

CHAPTER

28

FUEL

CONTENT

Name of item	Chapter Section/Subsection Subject	Page
GENERAL	28-00-00	28-1
FUEL TANKS	28-10-00	28-2
DESCRIPTION AND OPERATION		28-2
MAINTENANCE		28-3
REMOVAL / INSTALLATION		28-3
Removal of main fuel tank		28-3
Installation of main fuel tank		28-3
Removal of auxiliary fuel tank		28-5
Installation of auxiliary fuel tank		28-5
APPROVED REPAIRS		28-6
Repair and embedding of fuel tanks		28-6
Z 143L FUEL DISTRIBUTION	28-20-00	28-8
DESCRIPTION AND OPERATION		28-8
FAULT REMEDY		28-13
Z 143LSi FUEL DISTRIBUTION		28-14
DESCRIPTION AND OPERATION		28-14
FAULT REMEDY		28-19
MAINTENANCE		28-20
REMOVAL / INSTALLATION		28-20
Removal of fuel valve		28-20
Installation of fuel valve		28-21
Removal of fuel primer		28-22
Installation of fuel primer		28-24
INSPECTION / CHECK		28-25
Check of tightness of fuel system		28-25
Check of cleanness of fuel valve		28-25
APPROVED REPAIRS		28-26
Repairs of fuel system		28-26
FUEL QUANTITY MEASUREMENT	28-40-00	28-27
DESCRIPTION AND OPERATION		28-27
FAULT REMEDY		28-30
MAINTENANCE		28-31
REMOVAL / INSTALLATION		28-31
Removal of float tank unit		28-31
Installation of float tank unit		28-31
INSPECTION / CHECK		28-34
Check of annunciation of usable fuel remainder		28-34

EFFECTIVITY: All

28 - CONTENTS

page 1
2011-02-02

INTENTIONALLY LEFT BLANK

GENERAL

Z 143 L

The fuel is supplied from the wing tanks through the fuel shut-off valve and pump to carburetor.

Z 143 LSi

The fuel is supplied from the wing tanks through the fuel shut-off valve and pump to injector.

During engine start-up the electric booster pump is in operation.

The fuel primer (if installed only Z 143L airplane) is used during engine start-up in cold conditions.

The fuel content in fuel tanks is measure by quadruple fuel quantity gauge. The remainder of usable fuel is annunciated by annunciator in light annunciation panel

FUEL TANKS

DESCRIPTION AND OPERATION

The main fuel tanks are located in the middle leading section of wing. They are accessible after removal of bottom wing panels under the tanks. The main fuel tanks are fixed in their embedding with flexible rubber fixing straps that are round the tanks. The main fuel tanks are of welded design.

The auxiliary fuel tanks are located near the wingtips. They are screwed along their periphery to wing skin. The auxiliary wing tanks are of riveted and glued design sealed by sealing agent.

Fuel Tank Capacity:

Name	L + P		Total capacity	
	[litres]	[US gal]	[litres]	[US gal]
Capacity of main tank	61 + 61	16,1 + 16,1	224	59
Capacity of auxiliary tank	51 + 51	13,4 + 13,4		
Unusable fuel remainder in main tanks	3 + 3	0,8 + 0,8	8	2
Unusable fuel remainder in auxiliary tanks	1 + 1	0,2 + 0,2		
Usable fuel quantity in main tanks	58 + 58	15,3 + 15,3	216	57
Usable fuel quantity in auxiliary tanks	50 + 50	13,2 + 13,2		

MAINTENANCE

REMOVAL / INSTALLATION

REMOVAL OF MAIN FUEL TANK

Preparatory works

- a) Dump fuel tanks.
- b) Remove wing panel under the tank (Fig. 52-5, item 29).
- c) Disconnect the board battery (subsection 24-32-00).

Removal of main fuel tank

- a) Disconnect bonding, uncouple two fuel pipes of airplane fuel system and hose of tank venting.
- b) Disconnect conductors from float unit terminals (section 28-40-00).
- c) Remove filler cap from tank filling port (Fig. 28-1, item 2).
- d) Remove safety ring (3) by screwdriver from inside of threaded coupling (1).
- e) Unscrew coupling (1) by wrench (4) supplied as a part of airplane tool kit.
- f) Disconnect fixing straps and remove tank from wing. Plug tank ports and place tank to storing stand.
- g) Replace if necessary the sealing of filling port that is screwed from inside to wing skin by six screws (5) with nuts.

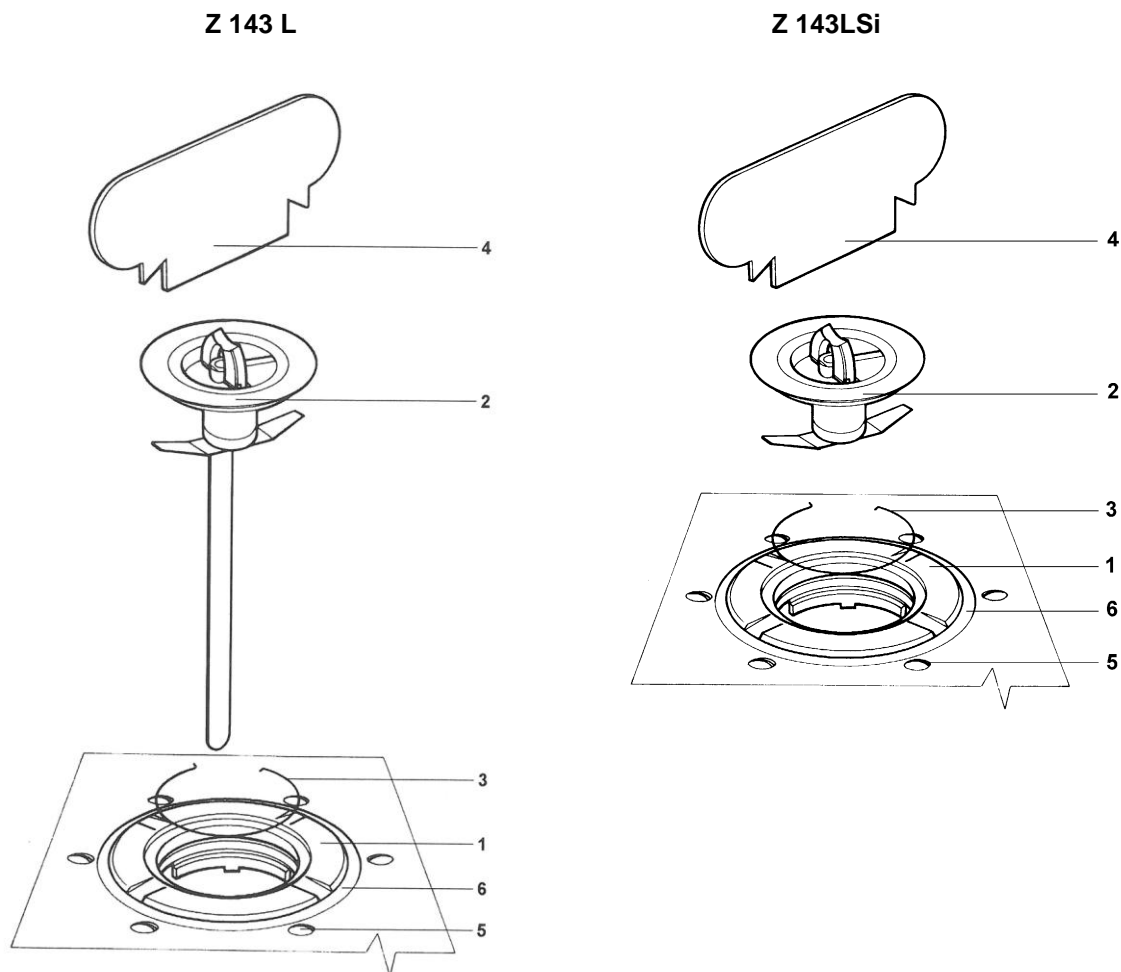
INSTALLATION OF MAIN FUEL TANK

- a) Remove plugs from tank ports and rinse the tank twice with white spirit.
- b) Fit tank to its embedding in wing, screw the screws of fixing straps in, and lock them after tightening with safety wire.
- c) Screw the threaded coupling into the filling port of tank (Fig. 28-1, item 1). Tighten the threaded coupling with wrench (4) and lock with safety ring (3).
- d) Fill the gap between threaded coupling (1) and filling port sealing with gas resistant cements as LOCTITE RTV. Fit filler cap (2) into the main tank filling port.
- e) Couple the tank venting hose and fuel system pipes to the tank. Lock the nuts after proper tightening with safety wire.
- f) Bonding to tank and conductors to the terminals of float tank unit (section 28-40-00).

Final works

- a) Check tightness of fuel tank.
- b) Install wing panel under the tank (Fig. 52-5, item 29).
- c) Connect board battery to airplane board network (section 28-40-00).
- d) Check annunciation of usable fuel remainder (section 28-40-00)

EFFECTIVITY: All



- 1 ... threaded coupling
- 2 ... main tank filler cap (up to S/N 0022 with main tank dip stick)
- 3 ... safety ring
- 4 ... wrench
- 5 ... screws (6 pcs)
- 6 ... cement

Fig. 28-1 Removal of filler cap threaded coupling

REMOVAL OF AUXILIARY FUEL TANK

Preparatory works

- a) Dump fuel from tank.
- b) Disconnect board battery (subsection 24-32-00).
- c) Remove wingtip (Fig. 52-5, item 14).
 - Unscrew fixing screws and remove wingtip from wing.
 - Disconnect connecting conductors of position lights and store the wingtip

Removal of auxiliary fuel tank

- a) Unscrew the screws along the periphery of tank and remove the tank from the end rib of wing.
- b) Disconnect electric cables, i. e. connector of (conductors) from float tank unit.
- c) Plug all the ports of tank and place it to the store shelf.

INSTALLATION OF AUXILIARY FUEL TANK

- a) Remove all the plugs from the tank and rinse the tank twice with white spirit.
- b) Fit the tank upon end rib of wing and connect the electric connector.
- c) Insert the fuel outlet and vent ports with care, fit the tank properly to end rib of wing and fix it gradually along the tank periphery with screws provided with washers.

