

# **MAINTENANCE MANUAL**

FOR

**JABIRU AIRCRAFT MODEL**

**J230-D**

**Serial Number XXX**

**SAMPLE**

**DOCUMENT No. JTM001-0-230-D-858**

**DATED: 8<sup>th</sup> May 2014**



This Manual has been prepared in accordance with ASTM Standard F2483 as a guide to correctly and specifically maintain Jabiru Aircraft Model J230-D Serial # 858. Other Maintenance Manuals for other configurations of the Jabiru J230 aircraft are not to be used for maintenance instructions for this aircraft.

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.

This document is controlled and kept with the aircraft compliance files at Jabiru Aircraft Pty, Ltd and a copy is also kept at Jabiru USA Sport Aircraft, LLC. It remains controlled while in the aircraft compliance files. Once this no longer applies the document becomes uncontrolled.

Should you have any questions or doubts about the contents of this manual, please contact Jabiru Aircraft Pty Ltd.



## Owner/Operator Responsibilities

To maintain compliance with ASTM Standard F2295 which establishes the parameters for continued operational safety and is an underlying requirement for a LSA Airworthiness Certificate, the owner or operator of this aircraft must follow six rules that are specified in Section 5.4 of F2295. Failure to comply with these responsibilities could result in an aircraft that may be out of compliance with the ASTM standards and could lead to revocation of the aircraft airworthiness certificate.

1. Each owner/operator of this aircraft shall read and comply with the maintenance and continued airworthiness information and instructions provided by the manufacturer.
2. Each owner/operator of this aircraft shall be responsible for providing the manufacturer with current contact information where the manufacturer may send the owner/operator supplemental notification bulletins.
3. The owner/operator of this aircraft shall be responsible for notifying the manufacturer of any safety of flight issue or significant service difficulty upon discovery.
4. The owner/operator of this aircraft shall be responsible for complying with all manufacturer notices of corrective action and for complying with all applicable aviation authority regulations in regard to maintaining the airworthiness of this aircraft.
5. The owner/operator of this aircraft shall ensure that any needed corrective action be completed as specified in a notice, or by the next scheduled annual inspection.
6. Should an owner not comply with any mandatory service requirement, the aircraft shall be considered not in compliance with applicable ASTM standards and may be subject to regulatory action by the presiding aviation authority.



<b>OWNER/OPERATOR RESPONSIBILITIES .....</b>	<b>2</b>
1.1 TABLE OF FIGURES .....	6
1.2 LIST OF TABLES .....	9
<b>2 SECTION 2 – GENERAL INFORMATION .....</b>	<b>10</b>
2.1 FOREWORD / APPLICABILITY .....	10
2.2 ADDITIONAL REFERENCE MANUALS .....	12
2.3 LIST OF EFFECTIVE PAGES / ISSUE STATUS .....	12
2.4 INTRODUCTION .....	12
2.5 DEGREE OF DIFFICULTY .....	12
2.6 USE-BY DATES & STORAGE .....	13
2.7 GENERAL DESCRIPTION .....	13
2.8 OWNER MAINTENANCE .....	13
2.9 AIRCRAFT SPECIFICATIONS .....	14
2.10 CENTRE OF GRAVITY LIMITATIONS .....	14
2.11 STANDARD PRACTICES .....	14
2.12 AIRCRAFT STRUCTURE .....	15
2.13 ENGINES .....	15
<b>3 AIRCRAFT SPECIFICATIONS .....</b>	<b>15</b>
3.1 UNIVERSAL SPECIFICATIONS .....	15
3.2 TORQUE VALUES (IN FIBREGLASS) .....	17
<b>4 MAINTAINER REQUIREMENTS .....</b>	<b>18</b>
4.1 FACILITIES .....	18
4.2 TRAINING .....	18
4.3 RATING .....	18
4.4 EXPERIENCE .....	18
4.5 TOOL & GAUGE CONTROL .....	18
4.6 TOOLS: .....	18
4.7 EQUIPMENT: .....	20
4.8 GENERAL: .....	20
4.9 SPECIAL TOOLS & COMPOUNDS .....	21
<b>5 CLEANING, GROUND HANDLING &amp; STORAGE .....</b>	<b>25</b>
5.1 CLEANING .....	25
5.2 GROUND HANDLING .....	26
5.3 STORAGE .....	28
<b>6 INSPECTIONS .....</b>	<b>31</b>
6.1 SERVICE INTERVAL TOLERANCE .....	31
6.2 BASIC INSPECTION PROCEDURE .....	31
6.3 MANDATORY INSPECTIONS & LIFE LIMITED ITEMS .....	31
6.4 INSPECTION CHART .....	32
6.5 SERVICING .....	37
6.6 GENERAL INSPECTION GUIDELINES .....	37
6.7 ENGINE PRE-INSPECTION RUN-UP: .....	38
6.8 PROPELLER 100-HOURLY / ANNUAL .....	38
6.9 ENGINE COMPARTMENT 100-HOURLY / ANNUAL .....	38
6.10 FUEL SYSTEM 100-HOURLY / ANNUAL .....	40
6.11 LANDING GEAR 100-HOURLY / ANNUAL .....	41
6.12 AIRFRAME 100-HOURLY / ANNUAL .....	42
6.13 CONTROL SYSTEMS 100-HOURLY / ANNUAL .....	43
6.14 LUBRICATION .....	43
6.15 SPECIAL INSPECTIONS – WEIGHING .....	43
6.16 SPECIAL INSPECTIONS – CONTROL CABLES .....	46
6.17 SPECIAL INSPECTIONS – CONTROL SURFACES .....	47
6.18 SPECIAL INSPECTIONS – MAIN WHEEL ALIGNMENT .....	52
6.19 SPECIAL INSPECTIONS – FUEL GAUGE DECAL SETUP .....	55
6.20 SPECIAL INSPECTIONS – FUEL SENDER CALIBRATION .....	57



6.21	SPECIAL INSPECTIONS – WING & STRUT BUSH SERVICE.....	62
<b>7</b>	<b>STRUCTURES .....</b>	<b>67</b>
7.1	FUSELAGE .....	67
7.2	WINGS & EMPENNAGE .....	76
7.3	LANDING GEAR & BRAKES .....	83
<b>8</b>	<b>AILERON CONTROL SYSTEM .....</b>	<b>109</b>
8.2	WING FLAP CONTROL SYSTEM .....	119
8.3	ELEVATOR CONTROL SYSTEM.....	131
8.4	CONTROL COLUMN.....	132
8.5	ELEVATOR .....	132
8.6	ELEVATOR CONTROL CABLES .....	135
8.7	RIGGING.....	135
8.8	ELEVATOR TRIM – CONTROL LEVER ASSY.....	137
8.9	ELEVATOR TRIM – AFT ASSEMBLY .....	138
8.10	TRIM CONTROL CABLES .....	140
<b>9</b>	<b>RUDDER CONTROL SYSTEM .....</b>	<b>141</b>
9.1	RUDDER PEDAL SYSTEM .....	141
9.2	RUDDER CENTERING SYSTEM.....	143
9.3	RUDDER.....	146
9.4	RUDDER CONTROL CABLE .....	148
9.5	RUDDER BALANCE.....	149
9.6	RIGGING.....	149
<b>10</b>	<b>ENGINE &amp; ENGINE INSTALLATION.....</b>	<b>151</b>
10.1	ENGINE COWLS.....	151
10.2	ENGINE .....	153
10.3	FLEXIBLE HOSES .....	154
10.4	COOLING AIR BAFFLES .....	155
10.5	ENGINE MOUNT.....	156
10.6	ENGINE FUEL SYSTEM .....	157
10.7	ENGINE THROTTLE CONTROL.....	157
10.8	CHOKE CABLE .....	159
10.9	AIR INTAKE SYSTEM & CARBURETTOR HEAT.....	160
10.10	EXHAUST SYSTEM.....	162
10.11	CABIN HEATER SYSTEM.....	164
10.12	EXTREME CLIMATIC CONDITIONS.....	166
<b>11</b>	<b>FUEL SYSTEM .....</b>	<b>168</b>
11.1	DESCRIPTION .....	168
11.2	FUEL LINES.....	170
11.3	FUEL TANKS .....	172
11.4	FUEL VENTS .....	174
11.5	FUEL SHUT-OFF VALVE .....	175
11.6	FUEL GAUGES.....	177
11.7	FUEL FILTERS.....	178
11.8	FUEL PUMPS .....	178
<b>12</b>	<b>INSTRUMENTS &amp; INSTRUMENT SYSTEMS .....</b>	<b>180</b>
12.1	GENERAL .....	180
12.2	INSTRUMENT PANEL .....	180
12.3	INSTRUMENT PANEL MOUNT.....	182
12.4	INSTRUMENTS.....	183
12.5	PITOT & STATIC SYSTEMS .....	184
12.6	ALTERNATE STATIC SOURCE.....	192
12.7	ANALOGUE TACHOMETER.....	193
12.8	DIGITAL DISPLAYS .....	194
12.9	MAGNETIC COMPASS.....	195
12.10	GYRO INSTRUMENT PACKAGE (OPTION).....	195



<b>13</b>	<b>ELECTRICAL SYSTEMS.....</b>	<b>197</b>
13.1	ELECTRICAL POWER SUPPLY SYSTEM.....	197
13.2	MINOR ELECTRICAL EQUIPMENT.....	200
13.3	BATTERY SYSTEM.....	201
13.4	ELECTRICAL LOAD ANALYSIS (ELA).....	202
13.5	RADIO INSTALLATION.....	202
13.6	TRANSPONDER.....	204
<b>15</b>	<b>PAINTING &amp; FINISHING.....</b>	<b>206</b>
15.1	EXTERIOR.....	206
<b>16</b>	<b>PLACARDS.....</b>	<b>208</b>
16.1	MODEL-SPECIFIC DECALS.....	208
16.2	PLACARDS GENERAL.....	208
<b>17</b>	<b>FAIRINGS.....</b>	<b>212</b>
17.1	DESCRIPTION.....	212
<b>18</b>	<b>FEEDBACK FORM.....</b>	<b>213</b>
<b>19</b>	<b>PROPELLER SERVICE MANUAL.....</b>	<b>213</b>
19.1	CERTIFIED PROPELLER MODELS.....	213
19.2	APPROVED INSTALLATIONS.....	213
19.3	213	
19.4	INSTALLING & SERVICING.....	213
19.5	INSTALLATION.....	213
19.6	TO REMOVE EXISTING PROPELLER.....	215
19.7	TO ASSEMBLE AND REPLACE PROPELLER ASSEMBLY.....	215
19.8	PROPELLER BALANCING PROCEDURE.....	215
<b>20</b>	<b>APPENDIX B – WORKSHEETS.....</b>	<b>217</b>



## 1.1 Table Of Figures

Figure 1 – J230-D General Arrangement .....	16
Figure 2 – Sealants, Compounds & Lubricants #3.....	21
Figure 3 – Optical Tachometer .....	22
Figure 4 – “Crowsfoot” Adaptor .....	22
Figure 5 – Safety Wire / Wire Pliers .....	22
Figure 6 – Torque Wrench & Crowsfoot Adaptor Setting 1 .....	22
Figure 7 – Torque Wrench & Crowsfoot Adaptor Setting 2 .....	23
Figure 8 – Using A Crowsfoot Adaptor .....	23
Figure 9 – Undercarriage.....	32
Figure 10 – Weighing Diagram.....	45
Figure 11 – Normal and Jammed Control Illustration.....	48
Figure 12 – Rudder Gap Cross Section .....	49
Figure 13 – Aileron Clearance.....	49
Figure 14 – Test Load Application.....	50
Figure 15 – Elevator Gap Cross Section .....	50
Figure 16 – Scratches on Rudder.....	51
Figure 17 – Wheel Alignment Set Up .....	52
Figure 18 – Alignment Straight Edge In Position.....	53
Figure 19 – Alignment Measurements.....	53
Figure 20 – Camber / Toe-In Adjustment .....	54
Figure 21 – Max Empty (Left) and Acceptable Empty (Right) Indications.....	56
Figure 22 - Fuel Gauge Calibration Decal Parts .....	56
Figure 23 – 20L Indication on Sender & Decal to Match.....	56
Figure 24 – EMS Fuel Calibration Screens .....	58
Figure 25 – Fuel Line Clamps .....	59
Figure 26 – EMS Calibration Screen #1 .....	60
Figure 27 – EMS Calibration Screens #2 and #3 .....	61
Figure 28 – Wing Lug Versions .....	64
Figure 29 – Bond Details .....	65
Figure 30 – ShockWatch Indicator .....	69
Figure 31 – J230-D Door Hinge Assy.....	71
Figure 32 – J230-D Door Assembly .....	72
Figure 33 – J230-D Rear Door Assy .....	72
Figure 34 – J230-D Door Latch Mechanism Assembly.....	73
Figure 35 – Top Door Catch .....	73
Figure 36 – J230-D Wing Assembly Sheet 1 (Ser 13) .....	77
Figure 37 – J230-D Wing Assembly Sheet 2 (Ser 13) .....	77
Figure 38 – J230-D Wing Assembly Sheet 3 (Ser 13) .....	78
Figure 39 – Light Installed (Left) & Slotted Hole In Housing .....	80
Figure 40 – Night-VFR Lighting Aim Diagram .....	80
Figure 41 – Wing Inspection Panel.....	81
Figure 42 – Wheel Spat Installation.....	85
Figure 43 – Main Wheel to Leg Assy.....	88
Figure 44 – Main Wheel Assembly.....	88
Figure 45 – Directional Brake Disc Installation.....	89
Figure 46 – J230-D Main Undercarriage Assembly (Type 2) .....	92



Figure 47 – Nose Wheel Hub Assembly.....	95
Figure 48 – Nose Leg Soft Link Assy (J200 Family) .....	96
Figure 49 – Nose Leg Housing & Assembly.....	99
Figure 50 – Nose Leg Assy – Long Trail (J160 Family) .....	100
Figure 51 – Fabricated Nose Wheel Yoke Assy.....	100
Figure 52 – Machined Nose Leg Housing .....	102
Figure 53 – Brake Master Cylinder & Lever Assy (Type 2) .....	104
Figure 54 – Single Calliper Detail (Mk III brakes).....	108
Figure 55 – Aileron System Schematic – Type 3. ....	109
Figure 56 – Control Column Assy – Type 3.....	111
Figure 57 – Clamp Comparison (Primary Cable Clamp Upper on Right Picture) .....	113
Figure 58 – Clamp Comparison & Installation (Rudder Cable) .....	114
Figure 59 – Clamp Installations (Elevator & Aileron).....	114
Figure 60 – Trim Cable Clamp Installation .....	115
Figure 61 – Cable & Clamp Comparison.....	115
Figure 62 – Correct and Incorrect Clamp Installation.....	115
Figure 63 – Aileron Stops – Type 3.....	118
Figure 64 – Linear Actuator Disassembled .....	121
Figure 65 – Commutator Ring Close-Up .....	122
Figure 66 – Flap Controls – Sheet 1 (Fibreglass Motor Mount) .....	123
Figure 67 – Flap Controls – Sheet 1 (Aluminium Motor Mount).....	123
Figure 68 – Flap Controls – Sheet 2.....	124
Figure 69 – Flap Controls – Sheet 3 (Fibreglass Motor Mount) .....	124
Figure 70 – Flap Controls – Sheet 3 (Aluminium Motor Mount).....	125
Figure 71 – J200 Family Electric Flap System Sheet 1.....	125
Figure 72 – J200 Family Electric Flap System Sheet 2.....	126
Figure 73 – Flap Cross Tube Assy J160 Family .....	127
Figure 74 – Flap Cross Tube Assembly J200 Family, Electric.....	128
Figure 75 – Elevator Control System – Type 1, Sheet 2.....	131
Figure 76 – Elevator Control Assy Type 2.....	132
Figure 77 – Wide-Span Models – Horizontal Tail & Elevator Assembly – Type 1 .....	134
Figure 78 – Wide-Span Models – Horizontal Tail & Elevator Assembly Type 2 .....	134
Figure 79 – Elevator Travel Limits.....	136
Figure 80 – Elevator Trim Handle Assy – Type 3.....	138
Figure 81 – Trim Controls – At Tail.....	139
Figure 82 – Typical Rudder System Schematic .....	141
Figure 83 – Rudder Pedal - Non-Adjustable.....	142
Figure 84 – Adjustable Rudder Pedal Assy – Type 2.....	143
Figure 85 – Steering/Rudder Centering Assy – Type 3 (Sheet 1).....	144
Figure 86 – Steering/Rudder Assy – Type 3 (Sheet 2) .....	145
Figure 87 – Steering/Rudder Centering Assy – Type 3 (Includes Soft Link).....	145
Figure 88 – Typical Rudder Installation (Alloy Hinges) .....	147
Figure 89 – Typical Rudder Installation (Steel Hinges) .....	148
Figure 90 – Typical Upper Cowl Assy .....	152
Figure 91 – Typical Lower Cowl Assy .....	152
Figure 92 – Fuel Hose Assy – Engine Bay.....	155
Figure 93 – Air Duct Hard Point Reinforcement .....	156



Figure 94 – Throttle Assy (Large Panel Mount) .....	159
Figure 95 – Control Cable End Fitting Installation .....	160
Figure 96 – Carburettor Heat Box .....	161
Figure 97 – Hot Air Duct Assy .....	162
• If the exhaust manifolds / extractors have been loosened or removed, then during installation care must be taken to position the muffler correctly. Carry out a test fit of the muffler to the system, then stand back and check that it is positioned at the engine centreline and is true and straight. If necessary adjust the manifold or extractors. Before final fit ensure that extractors / manifolds are aligned well with the exhaust ports. Poor alignment will result in exhaust port damage (particularly for 2-bolt flanges). Tighten all extractor screws & assemble. Figure 98 – 3300 Exhaust System Type 1 .....	163
Figure 99 – 3300 Exhaust System Type 2 .....	164
Figure 100 – Cabin Heat Mixer Assembly .....	165
Figure 101 – Cabin Heat Exchanger Assy .....	166
Figure 102 – J200 Family Engine Installation Type 2 .....	167
Figure 103 – Fuel System Schematic – Type 4 .....	169
Figure 104 – Schematic.....	170
Figure 105 – Sample Fuel Line Details .....	171
Figure 106 – Fuel Lines Showing Typical “U” Requiring Correction .....	171
Figure 107 – Corrected Fuel Lines .....	172
Figure 108 – Header Tank Installation – Type 2 (Sheet 1) .....	173
Figure 109 – Header Tank Installation – Type 2 (Sheet 2) .....	174
Figure 110 – Vented Fuel Cap Assy.....	175
Figure 111 – Single Line Fuel Tap .....	176
Figure 112 – Fuel Gauge – Sight Glass .....	177
Figure 113 – Instrument Panel Layout Type 1 .....	181
Figure 114 – Instrument Panel Layout Type 2 .....	181
Figure 115 – Instrument Panel Layout Type 3 .....	182
Figure 116 – Instrument Panel Layout Type 4 .....	182
Figure 117 – Instrument Panel Mount Installation .....	183
Figure 118 – Pitot Assembly.....	185
Figure 119 – Static Probe System Assembly .....	186
Figure 120 – Pitot / Static Water Trap .....	187
Figure 121 – Pitot-Static System – Water Trap Locations .....	187
Figure 122 – Static System Test .....	192
Figure 123 – Alternate Static Source Assy.....	193
Figure 124 – Wiring Diagram Sheet 1. ....	198
Figure 125 – Wiring Diagram Sheet 2. ....	199
Figure 126 – Night-VFR Lighting Sheet 1.....	199
Figure 127 – Night-VFR Lighting Sheet 2.....	200
Figure 128 – VHF Antenna Installation.....	203
Figure 129 – Second VHF Antenna Installation (J120 / J160 Families).....	203
Figure 130 – Second VHF Antenna Installation (J230 Families) .....	204
Figure 131 – Transponder Antenna Installation .....	205
Figure 132 - Typical Scimitar propeller installation.....	214





## 1.2 List Of Tables

Table 1 – J230-D Specifications .....	16
Table 2 – Recommended Bolt Torque Values .....	17
Table 3 – Inspection Schedule Chart .....	33
Table 4 – Control Free Play Limits .....	46
Table 5 – Trouble Shooting – Main Undercarriage .....	92
Table 6 – Trouble shooting – Nose Leg. ....	99
Table 7 – Trouble Shooting – Brakes .....	107
Table 8 – Trouble Shooting – Fuel System .....	169
Table 9 – Trouble Shooting – Pitot-Static System.....	189
Table 10 – Trouble Shooting – Airspeed Indicator .....	190
Table 11 – Trouble Shooting – Altimeter .....	190
Table 12 – Trouble Shooting – Vertical Speed Indicator.....	191
Table 13 – Trouble Shooting – Tachometer.....	194
Table 14 – Trouble Shooting – Digital Instruments Gauges.....	195
Table 15 – Model-Specific Decals .....	208
Table 16 – General Decals.....	208
Table 17 – Approved Scimitar Propeller Installations (Factory built Models).....	213

## 2 Section 2 – General Information

### 2.1 Foreword / Applicability

- This manual contains JABIRU recommended procedures and instructions for ground handling, servicing and maintaining the following Jabiru J230-D aircraft.
- It is the owner's responsibility to become fully aware of the particular maintenance requirements and limitations applicable to the appropriate registration.

### **IMPORTANT**

All maintenance should be undertaken with careful regard for the procedures outlined in this manual. A detailed record of maintenance undertaken should be recorded in the Aircraft Log Books.

Model J230-D must be maintained by an Authorised Person (Owner, Licensed A&P or Licensed Light Sport Repairman/ Maintenance (LSR/M)).

Jabiru J230-D Light Sport Aircraft have a Special Certificate of Airworthiness which remains in force provided:

- Only modifications and repairs approved by the manufacturer are incorporated on the aircraft;
- The aircraft complies with all safety directions issued by the manufacturer;
- The aircraft has been maintained in accordance with the manufacturer's requirements; and
- The continuing airworthiness functions are performed by the manufacturer (or a person appointed by the Manufacturer).

If the aircraft no longer complies with one or more of these conditions, the C of A becomes void. Continued operation with an invalid C of A is a criminal offence. It is permissible, however, for the registration holder of a non-compliant aircraft to apply for an Experimental Certificate.

Owners or Operators of Experimental Light Sport Category (E-LSA) aircraft are authorized to maintain and inspect an E-LSA Jabiru J230-D that they own or operate only upon completion of the Light Sport Repairman / Inspection course.

In the interests of product development, we encourage owners to make suggestions related to design improvements. However, the final decision on their adoption or otherwise rests with JABIRU AIRCRAFT Pty Ltd.

**WARNING:**

Jabiru Aircraft Pty Ltd has devoted significant resources and testing to develop the J230-D for recreational flying and flight training. Any other uses or applications not approved by Jabiru Aircraft P/L may be extremely hazardous, leading to property damage, or injury or death of persons on or in the vicinity of the vehicle. Jabiru Aircraft Pty Ltd does not support the use of this aircraft in any applications which do not meet the requirements of the appropriate Pilot Operating Handbook or Flight Manual. Any non-compliant operation may render the aircraft un-airworthy and will void any warranty issued by Jabiru.

Jabiru J230-D Aircraft are designed to be maintained only in strict accordance with this Maintenance Manual. Any variation of any kind, including alteration to any component at all, whether replacement, relocation, modification or otherwise which is not strictly in accordance with these manuals may lead to dramatic changes in the performance of the aircraft and may cause unexpected engine stoppage, loss of control or have other detrimental effects on the aircraft which may lead to injury or death. Jabiru Aircraft Pty Ltd does not support any modifications to an aircraft, its parts, or components. Any such actions may render the aircraft un-airworthy and will void any warranty issued by Jabiru.

Maintenance and modification cannot be supervised by the manufacturer. Maintenance requires extreme cleanliness, exact parts, precise workmanship and proper consumables. It is the owner's responsibility to ensure absolute attention to detail no matter who may become involved in work on this aircraft. Your safety, your life and your passenger's lives rely on precise and accurate following of instructions in this manual.

In exchange for the Maintenance Manual provided by Jabiru Aircraft Pty. Ltd. ("Jabiru") I hereby agree to waive, release, and hold Jabiru harmless from any injury, loss, damage, or mishap that I, my spouse, heirs, or next of kin may suffer as a result of my use of any Jabiru product, except to the extent due to gross negligence or wilful misconduct by Jabiru. I understand that proper skills and training are essential to minimize the unavoidable risks of property damage, serious bodily injury and death that arise from the use of Jabiru products.

## 2.2 Additional Reference Manuals

- Jabiru Engine Installation Manual JEM3302
- Jabiru Engine Maintenance Manual JEM0002
- Jabiru Engine 3300 Hydraulic Lifter Parts Book JEM3303
- Jabiru Engine Overhaul Manual JEM001
- Jabiru Propeller Manual JPM0001

The latest revisions of these manuals are available online at [www.jabiru.net.au/manuals](http://www.jabiru.net.au/manuals).

### Always Obtain the Latest Revision of These Manuals Before Any Maintenance

## 2.3 List of Effective Pages / Issue Status

- This manual is revised as a whole. All pages retain the revision status of the overall document.

Issue Notes:


1	Initial Issue
2	Add procedure for correcting free-play in wing & strut attachments.
3	As prescribed by ASTM 2483-12: Add maintainer requirements. Revise logbook worksheet format. Add notes re Shockwatch indicator.





## 2.4 Introduction

- The information in this manual is based upon data available at the time of publication, and is supplemented and kept current by Service Bulletins & Service Letters published by JABIRU AIRCRAFT Pty Ltd. These are distributed directly to owners of factory-built aircraft in addition to being posted on the JABIRU website or provided to your local distributor. **IT IS MANDATORY** that new owners of pre-owned aircraft should ensure that the transfer of their aircraft has been advised to JABIRU AIRCRAFT Pty Ltd or your Jabiru representative so that our owner databases can be updated. Existing owners should ensure that they update Jabiru with their new contact details when they move or details change.
- **This Maintenance Manual is specific to the J230-D aircraft listed on the cover page and may not be appropriate to any other J230-D aircraft.**
- Before working on an aircraft the technician must be fully conversant with the Aircraft Maintenance Manual, Engine Maintenance Manual, Propeller Manual and any relevant Service Bulletins, Service Letters or other manufacturer's data. Current information is available from the Jabiru Aircraft (Australia) web site – [www.jabiru.net.au](http://www.jabiru.net.au) and in the LSA Owners Info at [www.usjabiru.com](http://www.usjabiru.com).
- Maintenance must only be carried out by an approved person. Authorized persons are noted for each procedure in the manual.

## 2.5 Degree Of Difficulty

- This manual is intended for use by experienced technicians and while all processes will be explained as clearly as possible, some knowledge is assumed. This manual is not intended to be sufficient reference for a person with no other training to safely maintain an aircraft.
- In this manual we have used a “spanner scale” to help technicians approach a job. Anyone considering undertaking a task in this manual must realistically assess themselves against this scale and not attempt any task for which they lack knowledge or the required tools.

The Spanner Scale	Translation
	Simple, basic, straightforward. A careful layman, with guidance,
DOCUMENT No. JTM001-0-230-D-868	08 May 2014
	Page 12 of 223

	can achieve this.
	Straightforward, but with some technical bits. Basic knowledge, care and guidance needed.
	Straightforward, but requires special tools, training and/or judgement. Sound basic knowledge guidance and a careful approach are required.
	A technical job. Take your time, double-check everything. Only for the experienced maintainer.
	A difficult job. Requires special tools, solid skills, good judgement. Only for experts.

## 2.6 Use-By Dates & Storage

- Some products called for by this manual – including thread locking compound, resins and glues – have a use-by date. Care must be taken to ensure all such compounds are within their shelf life before applying them to an aircraft.
- Loctite products typically do not have their use-by date marked on the bottle. For these products it is necessary to note the batch number on the bottle and contact the distributor for shelf-life information.
- Similarly, for many products the shelf-life assumes a certain type of storage – i.e. sealed, temperature controlled etc. Maintainers must ensure that such products are stored appropriately.

## 2.7 General Description

- The JABIRU aircraft described in this manual are 2-seat, high-wing monoplane composite aircraft of monocoque construction. They are equipped with fixed tricycle landing gear of composite construction. The steerable nose gear is a welded metal, trailing link assembly with rubber springs.
- The aircraft are equipped with a JABIRU 6-cylinder, 4-stroke engine of around 120hp. Both engines are optimised to drive a 2-bladed, Jabiru composite propeller.

## 2.8 Owner Maintenance

### 2.8.1 Factory-Built Models

- All Jabiru J230-D Aircraft have been specifically designed as simple aircraft which can be maintained by owners to the extent allowed in CFR 14, Part 43.3. Jabiru Aircraft allows preventive maintenance as allowed in Appendix A of Part 43 to be carried out by the owner or operator. This servicing includes:
  - Removal, installation, and repair of landing gear tires.
  - Servicing landing gear wheel bearings, such as cleaning and greasing.
  - Replacing defective safety wiring or cotter keys.
  - Lubrication not requiring disassembly other than removal of non structural items such as cover plates, cowlings, and fairings.
  - Replenishing hydraulic fluid in the hydraulic reservoir.
  - Refinishing decorative coating of fuselage, wings, tail group surfaces (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not required.
  - Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.



- Repairing upholstery and decorative furnishings of the cabin or cockpit interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect the primary structure of the aircraft.
- Making small simple repairs to fairings, nonstructural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper air flow.
- Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system.
- Trouble shooting and repairing broken circuits in landing light wiring circuits.
- Replacing bulbs, reflectors, and lenses of position and landing lights.
- Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.
- Replacing or cleaning spark plugs and setting of spark plug gap clearance.
- Replacing any hose connection except hydraulic connections.
- Replacing prefabricated fuel lines.
- Cleaning or replacing fuel and oil strainers or filter elements.
- Replacing and servicing batteries.
- Replacement or adjustment of nonstructural standard fasteners incidental to operations.
- Every 100 hours (if used in flight training) or Annually (whichever happens first) a 100-hour inspection must be carried out by an Authorised Person as specified on the 100 hour inspection checklist in this manual.

#### CAUTION

**It is the operator's responsibility to ensure that the factory-built aircraft is correctly maintained for the intended use.**

## 2.9 Aircraft Specifications

- Leading particulars of the aircraft discussed in this manual are given in Section 3. If these dimensions are used for constructing a hangar or computing clearances, remember that such factors as tyre pressure, tyre size and load distribution may result in some dimensions that may be somewhat different from those listed.

## 2.10 Centre Of Gravity Limitations

- All JABIRU J230-D aircraft are relatively light weight. The installation of equipment may significantly alter the approved CG limits of the aircraft. Therefore, all proposed fixed installations must be approved by JABIRU AIRCRAFT Pty Ltd or a person authorized to revise an aircraft's weight and balance information (such as the holder of a CASA Weight Control Authority)

## 2.11 Standard Practices

- Do not over tighten bolts
- Ensure a minimum of 1 full thread is clear of nuts.
- Do not exceed 3 threads clear on nuts (use extra washers).
- Ensure nuts are not thread-bound (i.e. the thread on the nut has hit the end of the thread on the bolt.
- All spherical bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure. i.e. a ¼" washer must be fitted to 3/16" bolts or a 5/16" washer to ¼" bolts.
- FAA AC-43.13 or similar approved data gives guidance on accepted means for carrying out typical aircraft maintenance tasks – such as safety-wiring etc.

#### WARNING

**Thread bound nuts can carry far less load and are much more susceptible to failure.**

#### WARNING

**DO NOT REUSE SELF-LOCKING NUTS**



## 2.12 Aircraft Structure

- In all Jabiru Aircraft, due to the monocoque construction the majority of the structure is primary. The components of the aircraft which are secondary structure can be identified by the fact that they are designed as fairings and are generally removable. Examples of secondary structure are the engine cowls, speed fairings, ventral fin and wheel spats.

## 2.13 Engines

- The engines used in Jabiru Aircraft are not discussed within this manual. For details of installation, maintenance and overhaul refer to the latest revisions of the Jabiru Engine manuals for the 3300L model engine.
- Up-to-date engine manuals are available from the Jabiru Aircraft website; [www.jabiru.net.au](http://www.jabiru.net.au).

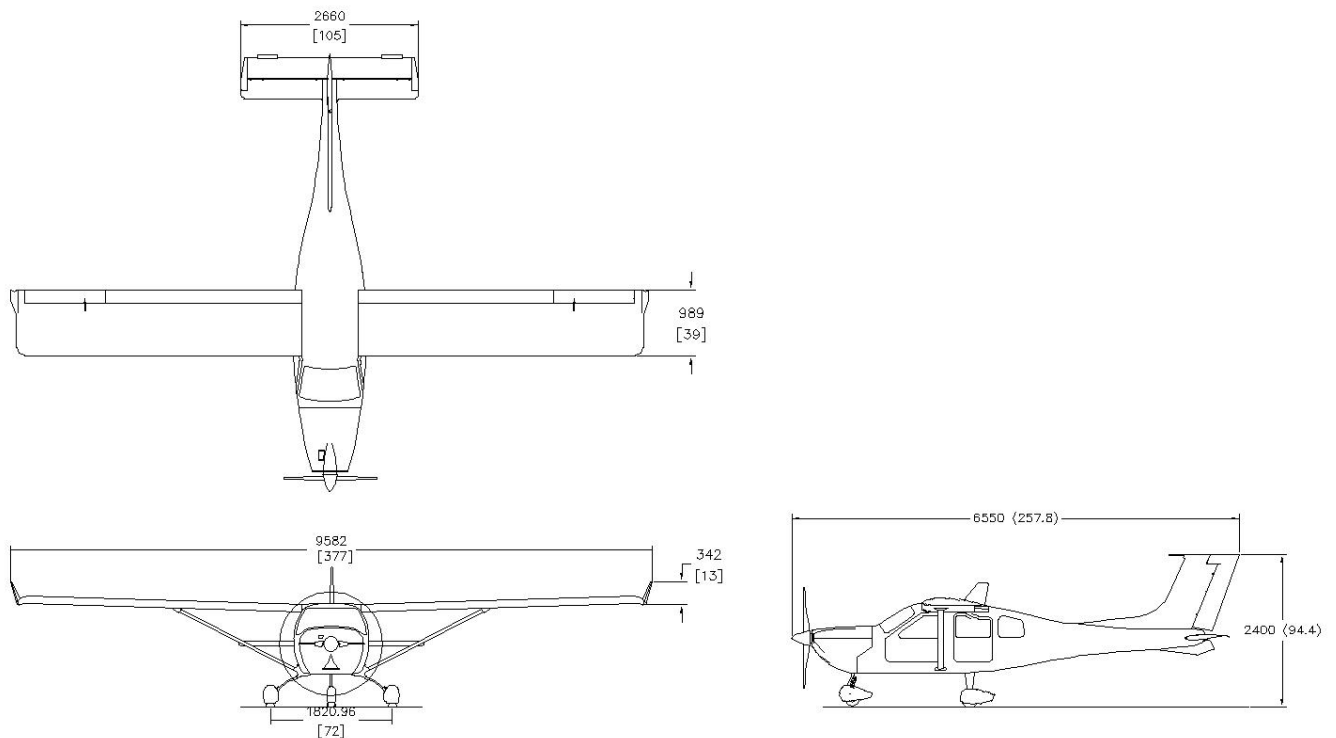
# 3 Aircraft Specifications

## 3.1 Universal Specifications

Item	Specification
Fuel Type	<ul style="list-style-type: none"> <li>• AVGAS 100LL or 100/130.</li> <li>• MOGAS with Octane Rating 95 RON (AKI 91) or above</li> </ul> <p style="text-align: center;"><b>CAUTION</b>  <b>S-LSA-certified models may not use fuel containing alcohol. Operators who choose to use MOGAS do so at their own risk and are required to test each new batch of MOGAS for the presence of ethanol before adding it to the aircraft tanks. REFER TO SERVICE LETTER JSL007 FOR DETAILS</b></p>
Battery Location	<ul style="list-style-type: none"> <li>• In Engine Compartment</li> </ul>
Propeller Type	<ul style="list-style-type: none"> <li>• Jabiru</li> <li>• 2-bladed Composite</li> </ul>
Propeller Diameter	<ul style="list-style-type: none"> <li>• 60" dia (1524mm)</li> </ul>
Target Wheel Alignment (at gross weight)	<ul style="list-style-type: none"> <li>• 0° Camber, 0° Toe-in.</li> </ul>
Engine Oil Type	<ul style="list-style-type: none"> <li>• Refer Engine Manuals</li> </ul>

**Table 1 – J230-D Specifications**

Model	J230-D
Number of Seats	2
Aircraft Maximum Weight	600kg / 1320 lbs
Fuel Capacity	135 litres / 36 gal
Oil Capacity	3.5 litres / 3.7 qt
Engine Model	Jabiru 3300L
Propeller Pitch	Jabiru 55" pitch (1397mm) or
Wheel Sizes Standard	500 x 6" rim
Tyres Standard	6" wide, 6 Ply
Tyre Pressures Standard - Mains	310 kpa (45 psi)
Tyre Pressures Standard - Nose	207 kpa (30 psi)



**Figure 1 – J230-D General Arrangement**



### 3.2 Torque Values (In Fibreglass)

- Unless noted otherwise, all bolt torque settings detailed within this manual are for clean, dry threads.
- When checking fastener torque, use the following procedure:
  - Ensure the fastener to be checked is clean and dry before proceeding.
  - Where a reversible wrench is being used, set the torque to a value slightly below the target torque and LOOSEN the fastener slightly (approx 1/3 or a turn). The wrench should “click” – indicating that the fastener had maintained its set torque. If the fastener torque has reduced significantly it may be an indication of damage or degradation to the assembly and should be investigated.
  - The fastener is first loosened slightly to ensure that it is free to move on its threads. If this step is not carried out it is possible for the fastener to corrode in place. If that happens, the friction of the corrosion will seize the fastener, ensuring that it appears to “pass” torque checks but in fact has lost tension and is no longer holding the assembly correctly.
  - Tighten the fastener smoothly to the set torque. Any jerks or bumps when tightening can cause the reading to be obtained prematurely.
  - The torque must be obtained while the nut is turning. If you stop to reposition the torque wrench and then the required torque reading is obtained without the nut turning, the nut needs to be loosened a little and then tightened again so the torque reading is obtained while turning.

**Table 2 – Recommended Bolt Torque Values**

Bolt Size	Torque (Inch.lb) (Core-mat or thin laminate)	Torque (Inch.lb) (Thick, glass-only laminate)
AN3	20 - 25 (1.7 – 2.1lb.ft)	Up to 4 lb.ft
AN4	50 - 70 (4.2 – 5.8lb.ft)	Up to 8 lb.ft
AN5	100 –140 (8.3 – 11.7lb.ft)	Up to 18 lb.ft
AN6	<b>N/A</b>	Up to 24 lb.ft
AN4 Propellor	72 (6lb.ft)	<b>N/A</b>

- These values relate only to steel nuts on oil-free cadmium plated threads.
- For Engine Bolt Torque Values see Engine Maintenance Manual.
- The above values are recommended for all installation procedures contained in this Manual, except where other values are stipulated.
- The above values are not to be used for checking tightness of installed parts during service.



## 4 Maintainer Requirements

- The following are recommended as the minimum requirements for someone carrying out maintenance & inspection on Jabiru Aircraft:

### 4.1 Facilities

- An enclosed workspace with sealed floor, adequate lighting, compressed air & mains electricity.

### 4.2 Training

- For engines: completion of an approved instruction course specific to Jabiru Engines. Approved courses include those offered by Jabiru Aircraft Australia or by local Jabiru Aircraft representatives.
- Airframe: completion of an approved instruction course specific to Jabiru Aircraft. Approved courses include those offered by Jabiru Aircraft Australia or by local Jabiru Aircraft representatives.

### 4.3 Rating

- Commercial maintainers must hold suitable ratings as required by their local Airworthiness Authority.

### 4.4 Experience

- A minimum of 2 years experience working on aircraft under supervision is recommended for commercial maintainers before working un-supervised.

### 4.5 Tool & Gauge Control

- Tool & gauge control is an important part of aviation maintenance systems. Tools & gauges must be accurate enough for the intended use (i.e. a 12" steel ruler is not the appropriate tool to use to measure the cylinder bore diameter) & be accurately calibrated by an approved laboratory.
- Calibrations must be kept up to date. This means a check calibration every year or more frequently for regularly used, critical tooling.
- Even quality equipment will wear over time so items like reams and go / no-go gauges must periodically be checked to ensure they remain within limits.

### 4.6 Tools:

Access to the following tools will be required. All tools must be good quality items:

- Imperial Allen keys
- Circlip pliers
- Pliers: long nose, regular square jaw, side cutters
- Ring/open end spanners: 5/16", 3/8", 7/16", 1/2", 9/16", 10mm, 17mm
- Ratchet 3/8" drive, breaker bar, 2" extension bar, 3/8", 7/16", 1/2" sockets, 7/16" tube socket, 18mm spark plug socket
- Screwdrivers: flat blade and Phillips head in various sizes
- Feeler gauges: metric and imperial sizes
- Punch set
- Torque wrench: 3/8" drive, "name" brand (Snap-On, Warren & Brown etc), with valid calibration. The wrench must have a suitable scale for use on the fasteners typically found on Jabiru Aircraft – for example a wrench with a scale from 20 – 100 lb.ft is unsuitable.
- Adjustable reams



- Picks / probes
- Good quality wire strippers. Terminal crimp pliers, terminals, heat shrink etc.
- Safety wire pliers & 0.032" stainless steel safety wire.
- Inspection mirror / Boroscope



## 4.7 Equipment:

Access to the following equipment will be required:

- Bench vice with padded jaws
- Calipers: must read up to 180mm
- Degreasing/cleaning system with solvent/solution containment/recycling
- Hand press
- Heat gun or small butane/propane torch with a soft pencil flame
- Multimeter or an ohmmeter
- Imperial thread taps: UNF and UNC
- Adjustable wing stands
- Saw-horses
- Fuel-proof container with accurate volume markings
- Soldering iron
- Cable ties
- An accurate tyre pressure gauge
- Accurate scales and spirit level if the aircraft is to be weighed.

## 4.8 General:

- Brass drifts, punches, rags, soft mallet, hammers
- Greases: molybdenum disulphide, general purpose
- TorqueSeal brand security marking lacquer or similar, such as coloured nail varnish
- 5-Minute epoxy resin, Jabiru epoxy resin, cotton fibre flock, Q-cells (micro-balloons), containers, scales, mixers etc.
- Scratch-removing compounds such as Novus Plastic Polish for windows.

## 4.9 Special Tools & Compounds



Figure 2 – Sealants, Compounds & Lubricants #3

- Loctite 620 is designed for the bonding of cylindrical fitting parts. Typical applications include locating pins in radiator assemblies, sleeves into pump housings and bearings in auto transmissions. Particularly suitable for applications where temperature resistance up to 200°C is required. Used as a ultra-strong threadlock. Loctite 620 is specified in several places in the Jabiru Aircraft where a reliable bond is essential. When using it, follow the rules below:

### WARNING

**Failure to use Loctite 620 correctly can result in bond failure.**

- **Check use-by dates.** Loctite 620 (like most other compounds) has a use-by date. Generally this is not printed on the bottle but can be found by contacting the distributor and telling them the batch number.
  - **Work fast.** Loctite 620 can cure very quickly. All screws must be torqued to final settings as quickly as practical. Anything more than a minute is not recommended, particularly if cure accelerator spray (Loctite 7471) is used.
  - **Only use as much as required/specified.** Excess compound can make it nearly impossible to disassemble the parts later.
  - **Surface preparation is critical.** Threads must be cleaned and prepared properly.
  - **To Remove.** Can normally be achieved by heating the screw to over 150°C using a pencil-point gas burner. Minimise direct heat applied to the head of the screw as this can weaken the drive socket – direct heat towards the thread as much as possible.
- Loctite 290 is designed for the locking and sealing of threaded fasteners. Because of its low viscosity and capillary action, the product wicks between engaged threads and eliminates the need to disassemble prior to application. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. The product can also fill porosity in welds, castings and powdered metal parts.
  - Loctite 262 is designed for the permanent locking and sealing of threaded fasteners. Typical applications include the locking and sealing of large bolts and studs (up to M25 ). A medium strength threadlock.
  - Loctite 243 is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools. Particularly suitable for applications on less active substrates such as stainless steel and plated surfaces, where disassembly with hand tools is

required for servicing. A medium-strong threadlock. Typically used for cap screws into castings or Aluminium.



An accurate optical tachometer. Reads directly from reflective strips fitted to the propeller and is used whenever an accurate check of RPM is required. Will usually read propeller RPM in sunlight without reflective strips. Used to confirm accuracy of RPM readings of standard instruments.

Figure 3 – Optical Tachometer



Commercially available tool designed for high-torque applications on small nuts. Also allows the use of a torque wrench in inaccessible locations. Note usage instructions below.

Figure 4 – “Crowsfoot” Adaptor



Figure 5 – Safety Wire / Wire Pliers

- Wire used to secure items (nuts, bolts etc) to prevent rotation in service.

#### 4.9.1 Torque / Tension Wrench

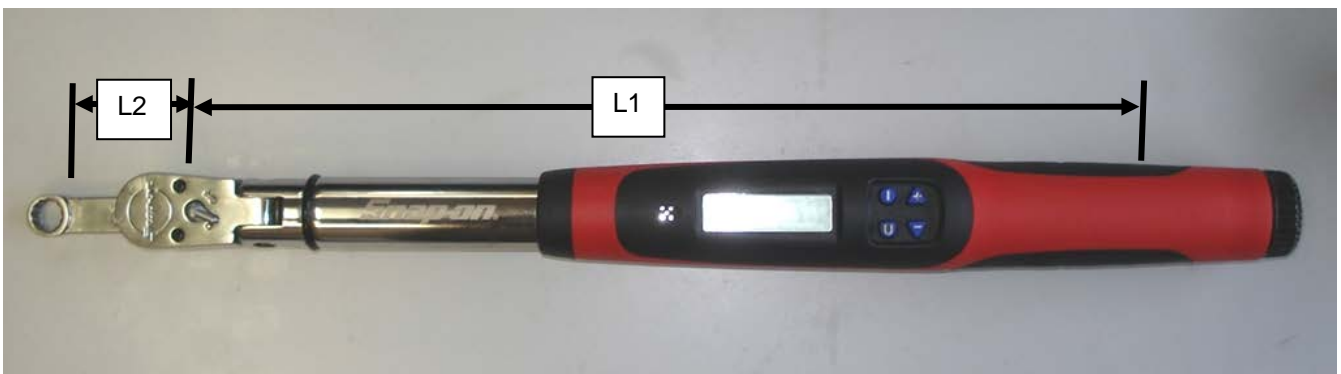
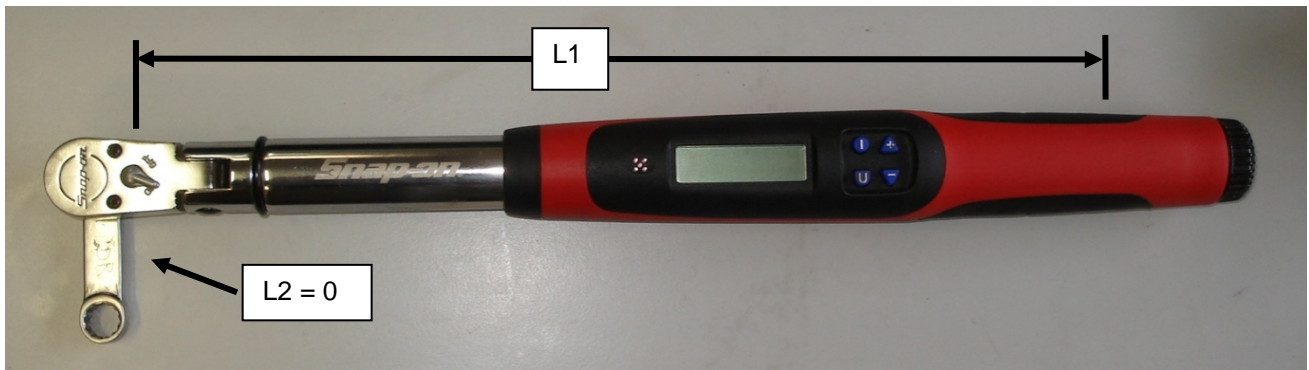


Figure 6 – Torque Wrench & Crowsfoot Adaptor Setting 1



**Figure 7 – Torque Wrench & Crowsfoot Adaptor Setting 2**

- A good torque wrench is an essential tool for maintaining Jabiru Aircraft. It's important to realise however that even the best wrench needs calibrating occasionally. This can be done using a dead weight on the end of a known arm or – preferably – sending the wrench away to be calibrated. Note that Civil Aviation Authorities generally require that the tool be calibrated in a way which is traceable to a NATA-standard laboratory.
- A “Crowsfoot” extension as shown in Figure 4 is sometimes necessary – it allows high torque settings to be used on small nuts without damaging them and access to difficult locations. However, when using the extension as shown in Figure 6 the extra length will throw off the torque setting of the wrench. This must be corrected using the following formula:

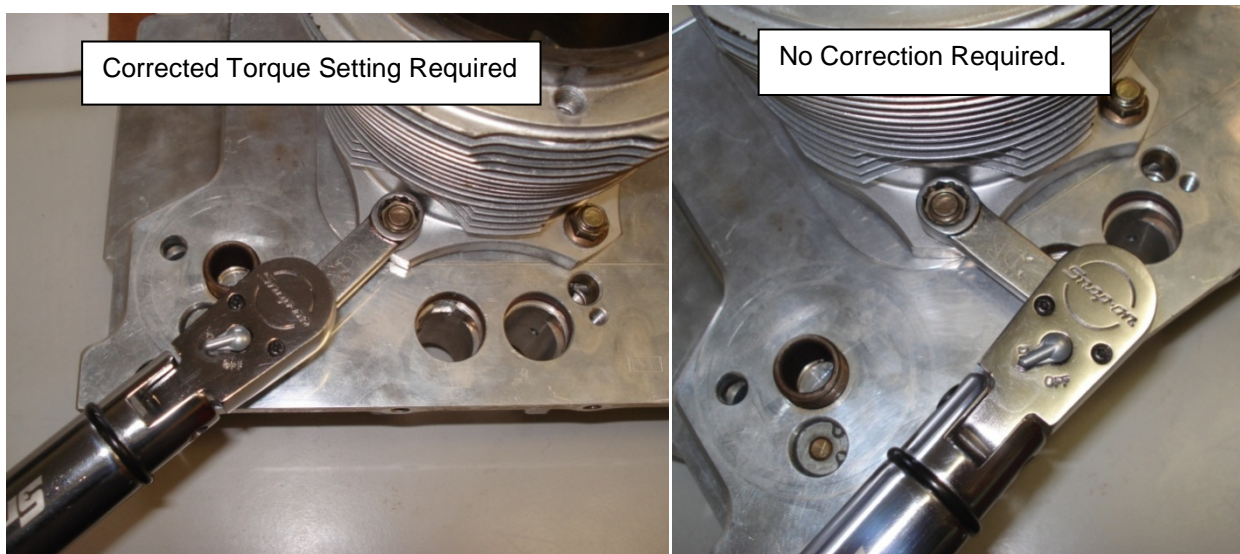
$$\text{Adjusted Torque Setting} = \text{Required Torque Setting} \times \left( \frac{L1}{L1+L2} \right).$$

- L1 is the distance from the middle of the grip of the handle to the centre of the wrench drive lug
- L2 is the distance *in the direction of the handle* from the centre of the wrench drive lug to the centre of the nut socket of the adaptor.
- For example: a nut needs to be tensioned to 30lb.ft. The torque wrench is 12” long and the crowsfoot extension is 2” long. The extension is oriented as shown in Figure 6. This means that the torque wrench must be set to:

$$\text{Adjusted Torque Setting} = 30 \times \left( \frac{12}{12 + 2} \right)$$

$$\text{Adjusted Torque Setting} = 30 \times 0.857 = 25.7\text{lb. ft}$$

- If the extension is oriented at 90° to the wrench as shown in Figure 7 then no correction is needed because L2 is zero.



**Figure 8 – Using A Crowsfoot Adaptor**

**4.9.2 Torque Application Procedure**

- Good torque application technique is essential if an accurate bolt torque reading is going to be obtained.
- Firstly the nut must be tightened smoothly. Any jerks or bumps can cause the torque reading to be obtained prematurely.
- The torque must be obtained while the nut is turning. If you stop to reposition the torque wrench and then the required torque reading is obtained without the nut turning, the nut needs to be loosened a little and then tightened again so the torque reading is obtained while turning.
- Unless specified otherwise all torque settings given in this manual are “dry” – i.e. no special lubricant is applied to the threads or parts. Where directed otherwise it is vital that the directions are followed exactly.



## 5 Cleaning, Ground Handling & Storage

### 5.1 Cleaning

- Keeping the aircraft clean is important. Besides maintaining the appearance of the aircraft, cleaning makes inspection and maintenance easier.

#### 5.1.1 Windshield And Windows

- These should be cleaned carefully with plenty of fresh water and a mild detergent, using the palm of the hand to feel and dislodge any caked dirt or mud. A sponge, soft cloth or chamois may be used but only as a means of carrying water to the plastic. Rinse thoroughly then dry with a clean, moist chamois. DO NOT rub the plastic with a dry cloth as this builds up an electrostatic charge, which attracts dirt. Oil and grease may be removed by using a soft cloth moistened with mineral turpentine.

#### CAUTION

**DO NOT use gasoline, alcohol, Buzene, Acetone, Carbon Tetrachloride, fire extinguisher fluid, de-icer fluid, lacquer thinner or glass window cleaning spray.**

**These solvents will soften and craze the Plastic.**

**DO NOT use a canvas cover on the windshield or windows as the cover may scratch the plastic.**

#### 5.1.2 Interior Surfaces

- Interior surfaces should be cleaned with a soft cloth, fresh water and a mild detergent. Volatile substances such as those mentioned in the previous section must never be used.
- Note that

#### 5.1.3 Exterior Surfaces

- The exterior surfaces, under normal conditions, require a minimum of polishing and buffing.

#### CAUTION

**DO NOT polish or buff the aircraft within the first 2 weeks after delivery from the factory as surface treatments take up to 14 days to properly cure.**

- Generally, the exterior surfaces can be kept bright by washing with water and a mild soap or detergent, followed by a rinse with water and drying with a cloth or a chamois.
- Remove stubborn oil and grease with a cloth moistened with mineral turpentine, then wash with water and a mild soap, rinse and dry as stated before.
- After the curing period the aircraft may be waxed with a good quality automobile wax. A heavier coating of wax on the leading edges of the wing, tail and on the engine nose cap will help reduce abrasion encountered in these areas.

#### CAUTION

**DO NOT use Silicon based cleaning materials as Silicon is absorbed into the composite materials and may affect reparability.**

#### 5.1.4 Aluminium Surfaces

- The aluminium surfaces require a minimum of care, but should not be neglected. Wash and clean as detailed in paragraph 3.3.3 above.

#### CAUTION

JABIRU aircraft are designed for minimum maintenance. **However, special attention should be applied when the aircraft has been used in extremely corrosive conditions, e.g. beach landings with sand and salt. Always ensure the aircraft is thoroughly hosed and washed immediately after such use.** Pay particular attention to wheels and external controls. Always

hose down wheels and spats after landings in mud or sand to ensure brakes, wheels and spats are free of dirt build-up.

### 5.1.5 Engine And Engine Compartment

- The engine should be kept clean since dirty cooling fins and baffles can cause overheating of the engine. Also, cleaning is essential to minimise any danger of fire and provide easy inspection of components.

#### CAUTION

**DO NOT hose engine. Electrical components may be damaged by moisture. Ensure electrical components are protected against moisture. Caustic cleaning solutions should not be used.**

- Recommended cleaning procedure is lightly spray with degreasing fluid – after sealing coils and starter motor. WIPE clean with brush and cloth.

### 5.1.6 Propeller

- Wash with soap and water, rinse with clean water and dry with cloth or chamois.

#### CAUTION

**Do not use a wax based substance as this would make it almost impossible to refurbish the prop if need at a later stage.**

### 5.1.7 Wheels

- The wheels should be washed periodically and examined for corrosion, cracks or dents in the wheel halves or in the flanges or hubs. If defects are found, remove and repair in accordance with Section 7.3. Discard cracked wheel halves, flanges or hubs and install new parts.

## 5.2 Ground Handling

### 5.2.1 Towing

- All Jabiru aircraft are relatively light and should always be moved by hand.
- Moving the aircraft is accomplished by using the wing struts, prop hub or landing gear struts as push points.

#### CAUTION

**Do not use control surfaces to move the aircraft – Damage to the control system may result**

- When pushing or moving the aircraft, take care that you do not jam your fingers under the rudder or in the rudder hinge – remember that it is connected to the Nose Wheel and will move whenever the nose wheel direction changes.
- The aircraft may also be moved by placing the propeller in the horizontal and then placing one hand on the propeller on either side of the spinner. The aircraft can then be pulled forward.

#### WARNING

**Never move the aircraft in this manner whilst the engine is hot as it may fire when the propeller is moved and result in severe injury.**

**Always ensure that the Master and Ignitions are OFF.**

**Never approach the propeller when anyone is in the aircraft.**

**Always treat the propeller as LIVE! IT KILLS!**

### 5.2.2 Jacking

- Before jacking, ensure that it is as light as possible by removing luggage and any unnecessary fuel.

### 5.2.2.1 JACKING MAIN GEAR

1. Remove main gear spat on the side to be jacked or both spats if both wheels to be jacked.
2. Where equipped, the fuel filler cap vent of the wing which is not being jacked may be blocked using a vent cap. This is to prevent fuel leaking onto the wing while the aircraft is jacked.

### CAUTION

**Where a vent cap is used ensure that it is large and highly visible to ensure it is removed on completion of the work.**

3. The aircraft can be lifted on one side by a person of reasonable strength (or 2 of lesser strength) by lifting on the Wing Spar – lift at a point in line with the wing strut and about 1m (3 feet) outboard of the strut attachment. Be careful lifting close to the wing tip as the wing structure in this area is quite light and can easily be damaged by misplaced jacking loads.
4. Place a solid block (preferably wood) under the bottom of the composite glass leg which will result in the wheel being off the ground when the aircraft is lowered. Be careful not to interfere with brake components or Wheel Spat attachments. Chock the opposite wheel.
5. Repeat for other side if necessary.

### 5.2.2.2 JACKING NOSE GEAR

1. Push down on Tail Plane (NOT THE ELEVATOR) until nose wheel is off the ground.
2. Place trestle or drum under rear fuselage together with absorbent material such as foam block, sandbags or a pillow. Alternately, a pillow or similar may be placed on the ground so that the ventral fin rests on it when the tail is pressed down.

### CAUTION

**If using a trestle, ensure it does not foul Ventral Fin.**

3. Protect the paint of the horizontal tail using rags, pillows etc and weigh down tail plane with sandbags or similar heavy absorbent material – do not use anything hard as items like bricks are likely to damage the aircraft) material. Place weights as close as possible to the aircraft centreline and, where possible, apply weight symmetrically to both sides of the aircraft.

### CAUTION

**Do not lift using control surfaces. Damage to the control surface or control system may result.**

4. Place a padded trestle or similar under the front of the fuselage immediately aft of the cowl outlet to ensure that the nose cannot drop down if the aircraft balance is disturbed.

### 5.2.3 Hoisting

- This procedure should not be necessary for most service or maintenance procedures. Should hoisting be necessary:
  1. Drain Fuel from both wings (Wet Wing models only) & Remove wings.
  2. Fit shackles to wing support brackets (4 off).
  3. Fit cables/rope to shackles and to a centre lift shackle.
  4. Hoist only from this point ensuring that cables/ropes do not mark the top of the fuselage at corners above wing support brackets.
- Refer to sections below for details on procedures for fuel draining, wing removal etc.

### 5.2.4 Levelling

#### Longitudinal Levelling:

- For longitudinal levelling use a spirit level on the lower door sills, or
- For longitudinal levelling use a spirit level on the trim decal on the centre console.

**Lateral Levelling:**

- Apply a spirit level to the flap drive cross shaft, or
- Apply a spirit level across the aircraft, referencing the join line of the cowl top & bottom halves.

**5.2.5 Parking**

- It is strongly recommended that aircraft are stored in hangars wherever possible to minimise degradation caused by the elements and pests.
- Parking precautions depend principally on local conditions. As a general precaution, check the wheels and tie the control handle back firmly with a seat belt to lock the controls. Park into the wind and tie down the aircraft as outlined in below if a hangar is not available.
- Whenever the aircraft is not active or being maintained it is strongly recommended that the following points are covered to prevent contamination and pest ingress:
  - Pitot tube
  - Static vent
  - Engine air inlet
  - Exhaust outlet
  - Fuel tank vent(s)

**WARNING**

**Ensure that fuel tank vent covers are not tight-fitting. A tight cap can prevent fuel vapours escaping, pressurising the tank and severely damaging the tank and wings (for wing tanks).**

**CAUTION**

**Equip all covers with tags or other high-visibility devices to minimise the chance of inadvertent operation with covers still fitted.**

**5.2.6 Tie Down**

- When tying the aircraft down in the open, head into the wind if possible. Secure control surfaces by tying the control handle back firmly with the seat belts.
- Then:
  1. Tie ropes to the top end of each wing strut or to the strut tie-down lug (if equipped). Secure opposite end of the ropes to ground anchors located at approximately 30 degrees to the vertical, outboard of the top wing attachment point. Ensure that the ropes have sufficient slack to not strain the wing attachments should a tyre deflate while the aircraft is tied down.
  2. Tie rope to the Tail Tie-down Hole in the Ventral Fin. Secure the opposite end of rope to ground anchors.

**5.3 Storage****5.3.1 Flyable Storage**

- Flyable storage is defined as a maximum of 30 days non-operational storage.
- Ensure that the engine has been stopped by turning off the fuel valve, thereby not leaving any fuel in the carburettor bowl.
- Every 7th day the propeller should be rotated through 5 revolutions, without running the engine. Leave the propeller in the horizontal position to ensure even distribution of liquids in the wood. If left in the vertical position, liquids will drain to the lower tip resulting in an unbalanced propeller.

**CAUTION**

**Ensure that the Master and Ignition Switches are OFF before turning motor!**

**WARNING**

**Do not store MOGAS or fuels containing alcohol for longer than 30 days in a Jabiru aircraft. Refer to Service Letter JSL007 for details.**

- Store under cover, away from direct sunlight.

- In addition to the normal parking covers detailed in Section 5.2.5, openings in the engine cowl and other similar openings should have protective covers fitted to prevent entry of foreign materials and pests (especially wasps).

### 5.3.2 Returning Aircraft To Service

- After flyable storage, returning the aircraft to service is accomplished by performing a thorough pre-flight inspection. Ensure all protective covers are removed.

### 5.3.3 Temporary Or Indefinite Storage

- Temporary storage is defined as aircraft in non-operational status for a maximum of 90 days.
- Treat as for flyable storage (see Paragraph 3.1.7), plus:
  - For temporary storage, fill fuel tank with AVGAS (to prevent moisture accumulation).
  - For indefinite storage, drain fuel tank, ensure carburettor bowl is empty by running engine with fuel valve off until it stops or by draining bowl.

