

SERVICE BULLETIN



Diamond
AIRCRAFT

Service Bulletin No.: DA C1-28-01, Rev.0

Date Issued: October 8, 1998

Title: Type II Fuel System/Pump Retrofit

Page: 1 of 13

1. ATA Code: 2810

PLANNING INFORMATION:

2. Effectivity: DA20-C1 aircraft with Type I fuel systems S/N C0002 - C0013.

DA20-C1 aircraft with Facet fuel pumps S/N C0002 - C0035.

3. General: Part I of this SB addresses upgrade of the Type I fuel system to a Type II fuel system. This modification results in improved engine starting, improved fuel system performance and a reduction of the unusable fuel quantity. The modification includes replacement of the electric boost pump (FACET) with a higher performance model (DUKES), replacement of the existing single outlet fuel tank with a dual outlet fuel tank and miscellaneous associated fuel system modifications.

Part II of this SB addresses only the 'Dukes' pump installation in aircraft which already have the dual outlet tank installed.

4. Compliance: Compliance with part '1' and part '2' of this service bulletin is optional.

5. Approval: Engineering data referenced or contained in this bulletin is approved as part of the type design.

6. Labor: Approximately 4.0 hours will be required to accomplish this service bulletin.

This estimate is for direct labor performed by a technician and it does not include setup, planning, familiarization, cure time, part fabrication or tool acquisition.

7. Material: **Part 1**

Part Number	Description	Qty
22-2821-71-00	Gascolator assy.	1
AE7010000G0156	Fuel Hose	1
AE7010200G0087	Fuel Hose	1
AE7010000G0421	Fuel Hose	1
MS51958-65	Bolt	1
22-2824-00-12	Standoff	2
AN3-24A	Bolt	2
MS21919-WDF8	P Clamp	3
AN960-416L	Washer	3
AN4-5A	Bolt	3
MS3367-5-9	Cable Tie	6
AN960C-10L	Washer	7
MS21044N3	Lock Nut	3
22-2810-10-00	Anchor Strap assy.	1

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7. Material: Part 1(continued)

Part Number	Description	Qty
EMS-A-CO	Cable Tie Base	2
CSCS-M	Cable Spacer	1
22-2824-01-00	Fuel Pump assy.	1
22-2824-00-14	Fuel Pump Bracket	1
MS1527B6 or 960-040	Elbow Fitting	1
MS28778-6	O-Ring	2
MS24487D6 or 960-039	Straight Fitting	1
AN3-5A	Bolt	4
AN 960C10	Washer	4
2140-52-6	Drain Fitting	1
22-2824-00-15	Rubber Vent Hose	1
MS27039C1-05	Machine Screw	4
MS35338-43	Lock Washer	4
MS21047-L4	Nut Plate	1
CCR244SS3-04	Rivet	2
60619-1	Socket	2
1-480303-0	Connector	1
* 22-2861-00-00	Type II Fuel Tank	1
2-250-234	Cork Gasket	1
22-2810-00-01	Support Cushion	2
22-2810-94-00	Support Cushion, LH	1
22-2810-95-00	Support Cushion, RH	1
22-2810-94-02	Wedge	4 (A/R)
22-1120-00-25	Fuel Qty. Label , Exterior	1
22-3910-04-23	Fuel Qty, Label, Interior	1
22-2550-14-00	Dip Stick, Type II	1
MS3320-10	Circuit Breaker	1
22-0000-60-03	Left Access Door	1

The material listed above is available as a kit by ordering P/N DA C1-28-01AMK0.

* Type II Fuel Tank supplied without fuel quantity sender.

Material required but not supplied.

DP 110	Epoxy Adhesive	A/R
SEALUBE	Sealant	A/R
545	Loctite	A/R
.032	Lockwire	A/R

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7. Material:	Part 2		
	Part Number	Description	Qty
	2140-52-6	Drain Fitting	1
	22-2824-00-15	Rubber Vent Hose	1
	MS27039C1-05	Machine Screw	4
	MS35338-43	Lock Washer	4
	MS21047-L4	Nut Plate	1
	215-076	Rivnut	1
	CCR244SS-3-04	Rivet	2
	60619-1	Socket	2
	1-480303-0	Connector	1
	22-2824-01-00	Fuel Pump assy.	1
	22-2824-00-14	Fuel Pump Bracket	1
	MS1527B6 or 960-040	Elbow Fitting	1
	MS28778-6	O-Ring	2
	MS24487D6 or 960-039	Straight Fitting	1

The material listed above is available as a kit by ordering P/N DA C1-28-01BMK0.