NOTE

Each third screw should be conductive connected with airframe by proper cleaning of surface under the screw head.

- d) Connect conductors to terminals of float tank unit (section 28-40-00).

Final works

- a) Check tightness of airplane fuel system.
- b) Install wingtip (Fig. 52-5, item 14):
 - Fit the wingtip to wing end and connect electric conductors of position lights.
 - Fix the wingtip to wing by screws provided with washers.
- c) Connect board battery to board electric network (subsection 24-32-00).
- d) Check serviceability of float tank unit and position light.

APPROVED REPAIRS

REPAIR AND EMBEDDING OF FUEL TANKS

1. Main Fuel Tank

Fault	Remedy
1) Excessive deformation 2) Corrosion deeper than 0.1 (0.004 in) mm. 3) Longitudinal cracks in welds longer than 20 mm (0.8 in), transversal cracks protruding from welds deep to tank jacket.	Replace tank if any described fault is detected.
4) Dent.	Remove dent with care.
5) Corrosion of depth less than 0.1 mm (0.004 in).	Remove corrosion with care by emery paper and repair tank paint (subsection 51-72-00).
6) Longitudinal cracks less than 20 mm (0.8 in) long, transversal cracks in welds.	Weld cracks and repair paint (subsection 51-72-00)

Welding of Cracks:

- a) Detect spots with cracks:
 - Join pipe coupling for source of air pressure to one tank port and plug remaining holes and ports with plugs provided with rubber gaskets.

Recommendation

Use for port plugging the 32-Z 42-5578 set of plugs.

- Connect hose of air pressure source to above pipe coupling and provide one plug with pressure gauge.
 - Submerge main tank into the water tank and start inflate it with dry air up to 25 kPa (3.6 p.s.i.) pressure. Mark the detected cracks in welds out with soft pencil.
 - Dry main tank.
- b) Grind and file the cracks in with necessary for welding. Drill off the ends of cracks protruding from weld to tank jacket with 1.5 mm (0.06 in) drill. Remove paint in the very vicinity of crack.
 - c) Rinse main tank at least twice with about three liters of trichloroethylene or tetrachloroethylene and 80 to 90°C (176 to 194°F) warm water.
 - d) Fill the main tank with warm water or inert gas, e. g. carbon dioxide. Dry the main tank before its filling with inert gas and supply gas to highest port until whitish gas escapes from the hole. Move with filling hose inside the tank during tank filling to be sure the gas fills the internal space completely.
 - e) Weld the cracks by flame welding and use as filler the CSN 42 4232 2 mm welding wire with SUPRA SPECIAL flux agent.
 - f) Remove flux agent with soft brush and running warm water.
 - g) Check tightness of main tank with compressed air for 3 minutes according to procedure described in point a). Remove plugs and pipe coupling for supply of compressed air. Dry completely the tank in drying chamber at 80°C (176°F) or by warm air.

EFFECTIVITY: All

2. Main Tank Embedding

Fault	Remedy
1) Tank fixing strap: <ul style="list-style-type: none">- Corrosion- Mechanical defects, cracks	Remove corrosion with emery paper and repair faulty part (subsection 51-72-00). Replace cracked, deformed, or otherwise defective straps.

3. Auxiliary Tank

Fault	Remedy
1) Untaught couplings.	Let the repair carried out in manufacture or authorized repair shop.
2) Faulty or corrosive fixing screws.	Replace faulty screws.

EFFECTIVITY: All

28-10-00

page 28 - 7
2011-02-02

FUEL DISTRIBUTION

DESCRIPTION AND OPERATION

Z 143L

The main tanks (Fig. 28 - 2, item 1) are refueled from the auxiliary tanks (2) by gravity. The non - return flap valves (3) prevent reverse flow from main tank to the auxiliary ones. The fuel from the main tanks is led through fuel outlet valve (4) and fuel pipe to fuel valve (5) that is in the bottom part of fuselage. From there the fuel proceeds through fuel pipe to fuel pump (6) with air vent (7). The fuel pump (6) supplies fuel through hose to the carburetor (8).

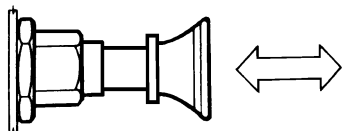
The fuel pump (6) is air-cooled. The ambient air for pump cooling enters the ports in fwd part of engine covers and from the rear internal covers it is led pump through hose (Fig. 75-3, item 13).

The fuel system during engine start-up is flooded after turning the fuel booster pump on (Fig. 28-2, item 9) that is fixed to airframe structure under the floor. As soon as the electric fuel booster pump is turned on by **FUEL PUMP** switch the by-pass valve (10) shuts the direct flow of fuel (item A) from fuel shut-off valve (5) to fuel pump (6). Simultaneously the passage (item B) is opened and fuel flows from fuel shut-off valve (5) through electric fuel booster pump (9) to fuel pump (6).

The cold weather engine start-up may be simplified by fuel injection to engine induction system by manual controlled fuel primer (11) (if installed) that is coupled to fuel priming system (16) of the engine. The fuel primer is installed under the left instrument panel.

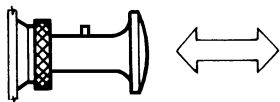
Manual fuel primer controller:

LUN 6200

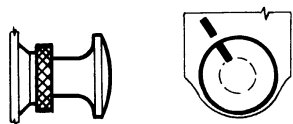


- fuel is injected to engine induction system in front of suction valves

ESSEX



- fuel is injected to engine induction system in front of suction valves




- manual controlled fuel primer is in locked position (the controller is pushed in and turned so that the red lines upon fuel primer controller and console coincide

The main tank (1) are provided in their utmost upper parts with air vent valves (12) that are interconnected by hoses and pipes with auxiliary tanks (2). The fuel air venting systems in both wings are interconnected and the venting outlet (13) is located in the bottom of fuselage.

Both main and auxiliary tanks are gravity refueled through fuel fillers provided with filler caps (14).

EFFECTIVITY: Z 143L

The very bottom spots of tanks are provided with drain valves () used for fuel draining, sampling, and dumping of individual tanks. The airplane fuel system draining and central fuel dumping may be executed by fuel valve (5).

- The fuel draining is made by transparent draining vessel provided with needle that is supplied with airplane tool kit. The needle during fuel draining is pushed into the hole of drain valve (Fig. 28-3, item A) to open it and let the fuel flow into the draining vessel. The drain valve as soon as the needle is removed shuts automatically.

As soon as the draining vessel is full it is possible to check fuel for presence of water and mechanical impurities. In case the impurities or water are detected in fuel it is necessary to repeat the fuel draining. In case that the water and/or impurities are detected even after repeated draining it is necessary to dump all the fuel from the fuel system and to replenish it with completely new, clean fuel.

- The fuel is dumped from the airplane fuel system by means of fuel dumping fixture supplied with airplane tool kit. For fuel dumping the dumping fixture (Fig. 28-3, item B), is screwed into fuel dumping (draining) valve, the fuel dumping valve opens, and fuel flow trough the fixture into prepared vessel. As soon as the dumping fixture is unscrewed from valve the valve shuts automatically.

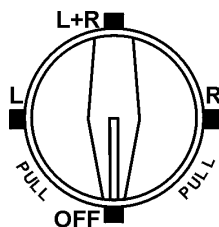
NOTE

The fuel dumping may be made according to fuel selector valve setting (Fig. 28-2, item 15) as follows:

- From the tanks in port wing.
- From the tanks in starboard wing.
- From tanks in both wings simultaneously

The fuel valve controller (15) permits fuel supply change-over from the individual groups of tanks. The fuel valve controller is located in panel between fwd seats.

Position of fuel valve controller:

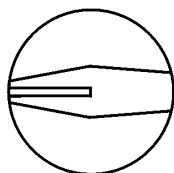


- fuel passage is shut

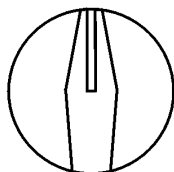
NOTES

CLOSED position may be set when controller pulled.

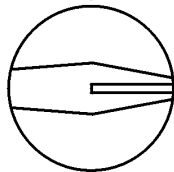
Placard at fuel control valve is described in Chapter 11.