### CAUTION

**Do not store MOGAS or fuels containing alcohol for longer than 30 days in a Jabiru aircraft. Refer to Service Letter JSL007 for details.**

Then:

1. Clean aircraft thoroughly.
2. Clean any dirt, oil or grease from tyres and coat tyres with a tyre preservative. Cover tyres to protect against dirt and oil.
3. Either block up undercarriage/fuselage to relieve pressure on tyres or rotate wheels every 30 days to prevent flat spotting the tyres.
4. Seal or cover all openings. Note that wing tank breather covers **MUST BE LOOSE!**
5. Remove battery and store in a cool dry place. Service the battery periodically and charge as required.

**NOTE: It is recommended that batteries not being used should be charged every 30 days.**

6. Disconnect spark plug leads and remove spark plugs from each cylinder. Using an oil can or spray atomiser, spray preservative oil through a spark plug hole of each cylinder with the piston in the down position. Rotate the propeller 10 – 12 times, leaving it in the horizontal position.

**NOTE: Use SHELL Aero fluid 2UN (MIL-C-6529C Type 1) or similar engine corrosion inhibitor.**

7. Install spark plugs and connect leads.
8. Seal exhaust pipes. Attach a red streamer to each.
9. Cover but **DO NOT** seal fuel tank breathers – breather covers must be a loose fit to prevent the possibility of pressure-related damage to the fuel tanks.
10. Place protective covers over pitot tube, static source vents, air vents and openings in engine cowl to prevent the entry of foreign material or pests (especially wasps).
11. Attach a warning placard to the instrument panel stating that vents and breathers have been sealed and that the engine must not be started with the seals in place.
12. Every 7 days the propeller should be rotated through 5 revolutions without running the engine – leave propeller in the horizontal position.

### CAUTION

**Ensure that the Master and Ignition Switches are OFF before turning motor!**

### 5.3.4 Inspection During Storage

1. Generally inspect airframe and clean as necessary.
2. Inspect the interior of at least one cylinder through the spark plug hole for corrosion at least once a month.
3. If, at the end of the 90 day period, the aircraft is to be continued in non-operational storage – repeat Steps 1-13 above (most will only need to be checked).



### 5.3.5 Returning Aircraft To Service

After temporary storage, the procedures for returning the aircraft to service are as follows:

1. Remove aircraft from blocks and check tyres for proper inflation.
2. Check battery and install.
3. Check carburettor air filter and service if necessary.
4. Remove warning placard from propeller.
5. Remove materials used to cover openings.
6. Remove, clean and gap spark plugs.
7. While spark plugs are removed, rotate propeller using the starter motor for several revolutions to clear excess preservative oil from cylinders.

#### **CAUTION**

**Ensure that the Master and Ignition Switches are OFF before turning motor!**

8. Install spark plugs – torque to 11 nm (8 ft/lbs).
9. Check fuel filter – replace if necessary.
10. Check brake fluid level.
11. If returning to service after indefinite storage, fill fuel tanks with correct grade of fuel.
12. Check fuel tank and fuel lines for moisture and sediment. Drain enough fuel to eliminate any moisture and sediment.
13. Check that the fuel tank breathers are clear.
14. Perform a thorough pre-flight inspection.
15. Start and warm engine.

## 6 Inspections

### 6.1 Service Interval Tolerance

- A tolerance of plus or minus 3 hours is allowable on all service intervals set within this manual

### 6.2 Basic Inspection Procedure

- Remove the engine cowlings and inspect the engine bay in “dirty” condition.
- Clean the engine bay, propeller and aircraft exterior.

Carry out the inspections listed in

- Table 3.
- Test and re-assemble the aircraft. Test fly if required.

### 6.3 Mandatory Inspections & Life Limited Items

#### 6.3.1 Airframe

- At intervals of 5000 hours the Jabiru (all models) airframe must be subject to an overall condition inspection by Jabiru Aircraft or an aircraft maintainer authorised by Jabiru Aircraft. As part of this inspection, wing struts must be disassembled, inspected for damage using appropriate NDT methods (such as dye-penetrant testing).
- Jabiru aircraft do not have an overall airframe life limitation.

#### 6.3.2 Control Cables

- Control cables for all aircraft are subject to the inspection and replacement requirements detailed in Section **Error! Reference source not found.**

#### 6.3.3 Engine Bay Flexible Hoses

- All flexible hoses in the engine compartment should be replaced at engine overhaul or every 2 years whichever comes first. Hoses which show visible deterioration (cracking, excessive hardening) must be replaced immediately, irrespective of age.

#### 6.3.4 Undercarriage

- Main undercarriage bolts and nose leg pivot bolts shown in Figure 9 are to be changed every 500 hours TIS.

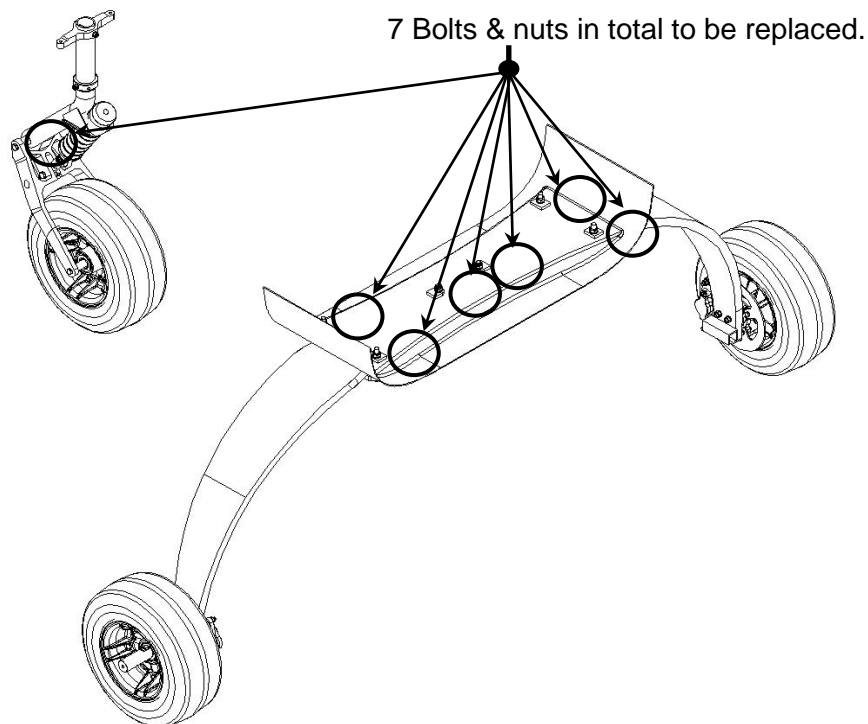


Figure 9 – Undercarriage

## 6.4 Inspection Chart

- The Engine Maintenance Manual also details engine inspection schedules and should be consulted in addition to this chart.
- The chart below shows the recommended intervals at which items are to be inspected.
- Additional detail of the maintenance required in each section is given in the sections below the inspection chart.
- As shown in the chart, there are items to be inspected each **100 hours**, each **200 hours** and **Annually**. There are also special inspection items that require inspection or servicing at intervals other than 100, 200 hours or Annually.
- When conducting an inspection at 100 hours, all items marked under **Each 100 Hours** is inspected, serviced or otherwise completed.
- At each 200 hours inspection, the 100 hours items are completed in addition to the items marked under **Each 200 Hours**.
- An inspection conducted Annually would likewise include the 100 hour items and 200 hour items in addition to the items marked under **Annual Inspection**.
- A complete aircraft inspection includes all **100, 200** hour and **Annual** items together with those shown in the Engine Maintenance Manual and Propeller Manual.

**Special Inspection items are carried out as required or as specified in**





- Table 3 below.

**Table 3 – Inspection Schedule Chart**

		Annual Inspection	Each 200 Hours	Each 100 Hours
<b>PROPELLER</b>				
1	Spinner	*	*	*
2	Spinner Flange	*	*	*
3	Spinner screws	*	*	*
4	Propeller	*	*	*
5	Propeller bolts/nuts - Tension	*	*	*
6	Spinner / Prop Tracking	*	*	*
<b>ENGINE COMPARTMENT</b>				
<b>Note: refer to engine maintenance manual for engine-specific inspections.</b>				
1	Carburettor air filter	*	*	*
2	Engine baffles and air ducts	*	*	*
3	Oil Hoses, lines, fire-sleeve & fittings	*	*	*
4	Fuel Hoses, lines, fire-sleeve & fittings	*	*	*
5	SCAT Hose Condition	*	*	*
6	Electrical wiring			*
7	Engine controls and linkages	*	*	*



<b>Annual Inspection</b>			
<b>Each 200 Hours</b>			
<b>Each 100 Hours</b>			
8	Engine mounts, mount structure	*	*
9	Starter, solenoid and electrical connections	*	*
10	Coils and electrical connections	*	*
11	Carburettor heat system	*	*
12	Firewall		*
13	Exhaust System (Including Muffler)	*	*
14	Fuel pressure warning light switch (where equipped)	*	*
15	Cabin heat system	*	*
16	Engine cowlings and clips	*	*
<b>Fuel System</b>			
1	Fuel filters, drain valves, carburettor bowl	*	*
2	Electronic fuel boost pump and fittings	*	*
3	Fuel lines and connectors	*	*
4	Fire sleeves	*	*
5	Fuel line sheath inside cabin	*	*
6	Fuel tank caps & placards	*	*
7	Fuel tank vent ball valve check	*	*
8	Fuel Tanks	*	*
9	Fuel shut-off valve & placards	*	*
<b>Landing Gear</b>			
1	Check ShockWatch indicator (where equipped)	*	*
2	Main gear wheels & fairings	*	*



<b>Annual Inspection</b>			
<b>Each 200 Hours</b>			
<b>Each 100 Hours</b>			
3	Nose gear wheel, steering links, tension links & fairings	*	*
4	Wheel bearings	*	*
5	Nose gear strut	*	*
6	Nose gear housing & bushes	*	*
7	Main gear struts, clamps, bolts & nuts	*	*
8	Main gear bolt inspection – Check life & replace as noted in Section 6.3.2	*	*
9	Tyres & tubes	*	*
10	Brake fluid, hoses, linings, discs, brake assemblies & master cylinder	*	*
11	Rod ends – condition, freedom of movement	*	*
12	Brake operational check	*	*
<b>Airframe</b>			
1	Aircraft exterior		*
2	Aircraft structure	*	*
3	Windows, windshield, doors & seals		*
4	Seatbelts & shoulder harnesses	*	*
5	Seat structure	*	*
6	Instruments & markings		*
7	Instrument plumbing & wiring		*
8	Instrument panel, shock mounts, decals & labels		*
9	Fresh air ventilation system		*
10	Cabin heat	*	*
11	Cabin upholstery, trim		*
12	Switches, fuses		*



<b>Annual Inspection</b>			
<b>Each 200 Hours</b>			
<b>Each 100 Hours</b>			
13	Pitot & static system		*
14	Radio, intercom & headsets	*	*
15	Antenna & cable		*
16	Door catches		*
17	Stall warning		*
18	Battery, battery cradle & cables	*	*
19	Carbon Monoxide Detector (where equipped)	*	*
20	Emergency Beacon (where equipped)	*	*
21	Landing / Taxi Light Alignment (N-VFR Only)	*	*
<p><b>Control Systems</b>                      In addition to the items listed below, always check for correct direction of movement (particularly if controls have been disconnected) and correct travel</p>			
1	Cables & clamps	*	*
2	Rod ends	*	*
3	Trim control & cable		*
4	Travel stops		*
5	Decals & labels		*
6	Flap control & linkages	*	*
7	Elevator control & linkages	*	*
8	Rudder pedals & linkages	*	*
9	Exterior surfaces of control surfaces	*	*
10	Control horns, hinges & hinge lock tabs.	*	*
11	Aileron controls & linkages	*	*
12	Rigging check flight		*



Annual Inspection			
Each 200 Hours			
Each 100 Hours			
13	Throttle controls		*
14	Control Surfaces per Section 6.17	*	*

\*\* Note that the control clearance inspection detailed in Section 6.17 must also be carried out at any time when the control rigging may have been altered – i.e. if a control is removed, repaired or adjusted.

## 6.5 Servicing

- Servicing requirements are shown in Section 6.4 below. The following paragraphs supplement this table by adding details not included.

**Note: Inspection Requirements are detailed at Paragraph 3.5.**

### 6.5.1 Engine Servicing Schedule

#### 6.5.1.1 PRE-FLIGHT:

- Refer to Flight Manual

#### 6.5.1.2 OTHER SERVICING

- Refer to Engine Maintenance Manual

## 6.6 General Inspection Guidelines

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- **MOVING PARTS:** Check for: lubrication, servicing, security of attachments, binding, excessive wear, safety, proper operation, proper adjustment, correct travel, cracked fittings, security of hinges, defective bearings, cleanliness, corrosion, deformation, sealing and tension.
- **METAL PARTS:** Check for: security of attachment, cracks, metal distortion, broken welds, corrosion, and any other apparent damage.
- **WIRING:** Check for security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration and corroded terminals.
- **BOLTS IN CRITICAL AREAS:** Correct torque in accordance with torque values given in the chart in Section 3.2, when installed or when visual inspection indicates the need for a torque check.

**NOTE: Torque values listed are for oil-free cadmium-plated threads and are recommended for all installation procedures contained in this manual except where other values are stipulated. They are not to be used for checking tightness of installed parts during service.**

- **FILTERS, SCREENS and FLUIDS:** Cleanliness, contamination and/or replacement at specified intervals.
- **AIRCRAFT FILE:** Various data, information and licenses are part of the aircraft file. Check that the following documents are up-to-date and in accordance with current Civil Aviation Authority Regulations. Most of the items listed are required by the Australian Civil Aviation Authority



Regulations. Since the regulations of other nations may require other documents and data, owners of exported aircraft should check with their own aviation officials to determine their individual requirements.

**To be displayed in the aircraft at all times:**

- Placards as detailed in Flight Manual / Owner's Manual.

**To be carried in the aircraft at all times:**

- Flight Manual / Owner's Manual

**To be made available on request:**

- Aircraft Registration
- Aircraft Operating Limitations
- Pilot License/Certificate including Medical Certificate (if appropriate).

## 6.7 Engine Pre-Inspection Run-Up:

- Before beginning the step-by-step inspection, start, run-up and shut-down the engine in accordance with instructions in the Flight Manual and Appendix 1 of this manual. During the run-up, observe the following, making note of any discrepancies or abnormalities:
  - Engine temperatures and pressures.
  - Static RPM. (Also refer to Engine Maintenance Manual).
  - Magneto drop. (Also refer to Engine Maintenance Manual).
  - Engine response to changes in power.
  - Any unusual engine noises.
  - Fuel shut-off valve; operate engine in ON position and in OFF position long enough to ensure shut-off functions properly.
  - Idling speed.
- After the inspection has been completed, an engine run-up should again be performed to determine that any discrepancies or abnormalities have been corrected.

## 6.8 Propeller 100-Hourly / Annual

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- Remove the spinner and carry out a thorough visual inspection checking for cracking, fraying, corrosion and other damage.
- Check for loose, missing, corroded or damaged fasteners and hardware.
- Check for deposits and radial markings which indicate fretting between moving parts.
- Visually check the condition of the propeller, looking for damage to the leading edge protection, glass de-lamination and cracks, splits or crushing of the propeller blades.
- Check the tension of the propeller bolts/nuts – Tension if required.
- Check spinner and Prop Tracking.
- Refer to Section 19 for test procedures, torque settings etc.

## 6.9 Engine Compartment 100-Hourly / Annual

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- Additional details of engine maintenance are contained in the appropriate engine manual. This manual must be followed in conjunction with the engine manual to ensure a proper inspection.

### WARNING



**Before starting work on the engine it is recommended that the engine starter be disabled (via disconnecting the starter solenoid or similar) to reduce the risk of injury from inadvertent engine start.**

- It is recommended that the engine compartment be visually inspected twice: once while “dirty” – i.e. fresh from operation – and again after cleaning. The “dirty” inspection allows the inspector to see patterns of leakage etc which are lost when the engine compartment is cleaned while the “clean” inspection may show items which were obscured by “dirt” previously. The engine and engine compartment must be cleaned in accordance with Section 5 as a part of the inspection.
- The Carburettor air filter keeps dust and dirt from entering the induction system. The value of maintaining the air filter in a good, clean condition cannot be overstressed. More engine wear is caused through the use of a dirty or damaged air filter than is generally believed.
- The frequency with which the filter should be removed, inspected and cleaned will depend on the operating conditions. A good general rule, however, is to remove, inspect and clean the filter ever 100 hours of engine operating time and more frequently if warranted by the operating conditions. Clean only with compressed air and replace regularly.
- Engine baffles and ram-air ducts must be visually inspected. Check for cracking, fraying and evidence of rubbing. Ensure that the hold-down points are in satisfactory condition and that the ram-air ducts are securely attached to the engine.
- Inspect all sealing rubbers on the ram-air ducts, oil cooler openings etc and repair & replace as required.
- Inspect all oil Hoses, lines, fire-sleeve & fittings. Check for hardening, cracking, leakage and any other signs of deterioration.
- Inspect all fuel Hoses, lines, fire-sleeve & fittings. Check for hardening, cracking, leakage and any other signs of deterioration. Ensure that fire sleeves are long enough to completely cover all flexible hoses – i.e. they must extend past the hose clamp to the very tip of the hose.
- Check SCAT hose interior and exterior condition.
- Ensure that all electrical wiring is secure. Check for rubbing and damage to insulation or fittings. Visually inspect for corrosion on fittings and any evidence of heat caused by a degraded connection or other issue – particular the connections to the regulator and starter solenoid.
- Check that all engine controls and linkages work smoothly and through their full travel. A Second person is required to watch the linkages move on the engine while the first person works the controls inside the cabin. Ensure all stops are set correctly and that all lock nuts are secure.
- Visually inspect the engine mounts, mount structure and mount rubbers for cracking or other signs of degradation.
- Visually inspect the ignition coils and electrical connections. Ensure the coils and electrical connections are secure.
- Verify that the carburettor heat system is functioning correctly – remove the SCAT hose and verify that the flap inside the air box is moving correctly and sealing properly.
- Visually inspect the firewall. Ensure that all firewall fittings (where equipped) are secure and properly filled with fireproof putty. Ensure there are no screws or rivets missing and that there are no open holes through the firewall.
- Visually inspect the exhaust system (Including Muffler). Check for the condition of the restraining springs and spring tabs. Check for cracks, dents or other damage. Particularly check for signs of leakage.
- Inspect the cabin heat system, ensuring that the control valve operates correctly – sealing at both positions – and that the heat exchanger is secure on the tailpipe.
- Inspect the engine cowlings, fasteners and clips. Check for cracks, fraying, signs of rubbing and other damage.
- Inspect the battery, battery cradle & cables for condition.



- The Battery is a sealed type and so is not a serviceable item. If electrolyte corrosion occurs, Use bicarbonate of soda (baking soda) and clean water to neutralise electrolyte of corrosion. Follow with a thorough flushing with clean water. Remove battery and clean residue from aircraft. Clean cable and terminal connections with a wire brush, then coat with petroleum jelly before connecting cables.
- Replace flexible oil & fuel line in engine compartment every 2 years or when visible deterioration (cracking, hardening) occurs.

### CAUTION

**If the aircraft is using a fuel blend containing alcohol the operator must be aware that flexible fuel lines will generally age faster when exposed to alcohol. Additional care must be taken to monitor fuel system condition.**

## 6.10 Fuel System 100-Hourly / Annual

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- The fuel tanks should be filled immediately after flight to lessen condensation of moisture.
- Service Letter JSL007 contains a great deal of detailed information on the suitability, operating requirements and storage requirements of different fuels. Operators and maintainers must familiarize themselves with this information and follow the guidelines given in the letter.
- Fuel drains must be inspected to ensure they are functioning correctly and are not leaking. Fuel drains are located:
  - For J230-D aircraft with wing tanks, in each of the Left & Right hand wing fuel tanks. The drains are located on the underside of the wing, near the wing root.
  - For J230-D aircraft with wing tanks, a third drain is located under the fuselage. This drain is located just aft of the sound curtain (the rear of the cabin) – depending on the model and configuration.
- Fuel filters must be checked and replaced at the intervals noted.
- The carburettor bowl must be removed and checked for contaminants. While the bowl is removed, inspect the float level and check for any foreign objects in any of the jets.
- Check the electronic fuel boost pump functions and produces a sufficient flow rate.
- Inspect fuel lines and connectors. Check for hardening, cracking, leakage, correct radius, obstruction, foreign matter and any other signs of deterioration.
- Check the condition of fire sleeves. Ensure that fire sleeves are long enough to completely cover all flexible hoses – i.e. they must extend past the hose clamp to the very tip of the hose
- Where equipped, check that the fuel line sheaths inside cabin are in place and secure at their attachments. Check for any tears, rips or signs of fuel leakage / pooling.
- Check the function of fuel tank caps. Check that the required placards are in place and in good condition.
- Where equipped, verify the function of the ball valve in the fuel tank vent cap (air should flow out easily at slow flow rates but be blocked at high flow rates. Air should be able to flow into the tank easily at all times.)
- Visually inspect the fuel tanks (in-situ) to check for staining and other signs of leakage or damage. Check the condition of the lines and fittings inside the wing root to determine if there is any leakage.
- Check the function of the fuel shut-off valve. Ensure that all placards are in place and in good condition.



## 6.11 Landing Gear 100-Hourly / Annual

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- Visually inspect the attitude of the aircraft on the ground: if the aircraft has developed a lean to one side since its last maintenance it is a likely indicator of insufficient tyre pressure or damage to an undercarriage leg.
- Where equipped, check the ShockWatch indicator as detailed in Section 7.1.2. Re-set the indicator before returning to service.
- Remove the nose and main wheel fairings and inspect them for cracks, fraying, rubbing or other damage.
- While the fairings are removed, inspect the wheels. Visually inspect the wheel for run-out which may occur due to a dent in the rim. Inspect for cracks, damaged hardware, corrosion and any other damage.
- Jack the aircraft and pull the un-loaded main undercarriage leg fwd and aft to check for looseness. Repeat for the second leg.
- Inspect the nose leg, steering links, tension links & fairings. Check for dents, bends, cracks, corrosion, damaged or missing hardware and signs of rubbing etc. Wriggle the trailing arm front suspension and check for any slop or wear in the pivot bushings of the suspension.
- Check for smooth rotation with no bearing “rumble” or slop. Replace worn or damaged bearings.
- Inspect the nose gear housing & bushes for wear – ensure there is no excess vertical or horizontal slop in the fit of the leg to the housing.
- Inspect the main gear struts, clamps, bolts & nuts. Check for rubbing, cracks, corrosion, missing or damaged hardware and any other damage.
- Replace the main gear bolts at the life indicated in Section 6.3 or earlier if the airframe is subject to rough runways, taxiways or training operations.
- Check the tyre pressure and the condition of tyres & tubes. Examine tyres for wear, cuts, bruises and slippage
- Apply the hand brake. Standing in front of the aircraft, pull firmly on the propeller – placing hands immediately beside the spinner. Rock the aircraft forward and aft, left and right while observing the nose leg and both main legs. Any excess movement, noise or vibration which is apparent during this test can indicate deterioration in the undercarriage legs, fastenings or mechanism and must be corrected.
- Inspect all rod ends to ensure condition, freedom of movement and secure lock-nuts.
- Visually inspect nose leg steering “soft link” (where equipped). Ensure the rubber is in good condition and that all the parts and hardware are not damaged or corroded.
- Check brake master cylinder and refill with automotive brake fluid (**DOT 3 or DOT 4**) Bleed the brake system of any trapped air whenever there is a spongy response on the brake lever.
- Check that discs are straight, not excessively corroded and not worn outside of limits.
- Check for brake fluid leaks, chafing or other damage to brake hoses. Ensure that the brake linings have sufficient wear remaining to reach the next scheduled maintenance. Check brake assemblies & master cylinder for rubbing, damaged or missing hardware or corrosion. Carry out a brake operational check. Refer to Section 7.3.20 for filling and bleeding of the brake system.

### CAUTION

**The JABIRU uses automotive brake fluid (DOT 3 or DOT 4). DO NOT use Aircraft hydraulic fluid (mineral based) or damage to the brake system will result.**



## 6.12 Airframe 100-Hourly / Annual

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- Inspect the aircraft exterior for cracks, dents, abrasions, corrosion or signs of fretting or rubbing. Check for missing or damaged hardware.
- Check for whitening of unpainted fiberglass areas (an indication of damage).
- Check for movement of wing attachments and threaded bushes, movement of undercarriage attachments, loosening of firewall/engine attachments.
- For each wing, hold the tip and shake up-and-down and fore-and-aft. If there is any slop in the wing or strut attachments it will be evident by feel and audibly. Any slop in these connections must be addressed.
- Inspect windows and windshield for cracking and scratches.
- Inspect doors & seals for condition. Check for cracks and signs of rubbing or degradation.
- Inspect seatbelts & shoulder harnesses for condition. Ensure all latches function correctly and do not have excess slop. Check joint pin between shoulder and lap belts and ensure it is secure and the connection solid.
- Inspect the seat structure. Check for cracks or damage. Remove the seat covers and pull fore and aft on the top of the seat back, watching for signs of de-lamination or other damage to the seat back.
- Inspect instruments & markings for security and indications of damage.
- Inspect instrument plumbing & wiring for damage, kinks and security.
- Inspect the instrument panel, shock mounts, decals & labels
- Inspect the fresh air vents for correct function and condition.
- Inspect the cabin heat system for correct function and condition.
- Ensure the carbon monoxide indicator (if equipped) has not expired.
- Inspect the cabin upholstery and trim for condition.
- Inspect switches and fuses for condition, security and function.
- Check the pitot & static system for condition, leaks and blockages.
- Check the radio, intercom & headsets for condition and correct function.
- Check the transponder (if equipped), antenna & cable for condition and function.
- Check door catches for condition and function.
- Check the stall warning system for function.
- Wing struts should be inspected for loose bolts, excessive clearance in wing strut attachments or corrosion.
- If equipped, ensure that the emergency beacon is within its useful life and test in accordance with manufacturer's instructions.

### 6.13 Control Systems 100-Hourly / Annual

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, the following.
- Inspect all primary control cables & clamps. Ensure clamps are assembled correctly and indexed correctly on the cables. Check all hardware is in good condition and is secure. Move all controls through their full travel, ensuring full and free movement with no binding.
- Inspect all rod ends and other hardware for condition and security. Ensure all lock nuts are secure.
- Inspect all secondary (trim, throttle etc) control cables & clamps. Ensure clamps are assembled correctly and indexed correctly on the cables. Check all hardware is in good condition and is secure. Move all controls through their full travel, ensuring full and free movement with no binding.
- Check control surface travel.
- Ensure that control surface stops are correctly adjusted and secure.
- Ensure all decals & labels are in place and in good condition.
- Cycle the flaps, checking the flap control & linkages for full and free operation with no binding. Listen to the electric flap motor (if equipped) and clean or replace if it sounds uneven or jerky.
- Inspect elevator control & linkages. Ensure all hardware is secure and in good condition.
- Inspect rudder pedals & linkages. Ensure all hardware is secure and in good condition.
- Inspect exterior surfaces of control surfaces – check for damage including cracking, fraying etc.
- Inspect control horns, hinges & hinge lock tabs. Check for condition and wear and replace as required.
- Inspect aileron controls & linkages. Ensure all hardware is secure and in good condition.
- Carry out a rigging check flight. Check all systems for correct function.
- Inspect throttle controls for correct function, smooth operation and correct adjustment of friction (to prevent inadvertent throttle movement).
- Inspect Control Surfaces per Section 6.17.

### 6.14 Lubrication

- Refer to the appropriate engine manuals for engine lubrication requirements.
- The following points are designed to run “dry” if required however application of some graphite lubricant is recommended if excess friction is detected.
  - Rudder pedal pivots
  - Wing flap cross shaft pivots
  - Control stick pivot and control stick shaft bushings
  - Nose leg pivot bushings.
  - Throttle shafts. Note that this refers both to the throttle cross-shafts (floor and panel-mount throttle systems) and to the shafts which pass through the instrument panel and have the throttle knobs on the aft end. Note that if fresh lubricant is applied to the throttle system it will be necessary to re-adjust the friction lock when the lubricant is applied and again after a few hours of operation.

### 6.15 Special Inspections – Weighing



Required Tools:	<ul style="list-style-type: none"> <li>- Chocks</li> <li>- Calibrated scales (x3)</li> <li>- Square or Plumb-bob</li> <li>- String and Tape</li> </ul>
-----------------	--



Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)

**6.15.1.1 SCALE LOCATIONS**

- For weighing three scales are used; one under each main wheel and one under the nose wheel.

**6.15.1.2 PROCEDURE**

1. Position the aircraft on the scales on a level surface, preferably one that positions can be marked on to, in the configuration to be weighed.
2. Chock the main wheels and make sure the brake is released. (If the chocks are of significant weight their weight will need to be subtracted from the relevant scale readings).
3. Level the aircraft using technique in Section 5.2.4. If the nose needs to be raised place packers under the nose wheel. If the nose needs to be lowered pack under main wheels or deflate nose wheel. (Remember to re-inflate to operating pressure before use)
4. Using a square or a plumb bob mark the wheel centres on to the floor or scale surface. Both sides of the nose wheel axle must be marked to eliminate any error if it isn't exactly straight.
5. Again using a plumb bob or a level, mark the wing leading edge onto the floor. Mark these points at a position outboard of the main wheels.
6. Take the wheel weights. When the wheel weights are being taken there must be nil wind blowing on the aircraft. Due to the light nature of the Jabiru even a small breeze can cause significant weight transfer and consequentially C of G errors. In addition, door must be shut, flaps in the UP position and any items not part of the standard equipment of the aircraft removed.
7. Using a string line or similar mark the wing leading edge on the floor under the aircraft. Normally using tape to fix a string line between the points marked earlier is the best method.
8. Measure the horizontal for/aft distance for each wheel (both sides of nose wheel) to the wing leading edge. Note that the two readings for the nose wheel are averaged.
9. All distances aft of the datum are considered positive and all distances forward of the datum are negative. See Figure 10. Note that while the arrangement shown assumes that the wing leading edge is the aircraft datum, for some Jabiru models the datum is displaced a fixed amount forward of the leading edge. For these models the measurements taken must be adjusted to readings relative to the datum. For example,
  - The datum is 1403mm forward of the wing leading edge
  - Measurements have found that the nose wheel is 400mm forward of the wing leading edge and the main wheels 400mm aft.
  - Corrected to reference the datum, these measurements become 1003mm aft of the datum for the nose wheel and 1803mm aft for the main wheels.
10. Always weigh and measure the aircraft at least twice and average the results. If one weighing gives results that are significantly different from the other – typically the aircraft weight should not be different by more than 2kg and the calculated CG position within 5mm – then weigh the aircraft a third time to get a better match. Discard the anomalous results. If the third weighing is also different then there is most likely a procedure or equipment issue and the weighing must be postponed until this issue has been corrected.
11. Due to the light weight of the aircraft, the scales used must have an accuracy of at least +/- 0.5kg and distances must be measured to within +/-1mm to ensure accurate results.

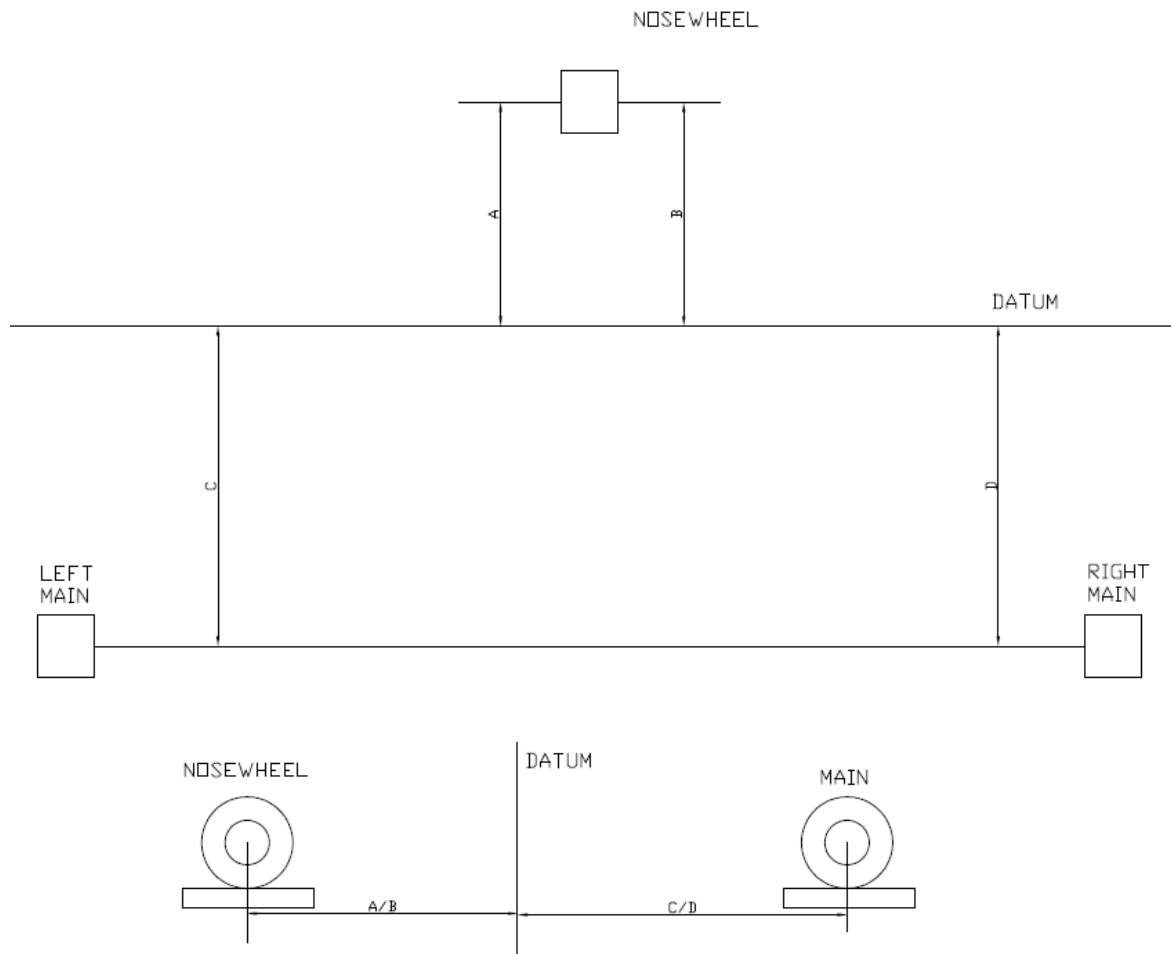


Figure 10 – Weighing Diagram.

## 6.16 Special Inspections – Control Cables



Required Tools:	- Steel Ruler or similar - Spring balance (graduations less than 300 grams)
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- Inspections are required to be carried out on the primary control cables (aileron, elevator & rudder) at intervals detailed in the Airworthiness Limitations Section of this Manual (Appendix V or Section **Error! Reference source not found.**).
- These inspections are to be carried out as described below:
  - Measure the movement of the trailing edge of each control allowed by cable free play.
  - Disconnect both ends of the cable.
  - Move the cable by hand through its full range of movement to check freedom of movement.
  - Using a spring balance with graduations of no more than 300g, measure the friction required to move the cable. Repeat this step to give a minimum of 5 friction measurements in each direction of travel.
  - Reconnect one end of the cable and measure slack in the cable.
- The cable must be replaced if the following is found:
  - Excess friction – **maximum allowable force to move cable 1.9kg.**
  - Excess slack in cable – **maximum allowable cable slack 3.5mm**
  - “Hard” or “tight” patches of the cable travel.
  - Gritty or rough operation.
  - Significant visible damage or degradation such as corrosion, scoring etc.

### Remedial Action

- Remedial action (replacement or re-routing of cable to reduce measured values) is required if the control free play exceeds the values given in Table 4. The amount of free play in each control linkage should be within the same tolerance as the control cable itself (i.e. 3.5mm)

**Table 4 – Control Free Play Limits**

Control	Free-Play
Elevator	3.5-mm
Rudder	3.5-mm
Aileron	3.5-mm

## 6.17 Special Inspections – Control Surfaces



Required Tools:	- Steel rule, Vernier or Gauges - Calibrated scales - Marker pen
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- The following set of inspections have been developed to address potential control surface jamming. These inspections are to be carried out at the frequency defined in the inspection chart of Section 6.4. In addition they must be repeated at any time when the control rigging may have been altered – i.e. if a control is removed, repaired or adjusted.
- If the inspection shows that the aircraft requires adjustment Jabiru Aircraft or our local representative must be consulted for an appropriate rectification method.
- In Figure 11 several terms are defined. This is provided to clarify the statements given in the remainder of this inspection.
- **Control** – This refers to control surfaces – rudder, elevator and ailerons.
- **Aircraft** – This refers to the fixed part of the aircraft immediately in front of the controls. In particular it refers to the point indicated in Figure 11, where the control will hit the aircraft if a jam occurs.
- **Control at the point of overlap** – This is the particular point where the rearmost edge of the aircraft is aligned with the front of the non-hinged side of the control. This is the critical point where a control jam becomes possible. Any control which has a critical overlap of less than 2mm should also be treated as having a “point of overlap” as defined by this bulletin.
- **Control clearance** – This is the working clearance between the control & the aircraft.
- **Control gap** – Best shown on Figure 13 (left). If the control passes the point of overlap a gap opens between the aircraft and the control. A gap like this combined with excess flexing of the control surface hinges will lead to control surface jamming.

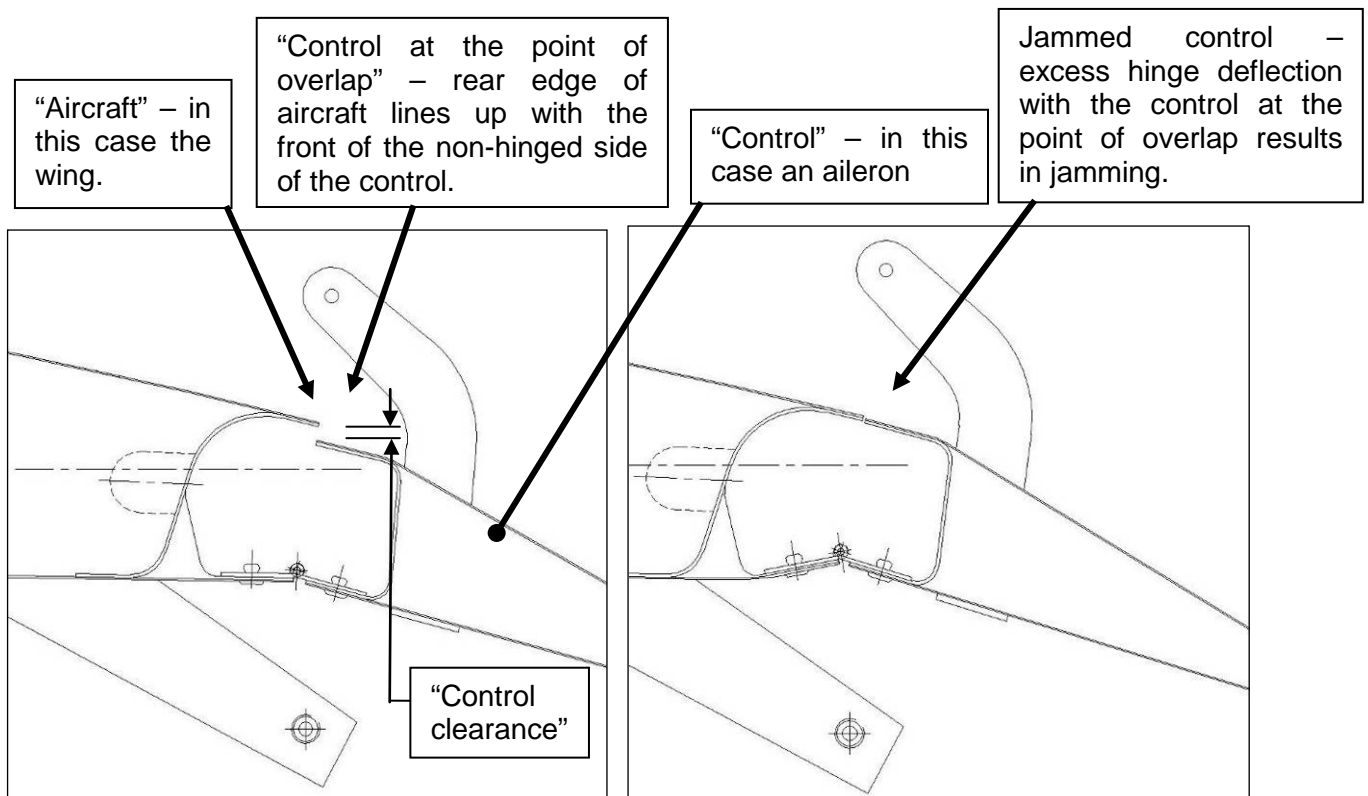


Figure 11 – Normal and Jammed Control Illustration

6.17.1 Inspection A:

- This inspection is to check if the controls are configured in such a way that there is a point of overlap as shown in Figure 11. At noted above the point of overlap is the critical point at which severe control jamming becomes possible.
  - Check each control by moving it to its maximum deflection and inspecting for a control gap – as shown in the example of Figure 13.
  - Note the result of Inspection A and carry on to Inspection B in all cases.

6.17.2 Inspection B:

- This inspection has two purposes: to check to see if jamming is likely due to insufficient clearance at the control’s point of overlap and to check if the control hinges are sufficiently stiff. All controls must be inspected in this way regardless of the results of Inspection A.
- Check the clearance between the control surface and the aircraft at the point of overlap as detailed below:
  - Set the controls so that the control being tested is at the point of overlap – as shown in the right picture in Figure 13. If the control being tested does not deflect to a point of overlap then place it as close as possible to the overlap point.
  - Press against the control using a thumb – pushing the control in the direction that would close the control clearance. Measure the control clearance while this load is applied.
  - Remove the load from the control and re-measure the control clearance.
  - Controls are to be tested this way at every hinge. The force to be applied in each direction is approximately 5-7kg (11 – 15lb). Inspectors can “calibrate” their thumbs by pushing onto a set of scales to indicate how hard they need to push. See Figure 14 for details of where to push on the controls.
- Rectification work is necessary whenever any of the following criteria are met:



- The control clearance is less than 3mm at the control's point of overlap when tested as detailed in Inspection B. Note that this clearance limit only applies to controls which are configured such that they actually have a point of overlap.
- The control clearance changes by 5mm or more when the test load of Inspection B is applied. This is irrespective of if the control has a point of overlap or not.
- Carry on to Inspection C in all cases.

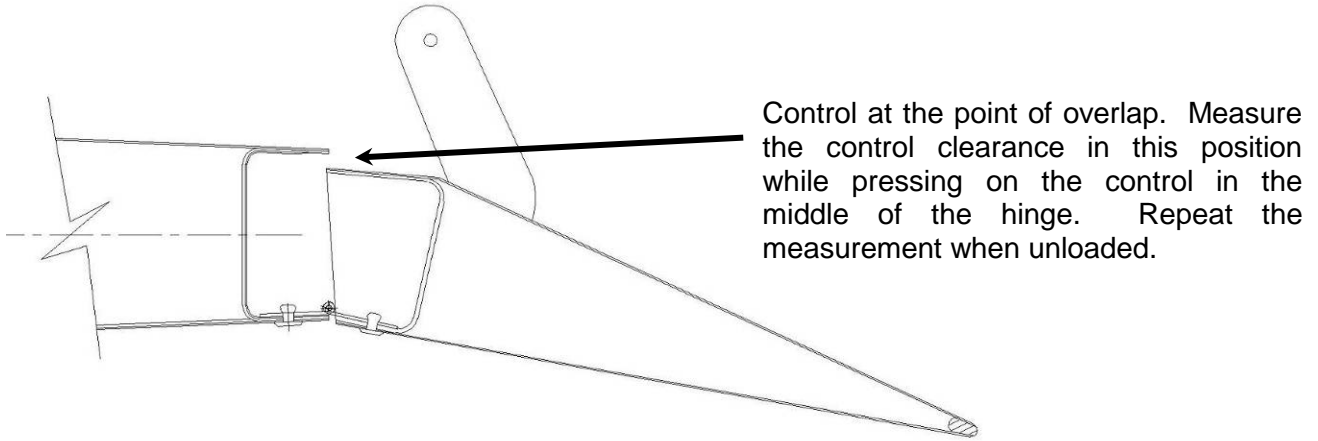


Figure 12 – Rudder Gap Cross Section

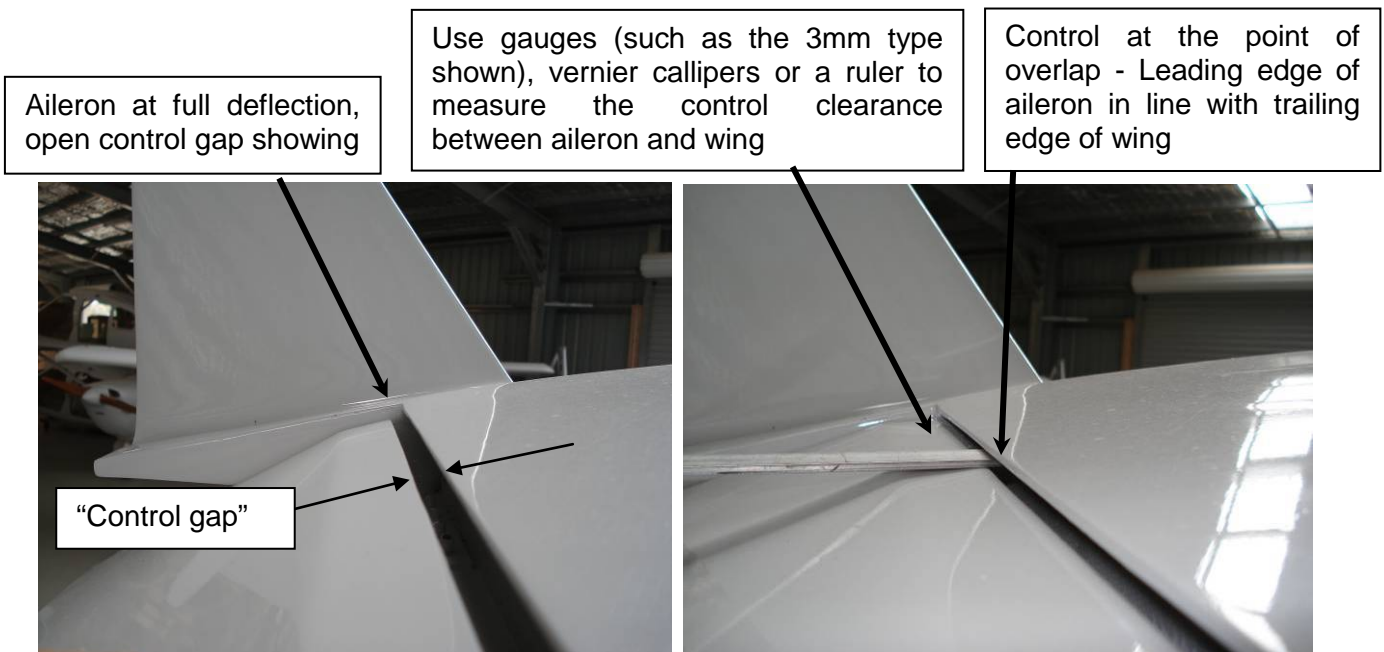


Figure 13 – Aileron Clearance

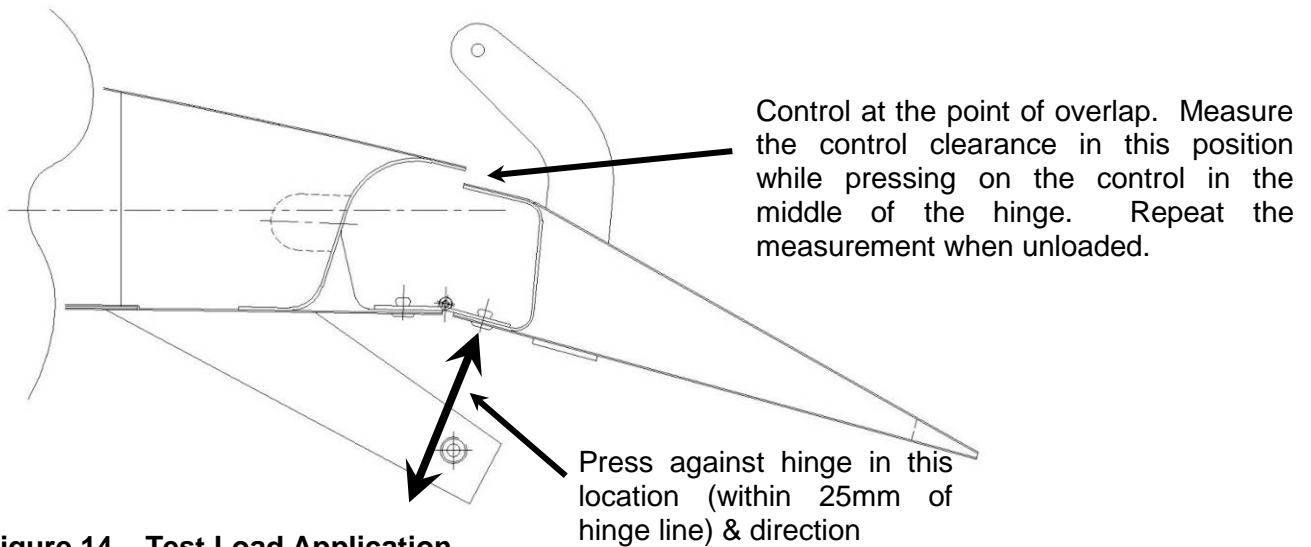


Figure 14 – Test Load Application

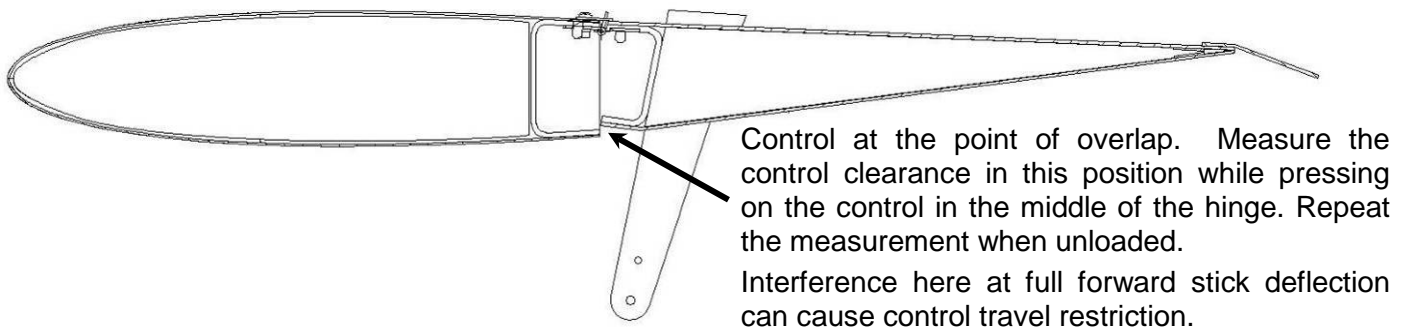


Figure 15 – Elevator Gap Cross Section

### 6.17.3 Inspection C:

- This inspection is to see if there is any travel restriction of a control at deflections other than at the control's point of overlap.
- For the purposes of this inspection a travel restriction is defined as a one-way jam – i.e. the control cannot reach full deflection but is able to move freely in the other direction.
- While a control is very unlikely to completely jam due to a travel restriction the fact that the control is not achieving its full travel must be addressed.
- Travel restriction normally presents at the opposite control travel extreme to the control's point of overlap – i.e. for the elevator shown above (Figure 15) full stick-forward deflection is the point most likely to exhibit a travel restriction as the lower surface of the elevator hits the aircraft.
- Inspect each control as detailed below:
  - Inspect the control for scratches and marks (as shown in Figure 16) in the overlap area where the control runs inside the aircraft. If no marks are found further inspection and/or rectification is unnecessary. However, if such marks are found complete the following steps:
    - Mark the extents of the control surface travel when driven by the controls.
    - Disconnect the control from the control cable, allowing it to swing freely.
    - Take care not to deflect the control beyond the point where it can normally be driven by the flight controls as this will result in a "false positive" - controls are able to move slightly beyond the normal travel limits but rubbing at these extreme deflections is not dangerous provided there is no chance of mechanical jamming. Note that for the rudder and elevator

the fixed stops fitted at the rear of the aircraft are located approx 2mm beyond the normal travel limit.

- Move the control through its normal travel range while pushing against each hinge in the direction that would close the control clearance with a force of approximately 5-7kg (11 – 15lb).
- Note if there is any travel restriction caused by the control rubbing against the aircraft.
- **Rectification work is necessary whenever any of the following criteria are met:**
- There is travel restriction caused by the control rubbing against the aircraft.



Scratches here indicate the control has rubbed against the fin (illustration)

Figure 16 – Scratches on Rudder

## 6.18 Special Inspections – Main Wheel Alignment



Required Tools:	<ul style="list-style-type: none"> <li>- Marker</li> <li>- Plumb-bob</li> <li>- String line</li> <li>- Straight edge (Steel RHS or similar at least 50mm high)</li> <li>- Digital protractor or similar</li> </ul>
Parts and Material:	<ul style="list-style-type: none"> <li>- Washers (used as spacers)</li> <li>- Flock (if adjustment is required)</li> </ul>
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- The following process must be carried out whenever a new undercarriage leg is fitted to the aircraft or if adverse tyre wear indicates alignment outside of tolerance.
- Before alignment, the aircraft must be pulled forwards for several metres to position it in the location where the wheel alignment is going to be checked. This step is very important as it “sets” all the wheels to the positions where they will be in normal operation.
- Mark a reference centreline for the aircraft on the floor. Use a plumb bob from the tip of the spinner and from the tip of the ventral fin to mark points on the floor, then join and mark the two points with a string line. Alternatively the aircraft may be positioned accurately over a fixed line on the floor (such as the join in the concrete slab used in the Figure below).



**Figure 17 – Wheel Alignment Set Up**

- Place a straight-edge (such as a length of RHS section steel) along the outside wall of the tyre. Check from above to ensure that the tyre and the straight edge are parallel. The straight edge used must stand at least 50mm high from the floor in order to touch enough of the tyre side wall.



Figure 18 – Alignment Straight Edge In Position



Figure 19 – Alignment Measurements

- Mark the position of the straight edge in front and behind the wheels. Positions are marked at 1.5m nominally either side of the wheel centre.
- Take measurements from the straight edge positions to the centreline of the fuselage.
- Compare the measured distances to see if the wheels have toe-in or toe-out.
- Camber is the vertical angle of the wheel to the ground. It is to be measured (using a digital protractor or similar) using the end of the axle or the brake disk as a reference. The aim is to have the wheel vertical when the aircraft is fully loaded.

- Toe in / toe out and the wheel camber angle are related in that when the wheel has camber it behaves like a cone and wants to track in a circle around the point where the centreline of the axle hits the ground. The toe of the wheel is used to compensate for this so that the wheel doesn't try and pull in or out on the leg as the plane taxis.
- A camber angle of  $1.5^{\circ}$  (with the top of the wheel leaning slightly outboard relative to the bottom of the wheel) is recommended for all models when unloaded.
- Depending on the type of operation the aircraft is normally used for the operator may alter the camber angle slightly – i.e. if the aircraft is normally loaded heavily a slightly higher camber angle may be used.
- Toe-in for the main wheels is set at between 10mm and 0 mm. This is for an empty aircraft.
- If adjustments are required, washers are used as spacers between the stub axle and the undercarriage leg.
- If a combined toe / camber adjustment is required a higher stack of washers is fitted to the bolt requiring most adjustment.
- After packing the wheel alignment must be checked again – this can be done by dry-assembling the wheel with packing washers but no flock and then re-measuring the aircraft – taking care to pull the aircraft forwards to allow the undercarriage legs to “set” to the new angles. Alternatively the wheel may be re-assembled with flock etc, left to cure and then re-checked once the resin has dried.
- If the wheel remains outside the given limits the alignment procedure above must be repeated.



Figure 20 – Camber / Toe-In Adjustment

## 6.19 Special Inspections – Fuel Gauge Decal Setup



Required Tools:	<ul style="list-style-type: none"> <li>- Clamp suitable for crimping fuel lines without damage (Figure 25).</li> <li>- Fuel container to drain fuel from wings.</li> <li>- Accurate fuel pump or measure. (i.e. Avgas bowser).</li> </ul>
Parts and Material:	<ul style="list-style-type: none"> <li>- Fuel Gauge</li> <li>- AVGAS Fuel (for filling)</li> </ul>
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- This procedure is applicable for Jabiru Aircraft equipped with wing tanks and electronic fuel gauge senders.
- This procedure must be carried out during initial assembly of a new aircraft or when a new gauge sender is fitted.
- The accuracy of the fuel indication system of the aircraft depends on careful and accurate completion of this process.
- For this procedure the fuel tanks need to be filled from empty. Therefore, they must be emptied now.
- Apply fuel line clamps to close the fuel lines between the wing tanks and the header tank.
- Before starting the fuel gauge calibration the aircraft needs to be laterally (left/right) level. See the aircraft flight manual for the levelling datum details.
- Add 1.5L of fuel to each tank, this is the unusable fuel. Check the indication of the fuel gauge. The fuel gauge needle must be pointing at the E or below. If it is not then the gauge unit will need to be removed and adjusted. See Figure 21 – with the tank containing the unusable fuel amount the needle must indicate a position between the two extremes shown.
- Accurately add 20L into the tank (on top of the unusable fuel). Then take the fuel gauge calibration decal (see Figure 22) and align inner fuel gauge dial representation with the 20L mark in the location indicated by the pointer in the fuel gauge. Repeat for the second tank. Make sure the decals are marked to indicate which tank they are matched with. In Figure 23 (left) a typical sender indication with 20L added is shown. Note how the needle is just slightly above 1/4. In Figure 23 (right) a decal assembly to match this indication is shown. The 20L arrow, on the outer, indicates just above the 1/4 mark on the inner.

### CAUTION

There is often a degree of friction within the gauge sender. Tap gently with a finger after adding fuel to maximise accuracy of reading.

### WARNING

Before removing clamps on the fuel line make sure all fuel lines are connected. On removal of clamps check that the fuel lines are not damaged and return to their original shape



Figure 21 – Max Empty (Left) and Acceptable Empty (Right) Indications

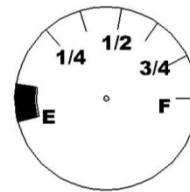
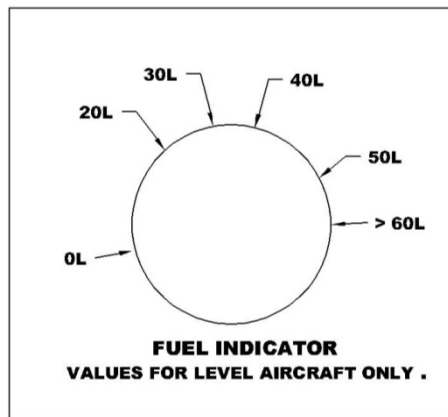


Figure 22 - Fuel Gauge Calibration Decal Parts

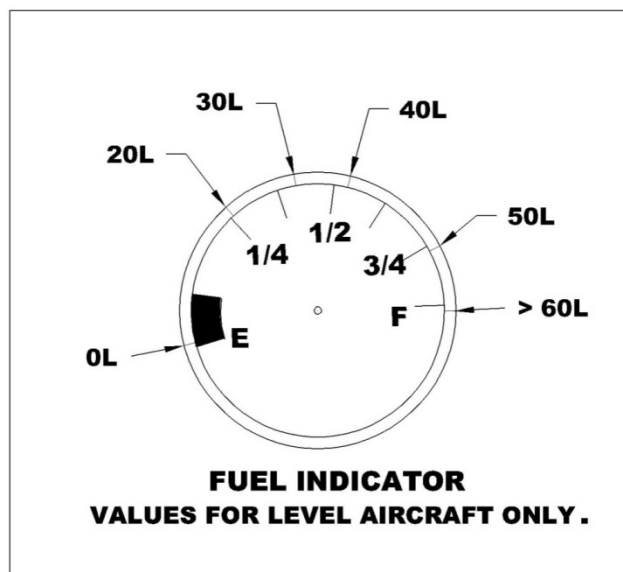


Figure 23 – 20L Indication on Sender & Decal to Match

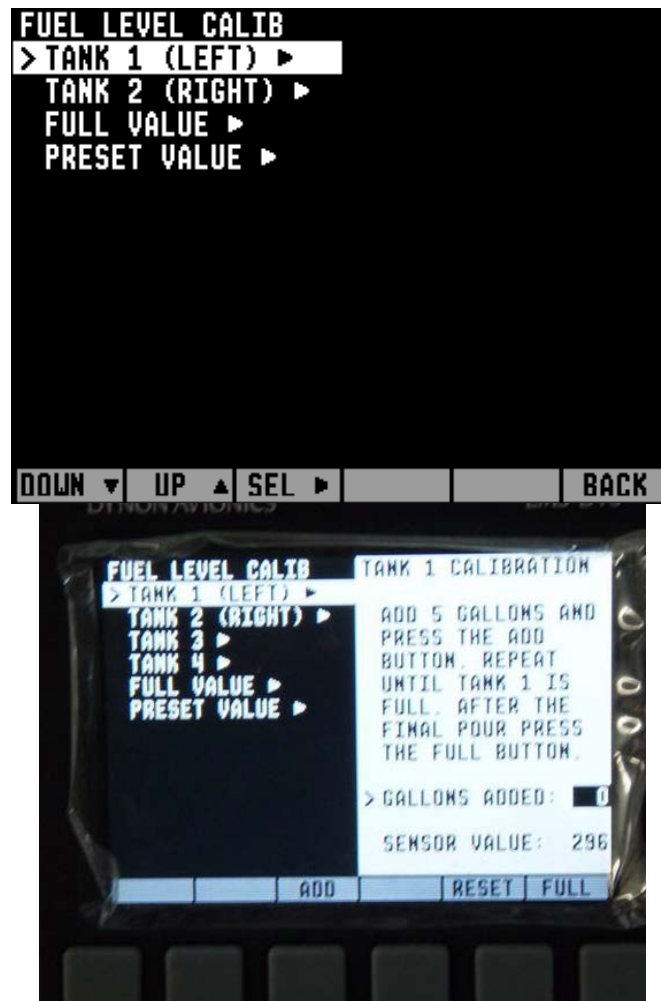


## 6.20 Special Inspections – Fuel Sender Calibration



Required Tools:	<ul style="list-style-type: none"> <li>- Clamp suitable for crimping fuel lines without damage (Figure 25).</li> <li>- Fuel container to drain fuel from wings.</li> <li>- Accurate fuel pump or measure. (i.e. Avgas bowser).</li> </ul>
Parts and Material:	- AVGAS Fuel (for filling)
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- This procedure explains how to calibrate the inbuilt gauges in the GRT Sport SX unit to the Jabiru Capacitance type gauges.
- This procedure is applicable for Jabiru Aircraft equipped with wing tanks and capacitance electronic fuel gauge senders.
- This procedure must be carried out during initial assembly of a new aircraft or when a new gauge sender or new engine / fuel monitor is fitted.
- The accuracy of the fuel indication system of the aircraft depends on careful and accurate completion of this process.
- **Each fuel gauge indicator on the instrument panel (or in the EMS) needs to be connected to the sender on same side. To achieve this:**
  - Turn on the EMS. Enter the EMS menu by pressing any button below an EMS main page and pressing MORE > SETUP > MORE > FUEL. You are presented with the screen shown Figure 24 (left). Press SEL and then enter a tank size of 65. Then press NEXT. Then press START. You will be presented with the screen show in Figure 24 (right).
  - The sensor value should read around 296 as shown.
  - Disconnect a wire off the left fuel gauge sender. The sensor value should increase to around 490, when wired correctly.
  - If the reading does not change, then disconnect a wire off the right side sender. If there is no change there is a wiring fault. If it does increase then fuel gauge sender connections are reversed and must be corrected.
  - To exit press RESET and then CANCEL.