Material required but not supplied.

SEALUBE	Sealant	A/R
545	Loctite	A/R
.032	Lockwire	A/R

8. Special Tools: Part 1, None. Part 2, 1/4" Rivnut Puller (alternate method, see 10.2.2)

9. References: DA20-C1Aircraft Maintenance Manual Doc. # DA201-C1.

10. 1 Accomplishment Instructions:

PART 1 Installation of Type II fuel system.

WARNING DO NOT ALLOW HEAT OR FIRE NEAR FUEL. FUEL BURNS VIOLENTLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING DO NOT GET FUEL ON YOUR SKIN. FUEL CAN CAUSE SKIN DISEASE.

Follow all of the usual safety precautions when working on the fuel system

10.1.1 Refer to the Aircraft Maintenance Manual DA202-C1, Ch. 28-10-00, pg 201, for the removal of the Type 1 fuel tank. Remove the fuel tank and fuel supply hose to the shutoff valve.

10.1.2 Remove the gascolator assembly (gascolator, shutoff valve and bracket) and fuel supply hose to the fuel pump.

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10.1 Accomplishment Instructions: (Continued)

- 10.1.3 Remove the fuel pump and tee fitting. Refer to the Aircraft Maintenance Manual DA202-C1, Ch. 28-20-00, pg 201, for the removal of the Facet fuel pump.
- 10.1.4 Remove the fuel sender from the tank. Remove the fittings and drains.
- 10.1.5 Break the S/N tab from the removed tank and return the tab to Diamond Aircraft. Clean the tank and discard.
- 10.1.6 Clean the removed gascolator, pump and hoses and return to Diamond Aircraft.
- 10.1.7 Remove the left access door and discard. Install the new access door. Refer to figure 1. Install the gascolator assembly P/N 22-2821-71-00. Adjustment of the bracket may be necessary to align the mounting holes.
- 10.1.8 Remove the 'Dukes' fuel pump from the mounting bracket. Secure the mounting bracket to the B-bulkhead using the two holes from the old fuel pump mount. Using the bracket locate the third mounting hole and drill a 1/4" hole.
- 10.1.9 Install the nut plate behind the 1/4" hole.
- 10.1.10 Attach the fuel pump to the bracket. Note that the inlet port of the pump is oriented inboard. Attach the pump assembly to the B-bulkhead.
- 10.1.11 Refer to figure 2 and 3. Install the fuel hose P/N AE701000G0421 between the gascolator and the fuel pump inlet.
- 10.1.12 Attach the three P clamps as shown in figure 3.
- 10.1.13 Connect the existing fuel hose to the fuel pump outlet.
- 10.1.14 Remove the access panel below the fuel pump. Locate and drill a 1/2" hole in the access panel. Refer to figure 1, note 4.
- 10.1.15 Leaving as much length as possible, cut the 'Faston' terminal off of wire 28000B16 and the 'Ring Terminal' off of wire 28201B16N.
- 10.1.16 Trim the wires to equal lengths.
- 10.1.17 Strip the wires and crimp the sockets to the ends.
- 10.1.18 Install wire #28000B16 into position 1 of the connector and wire #28001B16N into position 2.
- 10.1.19 Connect the electrical connector on the fuel pump to the fuselage harness connector.
- 10.1.20 Replace the access panel and route the fuel pump drain line through the hole in the access panel.