- fuel from port wing tanks is drained

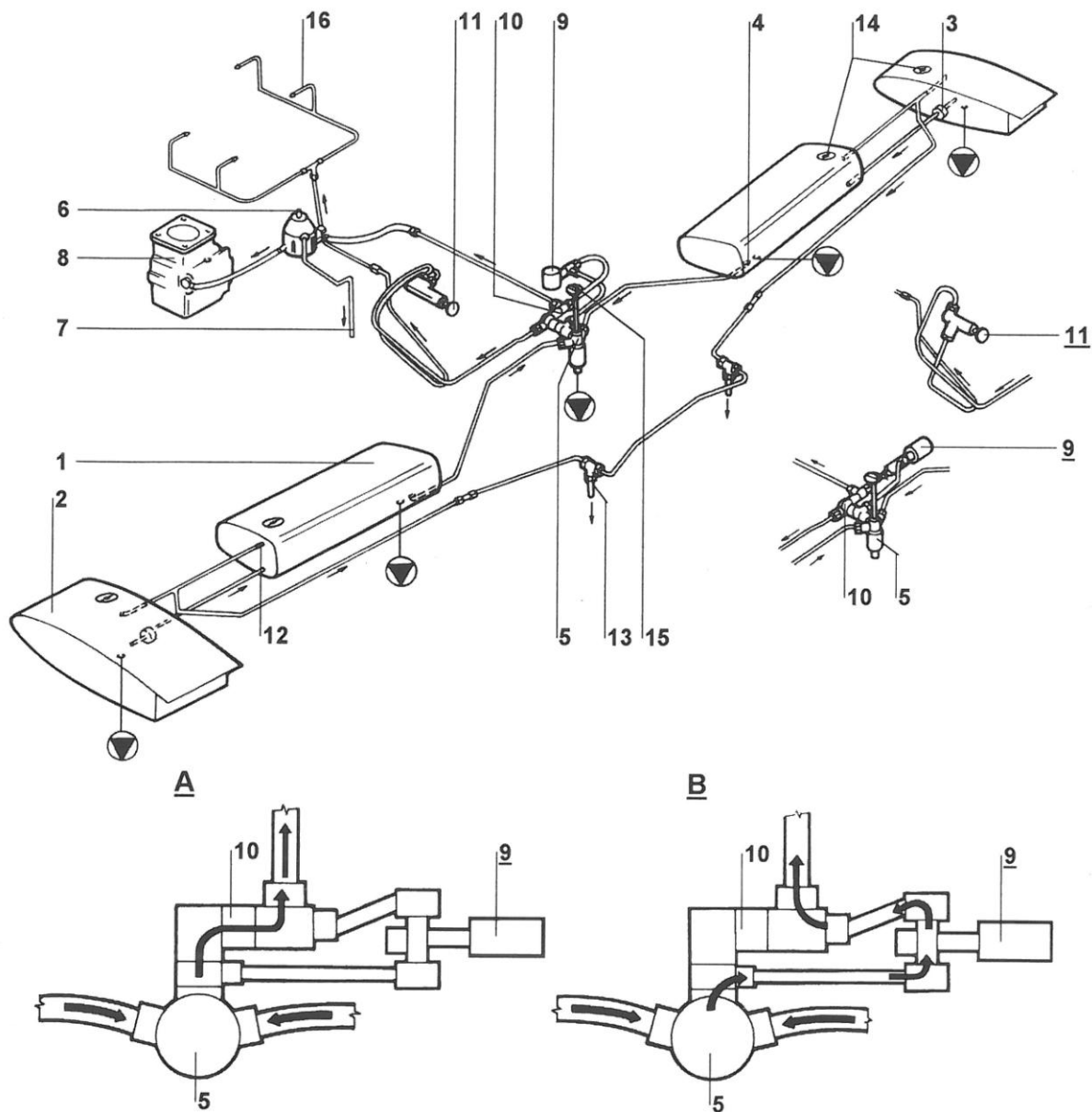


- fuel from tanks in both wings is drained



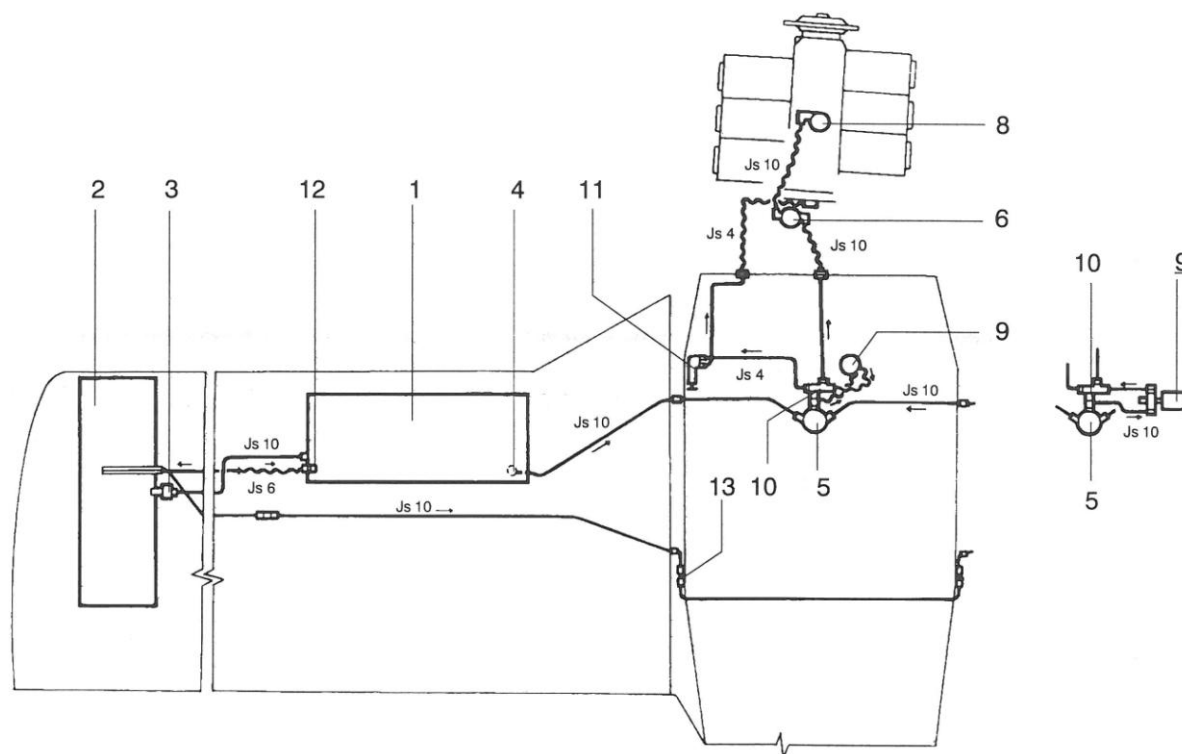
- fuel from starboard wing tanks is drained

Installation diagram



*Fig. 28-2 Fuel distribution
(page 1 of 2)*

Operation diagram



NOTE

The fuel system installation in starboard wing is symmetric to that in port wing.

