

Chapter 28

Fuel

TABLE OF CONTENTS

Chapter	Title	
28-00-00	GENERAL	3
28-01-00	MAINTENANCE PRACTICES	5
28-01-01	Refueling/Defueling	5
28-01-02	Reduction of Fuel Tank Vapor Hazards.....	5
28-10-00	STORAGE	7
28-11-00	MAINTENANCE PRACTICES	9
28-11-01	Center and Acro Tank Removal/Installation	9
28-11-02	Acro Tank Flop Tube Removal/Installation.....	10
28-11-03	Wing Tank Inspection Door Removal/Installation	11
28-11-04	Wing Tank Outlets Removal/Installation	12
28-11-05	Center Tank Filler Neck Removal/Installation	13
28-11-06	Wing Tank Filler Neck Removal/Installation	13
28-11-07	Filler Neck Sealing Lip Replacement	14
28-11-08	Ventilation Line Replacement.....	14
28-20-00	DISTRIBUTION	15
28-21-00	MAINTENANCE PRACTICES	17
28-21-01	Fuel Selector Valve Removal/Installation	17
28-21-02	Fuel Selector Valve Control Rod Removal/Installation	17
28-21-03	Gascolator Removal/Installation	19
28-21-04	Electrical Boost Pump Removal/Installation	20
28-21-05	Fuel Line Replacement	21
28-40-00	INDICATING	22
28-41-00	MAINTENANCE PRACTICES	24
28-41-01	Fuel Quantity Indicator Removal/Installation	24
28-41-02	Fuel Quantity Indicator Calibration (Center Tank).....	25
28-41-03	Tubular Tank Unit (Center Tank) Removal/Installation	25
28-41-04	Lever-type Tank Unit (Wing Tank) Removal/Installation	26
28-41-05	Float Wire Adjustment.....	27

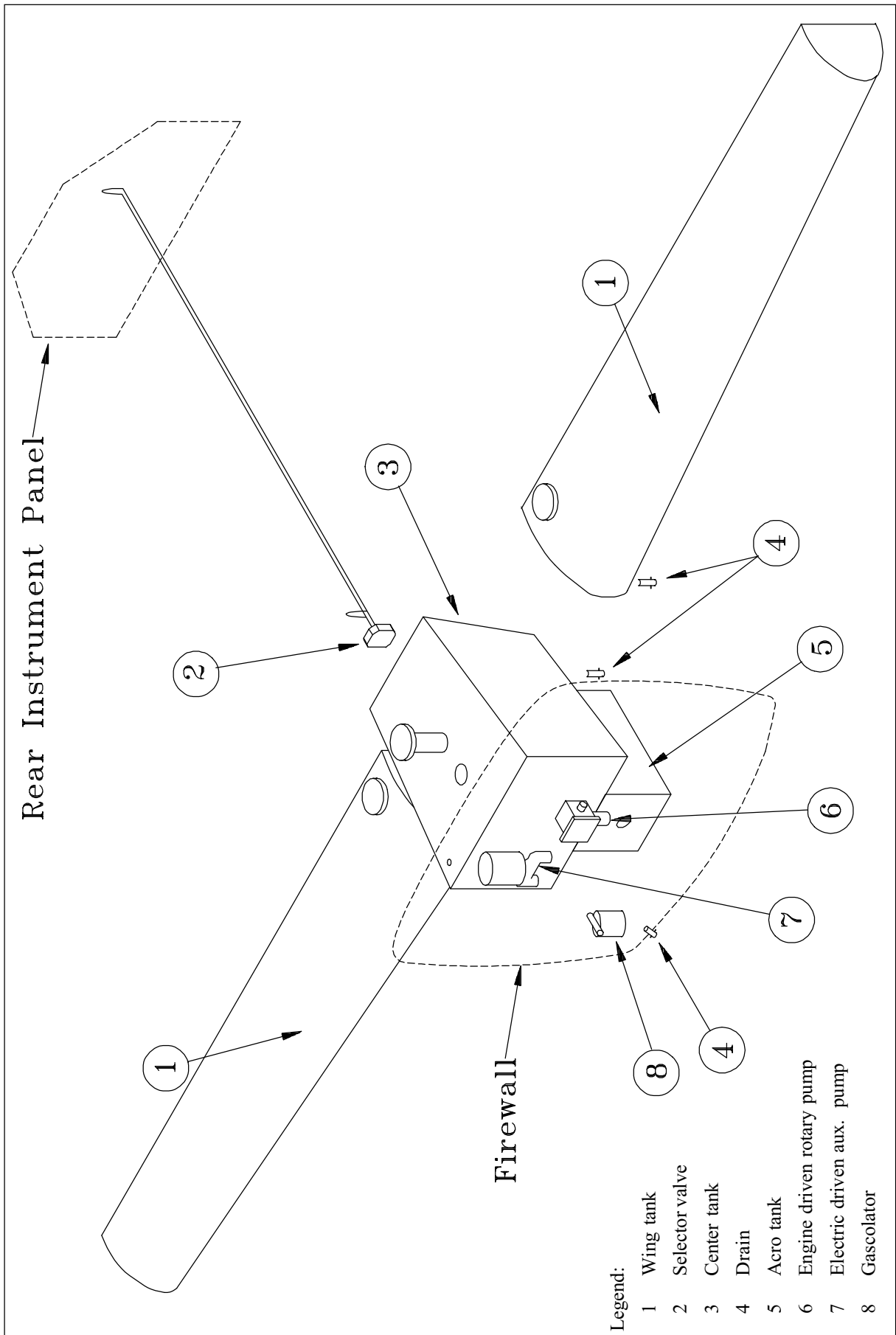
28-00-00

GENERAL

The fuel system (refer to Figure 1) consists of a center tank (3) with acro tank (5), two wing tanks (1), a fuel selector valve (2), a gascolator (8), an electrically driven auxiliary pump (7) and an engine driven rotary pump (6). Concerning the fuel drains (4) also refer to Chapter 12-10-03.

On the rear instrument panel one fuel quantity indicator for the center tank and one for the wing tanks, the switch/circuit breaker for the boost pump and the circuit breaker for the indication are installed.

For fuel tank capacities refer to Chapter 12-10-01.



Fuel System
 Figure 1

28-01-00

MAINTENANCE PRACTICES

28-01-01

Refueling/Defueling

Refer to Chapter 12 for detailed refueling/defueling procedures.

28-01-02

Reduction of Fuel Tank Vapor Hazards

General Precautions

During all ventilation or maintenance procedures involving the fuel system, observe the following general precautions.

- 1 Defueling should be outdoors with the aircraft at least 100 feet from hangars or other aircraft.
- 2 No smoking should be allowed within 100 feet of the aircraft.
- 3 Suitable fire fighting equipment should be available. Foam or soda type extinguishing agents are recommended.
- 4 Ground the aircraft to prevent static electricity from causing sparks. If a ramp ground is available it should be connected to exhaust stack. If a ramp ground is not provided, a temporary ground can be obtained by driving a metal rod into the ground and attaching a ground wire between the rod and the aircraft exhaust stack.
- 5 Flame and spark producing equipment should not be operated within 100 feet of the aircraft.
- 6 The aircraft should have its battery removed.
- 7 Only personnel working on the aircraft should be allowed in the immediate area, and no other maintenance should be performed while the tanks are being worked on.
- 8 When a fuel tank is opened for repair, air ventilation (refer to following Page) should be started immediately to reduce vapor concentrations.

- 9 When draining fuel, ensure that suitable containers are available and that drained fuel is stored safely. Do not allow fuel to drip to the ground and form pools.
- 10 If it is necessary to ventilate a tank when the aircraft is in hangar, ensure that vapors do not accumulate to explosive or toxic levels in the hangar.

WARNING

When fuel is being drained, there is little control over the release of fuel vapor. This vapor should be dissipated as quickly as possible. Compressed air or explosion-proof blowers may be used for the purpose.

Air Ventilation

- 1 Completely drain the fuel system per Chapter 12-10-02.
- 2 Remove inspection doors (refer to Chapter 28-11-03) and tank caps.
- 3 Use compressed air or an explosion-proof blower to blow air into the tank until tank interior is dry and free of vapor.
- 4 Continue ventilation whenever tank is open and being worked on.

WARNING

If flammable vapors from cleaning solvents are allowed in the tank increase air circulation to dissipate them.

