

**TECHNICAL MANUAL**  
**FOR**  
**JABIRU AIRCRAFT MODELS:**

**J120 Variants**  
**J160 Variants**  
**J170 Variants**  
**J200/J400 Variants**  
**J230/J430 Variants**  
**J250/J450 Variants**

**DOCUMENT No. JTM001-9**

**DATED: 13<sup>th</sup> December 2018**



**This Manual has been prepared as a guide to correctly maintain Jabiru Aircraft Models.**

**It is the owner's responsibility to regularly check the Jabiru web site at [www.jabiru.net.au](http://www.jabiru.net.au) for applicable Service Bulletins and have them implemented as soon as possible. Manuals are also updated periodically with the latest revisions available from the web site. Failure to maintain the engine or aircraft with current service information may render the aircraft un-airworthy and void Jabiru's Limited, Express Warranty.**

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<b>JTM001-9</b>	<b>J120, J160, J170, J200/J400, J230/J430, J250/J450 Variants</b>



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## 8 Fuel System

### 8.1 Description (all J-Series)

- Refer to Figures below for system schematic details.
- Two basic types of systems are used: a system where there is one fuel tank, fitted behind the seats inside the cabin and a system with two main tanks – one in each wing.
- For systems with the tank inside the cabin (J120):
  - The filler for the tank is located on the pilot's side of the fuselage
  - The tank is vented via a fitting on the belly of the aircraft.
  - The primary, mechanical fuel pump is fitted to the engine.
  - The secondary electric fuel pump and the fuel filter are fitted to the belly of the aircraft under the tank itself.
  - The main fuel tank is not structural and is held in place with straps.
  - A single ON-OFF selector is fitted to the centre console between the seats.
- For systems with the tanks inside the wings (all J-Series, n/a J120):
  - The fillers for the tanks are located on the upper surface of the wings.
  - The tank is vented via a fitting built into the fuel caps. Though in some cases a separate “sharks fin” vent fitted to the cabin roof may be used instead.
  - The primary, mechanical fuel pump is fitted to the engine.
  - The secondary electric fuel pump and the fuel filter are fitted adjacent to the header tank. This may be under the baggage shelf behind the seats (J160 family) or behind the sound curtain at the rear of the cabin (J230 family). Kit built models may have both pump and filter mounted inside a fiberglass housing fitted between the centre console and the firewall inside the cabin.
  - The main fuel tanks are structural and are integral parts of the wings.
  - A header tank is fitted. The tank may be located under the baggage shelf behind the crew seats (J160 family), behind the sound curtain at the rear of the cabin (J230 family), under the front passenger seat or behind the crew seats.
  - All aircraft are equipped with a drain sump in each tank. Some aircraft may also be equipped with gascolators inside the cabin “B” pillar.
  - For most aircraft a single ON-OFF selector is fitted to the centre console between the seats. Kit-built models may be equipped with taps on each wing tank instead.
  - Some models are equipped with fuel line sheathing and shaped external air vents to prevent leaked fuel from entering the cabin.
  - Some models are equipped with a low fuel pressure warning switch & light. The switch is located in the fuel line between the mechanical engine fuel pump and the carburettor.
- Due to space constraints not all different variations are shown herein. When ordering spare parts provide as much detail as possible – part description, aircraft model, serial number etc to Jabiru to ensure accurate part identification.

### WARNING

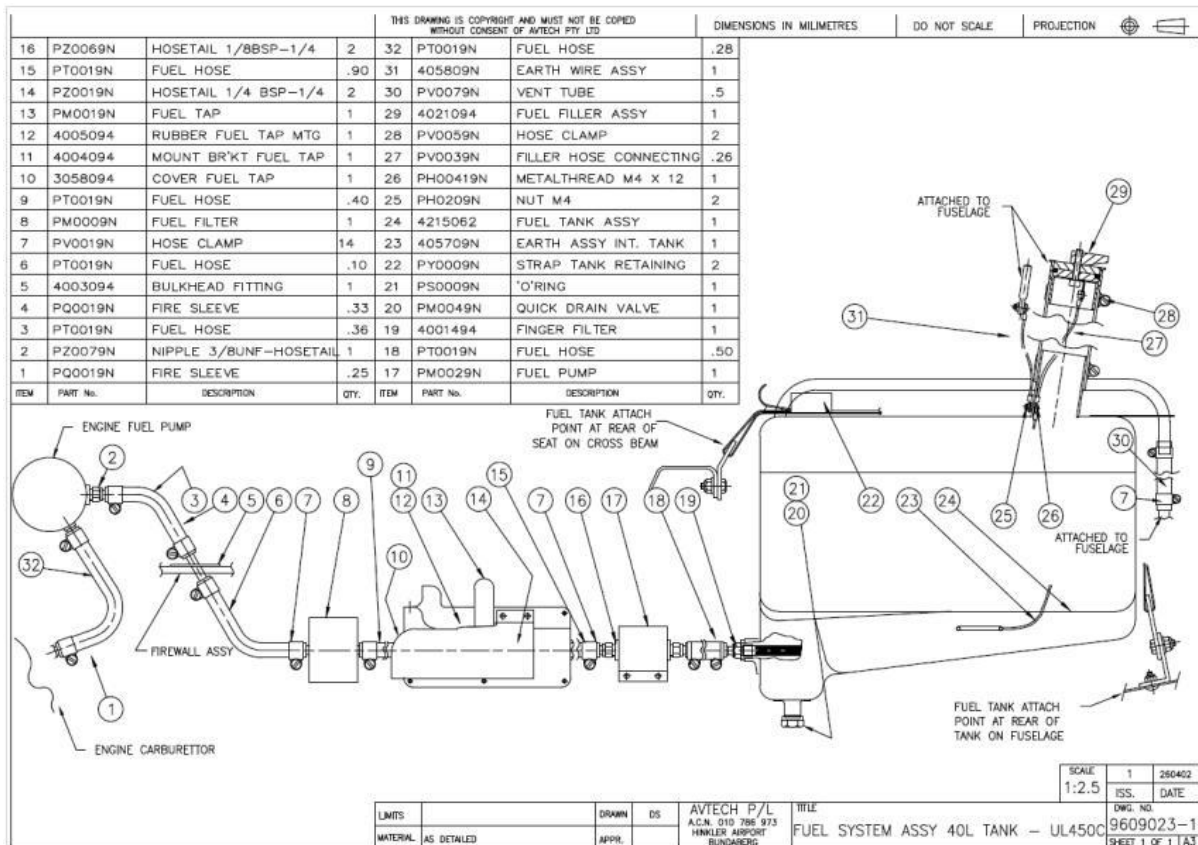
**Where secondary fuel valves are fitted between wing tanks and header tanks it is recommended that they be secured in the “ON” position using electrical fuse wire during normal operations.**