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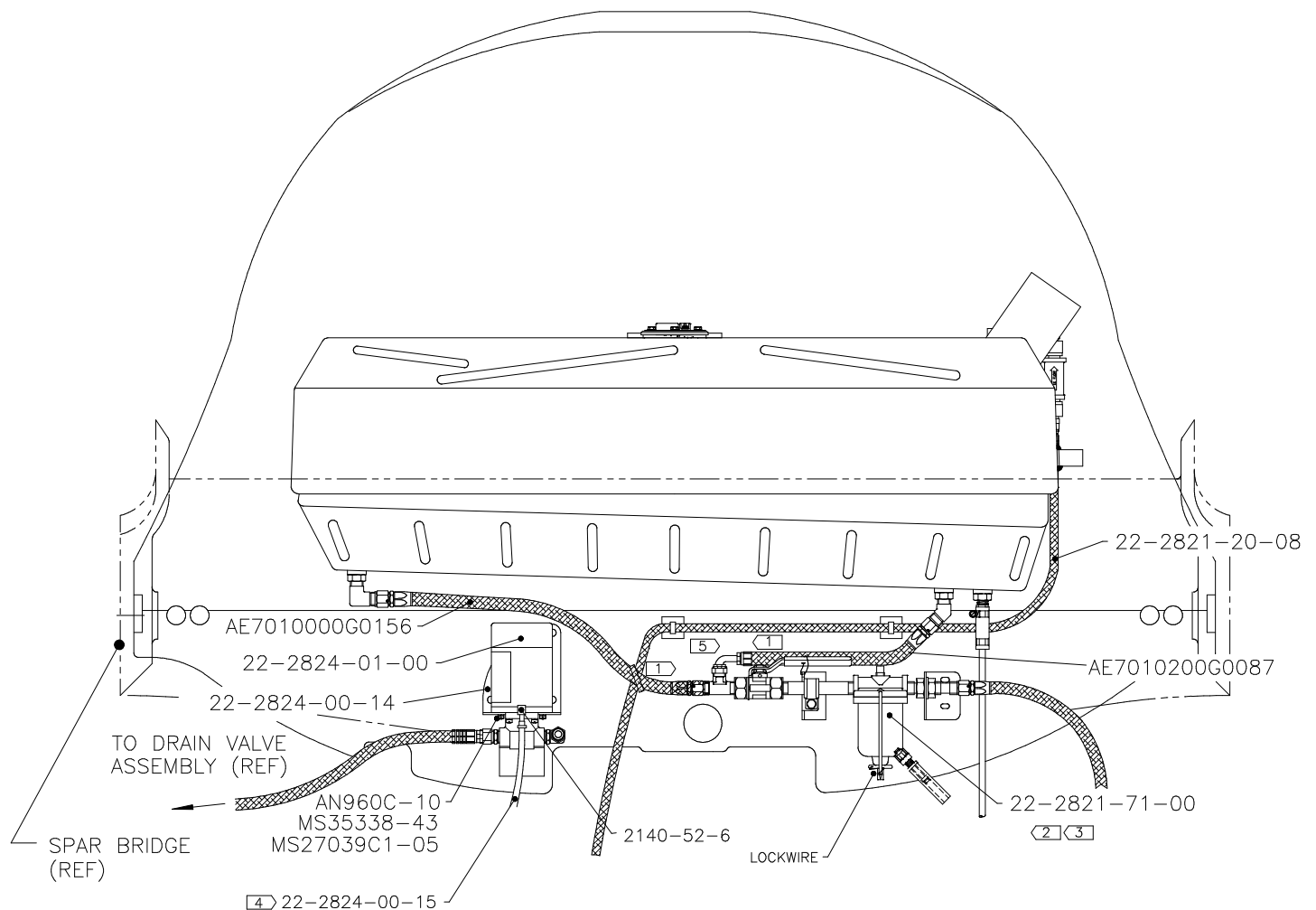
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- ① ADJUST FITTINGS AND HOSE CONNECTIONS AS REQUIRED TO ACHIEVE SLOPE FROM TANK TO TEE FITTING – NO LOW POINTS ALLOWED.
- ② MAINTAIN OUTBOARD DOWNWARD SLOPE OF ASSEMBLY (APPROX. 1°).
- ③ TURN GASCOLATOR BOWL TO ALIGN DRAIN HOSE WITH HOLE IN BELLY ACCESS DOOR.
- ④ ROUTE P/N 22-2824-00-15 THROUGH 12.7mm HOLE IN RIGHT ACCESS DOOR, 13mm AFT OF DOOR CENTERLINE AND 25mm INBOARD FROM DOOR RIGHT EDGE.
- ⑤ MAINTAIN MINIMUM GAP BETWEEN T-FITTING AND BULKHEAD OF 4 mm.

