CHAPTER

73

ENGINE FUEL AND CONTROL

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Gates Learjet Corporation

maintenance manual

Record of Temporary Revisions

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GENERAL - DESCRIPTION AND OPERATION

1. DESCRIPTION

A. Fuel from the aircraft fuel system is pumped through the engine fuel system by the fuel pump, filtered, metered by the fuel control, delivered to the combustor by the fuel manifold and atomized for efficient combustion by the fuel nozzles. The fuel pump is mounted on the aft side of the accessory gearbox and provides the drive for the fuel control. The fuel control function is accomplished by the engine-mounted fuel control and by the electronic computer located in the airframe. The flow divider valve of the fuel control assembly provides primary and secondary fuel flows to the fuel manifolds. Primary fuel flow is provided during starts and supplies secondary fuel flow as fuel flow requirements increase. The flow divider valve also provides a drain path for the primary nozzles of the fuel manifolds at shutdown.

B. For information pertaining to the fuel control, fuel manifold and fuel nozzles, refer to Engine Maintenance Manual.

FUEL FLOW INDICATING - DESCRIPTION AND OPERATION

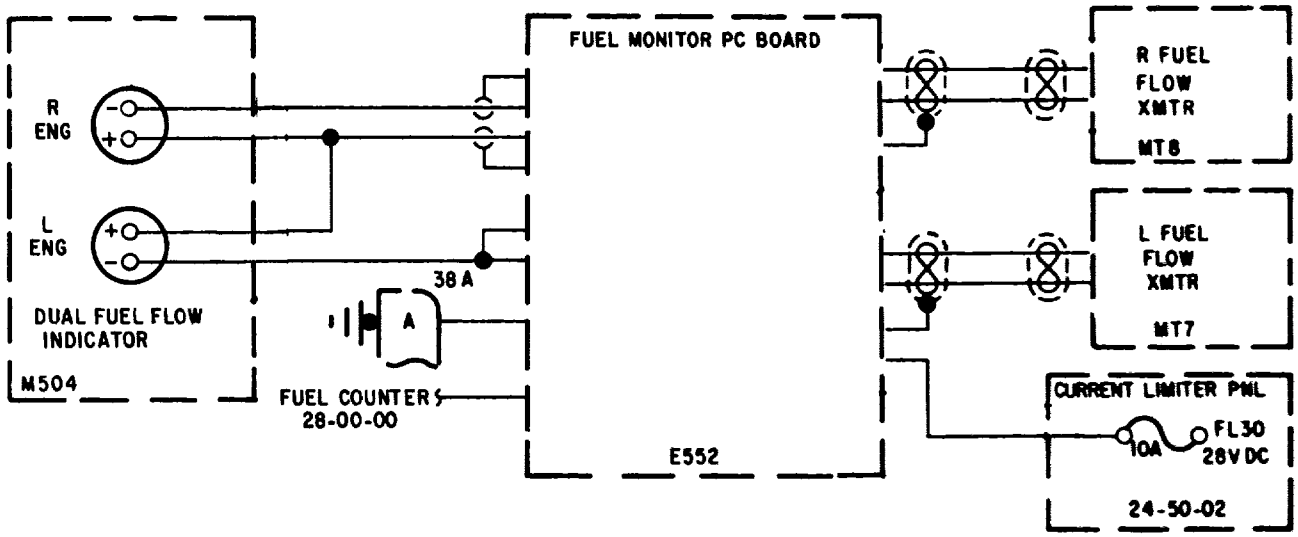
1. DESCRIPTION

A. The engine fuel flow indicating system consists of a fuel flow transmitter located on each engine, a fuel monitor printed circuit board located in the fuel control box in the tailcone, a fuel flow indicator located on the instrument panel. The system is powered by 28 vdc supplied through a 10-ampere current limiter.

(1) The fuel control box is located on the lower side of the RH electrical equipment tray in the tailcone.

2. OPERATION (See figure 1.)

A. The transmitters measure fuel flow by means of a rotor-turbine assembly in each engine fuel line. An increase or decrease in fuel flow causes the rotor-turbine assembly speed to increase or decrease. A pickup coil sensing device converts any change in electromagnetic flux caused by the rotating rotor-turbine assembly into alternating voltage. These alternating voltages are applied to the fuel monitoring circuit and converted into DC electrical signals. The DC electrical signals are applied to the fuel flow indicator. In addition, these electrical signals are applied to the fuel counter system, when installed.