#### 8.1.1 Precautions

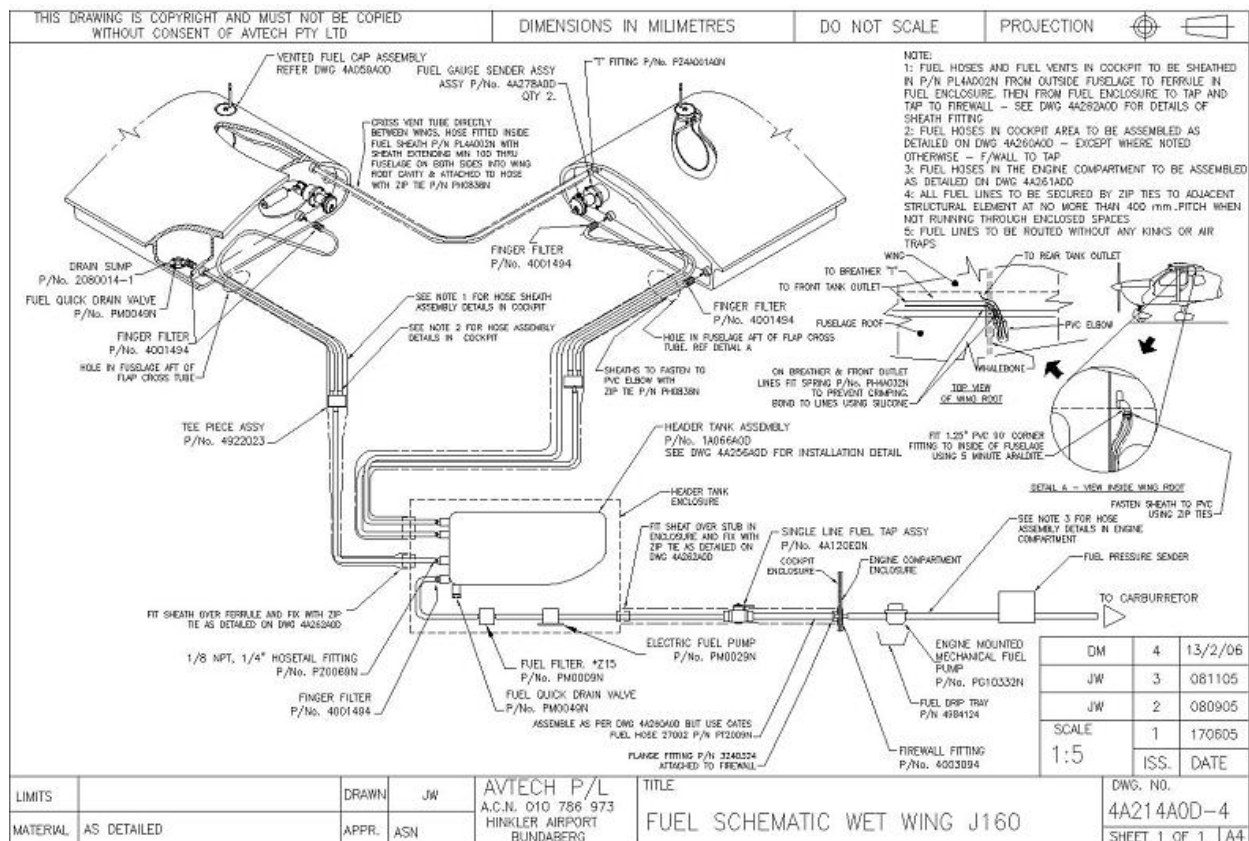
- There are certain general precautions and rules concerning the fuel system which must be observed when performing the operations and procedures in this Section.
1. During all fuelling, defueling, tank purging and tank disassembly, ground the aircraft to avoid static electricity sparks.
  2. Residual fuel draining from hose constitutes a fire hazard. Use caution to prevent the accumulation of fuel when hoses are disconnected.
  3. Cap open hoses and cover connections to prevent the entrance of foreign matter.

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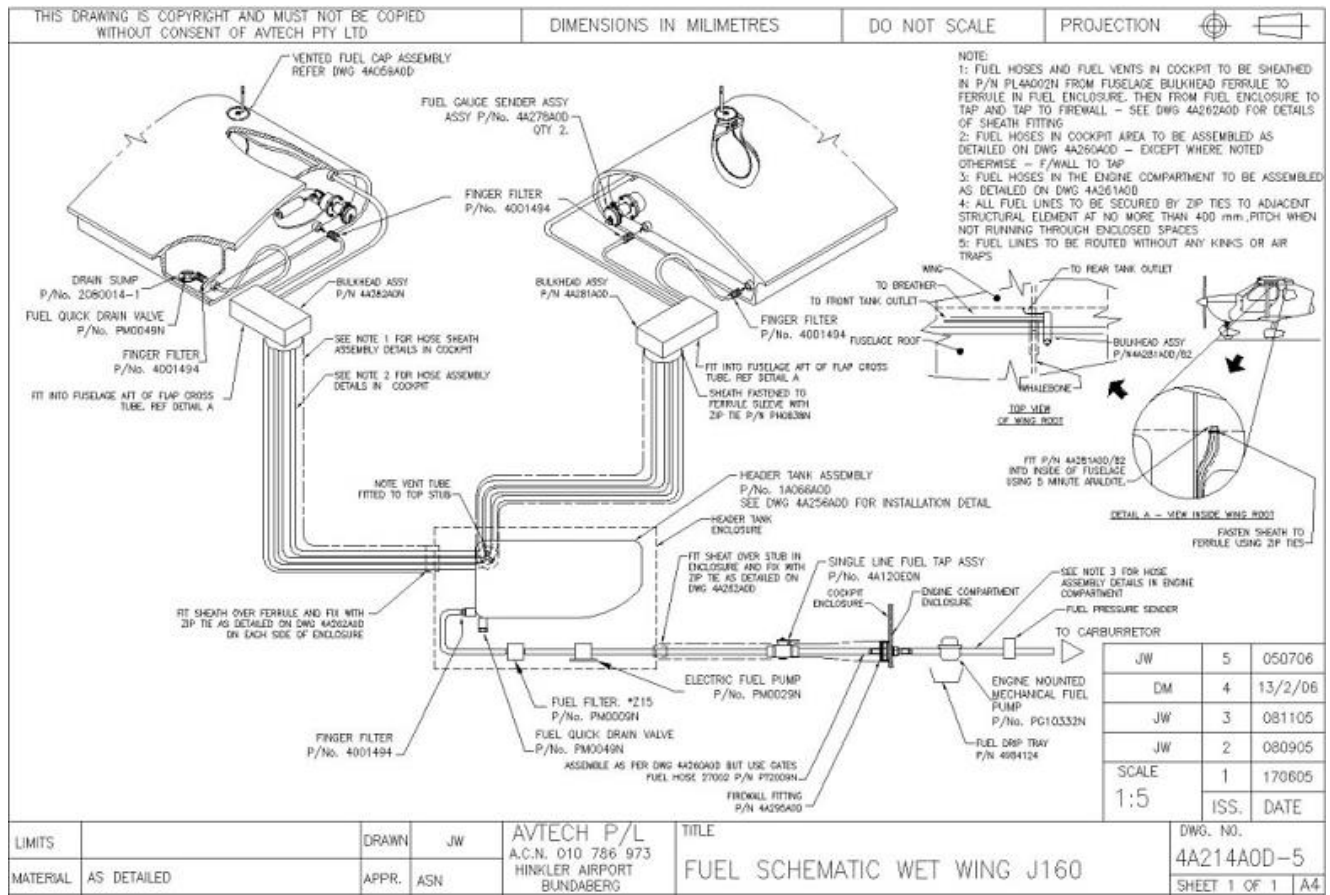