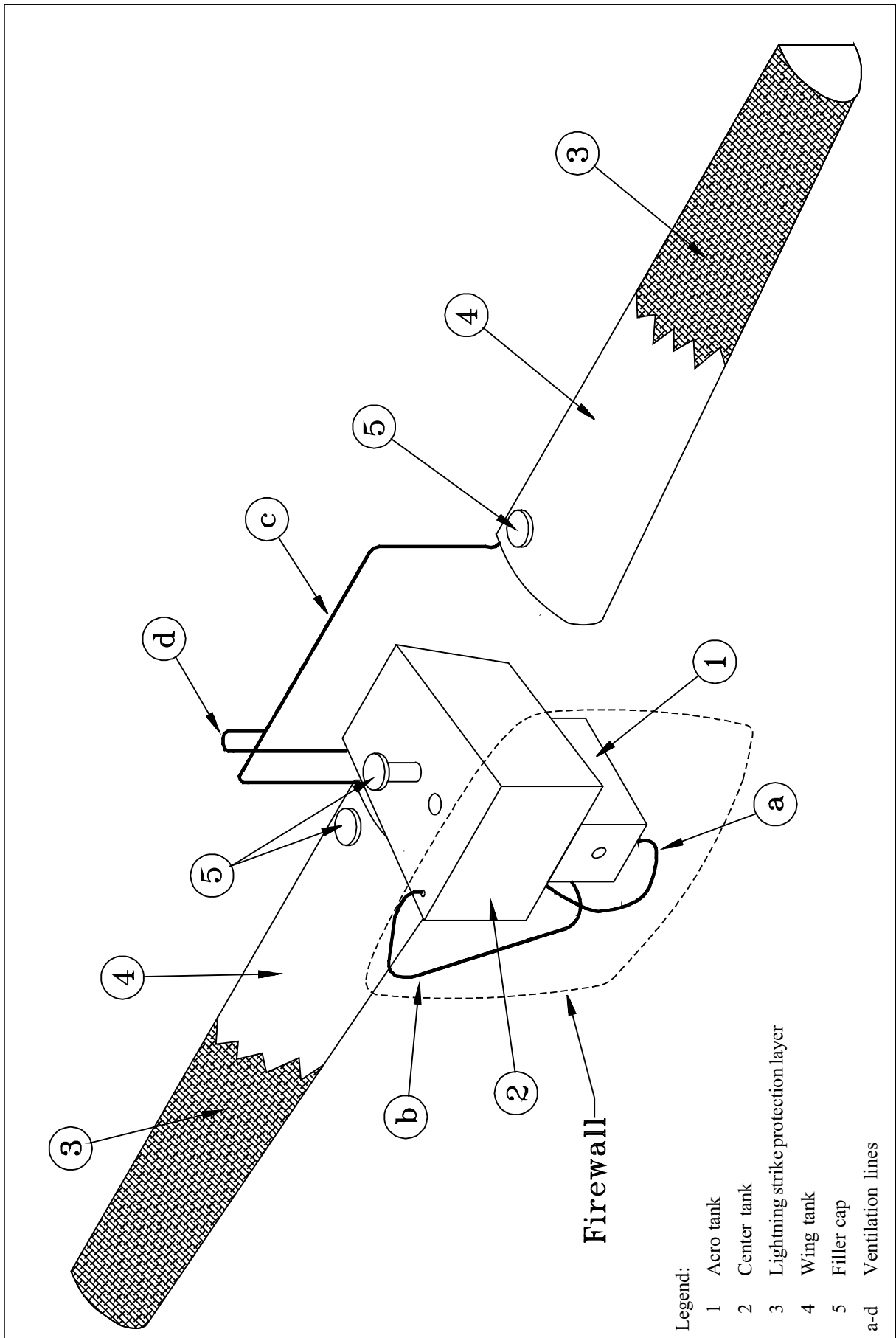
28-10-00

STORAGE

The EXTRA 200 is equipped with two independent fuel systems: The center- and acro tank system and the wing tank system.

The acro tank (1, Figure 2) incorporating an inverted flight fuel supply system is connected to the center tank (2) which is mounted in front of the main spar. Fueling the center and acro tank is by means of the fuselage 2" diameter filler cap (5). For leak detection the center and acro tank are furnished with a GRP tank shell. In case of leakage blue colored fuel is shining through. The center/acro tank is grounded. The center and acro tank deaerate by ventilation tubes (a-b) ending at the right side of the main landing gear spring.

The root section of each wing – in front of the main spars – forms an integral fuel tank of approximately 100 cm (39") length (4). Each wing tank has a 2" diameter filler cap (5) for gravity fueling. Sealing lips are installed at the filler necks inside the wingtank. For sealing 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) has been applied to the inside of the wing tanks. For lightning protection reason the shell in the area of the wing tank has an outer layer of carbon fiber with incorporated aluminium thread (3). The wing tanks are grounded. Each tank is provided with an alu ventilation tube (c) for adequate venting. The ventilation tubes are interconnected to a main tube (d), ending outside of the fuselage at the right side of the main landing gear spring.



Storage
 Figure 2

28-11-00

MAINTENANCE PRACTICES

28-11-01

Center and Acro Tank Removal/Installation

- 1 Remove the main fuselage cover (refer to Chapter 51).
- 2 Drain the fuel system per Chapter 12-10-02.
- 3 Loosen the electrical facilities and remove hose fixtures.
- 4 Loosen and remove the metal attachment belts with the rubber stripes.
- 5 Remove the center/acro tank to the top.
- 6 Install in reverse sequence of removal.

28-11-02

Acro Tank Flop Tube Removal/Installation

- 1 Drain the fuel system per Chapter 12-10-02.
- 2 Disconnect the hose (5, Figure 3) and the elbow fitting (4).
- 3 Loosen the flop tube fitting (3) and take the flop tube assembly (2) out of the acro tank (1).

WARNING

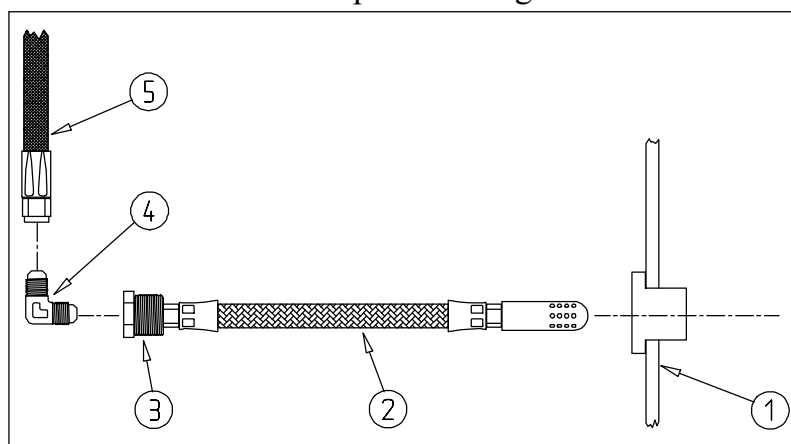
Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

- 4 Clean the sealing surfaces mechanically and with Acetone.

NOTE

If the flop tube assembly has to be replaced install a complete new assembly.

- 5 Install in reverse sequence of removal after applying Loctite 577 to the flop tube fitting thread.



Flop Tube Removal/Installation
Figure 3

28-11-03

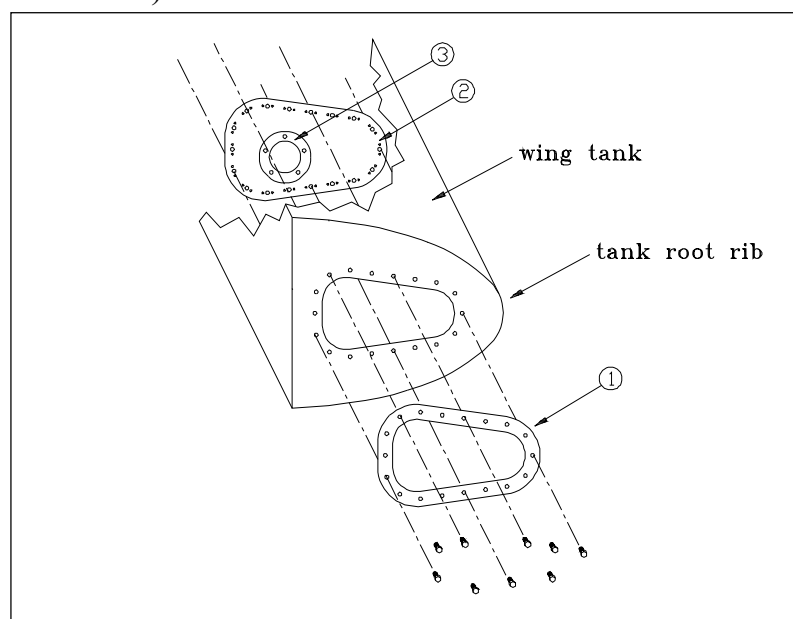
Wing Tank Inspection Door Removal/Installation

- 1 Drain the fuel system per Chapter 12-10-02.
- 2 Disconnect the ground bonding leads and if necessary (LH wing tank) the electrical wiring of the lever-type tank unit (3, Figure 4).
- 3 Remove the inspection door bolts.
- 4 Remove the inspection door flange (1).
- 5 Push the inspection door (2) into the tank, then turn and remove.

