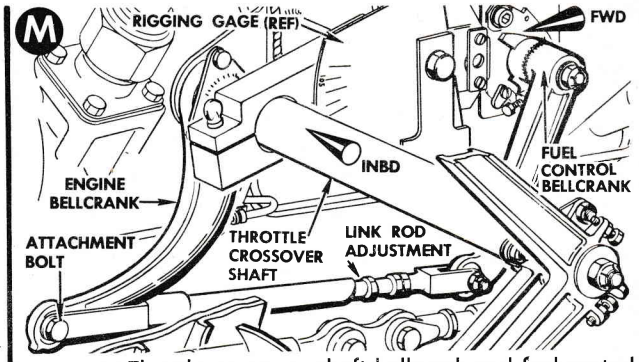
k1. Using a spring scale, check throttle for the following maximum operating forces: *Applicable to F-106A airplanes,* "OFF" to "IDLE", 6.0 pounds; "IDLE" to forward stop, 4.0 pounds. *Applicable to F-106B airplanes,* "OFF" to "IDLE", 6.5 pounds; "IDLE" to forward stop, 4.5 pounds.



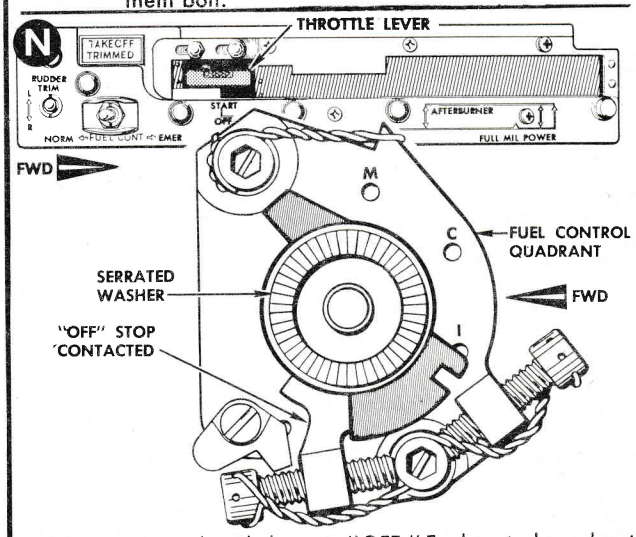
l. Position throttle in cockpit at "IDLE;" 13° indicated on rigging gage.



m. Set fuel control quadrant indicator at "I" position on fuel control quadrant. Fuel control linkage shall be in noticeable "IDLE" detent.



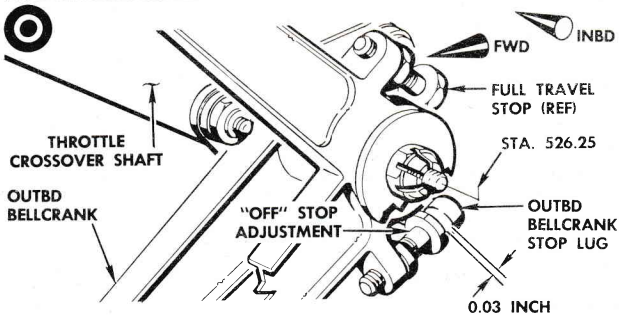
n. Throttle crossover shaft bellcrank and fuel control linkage rod holes shall align. Adjust linkage rod as required to obtain hole alignment; install attachment bolt.



o. Move throttle lever to "OFF." Fuel control quadrant shall be in the "OFF" position with stop on fuel control contacted.