**Figure 24 – EMS Fuel Calibration Screens**

- For this procedure the fuel tanks need to be incrementally filled from empty so first the tanks must be drained. Fuel containers of sufficient volume to contain at least 10L more than the volume of fuel in the tanks are required.
- Drain the fuel system completely. There are two ways to do this. They are:
  - Disconnect the fuel line from the carburettor. Using a length of fuel hose added to the fuel line pump out the fuel from the system using the auxillary electric pump and gravity. Ensure the fuel tap is turned off before removing the fuel line extension and re-connecting the line to the carburettor.
  - Remove the fuel drain from each fuel tank at a time and drain the fuel out this way. This method is faster than the previous but has the potential for spilling a lot of fuel. You also still need to drain fuel from the header tank via the engine fuel line.
- If the fuel has been drained out using the wing fuel drains then a small amount of fuel needs to be added to replace the unusable fuel. Add 1.5L to each wing tank to replace the unusable fuel. Note that this does not need to be done if the fuel was drained by method 1. Check that the fuel drains are not leaking after re-installation.
- Next all the fuel lines from each tank need to be clamped off so that fuel does not flow between tanks or to the header tank. Use fuel line clamps as shown in Figure 25.



**Figure 25 – Fuel Line Clamps**

- Before starting the fuel gauge calibration the aircraft must be laterally (left & right) level. See the Flight manual for the levelling datums.
- When ready to start the fuel calibration turn the EMS on and do as follows.
  - Enter the EMS menu by pressing any button below an EMS main page and pressing MORE > SETUP > MORE > FUEL. You are presented with the screen shown Figure 26. The menu reflects the number of fuel tanks selected in the Global Parameters Setup. If you do not see the correct number of tanks here, go back to the GLOBAL section of the SETUP menu and set the correct number of tanks.
  - Repeat the following steps for each tank you wish to calibrate:
    - Use the DOWN ▼ or UP ▲ buttons to select the tank that you wish to calibrate, and press SEL ►.
    - Enter the approximate number of gallons or liters the tank can hold (Figure 27, left). In this case it is 65L. Press NEXT.
    - Once you have confirmed that the tank you are calibrating is empty, press START (Figure 27, right).
    - Follow the on-screen instructions until the completion of your fuel calibration. Be aware that if you make a mistake you can only totally clear the calibration for that tank - so you have to start the calibration for that tank at the beginning again.

- At the completion of your fuel level calibration, the EMS-D10 will present you with a table of values in the format “pour #: mV gallons/litres”. If you wish, record these numbers for later reference, however there is no way of entering them into the EMS so it is not required.
- Repeat this procedure for the other fuel tank.

**CAUTION**

There is often a degree of friction within the gauge sender. Tap gently with a finger after adding fuel to maximise accuracy of reading.

**WARNING**

Before removing clamps on the fuel line make sure all fuel lines are connected. On removal of clamps check that the fuel lines are not damaged and return to their original shape



Figure 26 – EMS Calibration Screen #1

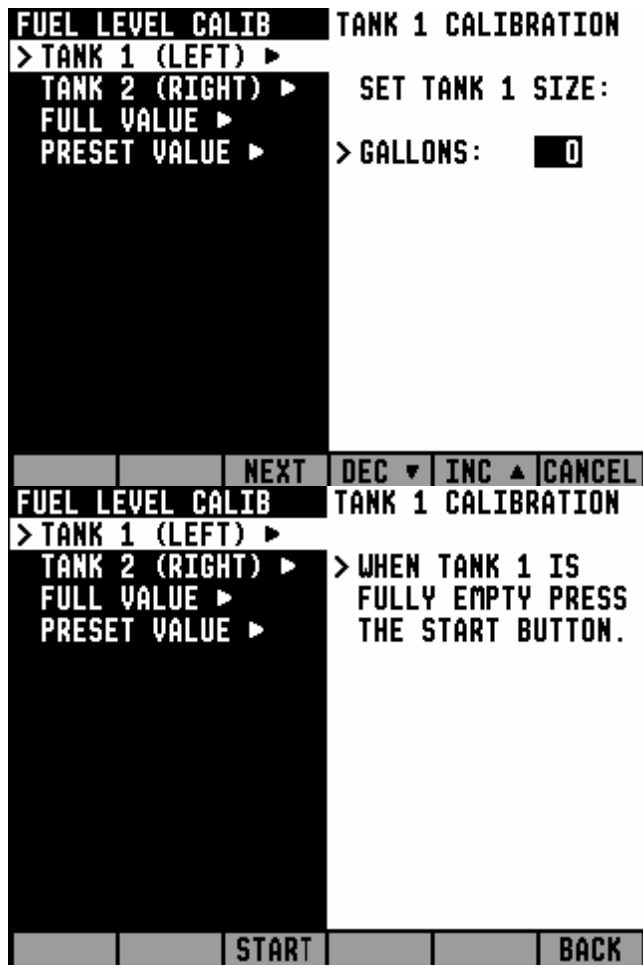


Figure 27 – EMS Calibration Screens #2 and #3

## 6.21 Special Inspections – Wing & Strut Bush Service



Required Tools:	<ul style="list-style-type: none"> <li>- Mechanic's stethoscope (can be helpful)</li> <li>- Wing stands</li> <li>- Soft hammer or similar</li> <li>- Die grinder drill, sandpaper (if lug replacement necessary)</li> <li>- UNC thread tap</li> <li>- Soldering iron or similar</li> </ul>
Parts and Material:	<ul style="list-style-type: none"> <li>- Replacement bolts (if required)</li> <li>- Replacement Lug fittings (if required)</li> <li>- Acetone, Resin and Flock (if lug replacement is necessary)</li> <li>- Etch primer, corrosion inhibitor (if strut lugs are replaced)</li> <li>- Stainless steel bush (if replacement is required)</li> </ul>
Type of Maintenance:	Line Maintenance, Heavy Maintenance (if free play detected)
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- As a part of daily and maintenance inspections the aircraft is gripped by each wingtip and shaken to check for any free-play in the wing or strut attachment points (Section 6.12). The procedure below details how free-play is corrected once detected.
- As detailed below there can be several different ways to correct free-play in these connections. It is recommended that maintainers who have not carried out this task before contact Jabiru Aircraft (or our local representative) for advice before continuing.
- Free-play can develop in any of the wing or strut attachments though it most commonly occurs in the front wing attachment. To determine which connection requires attention:
  - Remove the wing root fairing from the aircraft to expose the attachments between the wing and the fuselage.
  - Have an assistant shake the wing tip. While the wing is being shaken place a finger on each attachment in turn to feel which requires servicing. A mechanic's stethoscope may also be used. In rare cases both attachments may have free-play.
  - If no movement is apparent in the wing attachments remove the fairings from the top and bottom of the wing strut and repeat the process: have someone shake the wing while holding each attachment to feel for movement.
- The bolt fitted to a connection found to have free-play must be replaced.
- If a wing-fuselage attachment requires service the wing can be removed completely as detailed in Section 7.2 or placed on stands as follows:
  - This procedure method is suitable for aircraft with dry wings (no wing fuel tanks) and those with a minimum of 75mm (3") free-play in all connections between the wing and fuselage (fuel lines, aileron and electrical cables etc).
  - For aircraft equipped with fuel sight gauges inside the cabin this procedure will normally not be suitable as the short fuel hoses from the wing to the sight gauges do not have sufficient free length.
  - Two adjustable wing stands are required for this procedure.
  - Remove the wing root and wing strut fairings (both top and bottom).
  - Place the two stands under the wing – one located inboard close to the fuselage and the other positioned around 1m (3ft) inboard from the tip.
  - Adjust the outboard stand so that it is just clear of the underside of the wing.
  - Remove the wing strut from the aircraft as detailed in Section 7.2.3.1. The strut is removed completely to clear the work area and reduce the chance of over-stressing any attachment points.
  - Rest the wing on the outboard wing stand.



- Adjust the inboard wing stand until it is just clear of the underside of the wing.
- Remove both the forward and aft wing attachment bolts and rest the wing on the stand.
- The wing is now resting on the stands, positioned close to the fuselage at the normal height so that the fuel lines and aileron cable can be left connected.
- Service the attachment point as detailed in Section 6.21.1.

### **CAUTION**

**In this position the wing is vulnerable to being bumped or jostled off the stands. This will result in significant damage to the aircraft.**

- If a strut attachment requires service only 1 wing stand is required:
  - Remove the wing root and wing strut fairings (both top and bottom).
  - Remove the wing strut from the aircraft
  - Rest the on a wing stand positioned approximately 1m (3ft) inboard of the tip of the wing.
  - Service the attachment point as detailed below.

#### **6.21.1 Attachment Point Service – Movement Between Bolt & Lugs**

- Take the original bolt removed from the connection being serviced. Fit it to the holes in all the mating parts: i.e. for a wing connection fit it to the wing lug and to the Aluminium wing attachment lugs on the fuselage.
- Wriggle the bolt in each part feeling for movement. The bolt should be a transition fit: there should be no movement or minimal movement when fitted in each part of the connection. If excess movement is detected sometimes it can be corrected by fitting new bolts:
  - In most cases the aircraft wing-fuselage attachments will have been assembled using standard AN4 bolts (AN5 for J250/J450). In these cases excess movement between the bolt and the lugs may be corrected by replacing these bolts with new AN174 (1/4") or AN175 (5/16") close tolerance bolts.
  - Similarly, strut connections normally use AN5 bolts and excess movement between the bolt and the lugs may be corrected by replacing these bolts with new 5/16" AN175 close tolerance bolts.
  - New bolts should be lightly hand polished before installation to improve the fit.
  - Note that the ideal fit has minimal or zero clearance and will require thumb pressure or a light tap with a soft hammer for installation.
  - If there is excess movement remaining even with new bolts fitted then further work must be carried out as detailed below. This is a qualitative assessment which is best informed by experience. If in doubt it is recommended that the maintainer re-fit the wing with the new bolt and test for movement before continuing to any of the more significant repair processes (such as replacing lugs etc).
  - If the replacement bolts are a tight fit, re-assemble the aircraft and re-test as detailed in Section 6.12. Ensure a new bolt is used on the attachment which has been serviced.
- If the holes in the wing strut lugs have worn so that standard or close tolerance bolts have excess movement then the wing strut lug (or the whole strut assembly) must be replaced. Note that this type of wear is unusual. Checking the more common wear modes detailed below is recommended before replacing strut lugs.
  - Carefully measure from a fixed point on the strut to the tip of the strut lug & record the reading.
  - Remove the bolts connecting the lug to the strut section.
  - Remove the lug from the end of the strut.
  - Paint a replacement strut lug with a suitable Epoxy Etch Primer.
  - Once the paint has dried, treat the mating surfaces of the lug and the strut with a corrosion inhibitor such as Duralac.
  - Fit the new lug to the strut while the corrosion inhibitor is wet. Carefully measure the position of the lug relative to the strut to ensure the bolt hole is in the correct position. Note that small errors here will have noticeable effect on the dihedral angle of the wing.

- Align the bolt holes of the two strut lugs. This can be visually by fitting a long bolt to both the new and the old lugs and sighting along the strut to ensure they are parallel. Again, small errors here will cause difficulty re-assembling the aircraft so care must be taken.
- Match drill the new lug to the strut.

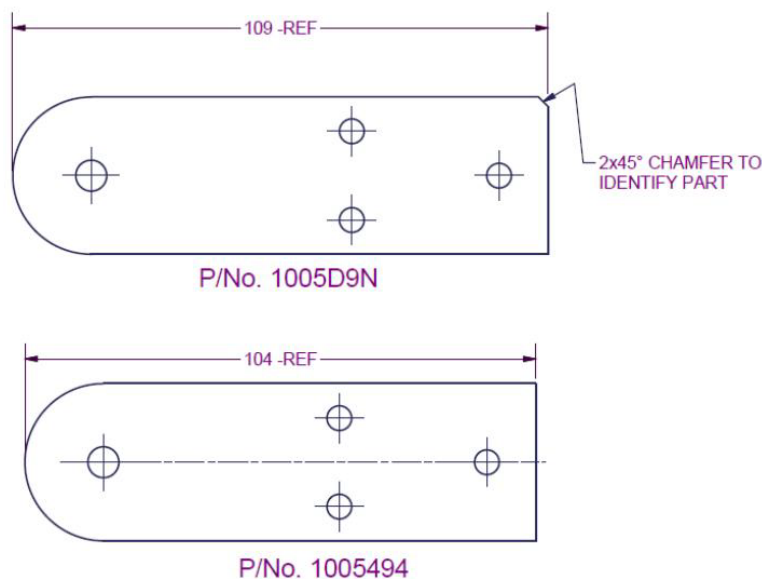
**CAUTION**

**Ensure holes in strut are not elongated, oversized or otherwise damaged during drilling. De-burr before final assembly.**

- Fit bolts and assemble lug to the strut. Apply corrosion inhibitor to the bolts & nuts.
  - Re-paint the new lug to match the aircraft colour.
  - Re-assemble the aircraft and re-test as detailed in Section 6.12. Ensure a new bolt is used on the attachment which has been serviced.
- If the holes in the wing attachment lugs of the fuselage have worn so that standard or close tolerance bolts have excess movement then the Aluminium fuselage lugs must be replaced. Note that this type of wear is unusual. Checking the more common wear modes detailed below is recommended before replacing fuselage lugs.
    - Either remove the wing from the aircraft completely or place on stands as detailed above.
    - Remove any upholstery covering the plates inside the cabin.
    - Remove the bolts holding the lugs to the fuselage.
    - Remove the lugs from the fuselage. These parts are bonded to the airframe with a bed of "Flock" – cotton fibre flock mixed with Epoxy resin – as well as bolts. Once the bolts have been removed, use a soft hammer or similar to break the lugs from their flock bed.
    - Use a die-grinder remove some of the old flock bed. Do not remove that portion of the bed where the bolts pass through: this will be used to locate the replacement lugs (See a cross-section of the lug assembly shown in Figure 29). Leave a portion of the bed approximately 12mm in diameter around each bolt hole to support the new lugs.
    - Dry fit the replacement lugs to check for correct fit. When ordering replacement parts note Figure 28: 2 different model lugs have been used on Jabiru Aircraft; the correct length must be fitted or dihedral angle errors will occur.
    - For J250 & J450 models the hole in the tip of the lug must be reamed to suit an AN5 or AN175 bolt before installation.

**CAUTION**

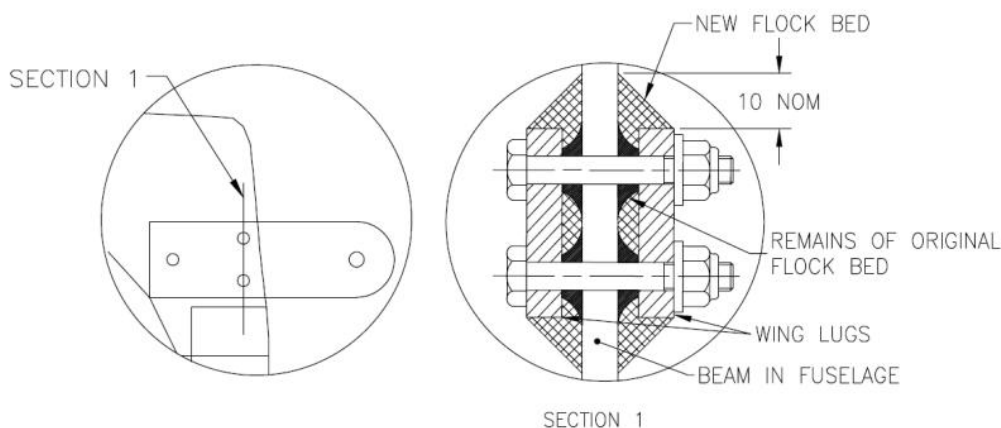
**Reaming is necessary to achieve proper tolerances. Do not drill.**



**Figure 28 – Wing Lug Versions**



- Prepare the Aluminium lugs for bonding: Lightly sand bonding faces using 400-grit sandpaper to remove dirt etc from the surface. After sanding, wipe bonding faces with a rag moistened with Acetone to remove any oils. Do not touch bonding surface with bare hand after wiping with Acetone.
- Prepare the fuselage for bonding: lightly sand the bonding faces using 180-grit sandpaper. After sanding, wipe bonding faces with a rag moistened with Acetone to remove any oils. Do not touch bonding surface with bare hand after wiping with Acetone. Finally, roughen surface again with 180-grit sandpaper & blow off dust using clean, dry air.
- Mix Jabiru Epoxy resin & hardener according to the manufacturer instructions.
- Lightly paint both the fuselage and aluminium lug bonding surfaces with resin.
- Mix cotton fibre flock with the resin to a “gluey” consistency; this mix must be stiff enough to hold its shape when applied vertically.
- Apply the resin/flock mix to the fuselage and bolt the lugs in place. Ensure 100% coverage of the lug.
- Ensure the lugs are seating correctly. Fit a bolt through the outboard hole to align the two lugs. Do not over-tighten: lugs must be parallel.
- Apply a resin/flock bead around the edge of the lugs as shown in Figure 29.
- Wipe off excess flock, clean up and allow to cure.
- When the resin has cured re-fit the upholstery.
- Re-assemble the aircraft and test to ensure the free-play has been removed. Ensure a new bolt is used on the attachment which has been serviced.



**Figure 29 – Bond Details**

- If the holes in the stainless steel bushes inserted into the fibreglass wing structure have worn so that standard or close tolerance bolts have excess movement then they must be replaced as detailed below:
  - Remove the wing from the aircraft or mount it on stands as detailed above.
  - If the bush to be replaced is an eccentric type (where the hole for the bolt is not in the centre of the bush) make a note of the orientation of the original part.
  - Use a large soldering iron or similar to heat the bush to around 70°C. This softens the resin bonding the bush in place and makes removal easier.
  - As this bush will not be re-used a large drill bit or rat-tailed file can be used as a screwdriver to remove the bush from the fibreglass.
  - Clean the thread cut into the wing lug fibreglass using a 5/8" UNC or 7/8" UNC tap as appropriate. Take care to align the tap teeth with the old thread & ensure tap is not cross-threaded
  - Note that there are several different styles and sizes of bush – when ordering ensure the correct part is specified.
  - Take a bolt at least 1 size smaller than the centre hole in the bush – i.e. for a 1/4" bush use a 3/16" bolt. Fit the bolt to the bush and affix a washer & nut. Tighten so that the small bolt is clamping the bush.



- Clean the replacement bush / bolt assembly in an acetone bath. Blow dry using clean air before installation.
- Mix Jabiru Epoxy resin & hardener according to the manufacturer instructions.
- Lightly paint both the thread of the fibreglass socket and the stainless steel bush with mixed resin.
- Mix cotton fibre flock with the resin to a “gluey” consistency; this mix can be left slightly wet & thin – this will aid penetration into the small voids in the threads.
- Screw the new bush into the wing. Use a spanner on the small bolt to drive the bush. Where an eccentric type is being fitted ensure it is oriented correctly.
- Ensure that the bush is straight, positioned centrally on the fibreglass lug and not cross-threaded. Leave to cure.
- Once the resin has completely set the small drive bolt can be removed from the bush. Inspect the centre bore of the bush and if necessary, clean out any resin using a pick or an adjustable ream.
- Test fit the new wing attachment bolt. Lightly hand polish bolt before fitting. If the fit is too tight an adjustable ream may be used to carefully re-size the bore of the bush. The ream must be adjusted to take a small cut to prevent from turning the bush. Minimum material must be removed.
- Fit the wing & test the connection for free-play as detailed in Section 6.12. Ensure a new bolt is used on the attachment which has been serviced.

### **CAUTION**

**Do Not apply any load to the bush until it has cured.  
Do Not use rapid-set (i.e. 5-minute) epoxy.**

#### **6.21.2 Attachment Point Service – Movement Between Bush & Wing**

- If the stainless steel bush fitted to the wing has become loose in the fibreglass lug it may be corrected as detailed below. This is the most common situation causing free-play in wing installations.
  - Remove the wing from the aircraft or mount it on stands as detailed above.
  - If the bush is an eccentric type (where the hole for the bolt is not in the centre of the bush) make a note of the orientation of the original part.
  - Use a large soldering iron or similar to heat the bush to around 70°C. This softens the resin bonding the bush in place and makes removal easier.
  - Take a bolt at least 1 size smaller than the centre hole in the bush – i.e. for a ¼” bush use a 3/16” bolt. Fit the bolt to the bush and affix a washer & nut. Tighten so that the small bolt is clamping the bush. This allows the technician to use the small bolt to screw the bush in and out of the fibreglass lug.
  - Remove the bush from the wing.
  - Clean the thread cut into the wing lug fibreglass using a 5/8” UNC or 7/8 UNC tap as appropriate. Take care to align the tap teeth with the old thread & ensure tap is not cross-threaded.
  - Clean the bush: remove all old resin & paint using a wire wheel or similar. Then place the bush / bolt assembly in an acetone bath to remove all oils. Blow dry using clean air before installation.
  - Mix Jabiru Epoxy resin & hardener according to the manufacturer instructions.
  - Lightly paint both the thread of the fibreglass socket and the stainless steel bush with resin.
  - Mix cotton fibre flock with the resin to a “gluey” consistency; this mix can be left slightly wet & thin – this will aid penetration into the small voids in the threads.
  - Screw the bush into the wing. Use a spanner on the small bolt to drive the bush. Where an eccentric type is being fitted ensure it is oriented correctly.
  - Ensure that the bush is straight, positioned centrally on the fibreglass lug and not cross-threaded. Leave to cure.

- Once the resin has completely set the small drive bolt can be removed from the bush. Inspect the centre bore of the bush and if necessary, clean out any resin using a pick or an adjustable ream.
- Test fit the new wing attachment bolt. Lightly hand polish bolt before fitting.
- Fit the wing & test the connection for free-play as detailed in Section 6.12. Ensure a new bolt is used on the attachment which has been serviced.

### CAUTION

**Do Not apply any load to the bush until it has cured.  
Do Not use rapid-set (i.e. 5-minute) epoxy.**

## 7 Structures

### 7.1 Fuselage

- The Fuselage is a composite monocoque (self-supporting) structure and includes both the Horizontal Stabiliser and Vertical Fin.
- All repairs must be referred to Jabiru Aircraft Pty Ltd or approved local representative.

#### 7.1.1 Windshield And Windows

##### 7.1.1.1 DESCRIPTION

- The windshield and windows are one-piece acrylic plastic panels set in sealing strips with Epoxy Resin & Fibre Flock. The windscreen and, in some cases, windows are also secured to the fuselage with screws/nuts.

### CAUTION

**In the event of a bird strike, the windshield is the only protection for the crew and therefore must be maintained in excellent condition. Cracks up to 25 mm in length should be stop drilled; those longer than 25 mm should NOT be repaired – the windshield must be replaced.**

##### 7.1.1.2 CLEANING

- Refer to Section 5.1.

##### 7.1.1.3 WAXING

- Waxing will fill in minor scratches in clear plastic and help protect the surface from further abrasion. Use a good grade of commercial wax (NOT SILICON BASED) applied in a thin, even coat. Bring wax to a high polish by rubbing lightly with a clean, dry flannel cloth.

### CAUTION

**Silicon based waxes and polish are not recommended as silicon may be absorbed into the glass fibre laminate and affect the reparability due to impairing bonding.**

##### 7.1.1.4 REPAIRS

- Damaged window panels and windshield may be removed and replaced if damage is substantial. However, certain minor repairs as prescribed in the following paragraphs can be made successfully without removing the damaged part from the aircraft.
- The procedure for repairing cracks is only recommended for low stress areas. No repairs of any kind are recommended on highly stressed or compound curved areas or where repair would be likely to affect the pilot's field of vision.

**7.1.1.5 SCRATCHES**

- Scratches on clear plastic surfaces can be removed by hand buffing and polishing using Plastic Polish available from JABIRU as Part No.: NOVUS#2.

**NOTE: Rubbing plastic surface with a dry cloth will build up an electrostatic charge which will attract dirt particles and may eventually cause scratching of the surface. After applying polish, dissipate this charge by rubbing surface with a slightly damp chamois. This will also remove dust particles which have collected while wax is hardening.**

**7.1.1.6 CRACKS**

- When a crack appears, drill a hole at the end of the crack to prevent further spreading. Hole should be approximately 1/16 inch in diameter, depending on length of crack and thickness of material. A slightly dull unfluted drill should be used.

**7.1.1.7 REMOVAL**

- As the windscreen and windows are bonded into the fuselage, it is not possible to remove them without destroying them. Once windows have been broken out, any screws used in the original installation should be removed.

**7.1.1.8 INSTALLATION**

- Ensure all old epoxy resin has been removed from the fuselage sealing strips (around the window frames).
- Check new windscreen for fit. File or grind away any excess material to ensure a close fit. Do not attempt to cut with any type of saw.
- Wet the window frame joggle with raw epoxy resin. Apply a bead of Epoxy & Flock around the outer edge of the windscreen.
- Place windscreen accurately over the sealing strips and locate with one screw top and bottom.
- Fit other screws.
- Take care not to crack windscreen when installing. DO NOT over tighten screws – cracking will result.

**7.1.2 ShockWatch Indicator**



Required Tools:	- Tools required for the checks listed
Parts and Material:	- Replacement parts if required
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- The installation of a 5g re-settable ShockWatch indicator is recommended for all aircraft. These indicators are fitted to any vertical surface of the airframe – such as the seat back, the wing carry-through beams or “whalebone”. The instrument panel is a suitable location in many cases however in some aircraft models resonant vibration of the panel can cause a premature trip. A location in clear view of the crew is recommended for easy monitoring.
- When the airframe is subjected to a load of over 5g – such as from a heavy landing, strong turbulence or rough round roll – the indicator will “trip” and a red dot will appear as shown in Figure 30.
- Before beginning an inspection of an airframe the indicator must be inspected. If the red dot is visible then particular care is to be taken to inspect the parts of the aircraft which can be affected by vertical overload forces.

- As all possible circumstances cannot be listed here, the following is provided as guidance only. A critical, trained eye is required and inspections should include, but not be limited to, these items.
  - Overall undercarriage: check for bent or damaged nuts, bolts etc. Check for damaged spats or spat mounting hardware.
  - Nose leg – check for bends / cracks. Check rubber has not cracked & rubber shaft is straight. Check nose wheel yoke & nose wheel housing on firewall have not bent.
  - Main undercarriage: check inboard and outboard bolts and clamps for damage and security. Carefully inspect the leg for cracking or other damage.
  - Brakes: check for bent discs, loose or damaged hardware. Check security of brake lines – i.e. they are strapped to the undercarriage leg and are not rubbing against any sharp objects such as screws etc.
  - Fuselage: check structure surrounding undercarriage mount points for damage including de-lamination, cracking, buckling etc.
  - Propeller tip: check for indications of impact.
  - Wings: check for free-play at attachments as detailed in Section 6.12.
- Where a tripped indicator is found during maintenance it must be recorded in the aircraft logbook.
- The indicator must be re-set before the aircraft is returned to service.
- If the indicator trips repeatedly it is recommended that the operator contact Jabiru Aircraft or our representative to determine a suitable program of additional preventative maintenance.

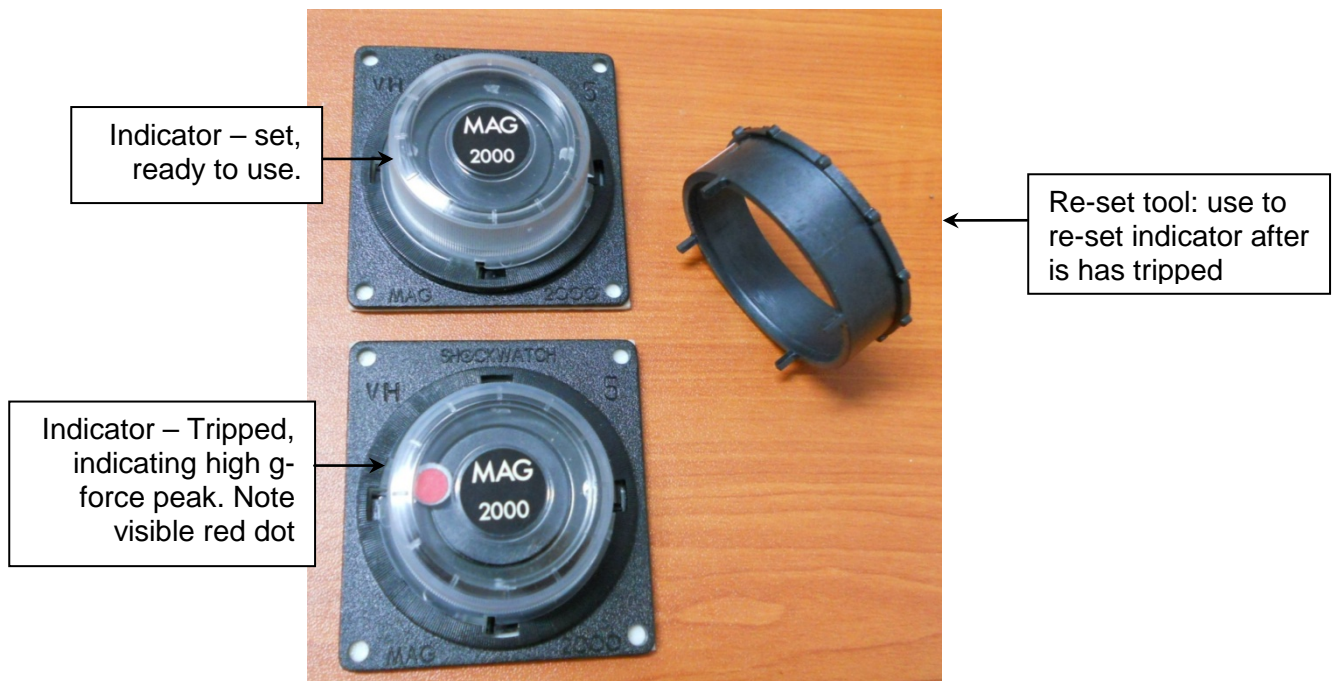


Figure 30 – ShockWatch Indicator

**7.1.3 J230-D Cabin Doors**

Required Tools:	- Spanners, screw drivers etc - Drill
Parts and Material:	- Weather strip (if replacement is required) - Replacement latches (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

**7.1.3.1 DESCRIPTION**

- J230-D cabin doors are those which use the door hinge assembly shown in Figure 31 and the latch shown in Figure 34.
- The doors consist of an outer skin and an inner skin – both made of fibreglass. The door hinges and latch mechanism are bonded into the door and an acrylic window is bonded in place during assembly.

**7.1.3.2 REMOVAL AND INSTALLATION**



- Removal of doors is achieved by removing the hinge bolts or removing the machined screws that attach the hinges to the door frame. Refer to Figure 37 below.

**7.1.3.3 ADJUSTMENT**

- Cabin doors should be adjusted so that the door skin fairs with the fuselage skin.

**7.1.3.4 DOOR SEALS**

- A weather strip is glued around all edges of the door. Apart from excluding wind and water, the weather strip is important in minimising exhaust fume entry to the cabin. It should be maintained in good condition and fit at all times. New weather strip may be applied after mating surfaces of weather strip and door are clean, dry and free from oil and grease.

**7.1.3.5 DOOR LOCKS**

- An optional cylinder and key lock is available. When fitted, the keyed barrel lock is located in the fuselage at the rear of the Port, Starboard & Rear doors. Spare keys are available to registered owners on request to Jabiru or our local authorized representative.

**7.1.4 J230-D Cabin Door Latches**

**7.1.4.1 DESCRIPTION**

- There is one main latch on each door of a simple spring type. This is complemented by a catch at the top front quadrant of each door. An assembly drawing of the latch mechanism is provided as Figure 42 below while the door-top latch is shown as Figure 35.

**7.1.5 Removal And Installation**



- Disassembly and removal of the main latch requires cutting or drilling into the door skins to allow the removal of the locking pins.

7.1.5.1 ADJUSTMENT

- Door latches or their component parts must be replaced if worn or damaged.

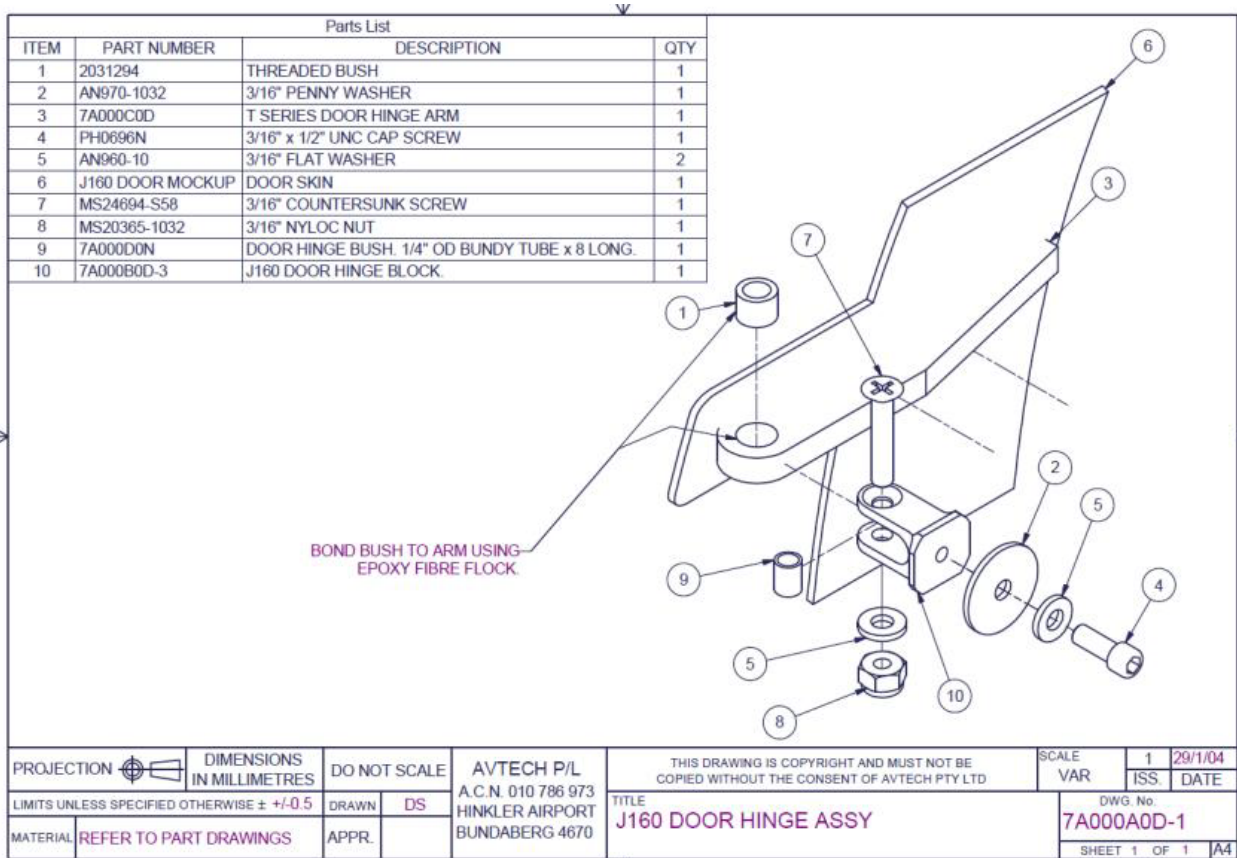


Figure 31 – J230-D Door Hinge Assy

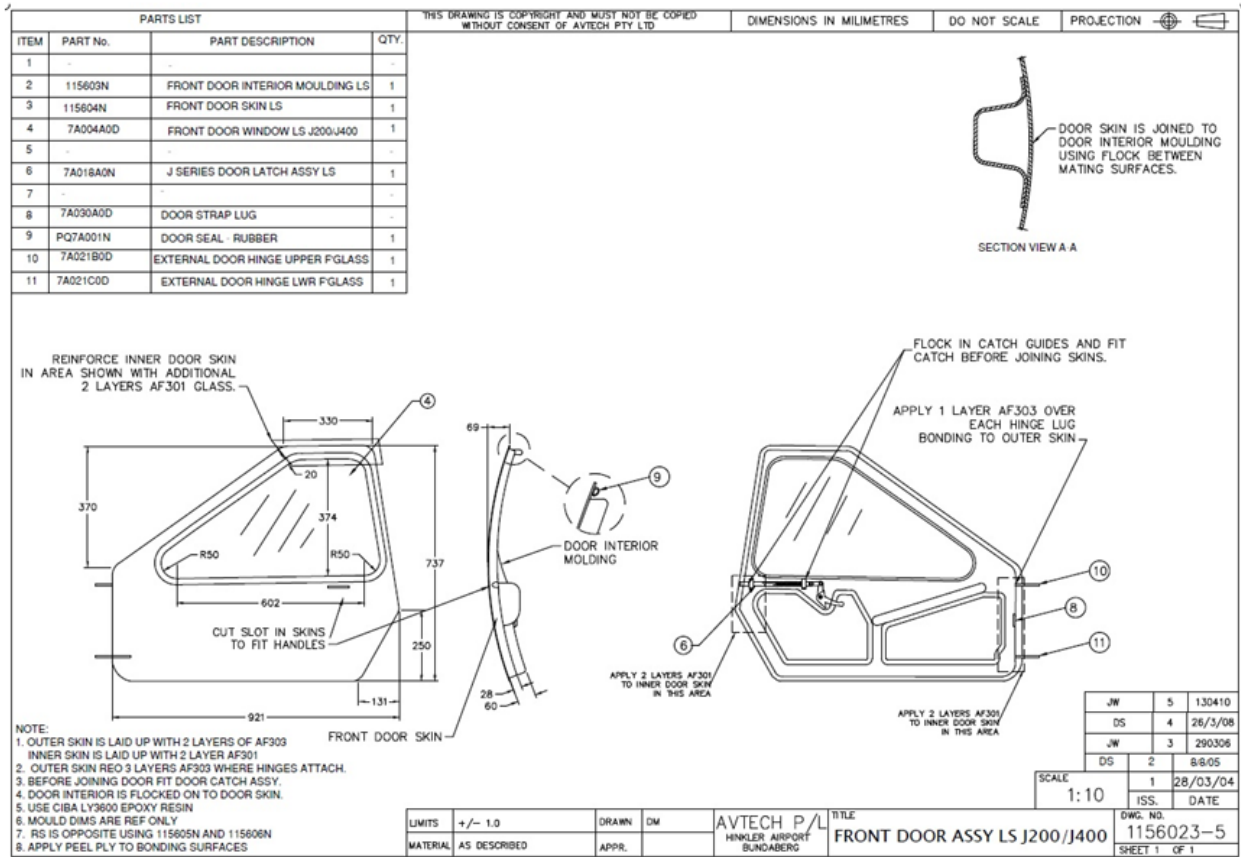


Figure 32 – J230-D Door Assembly

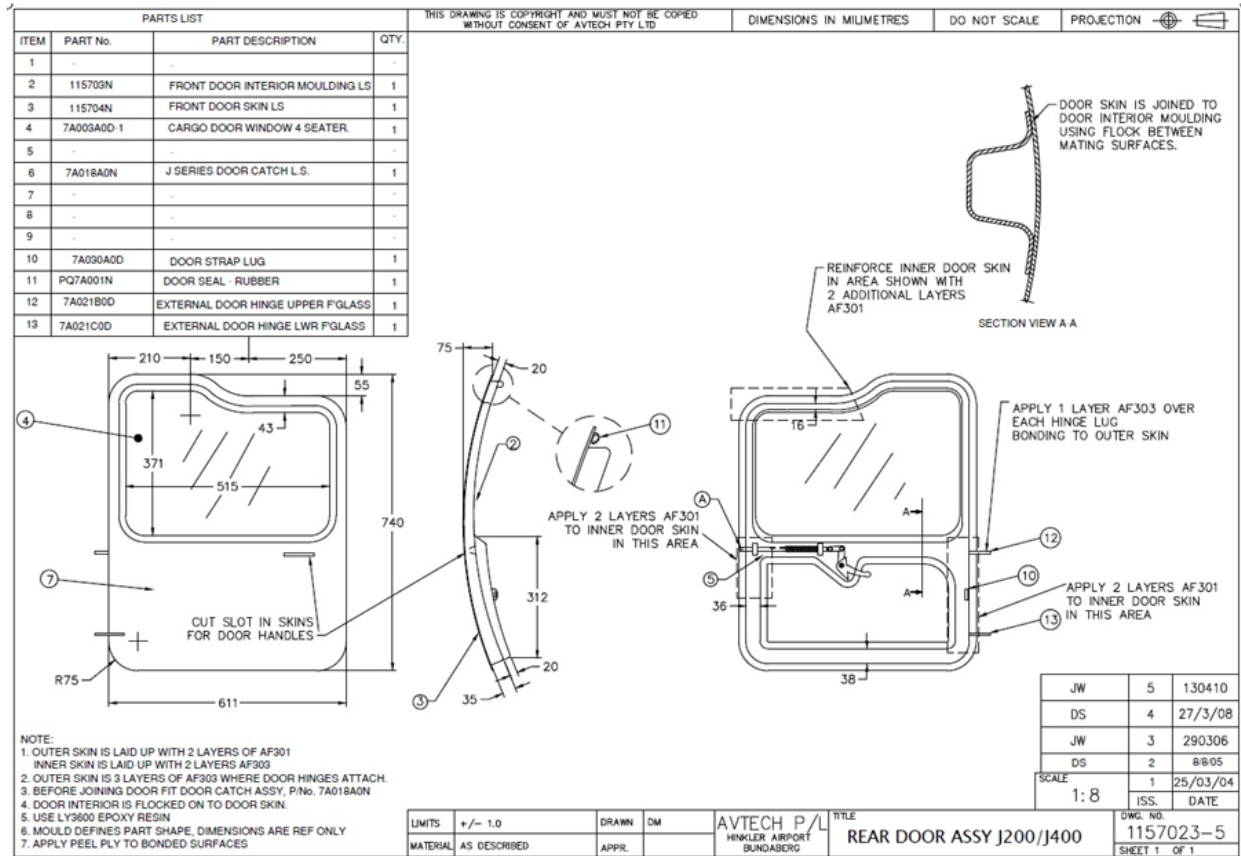


Figure 33 – J230-D Rear Door Assy



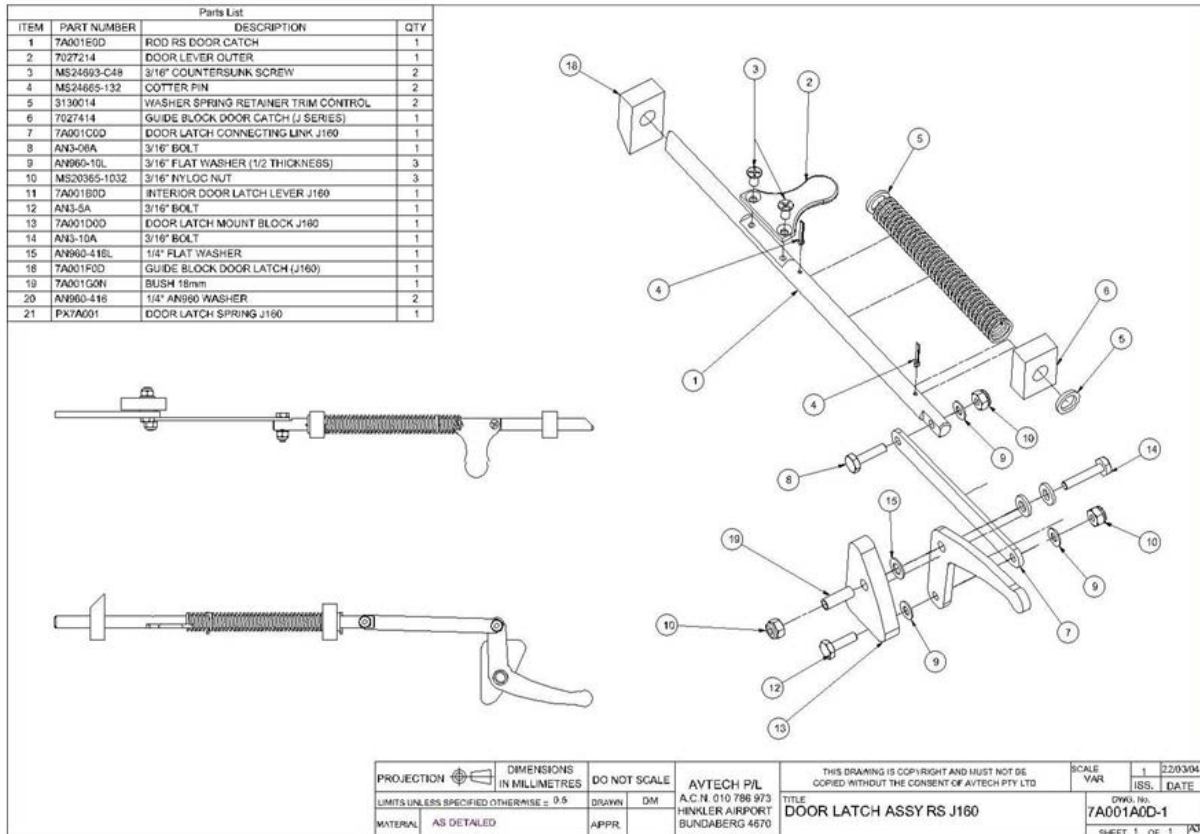


Figure 34 – J230-D Door Latch Mechanism Assembly

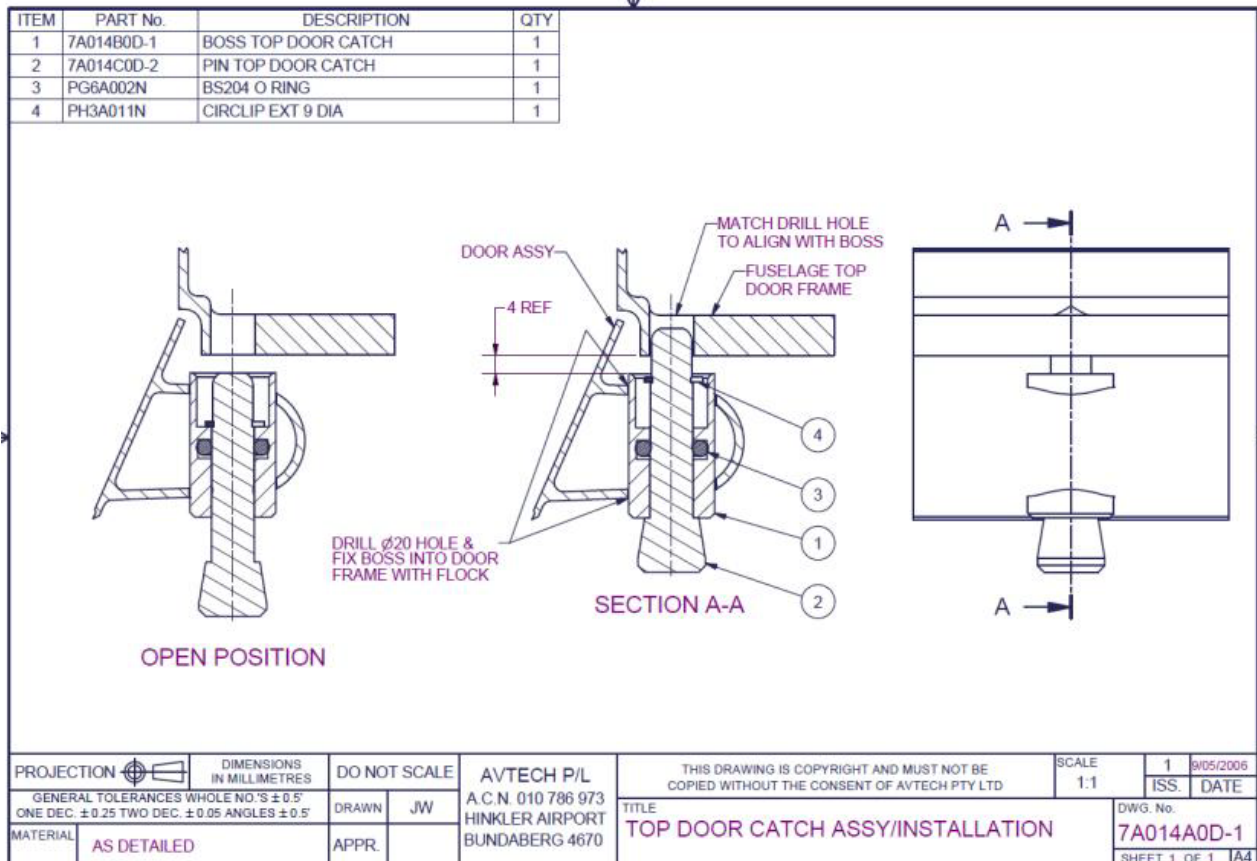


Figure 35 – Top Door Catch

**7.1.6 Seats**

Required Tools:	N/A
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

**7.1.6.1 DESCRIPTION**

- The JABIRU seats are an integral part of the structure of the aircraft; they are therefore fixed in position. Forward and upward adjustment can be achieved by placing a cushion behind and/or under the occupant. The seat pans incorporate crushable foam which is essential in providing shock absorption in crash conditions. The seat backs are also essential to restrain baggage in crash conditions.

**7.1.6.2 REMOVAL AND INSTALLATION**



- While the upholstery can easily be removed the actual seat structure is integral with the aircraft and cannot be removed.

**7.1.6.3 ADJUSTMENT**

- Adjustment is via the use of “Booster” cushions.

**WARNING**

**DO NOT MODIFY SEATS.**

**The seats are an integral part of the structure of the aircraft and must not be modified.**

**7.1.6.4 REPAIR**

- As seats are integral to the aircraft structure, any repair must be referred to Jabiru Aircraft Pty Ltd or our local approved representative.

**7.1.7 Upholstery**

- Seat upholstery is provided through slip-on covers. These are easily removed for cleaning and inspection of the seat structures.
- Optional Hood and Cabin lining is available, together with Door Pockets.
- All materials used in the upholstery (with the exception of leather) are treated with a flame retardant to meet the flammability requirements of CS-VLA. This treatment must be re-applied after every 5 washes. Accordingly, whenever an item of upholstery is washed this must be recorded in the aircraft logbook.

**Note: Flame retardant must be applied by an authorized person using an approved compound. Details are available from Jabiru Aircraft on request.**

**7.1.8 Soundproofing**

- A curtain of soundproofing material is used at the rear of the cockpit/baggage area. This curtain is attached to the forward rib of the fuselage using velcro straps. Its purpose is to minimise drumming of the fuselage as well as restricting material falling aft of the curtain and resulting in a severe aft centre of gravity condition. The curtain should be in place for all flights.

**WARNING**

**Do not stow items behind the sound curtain.**



## **7.1.9 Safety Provisions**

### **7.1.9.1 SEATBELTS**

- Aircraft grade Seatbelts, bolted to the fuselage structure, are provided for both seats. Belts should be replaced if frayed or cut, latches are defective or stitching is broken. Attaching parts should be replaced with equivalent parts if excessively worn or defective.

### **7.1.9.2 CARBON MONOXIDE DETECTOR**

- Carbon monoxide detectors are mandatory for all aircraft fitted with a cabin heater and strongly recommended for all other aircraft.
- Chemical or “black spot” detectors are used. These detectors have a life which starts from the point at which the detector is removed from its packaging.
- Operators must ensure that, where equipped, the carbon monoxide detector fitted to their aircraft is within its useful life.

### **7.1.9.3 EMERGENCY LOCATOR TRANSMITTER**

- Where emergency beacons are fitted they must be maintained in accordance with their manufacturer’s instructions.
- Beacons typically have a useful life based on the type of battery fitted.
- Operators must ensure that, where equipped, the emergency beacon is within its useful life.
- Testing of the beacon must be carried out in accordance with the manufacturer’s instructions during scheduled maintenance.

## 7.2 Wings & Empennage

### 7.2.1 General

**Note:** wings have a tag located inside the wing root which details the wing serial number and part number. Jabiru Aircraft may request this information to ensure the correct parts are supplied.

### CAUTION

Always ensure that the correct part is specified when ordering parts. Provide Jabiru with as much information about the aircraft (model, S/No. etc) as possible.

### 7.2.2 J230-D Wings

#### 7.2.2.1 DESCRIPTION

Required Tools:	- Spanners, screw drivers etc - Drill
Parts and Material:	- N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	A&P or LSA Repairman / Maintenance (LSR/M)
Return to Service:	A&P or LSA Repairman / Maintenance (LSR/M)

- The J230-D wing is a semi-cantilever, stressed-skin type with a main spar. The wing is a moulded structure with a series of ribs that are bonded through the moulding process to the fibreglass skin, fuel tanks and to the spar.
- The forward wing attachment is an extension of the forward sub-spar. The rear attachment is an extension of the rear sub-spar (also known as the wing attachment lug or fork). Both wing attachments are contained in a reinforced Wing End Plug and bond to the wing skins. The Wing End Plug distributes load from the attachments to the main spar. Both attachments are through stainless steel threaded bushes bonded into the attachment blocks.
- The wing internal structure is sealed and only needs to be accessed for repairs.
- The installation of the control surfaces, control cables etc for the J230-D are detailed in the drawings below. Refer to Figure 36, Figure 37 and Figure 38 for details.

#### 7.2.2.2 REMOVAL

- Refer to Section **Error! Reference source not found.** for removal details.

#### 7.2.2.3 REPAIR

- All repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

#### 7.2.2.4 INSTALLATION

- Refer to Section **Error! Reference source not found.** for installation details.

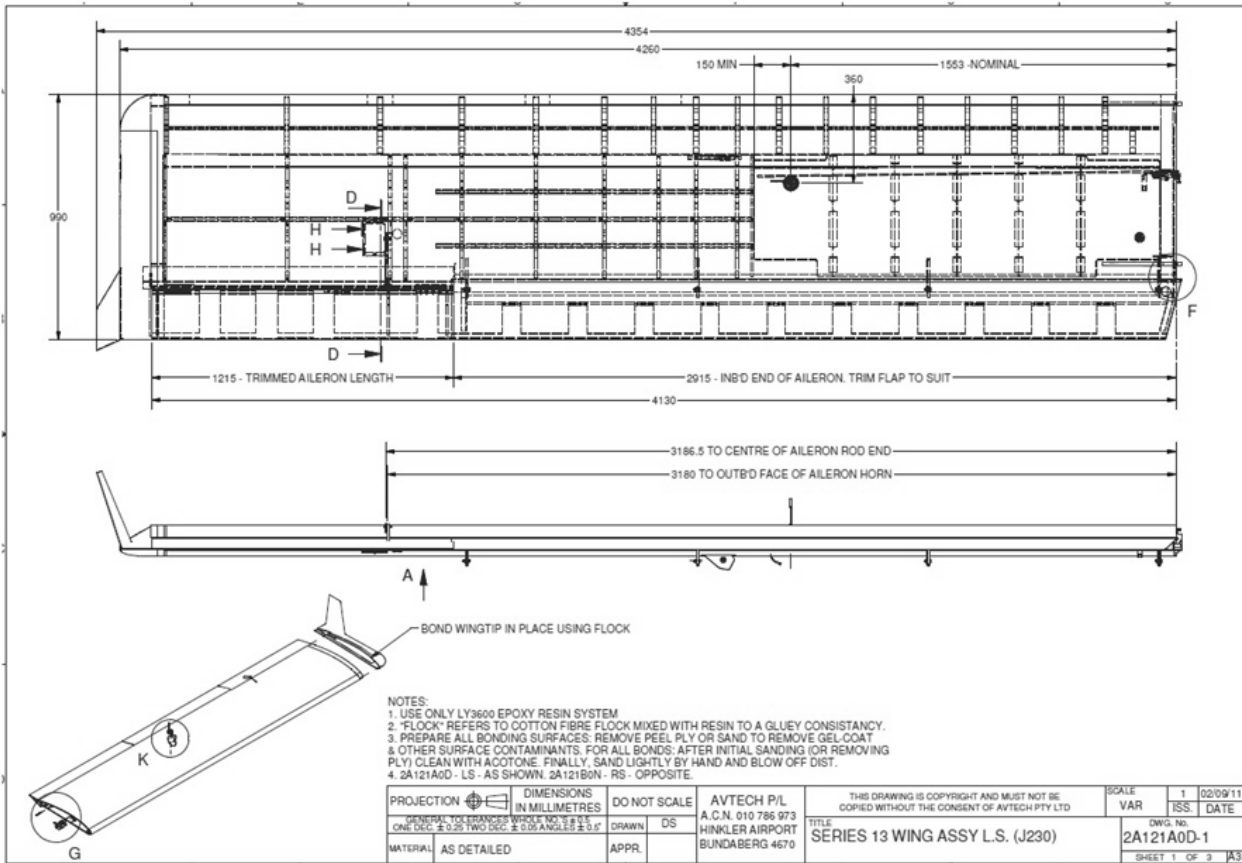


Figure 36 – J230-D Wing Assembly Sheet 1 (Ser 13)

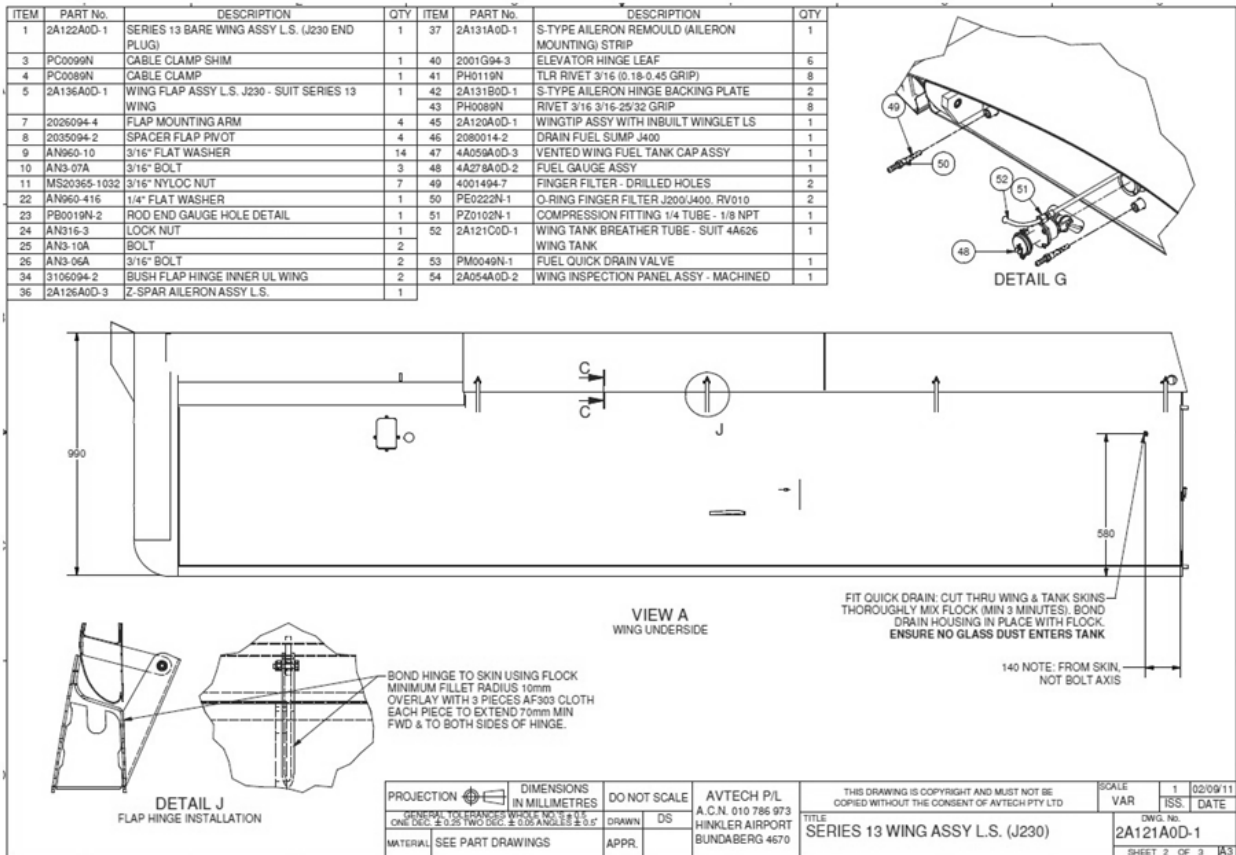


Figure 37 – J230-D Wing Assembly Sheet 2 (Ser 13)

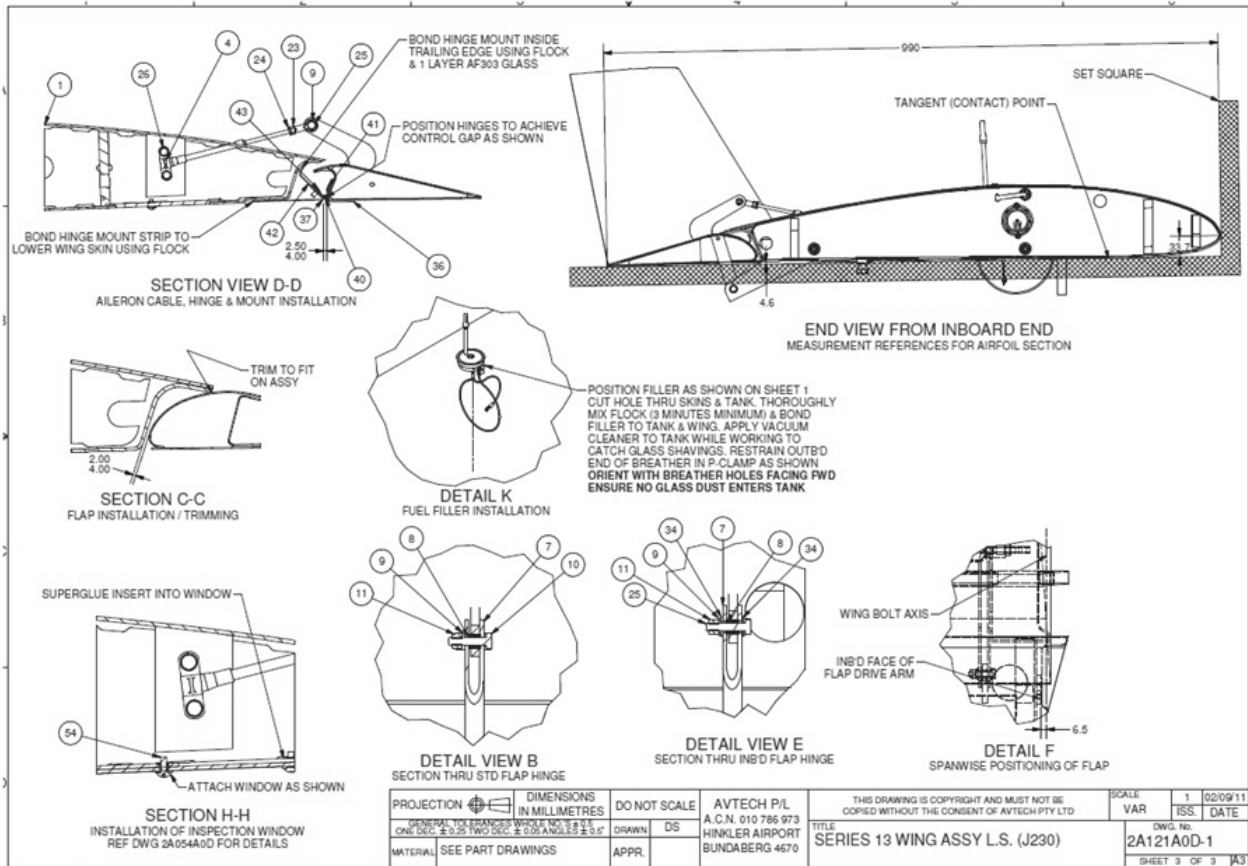


Figure 38 – J230-D Wing Assembly Sheet 3 (Ser 13)

### 7.2.3 Wing Struts

- Each wing strut is a single lift strut which transmits a part of the wing load to the lower portion of the fuselage. The strut consists of a streamlined tube bolted to two end fittings which attach to the fuselage and wing.