WARNING

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

- 6 Clean the sealing surfaces mechanically and with Acetone.
- 7 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) to the sealing surfaces (inspection door and tank root rib).



*Inspection Door Removal/Installation
Figure 4*

28-11-04

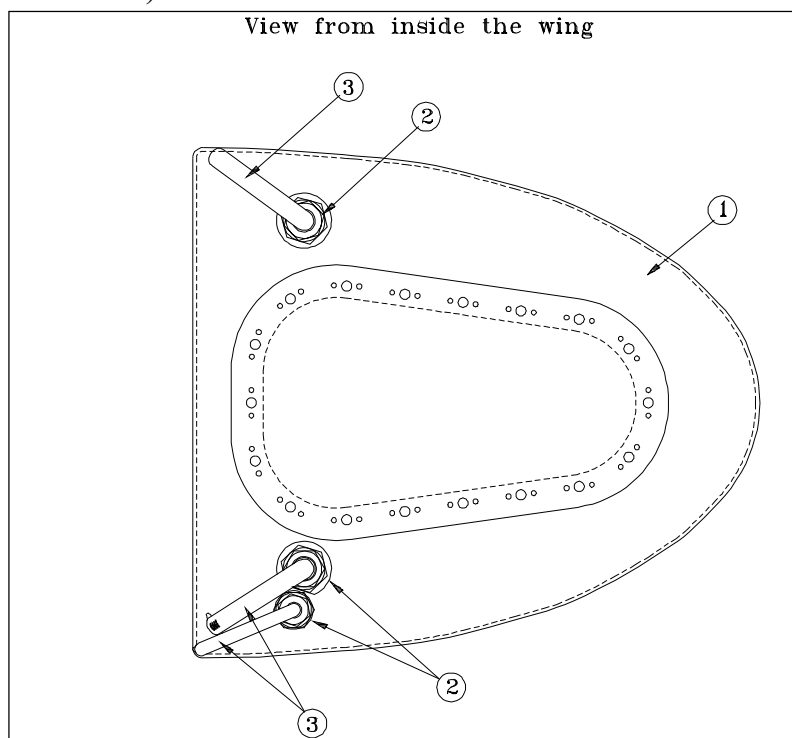
Wing Tank Outlets Removal/Installation

- 1 Remove the inspection door (1) (refer to Figure 5) per Chapter 28-11-04.
- 2 Remove the union nuts (2) and the elbow tubes (3).
- 3 Remove AN 924 nut and washers and remove AN 832 fitting.

WARNING

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

- 4 Clean sealing surfaces mechanically and with Acetone.
- 5 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) to the sealing surfaces (fitting to tank root rib). Ensure that the outlet end positions are in the upper-resp. undermost edge of the wing tank (see Figure 7 below).



*Wing Tank Outlets Removal/Installation
Figure 5*

28-11-05

Center Tank Filler Neck Removal/Installation

- 1 Remove the main fuselage cover per Chapter 51.
- 2 Completely drain the fuel system per Chapter 12.
- 3 Loosen the lower hose clip.
- 4 Remove the filler neck.
- 5 Install in reverse sequence of removal.

28-11-06

Wing Tank Filler Neck Removal/Installation

- 1 Completely drain the fuel system per Chapter 12.
- 2 Remove wing tank inspection door per Chapter 28-11-03.
- 3 Unscrew filler neck lock ring (4, Figure 6) with sealing lip (5) using a tool as shown in Figure 6.
- 4 Remove filler neck (3) with filler cap (1) and O-ring (2).

WARNING

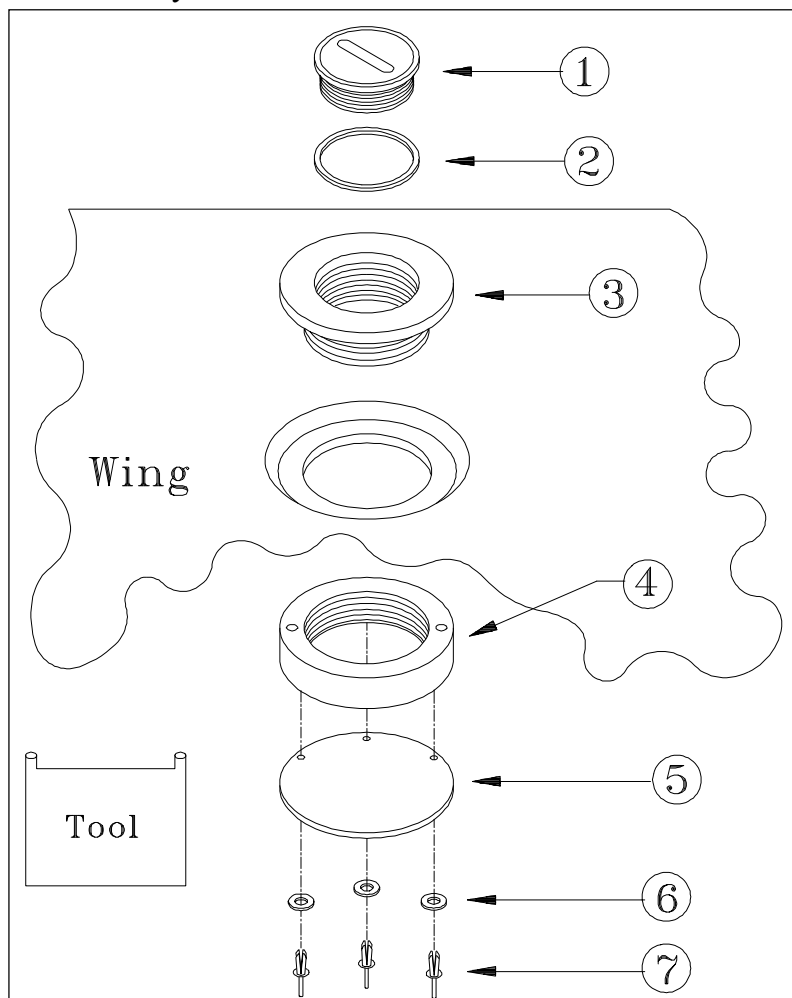
Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

- 5 Clean all sealing surfaces with Acetone.
- 6 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) to the sealing surfaces (wing/filler neck).

28-11-07

Filler Neck Sealing Lip Replacement

- 1 Carefully drill out the body-bound rivets (7, Figure 6).
- 2 Install the new sealing lip driving in new washers (6) and body-bound rivets.



*Filler Neck and Sealing Lip Removal/Installation
Figure 6*

28-11-08

Ventilation Line Replacement

Refer to Figure 6A. Small letters (a-c) refer to the marks of Figure 2.

General information concerning hoses and fittings you find in Chapter 20.