### Figure 168 – In-Cabin Fuel System (J120)

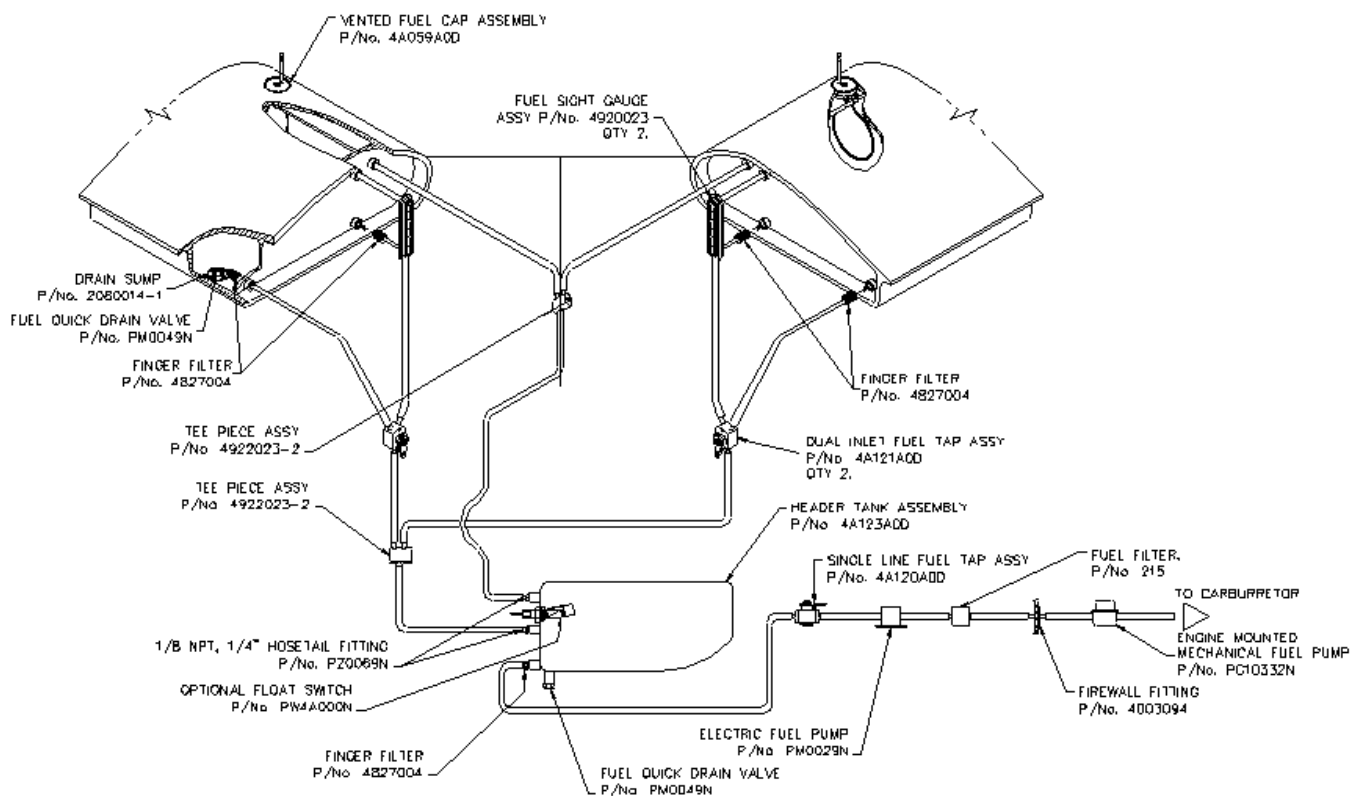


**Figure 169 – Fuel System Schematic – Type 1 (all J-Series, n/a J120)**





**Figure 170 – Fuel System Schematic – Type 2 (all J-Series, n/a J120)**



**Figure 171 – Fuel System Schematic – Type 3 (all J-Series, n/a J120)**

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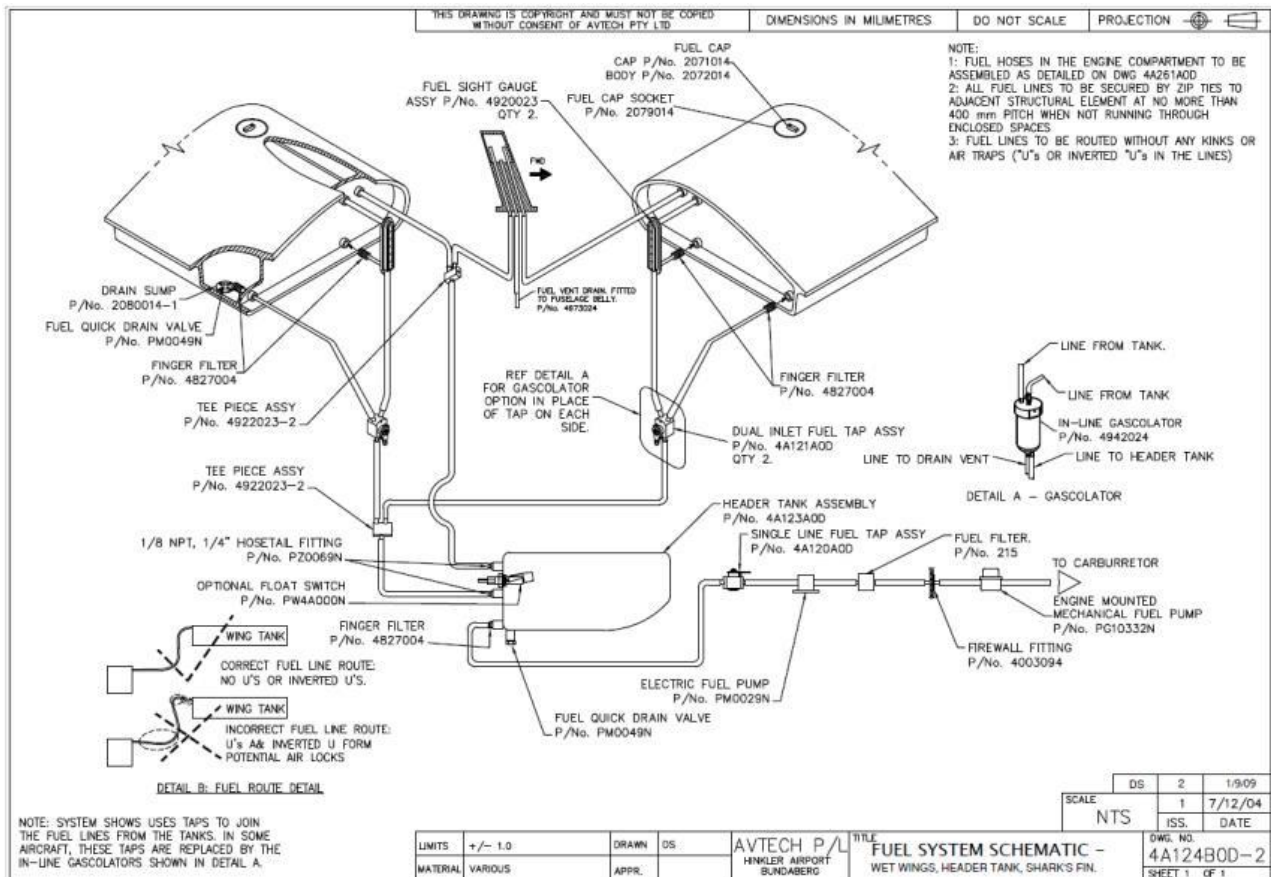


Figure 172 – Fuel System Schematic – Type 4 (all J-Series, n/a J120)

## 8.1.2 Fuel System Trouble Shooting

Table 8-1 – Trouble Shooting – Fuel System

Trouble	Probable Cause	Remedy
No fuel to carburettor	Fuel shut-off valve not turned ON	Turn valve ON
	Fuel tank empty	Service with proper grade and amount of fuel
	Fuel line disconnected or broken	Connect or repair fuel lines
	Fuel tank outlet strainer plugged	Remove and clean strainer and flush out fuel tank
	Defective fuel shut-off valve	Replace shut-off valve
	Plugged fuel filter	Replace filter
Fuel Starvation after starting	Fuel line plugged	Clean out or replace fuel line
	Partial fuel flow from preceding causes	Use the preceding remedies
	Plugged fuel vent	Clear vent
	Water in fuel	Drain fuel tank sump, fuel lines and filter



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## 8.2 Fuel Lines (all J-Series)

### 8.2.1 Description

- Flexible fuel lines are used in Jabiru aircraft.

### 8.2.2 Removal



Required Tools:	Screwdrivers Stanley knife / Scalpel blade
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

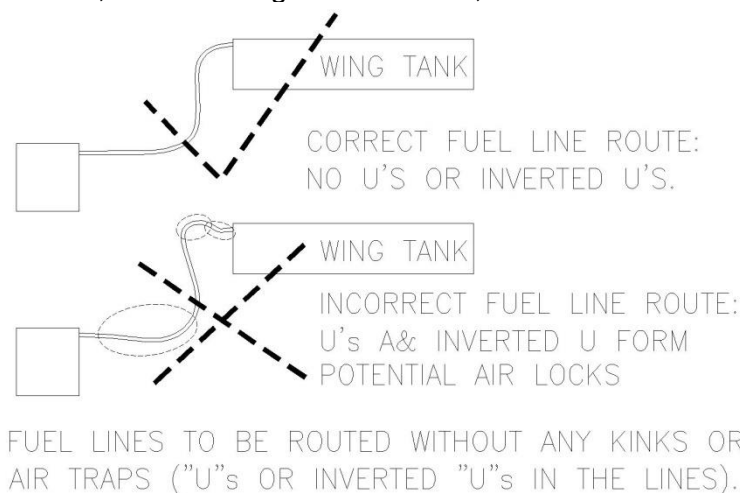
- Where required, fuel lines are removed by loosening the hose clamps and pulling the line off the hose-tails.
- In some cases it may be necessary to cut the lines off the hose tails due to lack of access, hard, tight lines etc. Care must be taken that sufficient spare line remains to re-connect for assembly, alternately a new line must be fitted.