— pipe
 ~~~ hose

A ... direct fuel passage

B ... fuel passage through electric booster pump

1 ... main fuel tank

2 ... auxiliary fuel tank

3 ... non-return flap valve

4 ... fuel outlet valve

5 ... fuel valve

6 ... fuel pump air venting

7 ... fuel by-pass

8 ... carburetor

9 ... electric booster pump

FACET (up to S/N 0014)

9 ... electric booster pump

WELDON (from S/N 0015)

10 ... by-pass valve

11 ... manual fuel primer  
LUN 6200

11 ... manual fuel primer  
ESSEX

12 ... air vent valve

13 ... air vent outlet

14 ... tank filler cap

15 ... fuel valve controller

16 ... fuel injection to engine  
induction

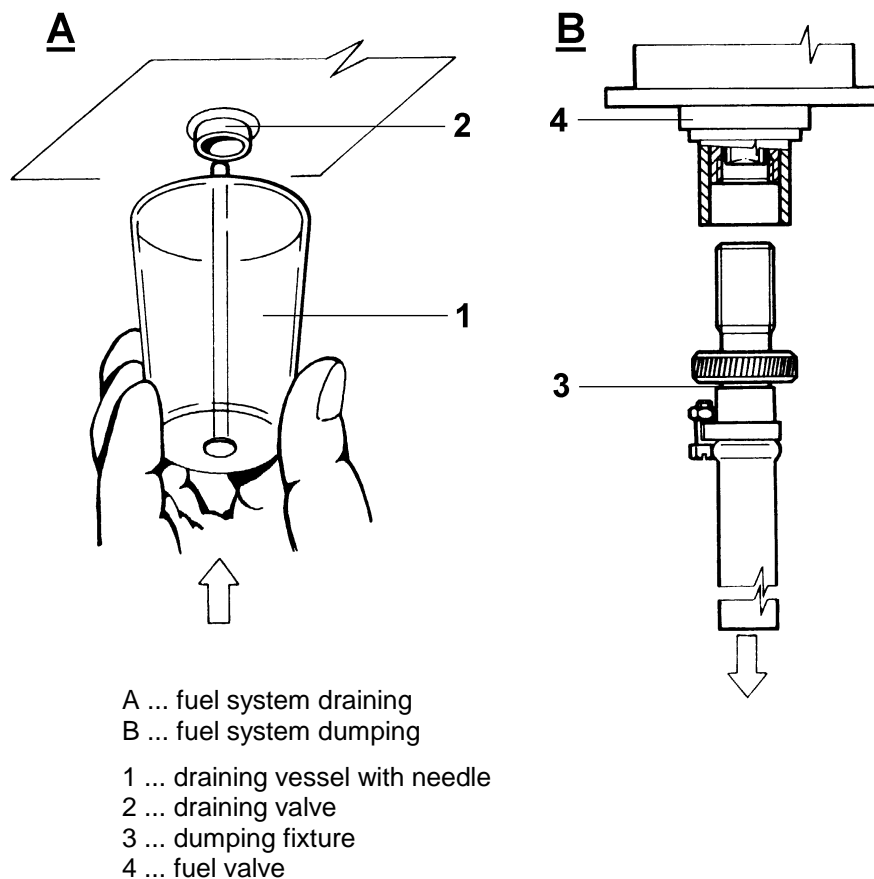
▼ ... drain valve

Fig. 28-2 Fuel distribution  
(page 2 of 2)

EFFECTIVITY: Z 143L

28-20-00

page 28 - 11  
2011-02-02



*Fig. 28-3 Fuel draining and dumping*



## **FAULT REMEDY**

| Fault                                                                   | Possible reason                                                 | Remedy                                                                                                                                             |
|-------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| No fuel pressure is indicated after electric booster pump is turned on. | The electric circuit is cut (Fig. 91-3, item B 8; B <u>9</u> ). | Measure the electric voltage at the pump drive motor terminals. If it is zero detect conductor interruption and repair it.                         |
|                                                                         | Defective electric booster pump.                                | Measure the electric voltage at the pump drive motor terminals. If it is equal to voltage of board network replace the electric fuel booster pump. |

**EFFECTIVITY:** Z 143L

# **FUEL DISTRIBUTION**

## **DESCRIPTION AND OPERATION**

### **Z 143LSi**

The main tanks (Fig. 28-2A, item 1) are refueled from the auxiliary tanks (2) by gravity. The non-return flap valves (3) prevent reverse flow from main tank to the auxiliary ones. The fuel from the main tanks is led through fuel outlet valve (4) and fuel pipe to fuel valve (5) that is in the bottom part of fuselage. From there the fuel proceeds through fuel pipe to fuel pump (6) with air vent (7). The fuel pump (6) supplies the fuel to the injector (8) via a hose. The injector regulates the proper fuel supply to the fuel distributor (24), which distributes evenly the measured amount of fuel to the fuel nozzles (23). The nozzles inject the fuel the suction port of each engine cylinder.

BENDIX RSA fuel injector system is based on the airflow measurements, which are used by the transducer converting air pressure to fuel pressure. The fuel pressure data (obtained by the fuel measuring unit) determine the proper amount of injected fuel in relation to the amount of air. The fuel evaporates in the cylinder's suction ports.

More information about fuel injector system is described in "BENDIX RSA fuel injector system" manual by Bendix manufacturer.

The fuel pump (6) is air-cooled. The ambient air for pump cooling enters the ports in fwd part of engine nacelle and from the aft internal covers it is led to fuel pump through hose (Fig. 75-3A, item 13).

The fuel system during engine start-up is flooded turning the fuel booster pump on (Fig. 28-2A, item 9) that is fixed to airframe structure under the floor. As soon as the electric fuel booster pump is turned on by **FUEL PUMP** switch the by pass valve (10) shuts the direct flow of fuel (item A) from fuel shut-off valve (5) to fuel pump (6). Simultaneously the passage (item B) is opened and fuel flows from fuel shut-off valve (5) through electric fuel booster pump (9) to fuel pump (6).

The main tank (1) are provided in their utmost upper parts with air vent valves (12) that are interconnected by hoses and pipes with auxiliary tanks (2). The fuel air venting systems in both wings are interconnected and the venting outlet (13) is located in the bottom of fuselage.

Both main and auxiliary tanks are gravity refueled through fuel fillers provided with filler caps (14).

**EFFECTIVITY: Z 143LSi**

The very bottom spots of tanks are provided with drain valves (▼) used for fuel draining, sampling, and dumping of individual tanks. The airplane fuel system draining and central fuel dumping may be executed by fuel valve (5).

- The fuel draining is made by transparent draining vessel provided with needle that is supplied with airplane tool kit. The needle during fuel draining is pushed into the hole of drain valve (Fig. 28-3A, item A) to open it and let the fuel flow into the draining vessel. The drain valve as soon as the needle is removed shuts automatically.  
As soon as the draining vessel is full it is possible to check fuel for presence of water and mechanical impurities. In case the impurities or water are detected in fuel it is necessary to repeat the fuel draining. In case that the water and/or impurities are detected even after repeated draining it is necessary to dump all the fuel from the fuel system and to replenish it with completely new, clean fuel.
- The fuel is dumped from the airplane fuel system by means of fuel dumping fixture supplied with airplane tool kit. For fuel dumping the dumping fixture (Fig. 28- 3, item B), is screwed into fuel dumping (draining) valve, the fuel dumping valve opens, and fuel flow trough the fixture into prepared vessel. As soon as the dumping fixture is unscrewed from valve the valve shuts automatically.

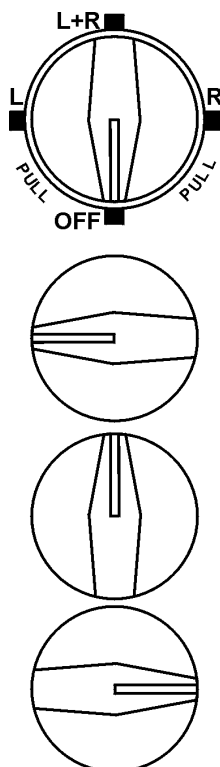
### **NOTE**

The fuel dumping may be made according to fuel selector valve setting (Fig. 28-2A, item 15) as follows:

- From the tanks in port wing.
- From the tanks in starboard wing.
- From tanks in both wings simultaneously.

The fuel valve controller (15) permits fuel supply change-over from the individual groups of tanks. The fuel valve controller is located in panel between fwd seats.

*Position of fuel valve controller:*



- fuel passage is shut

### **NOTES**

**CLOSED** position may be set when controlled pulled.

Placard at fuel control valve is described in Chapter 11