NOTE

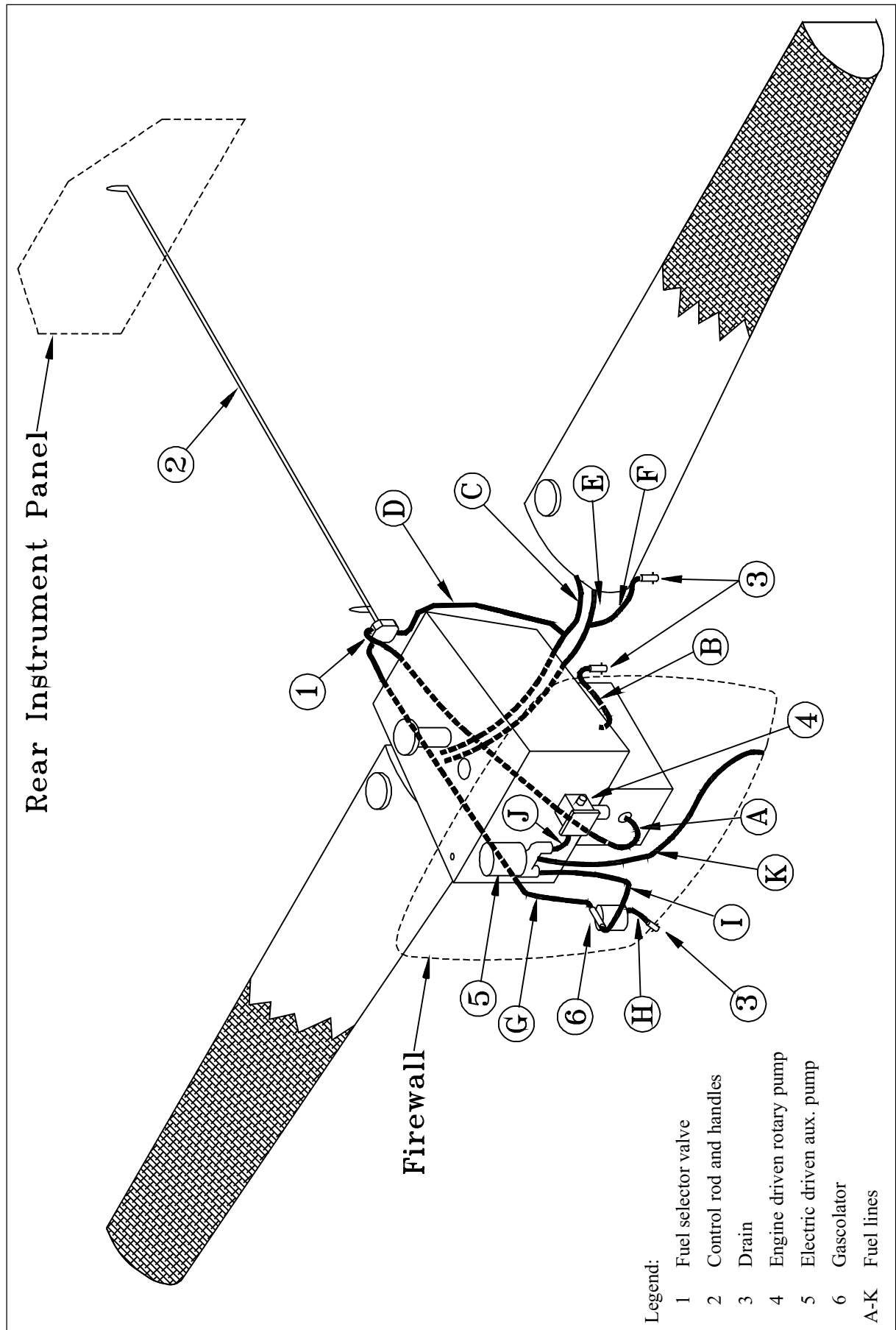
Use only, tubes and fittings as listed in the following.

28-20-00

DISTRIBUTION

(Refer to Figure 7) Flexible hoses and aluminium tubes (A-J) connect the particular components of the fuel system. From Serial No. 25 the drain line "K" has been added. In addition to the engine driven fuel pump (4), an electrically driven auxiliary pump (5) having sufficient capacity to feed the engine at take-off power is fitted as a safety device against failure of the engine driven pump. The auxiliary pump switch/circuit breaker is located on the rear instrument panel. A gascolator (6) is installed between the fuel selector valve and the auxiliary fuel pump at the firewall (engine side). A fuel selector valve of an Allen 6S122 type (1) is located at the right side of the front cockpit behind the main spar on a separate support. A control rod connects the selector valve to the control handles (2). The fuel selector valve is marked by the letters "WT" (Wing Tank), "E" (Engine), and "CT" (Center Tank) to ensure correct installation of fuel lines (Refer to "Detail A" of Figure 8).

The two tank systems are equipped with separate drain lines. Drains (3) are located at the gascolator and the left and right side of the bottom fuselage.



Distribution
 Figure 7

28-21-00

MAINTENANCE PRACTICES

28-21-01

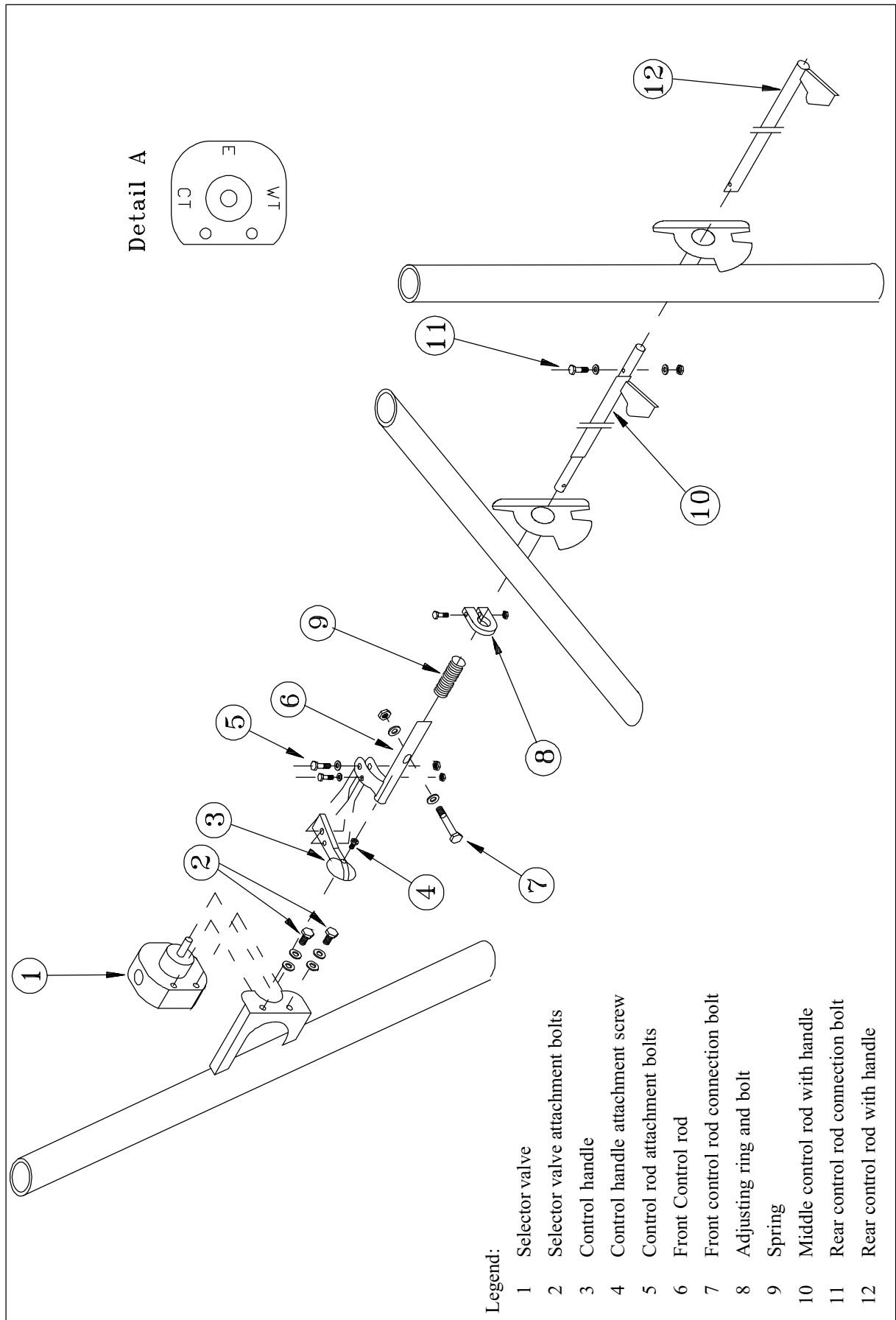
Fuel Selector Valve Removal/Installation

- 1 Drain the fuel system per Chapter 12-10-02.
- 2 Disconnect the fuel lines on the selector valve.
- 3 Remove the control rod attachment bolts (5, Figure 8).
- 4 Remove the selector valve attachment bolts (2).
- 5 Remove the selector valve (1).
- 6 Install in reverse sequence of removal. Use LOCTITE when installing the selector valve attachment bolts.