### 8.2.3 Inspection



Required Tools:	N/A
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- For aircraft with wing tanks:
  - Remove the header tank cover (the baggage shelf for J160 / J170 family aircraft and the sound curtain at the rear of the cabin for J230 family aircraft).
  - Ensure there are no U's or inverted U's in the lines.
  - Ensure line restraints are spaced at intervals no greater than 400mm (In some cases fuel lines are bundled inside tubes which are Velcro-ed to the aircraft – this is sufficient restraint.) If new restraints are added, plastic line clips can be bonded to the aircraft structure. (Figure 174 refers). Fasteners such as screws, which damage the structure, should not be used.



**Figure 173 – Schematic (all J-Series)**

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8.2.4 Installation



Required Tools:	Screwdrivers
Parts and Material:	Fuel line springs, clips, Zip ties (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- Care must be taken when re-routing lines to avoid bending the hose around too sharp a corner – the flexible hose used can crimp itself off if bent too sharply. If a sharp bend is unavoidable a spring may be threaded over the line to prevent it crimping. Springs must be a snug fit on the hose & are available from Jabiru Aircraft if required. Figure 174 refers.
- Note that in some cases it may be necessary to shorten or lengthen lines to prevent “U’s” or tight bends.
- For installation, reverse removal procedure given above.

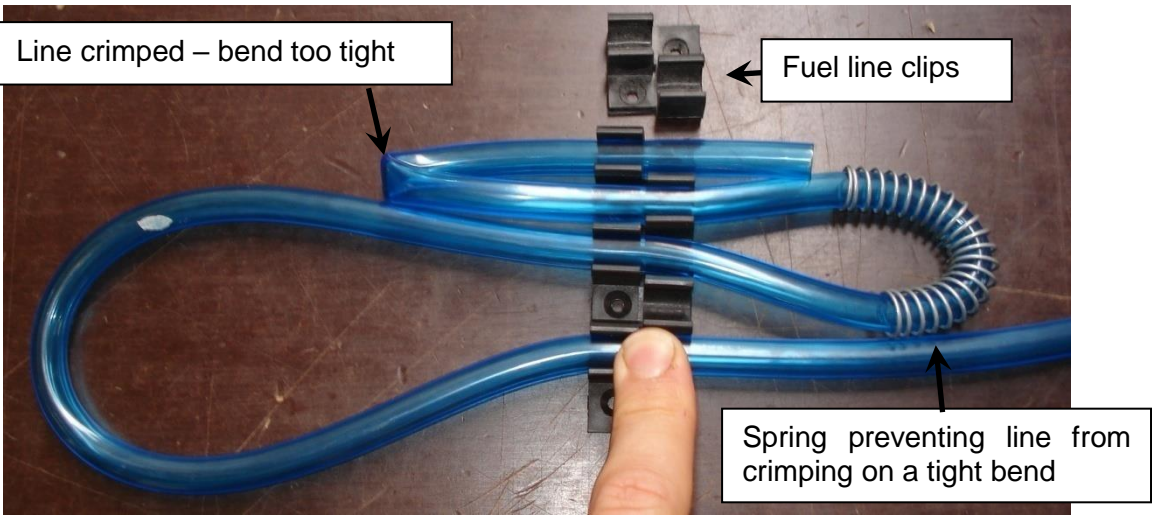


Figure 174 – Sample Fuel Line Details (all J-Series)

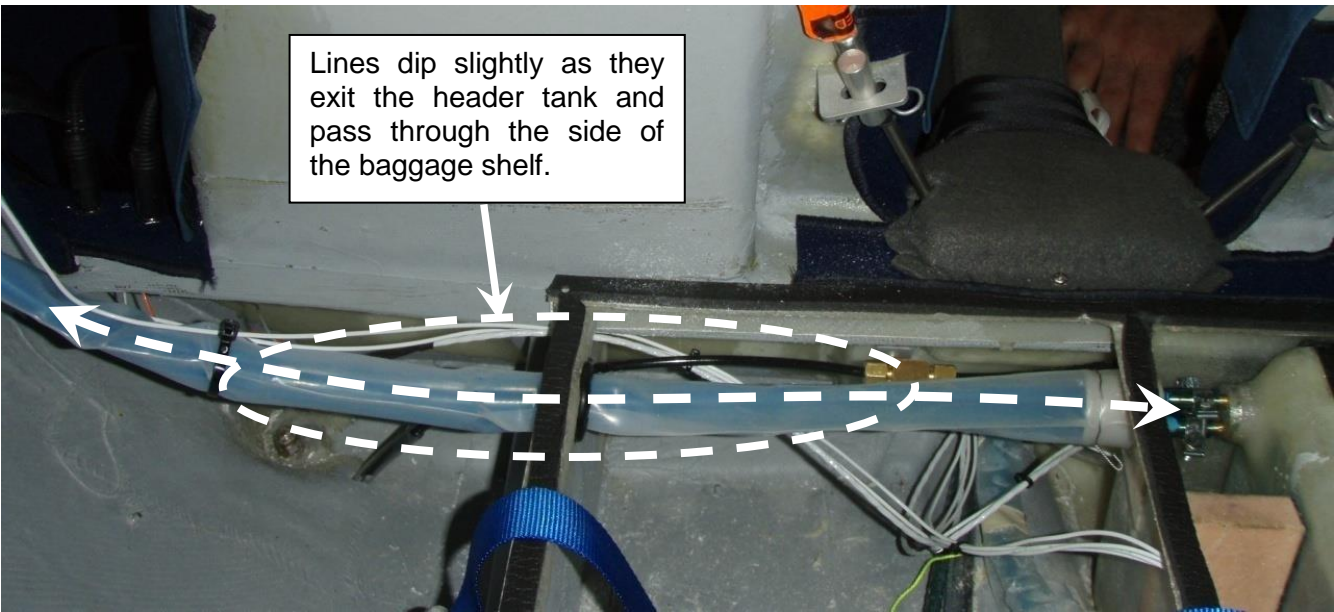
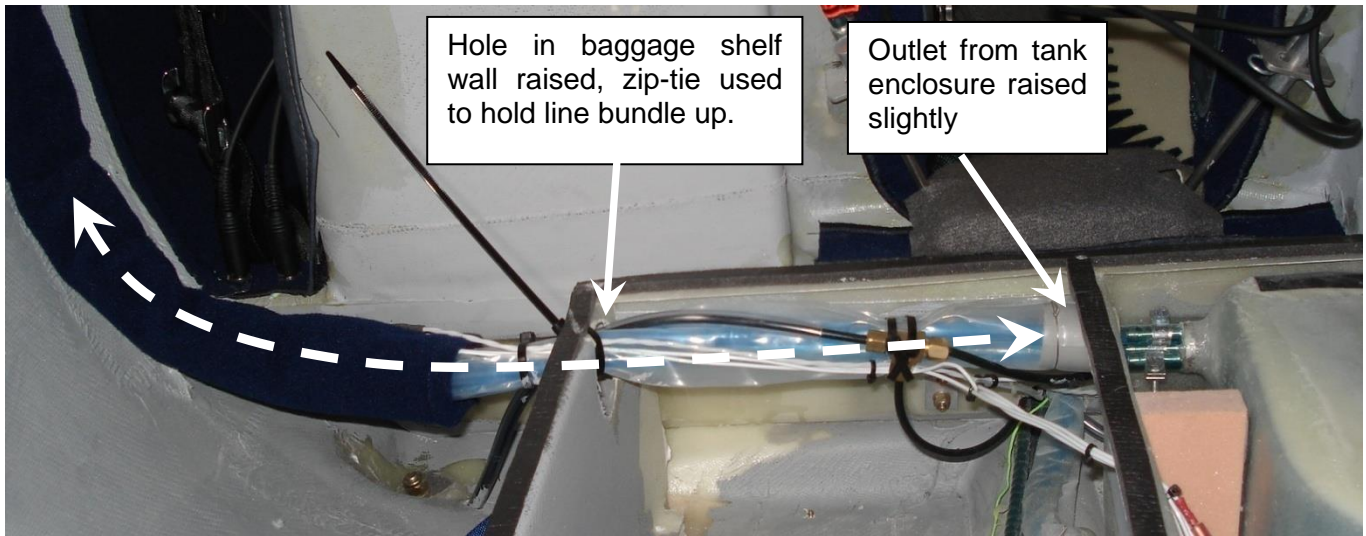


Figure 175 – Fuel Lines Showing Typical “U” Requiring Correction (all J-Series)





**Figure 176 – Corrected Fuel Lines (all J-Series)**

## 8.3 Fuel Tanks (all J-Series)

### 8.3.1 Description

- Where wing tanks are fitted, the composite tanks are located in the left & right hand wings. A header tank is also fitted – either under the passenger's seat, under the baggage shelf or behind the rear sound curtain. Wing tanks are an integral part of the wing structure whereas header tanks are non-structural and may be removed if required.
- A sump drain plug is provided for each tank.