- fuel from left wing tanks is drained

- fuel from tanks is both wings is drained

- fuel from right wing tanks is drained

### Installation diagram

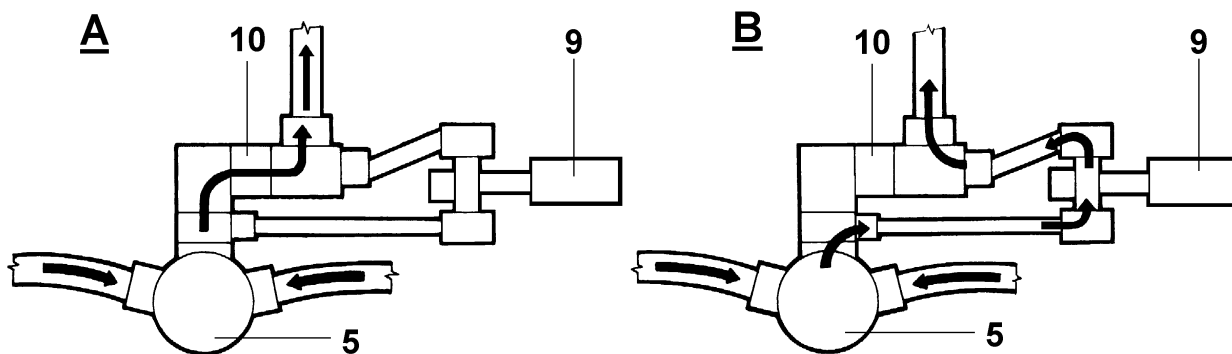
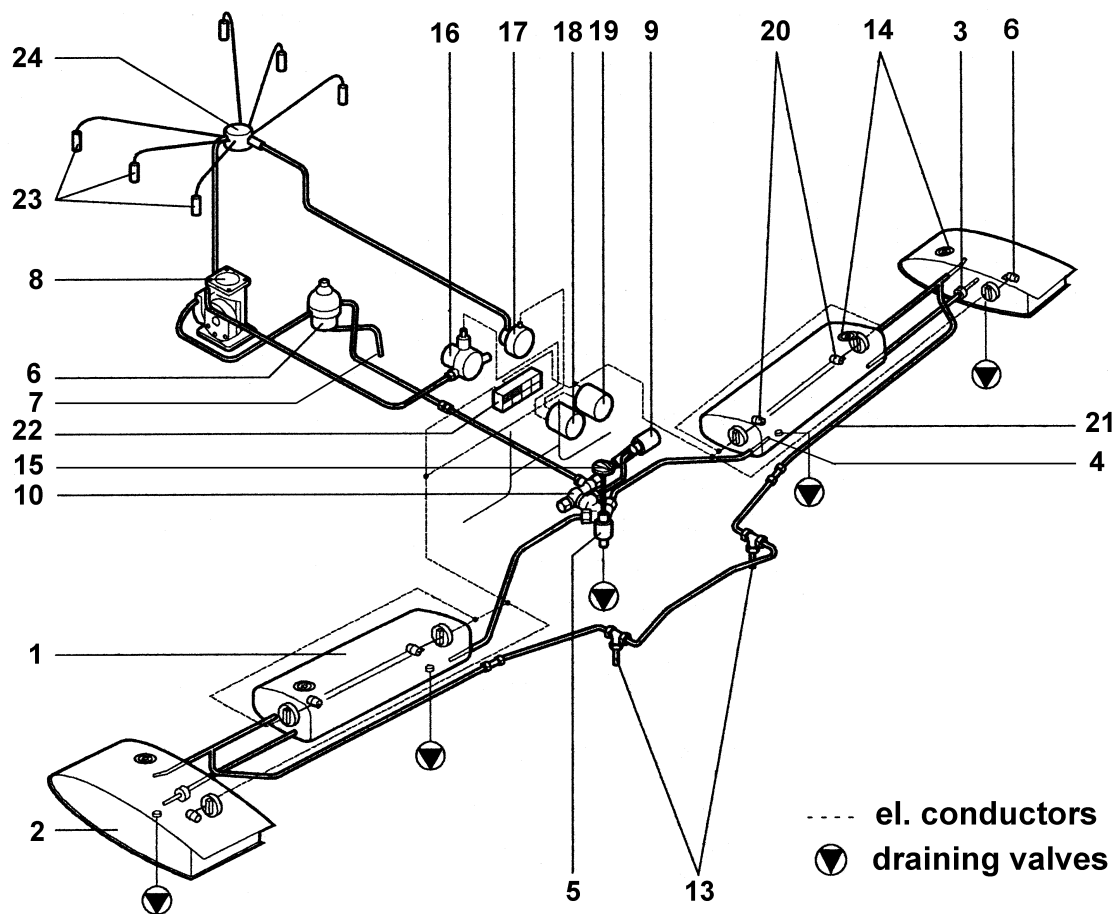
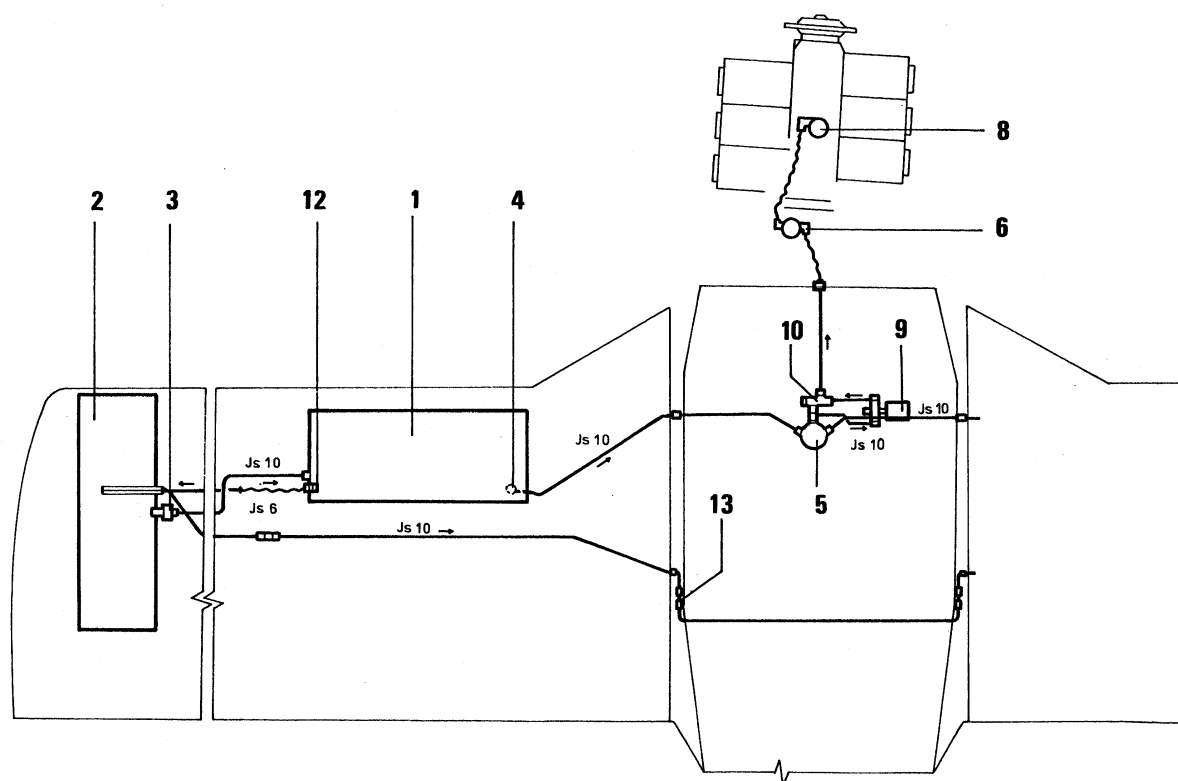


Fig. 28-2A Fuel distribution  
(page 1 of 2)

### Operation diagram



### NOTE

The fuel system installation in starboard wing is symmetric to that in port wing.

— pipe  
 ~ hose

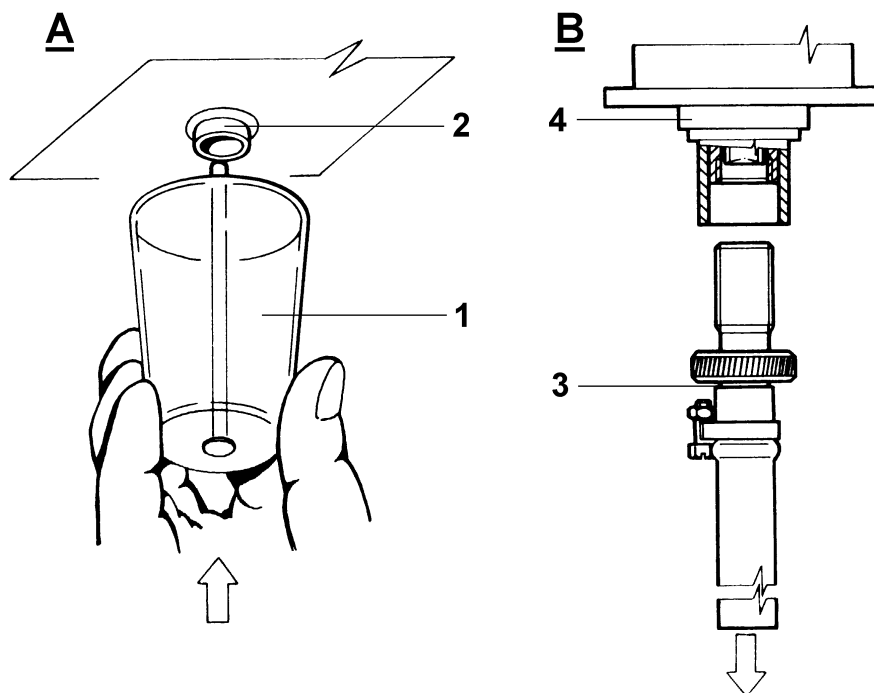
A ... direct fuel passage

B ... fuel passage through electric booster pump

- 1 ... main fuel tank
- 2 ... auxiliary fuel tank
- 3 ... non-return flap valve
- 4 ... fuel outlet valve
- 5 ... fuel valve
- 6 ... fuel pump air venting
- 7 ... fuel by-pass
- 8 ... injector
- 9 ... electric booster pump
- 10 ... by-pass valve
- 11 ... -
- 12 ... air vent valve

- 13 ... air vent outlet
- 14 ... tank filler cap
- 15 ... fuel valve controller
- 16 ... fuel injector to engine induction
- 17 ... consumption pressure transmitter
- 18 ... four-pointer engine indicator
- 19 ... four-pointer fuel indicator
- 20 ... float tank unit
- 21 ... air vent piping
- 22 ... annunciator lights
- 23 ... fuel nozzle
- 24 ... fuel distributor

Fig. 28-2A Fuel distribution  
 (page 2 of 2)



- A ... fuel system draining  
B ... fuel system dumping  
1 ... draining vessel with needle  
2 ... draining valve  
3 ... dumping fixture  
4 ... fuel valve

*Fig. 28-3A Fuel draining and dumping*

## **FAULT REMEDY**

| Fault                                                                   | Possible reason                                   | Remedy                                                                                                                                             |
|-------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| No fuel pressure is indicated after electric booster pump is turned on. | The electric circuit is cut (Fig. 91-3, item B 8) | Measure the electric voltage at the pump drive motor terminals. If it is zero detect conductor interruption and repair it.                         |
|                                                                         | Defective electric booster pump.                  | Measure the electric voltage at the pump drive motor terminals. If it is equal to voltage of board network replace the electric fuel booster pump. |

## MAINTENANCE

### REMOVAL / INSTALLATION

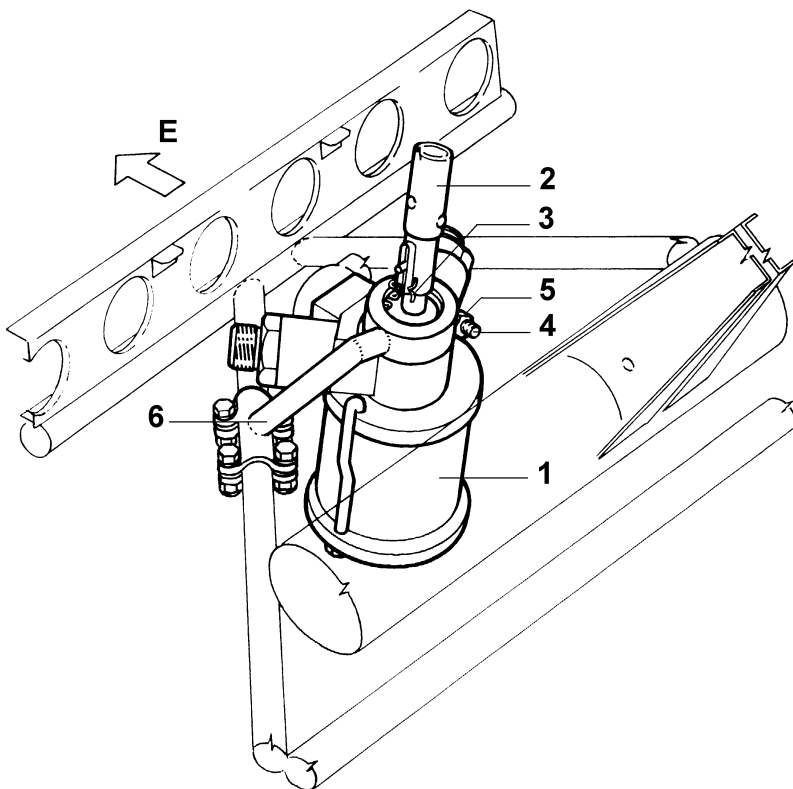
#### REMOVAL OF FUEL VALVE

##### Preparatory works

- a) Remove bottom fuselage panel (Fig. 52-5, item 24).
- b) Dump airplane fuel system.

##### Removal of fuel valve

- a) Unlock and remove fuel pipe and by-pass valve (Fig. 28-2, item 10) from fuel valve (Fig. 28-4, item 1).
- b) Remove cotter pin (3) from the lower part of control shaft (2).
- c) Release nut (5) of bolt (4) and release holder sleeve (6).
- d) Remove fuel shut-off valve (1) from the sleeve of holder (6) in downward direction.



E ... direction of flight

- 1 ... fuel valve
- 2 ... control shaft
- 3 ... cotter pin
- 4 ... bolt
- 5 ... nut
- 6 ... holder

Fig. 28-4 Fuel valve



### **INSTALLATION OF FUEL VALVE**

- a) Fit the fuel valve (Fig. 28-4, item 1) into the holder (6) and tighten the nut a bit (5) of nut (4).
- b) Connect pipe and by-pass valve (Fig. 28-2, item 10) to fuel valve (Fig. 28-4, item 1).
- c) Tighten the nut (5). Tighten the nut of pipe and by-pass valve while holding the ports of fuel valve (1) with wrench.
- d) Fit control shaft (2) upon the fuel valve (1) and lock it with cotter pin (3).
- e) Make sure the valve may be reset to all individual positions.
- f) Check tightness of airplane fuel system.
- g) Lock nuts of pipe and by - pass valve with safety wire.

### **Final works**

- a) Install bottom fuselage panel (Fig. 52-5, item 24).

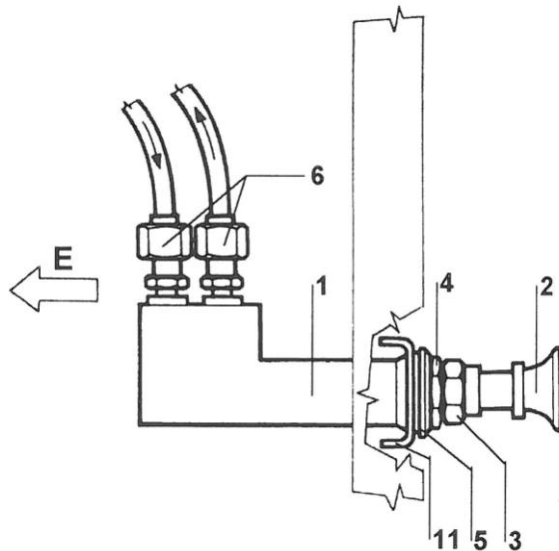
### REMOVAL OF FUEL PRIMER

#### 1. Removal of LUN 6200 fuel primer

##### CAUTION

THE FUEL PRIMER MAY BE LEFT WITHOUT INTERNAL PRESERVATION FOR MAXIMUM 24 HOURS.

- a) Unscrew cap nuts of inlet and outlet pipes (Fig. 28-5, item 6).
- b) Unscrew nut of fuel primer piston (3) and remove piston (2) from fuel primer (1).
- c) Unscrew nut (4) and remove ring (5).
- d) Slide the fuel primer (1) from console (11) in the direction to firewall.
- e) Assemble the fuel primer as follows:
  - insert ring (5) and screw the nut (4) on
  - insert piston (2) and screw the nut (3) of piston on.
- f) Preserve fuel primer as follows:
  - fill the fuel primer with 1:1 mixture of aviation fuel and engine lube oil.
  - plug inlet and outlet ports.



E ... direction of flight

1 ... fuel primer

2 ... piston

3 ... nut of piston

4 ... nut

5 ... ring

6 ... nut

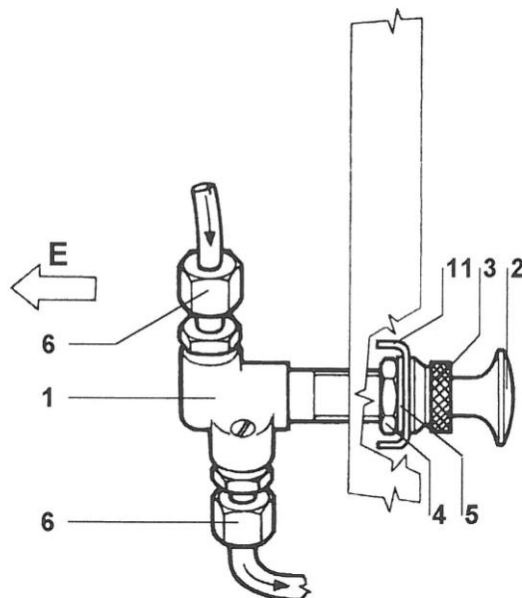
For information only:

11 ... console

Fig. 28-5 LUN 6200 fuel primer

## 2. Removal of ESSEX fuel primer

- Unscrew nuts fixing the fuel primer inlet and outlet pipes (Fig. 28-6, item 6).
- Unscrew piston nut (3) and remove piston (2) from fuel primer (1).
- Slide fuel primer (1) from hole of console (11) in the direction to firewall.
- Insert piston (2) into the fuel primer and screw the nut of piston (3) on.
- Plug inlet and outlet ports of fuel primer.



E ... direction of flight

1 ... fuel primer  
2 ... piston  
3 ... nut of piston  
4 ... nut

5 ... washer  
6 ... nut

For information only:  
11 ... console

*Fig. 28-6 ESSEX fuel primer*

**INSTALLATION OF FUEL PRIMER****1. Installation of LUN 6200 fuel primer**

- a) Remove preservation of fuel primer as follows:
  - remove plugs of inlet and outlet ports
  - rinse the fuel primer with aviation fuel by three times - pulling and pushing the primer piston (Fig. 28-5, item 2).
- b) Unscrew the nut (3) of piston and pull the piston (2) from the fuel primer (1).
- c) Fit the fuel primer into the hole of console (11), insert ring (5) and screw the nut (4) on.
- d) Insert piston (2) into the fuel primer and screw the piston nut (3) upon primer.
- e) Fix the inlet and outlet pipes by nuts (6) to fuel primer ports while holding the fuel primer pipe couplings with wrench.