### WARNING

**Do Not Tighten Strut Attachment Bolts. Metal fatigue may result. Bolt must be free to rotate.**

#### 7.2.3.1 REMOVAL AND INSTALLATION

- See above for the wing removal section relevant to the particular aircraft.

#### 7.2.3.2 REPAIR

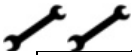
- Wing struts are structural components and therefore all repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.
- A dented, cracked or deformed wing strut should be replaced prior to next flight.

### 7.2.4 Landing Light(S)

#### 7.2.4.1 DESCRIPTION

- Landing / taxi lights are standard equipment for Jabiru Aircraft.
- Night-VFR variants have wing leading edge mounted housing on each wing with narrow-beam high intensity LED lights fitted.

#### 7.2.4.2 REMOVAL, INSPECTION & INSTALLATION



Required Tools:	Screwdrivers Stanley knife or Scalpel blade
Parts and Material:	Silicone adhesive (for reinstallation)
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner (Task instruction is helpful)

- Remove the clamping screw at the trailing edge of the light housing.
- If required, carefully remove silicone adhesive between housing and strut with knife – taking care not to damage the paint or the light housing.
- Remove the housing from the strut then disconnect the light wires.
- Remove light mounting screws to allow removal of the light from the housing.
- Visually inspect the light housing for cracks or damage. Check the strut for chaffing, wear or corrosion. Inspect the wires for damage to the insulation, corrosion on the connectors etc.
- For installation, reverse the steps given above. Note that silicone adhesive (or similar) is required to prevent the housing chaffing on the strut.

#### 7.2.5 Landing Light Adjustment (Night-Vfr Models)



Required Tools:	Screwdrivers
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner (Task instruction is helpful)

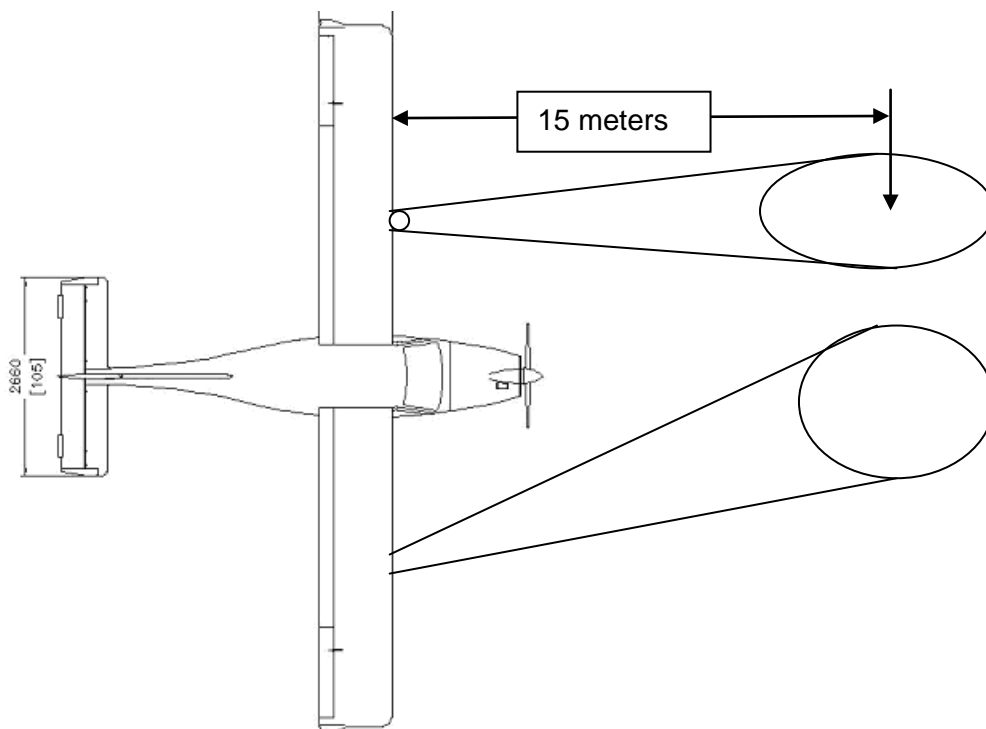
- The alignment of lights for aircraft carrying out Night-VFR operations must be checked as a part of the 100-Hourly / Annual inspection.
- The lights must be aimed to focus on the ground approximately 15 meters in front of the aircraft.
- Before this procedure is carried out ensure that the wires are connected and each light housing secure on the wing strut.
- Each housing must have at least one slotted light mounting hole (refer Figure 39). In some cases both holes must be slotted to achieve proper targeting.
- Note that Figure 39, Left, shows the light during a test fit; the trim ring, internal paint and Aluminium tape (see **Error! Reference source not found.**) have not been fitted yet.

Slot ½” long (13mm) maximum – measured from the edges of the hole.



**Figure 39 – Light Installed (Left) & Slotted Hole In Housing**

- Alignment is carried out in a dark hangar or outdoor at night. Turn the lights on and mark a distance 15 meters away from the wing.
- Aim the lights at the focal points given in Figure 40. Lock the position of the lamp by tightening the screws once aiming is complete.
- Ensure that when the “TAXI” light is selected the light shown on the right of Figure 40 illuminates – i.e. the TAXI light is aimed to shine on the centre of the taxiway 15m in front of the aircraft. The LANDING light is aimed straight ahead.



**Figure 40 – Night-VFR Lighting Aim Diagram**

**7.2.6**



### 7.2.7 Wing Inspection Window

#### 7.2.7.1 DESCRIPTION

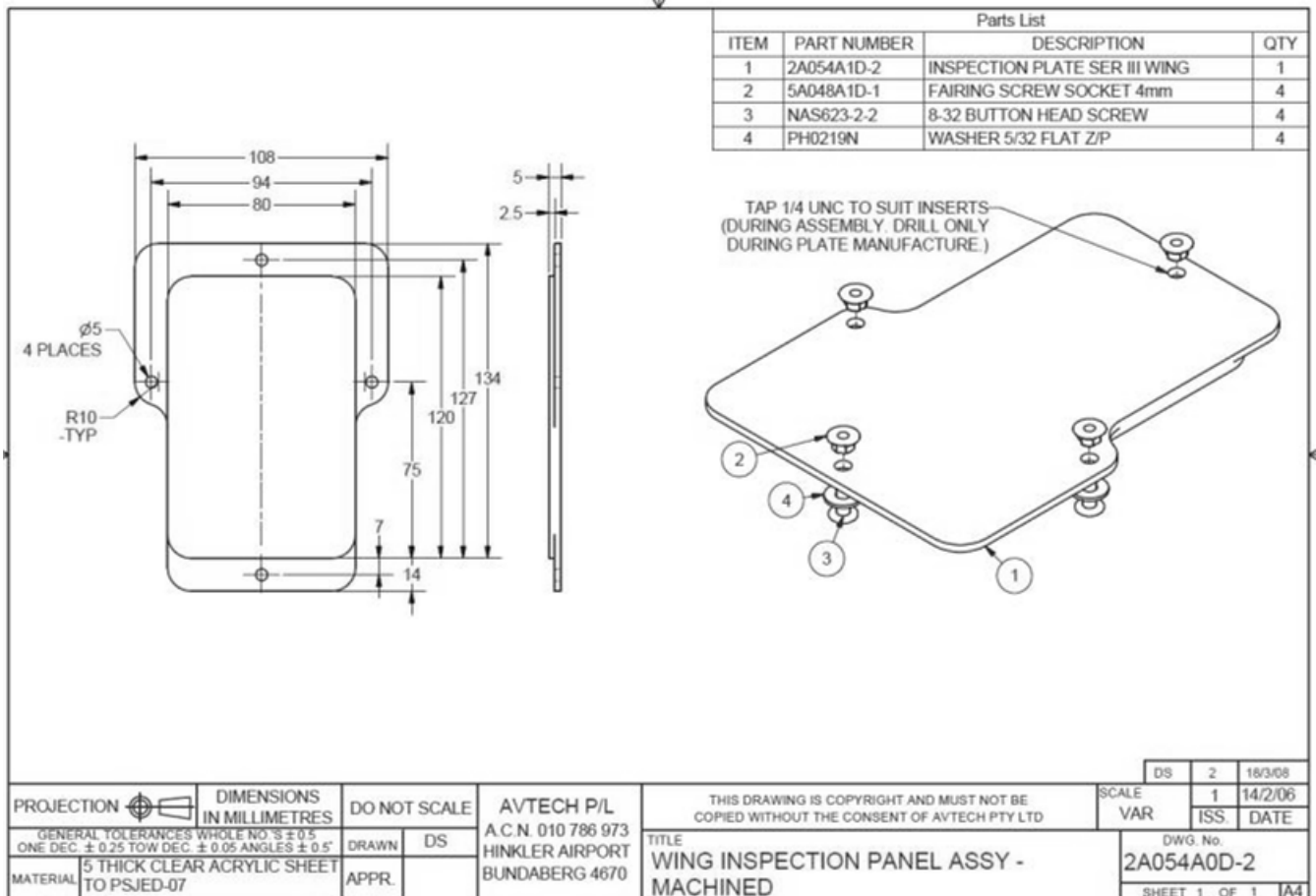
- All Jabiru Aircraft have a small acrylic window in the underside of the wing to allow inspection of the outboard aileron clamp.
- In some models this window is a simple rectangular piece of clear acrylic screwed to the wing using machine screws and anchor nuts. Later variants use a machined acrylic sheet with threaded inserts.

#### 7.2.7.2 REMOVAL, INSPECTION & INSTALLATION



Required Tools:	Screwdrivers
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner (Task instruction is helpful)

- Remove the screws holding the window to the wing and remove.
- Installation is the reverse.
- Also refer to wing assembly drawings shown above.



**7.2.8 Vertical Fin**

- The Fin is a moulded composite structure supported by ribs and a rear spar. Hinges attach the rear spar to the rudder.

**7.2.8.1 REMOVAL, INSTALLATION, INSPECTION AND REPAIR**

- The fin is an integral part of the fuselage structure and cannot be removed.
- All repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

**7.2.9 Horizontal Stabiliser**

- The horizontal stabiliser is a moulded stressed-skin structure of rigid cellular polystyrene bonded to a fibreglass skin and rear spar.

**7.2.9.1 REMOVAL AND INSTALLATION**

- The horizontal stabiliser is an integral part of the fuselage to which it is bonded. It cannot be removed.
- All repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local representative.

## 7.3 Landing Gear & Brakes

### 7.3.1 General Description

- Main gear comprises two separate composite beams which are bolted to the fuselage at the top and centre and to the wheel stub at the bottom.
- The nose gear is a welded steel, trailing arm assembly with a rubber spring system. The nose wheel is steerable with the rudder pedals.
- Nose Wheel and Main Wheel Speed Fairings (wheel spats) are optional equipment.
- 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.

### 7.3.2 Main Undercarriage Removal (Jacking)



Required Tools:	Wing stand – Construct from DAR pine, wood screws and a foam or thick carpet padding. Temporary fuel cap (should be large and brightly coloured) Spanners / socket wrench Jack
Parts and Material:	N/A
Type of Maintenance:	Heavy Maintenance
Level of Certification:	LSA repairman (with task specific instruction)

- The procedure given in Section 5.2.2 is useful for wheel/brake servicing or repairs, but is of no value in removing the main undercarriage. If the removal of the main undercarriage is necessary, adopt the following procedure:
  1. Manufacture a wing stand. A wing stand is a simple structure standing around 180cm high – a frame of 90 x 45 DAR Pine assembled with screws and a diagonal brace is sufficient. One end of the stand must be padded with foam, thick carpet or similar – this end of the stand will be supporting the underside of the wing and must be padded to spread the load and to prevent scratching the paint etc.

### WARNING

**When making a wing stand ensure that it is strong and stiff enough to support the aircraft with minimal distortion.**

2. Remove all unnecessary equipment from the aircraft.
3. Where equipped, apply a temporary cap to the fuel filler vent of the wing which will NOT be jacked as a part of this procedure. This is to prevent fuel leaking out the breather onto the wing. Ensure that the cap is large and highly visible to ensure it is removed when the job is done.
4. Apply the hand brake or wheel chocks to the wheel which will remain on the ground.
5. Lifting from a point in line with the wing strut and around 1m (3 feet) further outboard, lift the main wheel off the ground. More than 1 person may be required, depending on the model and weight of the aircraft.
6. Place the wing stand under the wing and allow it to take the weight of the aircraft.
7. If the aircraft is to remain on the stand for more than 24 hours it is recommended that alternate supports – such as trestles under the fuselage belly – be used to relieve the strain on the wing and undercarriage.

### WARNING

**Only jack 1 undercarriage leg at a time using this method. If both legs must be removed simultaneously, support the aircraft on trestles or similar supports under the fuselage belly.**

## WARNING

When supporting the aircraft by trestles under the belly ensure that that trestle is padded and located under the wing strut beam, undercarriage channel or similar hard point on the fuselage structure. Carelessly positioned trestles can easily damage the aircraft. Ensure that the aircraft is stable and supported so that it cannot tip off the trestles.

### 7.3.3 Main Wheel Fairing (Spats)

#### 7.3.3.1 DESCRIPTION

- Jabiru Aircraft are equipped with fairings for the main and nose wheel. These streamlined covers reduce the drag of the undercarriage and significantly improve the efficiency of the aircraft.

#### 7.3.3.2 REMOVAL AND INSTALLATION



Required Tools:	Screwdrivers Spanners / Socket wrench
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner (Task instruction is helpful)

- Remove the bolt on the outside of the fairing.
- Remove the machine screws on the inboard side of the fairing.
- In some models the fairing is in two pieces: the large, outboard section and the small inboard part. For these fairings the inner and outer pieces must be separated by removing all the machine screws before removal.
- Lift the fairing up and out until free of the wheel.
- Reverse the preceding steps for installation.

## WARNING

During assembly ensure that the brake line is not rubbing against the fairing or mounting screws. Rubbing can lead to failure of the brake line and wheel brake failure.

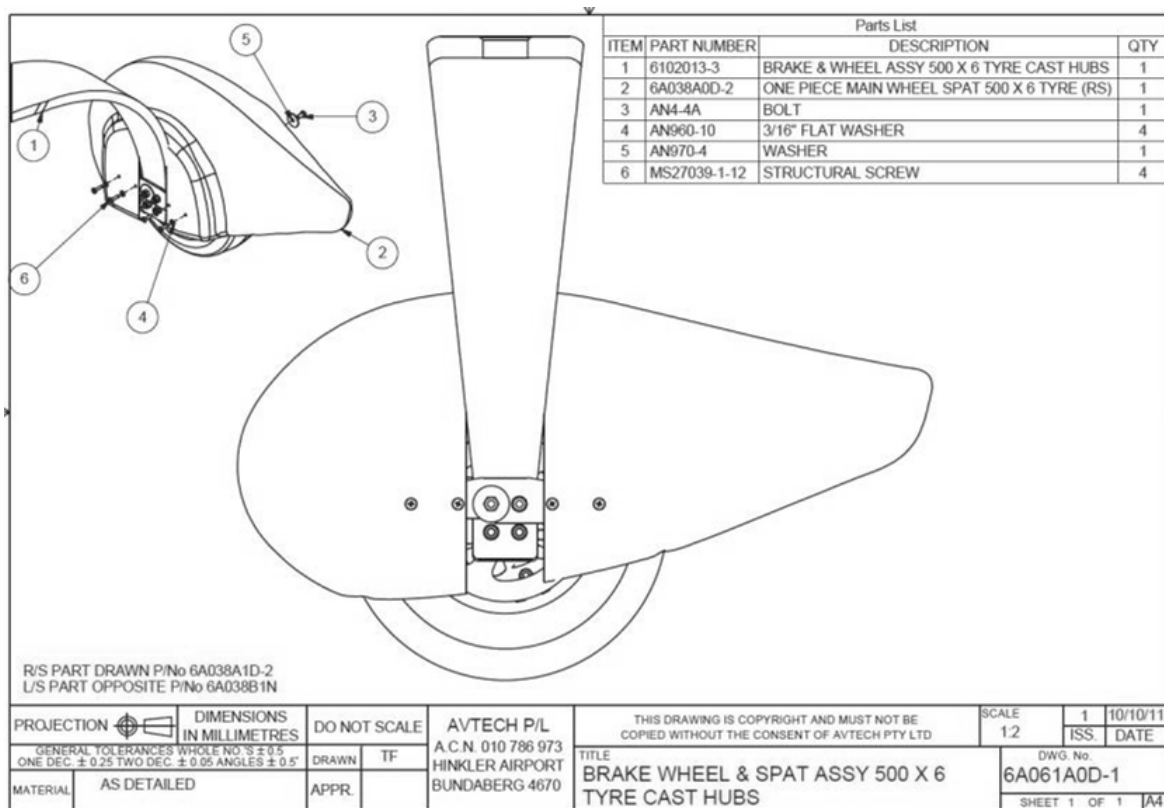


Figure 42 – Wheel Spat Installation

### 7.3.4 Main Gear Top Fairing (Speed Fairing)

#### 7.3.4.1 DESCRIPTION

- Jabiru Aircraft are equipped with fairings between the main leg and the fuselage. These smooth the airflow in this area and significantly improve the efficiency of the aircraft.

#### 7.3.4.2 REMOVAL AND INSTALLATION



Required Tools:	Screwdrivers
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner (Task instruction is helpful)

- The fairing at the top of the main undercarriage leg is removed by removing the securing screws.
- To install, reverse this procedure.

### WARNING

During assembly ensure that the brake line is not rubbing against the fairing or mounting screws. Rubbing can lead to failure of the brake line and wheel brake failure.

**7.3.5 Main Wheels**

**7.3.5.1 DESCRIPTION**

- The main wheels consist of an inner rim half – also containing the bearings and brake disc mounting and an outer half.
- Main wheel rims are cast Aluminium.
- Figure 43 shows a typical installation. While details and part numbers vary from model to model the general arrangement shown applies to all aircraft.

**7.3.5.2 MAIN WHEEL REMOVAL**



Required Tools:	Wing Stand - Construct from DAR pine, wood screws and a foam or thick carpet padding. Jack Spanners / Socket wrench Bead breaker
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner, LSA repairman (inspection or maintenance)

1. Jack aircraft as outlined in Section 7.3.2 above.
2. Remove the upper leg/fuselage fairing and the wheel spat (if equipped) as detailed above.
3. Remove outboard brake pad plates.
4. Remove lock bolt/nut through the axle extension.
5. Remove axle extension.
6. Pull wheel from axle.

**7.3.5.3 MAIN WHEEL DISASSEMBLY**

1. Deflate tyre and break tyre beads loose from tyre rims. A bead-breaker or similar may be required for this task.

**WARNING**

**Injury can result from attempting to separate wheel halves with the tyre inflated. Avoid damaging wheel flanges when breaking beads loose as a scratch, nick or gouge may cause wheel failure.**

2. Remove through-bolts/nuts and separate wheel halves, removing tyre, tube and wheel hub.
3. Remove brake disc.
4. Remove bearings from hub.

**Note: The bearings are “press-fit” in the wheel hub and should not be removed unless a new part is to be installed.**

**7.3.5.4 MAIN WHEEL INSPECTION, ASSEMBLY AND REPAIR**



Required Tools:	Solvent Course grit sand paper Spanners / socket wrench Torque wrench
Parts and Material:	Replacement wheel halves (if required) Replacement Brake discs (if required) Replacement Wheel bearings (if required) Automotive wheel rim lubricant
Type of Maintenance:	Heavy Maintenance

Level of Certification:	LSA repairman (inspection or maintenance)
-------------------------	---

- Figure 44 shows a typical wheel assembly. While details and part numbers vary from model to model the general arrangement shown applies to all aircraft.
- 1. Clean all metal parts in solvent and dry thoroughly.
- 2. Inspect wheel halves for cracks. Cracked wheel halves should be discarded and new parts used. Sand out nicks, gouges and corroded areas.
- 3. If excessively warped or scored or worn to a thickness of 2 mm, brake discs should be replaced with a new part. Sand smooth small nicks and scratches.
- 4. Carefully inspect bearings for damage and discolouration.

**Note: Bearings are pre-packed. DO NOT clean with solvents as it will remove the packing grease.**

- 5. If existing parts are unserviceable, replace bearings.
- 6. Apply automotive wheel rim lubricant to the bead areas of the rim halves. Note that if this step is missed, disassembly of the wheels in future will be very much harder.
- 7. Position tyre and tube between wheel halves with tube inflation valve through hole in outside wheel half.
- 8. Mate wheel halves. While holding halves together, assemble a washer and nut on one through-bolt and tighten snugly. Assemble the remaining washers and nuts on the through-bolts and torque to the “solid laminate” value specified in Table 7.

**CAUTION**

**Ensure tube is not pinched between wheel halves during assembly. Uneven or improper torque of through-bolt nuts can cause failure of bolts with resultant wheel failure.**

- 9. Insert through-bolts through brake disc and position disc on the inner wheel hub flange. Note that if directional brake discs are fitted, the discs must be oriented in for the correct direction of rotation. Refer to Figure 70 below.
- 10. Inflate tyre to seat tyre beads, then adjust to correct tyre pressure – Refer Aircraft Specifications above.

**7.3.5.5 MAIN WHEEL INSTALLATION**



Required Tools:	Spanners / socket wrench
Parts and Material:	“Anti Seize” or a Water Proof grease Assembled wheel Bearing spacer ring
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner, LSA repairman (inspection or maintenance)

- 1. Lightly coat axle with “Anti Seize” or a Water Proof grease.
- 2. While older and lighter aircraft models use a hollow axle stub, most recent aircraft use a solid version of the same part. When using the solid axle, an Aluminium bearing spacer ring must be fitted to the stub before the wheel assembly – see Figure 43. This part is not required for hollow axles.
- 3. Place wheel assembly on axle.
- 4. Install spacer and lock bolt/nut through centre of axle. Wriggle the wheel along the length of the axle – there should be minimal movement. Movement more than 0.75mm indicates a missing spacer ring, worn bearings or other issue requiring correction.
- 5. Place outboard brake pad plate and springs in position and secure with bolts/nuts/washers.
- 6. Install spats and speed fairing (if used) as outlined in Section 7.3.3 and 7.3.4.

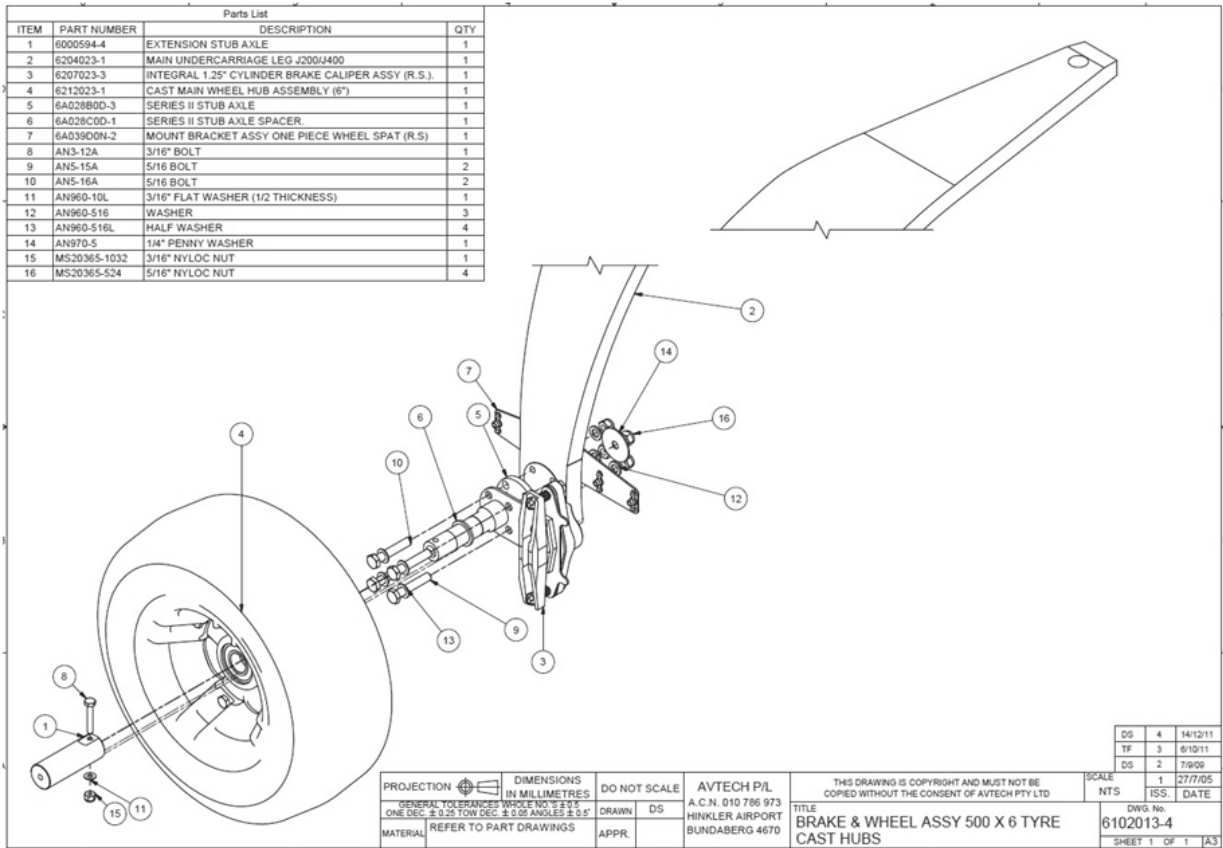


Figure 43 – Main Wheel to Leg Assy

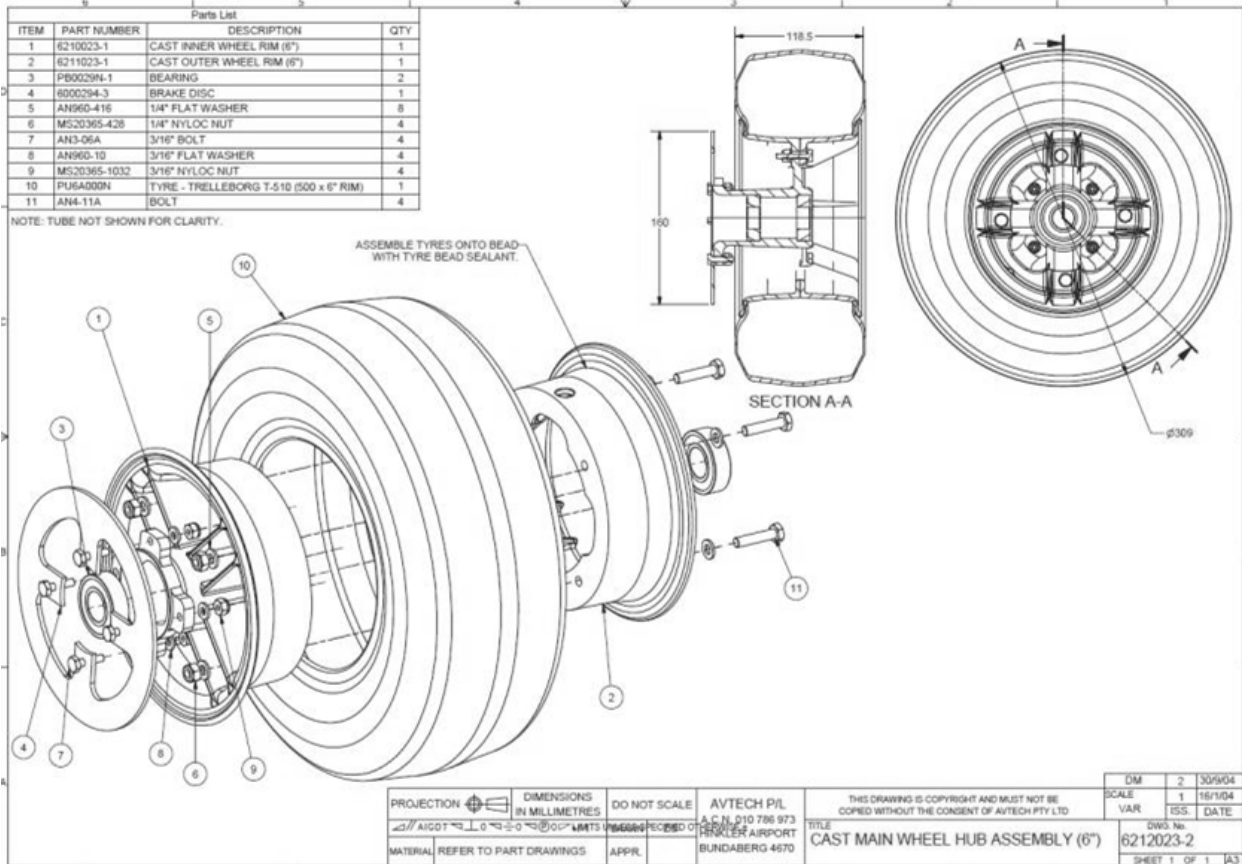


Figure 44 – Main Wheel Assembly



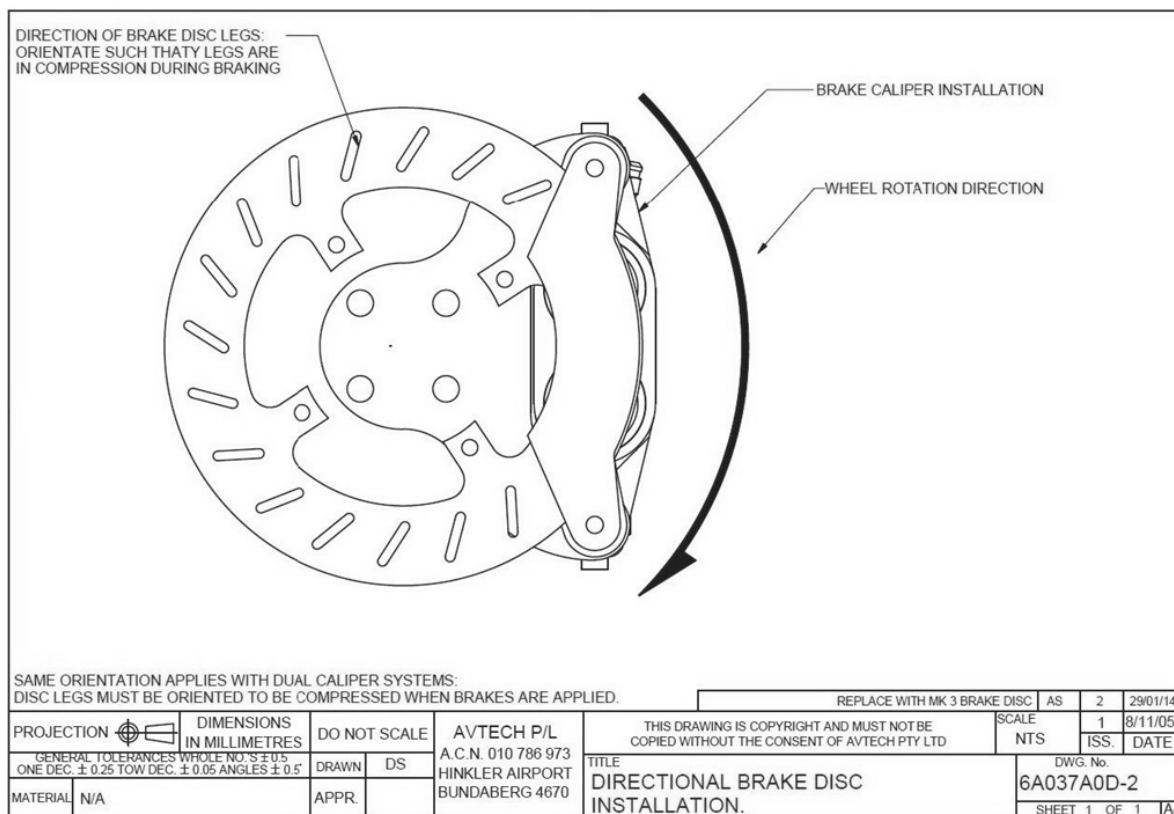


Figure 45 – Directional Brake Disc Installation

### 7.3.6 Main Wheel Stub Axle

#### 7.3.6.1 DESCRIPTION

- A steel stub axle is bolted to the outboard end of the undercarriage leg.
- Figure 43 shows a typical installation. While details and part numbers vary from model to model the general arrangement shown applies to all aircraft.

#### 7.3.6.2 MAIN WHEEL STUB AXLE REMOVAL



Required Tools:	Tools as required in Section 7.3.3 and Section 7.3.5.
Parts and Material:	Zip ties
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner, LSA repairman (inspection or maintenance)

1. Remove wheel spat in accordance with Section 7.3.3.
2. Remove wheel in accordance with Section 7.3.5.
3. Allow the brake calliper(s) to hang on the brake line, ensuring that the line is not being kinked, distorted or otherwise damaged. If the leg must be removed for an extended period it is recommended to use zip-ties or similar to support the brake calliper assembly to take the load off the brake line.
4. Remove 4 bolts/nuts/washers securing axle to leg.

**NOTE: When removing axle from leg, note number and position of the wheel alignment shims (if any) between the axle flange and composite leg. Mark these shims or tape them together carefully so that they can be installed in exactly the same position, to ensure that wheel alignment is not disturbed**

5. Remove inboard brake plate.

6. Remove axle from leg.

**7.3.6.3 MAIN WHEEL STUB AXLE INSTALLATION**



Required Tools:	Spanners / socket wrench
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner, LSA repairman (inspection or maintenance)

- Secure axle and inboard brake plate to composite leg, making sure that any wheel alignment shims are installed in their original position.
- Install wheel assembly on axle in accordance with Section 7.3.5.

**7.3.7 Wheel Balancing**

- Since uneven tyre wear is usually the cause of tyre imbalance, replacing the tyre will probably correct this condition. If a wheel shows evidence of imbalance during service, it may be statically balanced.

**7.3.8 Main Gear Leg**

**7.3.8.1 DESCRIPTION**

- For all models discussed in this manual the main undercarriage has the same general arrangement: a laminated composite spring forms the leg which is bolted to the fuselage at one end and the main wheels at the other.

**7.3.8.2 REMOVAL**



Required Tools:	Tools as required in Section 7.3.3 and Section 7.3.2
Parts and Material:	Zip ties
Type of Maintenance:	Heavy Maintenance
Level of Certification:	LSA repairman

- Remove fairings to access inner and outer undercarriage leg bolts as detailed in Section 7.3.3.
- Jack the aircraft in accordance with the details given in Section 7.3.2.
- Un-bolt the axle extension and the brake calliper(s) to allow the removal of the wheel, tyre and brake disc assembly. Allow the brake calliper(s) to hang on the brake line, ensuring that the line is not being kinked, distorted or otherwise damaged. If the leg must be removed for an extended period it is recommended to use zip-ties or similar to support the brake calliper assembly to take the load off the brake line.
- Cut the zip-ties holding the brake line to the undercarriage leg.
- Un-bolt the stub axle from the composite leg and remove.
- Remove bolt/nut from top inboard end of undercarriage beam. Remove rubber bushes (2).
- Remove bolts/nuts (2) from the clamp at bend in undercarriage beam.
- Remove clamp.
- Where equipped, note the orientation and remove the undercarriage leg wedge.
- Remove Undercarriage Leg Assembly.

**7.3.8.3 INSTALLATION**



Required Tools:	Spanners / socket wrench
-----------------	--------------------------

	Torque wrench
Parts and Material:	Resin with flock
Type of Maintenance:	Heavy Maintenance
Level of Certification:	LSA repairman

- The following procedural steps describe how to install the leg. Refer to applicable paragraphs for installation of the individual components.
  - 1. Offer the beam to the fuselage and install clamp and bolts/nuts (2 OFF) – Do not tighten at this stage.
  - 2. Locate top end bolt, install and tighten nut. Use the torque value given in Table 2 as guidance, however do not crush the rubber bush completely. Aim to compress the visible edge of the rubber to about half its unloaded thickness.
  - 3. For the curved undercarriage leg show in Figure 46, tighten outboard clamp bolts/nuts (2 OFF). Torque to “solid laminate” value give in Table 2.
  - 4. For the “straight” undercarriage leg shown in **Error! Reference source not found.** follow the additional steps below:
    - Check that the flock clamp bed applied to the leg is in place and fits the outboard leg clamp closely. If the flock has degraded, clean off any loose pieces.
    - Flock the clamp to the leg (Flock made by mixing Jabiru Epoxy resin and cotton fibre flock to a gluey consistency). Do not tighten bolts while the resin is wet.
    - After the resin has cured (around 24 hours, possibly more in cold climates) fully tighten the outboard clamp bolts. Torque to “solid laminate” value give in Table 2.
- Note: “straight” legs are “handed” – ensure the legs are installed on the correct side of the aircraft.**
- 5. Bolt the stub axle & calliper mount plate to the main undercarriage leg. Torque to “solid laminate” value give in Table 2. Note that if a new leg is being fitted it will be necessary to check and adjust the angle of the stub axle. This must be carried out in accordance with Section 6.18.
  - 6. Fit brake caliper to brake mount plate.
  - 7. Assemble the wheel and brake assembly. Fit the axle extension and adjust the brakes.
  - 8. Fasten the brake line to the undercarriage leg using zip ties (2 min per leg).

#### 7.3.8.4 INSPECTION AND REPAIR



Required Tools:	Spanners / socket wrench
Parts and Material:	Resin with flock Replacement bolts, nut, washers (if required) Replacement Clamp (if required)
Type of Maintenance:	Heavy Maintenance
Level of Certification:	LSA repairman

- 1. Inspect composite beam for damage indicated by cracks or de-lamination. Pay particular attention to the area around the centre bend and to areas around drilled holes.
- 2. When inspecting the legs shown in **Error! Reference source not found.** pay particular attention to the area around each bend in the leg. Note that it is possible for this leg type to have internal damage which does not show to the surface. In this case the best indicator of the damage is that the damaged leg will have lost stiffness compared to the other side and so the aircraft will lean in the direction of the damaged leg. If required, legs can be returned to Jabiru Aircraft for testing.
- 3. Inspect bolts and nuts for signs of stress, bending or corrosion – replace if in any doubt.
- 4. Inspect clamp for damage.
- 5. Inspect bolt seats in fuselage for signs of damage, wear or perishing.

- For the leg shown in **Error! Reference source not found.**, inspect the outboard clamp flock bed & re-flock if damaged.

**WARNING**

Repairs to the composite undercarriage beams must be referred to JABIRU AIRCRAFT Pty Ltd or our local approved agent.

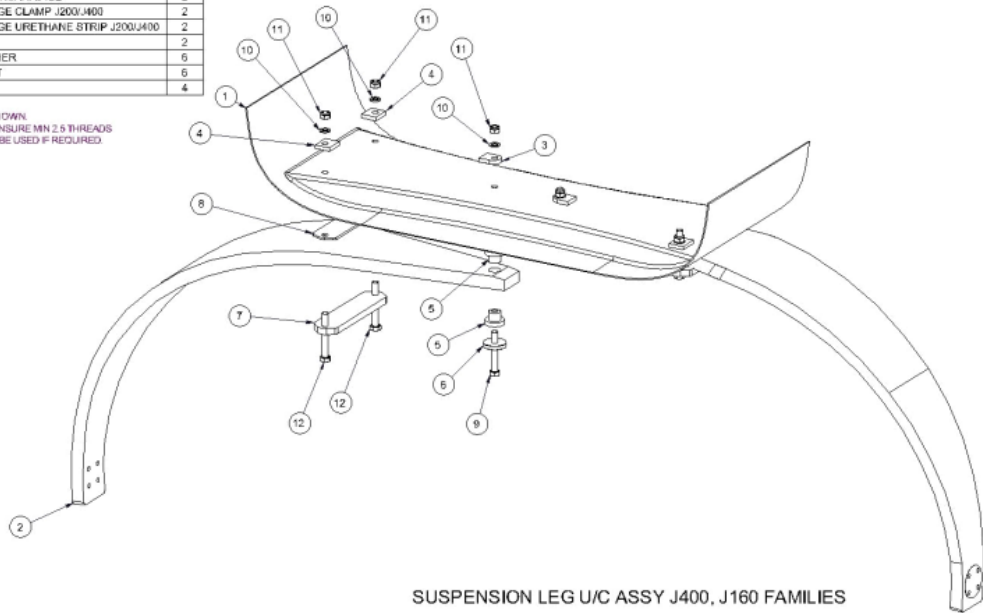
**7.3.9 Trouble Shooting – Main Undercarriage**

**Table 5 – Trouble Shooting – Main Undercarriage**

Trouble	Probable Cause	Remedy
Aircraft leans to one side	Incorrect tyre inflation	Inflate to pressure shown at above
	Landing gear attaching parts not tight	Tighten loose parts. Replace defective parts.
	Leg de-lamination	Install new part(s)
Tyres wear excessively	Incorrect tyre inflation	Inflate to pressure shown in above
	Main wheels out of alignment	Align as specified above
	Leg de-lamination	Install new part (s)
	Dragging Brakes	Refer to Section 7.3

Parts List			
ITEM	PART NUMBER	DESCRIPTION	QTY
1		BARE FUSE ASSY	1
2	8204023	MAIN UNDERCARRIAGE LEG J200/J400	2
3	9037094	U/C BACKING PLATE RAD	2
4	9036094	U/C BACKING PLATE RECT	4
5	9034094	BUSH UNDERCARRIAGE	4
6	9033094	WASHER UNDERCARRIAGE	2
7	9003094	UNDERCARRIAGE CLAMP J200/J400	2
8	820302N	UNDERCARRIAGE URETHANE STRIP J200/J400	2
9	AN6-24A	3/8" BOLT	2
10	AN96-616	3/8" FLAT WASHER	6
11	MS20365-624	3/8" NYLOC NUT	6
12	AN6-26A	3/8" BOLT	4

NOTE:  
 1. CENTRE CONSOLE OF FUSELAGE NOT SHOWN.  
 2. BOLT LENGTHS GIVEN ARE NOMINAL. ENSURE MIN 2.5 THREADS PROJECT PAST NUT. LONGER BOLTS MAY BE USED IF REQUIRED.



**Figure 46 – J230-D Main Undercarriage Assembly (Type 2)**

**7.3.10 Nose Wheel Speed Fairing (Spat)**

**7.3.10.1 DESCRIPTION**

- Jabiru Aircraft are equipped with a nose wheel speed fairing (wheel spat).
- This fairing smoothes the airflow around the nose wheel and significantly improves the efficiency of the aircraft.
- In some cases the nose wheel spat is complimented by a nose leg fairing which covers the nose leg and rubber spring assembly.

**7.3.10.2 REMOVAL & INSTALLATION**



Required Tools:	Screwdrivers Spanners / Socket wrench Tools as required in Section 5.2.2.2.
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner, LSA repairman (inspection or maintenance)

1. Weight or tie-down tail of aircraft to raise the nose wheel off the floor as detailed in Section 5.2.2.2.
2. If equipped, remove the screws holding the nose leg fairing together and those holding it to the wheel spat. Remove the fairing.
3. Remove the machine screws around the forward and rear sections of the fairing and remove the rear section.
4. Loosen and withdraw the axle, remove the wheel and remove the front section.
5. Reverse the preceding steps for installation.

**7.3.11 Nose Wheel**

**7.3.11.1 DESCRIPTION**

- The nose wheel assembly consists of a cast Aluminium split rim, tube and tyre. The smaller half of the split rim is common with the main wheel assemblies while the larger half, with integral bearing carriers, is specific to the nose wheel.
- Figure 47 shows a typical installation. While details and part numbers vary from model to model the general arrangement shown applies to all aircraft.

**7.3.11.2 REMOVAL AND INSTALLATION**



Required Tools:	Tools as required in Section 5.2.2.2. Spanners / Socket wrench Screwdrivers Torque wrench
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	Owner, LSA repairman (inspection or maintenance)

1. Weight or tie-down tail of aircraft to raise the nose wheel off the floor as detailed in Section 5.2.2.2.
2. Remove the wheel spat and the nose wheel axle bolt.
3. Pull nose wheel assembly from yoke.
4. Reverse the preceding steps to install nose wheel. Tighten axle bolt to “solid laminate” value given in Table 2.

**7.3.11.3 NOSE WHEEL DISASSEMBLY**

- Completely deflate tyre by removing the valve stem and break tyre beads loose at wheel rim. Refer to Figure 73.

**WARNING**

**Injury can result from attempting to separate wheel halves with the tyre inflated. Avoid damaging wheel flanges when breaking beads loose as a scratch, nick or gouge may cause wheel failure.**

1. Remove through-bolts and separate wheel halves.
2. Remove wheel hub.
3. Remove tyre and tube from wheel halves.
4. Remove bearings.

**NOTE: The bearings are “press-fit” in the wheel hub and should not be removed unless a new part is to be installed.**

**7.3.12 Nose Wheel Inspection and Repair**



Required Tools:	Solvent Course grit sand paper
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. Clean metal parts in solvent and dry thoroughly.
2. Inspect wheel halves for cracks. Cracked wheel halves should be discarded and new parts used. Sand out nicks, gouges and corroded areas. Clean thoroughly
3. Carefully inspect bearings for damage and discolouration.

**NOTE: Bearings are pre-packed with grease. DO NOT clean with solvents as it will remove the packing.**

4. Refit bearings.

**7.3.12.1 NOSE WHEEL REASSEMBLY**



Required Tools:	Spanners / Socket Wrench Torque Wrench
Parts and Material:	Replacement bearings (if required) Automotive wheel rim lubricant
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. Replace bearings in wheel hub.
2. Apply automotive wheel rim lubricant to the tyre bead faces on the inside of the wheel rims. Note that if this step is skipped disassembly of the wheel in future will be made much more difficult.
3. Position tyre and tube between wheel halves with tube inflation valve through hole in outside wheel half.
4. Mate wheel halves. While maintaining a light force, assemble a washer and nut on one through-bolt and tighten snugly. Assemble the remaining washers and nuts on the through-bolts and torque to the “solid lamination” value specified in Table 2.

**WARNING**

**Ensure tube is not pinched between wheel halves during assembly. Uneven or improper torque of through-bolt nuts can cause failure of bolts with resultant wheel failure.**

5. Inflate tyre to seat the tyre beads, adjust to correct tyre pressure – Refer Aircraft Specifications above.

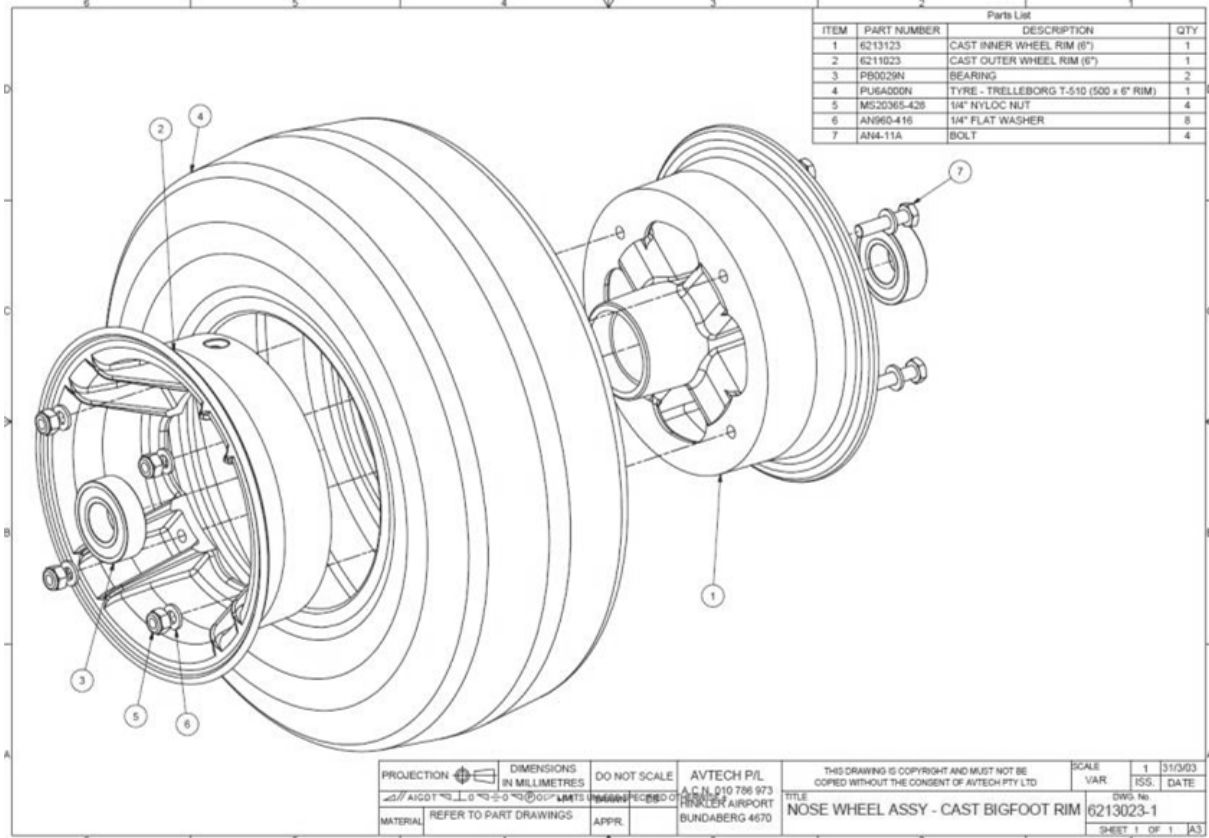


Figure 47 – Nose Wheel Hub Assembly

### 7.3.13 Nose Wheel Steering / Centering System

#### 7.3.13.1 DESCRIPTION

- For all models the nose wheel steering system consists pushrods directly connecting the rudder pedals to the nose leg assembly. The systems are shown in Section 9. For some models a “soft link” is fitted between the nose leg and the rudder pedals to absorb vibrations. Details of this assembly are shown below (**Error! Reference source not found.** and Figure 48).
- For all models the nose wheel Centering system consists of springs which are stretched when the nose leg is moved to the left or the right. The systems are shown in Section 9.

- Repair of these systems is limited to the replacement of parts.

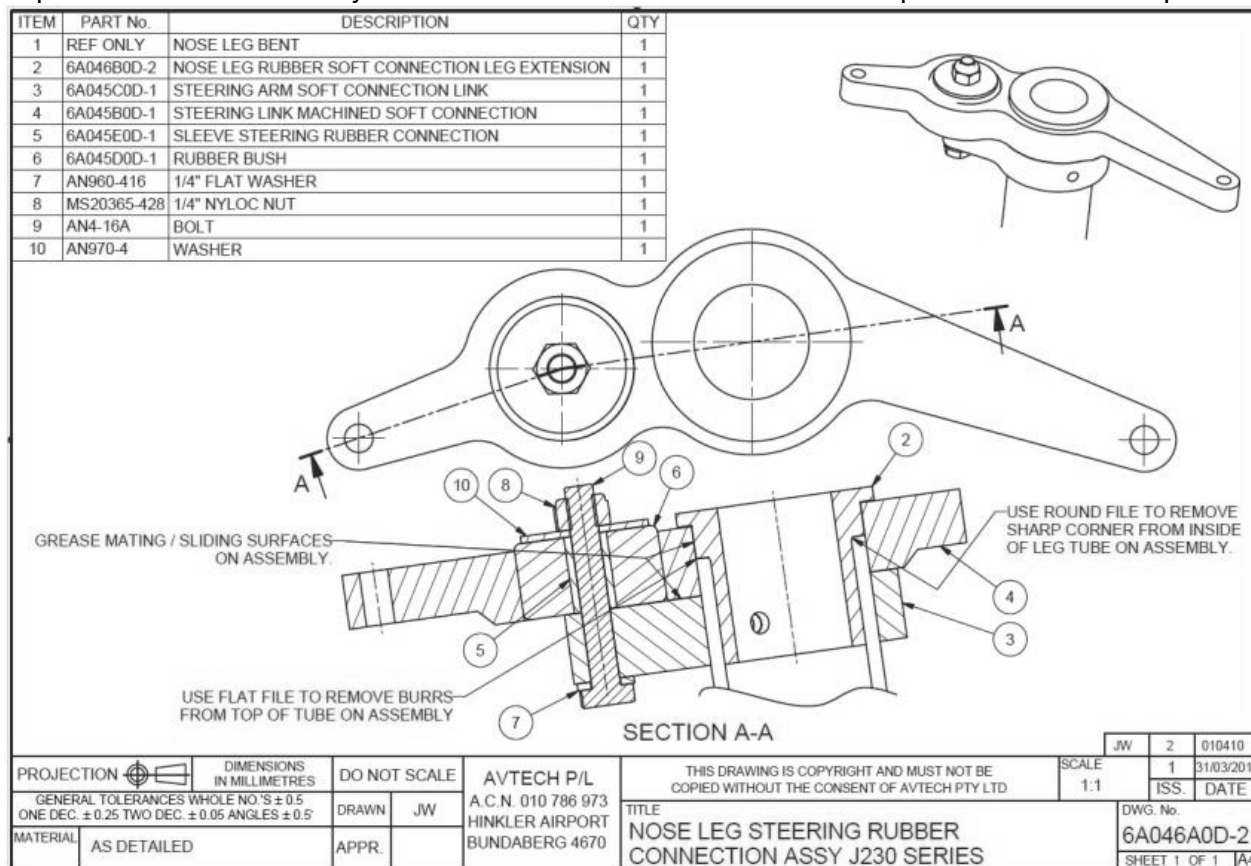


Figure 48 – Nose Leg Soft Link Assy (J200 Family)

### 7.3.14 Nose Undercarriage Leg

#### 7.3.14.1 DESCRIPTION

- The nose gear comprises a steerable nose wheel mounted on a welded steel assembly with an aluminium wheel yoke and a rubber spring system.
- Several variations of the steel leg assembly have been used on different aircraft models.
- On earlier aircraft the wheel yoke is bolted together (Figure 51) while later models use a 1-piece part.
- The steel tube is constrained within two Ertalite bushes mounted in a housing which is attached to the front of the firewall. For some models this housing is moulded in fiberglass, however for the majority an Aluminium housing is used.
- Nose wheel steering is achieved by connecting the rudder pedal assembly to the nose wheel steering link by push rods. The nose wheel is centred by springs. Some models incorporate a rubber “soft link” between pedals and nose leg to improve ground handling.
- A nose wheel speed fairing (wheel spat) is standard equipment.
- Refer to Section 9 for views of the entire leg / steering assembly.

#### 7.3.14.2 NOSE GEAR REMOVAL & INSTALLATION



Required Tools:	Tools as required in Section 5.2.2.2. Spanners / Socket Wrench Torque Wrench
Parts and Material:	Replacement bolts and hardware (if required)



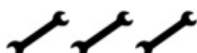
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. Weight or tie-down tail of aircraft to raise nose wheel off floor and remove the nose wheel and speed fairing as detailed in 5.2.2.
2. Disconnect nose wheel steering pushrods and steering yoke.
3. Unbolt steering yoke from the nose leg tube.
4. Push and pull the nose leg vertically, fwd-aft and side-side in the housing. A small amount of movement is normal however any excess must be removed before it becomes excessive. Refer to sections below for details on adjusting the vertical end-float of the leg in the housing or replacing housing bushes.
5. Remove upper collar / steering yoke (dependant on aircraft model) from the top of the leg.
6. Pull the nose wheel strut assembly down from the bushes in the fuselage.
7. To install the nose gear, reverse the preceding steps.

**7.3.14.3 NOSE GEAR GENERAL INSPECTION**

- Inspect steel tube and attachments for dents and straightness.
- Inspect rubber spring assembly for damage or perishing of the rubber, or de-lamination of the rubber from the metal spacers between the rubber blocks. Check that the washer has been fitted at the top of the rubbers.
- Inspect aluminium wheel yoke for damage or bending.
- Inspect pivot bushes for wear or damage.
- Inspect assembly bolts & hardware – replace if damaged or corroded.
- Inspect bolts/nuts for torque – see “thick lamination” torque values in Table 2.
- Repairs to the welded nose leg assembly beam must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

**7.3.14.4 NOSE GEAR END FLOAT ADJUSTMENT**



Required Tools:	Sanding block
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- If the end float of the leg in the housing requires adjustment, use the procedure below. Note that this applies regardless of the type of nose leg housing fitted to the aircraft:
  1. The nose leg retaining collar is drilled with 3 sets of holes, each at a slightly different position. Depending which holes are used the distance between the upper and lower retaining collars can be increased or reduced to allow for wear.
  2. If there is excess float adjust 1 collar to the next-smallest position. If this is then too tight to fit onto the housing use a sanding block to remove a small amount of material from the top of the Ertalyte bush to allow a proper fit.
  3. If no smaller adjustments remain then the Ertalyte bushes must be replaced.

**7.3.14.5 NOSE GEAR BUSH REPLACEMENT**



Required Tools:	Reamer Fine grit sand paper
Parts and Material:	Replacement Ertalyte bushes Grease or Wax Graphite lubricant

	Resin and flock mixture
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- To replace the Ertalyte bush(es):
  1. This task can be done with the housing mounted on the fuselage – removal is not necessary.
  2. Adjust the retaining collar(s) of the leg assembly to their largest setting.
  3. The new bushes will be bonded in place while installed on the nose leg. Therefore it is necessary to apply a light coating of grease or wax to all parts which should not be bonded to the housing.
  4. Break the existing bushes out of the housing, taking care not to scratch or damage the housing itself.
  5. Remove any leftover flock.
  6. Dry fit the replacement bushes to the leg. If they are too tight they may be reamed slightly to fit - however a slightly “firm” fit is preferable during initial assembly to ensure a good fit once the initial wear-in is complete. Graphite lubricant may be used.
  7. Lightly sand the bonding surfaces of the nose leg housing and the new bushes using 240 grit (or higher) paper.
  8. Wipe the sanded areas with a rag moistened with acetone to remove any oils and excess dust from the surfaces.
  9. Very lightly sand the bonding surfaces again and blow off dust using dry air.
  10. Paint bonding surfaces lightly with epoxy resin mixture.
  11. Mix cotton fibre flock with epoxy resin to a “gluey” consistency similar to toothpaste.
  12. Assemble the bushes to the leg housing and fit the leg. Place a jack or similar under the leg assembly so that the weight of the leg is not pulling down on the wet resin.
  13. Ensure there is a thick flock bed around the part as shown in Figure 49 (left).
  14. It is good practice to paint the flock with resin before it cures – this gives a smooth, shiny finish to the flock bed.
  15. Allow the resin to cure.
  16. Remove the leg and clean off any excess grease or rough edges.
  17. Apply graphite lubricant to the leg / housing. Check for full and free movement.

**7.3.14.6 NOSE GEAR DISASSEMBLY**



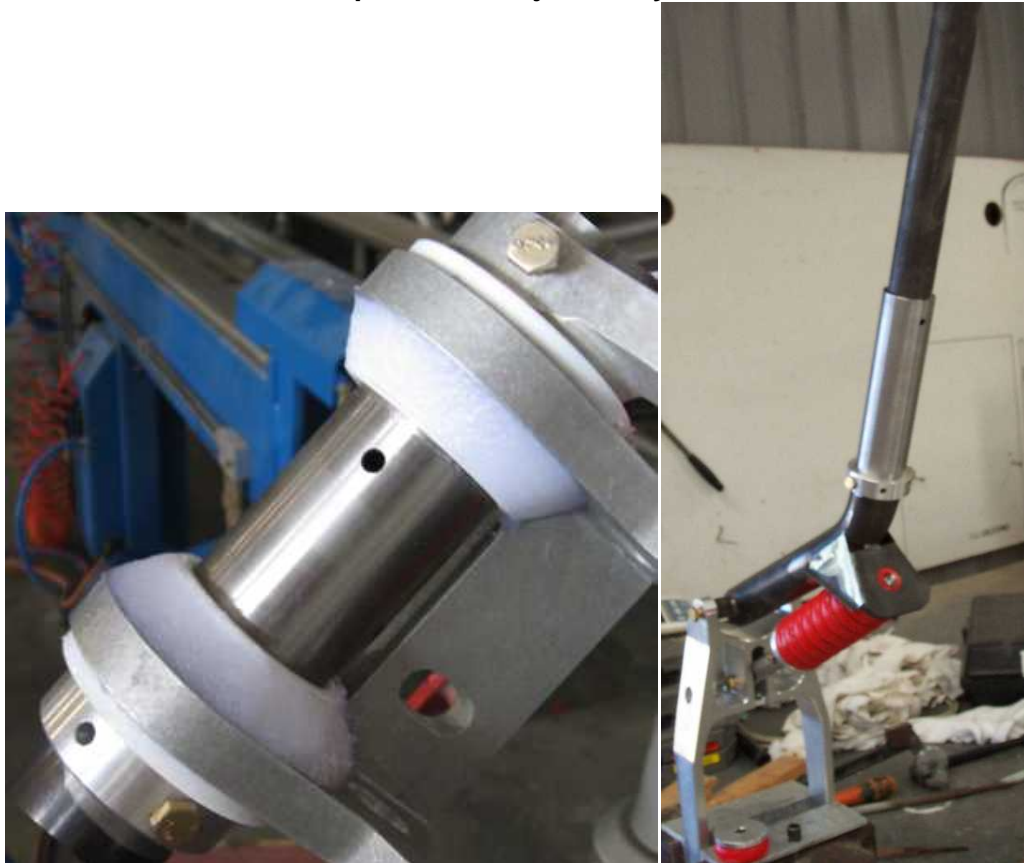
Required Tools:	Heavy workbench with strong, soft jawed vice Spanners / socket wrench Extension lever
Parts and Material:	Replacement pivot bushes (if required) Replacement rubber spring (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- To Disassemble the nose leg spring assembly (i.e. to replace the rubber spring or pivot bushes);
  1. The following requires a heavy workbench, fitted with a strong vice and thick soft-jaws.
  2. Remove the leg assembly from the aircraft.
  3. Clamp the leg in a vice as shown in Figure 49 (right). Ensure good soft-jaws are used to avoid damaging the nose leg yoke.
  4. Remove the nut from the bolt on the top of the spring shaft.
  5. Fit an extension to the nose leg as shown in Figure 49 (right) and use it as a lever to carefully compress the rubber until the tension comes off the restraint washer. Remove the restraint bolt and washer and carefully allow the rubber to expand.