Fuel Flow Electrical Control Schematic
Figure 1

FUEL FLOW INDICATING - MAINTENANCE PRACTICES

1. ADJUSTMENT/TEST

A. Functional Test of Fuel Flow Indicating System. (See figure 201.)

(1) Tools and Equipment

NOTE: Equivalent substitutes can be used in lieu of the following.

Name	Number	Manufacturer	Use
Audio Oscillator	200 C-D	Hewlett-Packard	Simulate fuel flow
Voltmeter	400 D	Hewlett-Packard	Monitor voltage of audio oscillator.

(2) Remove engine lower nacelle from LH and RH engines.
(3) Disconnect electrical connector from each fuel flow transmitter.
(4) Connect one lead from audio oscillator to pin A of LH and RH connectors.
(5) Connect one lead from audio oscillator to pin B of LH and RH connectors.
(6) Connect voltmeter so as to monitor voltage supplied by audio oscillator.
(7) Apply 28 vdc to aircraft.
(8) Adjust audio oscillator to frequency and voltage as shown in figure 201 and check LH and RH fuel flow indicator pointers at same time for indication shown ±5 percent. Difference in fuel flow between left and right shall not exceed 50 pounds.
(9) Remove electrical power from aircraft.
(10) Disconnect test equipment.
(11) If indications did not fall within stated tolerances, check continuity of wiring. When wiring is correct, preform Functional Test of Dual Pointer Fuel Flow Indicator. (Refer to 73-31-02.)
(12) Connect electrical connector to each fuel flow transmitter and install safety wire.
(13) Install engine lower nacelle on each engine.

Frequency	Voltage	Indication
18 HZ	1.0 v	500 pounds
36 HZ	1.0 v	1000 pounds
53 HZ	1.0 v	1500 pounds
71 HZ	1.0 v	2000 pounds

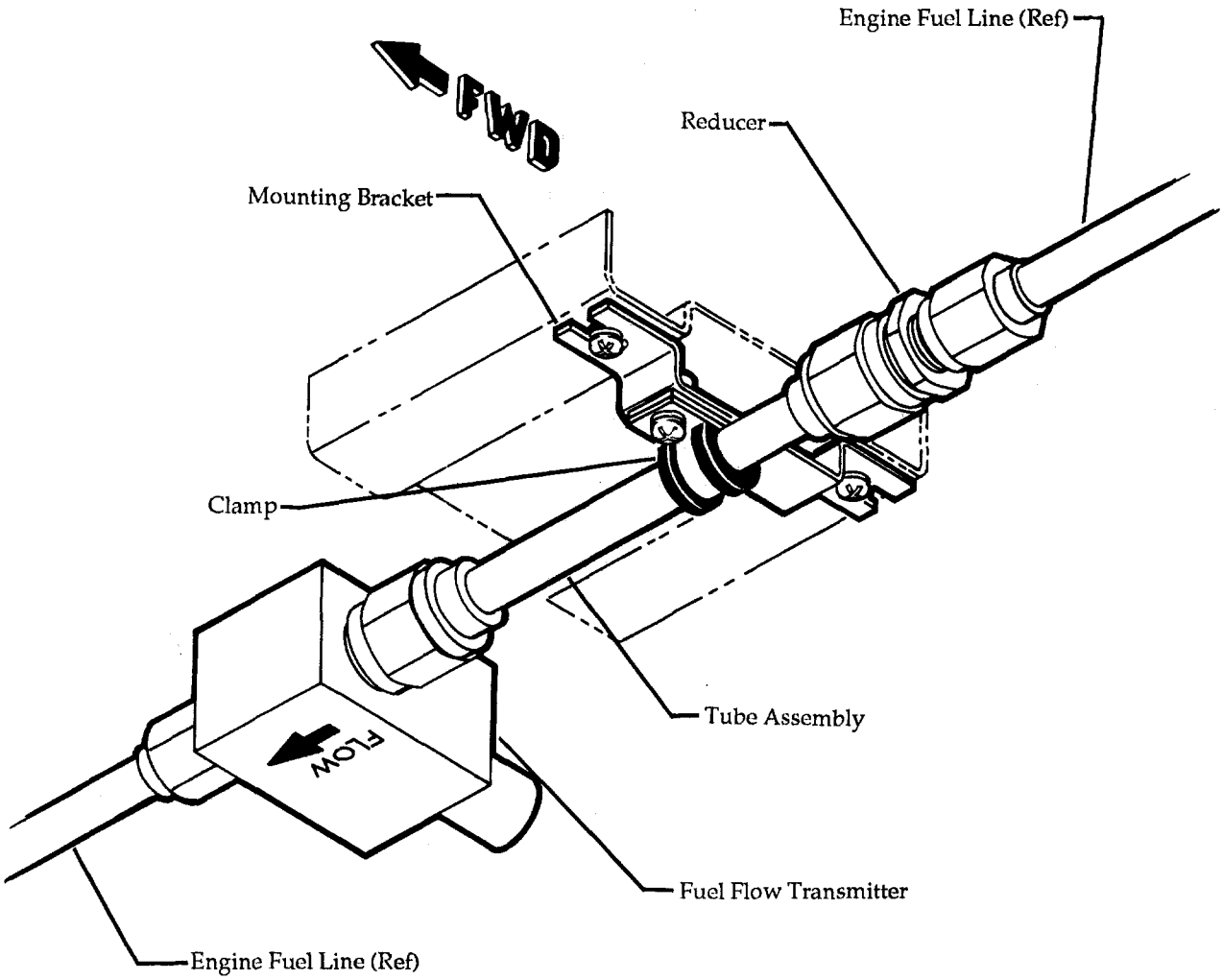
Fuel Flow Indicating System Test
Figure 201