FIGURE 1

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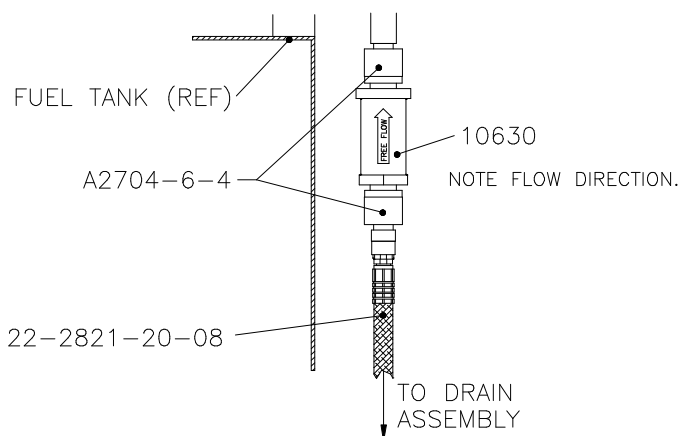
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USE EXISTING HOLES
IN TOP OF AFT CONTROL
BULKHEAD TO MOUNT
P/N AE7010000G0421



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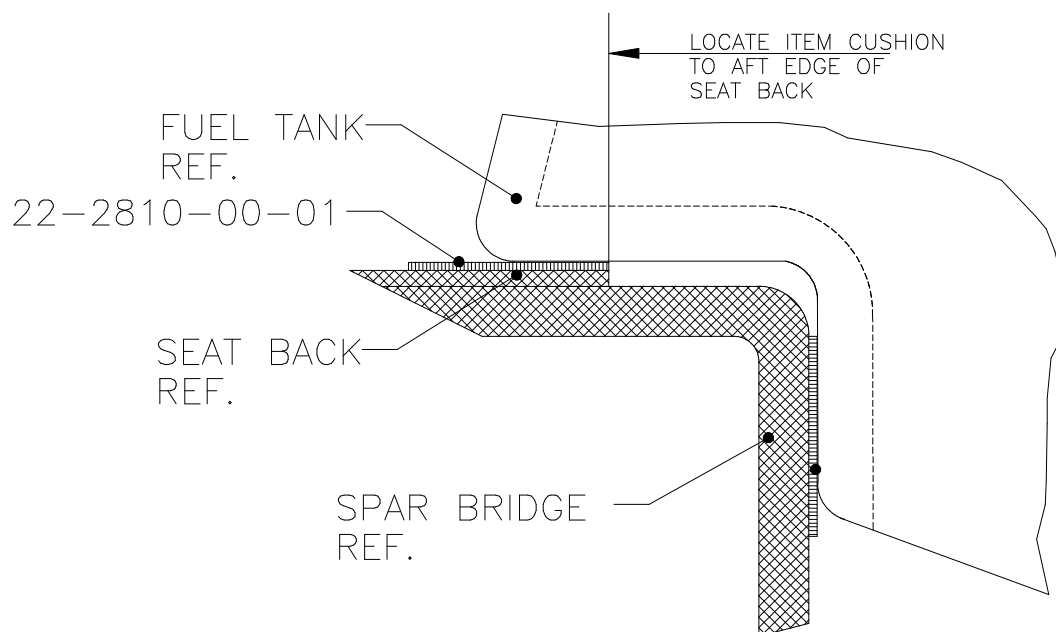