6. Remove the pivot bolts and disassemble the yoke.
7. If required, press the pivot bushes out of the leg and yoke and replace with new parts.
8. Assembly is the reverse of the process above.

**WARNING**

A great deal of force is required to compress the rubber. Care must be taken to ensure the vice and bench are strong enough and holding the leg securely. Two people are required to perform this job safely.



**Figure 49 – Nose Leg Housing & Assembly**

**7.3.15 Trouble Shooting – Nose Leg**

**Table 6 – Trouble shooting – Nose Leg.**

<b>Trouble</b>	<b>Probable Cause</b>	<b>Remedy</b>
Nose wheel shimmy	Nose strut bolts loose	Tighten bolts
	Loose or worn steering link	Tighten, replace defective parts
	Nose wheel out of balance	Refer Section 7.3.7
	Wheel bearings loose	Replace

**7.3.16 Nose Wheel Balancing**

- Refer to Section 7.3.7 for wheel balancing information.

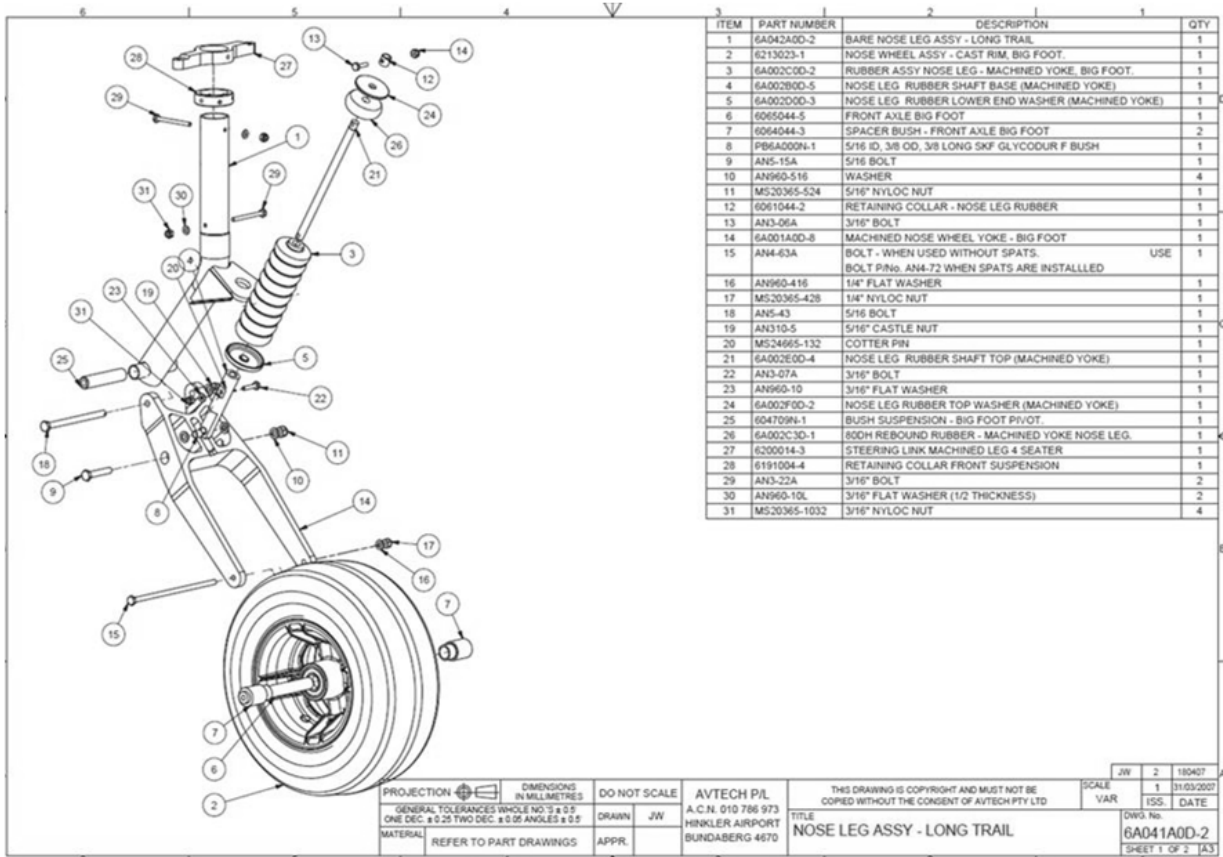


Figure 50 – Nose Leg Assy – Long Trail (J160 Family)

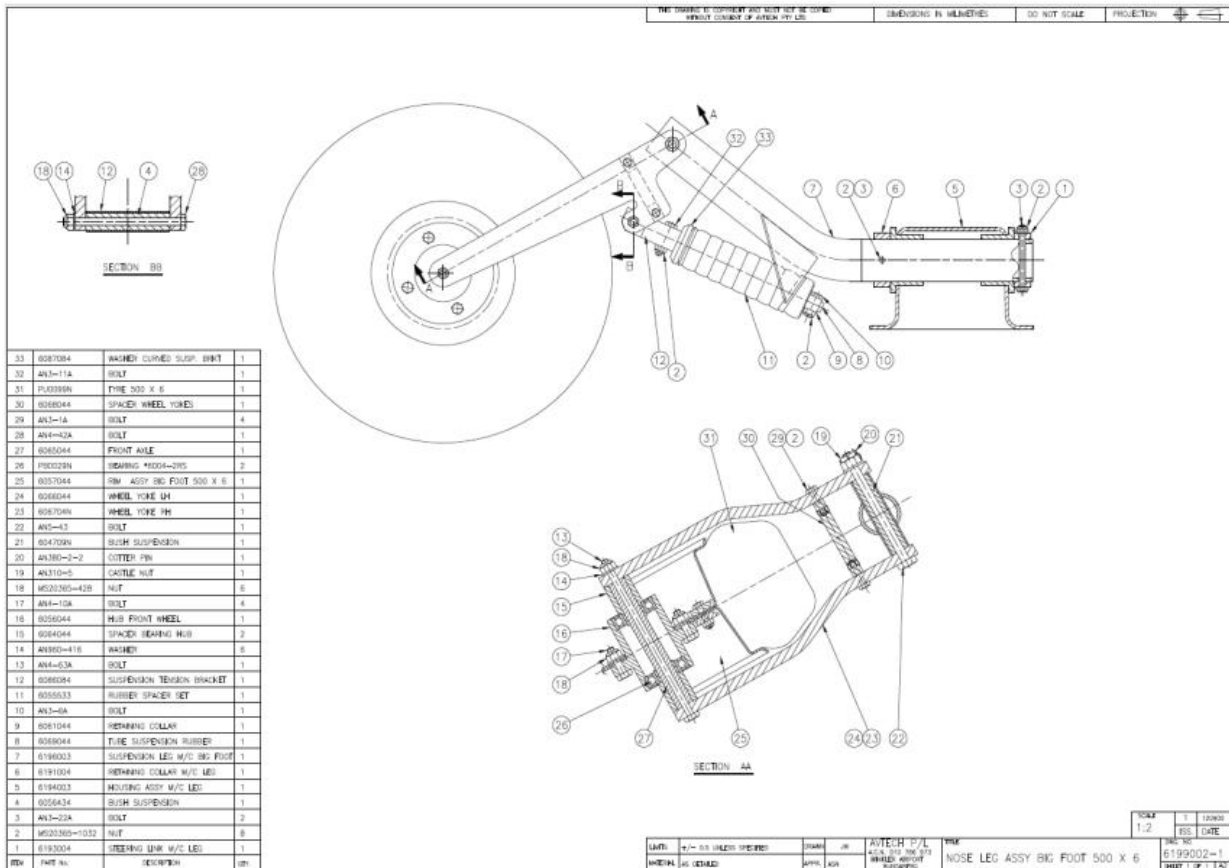


Figure 51 – Fabricated Nose Wheel Yoke Assy

### 7.3.17 Nose Leg Housing

#### 7.3.17.1 DESCRIPTION

- The nose leg housing is a structure bolted on to the lower, middle of the firewall. The nose leg tube runs in Ertalyle bushes which are bonded into this housing.
- Some models use a housing moulded from fiberglass while others are fabricated from bolted aluminium.

#### 7.3.17.2 REMOVAL



Required Tools:	Spanners / Socket Wrench Screw driver Heat gun
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- Before removing the housing the nose leg steering mechanism must be disconnected (Section 7.3.13) and the nose leg removed (Section 7.3.14).
- To remove, remove the bolts holding the housing to the firewall.
- If required, the aluminium housing can be disassembled by removing the assembly cap screws. Note that strong thread retaining compound is used on the cap screws holding the housing together. To remove it may be necessary to heat the part to about 80°C using a heat gun. Take care not to break screws.

#### 7.3.17.3 INSPECTION & REPAIR



Required Tools:	Tools as required in Section 7.3.14.5.
Parts and Material:	Replacement hardware (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- Before removing nose leg assembly, assess end float and radial wear in the nose leg bushes. If necessary the bushes may be replaced as detailed in Section 7.3.14.5.
- Visually inspect fiberglass housing: check for whitening, cracks or tears.
- Visually inspect the flock bead of all housings: check for cracking and other damage.
- Inspect hardware and metallic parts for wear, damage or corrosion.

#### 7.3.17.4 INSTALLATION



Required Tools:	Tools as required for Removal Air compressor Torque wrench
Parts and Material:	Loctite 620 Replacement hardware (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- Reverse procedure above for installation.
- Loctite 620 must be applied to the assembly screws for the aluminium housing:
  - Clean the threads in the aluminium parts using a 1/4" UNC tap.
  - Use compressed air or similar to blow out all blind holes to remove all debris.
  - If re-using hardware, thoroughly clean cap screw threads using a wire wheel or similar to remove all residual thread retaining compound. If new hardware is being used, thoroughly clean all threads using aerosol tool cleaner or similar.
  - Apply a bead of Loctite 620 to each screw and to each female thread. Beads should be approximately the size of a match head.
  - Assemble the parts, using the "solid laminate" torque specified in Table 2.
- Ensure fresh nyloc nuts are used.

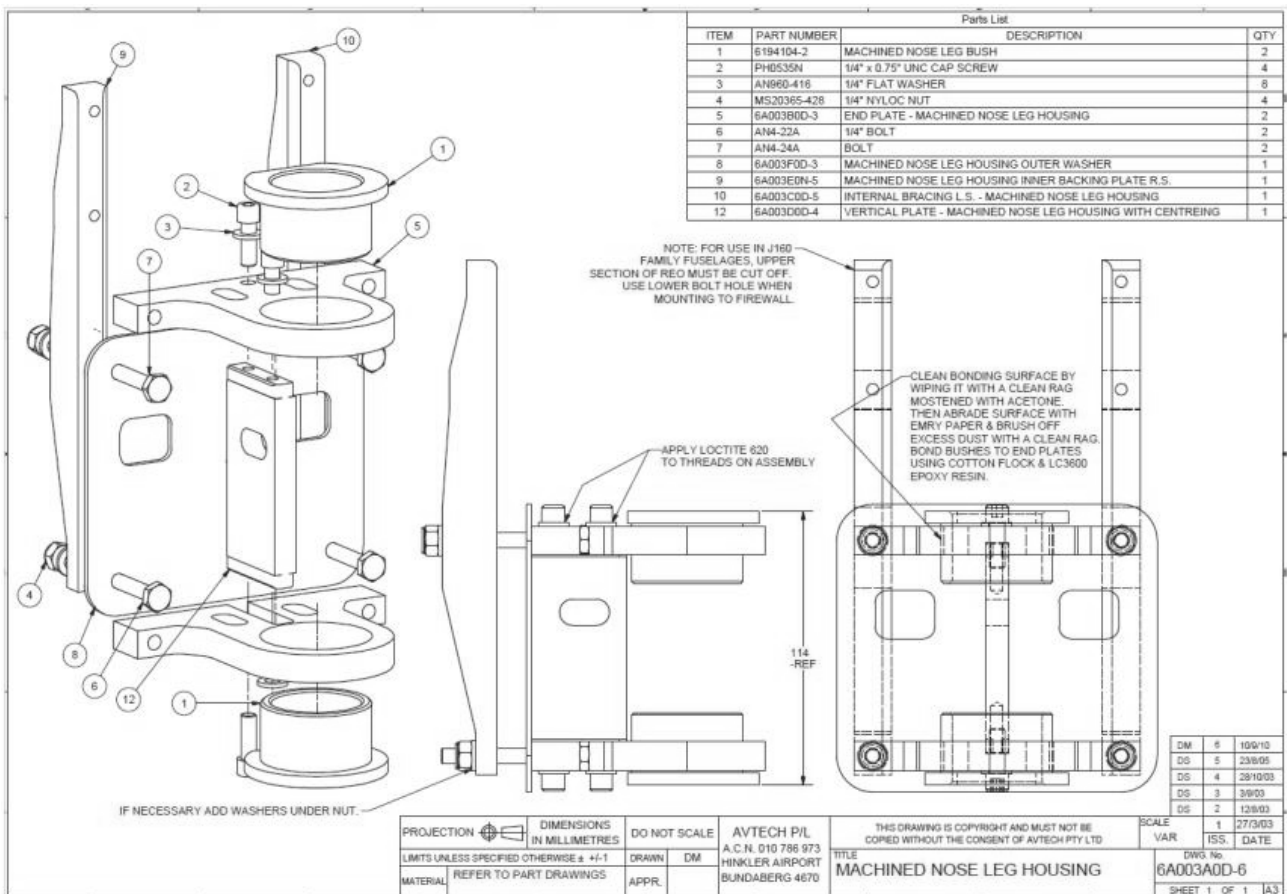


Figure 52 – Machined Nose Leg Housing

**7.3.18 Brake Master Cylinder**

**7.3.18.1 DESCRIPTION**

- The brake master cylinder is located either inside the centre console between the seats or on the front of the main longitudinal beam.
- In all models it is actuated by applying rearward pressure to the brake handle.
- A small reservoir is incorporated into the master cylinder for the fluid supply.

**7.3.18.2 BRAKE MASTER CYLINDER REMOVAL & INSTALLATION (INSIDE CENTRE CONSOLE)**



Required Tools:	Screw drivers Drill Spanners / Socket Wrench
Parts and Material:	Rag
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- The following procedure applies to brake cylinder installations inside the centre console, between the seats:
  1. Remove the flexible hose from one wheel brake assembly and drain the fluid from the brake system.
  2. Drill the rivets holding the master cylinder bracket to the centre console (while it is possible to remove the cylinder from the bracket in-situ it is much more difficult due to the limited access. It is generally faster to drill the rivets the replace them during re-installation.)
  3. Place a rag under the cylinder to catch any drips of brake fluid.
  4. Disconnect flexible hose at master cylinder.
  5. Remove the cylinder and mounting bracket assembly from the console and unbolt the master cylinder retaining bolts.
  6. Plug or cap hydraulic fittings and hoses to prevent the entry of foreign material.
  7. Reverse the preceding steps to install brake master cylinder, then fill and bleed brake system in accordance with Section 7.3.23.

**7.3.18.3 BRAKE MASTER CYLINDER REMOVAL & INSTALLATION (ON THE FRONT OF CENTRE CONSOLE)**

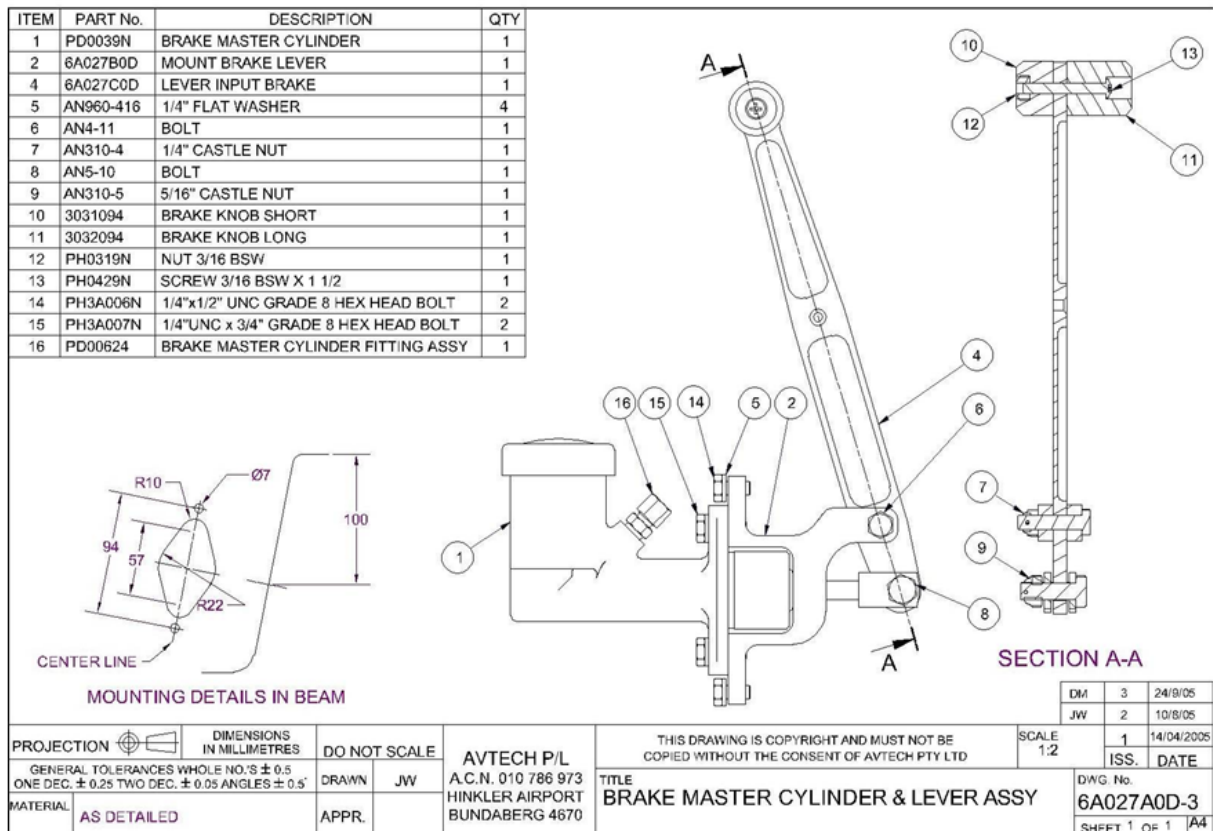


Required Tools:	Screw drivers Spanners / Socket Wrench
Parts and Material:	Plug or Cap
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- The following procedure applies to brake cylinder installations on the front of the centre console:
  8. Remove the flexible hose from one wheel brake assembly and drain the fluid from the brake system.
  9. Unbolt & remove brake handle.
  10. Disconnect flexible hose at master cylinder.
  11. Unbolt master cylinder retaining bolts.
  12. Plug or cap hydraulic fittings and hoses to prevent the entry of foreign material.
  13. Reverse the preceding steps to install brake master cylinder, then fill and bleed brake system in accordance with Section 7.3.23.

**7.3.18.4 BRAKE MASTER CYLINDER REPAIR**

- Repair is limited to installation of new parts, cleaning and adjustment. Use only automotive brake fluid. DO NOT use aircraft grade hydraulic fluid or damage will result.



**Figure 53 – Brake Master Cylinder & Lever Assy (Type 2)**

**7.3.19 Hydraulic Brake Lines**

Required Tools:	Screwdrivers
Parts and Material:	Replacement brake hoses (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

**7.3.19.1 DESCRIPTION**

- Jabiru Aircraft use flexible black nylon brake hoses. On most models they are connected to the master cylinder via a tee-piece – typically located in the main undercarriage channel under the belly of the aircraft.

**7.3.19.1.1 Removal Repair & Installation**

- Repair is limited to replacement.

**7.3.20 Wheel Brakes**

**7.3.20.1 DESCRIPTION**

- The Wheel Brake Assemblies consist of a disc which is attached to the main wheel hub with through-bolts and a floating brake caliper assembly.
- There is 1 calliper fitted to each wheel.



### 7.3.20.2 REMOVAL



Required Tools:	Spanners / Socket wrench Container
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- To remove from the wheel, unbolt the brake cylinder from the backing plate.
- To remove from the aircraft, disconnect the brake line. Use a container to collect the brake fluid draining from the system.
- The brake disc is removed after the wheel is removed and disassembled.

### 7.3.20.3 WHEEL BRAKE INSPECTION AND REPAIR



Required Tools:	Clean cloth Spanners / Socket Wrench
Parts and Material:	Solvent Replacement O-Rings Automotive brake fluid Replacement brake cylinder (if required) Replacement anchor bolts (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. Clean all parts except brake linings in dry cleaning solvent and dry thoroughly.
2. New piston sealing O-Rings should be installed each time the brakes are disassembled. If re-use is necessary, they should be wiped with a clean cloth saturated in automotive brake fluid and inspected for damage.

**NOTE: Thorough cleaning is important. Dirt and chips are the greatest single cause of malfunctions and leaks in hydraulic brake systems.**

3. Check brake linings for deterioration or excessive wear.
4. Inspect brake cylinder bore for scoring. A scored cylinder will leak or cause rapid seal wear. If wear is evident, install a new brake cylinder.
5. If the anchor bolts on the brake assembly are nicked or gouged, replace with new bolts.

### 7.3.20.4 WHEEL BRAKE INSTALLATION



Required Tools:	Spanners / Socket Wrench
Parts and Material:	N/A
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. Place brake calliper assembly in position on backing plate.
2. Install bolts, springs, outboard pad and nuts/washers.
3. Reconnect flexible hose.
4. Visually inspect. Ensure there is clearance between the brake components and the tyre.
5. Fill master cylinder reservoir with brake fluid.
6. Bleed brakes – Refer to Section 7.3.23.

### 7.3.21 Parking Brake

#### 7.3.21.1 DESCRIPTION

- The Parking Brake consists of an over centre cam on the brake handle. Should the cam have insufficient travel for the brakes to hold the aircraft with a propeller thrust of 2500rpm, adjust by one or all of the following:
  1. Adjust brakes as described in Section **Error! Reference source not found.**
  2. Bleed air from brake system as described in Section 7.3.23.

#### 7.3.22 Brake Pad Lining Installation (Solid Rivet retained pads only)



Required Tools:	Spanners / Socket Wrench 1/8" punch and hammer Drill
Parts and Material:	Replacement pads and rivets
Type of Maintenance:	Heavy Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- New brake linings should be installed when the existing linings are worn to expose the rivet heads.
- To replace outboard lining:
  1. Remove bolts securing outboard brake pad and brake cylinder to backing plate.
  2. Remove outboard brake pad.
  3. Place brake pad on a table with lining side down flat. Centre a 1/8" (or slightly smaller) punch on the rolled rivet and hit the punch sharply with a hammer (alternatively the rivet may be drilled – however take care not to damage the mount plates with the drill). Punch out all rivets securing the lining to the pad plate.

**NOTE: A replacement kit for brake pads and rivets is available from Jabiru Aircraft.**

  4. Align the new lining on the pad plate and place the brake rivet in the hole with the rivet head in the lining. Place the head against an anvil.
  5. Centre the rivet setting punch on the lips of the rivet. While holding the pad plate down firmly against the lining, hit punch with hammer to set the rivet. Repeat blows on the punch until the lining is firmly against the pad plate.
  6. Realign the lining of the pad plate and install and set rivets in the remaining holes.
  7. Replace the brake pad and refix with through-bolts and springs.
- To replace inboard lining:
  1. On aircraft with "Quick Change" brakes, once the calliper assembly bolts are removed the inner pad and mounting plate can be removed.
  2. For models without quick change brakes the calliper mount plate must be removed from the aircraft: Remove wheel assembly and stub axle from undercarriage leg – see Sections 7.3.5 and 7.3.6.
  3. Remove brake cylinder backing plate.
  4. Replace lining in accordance with details above.
  5. If required, re-fit the axle and wheel assembly as detailed in Sections 7.3.5 and 7.3.6.
  6. Install outboard brake pad and refix with through-bolts and springs.

7.3.23 Brake System Bleeding



Required Tools:	Spanners / Socket wrench
Parts and Material:	Automotive brake fluid
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. Fill the brake master cylinder with automotive brake fluid.
2. Loosen the bleed nipple at the brake cylinder.
3. Pull the handbrake back to the rear stop & hold in same position until nipple has been tightened. Release the hand brake & repeat step 3 until all air is expelled from lines.

**NOTE: Ensure brake master cylinder remains full above the outlet hose.**

4. The brake callipers have been designed so that when they are in their installed position on the aircraft any air bubbles will naturally move towards the bleed nipple outlet. However, for dual brake systems there is potential for air bubbles to be caught at the T-piece in the line near the wheel. If you are having difficulty bleeding a dual calliper brake system try removing both callipers from the aircraft temporarily and holding 1 calliper above the “T”. Also ensure that the “T” is rotated. Leave the assembly in this position for 5 – 10 minutes to allow any air bubbles to make their way into the high calliper then re-assemble and bleed as normal.
5. When air is fully expelled, tighten bleed nipples & check fittings for leaks.
6. Repeat steps 1-4 for other side brake.

**WARNING**

**Use only automotive brake fluid. DO NOT use aircraft hydraulic fluid or damage will result.**

**WARNING**

**The calliper mount plate can be damaged by repeated bending, sharp bending or tool marks. Care must be taken.**

7.3.23.1 BRAKE DISC WEAR LIMIT

1. Measure the thickness of the brake disc in an area where it is not being worn – i.e. on one of the hub legs. Compare this measurement to the wear face of the disc. The maximum wear (i.e. difference between the two measurements) is 2.0mm.
2. If brake disc is below minimum thickness, install a new part. For directional brake discs, refer to Figure 45 for installation details.

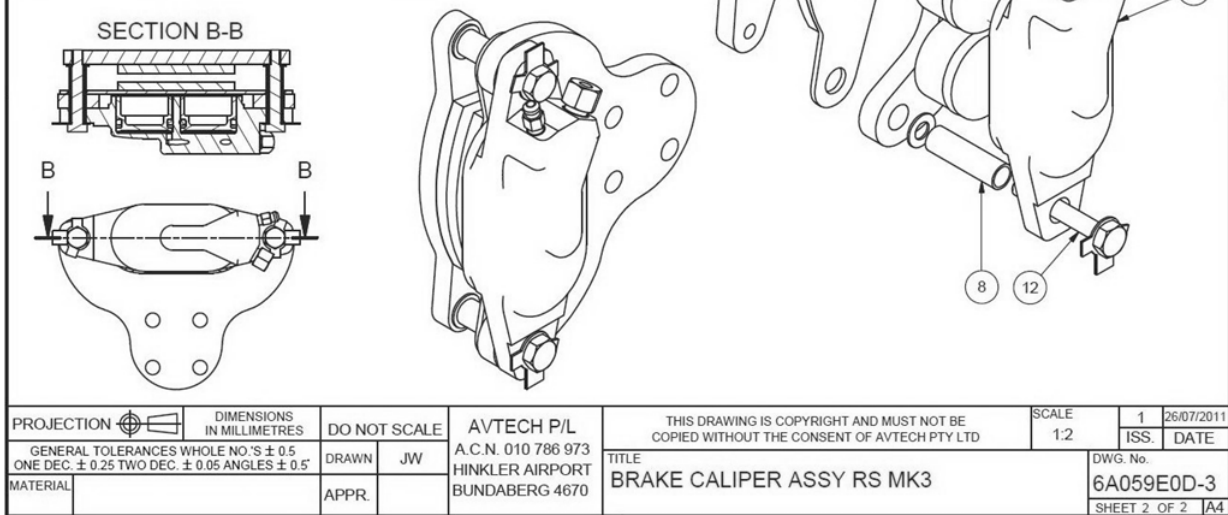
7.3.24 Trouble Shooting - Brakes

Table 7 – Trouble Shooting – Brakes

Trouble	Probable Cause	Remedy
Dragging brakes	Brake handle binding	Check and adjust
	Worn or broken master cylinder piston return spring	Repair or install new master cylinder
	Restriction in hydraulic lines or in master cylinder	Drain brake line, clear with compressed air. If cleaning lines fails, the master cylinder may be faulty and should be repaired or replaced.

	Brake callipers not aligned with disc	Check and adjust
Brakes fail to operate	Leak in system	If master cylinder or wheel cylinders are leaking, repair or install new parts.
	Air in system	Bleed system
	Lack of fluid in master cylinder	Fill and bleed system
	Master cylinder defective	Repair or install new parts
	Brake pads worn	Replace with new parts

ITEM	PART No.	DESCRIPTION	QTY
1	6A059C0D-1	MACHINED DUAL PISTON HOUSING RS MK3	1
2	6A055G0D-1	PERFORMANCE BRAKE PISTON	2
3	6100094-4	NIPPLE BRAKE BLEEDER	1
4	6207324-1	1.25" BRAKE CYLINDER FITTING	1
5	6A059E8D-1	LOCK TAB MK3 BRAKE	2
6	PD0082N	3/16" FERRULE (NYLON BRAKE LINE)	1
7	6A059E1D-2	CALIPER MOUNT PLATE MK3 BRAKE	1
8	6A059E2D-1	SLEEVE CALIPER MOUNT MK3 BRAKE	2
9	6A059E3D-1	INNER BRAKE PAD ASSY MK3 BRAKE	1
10	6A059E5D-1	OUTER BRAKE PAD ASSY MK3 BRAKE	1
11	PG4A002N-1	RV0214 O-RING	2
12	AN4-15A	1/4" BOLT	2
13	AN960-416L	1/4" THIN FLAT WASHER	2



**Figure 54 – Single Calliper Detail (Mk III brakes)**

## 8 Aileron Control System

### 8.1.1 Aileron Control System

#### 8.1.1.1 DESCRIPTION

- The general arrangement of the aileron system used in Jabiru Aircraft is shown in drawings below: **Error! Reference source not found.** and **Error! Reference source not found.**
- The aileron control system is comprised of a control column and two enclosed push-pull cables fitted with spherical bearings.
- 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

All spherical bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

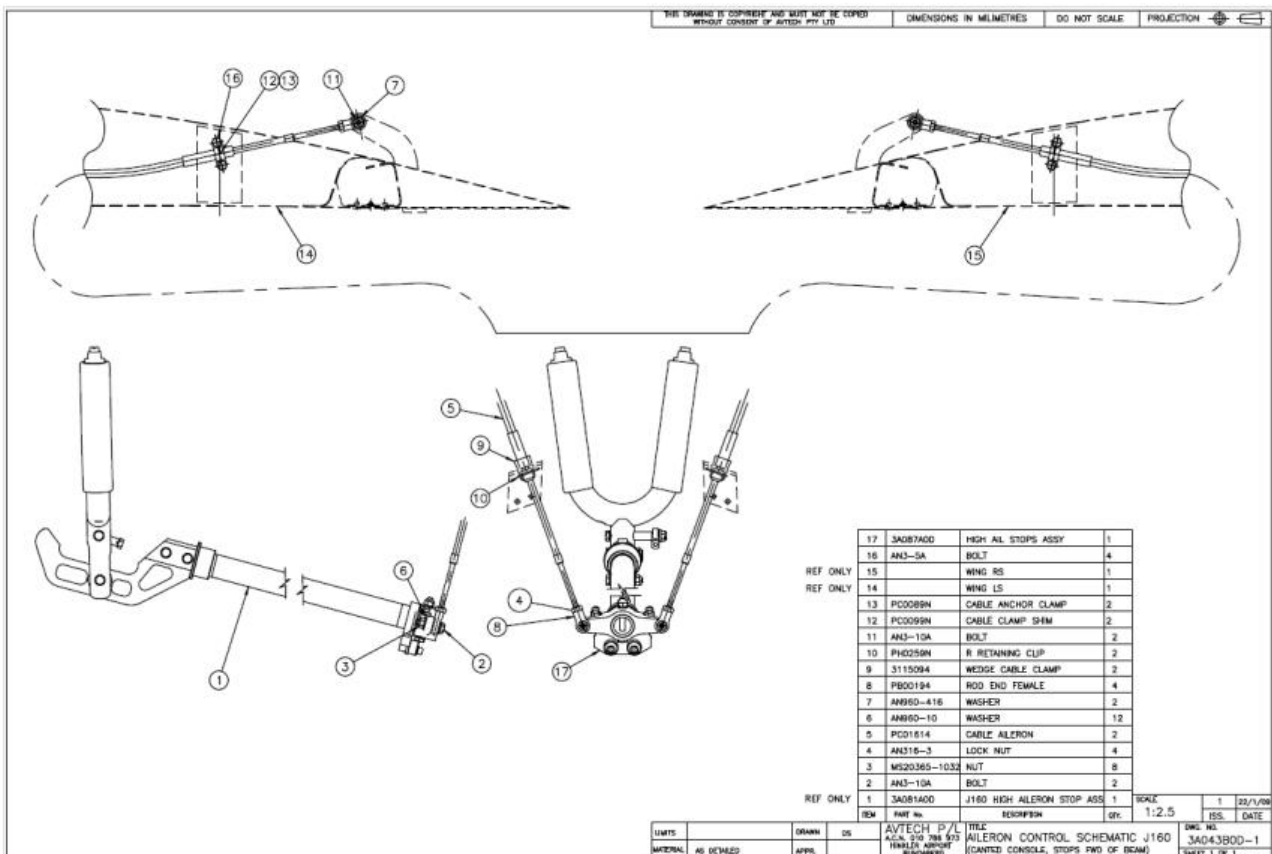


Figure 55 – Aileron System Schematic – Type 3.

### 8.1.2 Control Column

### 8.1.3 Description

- Refer to drawings below: **Error! Reference source not found.**, **Error! Reference source not found.** and Figure 55.
- Jabiru Aircraft have a single control shaft running between the seats on which the control stick is mounted.

8.1.3.1 CONTROL COLUMN REMOVAL



Required Tools:	Spanners / Socket wrench Screwdrivers
Parts and Material:	Replacement bushes (if required)
Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. If required, unbolt & remove the control stick from the pivot plate.
2. Unbolt and remove the aileron cable ends from the aileron drive arms at the rear end of the control column.
3. Unbolt & remove the aileron drive yoke from the rear end of the control column.
4. Draw the column forwards and out of the centre console (note that it may be necessary to partially or fully remove the instrument panel to allow removal of the shaft).

8.1.3.2 CONTROL COLUMN INSPECTION & REPAIR

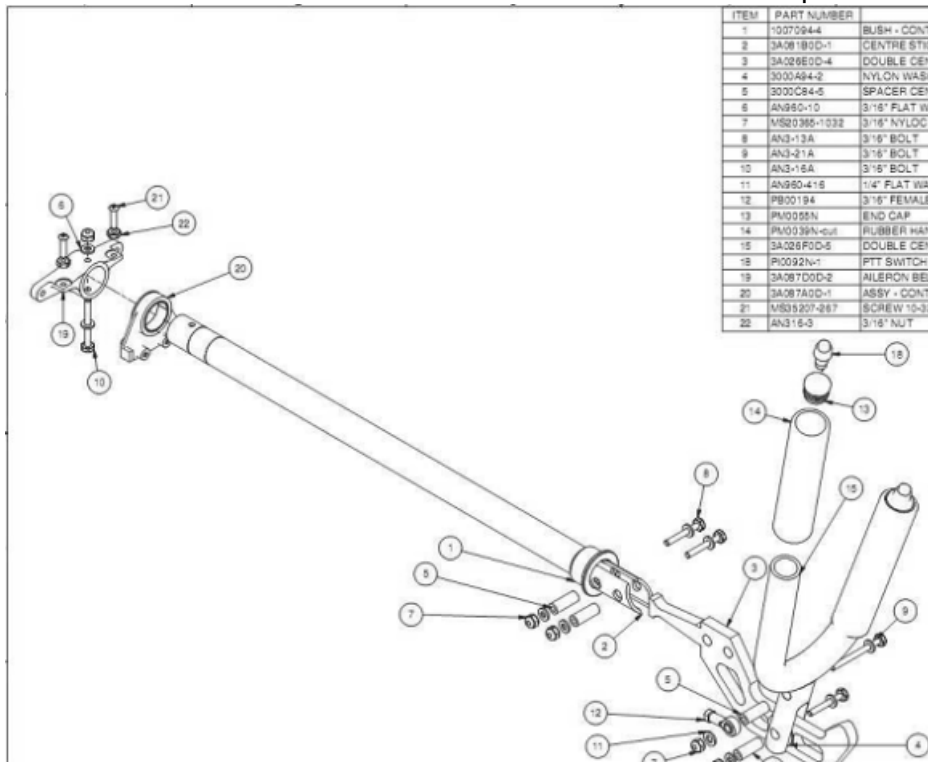
- Before disassembly check the shaft installation for end float and radial wear in the bushings. Excess wear must be corrected by replacing the bushings.
- Repair is limited to replacing worn parts.

**WARNING**

All spherical bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

8.1.3.3 CONTROL COLUMN INSTALLATION

- Installation is the reverse of the procedure given above.



ITEM	PART NUMBER	DESCRIPTION	QTY
1	1007094-4	BUSH - CONTROL COLUMN	1
2	3A08180D-1	CENTRE STICK PIVOT SHAFT	1
3	3A029E0D-4	DOUBLE CENTRE STICK PIVOT PLATE	1
4	3002A84-2	NYLON WASHER	2
5	3002C84-5	SPACER CENTRAL RIVOT	4
6	AN980-10	3/16" FLAT WASHER	6
7	N580385-1032	3/16" NYLOC NUT	6
8	AN3-13A	3/16" BOLT	3
9	AN3-21A	3/16" BOLT	1
10	AN3-16A	3/16" BOLT	1
11	AN980-418	1/4" FLAT WASHER	1
12	PB0019A	3/16" FEMALE ROD END	1
13	PM0055N	END CAP	2
14	PM0039N-cut	RUBBER HAND GRIP	2
15	3A026F0D-5	DOUBLE CENTRE STICK HANDLE ASSY	1
16	PI0092N-1	PTT SWITCH (SPST MOMENTARY ON, 3A-125V(1A-250V))	2
17	3A087D0D-2	AILERON BELLCRANK INBUILT STOPS	1
20	3A087A0D-1	ASSY - CONTROL SHAFT END HIGH AIL STOPS, SKF BEARING	1
21	M505207-267	SCREW 10-32 X 3/4	2
22	AN316-5	3/16" NUT	2

PROJECTION	DIMENSIONS IN MILLIMETRES	DO NOT SCALE	AVTECH P/L A.C.N. 913 798 973 HENKLER AIRPORT BUNDABERG 4670	THIS DRAWING IS COPYRIGHT AND MUST NOT BE COPIED WITHOUT THE CONSENT OF AVTECH PTY LTD	SCALE NTS	DATE 18/05/06
GENERAL TOLERANCES UNLESS OTHERWISE SPECIFIED ONE DEC. 0.25 TWO DEC. 0.20 ANGLES 0.5	DRAWN JW	APPR.	TITLE CONTROL STICK ASSY	DWG. No. 3A081A0D-4	SHEET 1 OF 1	DATE



**Figure 56 – Control Column Assy – Type 3**

**8.1.4 Control Cables**

**8.1.4.1 DESCRIPTION**

- Control Cables are of the enclosed push-pull type, fitted with spherical bearings at both ends. To operate, the outer cover of the cable must be clamped firmly at each end.

**8.1.4.2 CONTROL CABLE REMOVAL**

- Unbolt the connections (rod end bearings) at either ends of the cable.
- Unbolt the clamps at either end of the cable.
- Where required, remove any ties etc used to restrain the cables in the aircraft.
- Tie a string or light wire to one end of the cable.
- Draw the cable out of the aircraft, leaving the string/wire in place to allow installation of a replacement part.

**8.1.5 Control Cable Inspection & Repair**



<b>Required Tools:</b>	
<b>Parts and Material:</b>	
<b>Type of Maintenance:</b>	Line Maintenance
<b>Level of Certification:</b>	LSA repairman (inspection or maintenance)

- Control cables must be inspected in accordance with the details given in Section 6.16. Note that this is not normally part of a 100-Hourly / Annual inspection. The cable clamp inspections given below are a part of a normal 100-Hourly / Annual however.
- Repair of control cables is limited to the installation of new parts.
- The Figures below show various pictures of the cable clamps and cable assemblies. Points to note, and which must be checked during routine maintenance, include:
  - Primary cables have a green outer sheath with machined end fittings.
  - Trim cables have a black outer sheath with a visible crimp on the end fitting.
  - Primary cable clamps are smaller than trim cable clamps and have square corners.
  - Primary cable backing plates are smaller, have a slotted hole and are made from aluminium.
  - The two cables are made by different manufacturers and the clamps are supplied by each manufacturer to suit. The correct type of clamp must be used with each cable.
  - The rubber seal of primary control cables must be pulled back slightly to allow the clamps to be installed properly.
  - Both cables use clamps which work by the same means: the clamp has a locking tang which inserts into a groove machined in the cable end fitting.





Figure 57 – Clamp Comparison (Primary Cable Clamp Upper on Right Picture)

Trim Cable Clamp  
(note that it is larger than primary control cable clamp)

Primary Control Cable Clamp  
(note square corner of clamp)

Rudder cable clamp properly installed.  
Note seal pulled back slightly

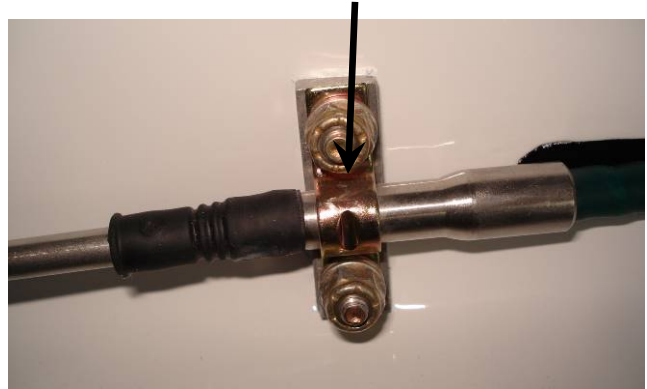
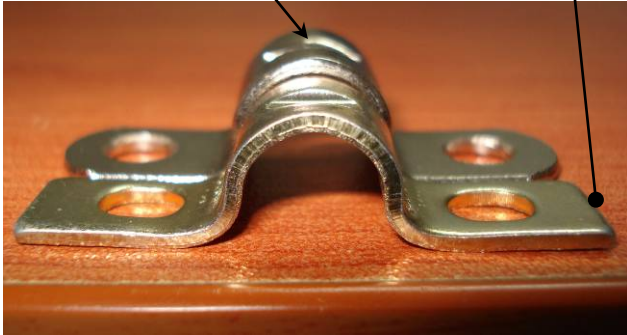


Figure 58 – Clamp Comparison & Installation (Rudder Cable)

Aileron cable clamp properly installed  
(viewed through inspection window).

Elevator cable clamp properly installed



Figure 59 – Clamp Installations (Elevator & Aileron)

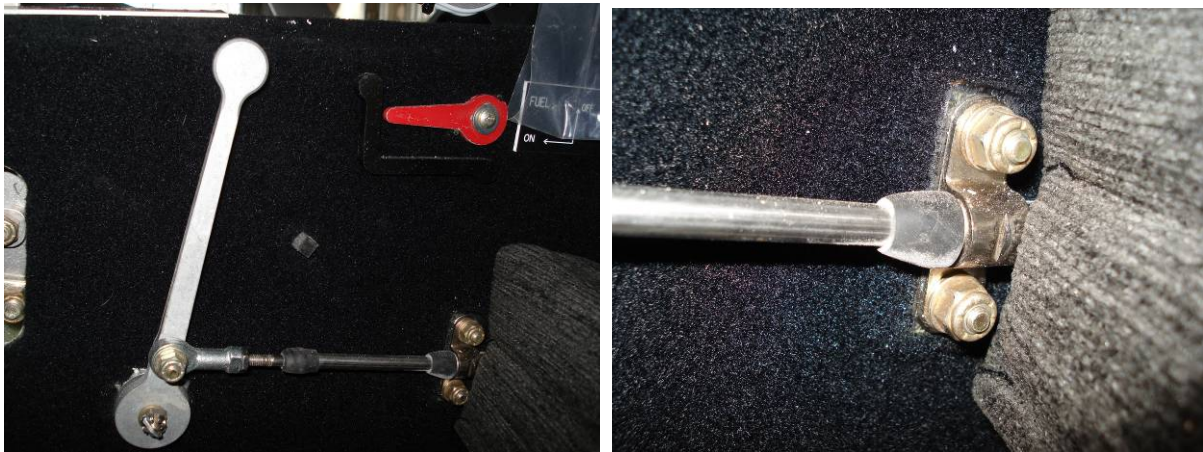


Figure 60 – Trim Cable Clamp Installation



Figure 61 – Cable & Clamp Comparison

Clamps correctly assembled. Locking tangs correctly fitted, clamp fitting snugly around body of cable.

Clamps incorrectly assembled. Locking tangs misaligned, clamp not fitting properly around body of cable.

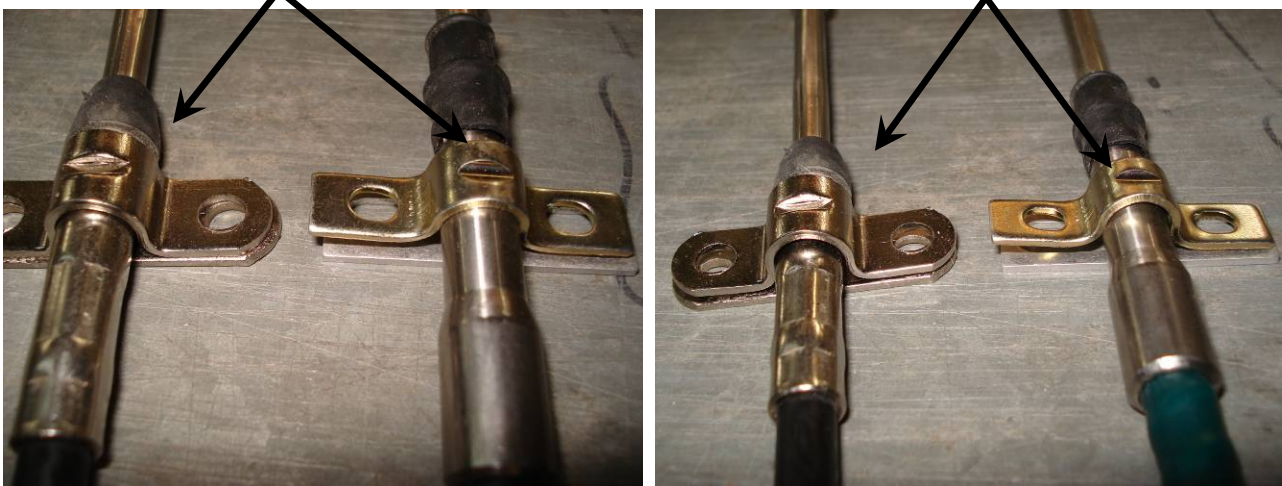


Figure 62 – Correct and Incorrect Clamp Installation

**8.1.5.1 CONTROL CABLE INSTALLATION**



Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- Installation procedure is the opposite of removal procedure outlined above.
- Ensure the cable clamps used match the cables and are properly installed.

**WARNING**

**Failure to properly install control cables may result in loss of control of the aircraft.**

### 8.1.6 Ailerons

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 8.1.6.1 DESCRIPTION

- Ailerons comprise a moulded and bonded monocoque structure embodying a composite drive arm. While most models employ a conventional aileron some J170 variants employ a Friese aileron as shown in **Error! Reference source not found.**
- Details of typical aileron installations are shown as Figures in Section 7.2.

#### 8.1.6.2 AILERON REMOVAL



1. Unbolt cable from aileron control arm.
2. Loosen screws in hinge pin retainers and lift hinge pin retainer away from the hinge pin. It is not necessary to completely remove these parts.
3. Remove hinge pins.
4. Remove aileron.

### WARNING

**All spherical bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

#### 8.1.6.3 AILERON INSPECTION & REPAIR



- Inspect ailerons for any signs of delamination or cracking. Pay particular attention to the Drive Arm and hinges and their surrounding areas.
- Inspect the top front of each aileron for any signs of rubbing against the wing at full up deflection: when the aileron hinge is pressed up using thumb pressure there should still be clearance between the aileron and the wing. Section 6.17 refers.
- Repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

#### 8.1.6.4 AILERON BALANCING



- The aileron does not have balancing weights fitted. The Aileron used for the J160-C does however have limits for weight and hinge moment which are applicable to all models using the same aileron (1215mm nominal length, non-Friese type):
  - Weight 1150g +/- 100g
  - Hinge Moment 94000g.mm +/- 4000g.mm
- The aileron balance is checked at the factory during assembly and unless they are repaired or refinished the balance should not change.
- To balance the ailerons they must be removed from the aircraft. Balancing is done around the hinges with the hinge pin line horizontal and on the high side of the ailerons. The hinge moments can be measured by measuring the upwards force needed to maintain the flat side of the aileron horizontal. Note that as this load is small, a finely graduated spring balance or similar measuring instrument will be required.

#### 8.1.6.5 AILERON INSTALLATION

- For aileron installation, reverse the procedure detailed for removal above.

8.1.7 Aileron Rigging



Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

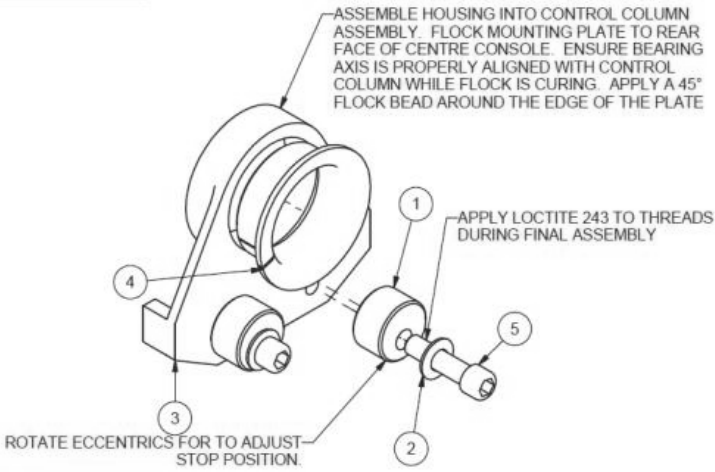
- With the control stick in the neutral position, use a straight-edge not less than 1 metre long. Hold the straight-edge flush on the underside of the wing aerofoil and adjust aileron to sit on the straight-edge. Make this adjustment with the cable rod-ends, ensuring that on completion the locknut is tight on the rod-ends and that cable is visible through the inspection hole in the rod-end.
- Check UP travel on both ailerons using the Aileron Rigging Template (see Appendix 3).
- Use the Aileron Control Stop adjustment on the central control shaft to adjust the total aileron movement (i.e. UP travel) and use cable adjustment as previously described to proportion UP and DOWN travel. Note that while it is possible to adjust the Type 3 aileron stops using the eccentrics using the limit screws shown in Figure 56 is easier.
- DO NOT move the Cable Anchors – these positions have been set using a jig.

**WARNING**

The control cable must be connected to the same side of the control column bellcrank as the wing to which the aileron is fitted, otherwise control surface reversal will result.

**DO NOT CROSS CABLES**

Parts List			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	3A087C0D-1	AILERON STOP ECCENTRIC	2
2	PH4A003N	3/16" BELLEVILLE WASHER	2
3	3A087B0D-1	SKF BEARING MOUNT / AIL STOP PLATE	1
4	PB3A003N-1	TOP-HAT BUSH. 28 OD, 25 ID, 12 LONG, 35 OD FLANGE. SKF PCMF252811.5B	1
5		3/16" x 3/4" UNC CAP SCREW	2

PROJECTION	DIMENSIONS IN MILLIMETRES	DO NOT SCALE	AVTECH P/L A.C.N. 010 786 973 HINKLER AIRPORT BUNDABERG 4670	THIS DRAWING IS COPYRIGHT AND MUST NOT BE COPIED WITHOUT THE CONSENT OF AVTECH PTY LTD	SCALE NTS	1	28/11/06
GENERAL TOLERANCES WHOLE NO'S ± 0.5 ONE DEC. ± 0.25 TOW DEC. ± 0.05 ANGLES ± 0.5°		DRAWN DS		TITLE ASSY - CONTROL SHAFT END HIGH AIL STOPS, SKF BEARING	DWG. No. 3A087A0D-1	ISS	DATE
MATERIAL	REFER TO PART DRAWINGS	APPR.				SHEET 1 OF 1   A4	

Figure 63 – Aileron Stops – Type 3

## 8.2 Wing Flap Control System

### 8.2.1 Wing Flap Control System

#### 8.2.1.1 DESCRIPTION

- For aircraft with electric flaps the control system comprises a switch mounted on the instrument panel, a position indicator mounted on the windscreen / door pillar and an electronic linear actuator-driven common shaft assembly, with pushrods connecting to the flap control surface horns.
- Models with manual flaps retain the same shaft assembly inside the cabin, driving the flaps via pushrod, however in these aircraft a manual lever located above the pilot's door drives the system.
- Refer to sections below for details on removal, maintenance and installation of the various parts of the system.
- 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

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

#### 8.2.1.2 OPERATIONAL CHECK

- Operate flaps through their full range of travel, observing for uneven or jumpy motion or binding in the system. Ensure flaps are moving together through their full range of travel. Manual Flap Lever Assy

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 8.2.1.3 DESCRIPTION

- Many Jabiru Aircraft are fitted with a manual flap system similar to that shown in **Error! Reference source not found.** In these systems the pilot pulls down on the lever to lower the flaps.
- 3 positions are available: up, first stage and second stage. The positions are controlled by the position of holes in the lever mounting plate.

#### 8.2.1.4 REMOVAL



- Apply heavy duty tape or similar to both wing flaps, holding them up.
- Remove the cotter pin and nut from the lever. Remove the lever from the mount plate.
- Remove the screw holding the drive shaft to the handle.

#### WARNING

Do not allow flaps to drop when disconnected from the handle or damage to the flaps, wings or fuselage may result.

#### WARNING

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

**8.2.1.5 INSPECTION & REPAIR**



- Visually inspect the handle for wear or cracking of the fiberglass. Small cracks between the moulded handgrip and the structural plate forming the handle may be repaired using 5-minute araldite.
- Inspect hardware for damage and replace as necessary.

**8.2.1.6 INSTALLATION**

- For installation reverse the removal procedure.
- Ensure tape is removed from flaps and an operational test carried out before use.

**8.2.2 Electric Flap Drive Assembly**

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)



**8.2.2.1 DESCRIPTION**

- The flap position controlling switch uses a manual toggle switch to control the flap deflection.
- A linear actuator is mounted in the wing root (inside the cabin) and drives the flap cross shaft directly.
- Drawings of the systems are shown as Figure 66 through to Figure 72

**8.2.2.2 REMOVAL**

- Apply heavy duty tape or similar to both wing flaps, holding them up.
- Un-bolt the motor from the flap cross shaft, position indicator and mounting bracket.
- Disconnect motor wires. Ensure that wires are marked to allow re-assembly in the same orientation.
- Remove actuator.

**WARNING**

**Do not allow flaps to drop when disconnected from the motor or damage to the flaps, wings or fuselage may result.**

**WARNING**

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

**8.2.2.3 INSPECTION & REPAIR**



- Note that while the pictures below show the motor removed, it is possible to carry out this work with the motor still fitted to the aircraft.
- Remove the two screws then take off the motor cover as shown in Figure 64.
- Figure 64 shows a close-up picture of the commutator ring. The unit in this picture is very dirty and badly needs cleaning.
- Use a rag lightly moistened with solvent (such as acetone) to remove as much of the black material from the ring as possible.
- Use a tooth brush or other similar small brush to clean between the segments of the ring as much as possible. The brush may be moistened with solvent.



- Care must be taken remove the black material from the motor – as it is conductive it could cause a short circuit or other problem if allowed to drip into the motor base.
- Allow the unit to dry fully.
- Re-assemble, taking care to line up the key slots on the motor housing.
- Test and repeat cleaning process if required.

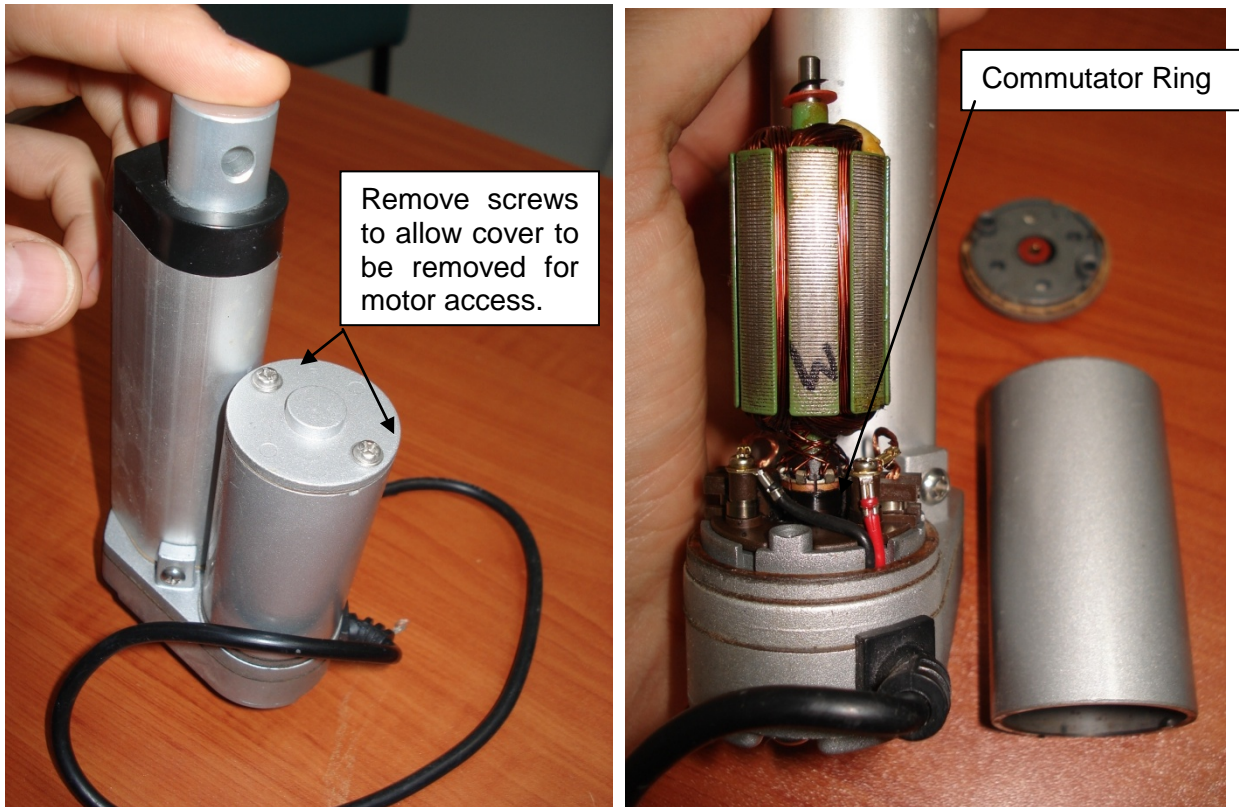


Figure 64 – Linear Actuator Disassembled

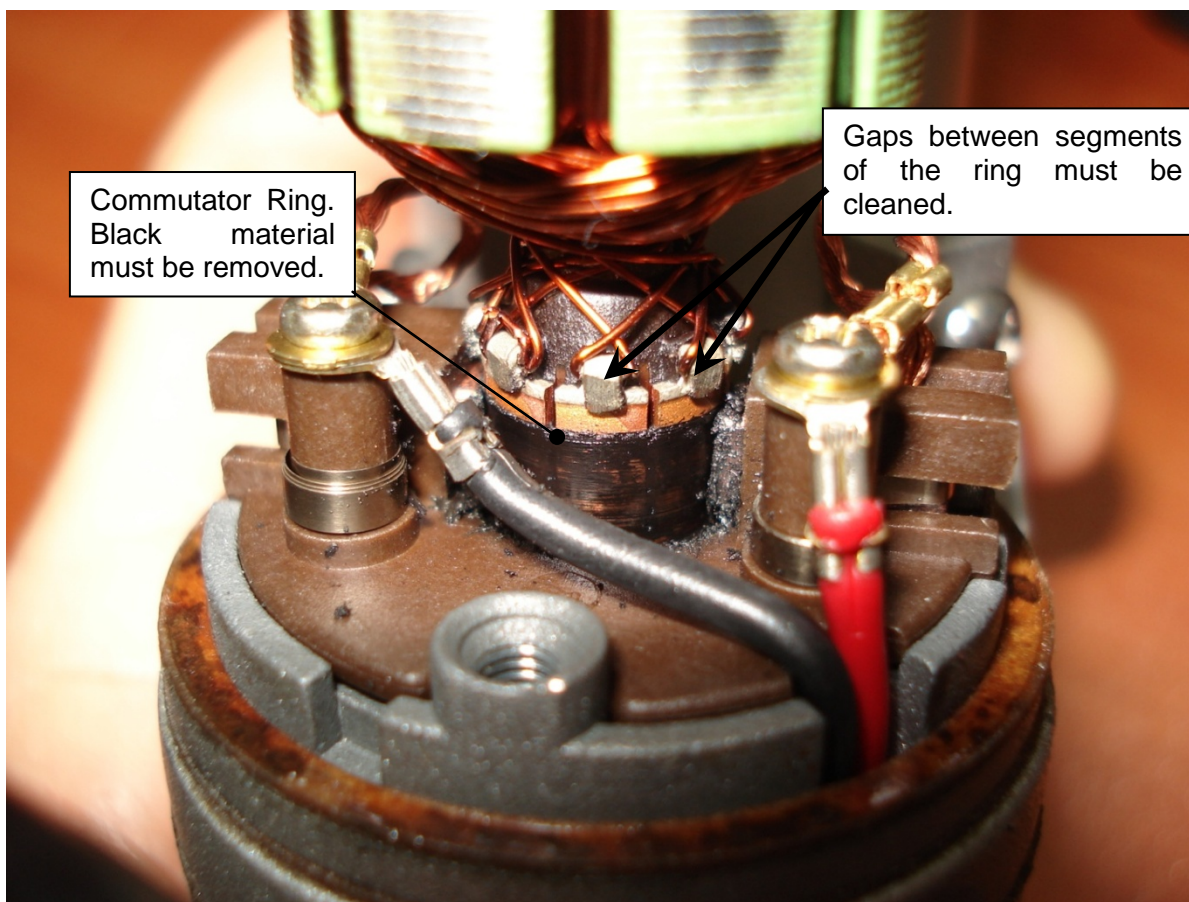


Figure 65 – Commutator Ring Close-Up

#### 8.2.2.4 INSTALLATION



- Installation is the reverse of removal.
- Ensure the flap position indicator is positioned correctly.
- Ensure tape is removed from flaps and an operational test carried out before use.