FUEL FLOW TRANSMITTER - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION
   A. Remove Fuel Flow Transmitter (See figure 201.)
      (1) Remove engine lower nacelle.

WARNING: AIRCRAFT FUEL IS HIGHLY FLAMMABLE. BEFORE LOOSENING ANY FUEL LINES OR COMPONENTS THAT CONTAIN FUEL, AIRCRAFT MUST BE PROPERLY GROUNDED AND ALL AUXILIARY ELECTRICAL POWER MUST BE SHUT OFF AND DISCONNECTED. BATTERIES ARE TO BE DISCONNECTED.

      (2) Place suitable container under transmitter to catch any fuel in lines.
      (3) Disconnect fuel lines from transmitter.
      (4) Cut safety wire and disconnect electrical connector from transmitter.
      (5) Remove attaching parts and transmitter from engine.
   B. Install Fuel Flow Transmitter (See figure 201.)
      (1) Install transmitter and secure with attaching parts. Ensure that flow arrow is pointed in proper direction.
      (2) Connect electrical connector to transmitter and safety wire connector.
      (3) Connect fuel lines to transmitter.
      (4) Install engine lower nacelle.



View Looking Up at Aft End of Engine
(TYPICAL)

Fuel Flow Transmitter Installation
Figure 201

FUEL FLOW INDICATOR - MAINTENANCE PRACTICES

1. REMOVAL/INSTALLATION

NOTE: The indicator is secured to the engine instrument panel by a clamp which incorporates a self-tightening action. One screw holds the clamp to the panel, while the remaining screw tightens the clamp.

A. Remove Fuel Flow Indicator (See figure 201.)
   (1) Remove power from aircraft.
   (2) Lower copilot's instrument panel.
   (3) Disconnect electrical connector from fuel flow indicator.

CAUTION: WHEN ELECTROLUMINESCENT (EL) PANEL ATTACHING PARTS ARE REMOVED, USE EXTREME CAUTION NOT TO BREAK WIRING TO THE EL PANEL.

   (4) Remove attaching parts and electroluminescent (EL) panel. This will allow access to the instrument clamp attaching parts.
   (5) Loosen and remove screws securing instrument clamp to panel.
   (6) Remove fuel flow indicator and spacers from panel.
   (7) Remove instrument clamp from indicator.