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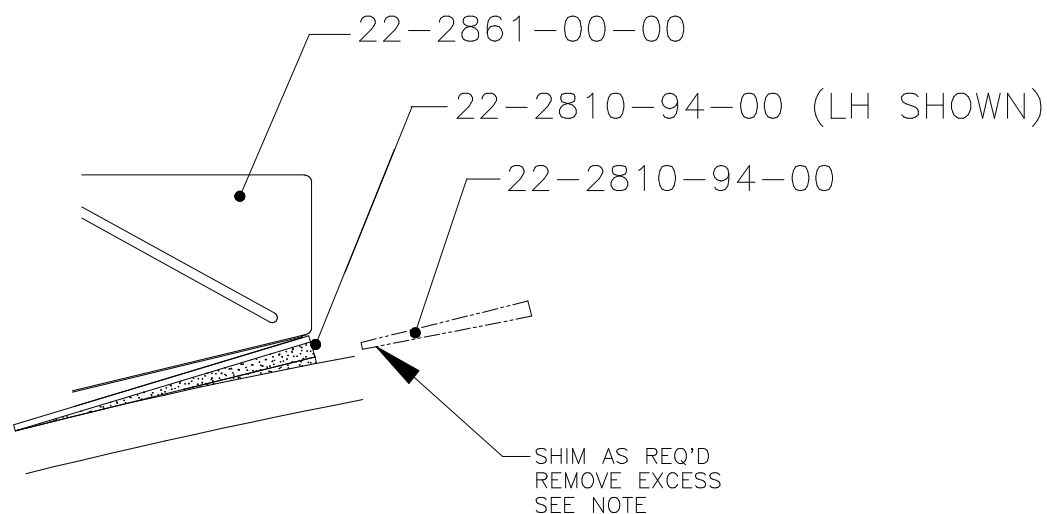
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BOND CUSHION IN PLACE USING DP110
OR EQUIVALENT 5 MINUTE EPOXY



NOTES:
APPLY DP 110 TO BOTH SIDES OF SHIM

FIGURE 4

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10.1 Accomplishment Instructions: (Continued)

- 10.1.21 Remove the fuel return fittings from the Type II tank.
 - 10.1.22 Temporarily place the Type II tank into position. Refer to figure 4. Note the forward cushion installation should contact the forward step on the tank. If the tank does not rest on the cushion as shown in figure 4 replace them with the cushions supplied in the materials kit.
 - 10.1.23 Refer to the Aircraft Maintenance Manual, DA202-C1, 08-20-00, pg 1 for information on how to level the aircraft.
 - 10.1.24 Check the tank for level. Check that the top surface of the tank is $0^\circ \pm 1^\circ$ with respect to the longitudinal axis of the aircraft and $0^\circ \pm 0.5^\circ$ with respect to the lateral axis. Check that the forward step on the tank is seated firmly on the rubber pad attached to the seat back.
 - 10.1.25 If the tank is not level or the forward step does not sit firmly on the seat back new shims and mounting cushions will need to be installed. If the tank is seated properly remove it and proceed to step 10.1.28.
 - 10.1.26 Remove the tank. Remove the existing shims and mounting cushions by breaking the foam material away from the B-bulkhead. Carefully sand the area to remove loose debris and any remaining foam.
 - 10.1.27 Refer to figure 4. Install the tank and press the forward step of it firmly against the cushion on the seat back. Slide the left and right mounting cushions under the tank and shim the mounts to level the tank. Mark the shims and location of the mounting cushions and remove the tank. Using DP 110 or an equivalent 5 minute epoxy bond the mounting cushions and shims into place.
 - 10.1.28 Connect the right hand fuel supply line AE7010000G0156 to the fuel tank only finger tight.
- NOTE: Apply loctite 545 from the 2nd thread back on all male pipe threads. DO NOT contaminate the fuel system with sealant. DO NOT use sealants on flare fittings.
- 10.1.29 Place the fuel tank in position.
 - 10.1.30 Install the filler neck, bonding wire, fuel return line fittings and tank drain tube.
 - 10.1.31 Install the fuel quantity sender and new cork gasket. Apply 'Sealube' to the cork gasket and mounting screws. Connect the electrical connections.
 - 10.1.32 Connect the fuel supply hose on the left side of the tank and connect the right fuel supply hose to the tee fitting on the gascolator assembly.