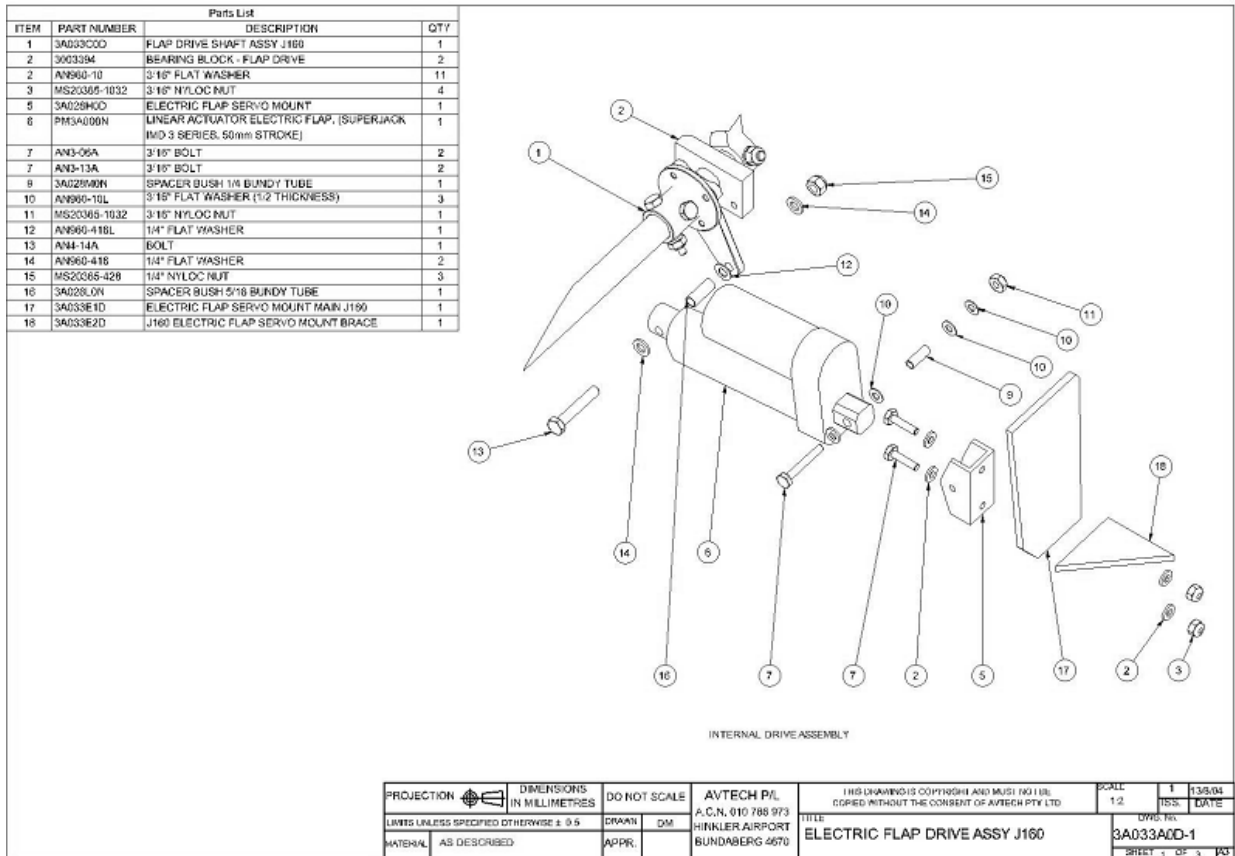


Figure 66 – Flap Controls – Sheet 1 (Fibreglass Motor Mount)

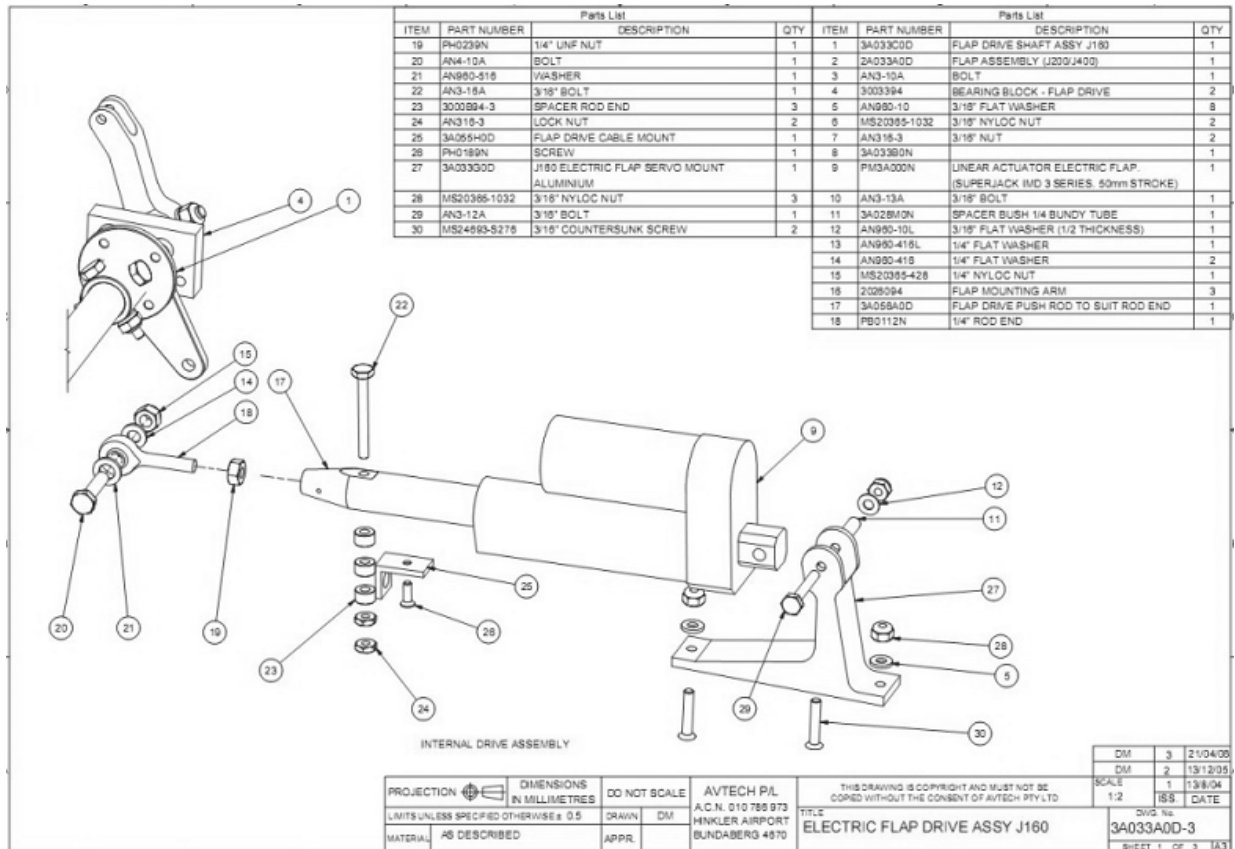


Figure 67 – Flap Controls – Sheet 1 (Aluminium Motor Mount)

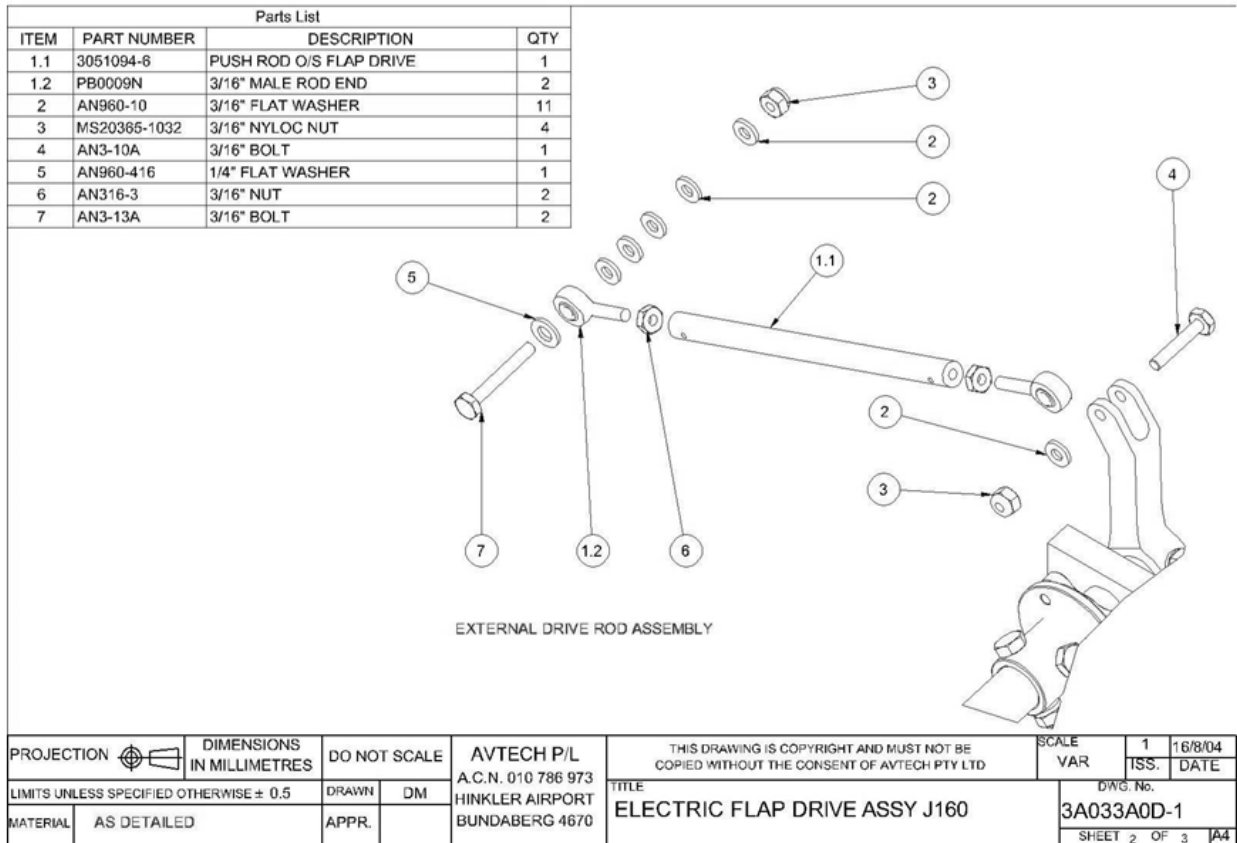


Figure 68 – Flap Controls – Sheet 2

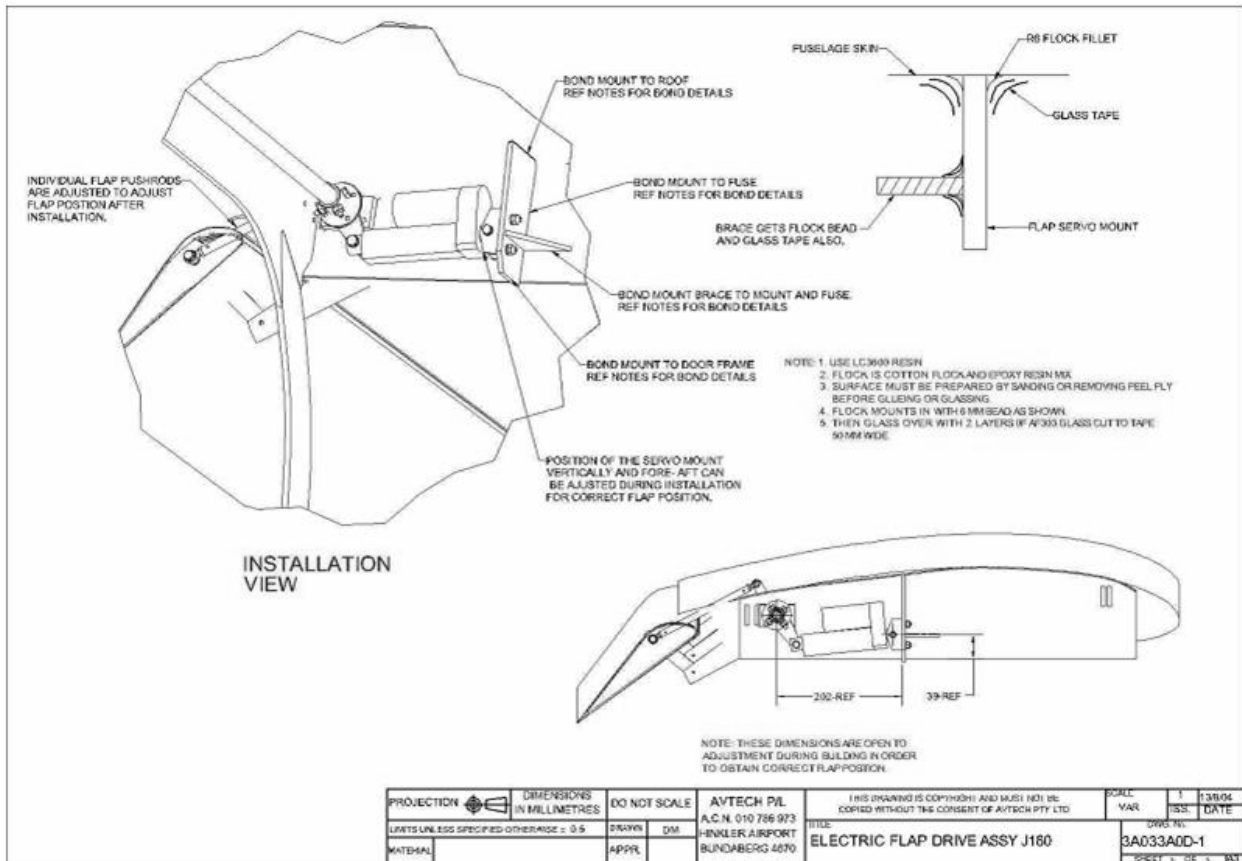


Figure 69 – Flap Controls – Sheet 3 (Fibreglass Motor Mount)

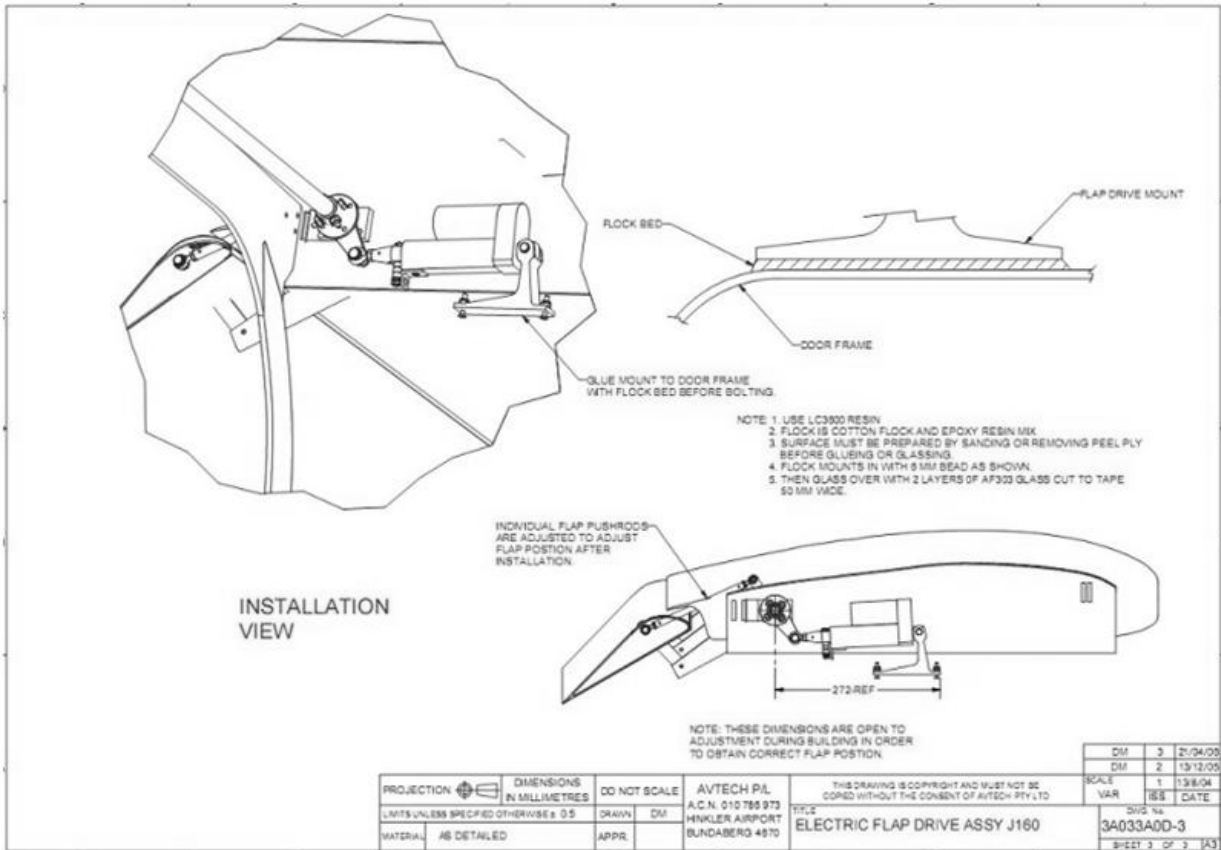


Figure 70 – Flap Controls – Sheet 3 (Aluminium Motor Mount)

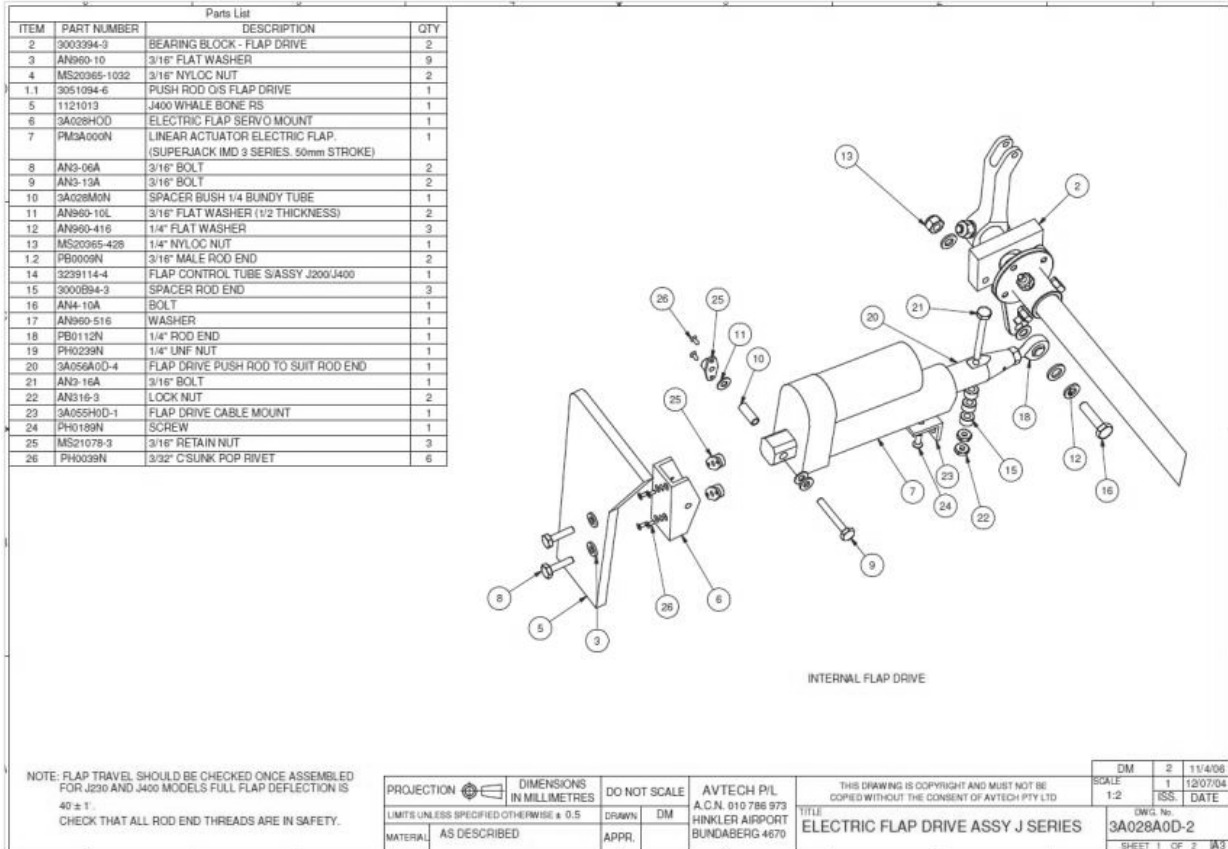


Figure 71 – J200 Family Electric Flap System Sheet 1

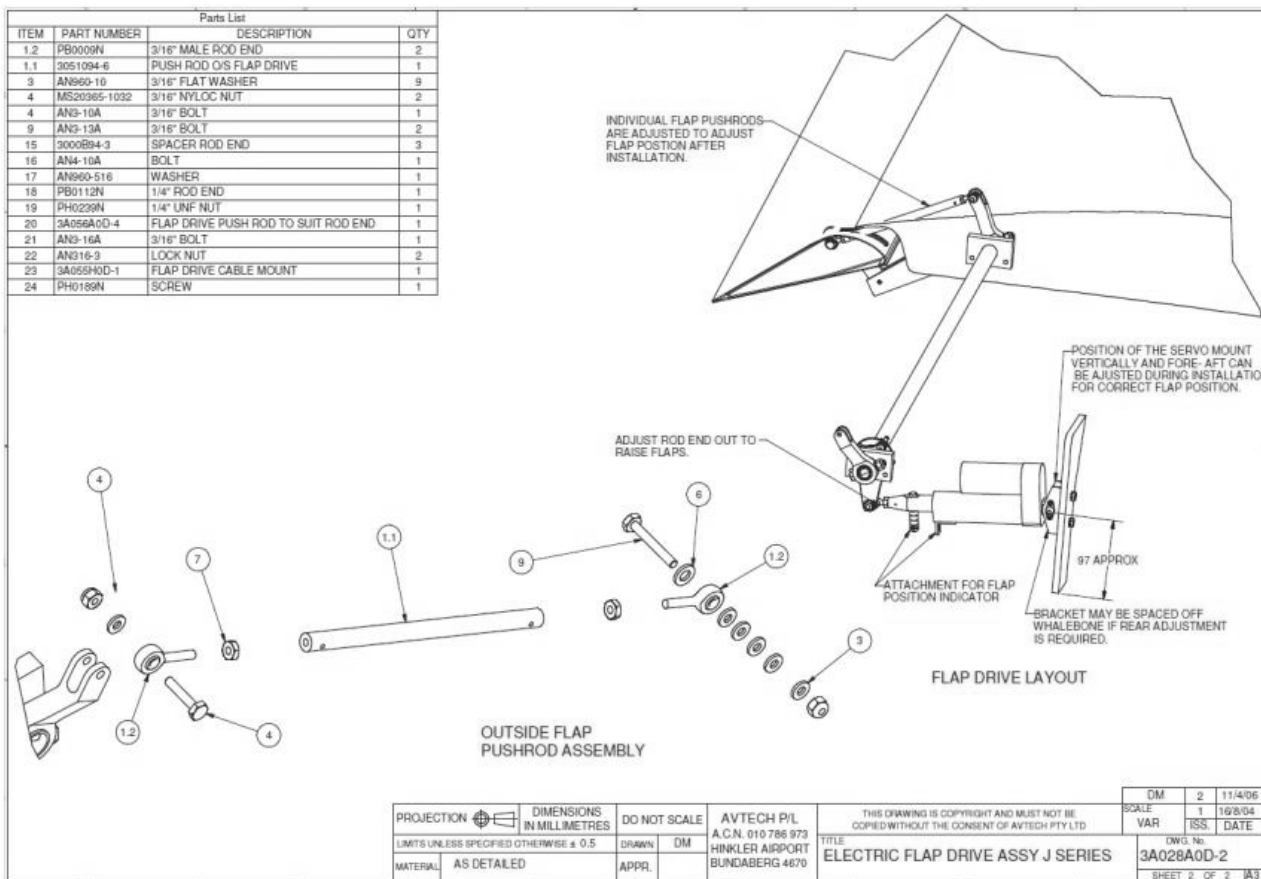


Figure 72 – J200 Family Electric Flap System Sheet 2

### 8.2.3 FLAP Cross SHAFT ASSEMBLY

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 8.2.3.1 DESCRIPTION

- As shown above the flaps are driven via a shaft which runs from one side of the fuselage to the other.
- In turn this shaft is an assembly of 2 different sized steel tubes with input and output arms attached.

#### 8.2.3.2 FLAP CROSS SHAFT REMOVAL



- Remove one wing to allow removal of shaft. Refer to Section 7.2 for details on wing removal procedure.
- Either use heavy duty tape to hold the remaining flap in the up position or remove the flap from the aircraft.
- Disconnect the flap drive motor or manual lever from the cross shaft input arm.
- Remove external flap drive arm from the end of the shaft nearest the remaining wing.
- Remove the bolts holding the input arm to the flap cross shaft. If fitted, it will be necessary to remove any upholstery and paint from the shaft to allow it to be drawn out through the bearings on the sides of the fuselage.
- Draw the tube out of the fuselage.

8.2.3.3 FLAP CROSS SHAFT INSPECTION & REPAIR



- Repair is limited to replacing worn parts.
- Inspect for corrosion or damage to any parts.

8.2.3.4 FLAP CROSS SHAFT INSTALLATION

- Installation procedure is the reverse of assembly.
- After installing carry out a test run while watching the external flap drive arms. Ensure the arms do not rub against the fuselage or wing mounts.

**WARNING**

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

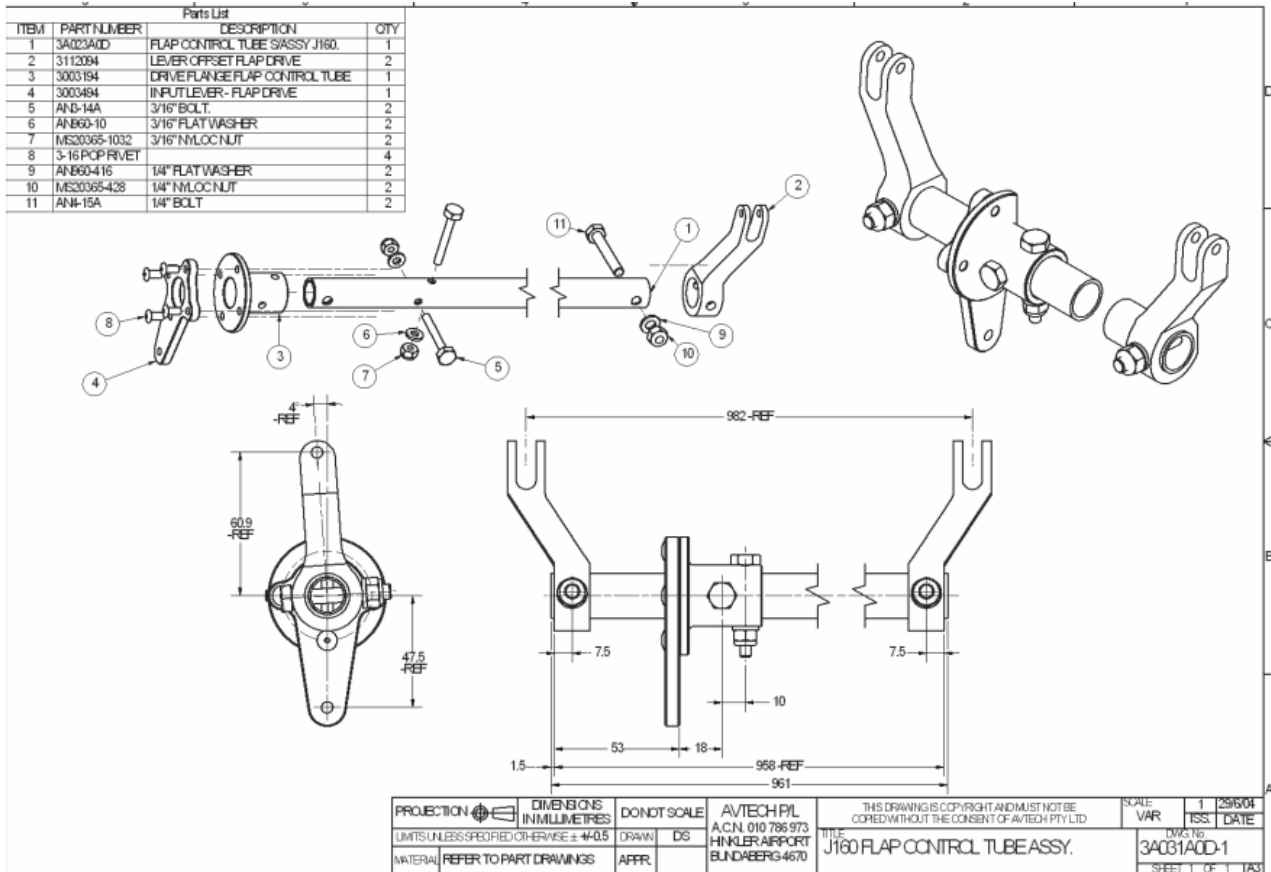


Figure 73 – Flap Cross Tube Assy J160 Family

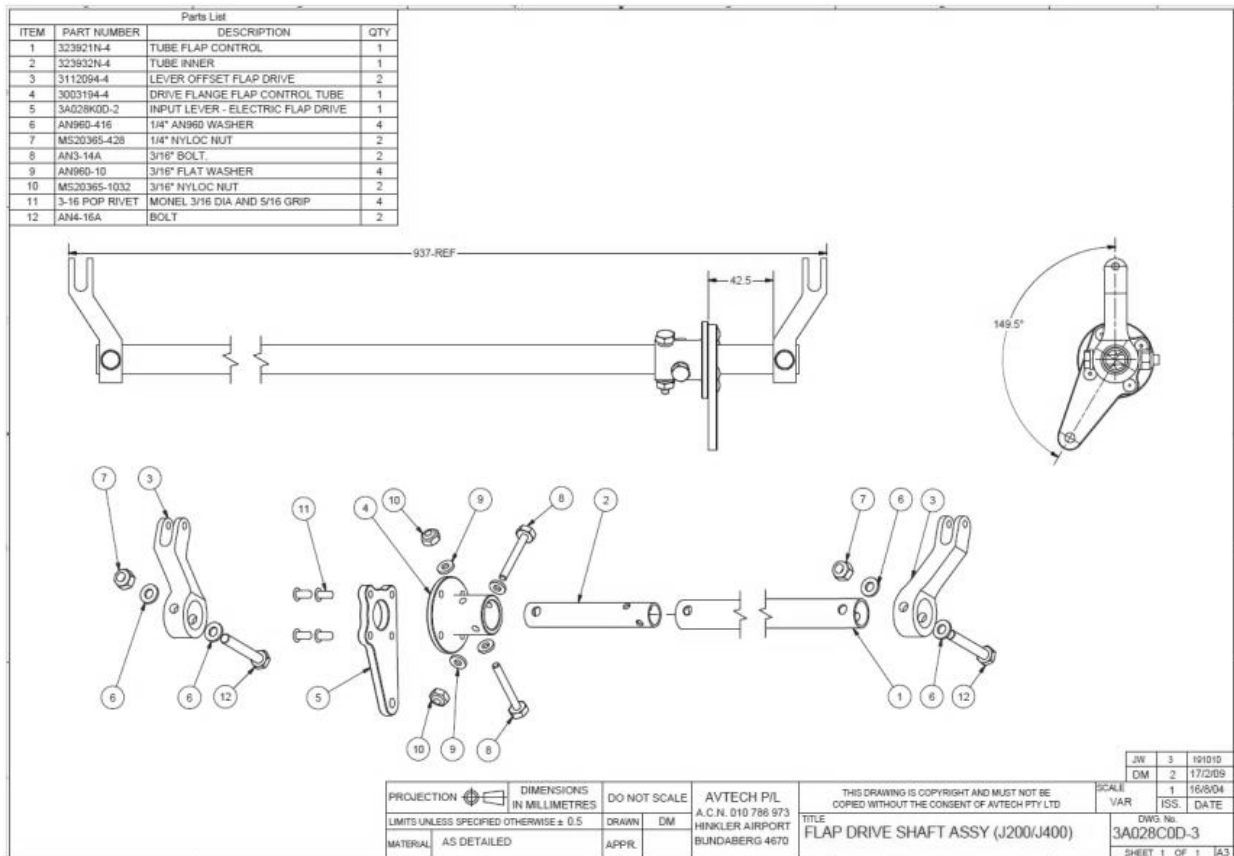


Figure 74 – Flap Cross Tube Assembly J200 Family, Electric

### 8.2.4 Flap Position Indicator

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

#### 8.2.4.1 DESCRIPTION

- 2 different flap position indicators have been used in Jabiru Aircraft (plus the manual handle which also acts as the position indicator for manual flap variants).
- Both indicators consist of a cable-driven indicator which moves inside a housing. Indicators are mounted to the windscreen / door pillars.

#### 8.2.4.2 FLAP POSITION INDICATOR REMOVAL



1. Undo screws holding indicator to “A” pillar.
2. For Type 1 indicators: drill rivets and disassemble indicator.
3. Loosen bolt on flap drive motor shaft & remove cable.

#### 8.2.4.3 FLAP POSITION INDICATOR INSPECTION & REPAIR



- Repair of the position indicator is limited to replacing worn or damaged parts.

#### 8.2.4.4 FLAP POSITION INDICATOR INSTALLATION

- Installation procedure is the reverse of the removal procedure outlined above. External Flap Push Rod



Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

**8.2.4.5 DESCRIPTION**

- The external flap push rods connect the flap cross shaft to the flaps.

**8.2.4.6 REMOVAL, INSPECTION & INSTALLATION**



- Apply heavy duty tape or similar to both wing flaps, holding them up.
- To remove, unbolt at both ends and remove. Reverse for installation.

**WARNING**

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

**8.2.5 Flap**

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (Inspector or Maintenance)

**8.2.5.1 DESCRIPTION**

- The flaps comprise a moulded and bonded monocoque structure embodying a composite control arm at the inboard end.
- Installation drawings for flaps are given in Section 7.2.

**8.2.5.2 FLAP REMOVAL**



1. Unbolt rod end from flap control arm.
2. Remove each flap hinge bolt and spacer.
3. Remove Flap.

**8.2.5.3 INSPECTION AND REPAIR**



- Inspect flaps for any signs of delamination or cracking. Pay particular attention to the Control Horn and hinges and their surrounding areas.
- Repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

**8.2.5.4 FLAP INSTALLATION**

- Reverse the preceding steps for installation. Replace all Nyloc nuts and torque in accordance with Table 2.

**WARNING**

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

**8.2.5.5 FLAP BALANCING**

- The flaps on the J160/J170 are not balanced.

### 8.2.5.6 FLAP RIGGING – J170-SP MODEL

- The J170-SP has a special requirement for its wing flap rigging. To attain the required “clean” stall speed, the J170-SP must have its flaps rigged using a special template, P/No. 8206Q5N.

### 8.2.6 Flap RIGGING (As Per Template)



1. With the flap selector lever in the neutral position, use a straight edge not less than 1 metre long. Hold the straight edge flush on the underside of the wing aerofoil and adjust flap so that the trailing edge of the flap sits on the straight edge and there is 4mm clearance between straight edge and trailing edge of the wing.
2. Adjust with the rod ends. Ensure that the lock nut is tight on the control ends and that the thread is visible through the hole in the rod.
3. Check for FULL DOWN travel using the Flap Rigging Template (see Appendix 3). Please note: There is only a requirement to check the down deflection because it has the highest value in travel.

### 8.3 Elevator Control System

#### 8.3.1 Elevator Control System

##### 8.3.1.1 DESCRIPTION

- The elevator control system is comprised of a control column and one enclosed push-pull cable fitted with rod ends at both ends.
- 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

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

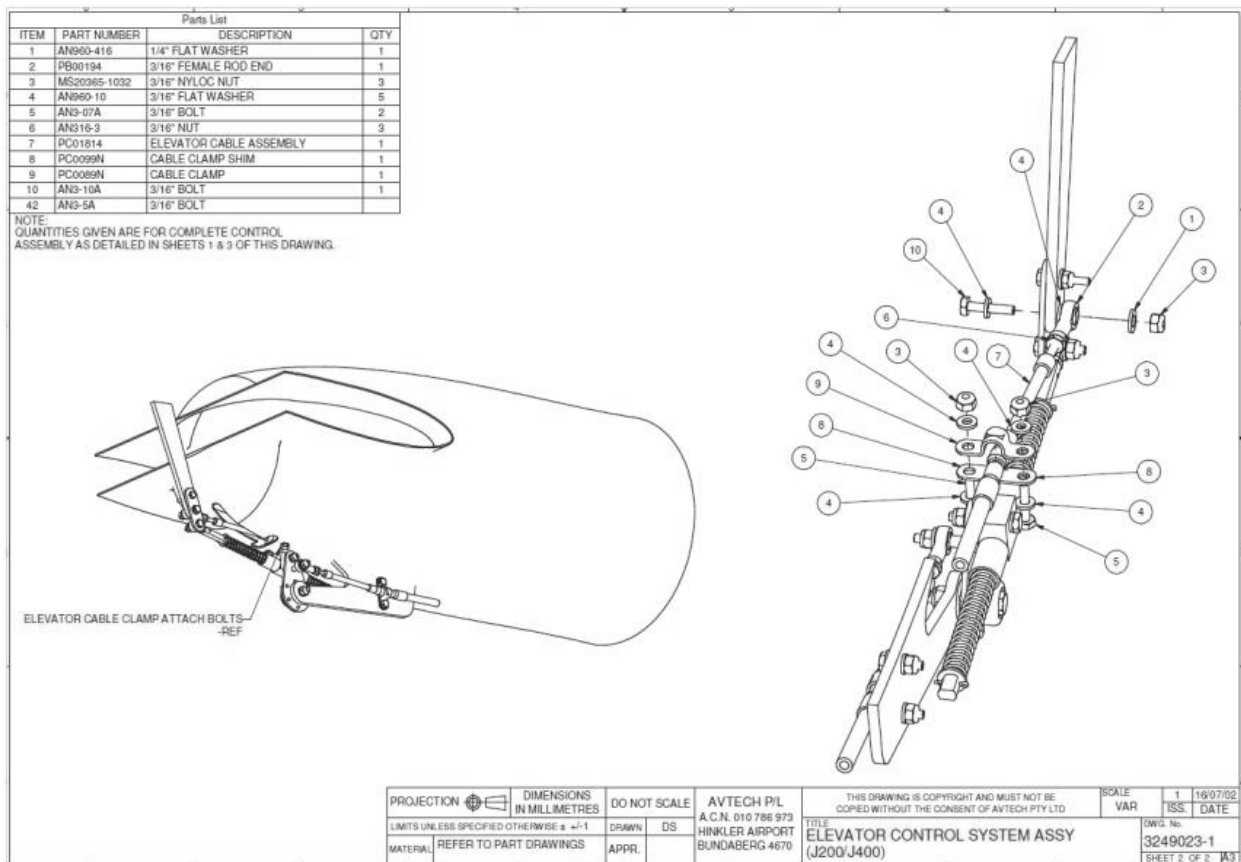


Figure 75 – Elevator Control System – Type 1, Sheet 2

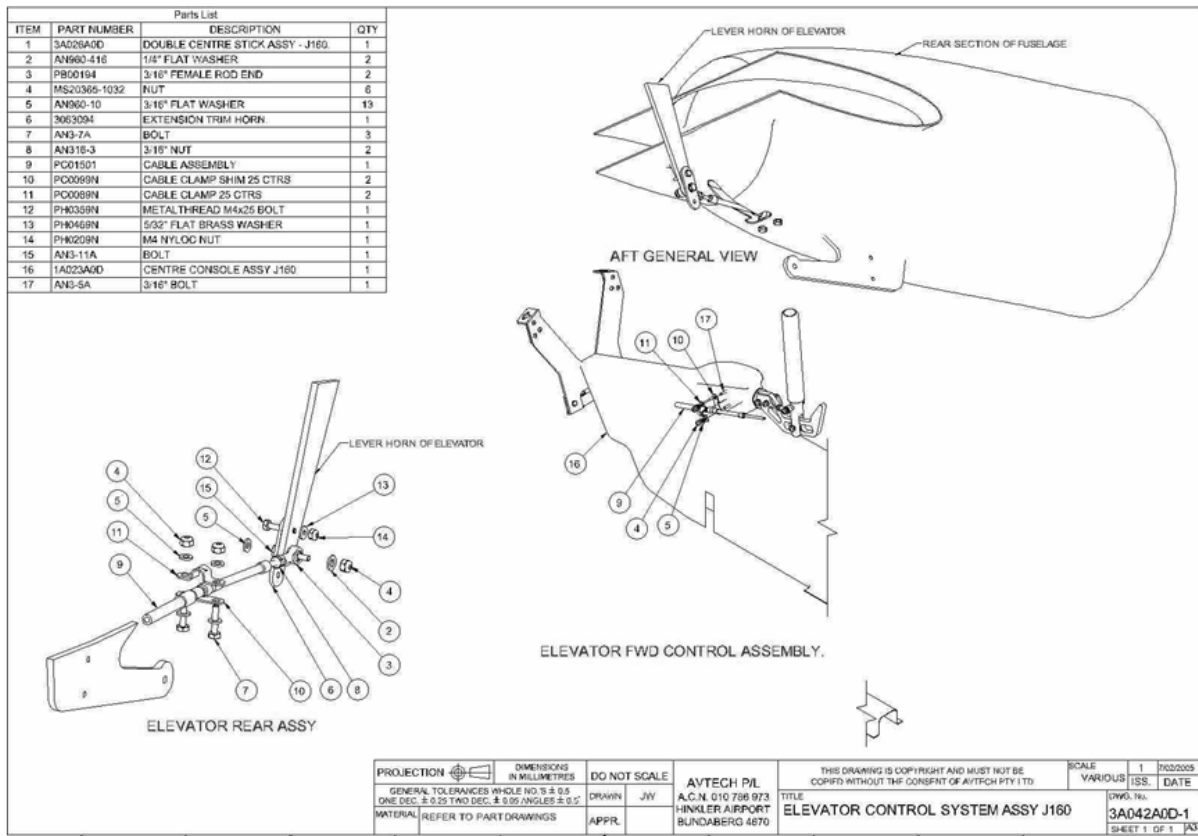


Figure 76 – Elevator Control Assy Type 2

## 8.4 Control Column

### 8.4.1 Description

- The same control panel is used for the elevator as for the ailerons. Drawings of the system are given in Section 8.
- A central shaft is located between the crew seats. The control column is mounted at the fwd end of this shaft via a pivot.

### 8.4.2 Removal And Installation

- Refer to the details given in Section 8.

## 8.5 Elevator

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (Inspector or Maintenance)

### 8.5.1 Description

- The elevator comprises a Rigid Cellular Polystyrene core moulded and bonded to a composite skin and embodying a composite control horn at the centre. An elevator trim system is attached – refer to Section 8.8.

### 8.5.2 Removal & Installation



1. Remove ventral fin from under tail to expose control cables etc.
2. Unbolt cable from control horn.
3. Unbolt trim linkage from control horn.
4. Loosen screws in hinge pin retainers and lift hinge pin retainers from hinge pins. It is not necessary to remove these parts.
5. Remove hinge pins.
6. Remove Elevator.
7. Reverse the preceding steps for installation.

### 8.5.3 Elevator Balancing

- The J230-D Elevator is balanced during construction. A standard weight of 750 grams of lead is placed in each control horn to balance the elevator. In service there should be no reason to rebalance the elevator.

### 8.5.4 Inspection And Repair



- Inspect elevator for any signs of delamination or cracking. Pay particular attention to the Control Horn and hinges and their surrounding areas.
- Inspect the front underside of the elevator for any signs of rubbing against the horizontal stabiliser at full down deflection: when the elevator hinge is pressed down using thumb pressure there should be clearance between the elevator and the stabiliser. Also refer to Section 6.17.
- Repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

### 8.5.5 Installation

- Reverse the preceding steps for installation.

### **WARNING**

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

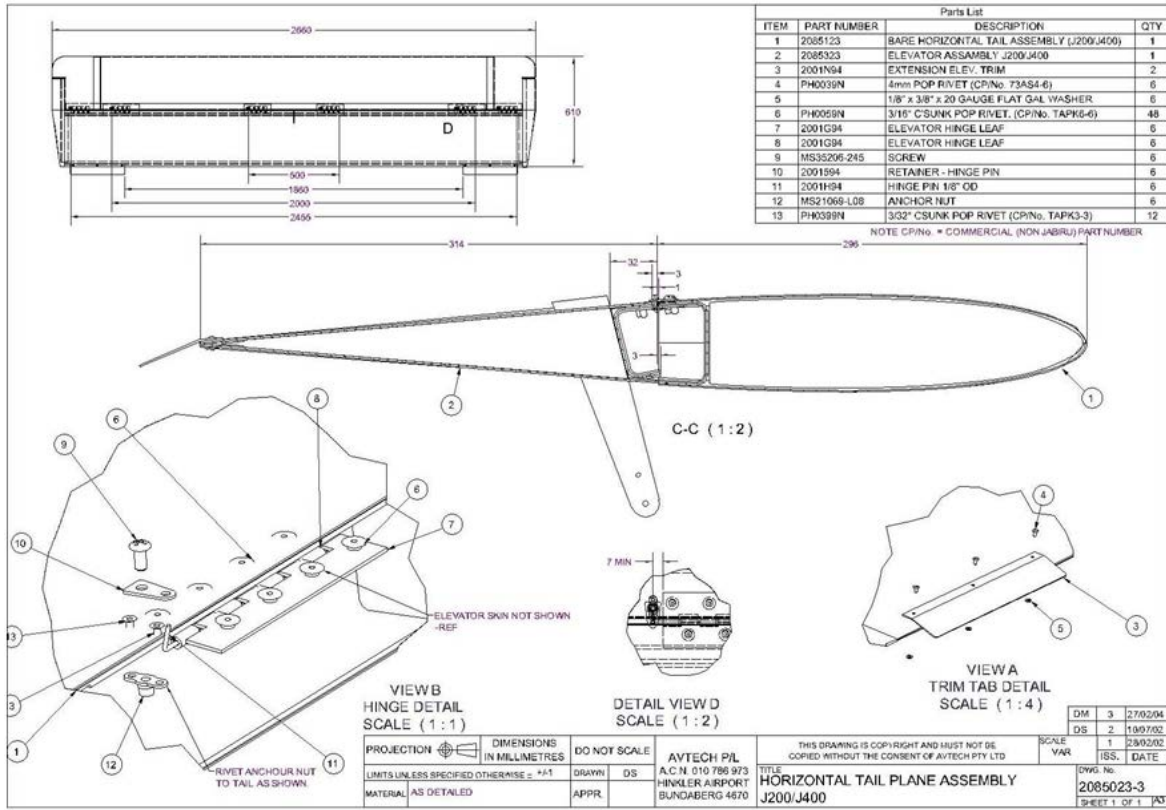


Figure 77 – Wide-Span Models – Horizontal Tail & Elevator Assembly – Type 1

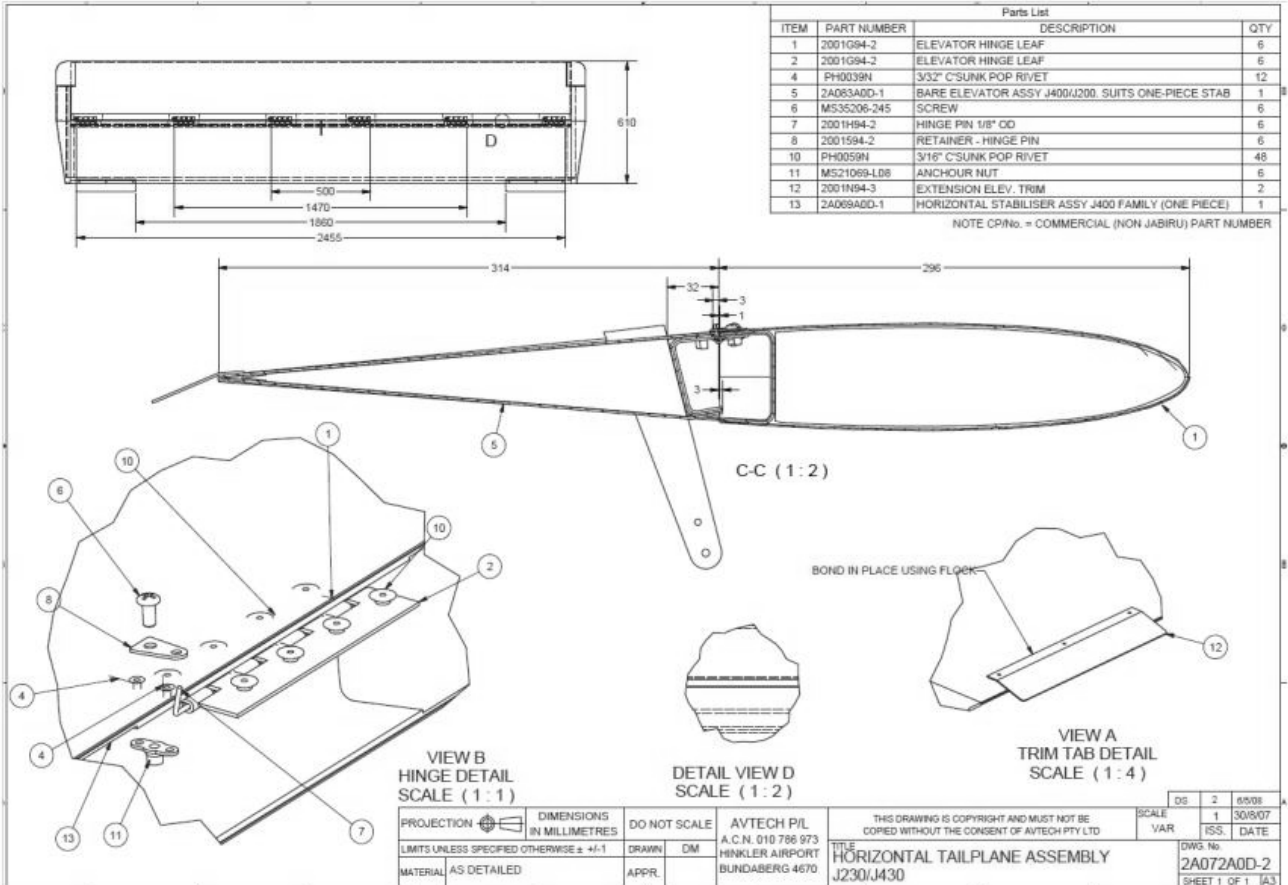


Figure 78 – Wide-Span Models – Horizontal Tail & Elevator Assembly Type 2

## 8.6 Elevator Control Cables

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (Inspector or Maintenance)

### 8.6.1 Description

- Control Cables are of the enclosed push-pull type, fitted with spherical bearings at both ends. To operate, the outer cover of the cable must be clamped firmly at each end.

### 8.6.2 Control Cable Removal



- Unbolt the connections (rod end bearings) at either ends of the cable.
- Unbolt the clamps at either end of the cable.
- Where required, remove any ties etc used to restrain the cables in the aircraft.
- Tie a string or light wire to one end of the cable.
- Draw the cable out of the aircraft, leaving the string/wire in place to allow installation of a replacement part.

### 8.6.3 Control Cable Inspection

- The Control Cable is a Primary Control and may not be repaired or removed without reference to Jabiru Aircraft Pty Ltd or our approved local agent.
- Details of inspections required for control cables are given in Sections 8.1.5 and 0.

### 8.6.4 Control Cable Installation

- Reverse the steps detailed above for installation.
- Ensure the required inspections are carried out and the cable is clamped securely.

## WARNING

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

## 8.7 Rigging



Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (Inspector or Maintenance)

- Refer to Figure 79.
- Control templates are available for all models from Jabiru Aircraft.
- Using the factory anchor points, make sure each end of the cable is secure.
- Set the full up travel first using the factory templates. Making sure both the control column and the elevator trim is hard back. Adjust the female ball ends in or out if adjustment is needed.
- To establish the neutral position, align balance horn with horizontal stabiliser.
- Adjust cable rod ends to achieve UP and DOWN travel using the Elevator Rigging Template (see Appendix 3).
- DO NOT** move the Cable Anchors – These are factory set.
- Ensure lock nut is tight on rod ends and that cable is visible through hole in spherical bearing.

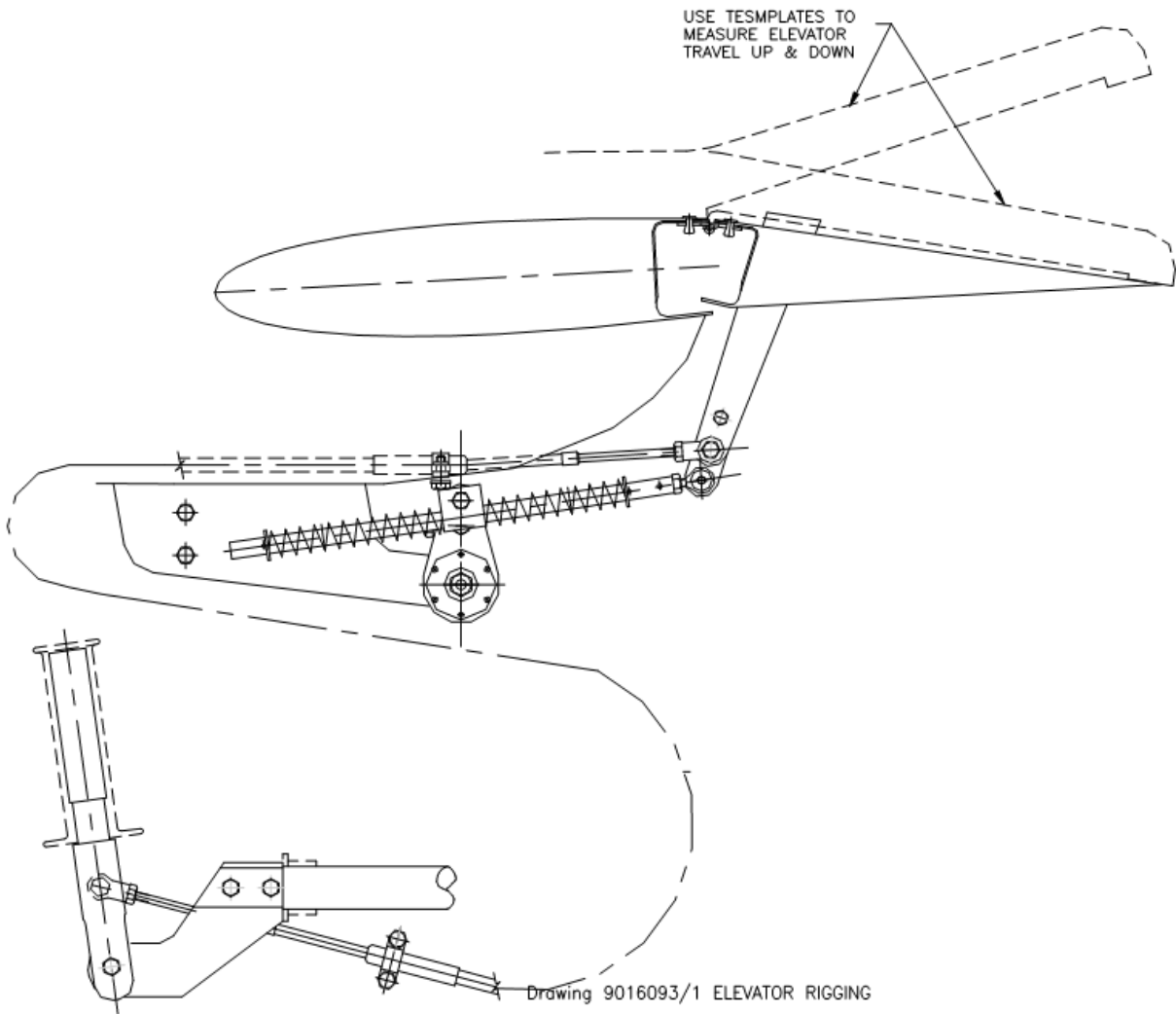


Figure 79 – Elevator Travel Limits



## 8.8 Elevator TRIM – CONTROL LEVER ASSY

### 8.8.1 Description

- The control lever for the elevator trim is mounted on the centre console.
- The assembly includes friction plates so that the lever does not move once in position.

### 8.8.2 Trim Control Lever Removal



Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (Inspector or Maintenance)

- For a type 1 assembly:
  - Remove the cotter pin and lock nut from the lever pivot.
  - Remove the locking bolt from the front of the friction plate.
  - Remove the lever from the pivot shaft.
  - Remove the machine screw attaching the control cable to the lever
  - Remove the assembly from the centre console.
- For a type 2 assembly:
  - Remove the cotter pin and lock nut from the lever pivot.
  - Remove the lever from the pivot shaft.
  - Remove the machine screw attaching the control cable to the lever
  - If required, drill the TLR rivets to remove the housing from the centre console.
- For a type 2 assembly:
  - Remove the cotter pin and lock nut from the pivot shaft.
  - Remove the levers from the pivot shaft
  - Remove the machine screw attaching the control cable to the lever
  - If necessary, drill the rivets to allow removal of the pivot housing. Note that the two end pieces of the housing connect to the central spacer with a thread and will need to be unscrewed for disassembly.

### 8.8.3 Inspection & Repair

- Inspect the friction plates for excess wear, galling or other damage.
- After installation carry out the functional tests and inspections noted below.

### 8.8.4 Installation

- Reverse the removal procedure above for installation.
- Adjust the tension of the pivot bolt to give the required friction force.
- Use a new cotter pin.

### WARNING

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

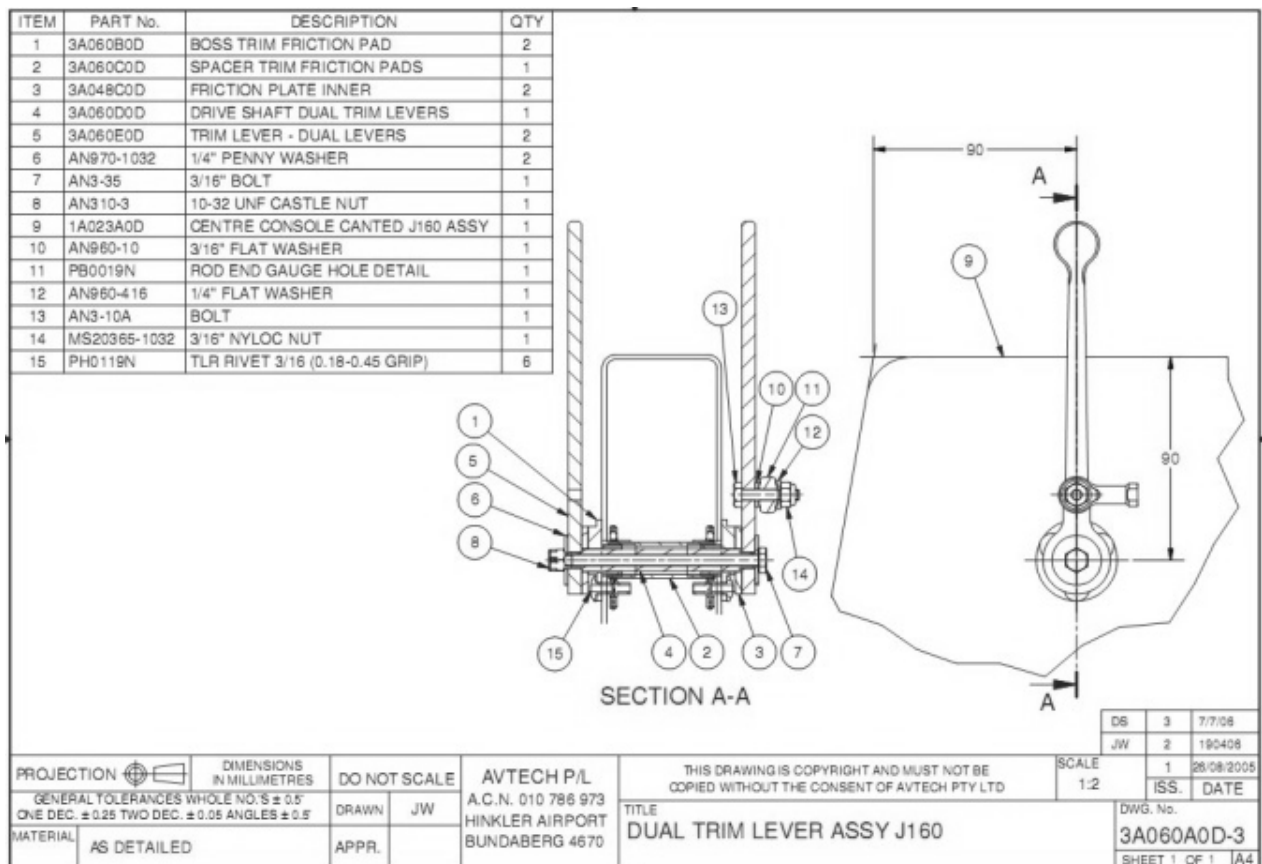


Figure 80 – Elevator Trim Handle Assy – Type 3

### 8.9 Elevator Trim – Aft Assembly

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (Inspector or Maintenance)

#### 8.9.1 Description

- The elevator trim control system comprises a Trim Cable connected to a lubron block, so that the cable is able to move the block fore and aft approximately 35mm. An aluminium rod is free to slide through this lubron block and is centred by 2 compression springs. The output end of the rod is connected to the Elevator Horn.
- This assembly allows a spring-loaded connection between the elevator trim lever and the elevator. This spring loading force is used to trim the aircraft.

#### 8.9.2 Operational Check

- Movement of the Trim Lever FORE and AFT should result in movement of the Main Control FORE and AFT and movement of the Elevator UP and DOWN.

### WARNING

It is important to carry out this operational check whenever the trim cable has been disconnected to ensure it has been correctly installed.

#### 8.9.3 Removal



- Remove the ventral fin to allow access to the assembly.

- Un-bolt and disconnect the trim shaft from the elevator. Use tape, seat belts or similar to apply full-aft to the control column and hold it in place. This is to raise the elevator out of the work area and prevent it from dropping back down.
- Un-bolt the lubron block from the pivot plate and remove the spring-loaded shaft.
- Un-bolt the control cable from the pivot arm and remove.
- Un-bolt the pivot assembly from the fiberglass tail horn and remove from the aircraft.

8.9.4 Inspection & Repair



- Visually inspect for excess wear or contamination of the lubron block.
- If required, apply fresh graphite lubricant
- Inspect the pivot bearings for condition and replace if required.
- Inspect hardware for damage or corrosion.

8.9.5 Installation

- Reverse the removal procedure above for installation.