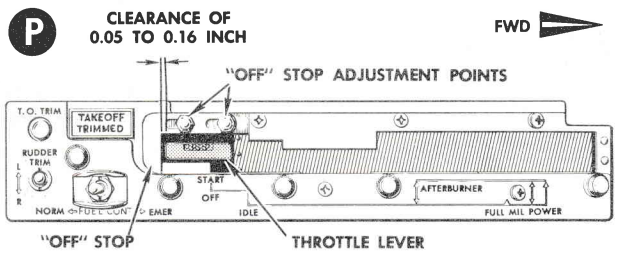
NOTE

IN F-106B AIRPLANES, WHEN MOVING THE THROTTLE FROM "IDLE" TO "OFF" FROM THE REAR COCKPIT, IT WILL BE NECESSARY TO MANUALLY POSITION THE FORWARD THROTTLE OUTBOARD BEYOND THE IDLE STOP.

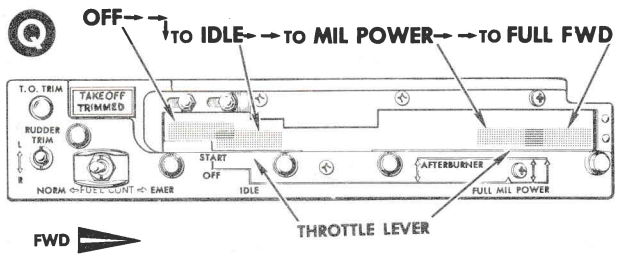


p. Adjust "OFF" stop at outboard end of throttle crossover shaft at station 526.25 for a clearance of 0.03 inch; lock stop with jam nut. .06.02.290-5B .76.01.00

Figure 2-6. Throttle Control System Rigging (Sheet 5 of 8)

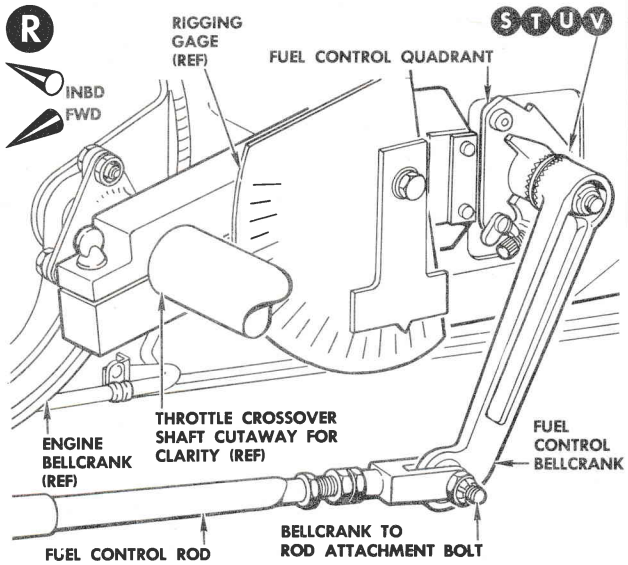


q. Adjust "OFF" stop at throttle quadrant or quadrants for a clearance of 0.05 to 0.16 inch; tighten stop bolts.

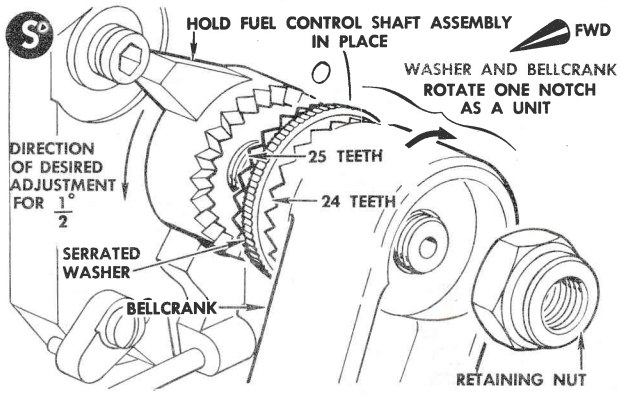


r. Move throttle lever from "OFF" to "IDLE," to "MIL PWR," to full forward position and record fuel control quadrant readings. Reading shall be as follows:

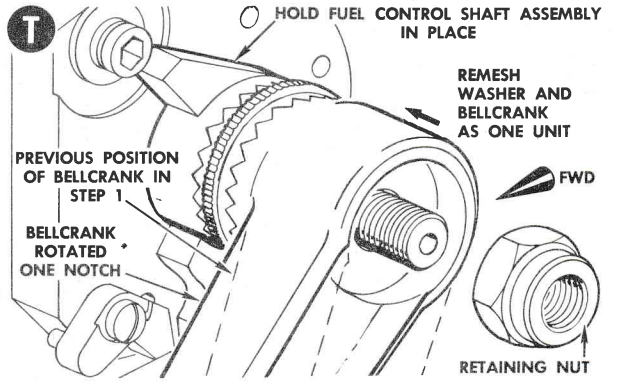
"OFF"	Off stop on fuel control contacted.
"IDLE"	"I" position on fuel control aligned with arm.
"MIL PWR"	"M" position on fuel control aligned with arm.
Full Forward position	Forward stop on fuel control contacted.



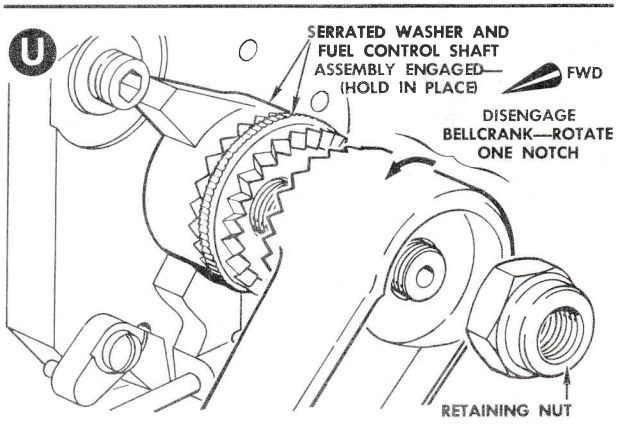
s. If the adjustment of the fuel control rod assembly is not adequate to obtain these values, adjust the location of the fuel control bellcrank. The serrated washer between the fuel control bellcrank has 25 teeth that mesh with the fuel control shaft, and 24 teeth that mesh with the bellcrank. By following the procedure given below, a net adjustment of approximately $\frac{1}{2}^\circ$ or multiples of $\frac{1}{2}^\circ$ is obtainable.



t. Loosen fuel control bellcrank retaining nut. Consider washer and bellcrank as an assembly. While holding the fuel control shaft stationary, rotate one notch in the opposite direction of the desired adjustment.



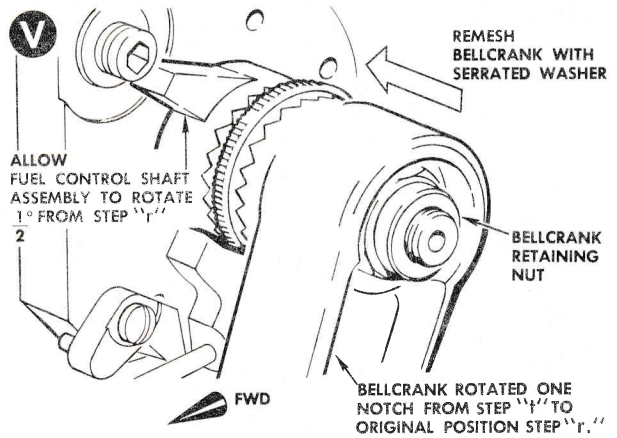
u. Remesh assembly with fuel control shaft.