**2. Installation of ESSEX fuel primer**

- a) Remove plugs from fuel primer inlet and outlet pipe couplings.
- b) Unscrew nut (Fig. 28-6, item 3) of piston and pull the piston (2) from fuel primer.
- c) Fit the fuel primer into the hole of primer console (11), insert piston (2) in and screw the nut (3) of piston upon primer. Lock the nut with LOCTITE 542 cement.
- d) Fit the washer (5) in and tighten the nut (4). Lock the nut with LOCTITE 542 cement.
- e) Fix the inlet and outlet pipes by cap nuts (6) while holding the fuel primer pipe couplings with wrench.

## **INSPECTION / CHECK**

### **CHECK OF TIGHTNESS OF FUEL SYSTEM**

#### **Recommendation**

The airplane manufacturer recommends checking airplane fuel system tightness with compressed air.

#### **A) TIGHTNESS CHECK WITH FUEL**

- a) Fill the airplane fuel system with fuel and check visually the system tightness.
- b) Tighten the untaught couplings.

#### **B) TIGHTNESS CHECK WITH COMPRESSED AIR**

##### **CAUTION**

USE FOR TIGHTNESS TEST OF AIRPLANE FUEL SYSTEM ONLY DRY AIR OR INERT GAS.

- a) Check closing of all the fuel tanks and setting of fuel valve controller to **OFF** position.
- b) Couple the tester hose to one fuel tank air vent outlet while plugging the other.
- c) Generate by means of tester 25 kPa (3,62 p.s.i.) overpressure in airplane fuel system.
- d) Observe reading of tester pressure gauge. The 25 kPa (3,62 p.s.i.) overpressure should remain unchanged for at least 3 minutes.
- e) Detect untaught coupling by means of soap water. Tight the faulty coupling and dry it. Make tightness test again.
- f) Deflate air pressure from airplane fuel system.
- g) Remove tester coupling and plug from fuel tank air vent ports.

### **CHECK OF CLEANNESS OF FUEL VALVE**

- a) Unscrew two nuts of fuel valve (Fig. 28-4, item 1) fixing screws and remove unit body with filter element.
- b) Clean filter element with aviation gas and clean internal space of body.
- c) Assemble the fuel shut-of valve, screw and tighten the nuts and lock the nuts with cotter pins.

## APPROVED REPAIRS

### REPAIRS OF FUEL SYSTEM

| Fault                                                                                                        | Remedy                                                                                                  |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 1) Hoses and pipes.<br>a) Mechanical defects<br>b) Out of date of expiry of rubber hoses (section 05-10-00). | Replace faulty hoses and pipes.<br>Replace expired hoses<br>(Life time of AEROQUIP hoses is unlimited). |
| 2A) Carburetor sieve:<br>a) dirty sieve<br>b) deformed or damaged sieve.                                     | Wash dirty sieve in solvent and blow with compressed air.<br>Replace faulty sieve.                      |
| 2B) Injector sieve<br>a) dirty sieve<br>b) deformed or damaged sieve.                                        | Wash dirty sieve in solvent and blow with compressed air.<br>Replace faulty sieve.                      |
| 3) Engine fuel pump:<br>Fuel and oil detected in pump air vent.                                              | Replace fuel pump.                                                                                      |
| 4) Electric fuel booster pump (Fig. 28-2, item 9):<br>Untightness                                            | Replace faulty gasket.                                                                                  |
| 5) LUN 6200 fuel primer:<br>- faulty operation<br>- untightness                                              | Faulty HP 4285-0405 packing - supplied with pump<br>Replace faulty sealing rings                        |
| 6) ESSEX fuel primer:<br>incorrect operation or untightness.                                                 | Replace fuel primer.                                                                                    |

# **FUEL QUANTITY MEASUREMENT**

## **DESCRIPTION AND OPERATION**

The fuel quantity in main and auxiliary tanks is indicated by quadruple fuel quantity gauge (Fig. 28-7, poz. 1), that is installed in right instrument panel. The quadruple fuel quantity gauge is connected to float tanks units (2; 2, 3) in individual tanks. The main tanks unit (2) are inbuilt in airplane from S/N 0023.

The fuel remainder in left and right tanks (3 liters up to S/N 0052 incl.; min. 8 liters from S/N 0053 incl.) is indicated by annunciators in light annunciation panel (4). The **L FUEL LOW LEWEL** and **R FUEL LOW LEVEL** annunciators are electrically controlled by main tank float units.

### **Measurement of fuel quantity by dipstick**

(airplanes up to S/N 0022)

#### **CAUTION**

NEVER OPEN MAIN TANK FILLER CAPS IN THE AUXILIARY TANKS ARE FUELED THERE IS DANGER OF FUEL ESCAPE.

In case the auxiliary tanks are empty it is possible to check fuel quantity in main tanks by dipstick (Fig. 28-8, item 2).

Procedure for fuel quantity measurement by dipstick in tanks of airplane up to S/N 0014:

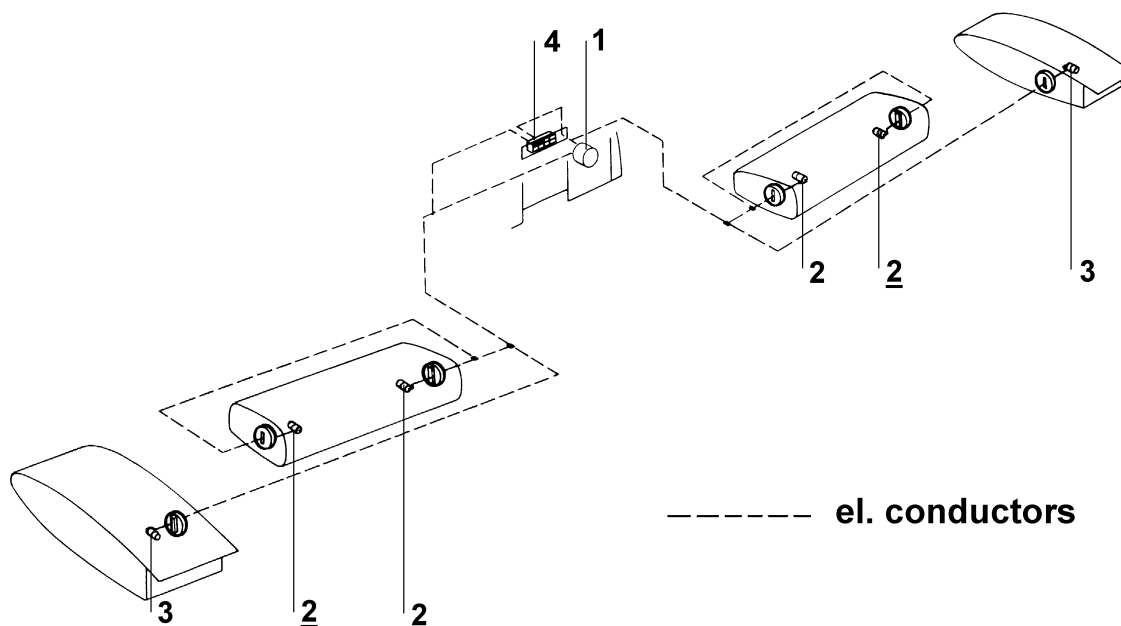
- Tilt segment (5) turn lock of main tank (1) filler cap to **OPEN** position and remove filler cap;
- Read fuel quantity in main fuel tank upon the cap dipstick (2);
- Insert filler cap (1) into the main tank, turn to **CLOSED** position, and tilt the segment (5).

Procedure for fuel quantity measurement by dipstick in tanks of airplane from S/N 0015 to S/N 0022 incl.:

- Tilt segment (5) turn lock of main tank (1) filler cap to **OPEN** position and remove filler cap;
- Wipe fuel from dipstick (2);
- Insert dipstick into the main tank until the spring (3) fits into the recess of coupling (4)
- Remove dipstick from the tank and read the fuel quantity in main tank;
- Insert filler cap into the main tank (1) turn it to **CLOSED** position, and tilt the segment (5).

#### **NOTE**

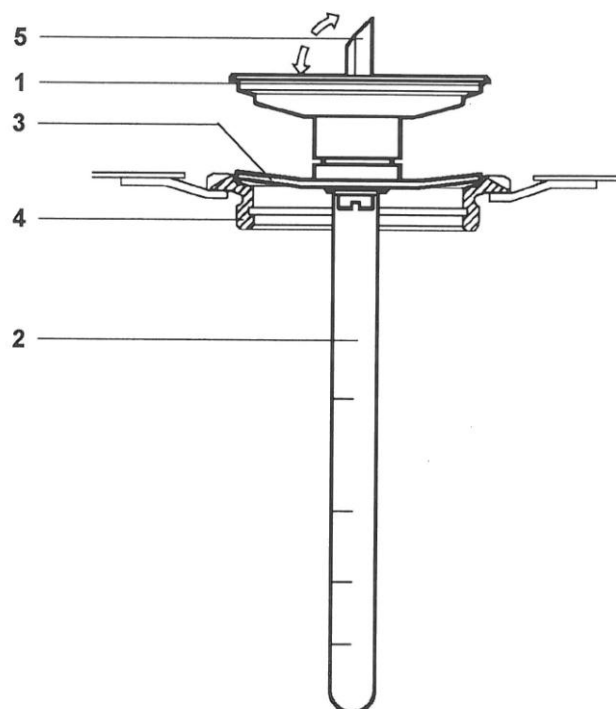
From S/N 0023 incl. main tank dipstick is not used.



- 1 ... quadruple fuel quantity gauge
- 2 ... float tank unit in main tank
- 2 ... float tank unit in main tank (from S/N 0023)
- 3 ... float tank unit in auxiliary tanks
- 4 ... light annunciation panel

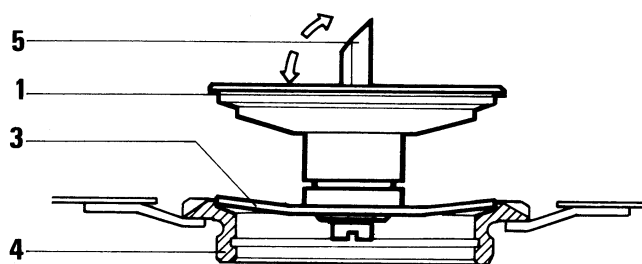