**WARNING**

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

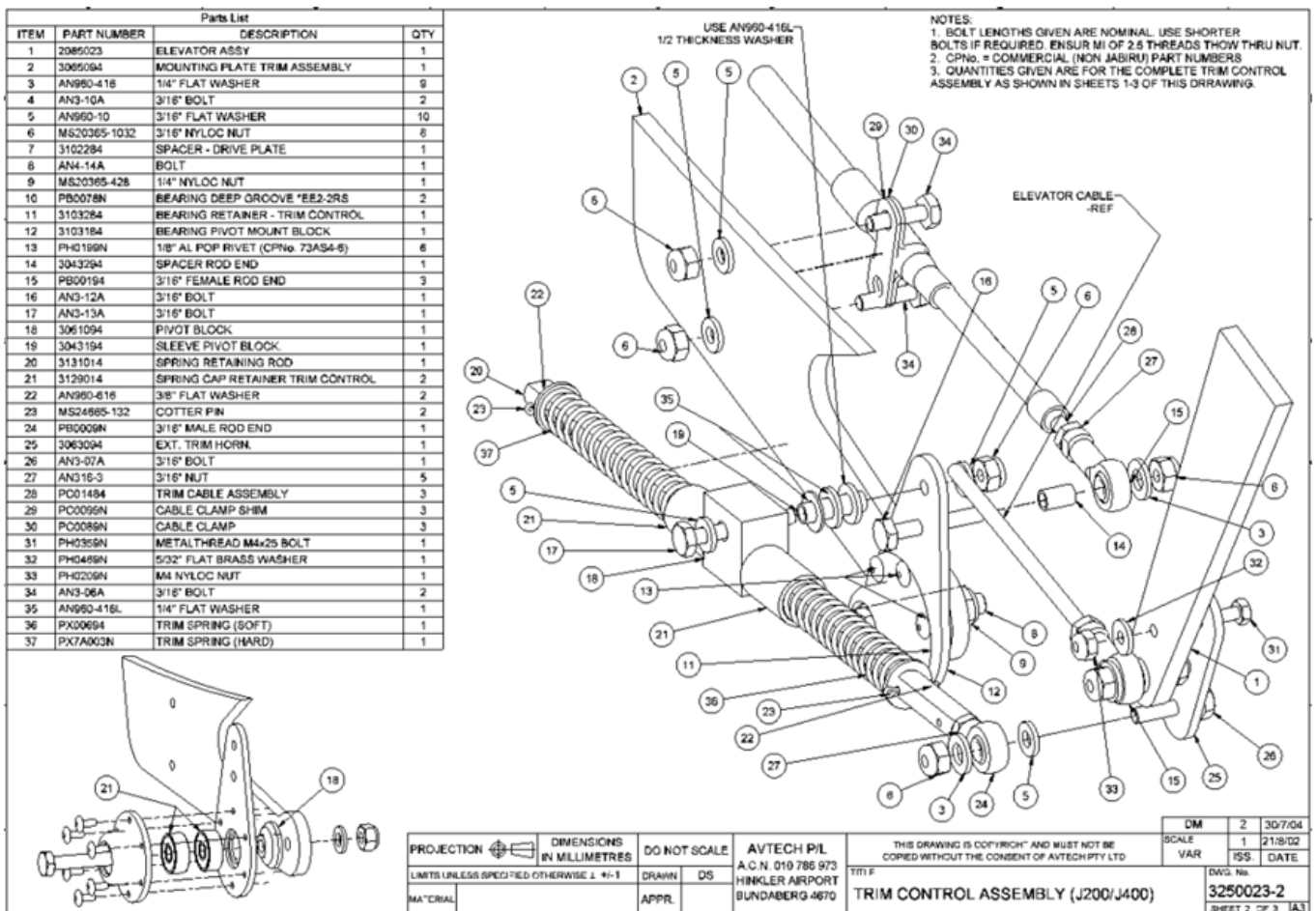


Figure 81 – Trim Controls – At Tail

## 8.10 Trim Control Cables

### 8.10.1 Description

- Control Cables are of the enclosed push-pull type, fitted with spherical bearings at both ends. To operate, the outer cover of the cable must be clamped firmly at each end.

### 8.10.2 Control Cable Removal



- Unbolt the connections (rod end bearings) at either ends of the cable.
- Unbolt the clamps at either end of the cable.
- Where required, remove any ties etc used to restrain the cables in the aircraft.
- Tie a string or light wire to one end of the cable.
- Draw the cable out of the aircraft, leaving the string/wire in place to allow installation of a replacement part.

### 8.10.3 Control Cable Inspection

- The Control Cable may not be repaired or removed without reference to Jabiru Aircraft Pty Ltd or our approved local agent.
- Details of inspections required for control cables are given in Sections 8.1.5 and 0.

### 8.10.4 Control Cable Installation

- Reverse the steps detailed above for installation.
- Ensure the required inspections are carried out and the cable is clamped securely.

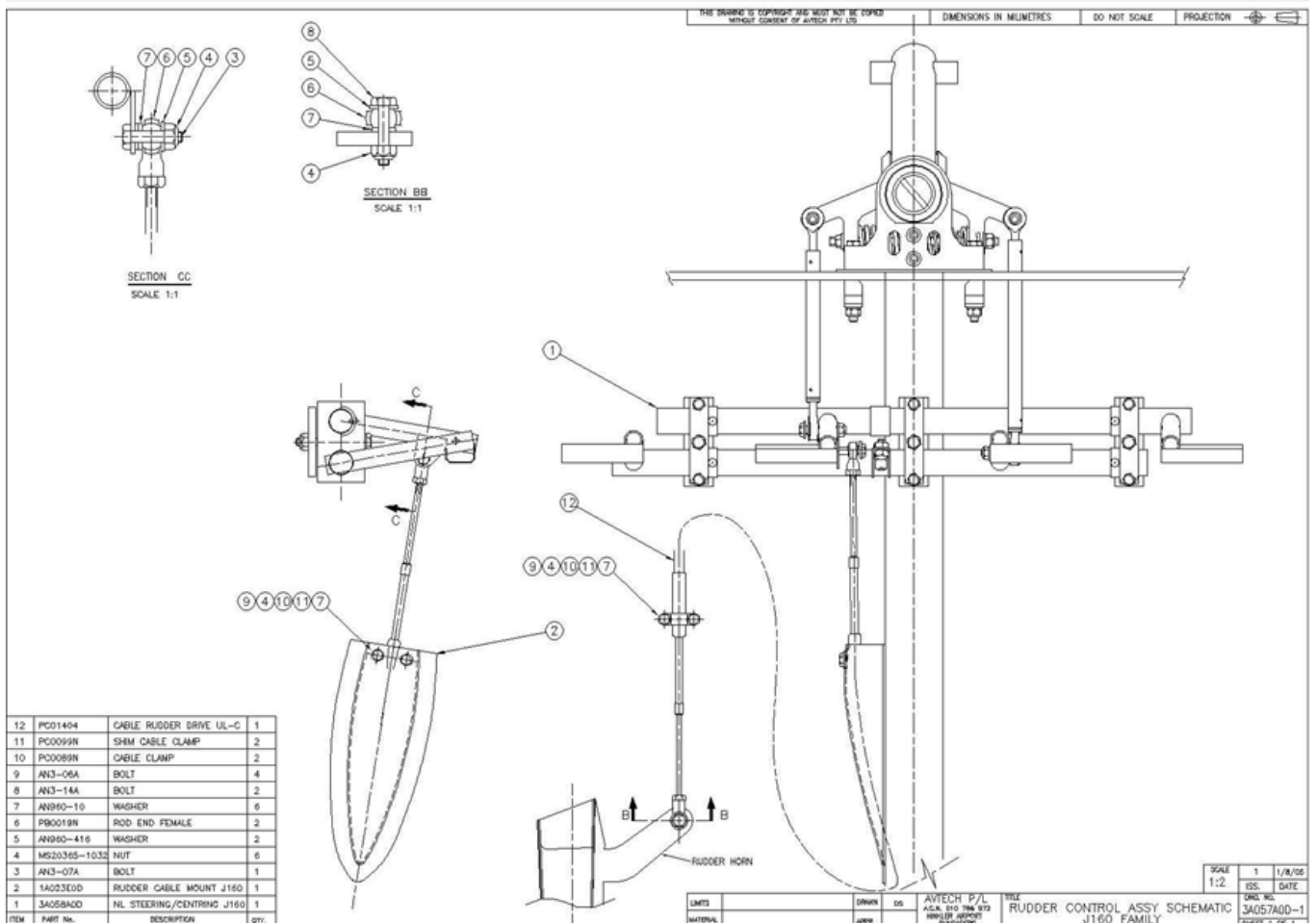
## 9 Rudder Control System

### 9.1 RUDDER Pedal SYSTEM

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 9.1.1 Description

- Jabiru Aircraft use rudder pedals connect directly to the nose leg to control nose wheel steering in addition to the rudder control surface. The system is comprised of rudder pedals, two push rods, a Centering mechanism and an enclosed push-pull cable.
- Optional adjustable rudder pedals may be fitted. These pedals are adjusted by means of a spring-loaded pin that allows each pedal to be moved to one of three positions.
- 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.



#### 9.1.2 Removal And Installation



- Unbolt push-pull cable.
- Disconnect Centering springs
- Unbolt both steering push rods.

4. Unbolt rudder pedal bearings.
5. Remove cover plates and nylon bearings.
6. Remove both pedal bars.
7. Reverse the preceding steps for installation.

**9.1.3 Inspection And Repair**



1. Inspect nylon bearings for wear. Replace if worn.
  2. Inspect pedal bars for wear around bearing area and for distortion.
  3. Inspect pedals for distortion or loose rivets in end stops.
  4. Inspect bolt holes for wear and elongation.
  5. Inspect bolts and nuts for distortion and wear.
  6. Replace any distorted or worn parts.
- If the optional adjustable rudder pedals are fitted these steps must also be performed:
    7. Inspect adjustment pins for wear, replace if required.
    8. Inspect adjustment pin springs and replace if required.
    9. Inspect adjustment pin pull rings for wear, replace if required.

**WARNING**

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

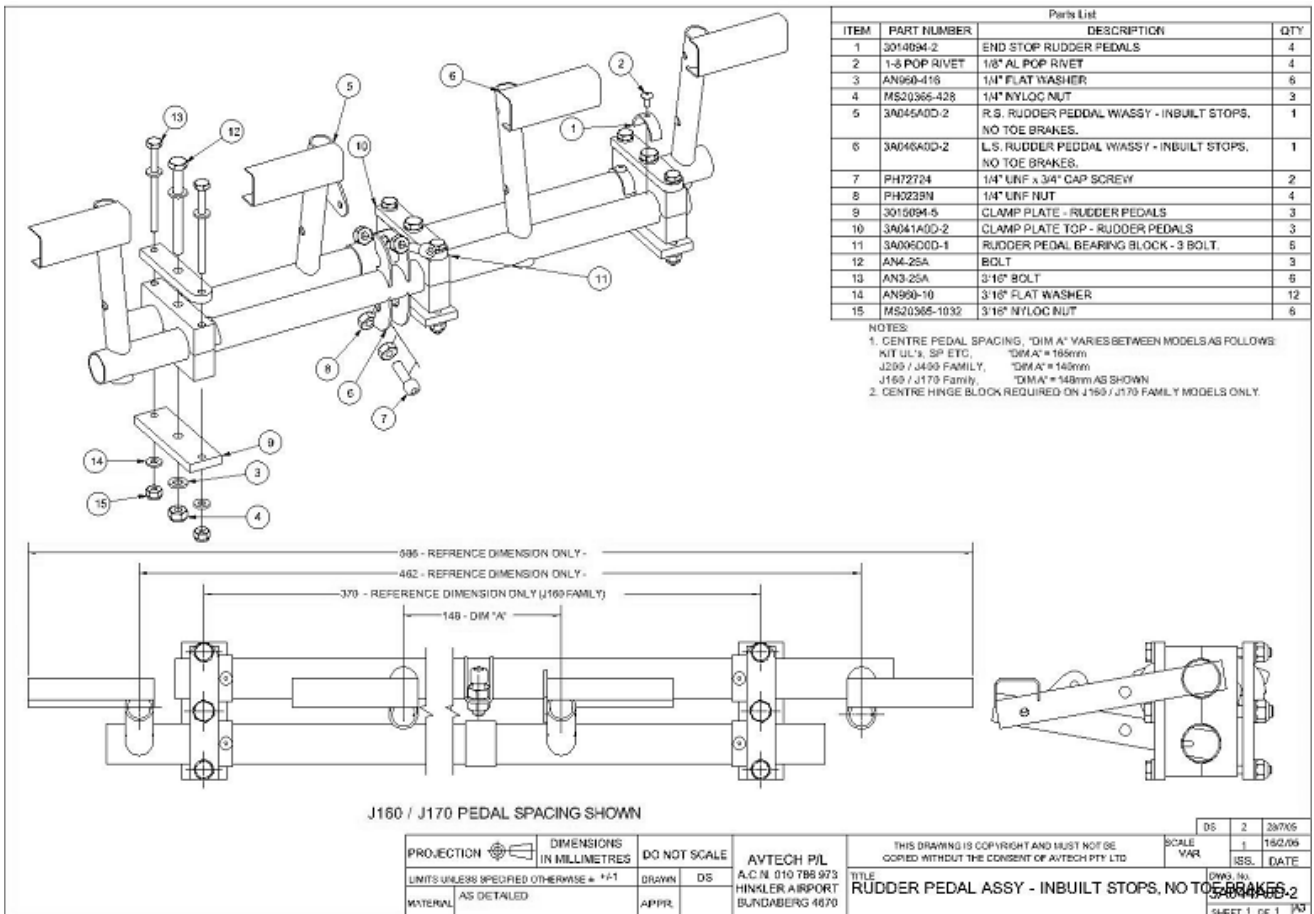


Figure 83 – Rudder Pedal - Non-Adjustable

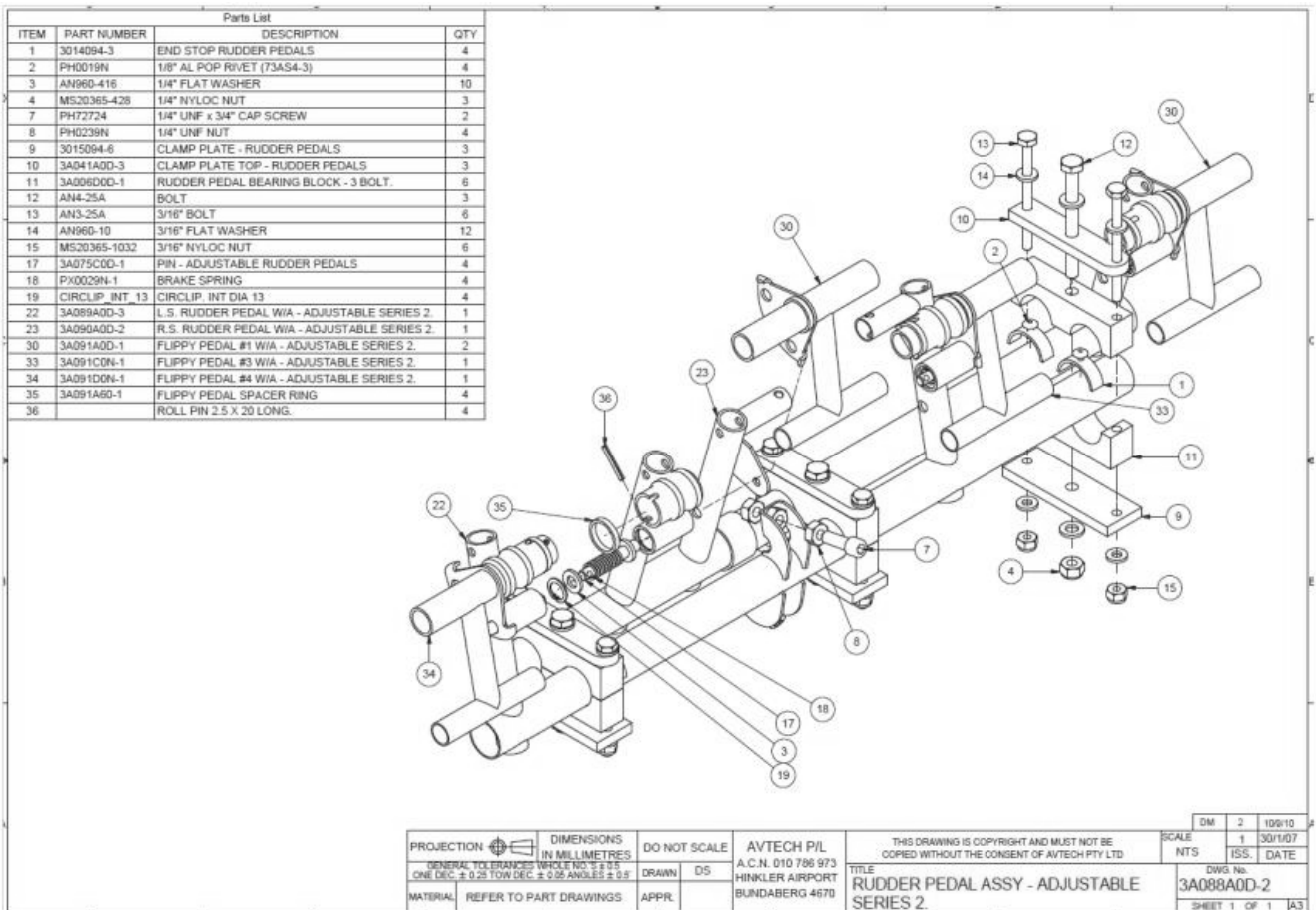


Figure 84 – Adjustable Rudder Pedal Assy – Type 2

## 9.2 Rudder Centering System

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

### 9.2.1 Description

- In Jabiru Aircraft the rudder pedals are connected directly to the nose leg. This gives both nose wheel steering and the mechanism connecting the left and right pedals.
- The drawings shown in **Error! Reference source not found.** through to Figure 87 show several variations of the systems used.

### 9.2.2 Rudder Centering System Removal



- For details on removing the nose leg and rudder pedals refer to the appropriate sections of this manual.
- To disconnect the rudder Centering system, remove the bolts and the pushrods connecting the pedals to the nose leg or Centering bellcrank.

### 9.2.3 Rudder Centering System Inspection & Repair



- Ensure lock nuts are secure
- Visually inspect the system for damage, wear and corrosion.

9.2.4 Rudder Centering System Installation

- To install reverse the removal procedure given above.

**WARNING**

All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.

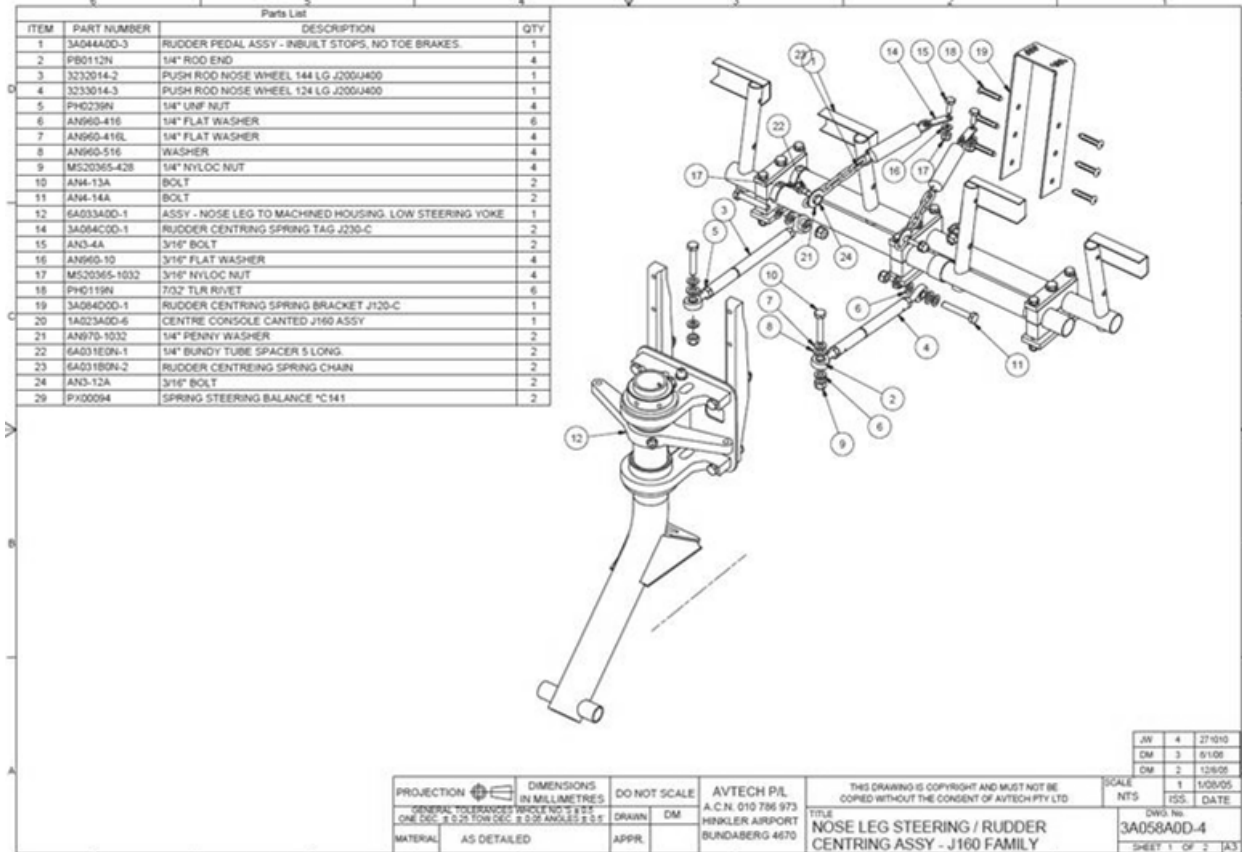


Figure 85 – Steering/Rudder Centering Assy – Type 3 (Sheet 1)



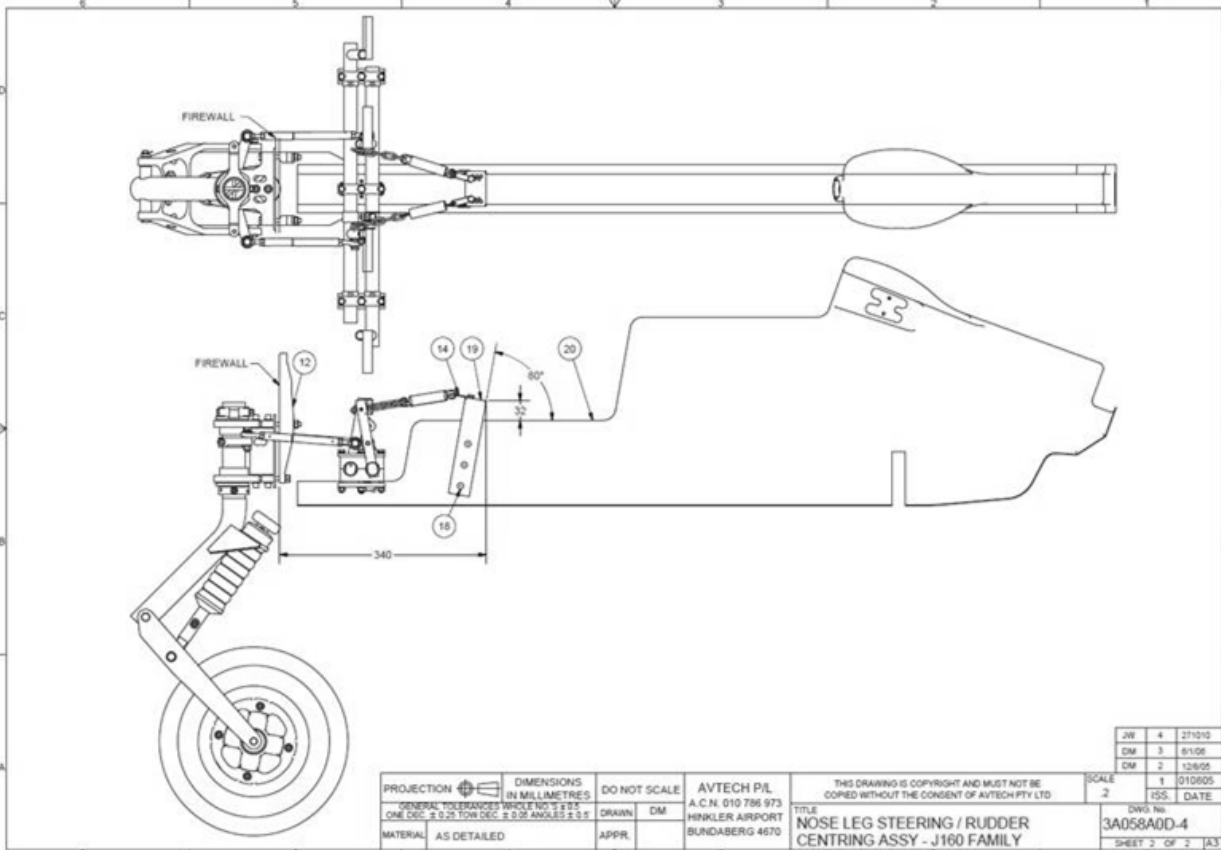


Figure 86 – Steering/Rudder Assy – Type 3 (Sheet 2)

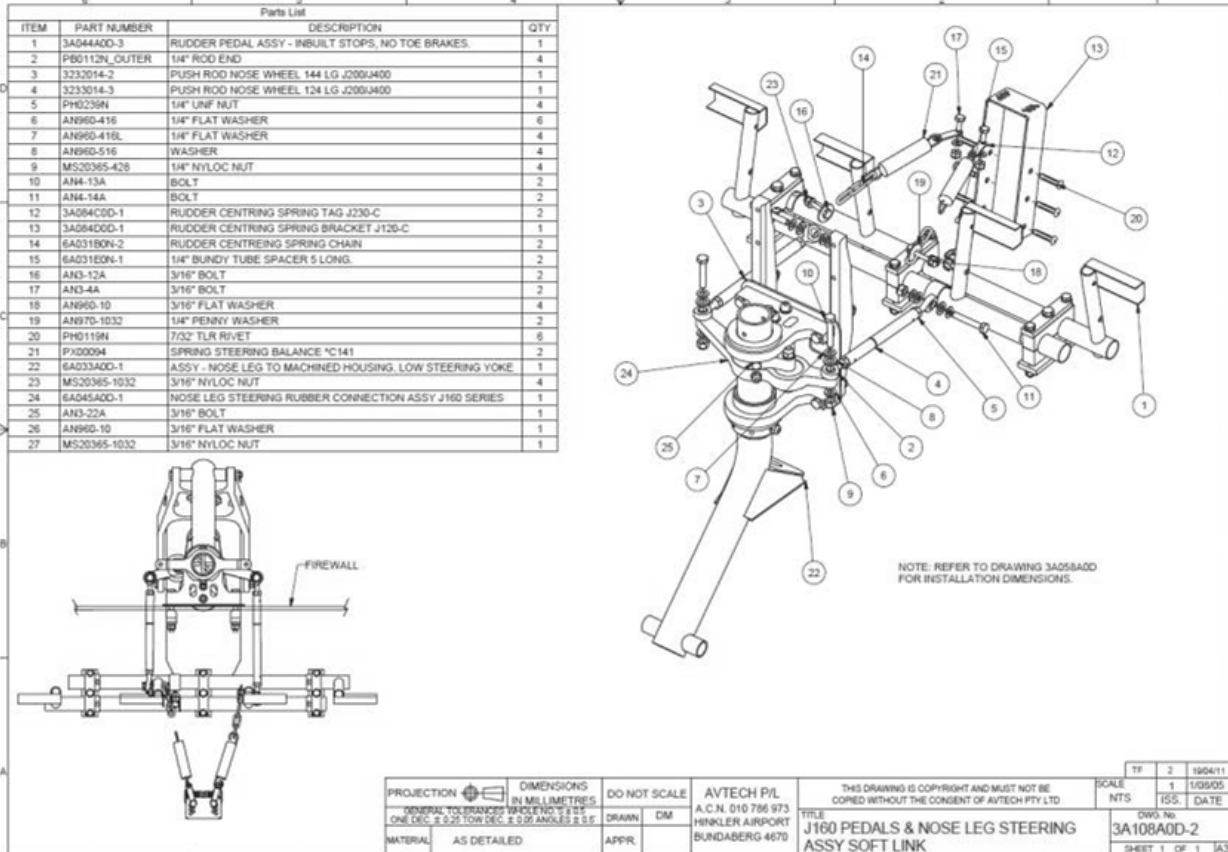


Figure 87 – Steering/Rudder Centering Assy – Type 3 (Includes Soft Link)

### 9.3 Rudder

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 9.3.1 Description

- The rudder of Jabiru Aircraft is a stressed-skin composite structure. It is connected to the rudder pedals via a self-contained push-pull cable.

#### 9.3.2 Removal & Installation



- Unbolt push-pull cable from rudder horn.
- Loosen screws in hinge pin retainers & lift retainer from hinge pin. It is not necessary to remove these parts.
- Remove hinge pins.
- Remove rudder.
- Reverse the preceding steps for installation.

#### 9.3.3 Inspection & Repair



- Inspect rudder for any signs of delamination or cracking. Pay particular attention to the Control Horn and hinges and their surrounding areas.
- Inspect the front right-hand of the rudder for any signs of rubbing against the vertical stabiliser when the rudder is at full deflection: when the rudder hinge is pressed in using thumb pressure there should be clearance between the rudder and the vertical stabiliser.
- Details of inspections required for control surfaces are given in Section 6.17.
- Repairs must be referred to Jabiru Aircraft Pty Ltd or our approved local agent.

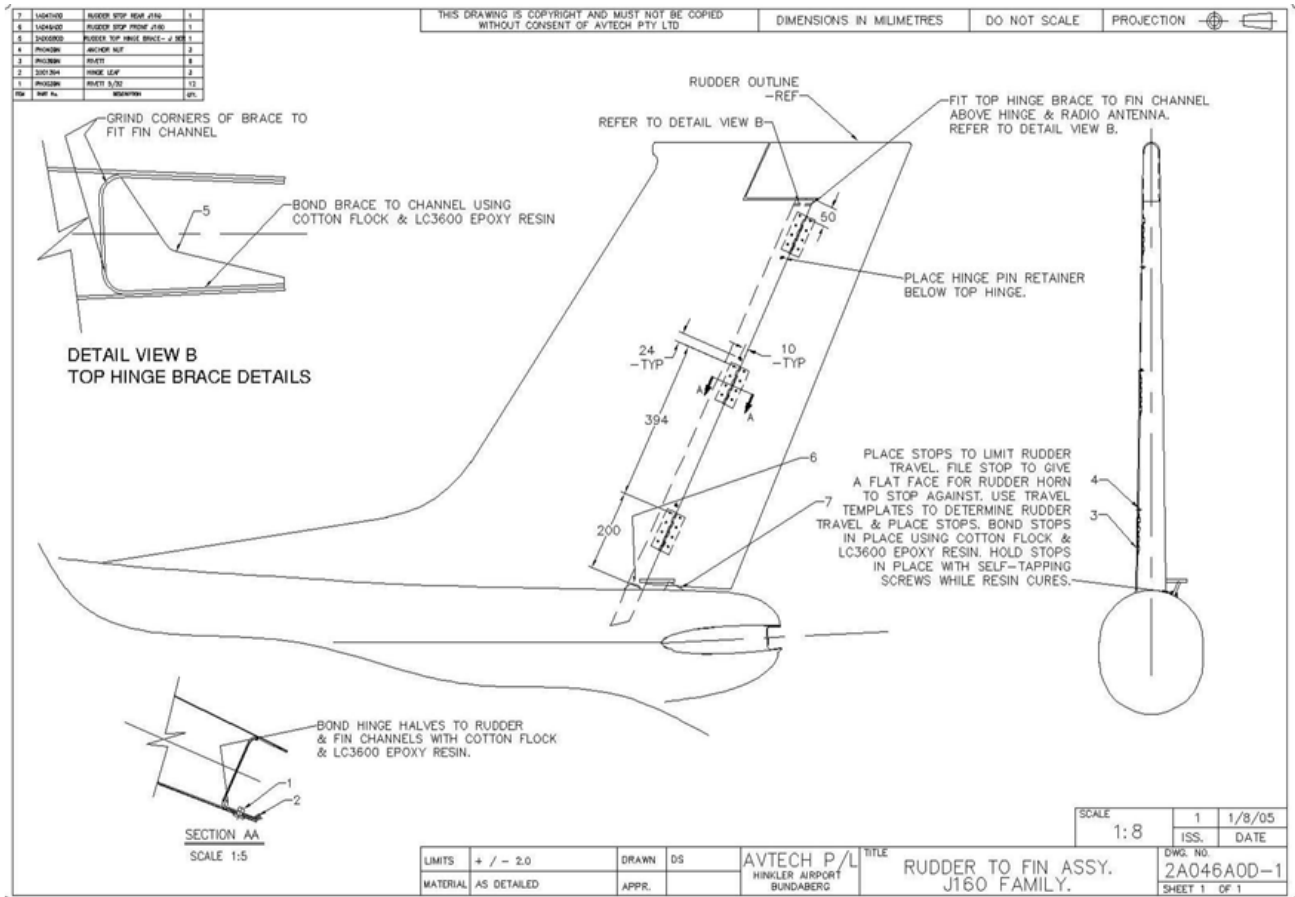


Figure 88 – Typical Rudder Installation (Alloy Hinges)

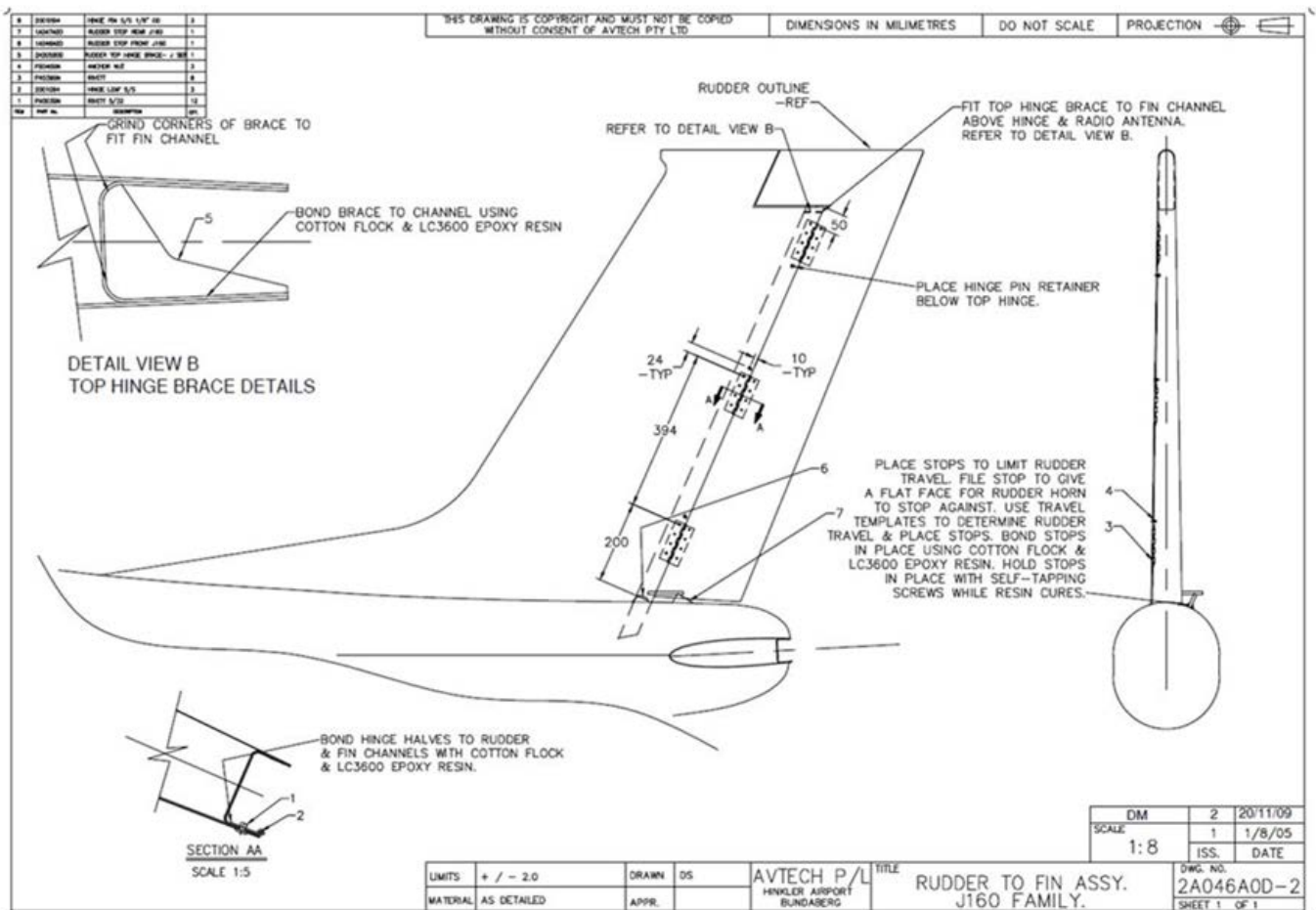


Figure 89 – Typical Rudder Installation (Steel Hinges)

## 9.4 Rudder Control Cable

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 9.4.1 Description

- Control Cables are of the enclosed push-pull type, fitted with spherical bearings at both ends. To operate, the outer cover of the cable must be clamped firmly at each end.

### 9.4.2 Control Cable Removal



- Unbolt the connections (rod end bearings) at either ends of the cable.
- Unbolt the clamps at either end of the cable.
- Where required, remove any ties etc used to restrain the cables in the aircraft.
- Tie a string or light wire to one end of the cable.
- Draw the cable out of the aircraft, leaving the string/wire in place to allow installation of a replacement part.

### 9.4.3 Control Cable Inspection



- The Control Cable is a Primary Control and may not be repaired or removed without reference to Jabiru Aircraft Pty Ltd or our approved local agent.

- Details of inspections required for control cables are given in Sections 8.1.5 and 0.

**9.4.4 Control Cable Installation**

- Reverse the steps detailed above for installation.
- Ensure the required inspections are carried out and the cable is clamped securely.

**WARNING**

**All spherical rod end bearings must be fitted with a large washer on the outside of the through-bolt to prevent the bearing case and cable releasing in the event of a bearing failure.**

**9.5 Rudder Balance**



Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

- The J160-C rudder is balanced at the factory during assembly and unless the rudder is damaged the balance should not change. If the rudder is found to be unbalanced outside the specified limits cause for this condition should be ascertained before proceeding.
- To balance the rudder it must be removed from the aircraft. Balancing is done around the rudder hinges with the hinge pin line horizontal and on the high side of the rudder. The balance weight takes the form of an epoxy resin and lead shot mixture set inside the leading edge of the rudder horn. The balance should be changed by either removing lead or adding to this mass with a similar mixture. The hinge moment can be measured using masses on the trailing edge or by measuring the force needed to maintain the rudder for/aft centreline horizontal.
- Weight and moment values are given below:
  - Weight                                    2100g                                    +/- 100g
  - Hinge Moment                            17500g.mm                            +/- 4000g.mm

**9.6 Rigging**



Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

1. To establish the neutral position, raise the nose wheel off the ground by leaning down on the horizontal stabiliser.
2. Allow the nose wheel (and therefore the rudder pedals) to centralise.
3. Align the rudder 5mm to the right at the top of the rudder when referenced to the lower lip of the fin.
4. Adjust the rod ends on the cable so that the hole in the rear rod end aligns with the hole in the control horn.
5. Fit bolt, nut and washers.
6. Mark a line from the centre of the Rudder trailing edge onto the Fuselage. Displace the Right Rudder Pedal to the Rudder Pedal Stop. Measure the Rudder displacement at the Rudder trailing edge with reference to the previously scribed line. It should be 75mm +/- 2mm for all models bar the J200 family. For the J200 family the travel must be 98mm ± 2mm.
7. Repeat Step 6 for Left Pedal and adjust Rudder Pedal Stops as required.

**WARNING**

**The Rudder Pedal Stops should engage – NOT the Control Surface Stops on the tail.**



**DO NOT** move the Cable Anchor Points or adjust control surface stops – These are factory set.

## 10 Engine & Engine Installation

### 10.1 Engine Cowls

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

#### 10.1.1 Description

- The engine cowls comprise both an Upper and Lower composite structure.
- The Upper Cowl is fitted with locating Cam Locks at the front & rear of the cowlings. Hinges run along the join lines on either side, holding the top & bottom together. The Lower Cowl is attached to the Fuselage with machine screws mounting into anchor nuts.
- 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.

#### 10.1.2 Upper Cowl Removal



1. Remove the Cam Locks from the front & rear of the cowl.
2. Remove Hinge Pin.
3. Grasping the cowl around the front nose, pull carefully upwards.
4. Remove the cowl.
5. Replace the cam locks in the cowl to ensure they are not misplaced.

**NOTE: Always ensure that the cowl is placed in a position where it cannot be damaged by persons walking around the aircraft or by wind.**

6. Reverse the preceding steps for installation.

#### **WARNING**

**Ensure the cam locks are properly engaged before starting the engine.**

#### 10.1.3 Lower Cowl Removal



1. Remove the top cowl – Refer above.
2. Disconnect the engine air inlet SCAT hose and cabin heat inlet hose (if fitted)
3. Remove lower cowl screws at rear of cowl.
4. Reverse the preceding steps for installation.

#### 10.1.4 Cleaning And Inspection



1. Wipe the inner surfaces of the cowlings with a cloth saturated with Mineral Turpentine.
2. Wash with a solution of mild soap and water and rinse thoroughly. After cleaning, inspect for dents, burns, rubbing marks, cracks and any signs of delamination.
3. Inspect cowl camloc mounts for rigidity & bonding & for wear. Inspect locking pins for damage. Inspect rubber grommets in firewall for wear or damage.
4. Replace any damaged or worn parts with new parts.

#### 10.1.5 Repair

- Repair is limited to replacement cam locks. Rivets fixing cam lock anchor lugs should be backed with washers.

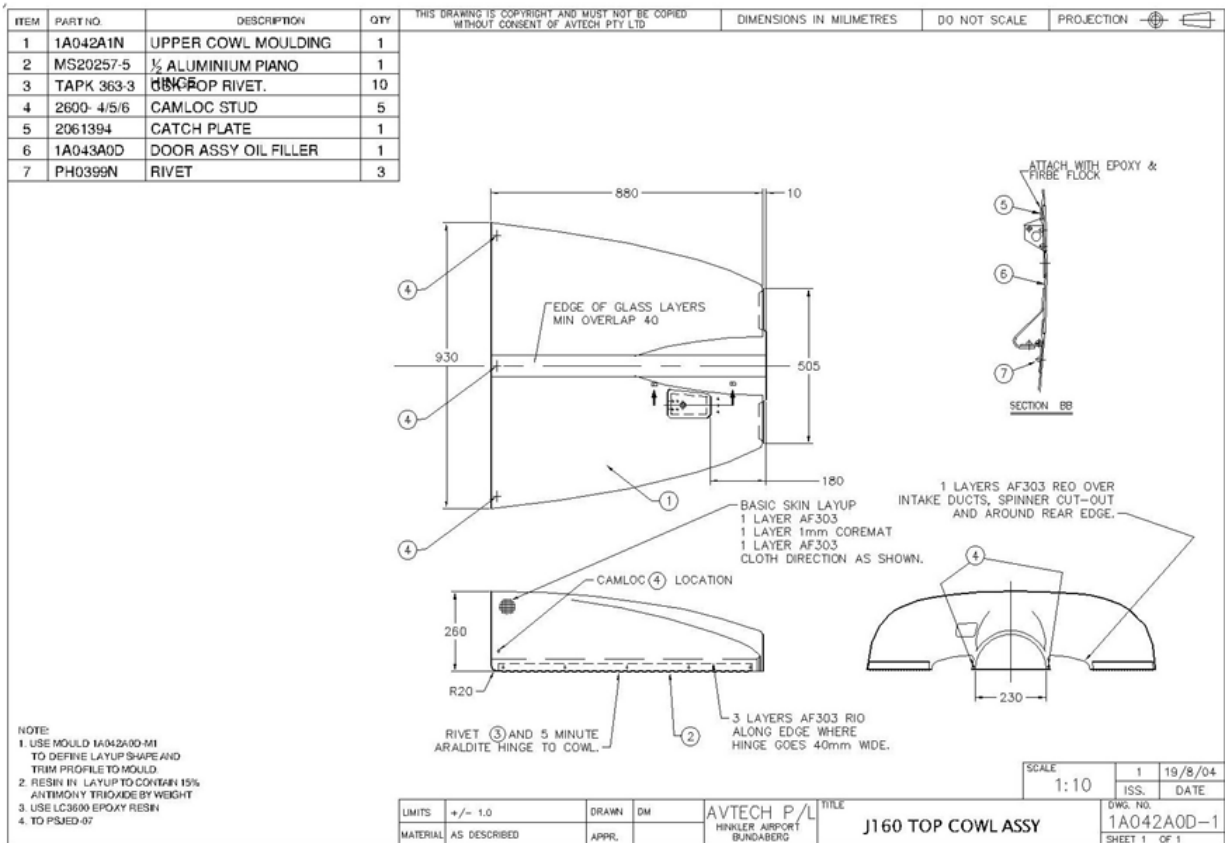


Figure 90 – Typical Upper Cowl Assy

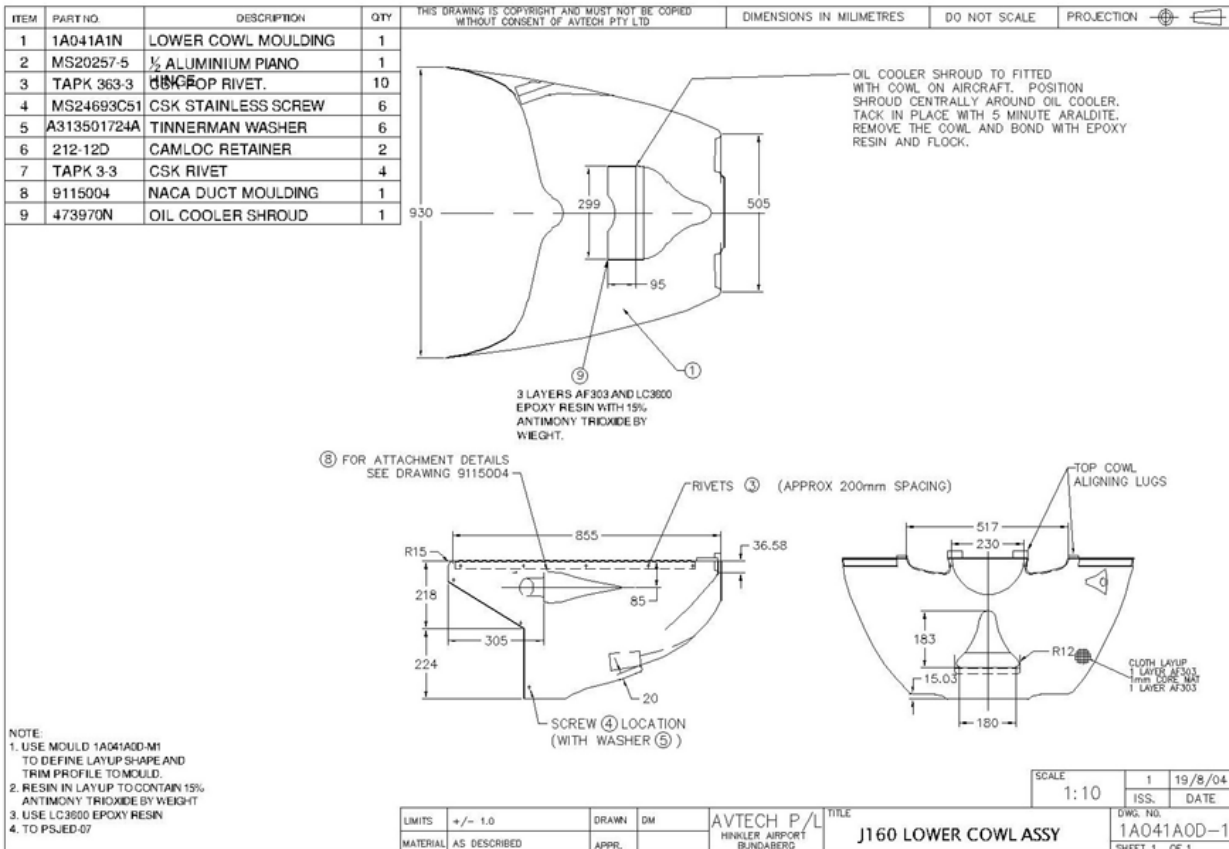


Figure 91 – Typical Lower Cowl Assy



## 10.2 Engine

### 10.2.1 Description

- The engines used in Jabiru Aircraft are horizontally-opposed, 4-stroke air-cooled designs, driving a fixed-pitch wooden propeller. 80hp, 4-cylinder "2200" versions are used in the J120, J160 and J170 model families while the 120hp, 6-cylinder "3300" engine is used in the J200, J230 and J250 model families. In some kit-built variants the 3300 engine may also be used in the smaller aircraft.
- The front Starboard cylinder is numbered 1, the front Port is numbered 2 with this numbering convention continuing for the remaining cylinders.
- Refer to Engine Maintenance Manual for detailed engine data.
- For repair & overhaul of the engine, refer to the Overhaul Manual issued by Jabiru Aircraft Pty Ltd.

### 10.2.2 Engine Data

- Refer Engine Maintenance Manual

### 10.2.3 Engine Removal & Installation

- Refer Engine Maintenance Manual

### 10.2.4 Engine Trouble Shooting

- Refer Engine Maintenance Manual

### 10.2.5 Engine Cleaning

- Refer to Section 5.1 & the Engine Maintenance Manual.

### 10.2.6 Engine Accessories

- Jabiru engines may be fitted with an accessory vacuum pump, mounted to a pad at the rear of the engine.
- All Jabiru engines are fitted with a permanent magnet alternator at the rear of the engine. This is considered a part of the engine and is discussed in the Engine Maintenance Manuals.
- Removal, inspection and installation of accessories are discussed in the appropriate Engine Maintenance Manual.

### 10.2.7 ENGINE Inspections

- For specific items to be inspected and for periodic inspection details, refer to Engine Maintenance Manual.
- Generally, inspect for:
  - Loose bolts, nuts, cracks, leaks & cooling fin damage
  - Inspect baffles, baffle seals & brackets for cracks, deterioration or damage.
  - Inspect hoses for internal swelling, chafing, cuts, breaks, stiffness or loose connections. Excessive heat on hoses will cause them to become brittle & easily broken. Hoses are most likely to crack or break near the ends & at support points. Check fire sleeves on fuel lines within the engine compartment.
  - All flexible hoses in the engine compartment should be replaced at engine overhaul or every 2 years whichever comes first. Hoses which show visible deterioration (cracking, excessive hardening) should be replaced immediately, irrespective of age.
  - For major engine repairs, refer to Jabiru Aircraft Pty Ltd or an Approved Jabiru Service Centre.

### 10.3 Flexible Hoses

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 10.3.1 Description

- Flexible “rubber” hoses are used within the engine bay to carry fuel and oil. Vent lines for the engine and carburettor are also flexible lines.

#### 10.3.2 Flexible Hose Removal



- Where equipped, cut the safety wire to allow the fire sleeve to be drawn back along the hose to allow access to the hose clamp.
- Loosen the hose clamp.
- Remove the hose from the hose fitting.
- Note that oil cooler lines, by design, often become bonded or “stuck” to the hose barb. This makes it impossible, in most cases, to remove these hoses without cutting them.

#### 10.3.3 Inspection

- Examine the exterior of hoses for evidence of leakage or wetness.
- Feel hoses to assess the hardness of the hose. Excessively hard hoses must be replaced as they are likely to be subject to cracking.
- Replace any doubtful hoses.

#### 10.3.4 Flexible Hose Installation

- Hoses should not be twisted on installation.
- Provide as large a bend radius as possible.
- Hoses should have a minimum of 12mm clearance from other hoses or surrounding objects or be tie-clamped to them.
- Where fire-sleeve is used ensure it is fitted per Figure 92.

**NOTE: Rubber hoses will take a permanent set during extended use in service. Straightening a hose with a bend having a permanent set will result in hose cracking. Care should be taken during removal so that hose is not bent excessively, and during reinstallation to assure hose is returned to its original position. Excessively hard hoses must be discarded.**

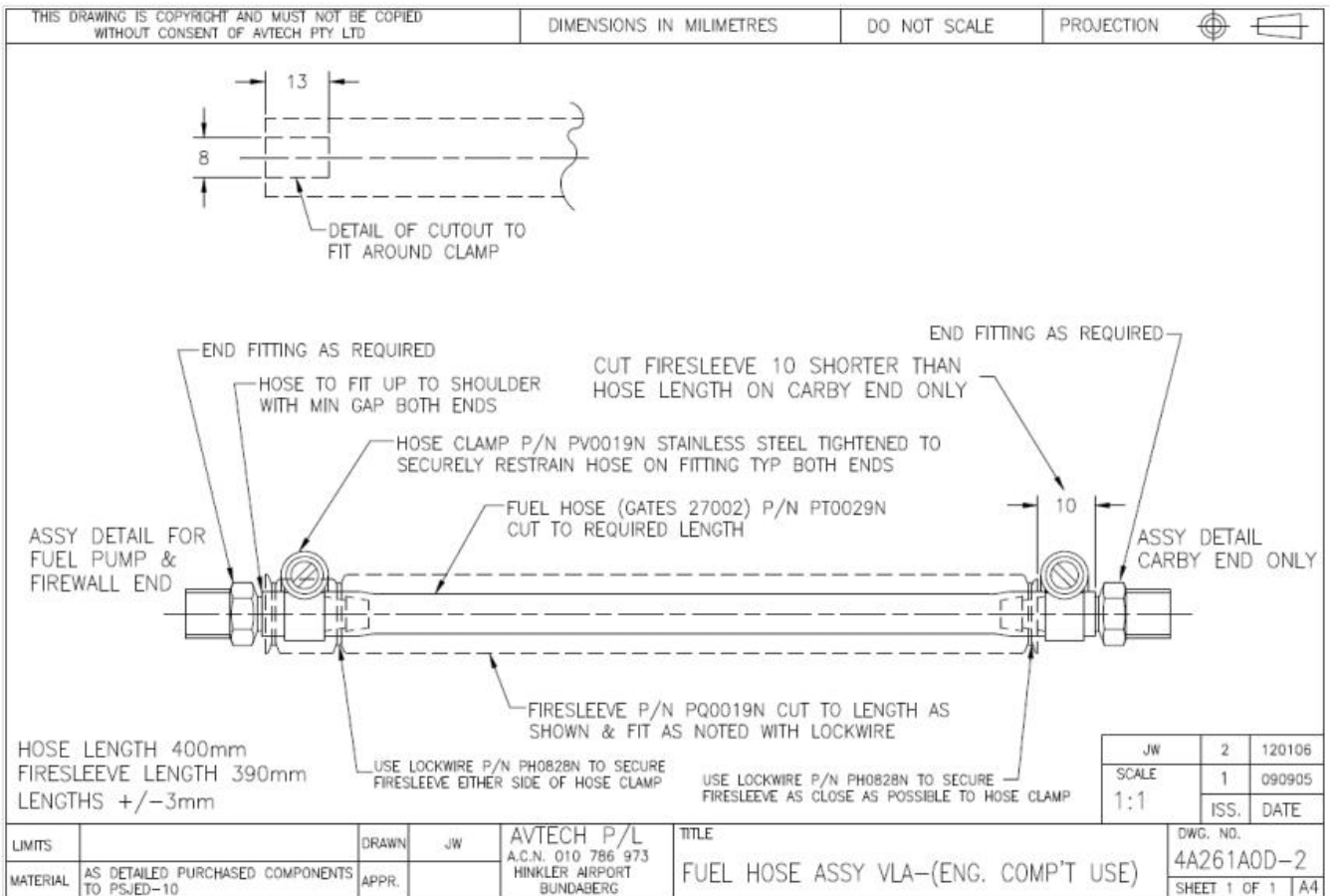


Figure 92 – Fuel Hose Assy – Engine Bay

## 10.4 Cooling Air Baffles

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

### 10.4.1 Description

- The baffles installed around the engine direct the cooling air flow to the oil cooler and to other engine components to provide optimum engine cooling. The baffles, air inlets and outlets and air scoops are accurately positioned to maintain engine cooling efficiency and their removal will cause improper air circulation and engine overheating.

### 10.4.2 Cooling Air Baffle Removal



- Baffles are removed by unbolting from the engine and removing tension springs and their attaching wires.
- In most cases the spark plug leads must also be removed with the duct.

### 10.4.3 Cleaning And Inspection



- Engine baffles should be cleaned with a suitable solvent (Mineral Turpentine) to remove dirt and oil.
- Inspect baffles for cracks, splits or damage. In particular, ensure that the hard-points where the ducts are bolted to the engine are in good condition.

10.4.4 Repair



- Rubber seals may be replaced by removing the existing rubber parts, rubbing back the bonding face of the fibreglass baffles to bare glass (using 80 grit sandpaper or similar) and bonding new rubber strips in place with 5-Minute Araldite.
- Damaged mounting hard points for the air ducts are best repaired by the installation of reinforcing tags as shown in Figure 93.

10.4.5 Cooling Air Baffle Installation

- Reverse the preceding steps for installation.

**WARNING**

An improperly secured air duct may result in poor cooling, high engine temperatures and engine damage. In addition, cases have been recorded where a poorly fitted duct lifted from the engine and pulled the spark plug leads off the engine, resulting in engine stoppage.



Figure 93 – Air Duct Hard Point Reinforcement

10.5 Engine Mount

Type of Maintenance:	Heavy Maintenance
Level of Certification:	LSA repairman (with task specific instruction)

10.5.1 Description

- The engine mount is a welded assembly. Its purpose is to support the engine and attach the engine to the airframe. The engine is attached to the mount with rubber cushions which absorb engine vibrations.
- Spacers are used to correctly align the engine. Ensure that they are correctly marked on removal and correctly replaced on reassembly.

### 10.5.2 Engine MOUNT REMOVAL



- Remove the engine in accordance with the instructions given in the Engine Maintenance manual.
- Cut the zip-ties holding wires, vents and lines to the engine mount.
- In some cases the instrument panel covers the bolts for the engine mount. Access must be secured to these bolts – either from the inside of the panel or by removing or loosening the instrument panel mounting.
- Un-bolt the engine mount fasteners and remove the mount from the aircraft.

### 10.5.3 Engine Mount Inspection

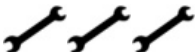


- Visually inspect for cracks, dents, bends and corrosion. Mild corrosion can be treated by sanding, applying etch primer then painting. Engine mounts with severe corrosion must be replaced.
- If cracks, dents or bends are found refer to Jabiru Aircraft or our local authorised agent. In most cases the damaged mount must be replaced.

#### **WARNING**

The engine mounts should not be repaired. If damaged, replace with a new part.

### 10.5.4 Installation



- For installation reverse removal procedure above.
- Use the “solid laminate” torque values given in Table 2.
- Ensure that the large aluminium washers (appr 40 x 40mm square) are in place on the inner side of the firewall.

#### **WARNING**

The bolts on the engine mount must only be fitted with high temperature nuts. **DO NOT USE NYLOC NUTS** as the nylon insert may melt causing failure.

## 10.6 Engine Fuel System

### 10.6.1 Description

- The engine is equipped with a carburettor mounted below the engine and a fuel pump at the Starboard rear of the engine. Refer to Engine Maintenance manual for carburettor jet removal, idle adjustment and carburettor bowl cleaning procedures.
- Refer to the Fuel System Section below (Section 11) for details.

#### **WARNING**

Fuel lines within the engine compartment are fitted with fireproof sleeves. These sleeves must not be removed.

## 10.7 Engine Throttle Control

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 10.7.1 Description

- Jabiru Engines use a cable-actuated throttle.
- While most aircraft use a throttle control mounted on the instrument panel some are equipped with a throttle fitted to the front of the crew seat (**Error! Reference source not found.** and **Error! Reference source not found.**)

### 10.7.2 Throttle Removal



- Loosen the lock nuts holding the cabin end of the throttle cable outer to the support bracket.
- Disconnect the throttle cable from the output shaft of the throttle cross tube.
- For the panel-mount throttle:
  - Loosen the lock-nut and un-screw the throttle push rod from the rod-end. Withdraw the throttle push rods from the panel.
  - Undo the screws holding the throttle shaft clamp blocks. Disassemble and remove the throttle shaft from inside the instrument panel.
  - If required, undo the fasteners and remove the input and output arms from the throttle shaft. Note that paint may need to be removed before these levers can be moved.
- For the seat-mount throttle:
  - Undo the screws holding the throttle shaft clamp blocks. Disassemble and remove.
  - Remove the throttle lever from the passenger's side of the aircraft.
  - Withdraw the throttle shaft from the centre console.
  - If required, undo the fasteners and remove the input and output arms from the throttle shaft. Note that paint may need to be removed before these levers can be moved.
- If required, disconnect the throttle cable from the carburettor and remove the cable assembly from the aircraft.

### 10.7.3 Throttle Inspection, Repair & Rigging



- When adjusting any engine control, it is important to check that the control slides smoothly throughout its full range of travel and that the lever or knob moves through its full range of travel. This must be verified both at the carburettor and inside the cabin.
- Check for chaffing or fraying of the cable.

### 10.7.5 Throttle Installation

- Reverse the removal procedure given above for installation.
- Adjust throttle stops (mounted on the throttle pushrods for panel mount throttle and on the seat front / floor for seat-mounted throttle) to give full throttle and correct idle speed. Details for procedures can be found in the Engine Maintenance Manual.
- Adjust friction of shaft clamps to ensure throttle does not move from a set position.