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10.1 Accomplishment Instructions: (Continued)

- 10.1.33 Route the fuel return hose and connect it to the tank as shown in figure 1 and 3.
- 10.1.34 Install the fuel tank strap and adjust the tension, Reference Aircraft Maintenance Manual, DA202-C1, Ch. 28-10-00, pg. 202.
- 10.1.35 Tighten all of the fittings and hoses.
- 10.1.36 Use cable ties and spiral wrap where necessary to achieve the desired routing and protection of hoses. Refer to figure 3.
- 10.1.37 Remove the instrument panel cover.
- 10.1.38 Remove the 3 amp fuel pump circuit breaker and install the 10 amp circuit breaker. Open the 10 amp fuel pump breaker
- 10.1.39 Remove the wire from the 'S' terminal of the fuel quantity indicator. Check that the resistance is 62-65 ohms between the wire and ground. Reconnect the wire. Remove the ring on the fuel quantity indicator and pull the indicator out through the front of the panel leaving the wiring connected.
- 10.1.40 Put 2 liters of clean 100 LL fuel in the tank. Check for leaks.
- 10.1.41 Connect the battery and a 14 volt battery charger to the electrical bus.
- 10.1.42 Adjust the calibration potentiometer on the fuel quantity indicator to read 0.
- 10.1.43 Disconnect the electrical power.
- 10.1.44 Refuel the aircraft completely to the top of the filler neck. Check for leaks.
- 10.1.45 Remove the fuel line from the engine mounted injection pump and allow it to drain into a suitable clear or white container (at least 2 gallon).
- 10.1.46 Open the fuel shutoff valve.
- 10.1.47 Connect electrical power.

CAUTION DO NOT ALLOW THE FUEL PUMP TO RUN DRY

- 10.1.48 Close the fuel pump circuit breaker.
- 10.1.49 Run the fuel pump. Check for leaks at the pump.
- 10.1.50 Allow the system to flush at least 1 gallon of fuel into the container. Check for contaminants. Continue to flush the system until there is no sign of contaminants.
- 10.1.51 Close the fuel shutoff valve. Run the pump to pressurize the system and check for leaks. Turn the pump off and open the fuel shutoff valve.
- 10.1.52 Connect the fuel line to the engine mounted injection pump.
- 10.1.53 Circulate fuel through the system using the electric fuel pump. Check the fuel return line for leaks. Check that fuel is returning to the tank.

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10.2 Accomplishment Instructions:

- 10.1.51 Ensure the maintenance shutoff valve and the gascolator bowl are safety lock wired.
- 10.1.52 Install the battery cover, baggage compartment floor and instrument panel cover.
- 10.1.53 Remove the placard installed on the fuel quantity indicator and install the new placard.
- 10.1.54 Remove the placard installed above the fuel filler and install the new placard.
- 10.1.55 Remove the dipstick from the aircraft and discard it. Install the new dipstick.
- 10.1.56 Update the 'Airplane Flight Manual' weight and balance records.
- 10.1.57 Make the appropriate entry into the aircraft technical log.

PART 2 Installation of Dukes fuel pump in a Type II fuel system.

WARNING DO NOT ALLOW HEAT OR FIRE NEAR FUEL. FUEL BURNS VIOLENTLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING DO NOT GET FUEL ON YOUR SKIN. FUEL CAN CAUSE SKIN DISEASE.

Follow all of the usual safety precautions when working on the fuel system

10.2.1 Remove the fuel pump and tee fitting. Refer to the Aircraft Maintenance Manual DA202-C1, Ch. 28-20-00, pg 201, for the removal of the Facet fuel pump.

10.2.2 Remove the 'Dukes' fuel pump from the mounting bracket. Secure the mounting bracket to the B-bulkhead using the two holes from the old fuel pump mount. Using the bracket locate the third mounting hole and drill a 25/64 " hole.

10.2.3 Use a 1/4" rivnut puller to install the rivnut. Wet the rivnut with DP110 prior to installation.

NOTE: STEPS 10.2.4 TO 10.2.6 INCLUDE AN ALTERNATE METHOD OF

10.2.4 Refer to the Aircraft Maintenance Manual DA202-C1, Ch. 28-10-00, pg 201, for the removal of the fuel tank.

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10.2 Accomplishment Instructions: (Continued)