*Fig. 28-7 Fuel quantity measurement*





- 1 ... main tank filler cap
- 2 ... main tank dipstick (NOTE)
- 3 ... spring
- 4 ... coupling
- 5 ... segment

*Fig. 28-8 Main tank filler cap up to S/N 0022 incl.*



- 1 ... main tank filler cap
- 3 ... spring
- 4 ... coupling
- 5 ... segment

*Fig. 28-8A Main tank filler cap from S/N 0023 incl.*

**EFFECTIVITY: All**

## **FAULT REMEDY**

| Fault                                                   | Possible reason                                                                                 | Remedy                                                                                  |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Quadruple fuel quantity gauge is not operated.          | Short circuit in electric circuit (Fig. 91-13; 91-14, Item M 7)                                 | Detect and remove short circuit, repair or replace defective parts.                     |
|                                                         | Faulty fuse<br><b>FUEL IND. L 1A</b> or<br><b>FUEL IND. R 1A.</b><br>(Up to S/N 0045 incl.)     | Detect reason and replace faulty fuse.                                                  |
|                                                         | <b>FUEL IND. L</b> or<br><b>FUEL IND. R</b><br>circuit breaker is OFF<br>(From S/N 0046 incl.). | Detect reason and circuit breaker ON.                                                   |
|                                                         | Cut electric circuit.                                                                           | Check the circuit by ohmmeter and repair or replace faulty parts and/or cut conductors. |
|                                                         | Faulty quadruple indicator or some float tank unit.                                             | Disconnect system and check individual circuits independently. Replace faulty parts.    |
| Annunciation usable fuel remainder is out of operation. | Electric circuit is short circuited (Fig. 91-13).                                               | Detect and remove short circuit, repair or replace defective parts.                     |
|                                                         | Cut electric circuit.                                                                           | Check the circuit by ohmmeter and repair or replace faulty parts and/or cut conductors. |

**EFFECTIVITY: All**

## **MAINTENANCE**

### **REMOVAL / INSTALLATION**

#### **REMOVAL OF FLOAT TANK UNIT**

##### **Preparatory works**

- a) Disconnect board battery from board electric network (subsection 24-32-00).
- b) Dump fuel from fuel tank.

##### **Removal of float tank unit**

- a) Open the access door in bottom wing skin at the face of fuel tank.
- b) Disconnect electric conductors from the terminals of float tank unit (Fig. 28-9, item 5; 5; 6).
- c) Unscrew nuts (8) of screws (3).
- d) Remove float tank unit (5; 5; 6) with care from fuel tank (1; 2).
- e) Remove gasket (4) from tank flange

#### **INSTALLATION OF FLOAT TANK UNIT**

- a) Fit the gasket (4) upon the flange of tank.
- b) Check float tank unit (5; 5; 6) length of arm, and insert it with care into the tank (1; 2) and fit it upon the screws (3) to have blue marked terminal upwards.

Marking and rrm dimension of float tank units used in main tanks:

FOR AIRPLANE UP TO S/N 0022

| Float tank unit (Fig. 28-9, item 5) |         |                       |              |    |      |                     |
|-------------------------------------|---------|-----------------------|--------------|----|------|---------------------|
| Drawing number                      | Marking | Arm dimension mm (in) |              |    |      | Note                |
|                                     |         | a                     |              | b  |      |                     |
| C 142.7231-00.08                    | 0H      | 139 ± 1               | 57,72 ± 0,04 | 11 | 0,43 | in left/right wings |

FOR AIRPLANE FROM S/N 0023

| Float tank unit (Fig. 28-9, item 5) |         |                       |              |    |      |                     |
|-------------------------------------|---------|-----------------------|--------------|----|------|---------------------|
| Drawing number                      | Marking | Arm dimension mm (in) |              |    |      | Note                |
|                                     |         | a                     |              | b  |      |                     |
| L 143.7231-07.00                    | 3H      | 133 ± 1               | 52,36 ± 0,04 | 20 | 0,80 | in left/right wings |
| L 143.7231-07.00A                   | 3H      | 133 ± 1               | 52,36 ± 0,04 | 20 | 0,80 | in left/right wings |

**EFFECTIVITY:** All

| Float tank unit (Fig. 28-9, item <u>5</u> ) |         |                       |             |                  |                       |    |      |    |      |               |
|---------------------------------------------|---------|-----------------------|-------------|------------------|-----------------------|----|------|----|------|---------------|
| Drawing number                              | Marking | Arm dimension mm (in) |             |                  |                       |    |      |    |      | Note          |
|                                             |         | a                     |             | b                |                       | c  |      | d  |      |               |
| L 143.7231-08.00                            | 3L      | 78 ± 1                | 3,07 ± 0,04 | 14 <sup>+1</sup> | 0,55 <sup>+0,04</sup> | 18 | 0,71 | -  | -    | in left wing  |
| L 143.7241-08.00                            | 3P      | 78 ± 1                | 3,07 ± 0,04 | 14 <sup>+1</sup> | 0,55 <sup>+0,04</sup> |    | -    | 18 | 0,71 | in right wing |
| L 143.7231-08.00A                           | 3L      | 78 ± 1                | 3,07 ± 0,04 | 14 <sup>+1</sup> | 0,55 <sup>+0,04</sup> | 18 | 0,71 | -  |      | in left wing  |
| L 143.7241-08.00A                           | 3P      | 78 ± 1                | 3,07 ± 0,04 | 14 <sup>+1</sup> | 0,55 <sup>+0,04</sup> |    | -    | 18 | 0,71 | in right wing |