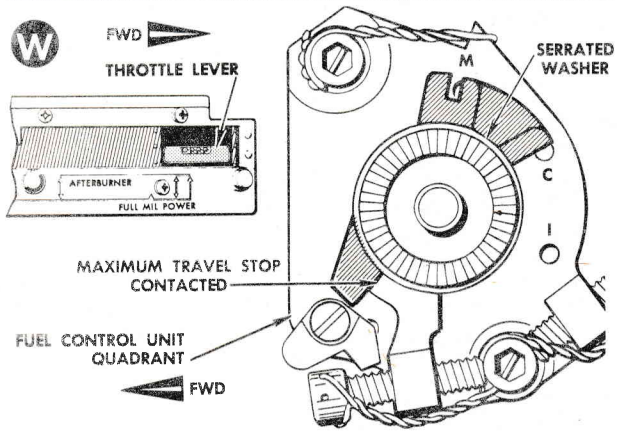
v. Pull bellcrank out of mesh with washer and rotate bellcrank one notch in opposite direction from that performed in step "t."

.06.02.290-6B .76.01.00

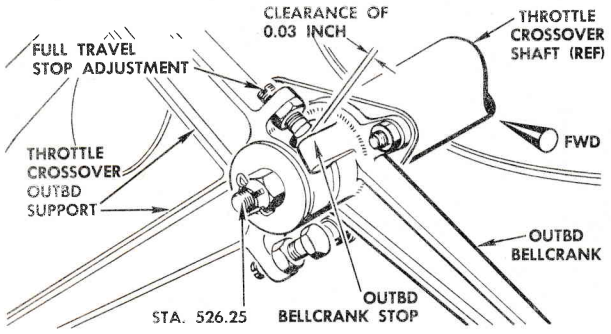
Figure 2-6. Throttle Control System Rigging (Sheet 6 of 8)



w. Remesh and tighten bellcrank retaining nut. Net rotation will be approximately ½° in direction of bellcrank rotation in step "u." Net rotation may be increased by increasing number of notches rotated. For example, rotate assembly 4 notches in one direction as stated in step "t" and 4 notches in opposite direction as stated in step "v" to obtain a net change of approximately 2°. Net rotation will always be in direction bellcrank was rotated.

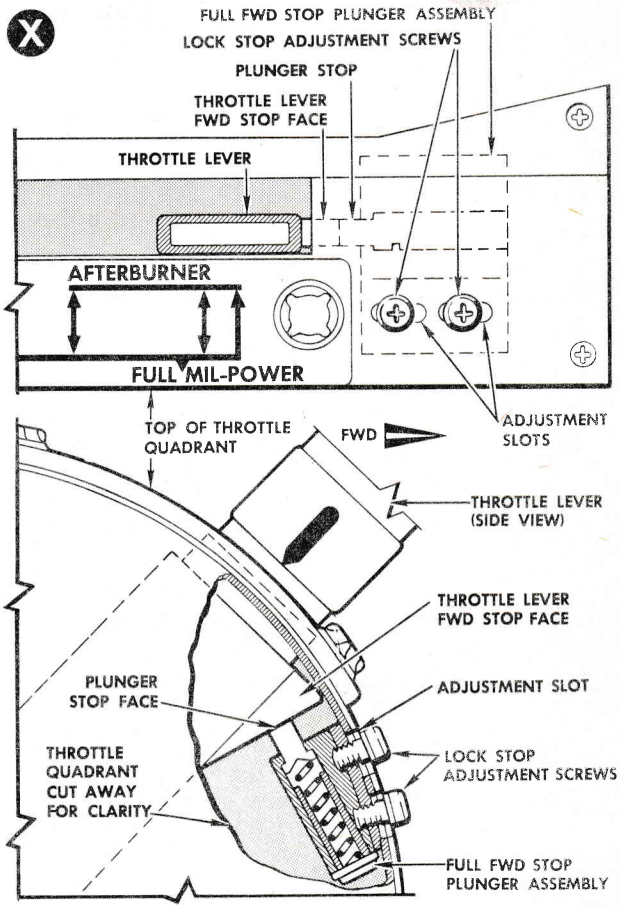


x. With throttle lever in full forward position, the fuel control maximum travel stop shall be contacted.



Adjust full travel stop at outboard end of throttle crossover shaft at station 526.25 for a clearance of 0.03 inch; lock stop with jam nut.