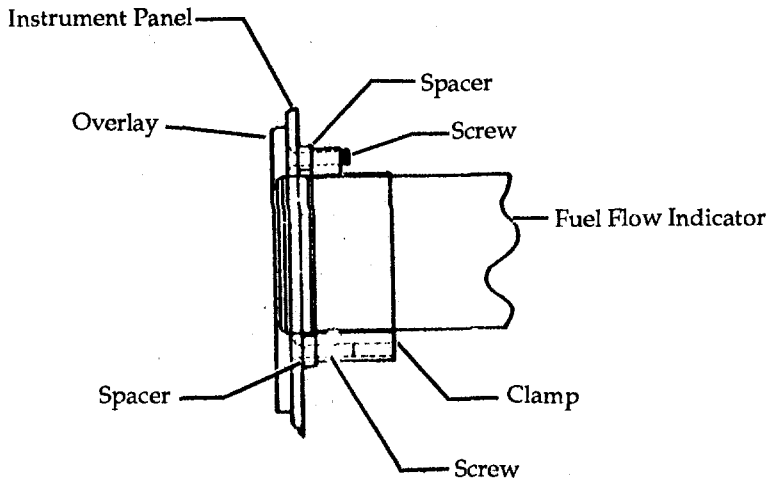
B. Install Fuel Flow Indicator (See figure 201.)
   (1) Install instrument clamp on indicator.
   (2) Install indicator and spacers and secure to engine instrument panel.
   (3) Install EL panel and secure with attaching parts.
   (4) Connect electrical connector to indicator.
   (5) Raise copilot's instrument panel and secure.
   (6) Restore power to aircraft.

2. ADJUSTMENT/TEST

A. Functional Test of Dual Fuel Flow Indicator (See figures 202 and 203)

NOTE: No adjustment of the fuel flow indicator is allowed.

   (1) Remove fuel flow indicator from instrument panel. (Refer to Removal/ Installation.)
   (2) Connect negative (-) power supply (regulated power supply capable of 0.0 to 0.7334 milliampere) lead to J751-B and positive (+) lead to J751-A.
   (3) Apply current to indicator, check indication, and record readings.
   (4) Connect negative (-) power supply lead to J751-D and positive (+) lead to J751-C.
   (5) Repeat step A.(3).
   (6) If indicator readings are not within tolerances or if the RH and LH pointers differ by 50 pounds or more, the indicator shall be replaced.
   (7) Install fuel flow indicator in instrument panel. (Refer to Removal/ Installation.)



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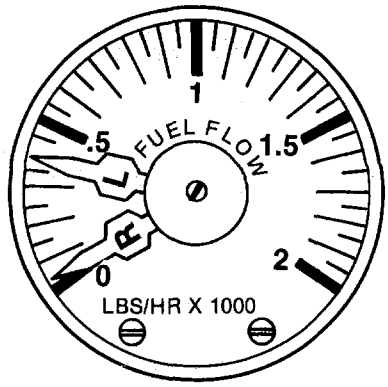
Fuel Flow Indicator Installation
Figure 201



INDICATOR FACE

Dual Fuel Flow Indicator Test
Figure 202

Fuel Flow Indicator	Applied Milliampere (mA)	INDICATOR READINGS			
		Required Lbs.	TOLERANCE		ACTUAL LBS
			Min. Lbs.	Max. Lbs.	
L Pointer	0.167	500	460	540	----
	0.333	1000	960	1040	----
	0.500	1500	1460	1540	----
	0.667	2000	1960	2040	----
R Pointer	0.167	500	460	540	----
	0.333	1000	960	1040	----
	0.500	1500	1460	1540	----
	0.667	2000	1960	2040	----