28-21-02

Fuel Selector Valve Control Rod Removal/Installation

- 1 Remove the rear control rod connection bolt (11, Figure 8).
- 2 Remove the rear control rod (12) to the rear.
- 3 Loosen the bolt of the adjusting ring (8).
- 4 Remove the front control rod connection bolt (7).
- 5 Remove the middle control rod (10), the adjusting ring (8) and the spring (9) to the rear.
- 6 Remove the control rod attachment bolts (5).
- 7 Remove the front control rod (6) .
- 8 Install in reverse sequence of removal. Consider that the position of the adjusting ring shall give the spring enough tension to move the control rod into the foremost position after having tied back.

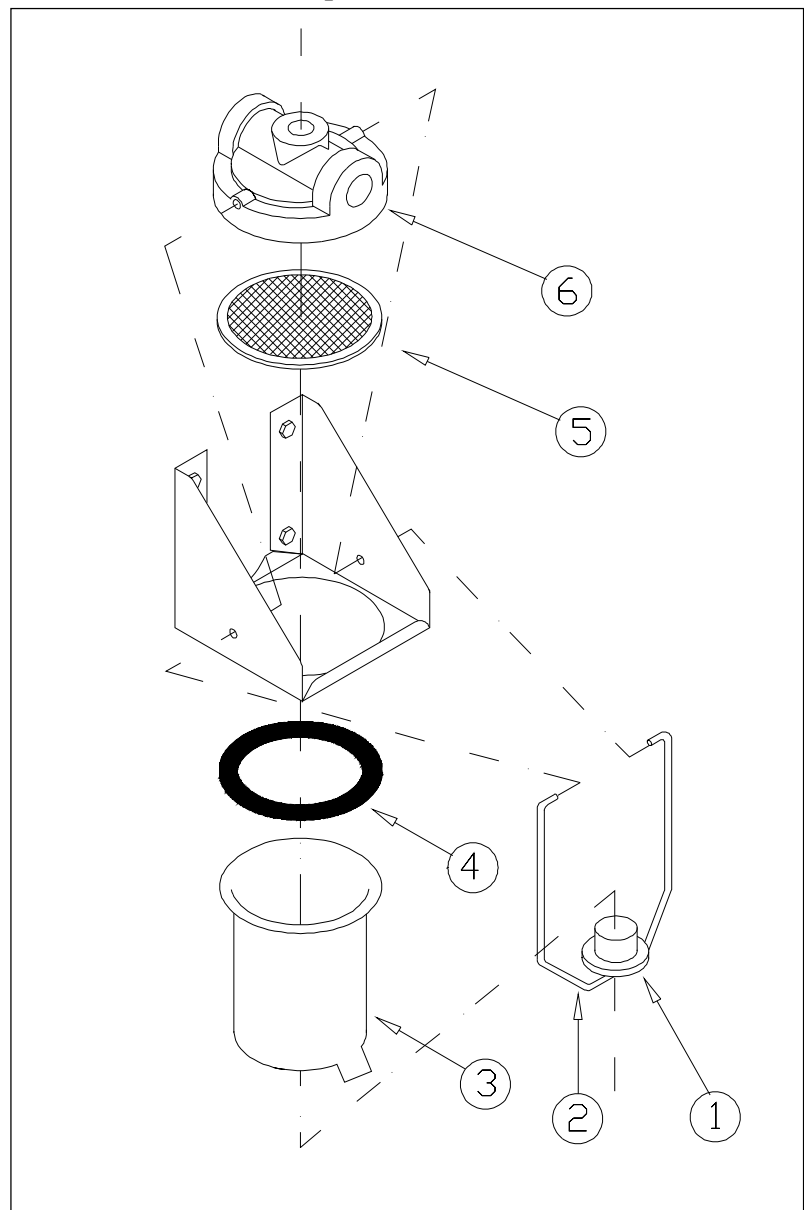


Fuel Selector Valve and Control Rod
Figure 8

28-21-03

Gascolator Removal/Installation

- 1 Drain the fuel system per Chapter 12-10-02.
- 2 Disconnect the fuel lines on the gascolator.
- 3 Loosen the knurled nut (1, Figure 9).
- 4 Remove the mounting bracket (2).
- 5 Remove the fuel reservoir (3) and the sealing ring (4).
- 6 Remove the strainer (5) and the gascolator cover (6).
- 7 Install in reverse sequence of removal.

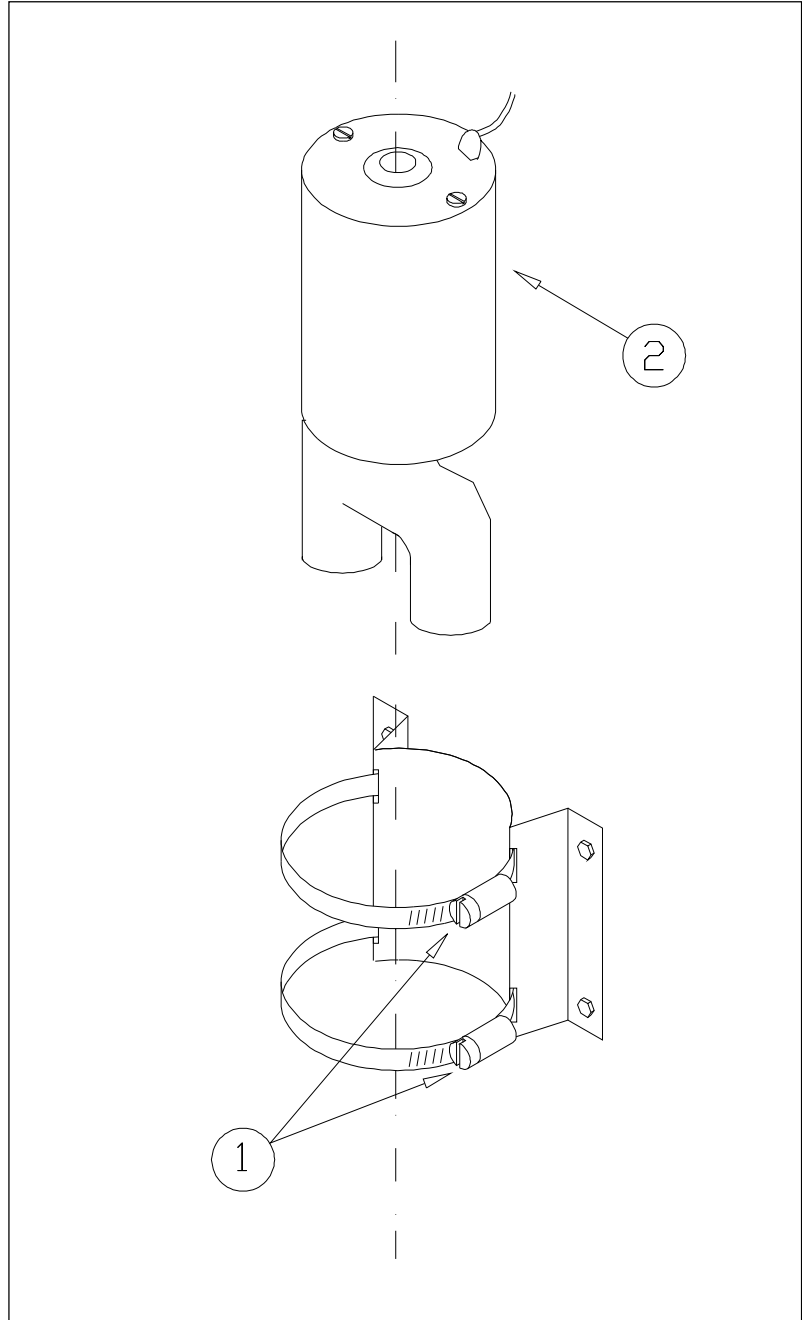


Gascolator Removal/Installation
Figure 9

28-21-04

Electrical Boost Pump Removal/Installation

- 1 Drain the fuel system per Chapter 12-10-02.
- 2 Disconnect the plug and the fuel lines on the boost pump.
- 3 Loosen the clamping device screws (1, Figure 10).
- 4 Remove the boost pump (2).
- 5 Install in reverse sequence of removal.



*Boost Pump Removal/Installation
Figure 10*

28-21-05

Fuel Line Replacement

Refer to Figure 10A. The letters (A-J) refer to the markings of Figure 7.

General information concerning hoses and fittings you find in Chapter 20.

I M P O R T A N T

If replacement of fuel lines passing the firewall is necessary, renew the sealing of the rubber grommet grooves and gaps at the engine side of the firewall. Use PRC-812 (Products Research & Chemical Corporation, USA) firewall sealant. Cover the fuel lines of the engine department with AEROQUIP AE102 fire sleeves as per Chapter 20-10-07.