.06.02.290-7D



NOTE

APPLICABLE TO F-106B AIRPLANES 57-2516 THRU -2519.

y. Move throttle quadrant full forward stop until contact is made with throttle lever; secure stop.

NOTE

APPLICABLE TO F-106A AIRPLANES 56-453, -454, 56-456 AND SUBSEQUENT, AND F-106B AIRPLANES 57-2508 THRU 57-2515, 57-2520 AND SUBSEQUENT.

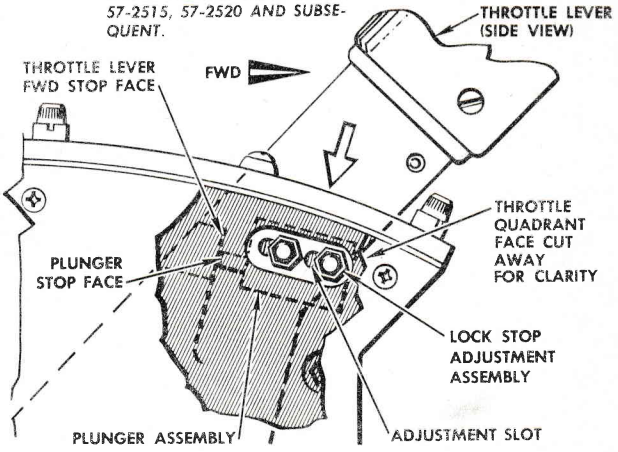
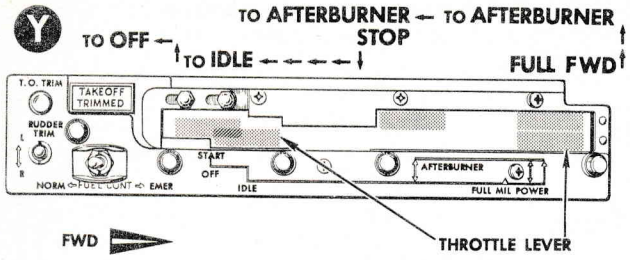
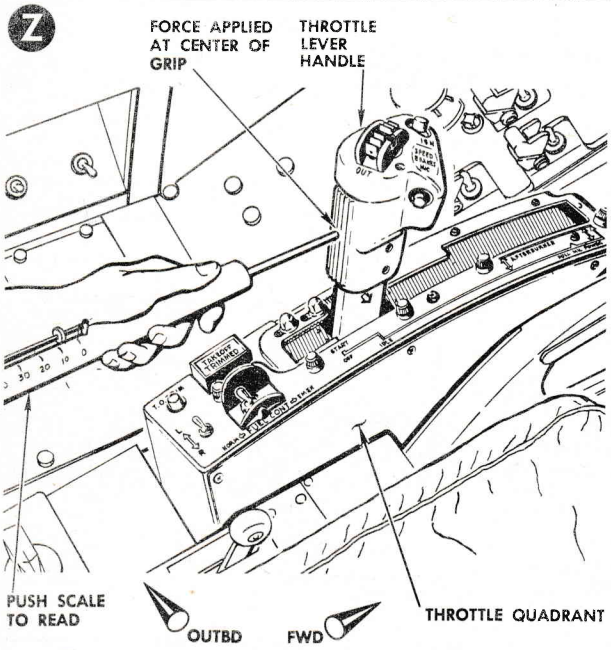


Figure 2-6. Throttle Control System Rigging (Sheet 7 of 8)



z. Move throttle lever to "AFTERBURNER" sector and retard to the afterburner stop, then inboard to the "IDLE" stop, then to "OFF." Record fuel control readings at each of the following points. Readings shall be as follows:

"IDLE"	"I" position on fuel control aligned with arm.
"OFF"	Stop contacted.



aa. Using a spring scale, apply force to center of throttle lever grip as indicated. Check throttle for the following maximum operating forces: *Applicable to F-106A airplanes,* "OFF" to "IDLE", 9.3 pounds; "IDLE" to forward stop, 7.5 pounds. *Applicable to F-106B airplanes,* "OFF" to "IDLE" 9.8 pounds; "IDLE" to forward stop, 8.0 pounds.