| L 143.7231-08.00B                           | 3L      | 78 ± 1                | 3,07 ± 0,04 | 14 <sup>+1</sup> | 0,55 <sup>+0,04</sup> | 18 | 0,71 | -  |      | in left wing  |
| L 143.7241-08.00B                           | 3P      | 78 ± 1                | 3,07 ± 0,04 | 14 <sup>+1</sup> | 0,55 <sup>+0,04</sup> |    | -    | 18 | 0,71 | in right wing |

Marking and arm length of float tank unit in auxiliary tanks:

| Float tank unit (Fig. 28-9, item 6) |         |                       |             |                     |
|-------------------------------------|---------|-----------------------|-------------|---------------------|
| Drawing number                      | Marking | Arm dimension mm (in) |             | Note                |
|                                     |         | a                     |             |                     |
| Z 42.7270-25.00                     | 1V      | 194 ± 1               | 7,64 ± 0,04 | in left/right wings |
| Z 42.7270-25.00A                    | 1V      | 194 ± 1               | 7,64 ± 0,04 | in left/right wings |

- c) Provide screws (3) with washers (7) and screw the nuts lightly upon them (8).

### NOTE

Couple the bonding cable under one of screws (3).

- d) Connect electric conductors to float tank unit terminals (5; 5; 6) according to electric diagram issued in section 91-80-00 and in subsection 91-81-00.
- e) Check operation of fuel remainder annunciation if float tank unit (5) of main tanks is replaced and check zero indication of quadruple fuel quantity gauge.
- f) Check tightness of airplane fuel system.

EFFECTIVITY: All

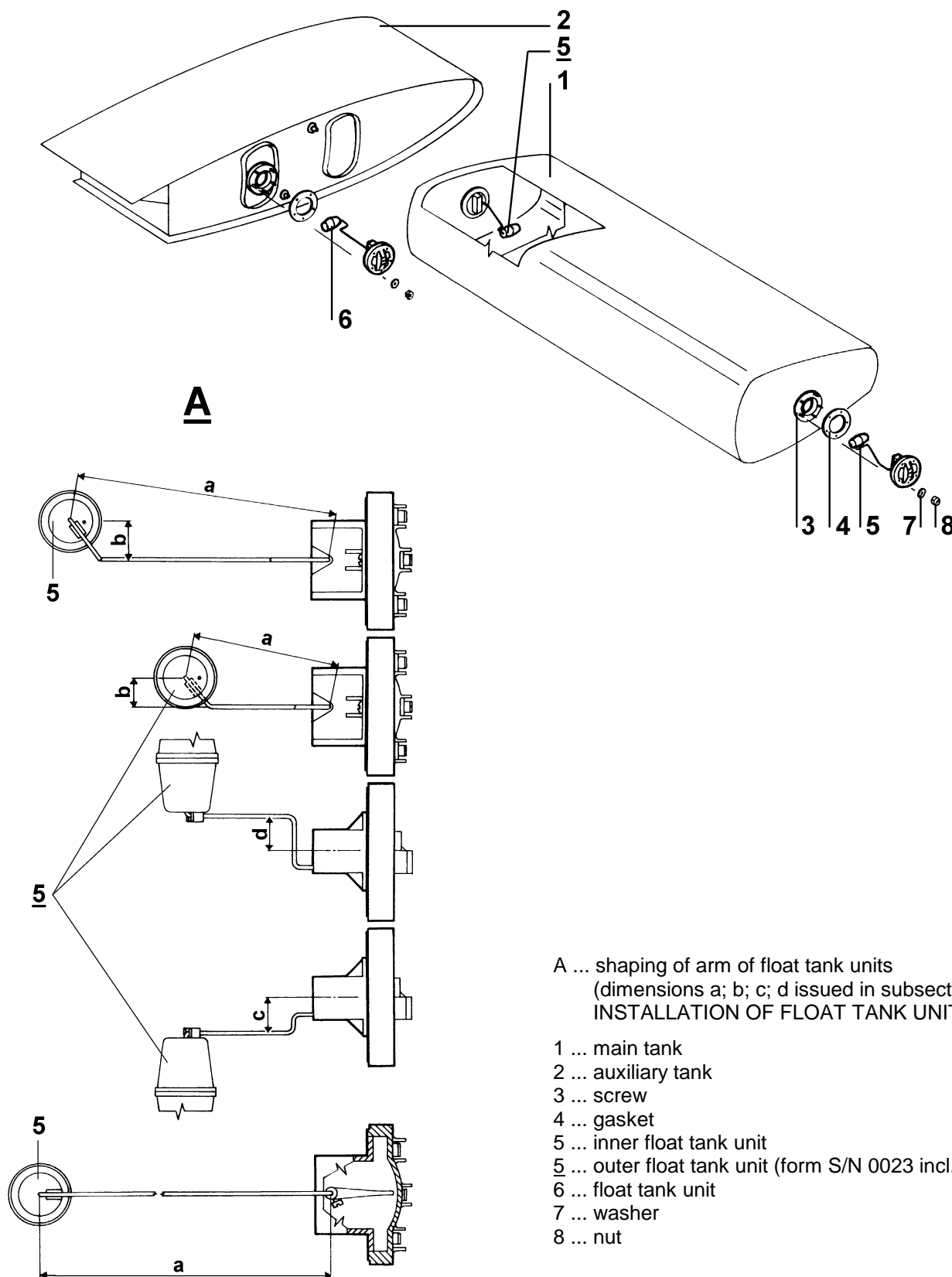


Fig. 28-9 Float tank unit

**EFFECTIVITY: All**

## INSPECTION / CHECK

### CHECK OF ANNUNCIATION OF USABLE FUEL REMAINDER

The annunciation of usable fuel remainder is checked after inboard float tank unit replacement (Fig. 28-9, item 5) in main fuel tanks.

#### Procedure of check:

- a) Lift the airplane by fuselage jack (subsection 07-11-00; 07-12-00) and set to horizontal position. Use longitudinally the NiB 2 and NiB 3 upon rear fuselage section and transversally NiB 6 of both post and starboard wings (Fig. 08 - 3).
- b) Make sure the fuel valve controller is set to **OFF** position. Screw the dumping fixture to fuel valve (Fig. 28-3, item B).
- c) Fill the checked tank with 3 liters (0.8 US gal) of aviation fuel and after three minutes set the fuel valve controller to checked tank (position **L** or **R**). Set fuel valve controller to **OFF** position as soon as the fuel flows continuously from fuel dumping fixture, i. e. when the fuel pipes are fully flooded.
- d) Dump all the fuel from the checked tank through tank draining valve that is in lowest point of tank. Shut the shut-off valve as soon as the fuel is dumped completely and pipes are flooded with fuel.
- e) **Effectivity: up to S/N 0052 incl.** : Fill the checked tank with 6,5 liters (1,7 US gal) of aviation fuel using graduated vessel, i. e. 3 liters (0,8 US gal) of unusable fuel 3 liters (0,8 US gal) of fuel annunciated by **L FUEL LOW LEVEL** or **R FUEL LOW LEVEL** annunciator and 0,5 liter (0,1 US gal) of reserve and check the switching of fuel remainder annunciation. It is checked by knocking with palm upon the tank in the leading edge area when the amber **L FUEL LOW LEVEL** or **R FUEL LOW LEVEL** light annunciator should flicker.

In case the above annunciator is either lit continuously or it is not lit at all proceed follows:

- Check the electric connection of float tank unit and light annunciation panel. Remove detected faults and check as above again.
  - Replace the float tank unit case there is not fault detected. Check before new tank unit installation the length of tank unit arm according to paragraph INSTALLATION OF FLOAT TANK UNIT. Check operation of fuel remainder annunciation again.
  - Bend fixing flange of float tank unit, case if even after float tank unit replacement the fault is not repaired.
- e<sub>1</sub>) **Effectivity: from S/N 0053 incl.** : Fill the checked tank with 18 liters (4,7 US gal) of fuel (3 liters (0,8 US gal) of unusable fuel + indicated remaining fuel quantity + reserve) using graduated vessel. Set the fuel selector valve to checked tank (position **L** or **R**). Damp fuel trough the main fuel drain valve. As soon as the indication light with inscription **L FUEL LOW LEVEL** or **R FUEL LOW LEVEL** lits, set the fuel selector valve to **OFF** position. Check the specified remaining fuel quantity of the fuel on fuel quantity indicator ( $11 \pm 3 \text{ l} = 2,9 \pm 0,8 \text{ US gal}$ ).
- In case the above annunciator element is off or the fuel quantity indicator indicates different value, proceed as follows
- Check the electric connection of float tank unit and light annunciation panel. Remove the detected faults.
  - Replace the float tank unit if the fault in electric connection was not detected - check the arm dimensions before the installation (INSTALLATION OF FLOAT TANK UNIT).

**EFFECTIVITY: All**

### Recommendation

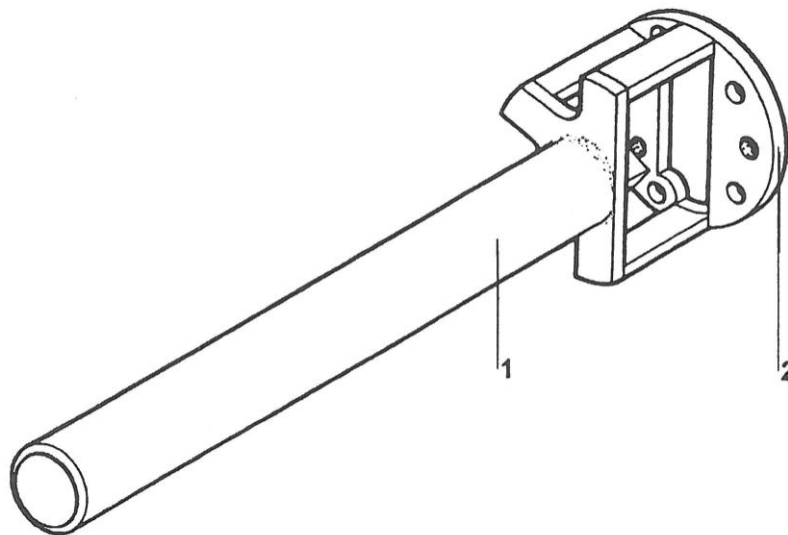
Use 003-622-0931 fixture for bending the tank flange:

- Dump fuel from the tank through tank drain valve to clean empty vessel.
- Unscrew nuts (Fig. 28-9, item 8) from screw (3), and remove washer (7).
- Provide float tank unit (5) with fixture (Fig. 28-10) and fix in place with nuts.
- Fill the tank with 6,5 liters (1,7 US gal) of aviation fuel.
- Bend with care the upper part of flange from the tank flange if the annunciator is lit during knocking continuously and bend with care the upper part of flange to the tank flange if the annunciator is not lit at all.

### NOTE

Maximum permissible bending of tank flange is  $\pm 2^\circ$ .

- Having finished the flange adjustment remove fixture from float tank unit, provide screws (Fig. 28-9, item 3) with washers (7) and screws and tight nuts (8) lightly.
- Check annunciator flickering again.



- 1 ... handle  
2 ... face

*Fig. 28-10 Fixture 003-622-0931 for tank flange bending*

INTENTIONALLY LEFT BLANK