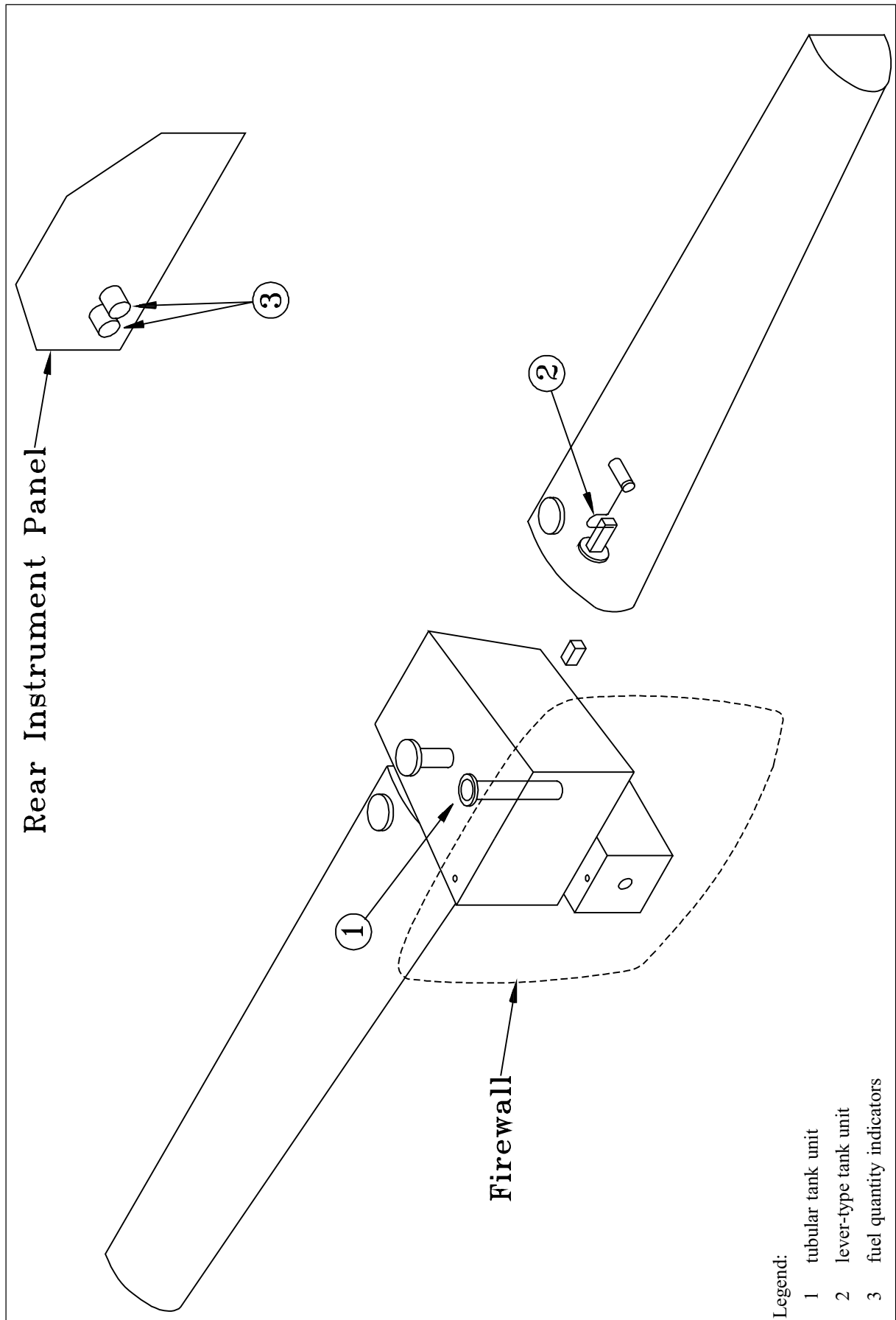
N O T E

Use only, tubes and fittings as listed in the following.

28-40-00

INDICATING

(Refer to Figure 11) For fuel contents indicating the center tank is equipped with a tubular tank unit (1) and the left wing tank with a lever-type tank unit (2). They transmit the fuel levels to the respective fuel quantity indicators at the instrument panel (3). In contrast to the fuel quantity indicator of the center tank the one in the wing tank is not adjustable. If the indication is inexact the float wire of the tank unit has to be adjusted (refer to Chapter 28-41-05).



*Indicating
Figure 11*

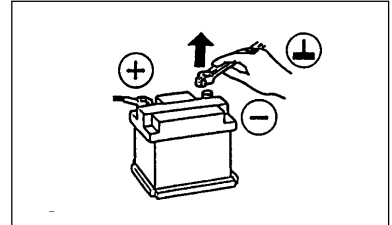
28-41-00

MAINTENANCE PRACTICES

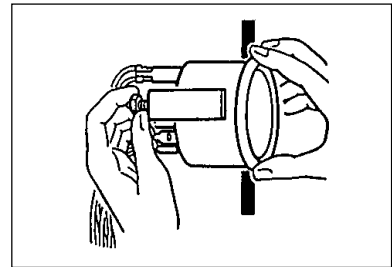
28-41-01

Fuel Quantity Indicator Removal/Installation

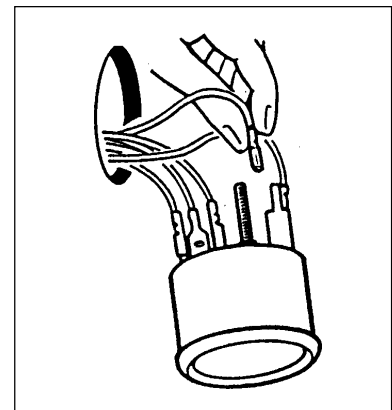
- 1 Disconnect battery.



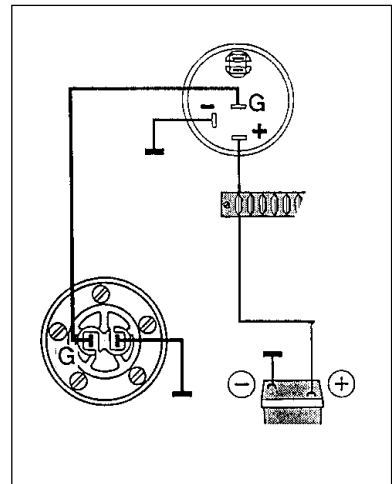
- 2 Loosen the nuts, remove the mounting bracket and remove the fuel quantity indicator.



- 3 Disconnect the wiring (the lamp is not used).



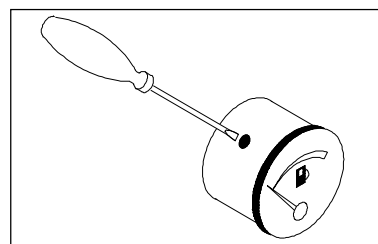
- 4 Install in reverse sequence of removal observing the wiring diagram.



28-41-02

Fuel Quantity Indicator Calibration (Center Tank)

- 1 Drain the fuel system (refer to Chapter 12-10-02).
- 2 Remove the fuel quantity indicator following step 2 of Chapter 28-41-01.
- 3 Bring indicator to „0“-position by turning the adjustment screw.

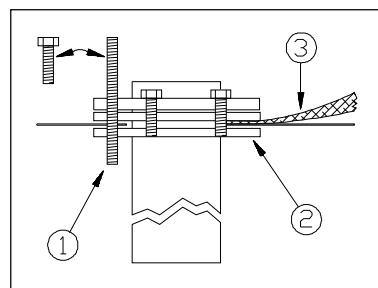


- 4 Reinstall the fuel quantity indicator.

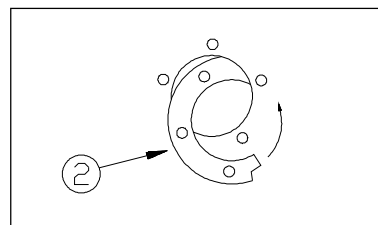
28-41-03

Tubular Tank Unit (Center Tank) Removal/Installation

- 1 Drain the fuel system per Chapter 12-10-02.
- 2 Loosen one bolt and replace by a M5 threaded rod (1) for securing the slotted retainer ring (2).
- 3 Remove the other bolts and the ground bonding lead (3).