### 8.3.2 Fuel Tank Removal



Required Tools:	Spanners / Socket Wrench Screwdrivers
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- As the wing fuel tanks are part of the wing integrity, these fuel tanks cannot be removed.
- The header tanks may be removed if necessary to check outlet strainers etc.
  - Drain fuel from wing tanks.
  - Remove the drain plug and drain the fuel from the header tank.
  - Remove the cover from the header tank enclosure. For kit-built models where the tank is under the passenger's seat this may require cutting a hole into the seat pan.
  - Remove tank restraints.
  - Loosen hose clamps, remove hoses & remove tank.
  - Installation is the reverse of removal.
- Main fuel tanks installed in the cabin can be removed:
  - Drain the tank.
  - Loosen the tank restraining straps
  - Loosen and remove the filler hose between the tank and the fuel filler on the outer skin of the fuselage.
  - Disconnect the earth wire between the tank and the fuel filler earth point.
  - Lean the tank to one side to allow access to disconnect the fuel line.



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- In some cases it may be necessary to disconnect the aileron cables to allow room for the tank to pass.
- Remove the tank from the aircraft.

### 8.3.3 Fuel Tank Inspection

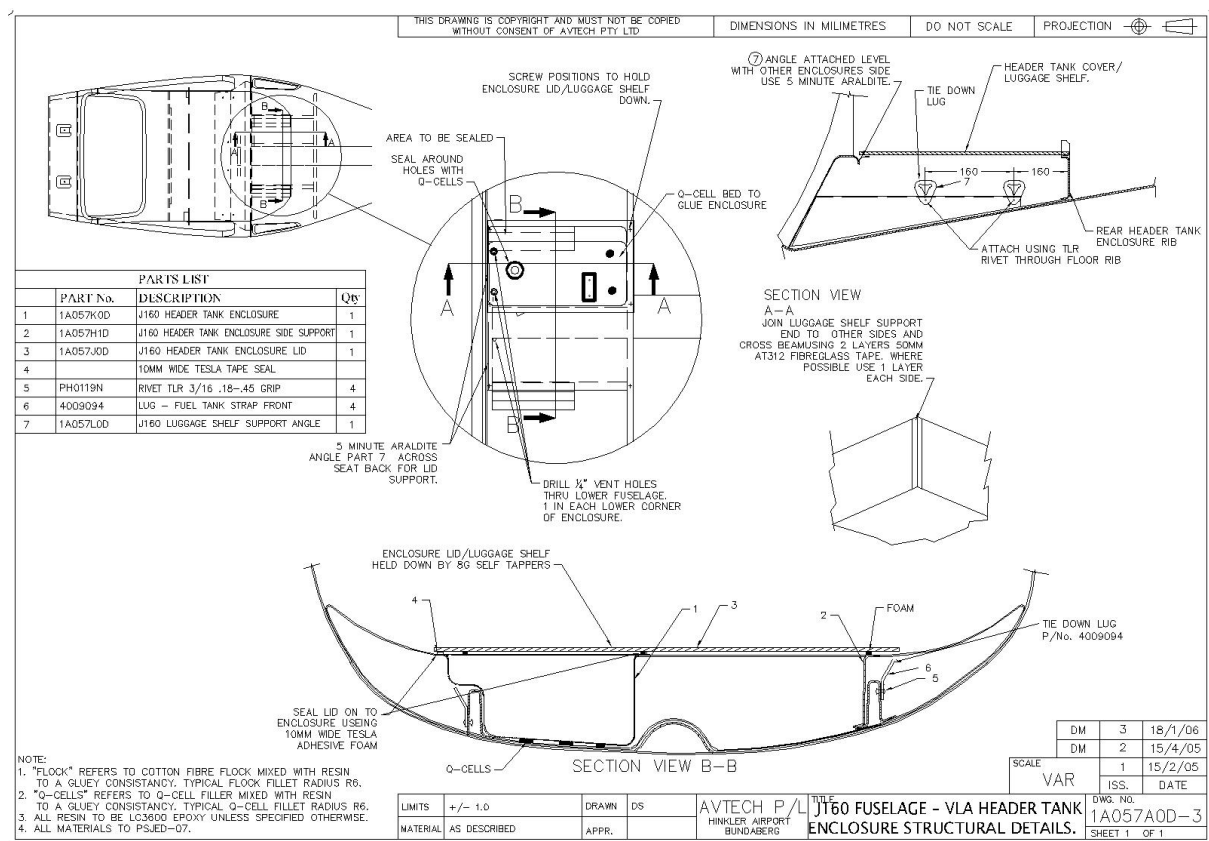


Required Tools:	N/A
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- Leaks can normally be found by visual inspection: AVGAS in particular will leave dye stains where leaks have occurred. If leaks are found contact Jabiru Aircraft for a repair procedure.
- Visually inspect the tank and fittings for corrosion, damage and contamination.

### 8.3.4 Fuel Tank Installation

- For installation, reverse removal procedure given above.



**Figure 177 – Header Tank Installation – Type 1 (all J-Series, n/a J120)**

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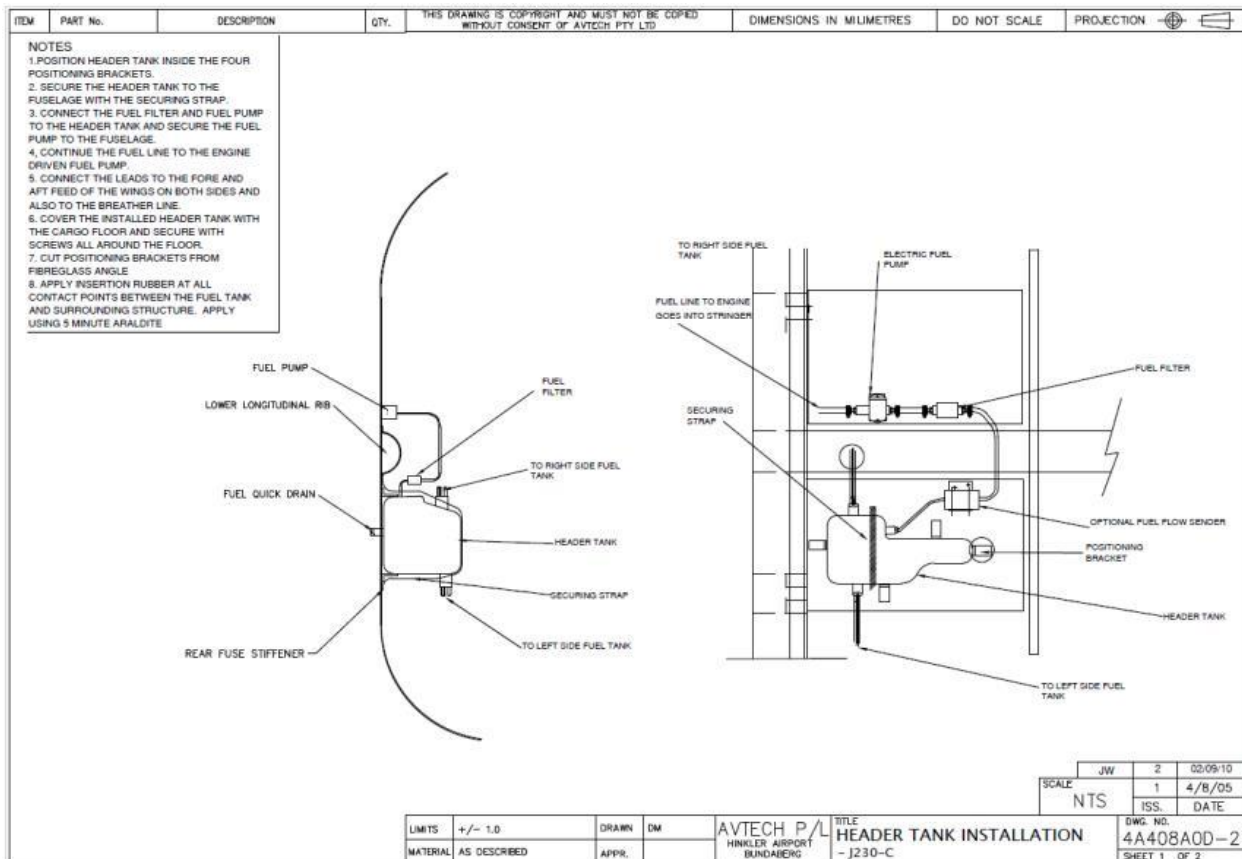