- 10.2.5 Remove the 'Dukes' fuel pump from the mounting bracket. Secure the mounting bracket to the B-bulkhead using the two holes from the old fuel pump mount. Using the bracket locate the third mounting hole and drill a 1/4" hole.
- 10.2.6 Install the nut plate behind the 1/4" hole. Install the fuel tank, Reference Aircraft Maintenance Manual, DA202-C1, Ch. 28-10-00, pg. 202.
- 10.2.7 Attach the fuel pump to the bracket. Note that the inlet port of the pump is oriented inboard. Attach the pump assembly to the B-bulkhead.
- 10.2.8 Refer to figure 2. Connect the fuel hose from the gascolater to the fuel pump inlet.
- 10.2.9 Connect the fuel hose from the maintenance drain to the fuel pump outlet.
- 10.2.10 Remove the access panel below the fuel pump. Locate and drill a 1/2" hole in the access panel. Refer to figure 1, note 4.
- 10.2.11 Leaving as much length as possible on the fuselage harness, cut the 'Faston' terminal off of wire 28000B16 and the 'Ring Terminal' off of wire 28201B16N.
- 10.2.12 Trim the wires to the same length.
- 10.2.13 Strip the wires and crimp the sockets to the ends.
- 10.2.14 Install wire #28000B16 into position 1 of the connector and wire #28001B16N into position 2.
- 10.2.15 Use cable ties and spiral wrap where necessary to achieve the desired routing and protection of hoses. Refer to figure 3.
- 10.2.16 Remove the instrument panel cover.
- 10.2.17 Remove the 3 amp fuel pump circuit breaker and install the 10 amp circuit breaker. Open the 10 amp fuel pump breaker.
- 10.2.18 Connect the electrical connector on the fuel pump to the fuselage harness connector.
- 10.2.19 Replace the access panel and route the fuel pump drain line through the hole in the access panel.
- 10.2.20 Remove the fuel line from the engine mounted injection pump and allow it to drain into a suitable clear or white container (at least 2 gallon).
- 10.2.21 Open the fuel shutoff valve and the Maintenance valve.
- 10.2.22 Connect electrical power.

CAUTION DO NOT ALLOW THE FUEL PUMP TO RUN DRY

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10.2 Accomplishment Instructions: (Continued)

- 10.2.23 Close the fuel pump circuit breaker.
- 10.2.24 Run the fuel pump. Check for leaks at the pump.
- 10.2.25 Allow the system to flush at least 1 gallon of fuel into the container. Check for contaminants. Continue to flush the system until there is no sign of contaminants.
- 10.2.26 Close the fuel shutoff valve. Run the pump to pressurize the system and check for leaks around the fuel pump. Turn the pump off and open the fuel shutoff valve
- 10.2.27 Connect the fuel line to the engine mounted injection pump.
- 10.2.28 If the tank was removed to install the nut plate. Run the pump to circulate fuel through the return line to the tank and check for leaks. Fill the tank entirely and check for leaks around the filler neck.
- 10.2.29 Lockwire the maintenance fuel shutoff valve in the open position as shown in figure 3. Check that the gascolator bowl is lockwired.
- 10.2.30 Install the battery cover, baggage compartment floor and instrument panel cover.

11. Weight and Balance:

PART 1: The empty weight of the aircraft decreases by 19.3 lbs (8.687 Kg).

The C.G. moves forward by 0.36 in (9.14 mm).

PART 2: The empty weight of the aircraft increases by 0.69 lbs (0.313 Kg)

The effect on C.G. is negligible

12. Electrical Load Data:

Description	Manufacturer	Part Number	Load and Duty Cycle Factor
Fuel Pump	Dukes	22-2824-01-00 (5308-00-01)	4amps @ 20% = 0.8 amps

13. Availability:

Contact Diamond Aircraft.

To obtain satisfactory results, procedures specified in this service bulletin must be accomplished in accordance with accepted methods and current government regulations. Diamond Aircraft Industries Inc. cannot be responsible for the quality of work performed in accomplishing the requirements of this service bulletin. Diamond Aircraft reserves the right to void continued warranty coverage in the area affected by this Service Bulletin until the date the Service Bulletin is incorporated.

If you no longer own the aircraft to which this service bulletin applies, please forward it to the current owner and send the name of the current owner to Diamond Aircraft Industries, Inc., at the address below

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