- 4 Lift tubular tank unit and sealing ring over the threaded rod.
- 5 Remove the threaded rod and turn out the slotted retainer ring (2).



WARNING

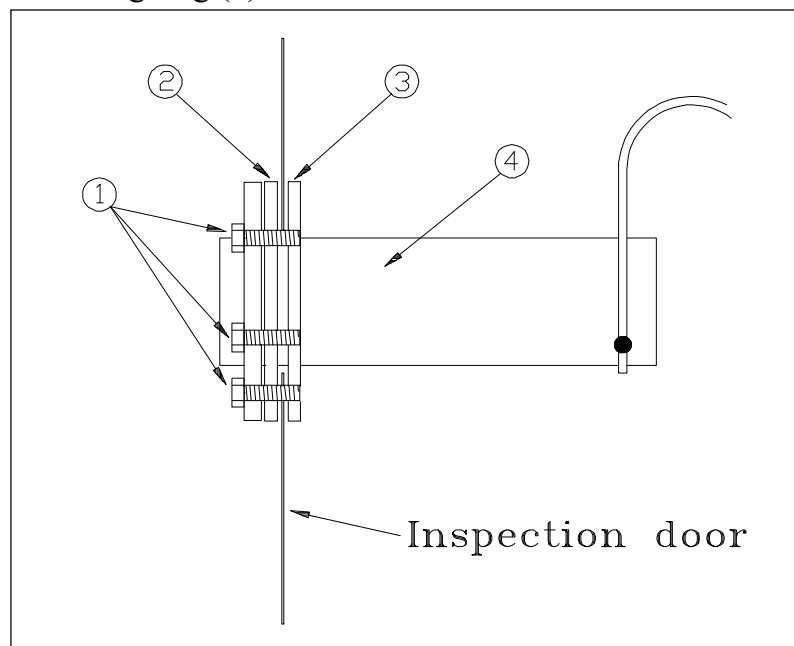
Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

- 6 Clean sealing surfaces mechanically and with Acetone.
- 7 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) for sealing to both sides of the sealing ring.

28-41-04

Lever-type Tank Unit (Wing Tank) Removal/Installation

- 1 Disconnect the electrical wiring.
- 2 Remove LH inspection door (refer to Chapter 28-11-03)
- 3 Remove tank unit bolts (1, Figure 12).
- 4 Remove the retainer ring (3) the tank unit (4) and the sealing ring (2).



*Lever-type Tank Unit (Wing Tank) Removal/Installation
Figure 12*

WARNING

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

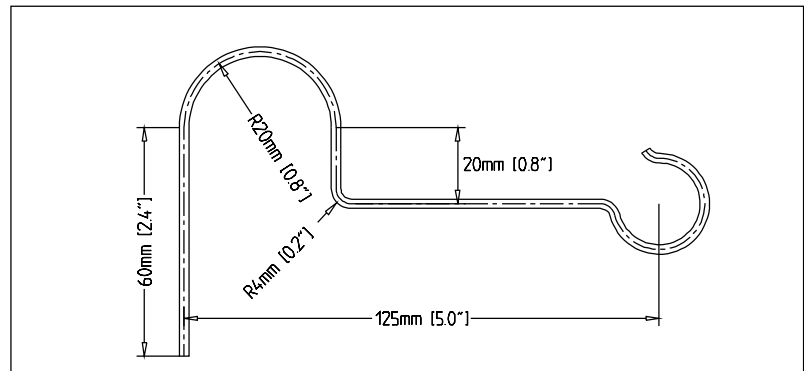
- 5 Clean sealing surfaces mechanically and with Acetone.
- 6 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA)

USA) for sealing to both sides of the sealing ring and the grooves inside the tank..

28-41-05

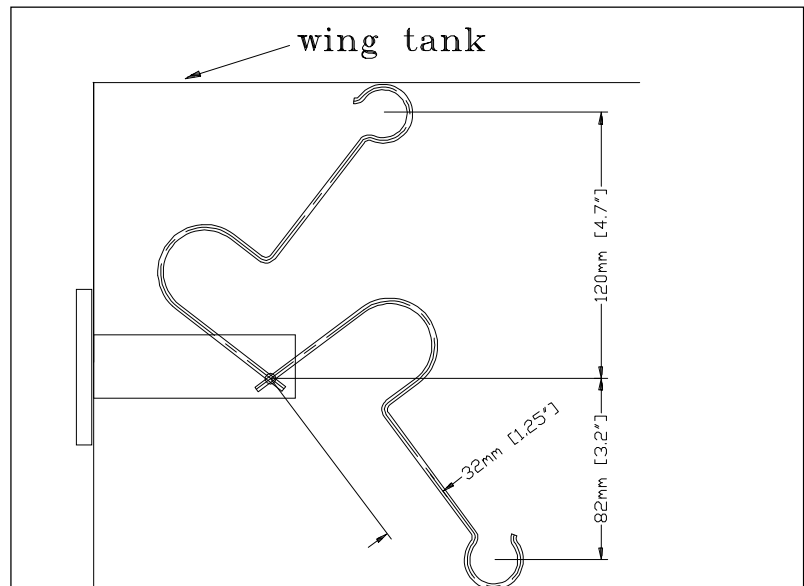
Float Wire Adjustment

- 1 Remove the lever-type tank unit per Chapter 28-41-04.
- 2 Remove the float wire and bend it in form like shown in the following Figure 13:



Float Wire Adjustment
 Figure 13

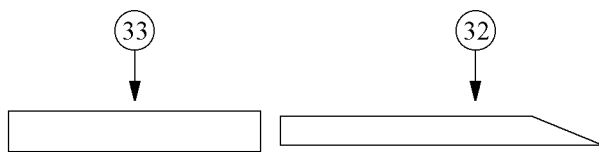
- 3 Reinstall the float wire observing the distances shown in Figure 14, pay attention to a proper alignment and tighten well the attachment bolt.



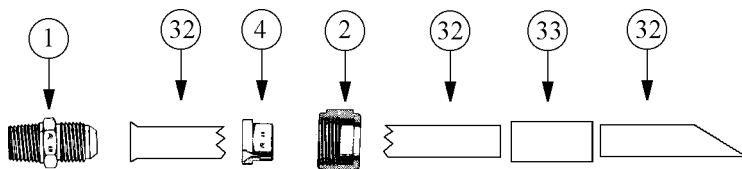
Float Wire Installation
 Figure 14

- 4 Reinstall the lever-type tank unit per Chapter 28-41-04.

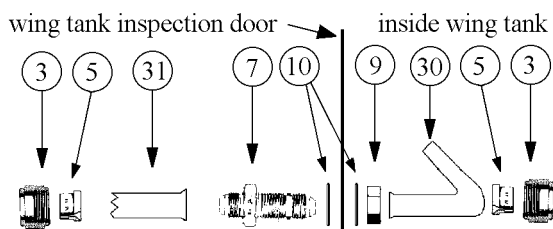
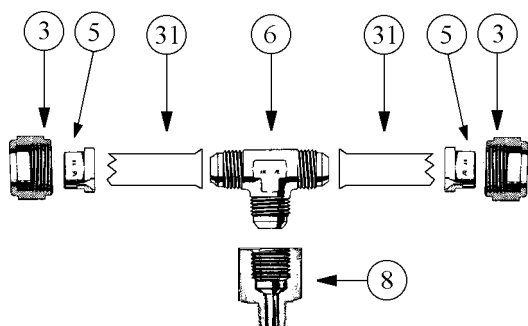
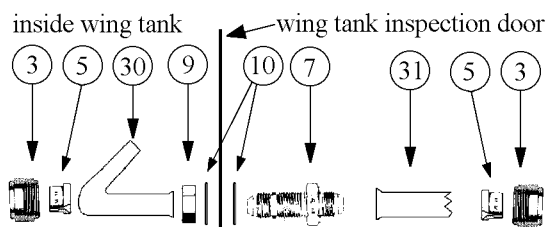
Acro tank to main landing gear spring connection (a)



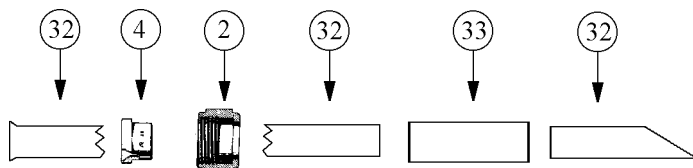
Center tank to main landing gear spring connection (b)



Wing tank to wing tank connection (c)



Tee-fitting to main landing gear spring connection (d)