Figure 178 – Header Tank Installation – Type 2 (Sheet 1) (all J-Series, n/a J120)

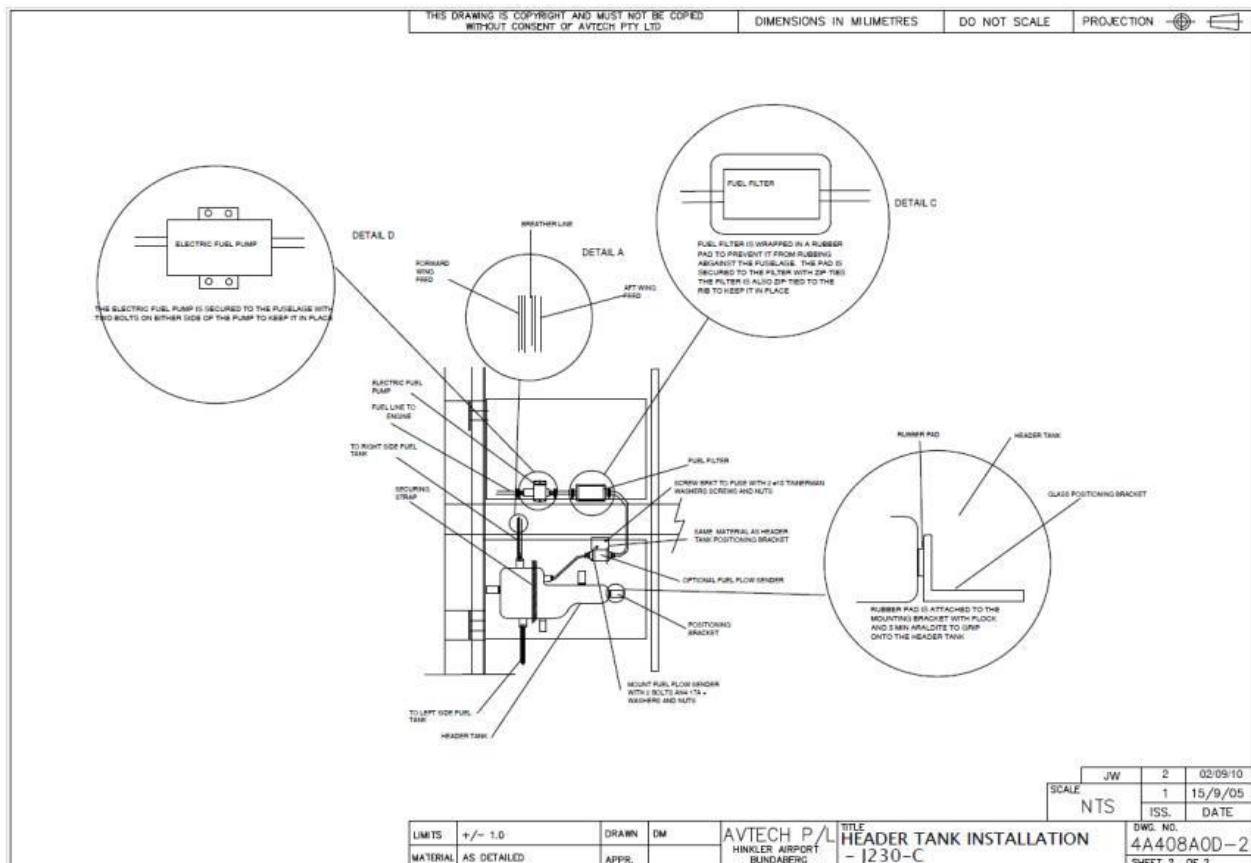


Figure 179 – Header Tank Installation – Type 2 (Sheet 2) (all J-Series, n/a J120)

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## 8.4 Fuel Vents (all J-Series)

### 8.4.1 Description

- For aircraft with wing tanks, ventilation is either provided by vented fuel caps or by a “sharks fin” vent fitted to the cabin roof.
- Where vented caps are used, some models incorporate a check valve to prevent excess fuel leakage when the aircraft is parked on an angle or flown out of balance.
- For aircraft with wing tanks and a header tank, all three tanks are interconnected to ensure uniform breather pressure and even feeding from all tanks.
- For aircraft with a single fuel tank fitted behind the crew seats a single vent line is fitted to the underside of the fuselage.

### 8.4.2 Inspections



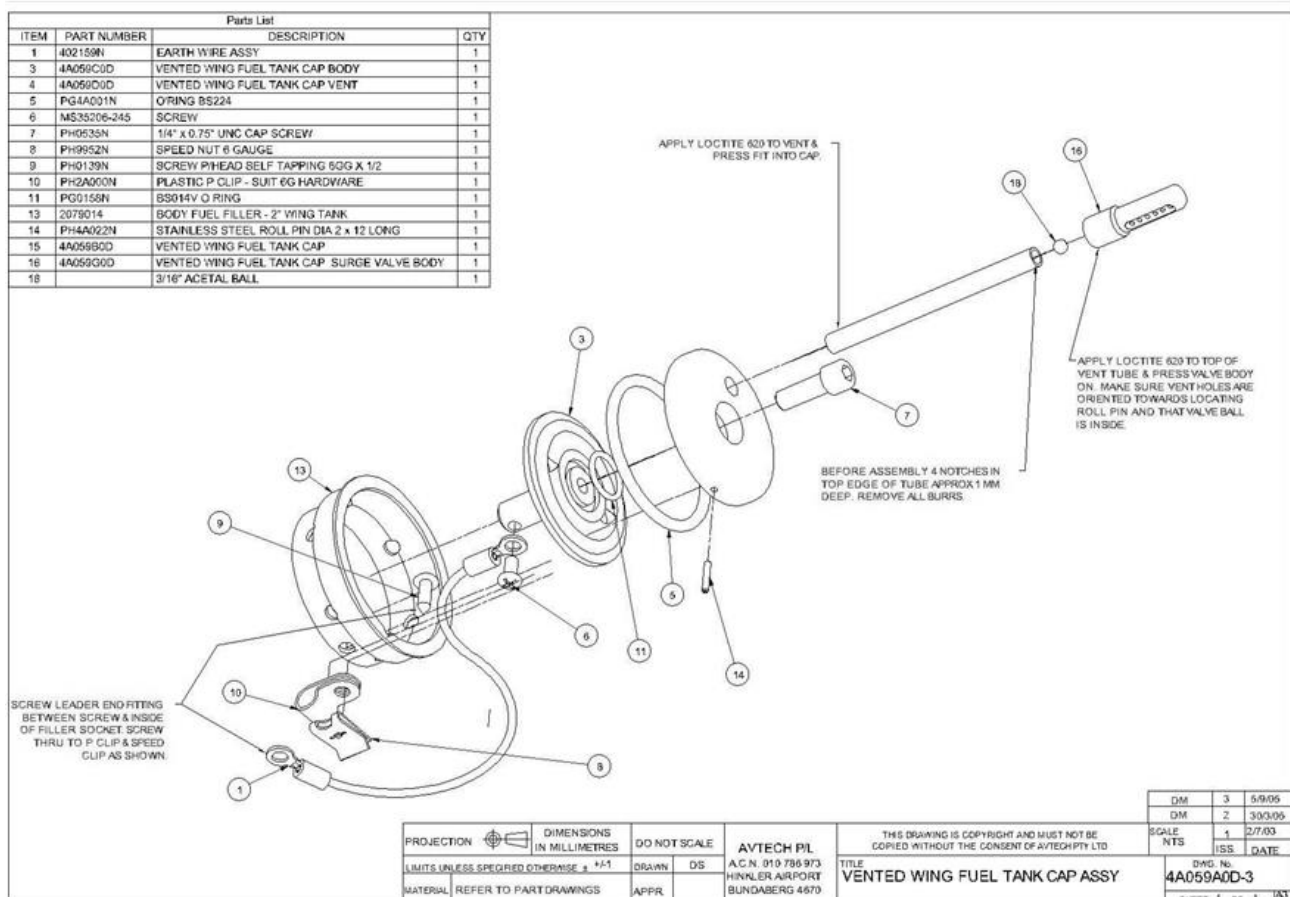
Required Tools:	Rubber glove or balloon Fuel line clamps
Parts and Material:	Replacement parts (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- Vent lines can become blocked, resulting in fuel starvation of the engine. Also, the vent line, if plugged, can result in pressure from expanding fuel pressurising the tank.
- The following procedure may be used to check the vent lines for aircraft with wing tanks:
  - Have an assistant hold a rubber glove or balloon over the vent tube on one cap.
  - Blow into the cap vent on the other wing. If the balloon/glove inflates the breather lines between the tanks are open and the tanks are cross-feeding.
  - Correct any blockage.