FINAL CLEANUP

a. Remove rigging gage from airplane.
b. Check that all linkage and stops are secure and safe.
c. Check that all rigging pins are removed.
d. Install access plate on inboard side of quadrant in cockpit.
e. Conduct engine operational checkout procedure.

CAUTION

EXERCISE CARE TO USE CORRECT LENGTH SCREWS (AN507-832R6) WHEN INSTALLING ACCESS PLATE. SCREWS OF EXCESSIVE LENGTH WILL DAMAGE QUADRANT INTERNAL COMPONENTS.

.06.02.290-8D .76.01.00

Figure 2-6. Throttle Control System Rigging (Sheet 8 of 8)

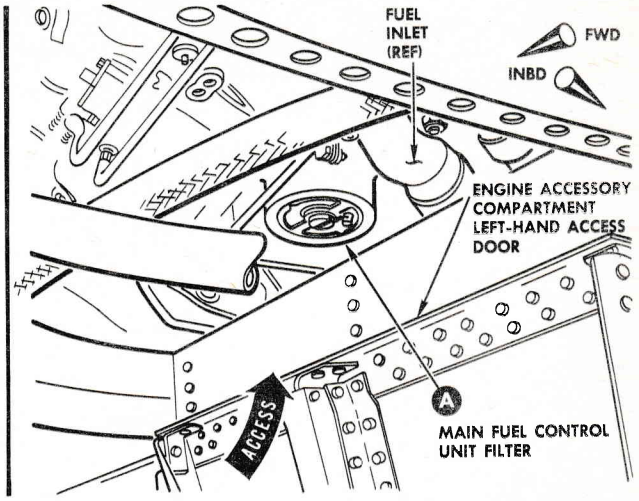
CLEANING, MAIN FUEL CONTROL FILTER

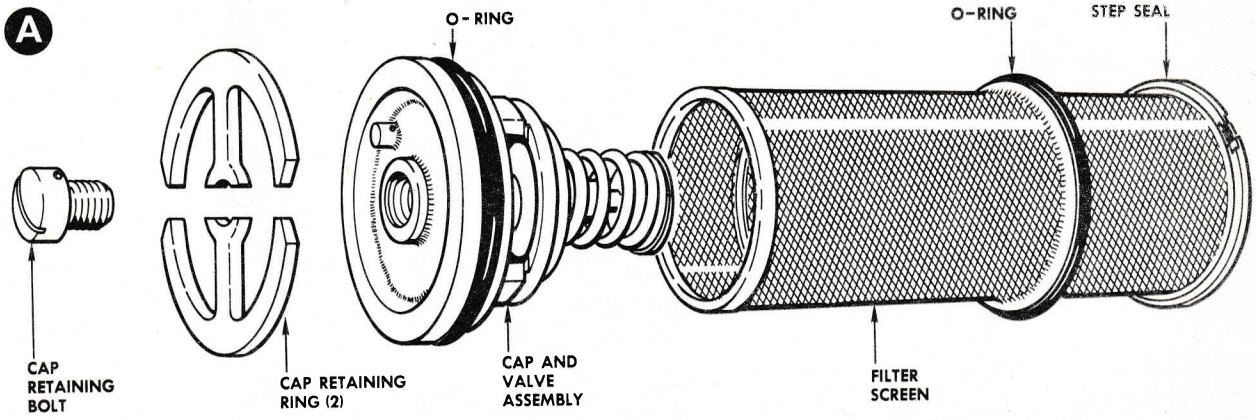
a. Gain access to main fuel control unit through the engine accessory compartment left-hand access door.
b. Cut safety wire and remove filter retaining bolt.