Dual Fuel Flow Indicator Tolerance
Figure 203

FUEL FLOW CONTROL BOX - MAINTENANCE PRACTICES

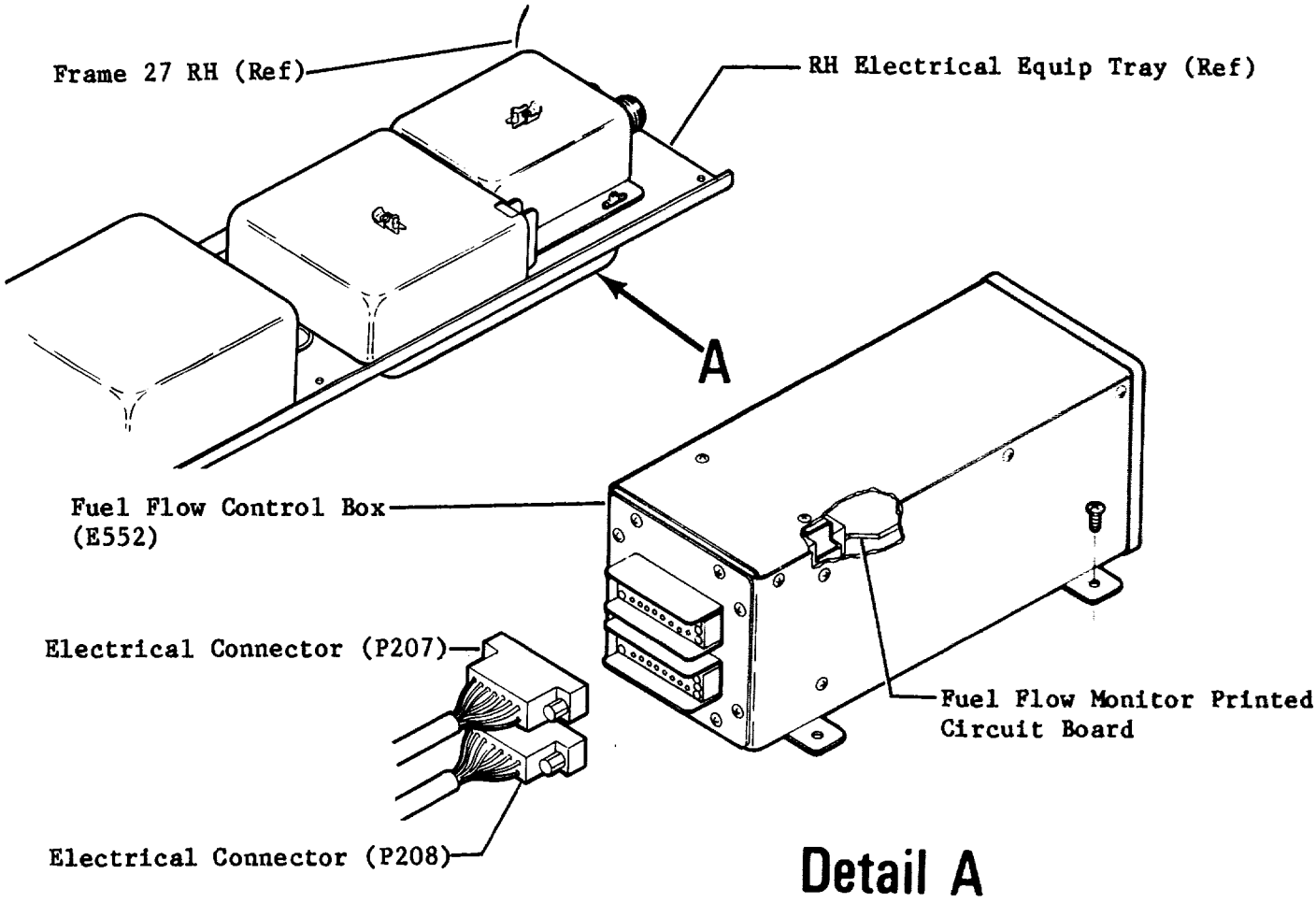
1. REMOVAL/INSTALLATION

A. Remove Fuel Flow Control Box (See figure 201.)

(1) Lower tailcone access door.
(2) Disconnect electrical connectors from box.
(3) Remove attaching parts and box from panel.
(4) Remove cover from box.
(5) Remove printed circuit board from box.

B. Install Fuel Flow Control Box (See figure 201.)

(1) Insert printed circuit board in box.
(2) Install cover and secure with attaching parts.
(3) Install box on RH electrical equipment tray and secure with attaching parts.
(4) Connect electrical connectors to box.
(5) Raise and secure tailcone access door.



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9-162B

Fuel Flow Control Box
Figure 201