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- To check the breather line for the header tank:
  - Where equipped, turn off taps between the wing tanks and the header tank. Alternately fuel line clamps may be used.
  - Disconnect the fuel line from the mechanical fuel pump on the engine.
  - Allow fuel to flow from the line for approximately a minute **WITHOUT** turning the electric boost pump on. If the fuel flows freely the breather connection between the header tank and the main tanks is clear. Note that the fuel hose outlet must be positioned at carburettor height during this test.
  - Correct any blockage & reassemble.
- To check the operation of the filler cap fuel vent check valve (where equipped):
  - Remove the cap and shake it. The ball inside should move freely, producing a rattling sound.
  - An alternative method which may be used is to fill the wing tanks with fuel, then shake the aircraft by pushing up and down on the wingtip. While small droplet leakage is normal, fuel must not squirt out of the vent.
  - Check for air flow through the valve; at low flow rates air should pass freely out the valve, at higher rates outflow is restricted. Air must be able to pass freely into the tank at all flow rates.
  - If a fault is detected, disassemble the vent and replace any defective parts.



**Figure 180 – Vented Fuel Cap Assy (all J-Series)**

## 8.5 Fuel Shut-Off Valve (all J-Series)

### 8.5.1 Description

- The fuel shut-off valve is a two-position ON – OFF valve. This valve is normally located in front of the main longitudinal beam between the crew seats.

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## 8.5.2 Fuel Valve Removal & Installation



Required Tools:	Fuel line clamps Screwdrivers
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

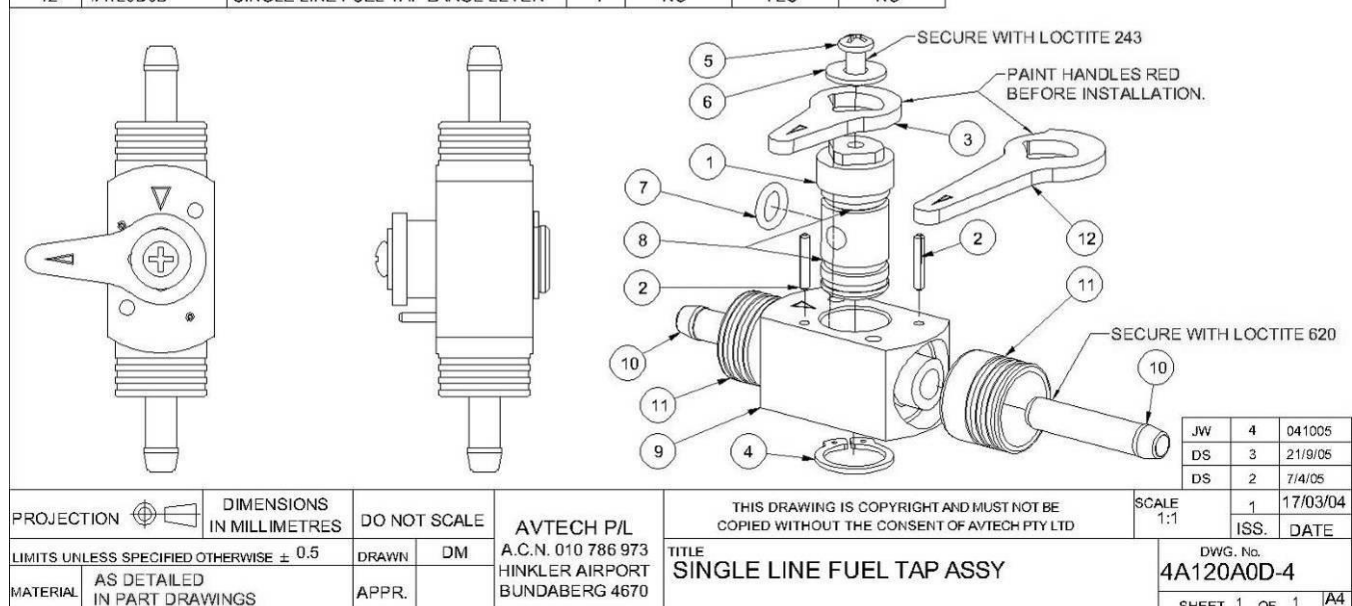
- Where equipped, turn OFF both taps between wing tanks and header tank. Cover both tank cap vents. Alternately removable fuel line clamps may be used.
- Remove fuel shut-off valve cover (where equipped).
- Remove shut-off valve handle.
- Remove cover plate (where equipped).
- For some variants access to the valve requires the removal of the section of fuel line containing the tap. To achieve this, loosen the hose clamps, disconnect the hose and draw it carefully out of the centre console.
- Where equipped, disconnect the fuel line sheath from the shut-off valve.
- Disconnect shut-off valve from fuel line.
- Remove shut-off valve.
- Reverse the preceding steps for installation.

### WARNING

**Ensure wing tank cap vent covers and fuel line clamps are removed.**

ITEM	PART NUMBER	DESCRIPTION	QTY	4A120A0D	4A120E0N	4A120F0N
1	4905214	SPOOL FUEL TAP - J SERIES	1	YES	YES	YES
2	PH4A020N	ROLL PIN DIA 2 x 12 LONG	2	YES	YES	YES
3	4905314	FUEL TAP LEVER - J SERIES	1	YES	NO	YES
4	PH4A019N	CIRCLIP. EXT DIA 14	1	YES	YES	YES
5	MS35206-245	SCREW	1	YES	YES	YES
6	PH4A021N	PLAIN (GAL) WASHER - ID 5, OD 12.5	1	YES	YES	YES
7	PG4A023N	BS010V O RING	1	YES	YES	YES
8	PG4A024N	BS013V O RING	2	YES	YES	YES
9	4A120B0D	SINGLE LINE FUEL TAP BODY	1	YES	YES	YES
10	4920223	HOSETAIL SIGHT GLASS	2	YES	YES	YES
11	4A120C0D	FUEL SHEATH SPIGOT.	2	NO	YES	YES
12	4A120D0D	SINGLE LINE FUEL TAP LARGE LEVER	1	NO	YES	NO

NOTES:  
1. ORIENTATION OF LEVER IN ASSY, WHEN CORRECTLY ASSEMBLED, ARROW ON LEVER POINTS IN SAME DIRECTION AS ARROW ON TAP BODY. TAP WILL ONLY THRU THRU 90 DEG WHEN ASSEMBLED PROPERLY - IF TAP TURNS FURTHER IT MUST BE RE-ASSEMBLED PROPERLY.



**Figure 181 – Single Line Fuel Tap (all J-Series)**

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## 8.6 Fuel Gauges (all J-Series, n/a J120)

### 8.6.1 Description

- Fuel gauges may be sight gauges or electrical float gauges in the wing roots for aircraft with wing tanks or a direct-reading scale fitted to the front of the fuselage fuel tank.