NOTE

FILTER IS LOCATED ON LOWER SIDE OF FUEL CONTROL UNIT, JUST FORWARD OF THE FUEL INLET.

c. Remove filter retaining cap, filter, and O-rings.
d. Check filter screen for contamination. Replace filter screen if it is clogged, bent, or otherwise damaged.
e. Clean filter screen using cleaning solvent, Federal Specification P-S-661; blow dry with compressed air.
f. Install filter screen using new O-ring seal.
g. Install filter retaining cap, new O-ring, and bolt; safety bolt.
h. Visually check fuel control filter installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.





CLEANING, MAIN FUEL PUMP STRAINER

a. Gain access to engine fuel pump through the engine accessory compartment right-hand access door.
b. Remove attachment bolts (4) and remove strainer cover; remove strainer.

NOTE

STRAINER IS LOCATED ON THE LOWER RIGHT-HAND SIDE OF THE FUEL PUMP.

c. Check strainer for contamination. Replace strainer if it is clogged, bent or otherwise damaged.
d. Clean strainer using solvent, Federal Specification P-S-661; blow dry with compressed air.
e. Install strainer in fuel pump using new seal; install cover. Safety bolts in pairs.
f. Visually check fuel pump strainer installation for fuel leakage during first engine ground run idle rpm. Refer to Section I for engine ground run procedures.