Fittings and washers

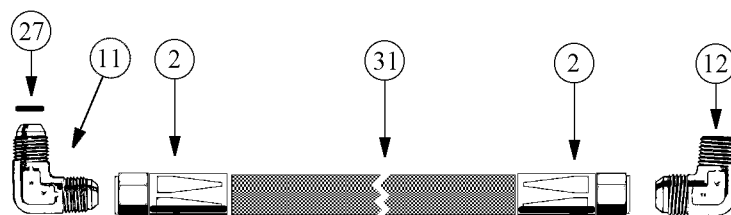
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PN: PC-00159
- 2 AN818-4D
PN: PC-00161
- 3 AN818-6D
PN: PC-00160
- 4 AN819-4D
PN: PC-00860
- 5 AN819-6D
PN: PC-00162
- 6 AN824-6D
PN: PC-00168
- 7 AN832-6D
PN: PC-00170
- 8 AN894-6-4D
PN: PC-00154
- 9 AN924-6D
PN: PC-00177
- 10 AN960-C916
PN: PC-01852
- 11 AN822-4D
PN: PC-00155

Tubes

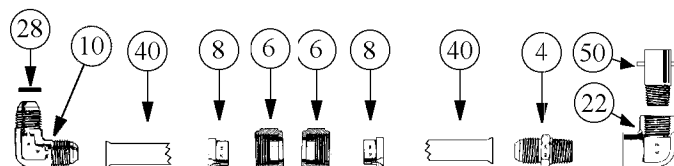
- 30 strainer tube
PN: PC-63202.2
- 31 alu tube 5052-0, Ø3/8 inch
PN: PC-00122
- 32 alu tube 5052-0, Ø1/4 inch
PN: PC-00123
- 33 vinyl tubing
PN: PC-01607

*Ventilation lines
 Figure 6A*

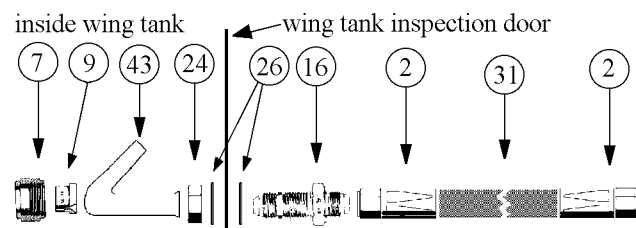
Acro tank to selector valve connection (A)



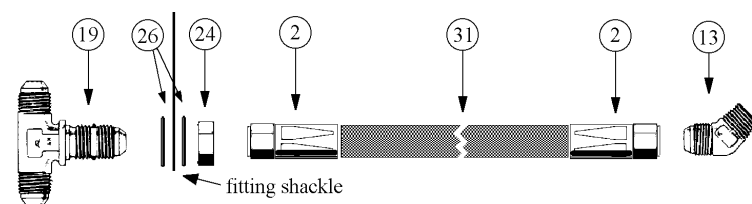
Acro/center tank drain (B)



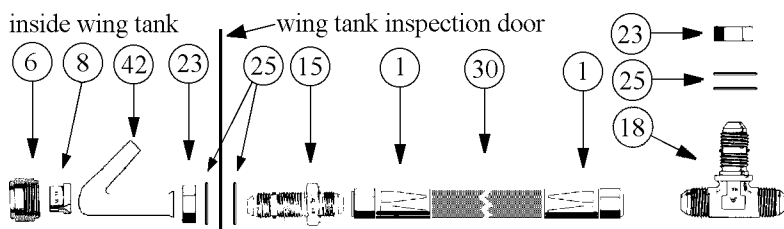
Wing tank to Tee-fitting connection (C)



Tee-fitting to selector valve connection (D)



Wing tank to Tee fitting connection (drain line) (E)



* Refer to Ch. 20-10-07

Fittings and washers

- 1 AN491-4D
PN: PC-00149
- 2 AN491-6D
PN: PC-00150
- 4 AN816-4D
PN: PC-00159
- 6 AN818-4D
PN: PC-00161
- 7 AN818-6D
PN: PC-00160
- 8 AN819-4D
PN: PC-00860
- 9 AN819-6D
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- 22 AN916-1D
PN: PC-00180
- 23 AN924-4D
PN: PC-00178
- 24 AN924-6D
PN: PC-00177
- 25 AN960C-716
PN: PC-00810
- 26 AN960-C916
PN: PC-01852
- 27 O-ring MS29512-06
PN: PC-01270
- 28 O-ring MS29512-04
PN: PC-02632

Hoses*

- 30 AEROQUIP 303-4
PN: PC-00402
- 31 AEROQUIP 303-6
PN: PC-00403

Tubes

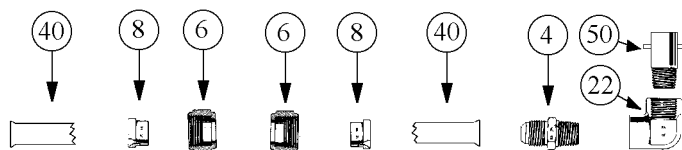
- 40 alu tube 5052-0, Ø1/4 inch
PN: PC-00123
- 42 strainer tube
PN: PC-64202.4
- 43 strainer tube
PN: PC-64202.2

Valves

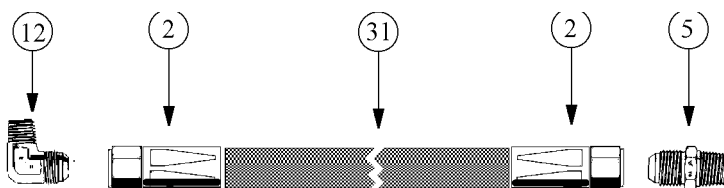
- 50 drain valve
PN: PC-01211

*Fuel Lines Airframe Department
 Figure 10A, Sheet 1*

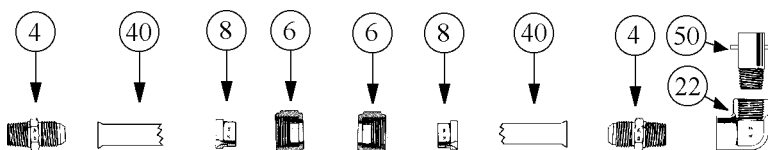
Wing tank drain assembly (drain line) (F)



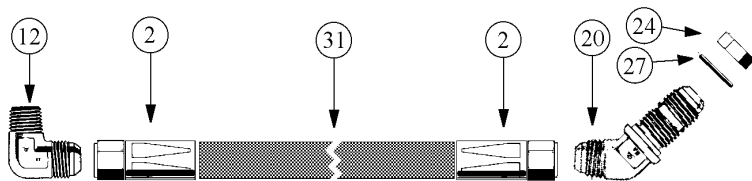
Selector valve to gascolator (G)



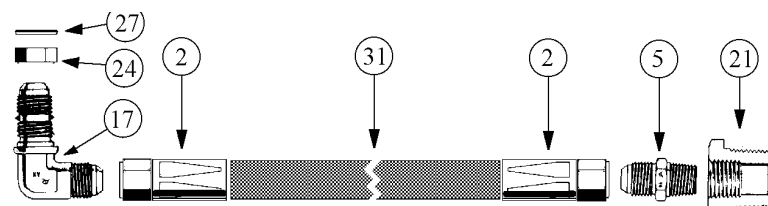
Gascolator drain assembly (H)



Gascolator to boost pump connection (I)



Boost pump to engine driven fuel pump connection (J)



Fittings and washers

- 2 AN491-6D
PN: PC-00150
- 4 AN816-4D
PN: PC-00159
- 5 AN816-6D
PN: PC-00158
- 6 AN818-4D
PN: PC-00161
- 8 AN819-4D
PN: PC-00860
- 11 AN822-6D
PN: PC-00164
- 12 AN822-6D
PN: PC-00164
- 17 AN833-6D
PN: PC-00172
- 20 AN837-6D
PN: PC-02858
- 21 AN912-9D
PN: PC-00176
- 22 AN916-1D
PN: PC-00180
- 24 AN924-6D
PN: PC-00177
- 27 O-ring MS29512-06
PN: PC-01270

Hoses *

- 31 AEROQUIP 303-6
PN: PC-00403

Tubes

- 40 alu tube 5052-0, Ø1/4 inch
PN: PC-00123

Valves

- 50 drain valve
PN: PC-01211

* Refer to Ch. 20-10-07

*Fuel Lines Airframe Department
 Figure 10A, Sheet 2*