### 8.6.2 Fuel Gauge Removal & Installation



Required Tools:	Tools as required in Section 0 Tools as required in Section 11 Screwdrivers
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- For wing root sight gauges:
  - Remove the fairings from between the wings and the fuselage.
  - Disconnect the fuel lines running between the wing tanks and the sight gauges. It is recommended that these lines be cut and replaced on re-assembly.
  - Remove the gauge from the aircraft.
  - If required, remove the screws and disassemble the gauge.
  - Reverse the preceding steps for installation.
- For wing root electric / float gauges:
  - Remove the fairings from between the wings and the fuselage.
  - Disconnect the fuel lines and remove the wings as detailed in Section 0.
  - Remove the gauge assembly from the aircraft wing.
  - Calibration of the electric fuel senders is discussed in Section 11.
  - Reverse the preceding steps for installation.

### 8.6.3 Electric Fuel Gauge Troubleshooting

**Table 8-2 – Trouble Shooting – Fuel Gauge**

Trouble	Probable Cause	Remedy
Gauge on panel reads full, tanks low	Bad connection between sender & gauge	Fix connection
	Sender mechanism has failed / lost calibration	Contact Jabiru Aircraft for detailed advice & spare parts.







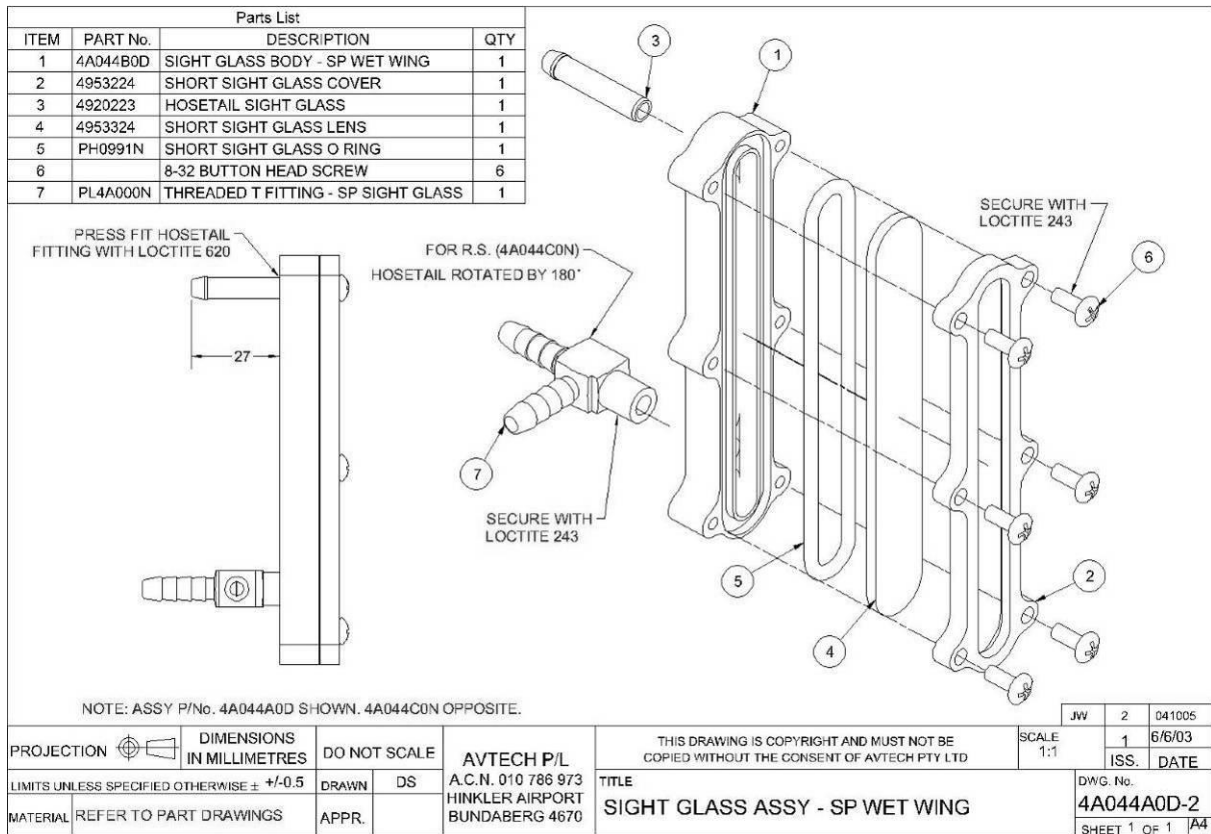


Figure 184 – Fuel Gauge – Sight Glass (all J-Series, n/a J120)



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## 8.7 Fuel Filters (all J-Series)

### 8.7.1 Description

- The fuel filter is of the in-line type. It is located:
  - Inside the header tank enclosure behind the seats for J160 family models
  - Under the fuel tank for models equipped with a fuselage fuel tank.
  - Inside the removable fibreglass console joining the centre console to the firewall (between the rudder pedals) for J200 family models.
  - Beside the header tank, inside the fuselage, aft of the sound curtain for J230 family aircraft.

### 8.7.2 Fuel Filter Removal & Installation



Required Tools:	Screwdrivers Cloths Fuel line clamps
Parts and Material:	Replacement fuel filter (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

- Shut off the fuel on the tank side of the filter. This may require the fuel tap be turned off or that the fuel system, wing tanks and header tanks be drained (where equipped). Alternatively fuel line clamps (Figure 33) may be used to close the fuel lines so that the filter can be changed without fuel leakage.
- Place a cloth beneath the filter to collect any fuel which may be split during removal of the filter.
- Disconnect the fuel lines at both ends of the filter.
- Remove filter.
- Reverse the preceding steps for installation. Ensure waste cloth is removed.

### WARNING

**Ensure tank vents are open (no vent covers fitted).**

**The fuel filter must only be installed in one direction. An arrow on the side of the filter marks the fuel flow direction. Ensure this arrow is pointed towards the Firewall and Engine.**

## 8.8 Fuel Pumps (all J-Series)

### 8.8.1 Description

- The Primary Fuel Pump is located on the Starboard rear of the Engine. Refer to Engine Maintenance Manual for details.
- A secondary, electric fuel pump is also installed in all Jabiru Aircraft to assist the primary pump, prevent vapour-lock and for redundancy.

### 8.8.2 Secondary Fuel Pump Removal & Installation



Required Tools:	Fuel line clamps Screwdrivers Spanners / Socket Wrench
Parts and Material:	Aerostart (or other volatile tool cleaner) Loctite 7471 and 262
Type of Maintenance:	Line Maintenance
Level of Certification:	L2 or LAME (A&P or LSA Repairman / Maintenance)
Return to Service:	L2 or LAME (A&P or LSA Repairman / Maintenance)

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<b>JTM001-9</b>	<b>J120, J160, J170, J200/J400, J230/J430, J250/J450 Variants</b>

- Shut off the fuel on the tank side of the pump. This may require the fuel tap be turned off or that the fuel system, wing tanks and header tanks be drained (where equipped). Alternatively fuel line clamps (Figure 33) may be used to close the fuel lines so that the pump can be changed without fuel leakage.
- Free the pump from its mounts – undo the screws holding it in place. Note that in several models this will require a second person outside the aircraft to hold the head of the screw while the nut is loosened inside the cabin.
- Disconnect the pumps electrical connections.
- Place a cloth beneath the pump to collect any fuel which may be split during removal of the filter.
- Disconnect the fuel lines at both ends of the pump.
- Remove pump.
- Remove the hose tail fittings from both ends of the pump. Clean the thread of the fittings for re-use.
- Clean the threads of the hose tails and of the replacement pump using Aerostart or a volatile tool cleaner (a type which does not leave a residue). If cure time is an issue use Loctite 7471 Cure Accelerator on the parts before assembly.
- Apply Loctite 262 to the mating threads; a bead the size of a match head should be applied to both the male and female threads. Assemble.
- Allow the Loctite to cure.
- Reverse the preceding steps for installation. Ensure waste cloth is removed.

## **WARNING**

**Ensure tank vents are open (no vent covers fitted).**

**The fuel filter must only be installed in one direction. An arrow on the side of the filter marks the fuel flow direction. Ensure this arrow is pointed towards the Firewall and Engine.**