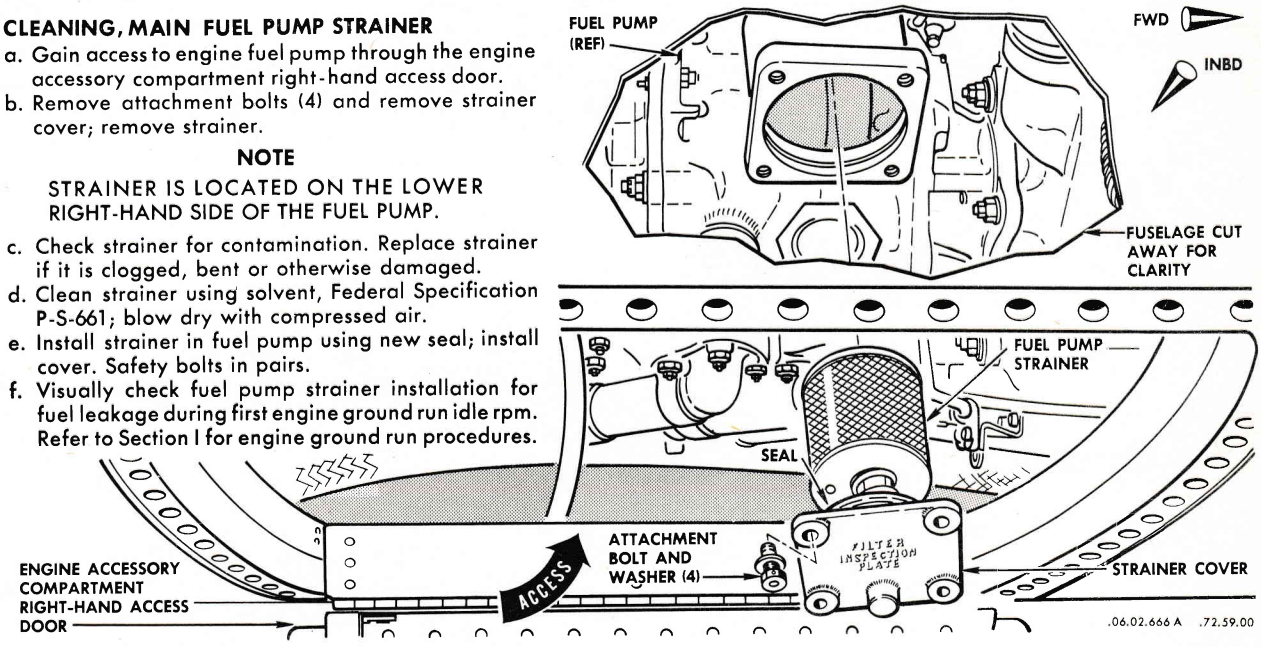
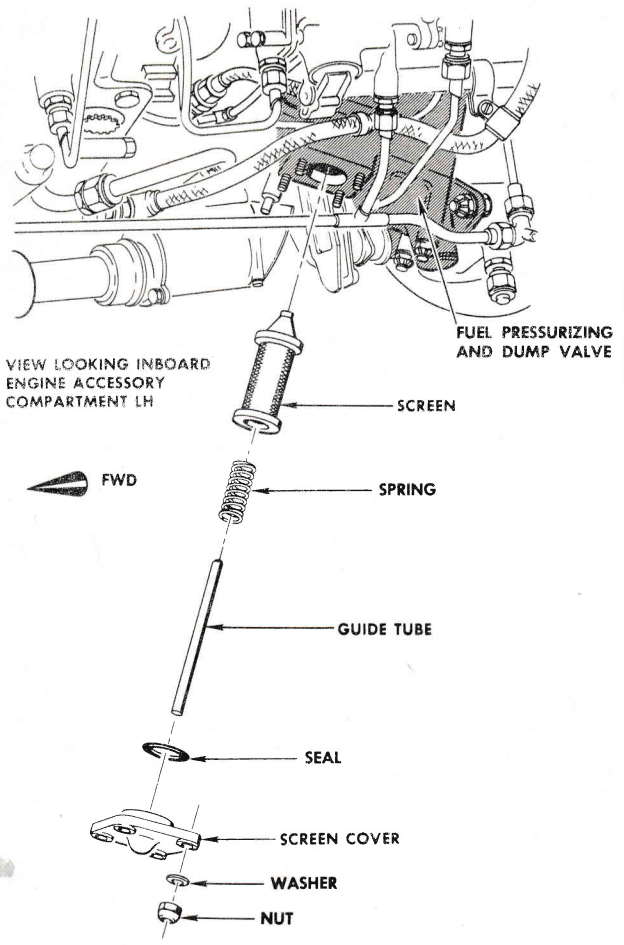
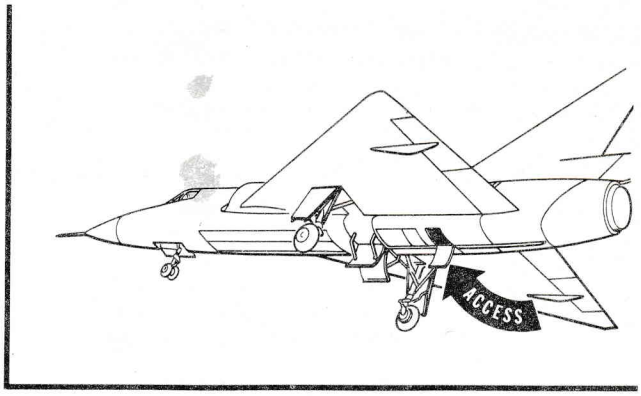


Figure 2-7. Cleaning, Main Fuel Filter and Fuel Pump Strainer





CLEANING, FUEL PRESSURIZING AND DUMP VALVE FUEL SCREEN.

Gain access to fuel pressurizing and dump valve through the engine accessory compartment access doors.

a. Remove four (4) nuts from large square cover at bottom of valve assembly.
b. Remove cover, spring, and screen from valve. Slide screen and spring off the long guide tube which is a part of the cover.
c. Check screen for contamination. Replace screen if clogged, bent, or otherwise damaged.
d. Clean screen using solvent, Federal Specification P-S-661; blow dry using compressed air.
e. Install new seal on cover.
f. Install screen and cover.
g. Visually check fuel screen installation for fuel leakage during first engine ground run idle rpm. Refer to Station I for engine ground run procedures.

Figure 2-8. Cleaning, Fuel Pressurizing and Dump Valve Screen