#### **WARNING**

**Adjustments must be set with care: poorly adjusted throttle stops can result in engine stoppages, apparent loss of power or increased landing distances due to high idle. Poorly adjusted friction stops can result in throttle position creeping – resulting in un-commanded application of high power.**

**CASES OF SEVERE DAMAGE TO AIRCRAFT DUE TO THESE EFFECTS HAVE BEEN RECORDED**

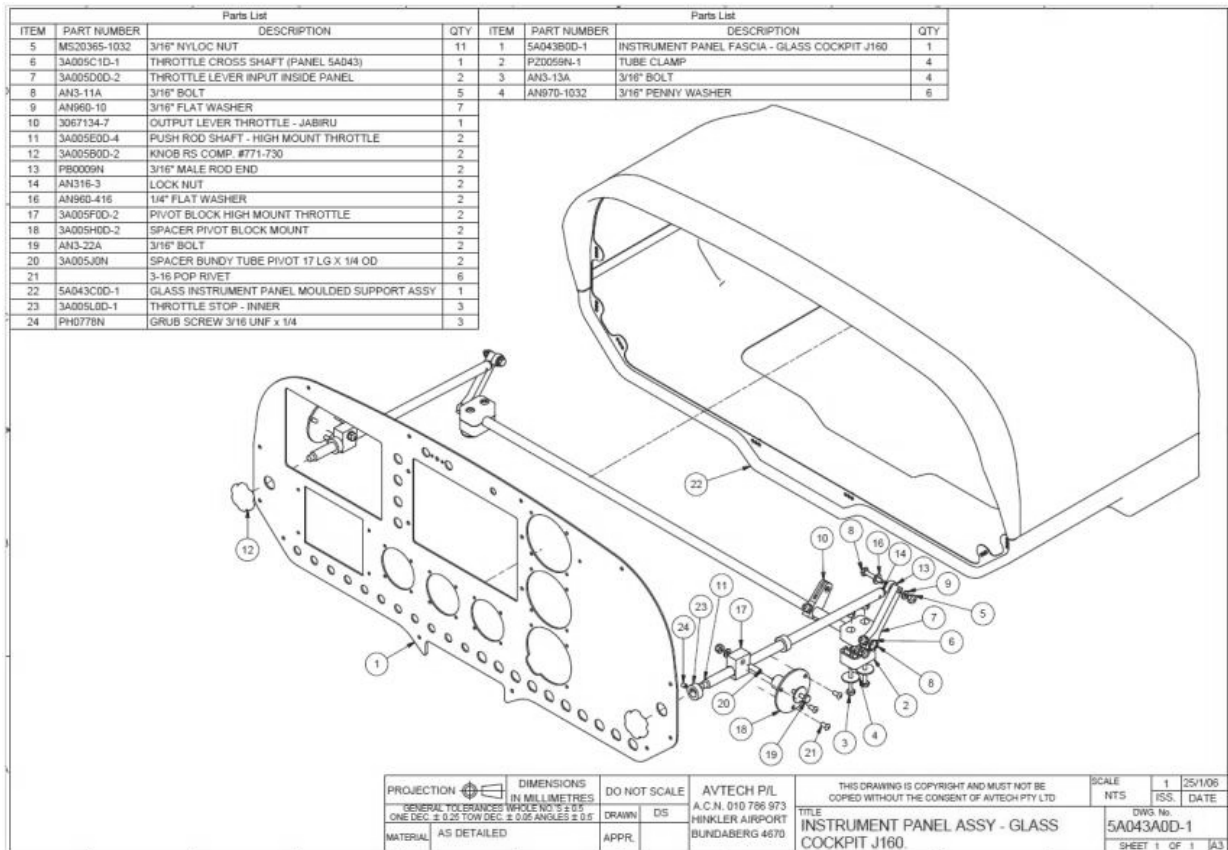


Figure 94 – Throttle Assy (Large Panel Mount)

## 10.8 Choke CABLE

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 10.8.1 Description

- The Choke Control is normally located in the main instrument panel & is connected to the carburettor by a control cable. In some cases the Choke Control may be located on the left-hand side of the firewall beside the instrument panel.

### 10.8.2 Removal, Inspection & Installation



- Disconnect the choke inner & outer cable from the carburettor.
- To remove the cable end fitting, remove the cotter pin (Figure 95). Note that for older aircraft the soldered end fitting must be heated (with a powerful soldering iron or small gas burner) and removed when the solder melts.
- Undo the clamp nuts from the cabin end of the cable.
- Where equipped, un-screw and remove the fireproof fitting on the firewall which the cable passes through.
- Draw the cable through the firewall & panel. In some cases removal of the end fitting will be necessary to achieve this.
- Installation is the reverse of the removal process above. Note that when the firewall fitting is re-fitted fireproof putty (available from Jabiru Aircraft) must be replaced to ensure a flame-proof seal.

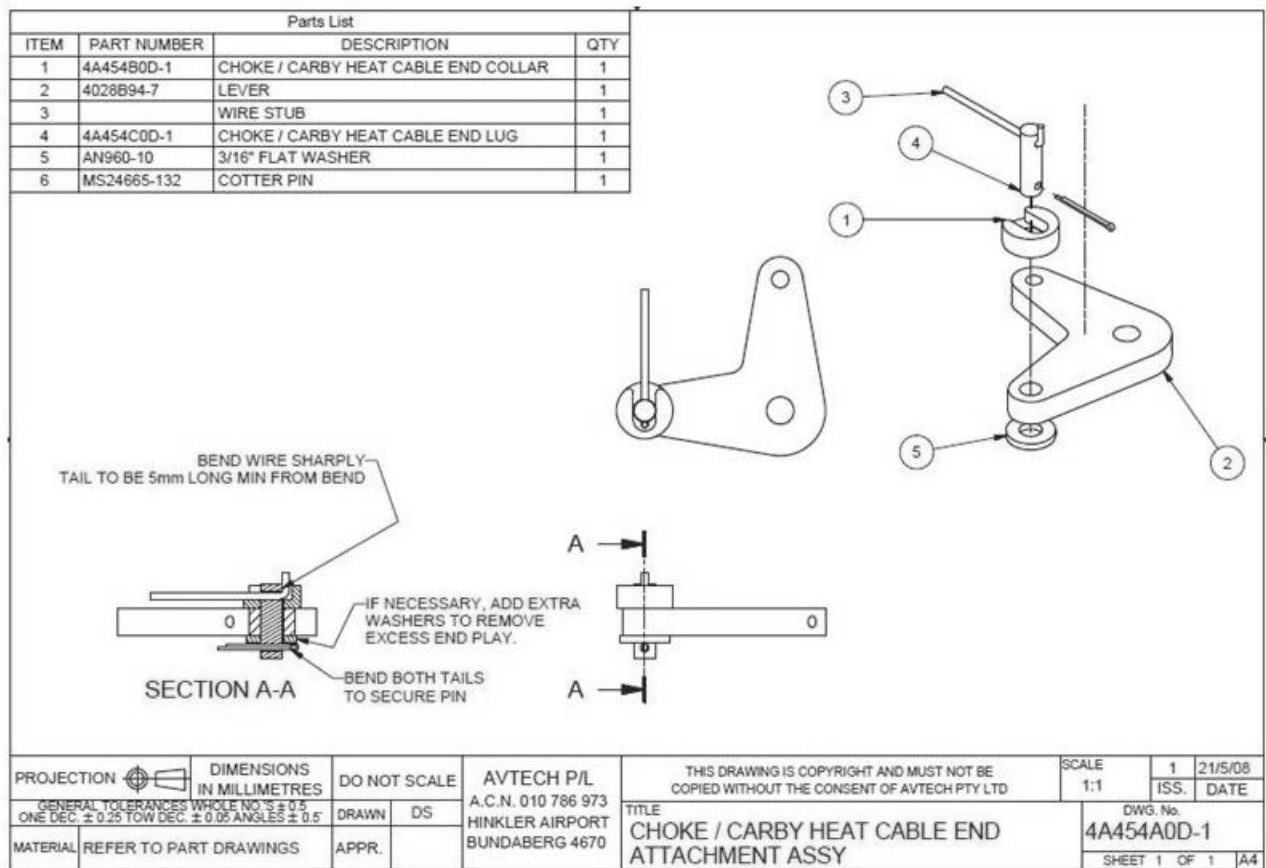


Figure 95 – Control Cable End Fitting Installation

## 10.9 Air Intake System & Carburettor Heat

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 10.9.1 Description

- The engine air intake system comprises a cold air inlet in the lower cowl, a hot air muff attached to the exhaust system, a mixer assembly mounted on the firewall and connected to a carburettor. The mixer box incorporates the air filter, control flaps etc.
- Carburettor Heat is activated by pulling the Carburettor Heat Control on the panel OUT. This opens the hot air valve in the mixer assembly and permits hot air to flow from the muff into the carburettor.

### 10.9.2 Removal, Inspection & Installation



- To remove hot air mixed box the cable must be disconnected then the rivets holding it to the firewall drilled. This is not required during routine maintenance.
- To remove heat muff from the exhaust, undo the hose clamps holding it in position.
- The air filter should be inspected every 100 hours or more regularly if the engine is operated in dusty conditions. Dirty filters can be cleaned once by blowing out with compressed air – when the filter becomes dirty again it must be replaced.
- Hot air mixer boxes must be inspected for conditions and to make sure they are clean and dry inside. Ensure that the carby heat valve is operating correctly.
- SCAT hoses must be inspected for condition and replaced if they are ripped etc.
- Visually inspect the system looking for rubbing, wear, damage or corrosion.



- For installation, reverse the procedure given above.

**WARNING**

Incorrect function of carburettor heat valve can lead to engine failure. Ensure flap of valve is securely attached to shaft, moves with it correctly and seals when in position.

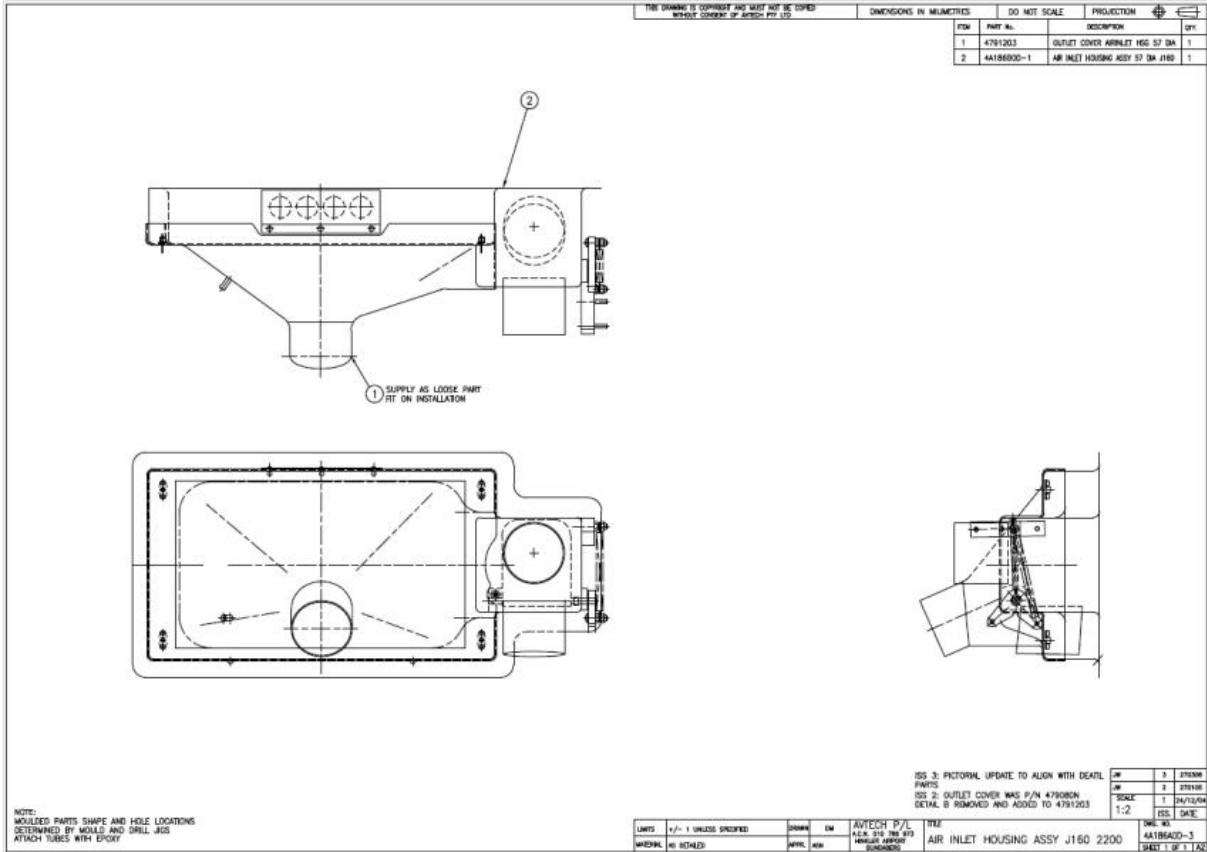


Figure 96 – Carburettor Heat Box

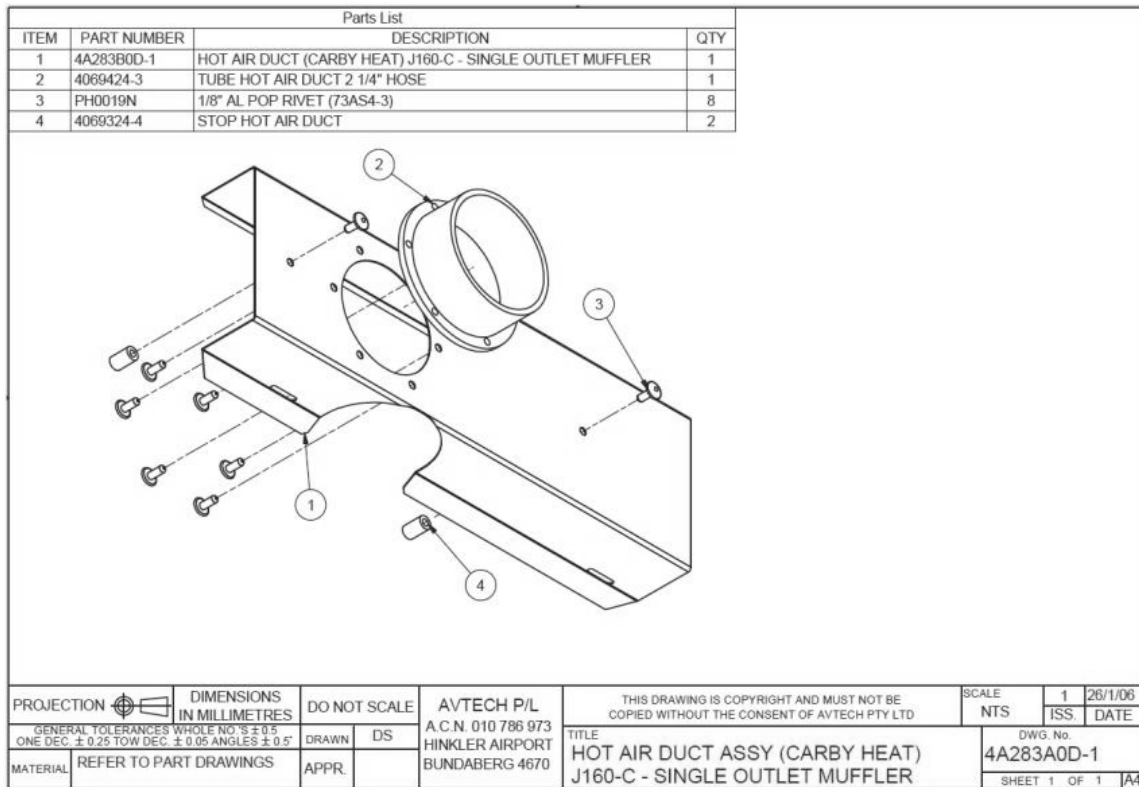


Figure 97 – Hot Air Duct Assy

## 10.10 Exhaust System

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 10.10.1 Description

- The exhaust system consists of exhaust extractor pipes running from the cylinder heads to the muffler. In some cases the individual extractor pipes are connected into manifolds before reaching the muffler.
- The muffler is attached to the extractors / manifolds using springs.
- Note that the majority of exhaust maintenance is detailed in the Engine Maintenance Manuals.

### 10.10.2 Exhaust System Removal



- Remove both top and bottom engine cowls.
- Remove springs.

### **WARNING**

**Never remove coupling spring with a sharp object or one which can mark the spring material. A rounded screwdriver shank or a hook fashioned from 1/4" bar stock is ideal.**

- Remove muffler assembly.
- Disconnect carburettor heat pipes and, if necessary, remove the heat muff from the muffler.
- If necessary, remove exhaust manifolds from engine. Note that loosening the screws holding the extractors to the cylinder heads will often assist in removing muffler.

### 10.10.3 Exhaust Inspection



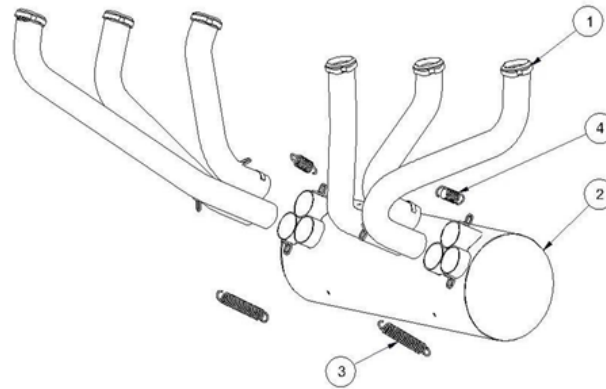
- As all exhaust systems are subject to burning, cracking and general deterioration from alternate thermal stress and vibration, inspection is very important and should be carried out every 100 hours of operation.
- In addition, an inspection of the exhaust system must be undertaken anytime exhaust fumes are noticed in the cabin.
  1. Remove engine cowlings.
  2. Inspect complete system, starting at the connection to the head; securing bolts and moving outwards. Especially check areas adjacent to welds. Look for exhaust gas deposits in surrounding areas, indicating that exhaust gas is escaping through a hole or crack.
- For a more thorough inspection, the following procedure is recommended.
  1. Remove manifolds and/or muffler.
  2. Use rubber expansion plugs to seal openings.
  3. Using a manometer or gauge, apply approximately 1-1/2 psi (3 inches of mercury) air pressure while the manifold and/or muffler are submerged in water. All leaks will appear as bubbles and can be readily detected.
  4. It is recommended that any exhaust system component found to be defective is replaced with a new part before the next flight.

### 10.10.4 Exhaust Installation



- For installation reverse the removal procedure given above.
  - If the exhaust manifolds / extractors have been loosened or removed, then during installation care must be taken to position the muffler correctly. Carry out a test fit of the muffler to the system, then stand back and check that it is positioned at the engine centreline and is true and straight. If necessary adjust the manifold or extractors. Before final fit ensure that extractors / manifolds are aligned well with the exhaust ports. Poor alignment will result in exhaust port damage (particularly for 2-bolt flanges). Tighten all extractor screws & assemble. Figure 98 – 3300 Exhaust System Type 1

ITEM	PART No.	DESCRIPTION	QTY
1	4A199A0D	EXTRACTOR EXHAUST PIPE SET	1
2	4A175A0D	MUFFLER W/ASSY 3.3L W/O OUTLET	1
3	PE01094	SPRING EXHAUST RETAINER	2
4	PE4A003A0D	SPRING EXHAUST RETAINER 8 CYL	2



EXHAUST ASSY 3300 TRACTOR 4A293A0D-1

Figure 99 – 3300 Exhaust System Type 2

## 10.11 Cabin Heater System

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 10.11.1 Description

- A cold-air inlet is fitted to the front of the engine cowls. From here the air flows through a heat exchanger installed on the exhaust tailpipe, through a control valve and into the cabin.

### **WARNING**

**A malfunctioning cabin heat system has potential to release harmful gases such as carbon monoxide into the cabin. Aircraft equipped with a cabin heater must also be fitted with a current carbon monoxide detector tag at all times.**

### 10.11.2 Cabin Heat Removal



- For the control valve:
  - Disconnect spring from Lever arm.
  - Remove Split Pin from cable locking pin.
  - Remove locking pin, disconnect control cable.
  - Loosen hose clamp screws.
  - Remove hose.
- For the heat exchanger:
  - Loosen the hose clamps and disconnect the air hoses from the heat exchanger.
  - Loosen the cap screws holding the assembly to the tailpipe.
  - Remove the exchanger.

10.11.3 Cabin Heater Inspection



- Check for cracking or splitting of the cabin heat hose.
- Ensure there is free movement of the control cable.
- Check for free movement of the butterfly valve. Ensure the valve is closing fully in both the ON and OFF positions.
- Ensure the locking pin components are all in working order.
- Check that the heat exchanger is secure on the exhaust and not damaged.
- Any damaged or inoperative parts will need to be replaced, repair is not possible on these components.

10.11.4 Installation

- For installation, reverse removal procedure above.

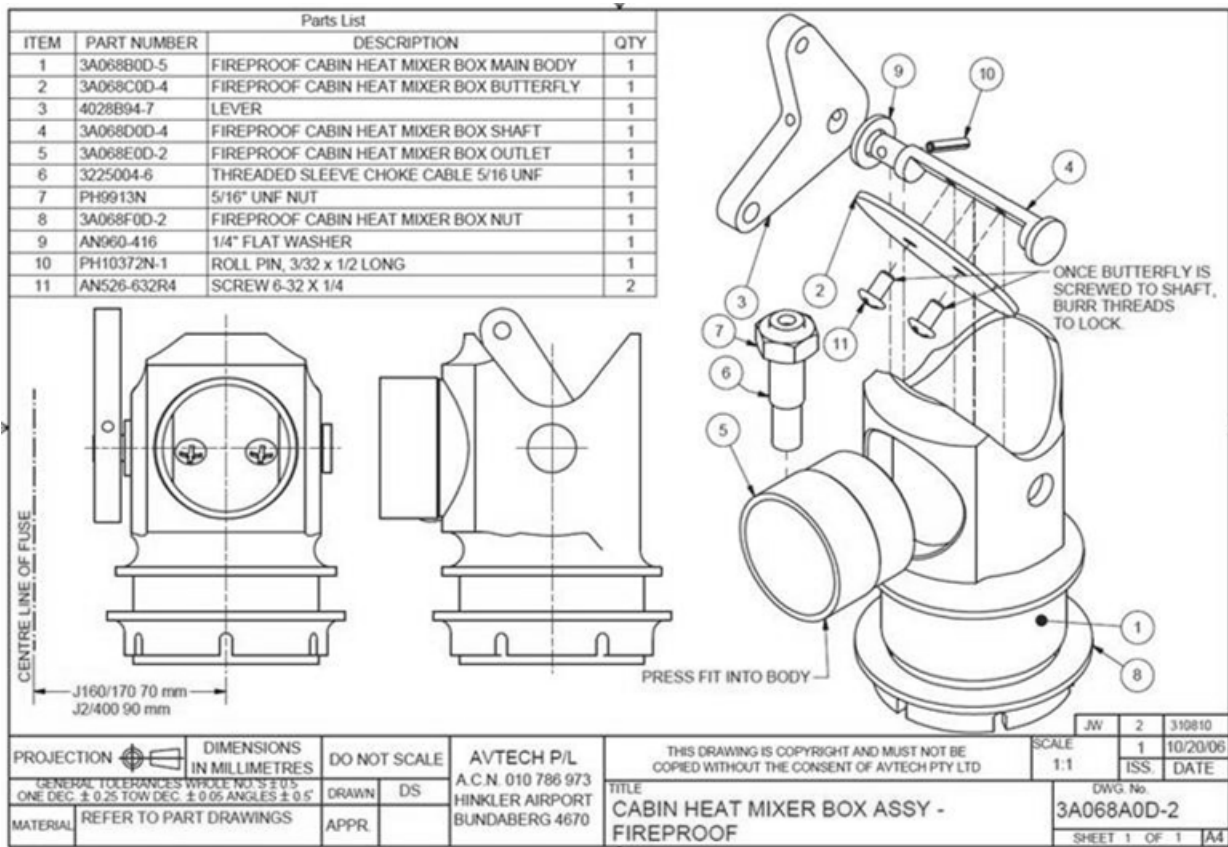


Figure 100 – Cabin Heat Mixer Assembly

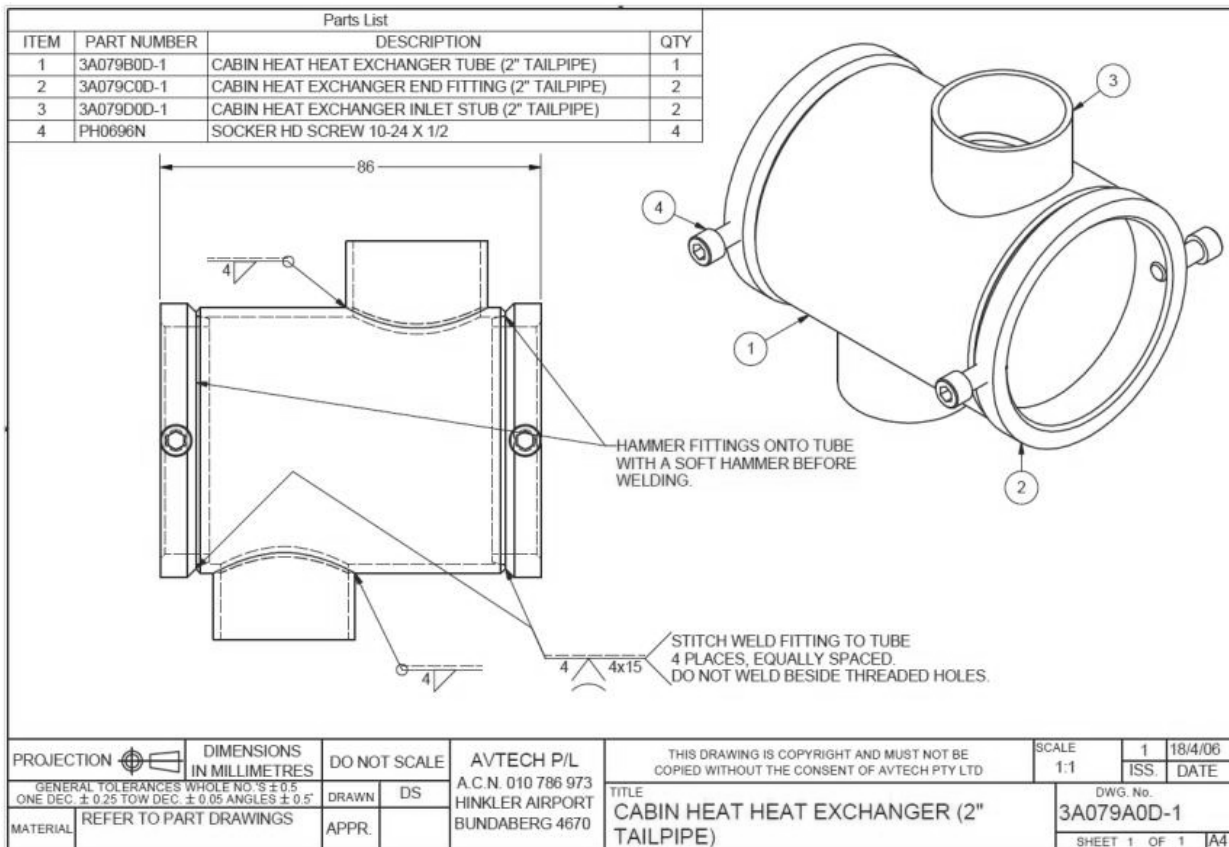


Figure 101 – Cabin Heat Exchanger Assy

## 10.12 Extreme Climatic Conditions

### 10.12.1 Dust

- Dust induced into the carburettor air intake system is probably the greatest single cause of early engine wear. When operating under high dust conditions, the carburettor air filters should be serviced regularly. Servicing intervals for aircraft operating in extreme conditions are at the operator's discretion.

### 10.12.2 Seacoast And Humid Area

- In salt water areas, special care should be taken to keep the engine and accessories clean to prevent oxidisation.
- In humid areas, fuel should be checked frequently and drained of condensed moisture.

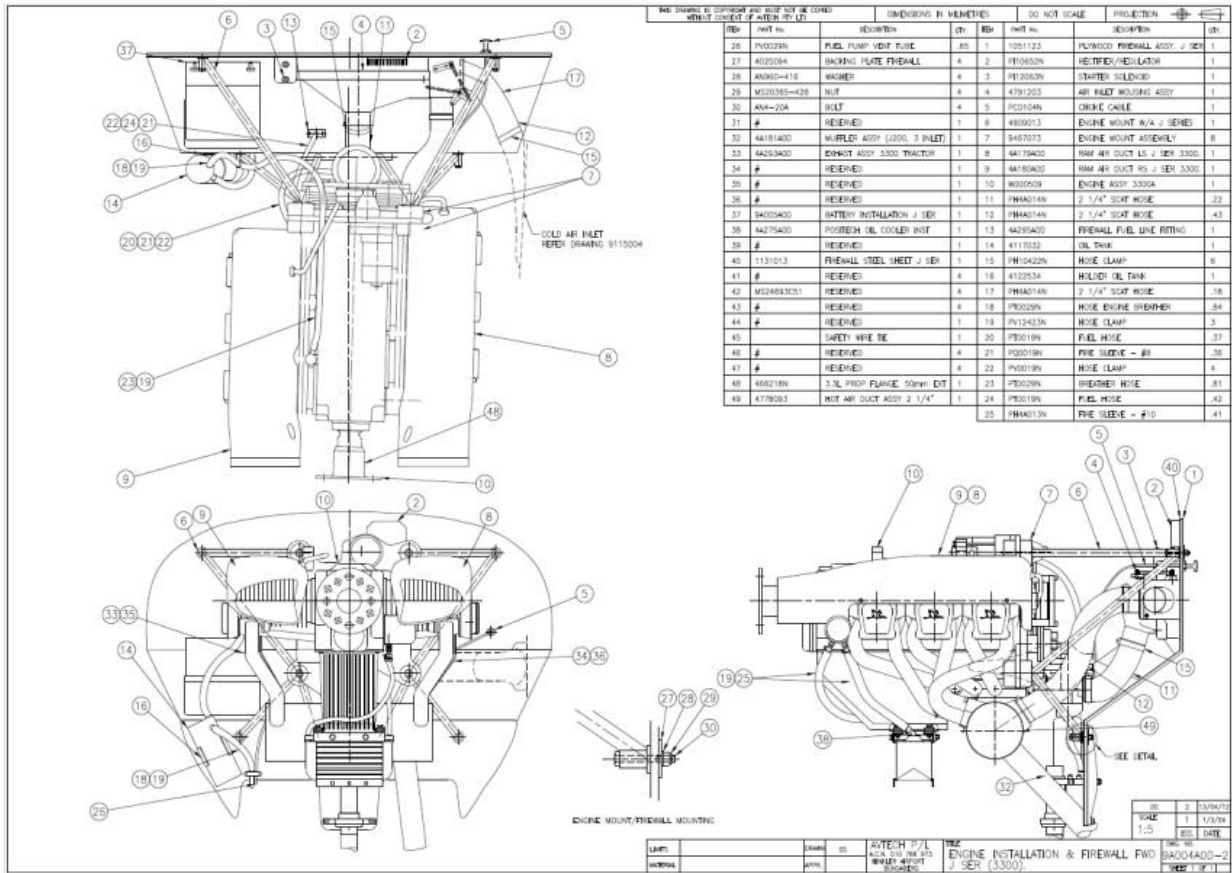


Figure 102 – J200 Family Engine Installation Type 2

## 11 Fuel System

### 11.1 Description

- 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:
  - 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:
  - 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.**

#### 11.1.1 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

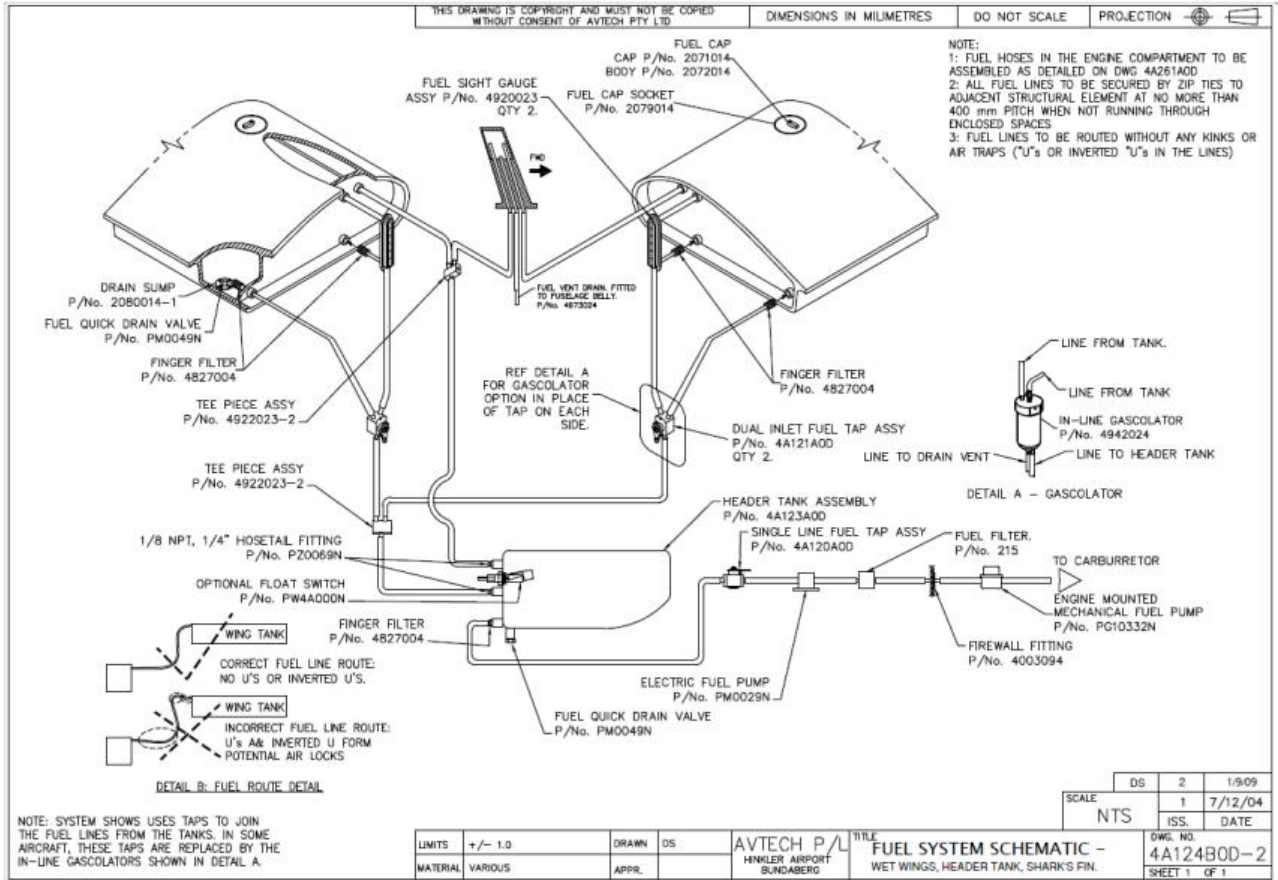


Figure 103 – Fuel System Schematic – Type 4

11.1.2 Fuel System Trouble Shooting

Table 8 – 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 line plugged	Clean out or replace fuel line
Fuel Starvation after starting	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

## 11.2 Fuel Lines

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 11.2.1 Description

- Flexible fuel lines are used in Jabiru aircraft.

### 11.2.2 Removal



- 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.

### 11.2.3 Inspection



- 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 105 refers). Fasteners such as screws, which damage the structure, should not be used.

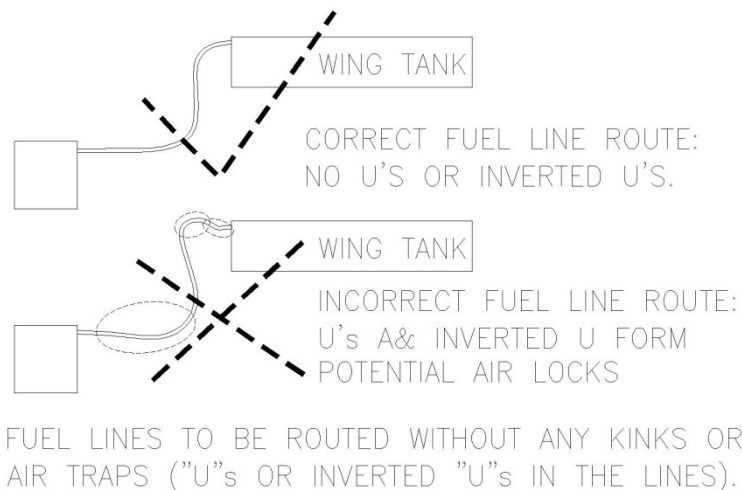


Figure 104 – Schematic

### 11.2.4 Installation



- 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 105 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.

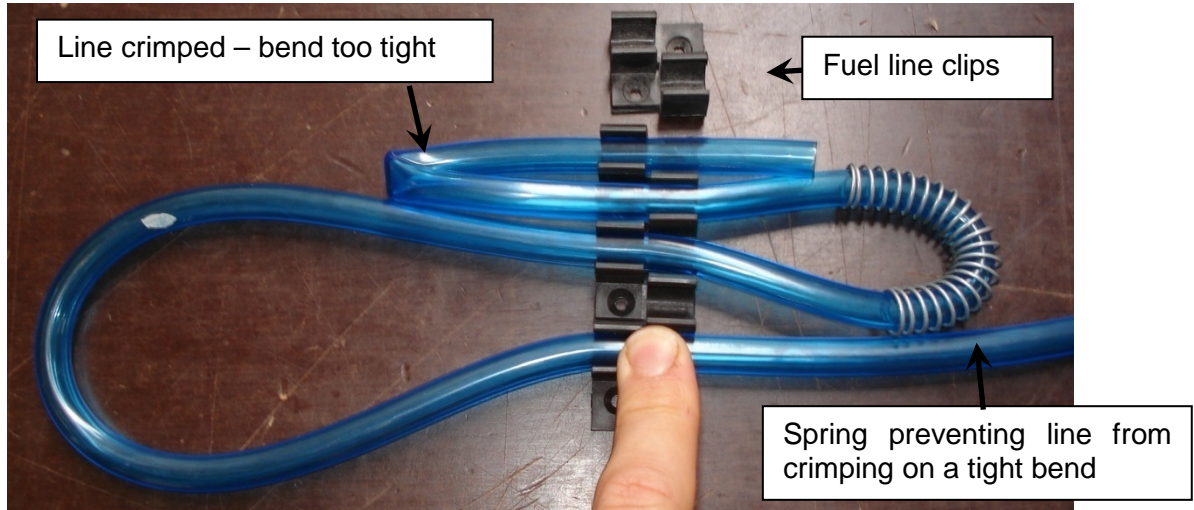


Figure 105 – Sample Fuel Line Details

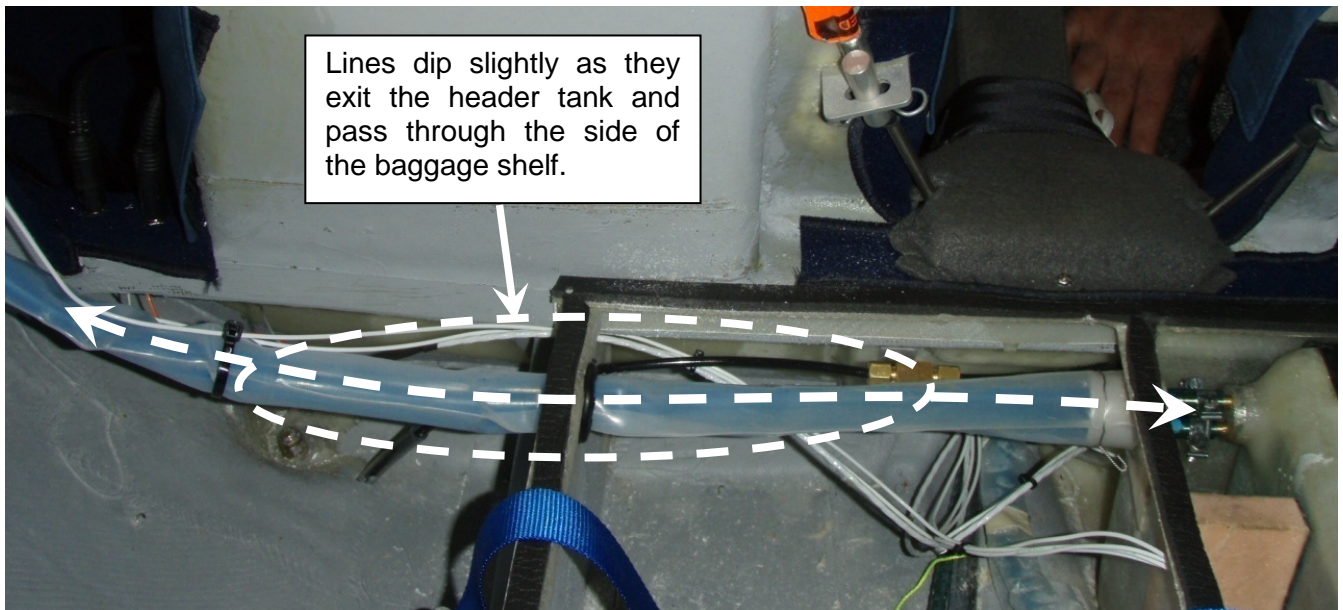


Figure 106 – Fuel Lines Showing Typical “U” Requiring Correction

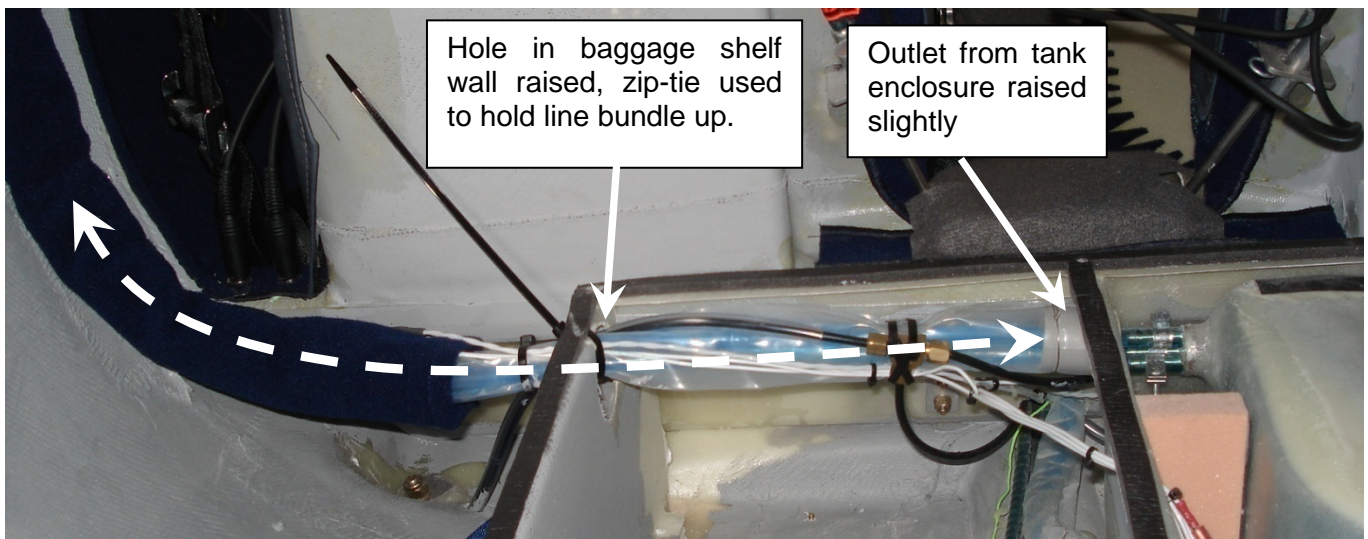


Figure 107 – Corrected Fuel Lines

### 11.3 Fuel Tanks

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 11.3.1 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.

#### 11.3.2 Fuel Tank Removal



- 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.
  - 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.

### 11.3.3 Fuel Tank Inspection



- 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.

### 11.3.4 Fuel Tank Installation

- For installation, reverse removal procedure given above.

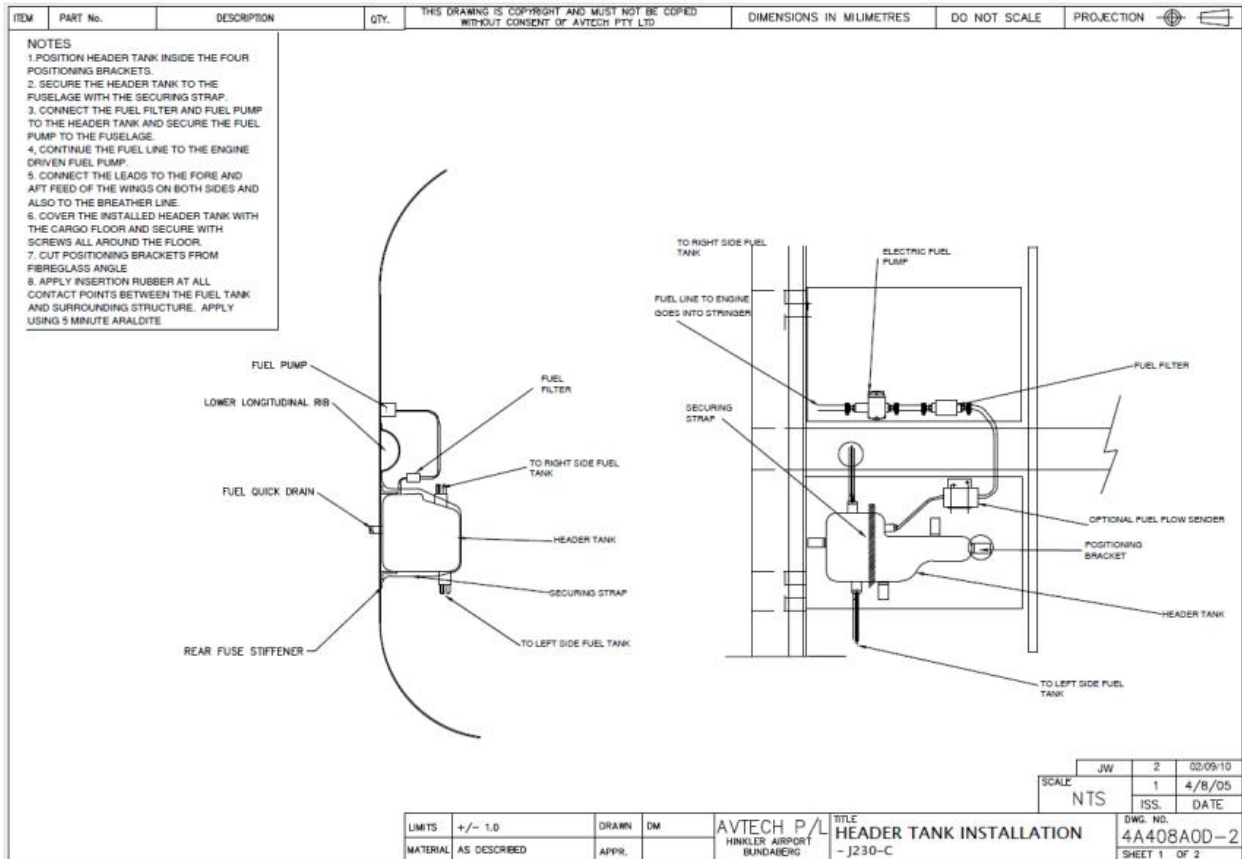


Figure 108 – Header Tank Installation – Type 2 (Sheet 1)

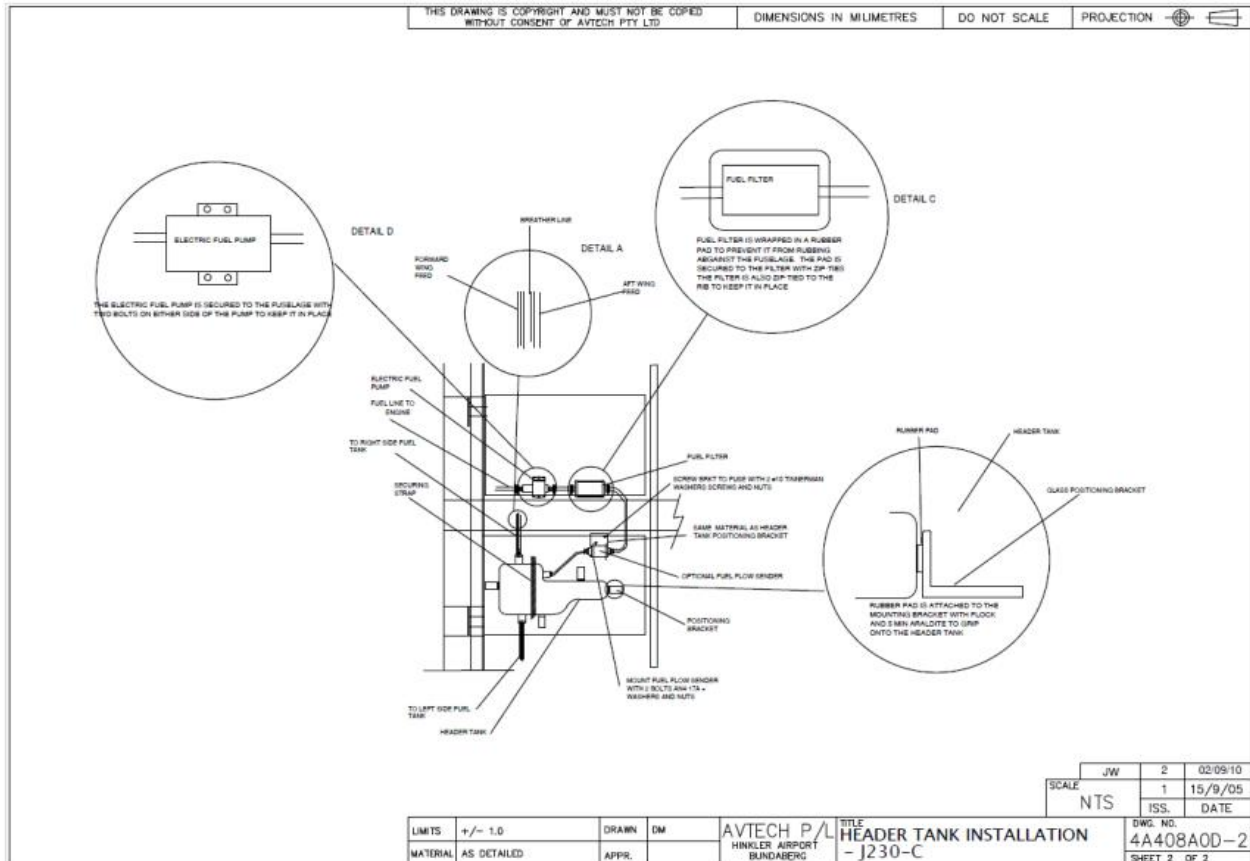


Figure 109 – Header Tank Installation – Type 2 (Sheet 2)

### 11.4 Fuel Vents

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 11.4.1 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.

#### 11.4.2 Inspections



- 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.

- 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 carburetor 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.

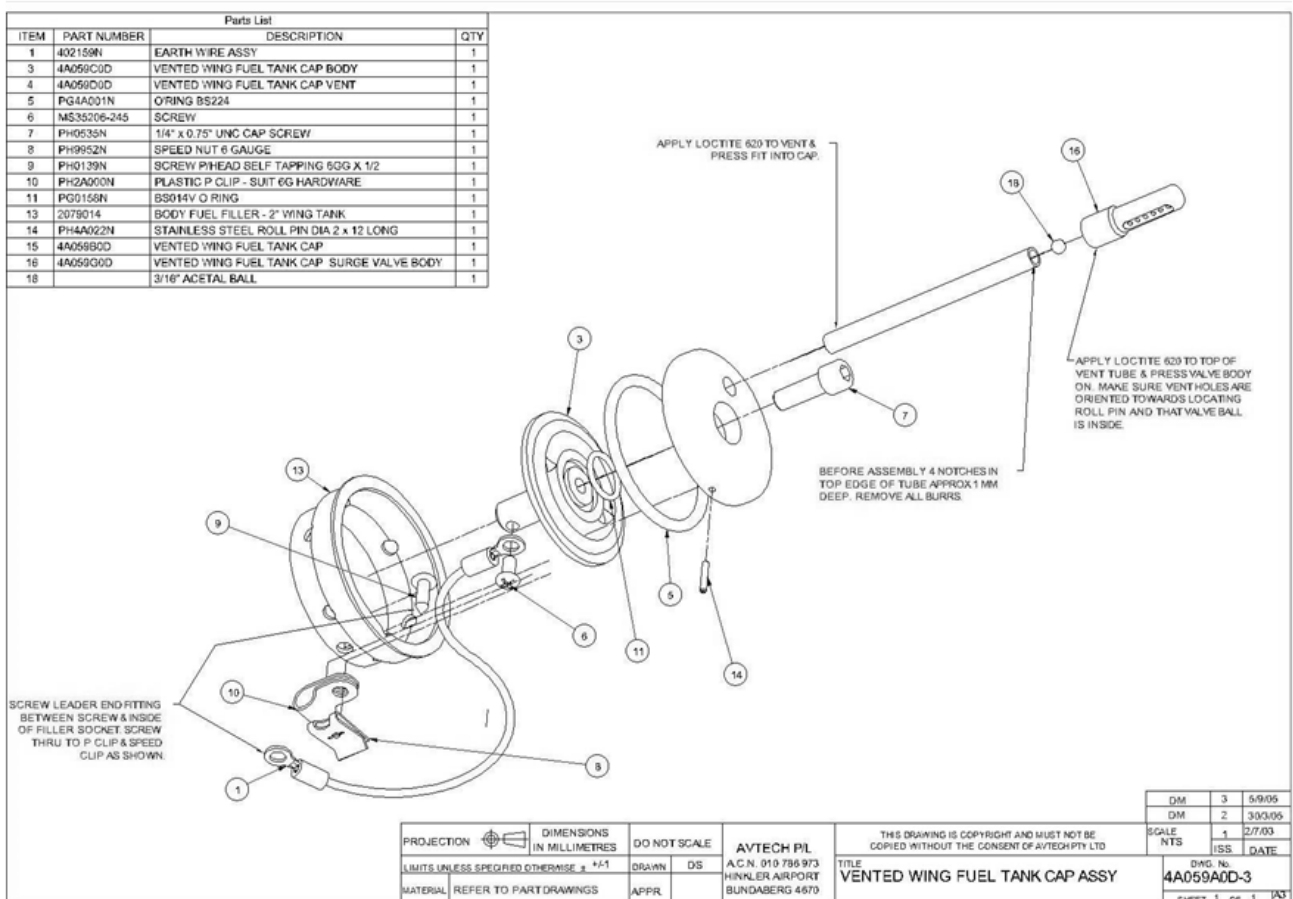


Figure 110 – Vented Fuel Cap Assy

### 11.5 Fuel Shut-Off Valve

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

**11.5.1 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.

**11.5.2 Fuel Valve Removal & Installation**



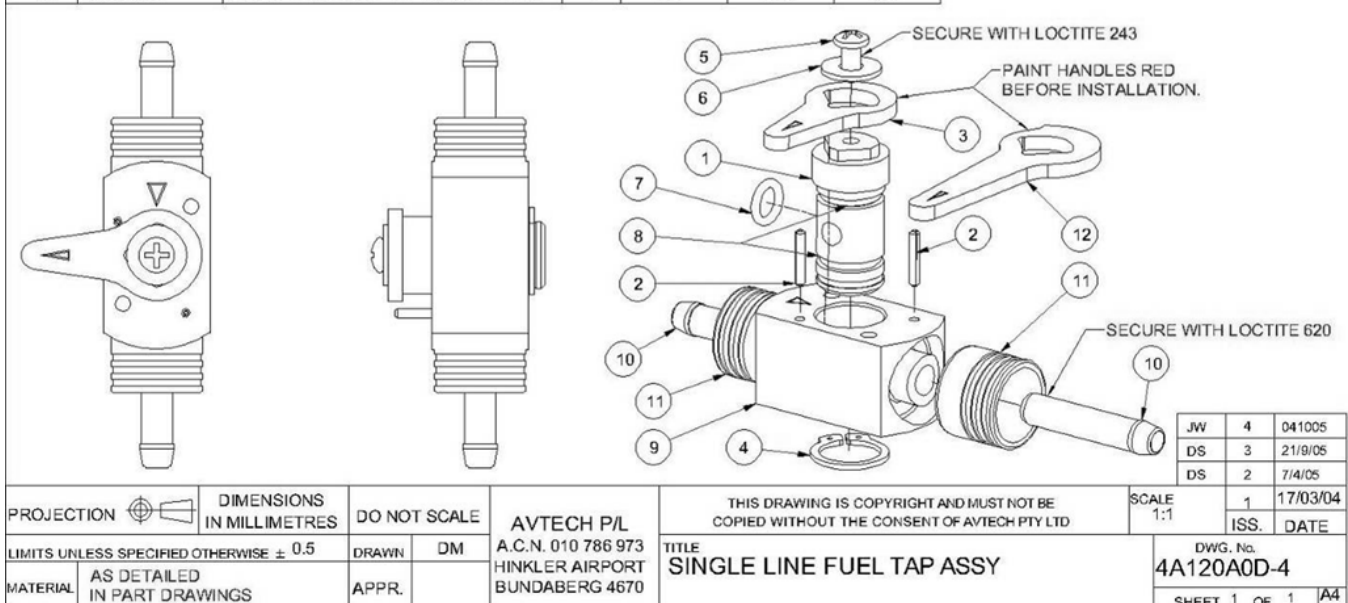
- Where equipped, turn OFF both taps between wing tanks and header tank. Cover both tank cap vents. Alternately removable fuel line clamps may be used.
- Remove fuel shut-off valve cover (where equipped).
- Remove shut-off valve handle.
- Remove cover plate (where equipped).
- For some variants access 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 111 – Single Line Fuel Tap**



### 11.6 Fuel Gauges

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

#### 11.6.1 Description

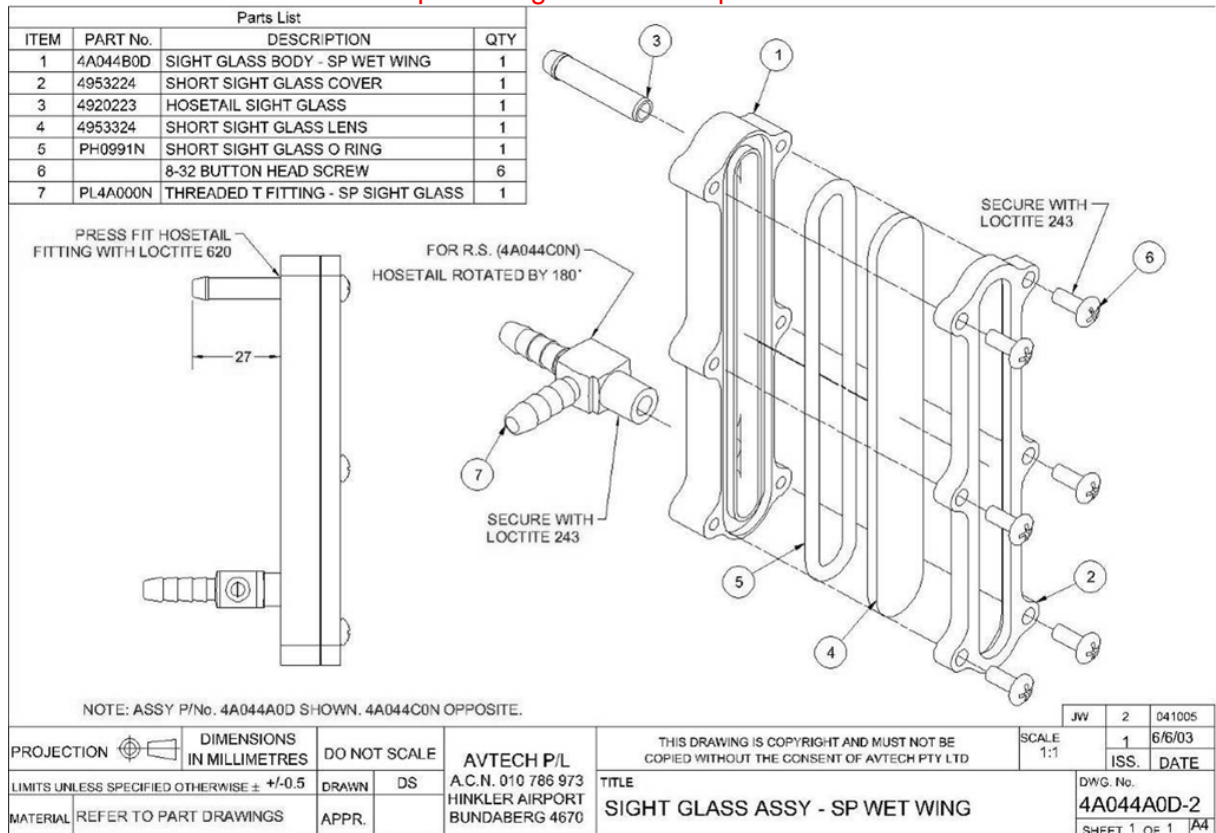
- Fuel gauges may be sight gauges or electrical float gauges in the wing roots for aircraft with wing tanks or a direct-reading scale fitted to the front of the fuselage fuel tank.

#### 11.6.2 Fuel Gauge Removal & Installation



- 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 7.2.
  - Remove the gauge assembly from the aircraft wing.
  - Calibration of the electric fuel senders is discussed in Section 12.
  - Reverse the preceding steps for installation.

Parts List			
ITEM	PART No.	DESCRIPTION	QTY
1	4A044B0D	SIGHT GLASS BODY - SP WET WING	1
2	4953224	SHORT SIGHT GLASS COVER	1
3	4920223	HOSETAIL SIGHT GLASS	1
4	4953324	SHORT SIGHT GLASS LENS	1
5	PH0991N	SHORT SIGHT GLASS O RING	1
6		8-32 BUTTON HEAD SCREW	6
7	PL4A000N	THREADED T FITTING - SP SIGHT GLASS	1

NOTE: ASSY P/No. 4A044A0D SHOWN. 4A044C0N OPPOSITE.

PROJECTION	DIMENSIONS IN MILLIMETRES	DO NOT SCALE	AVTECH P/L A.C.N. 010 786 973 HINKLER AIRPORT BUNDABERG 4670	THIS DRAWING IS COPYRIGHT AND MUST NOT BE COPIED WITHOUT THE CONSENT OF AVTECH PTY LTD	SCALE 1:1	JW 2 D41005 1 6/6/03 ISS. DATE
LIMITS UNLESS SPECIFIED OTHERWISE ± +/-0.5	DRAWN	DS	TITLE SIGHT GLASS ASSY - SP WET WING	DWG. No. 4A044A0D-2	SHEET 1 OF 1   A4	
MATERIAL REFER TO PART DRAWINGS	APPR.					

Figure 112 – Fuel Gauge – Sight Glass

## 11.7 Fuel Filters

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 11.7.1 Description

- The fuel filter is of the in-line type. It is located:
  - Beside the header tank, inside the fuselage, aft of the sound curtain for J230 family aircraft.

### 11.7.2 Fuel Filter Removal & Installation



- 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 25) 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.**

## 11.8 Fuel Pumps

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 11.8.1 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 vapor-lock and for redundancy.

### 11.8.2 Secondary Fuel Pump Removal & Installation



- 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 25) 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.**

## 12 Instruments & Instrument Systems

### 12.1 General

- This Section describes the typical instrument installation and its operating system. Emphasis is placed on trouble shooting and corrective measures only. It does NOT deal with specific instrument repairs as this usually requires special equipment and data and should be handled by instrument specialists. Malfunctioning instruments should be either returned to JABIRU AIRCRAFT Pty Ltd or sent to an approved instrument overhaul and repair station for servicing.
- Our concern here is with preventive maintenance on the various instrument systems and correction of system faults which will result in instrument malfunctions. The descriptive material, maintenance and troubleshooting information in this Section is intended to help the owner or mechanic determine malfunctions and correct them, up to the defective instrument itself, at which point an instrument technician should be called in.
- Some instruments, such as Oil Temperature and Pressure Gauges, are simple and relatively inexpensive and repairs will usually cost more than a new instrument. Flight instruments, on the other hand, are usually well worth repairing. The words “replace instrument” in the text, therefore, should be taken only in the sense of physical replacement in the aircraft. Whether replacement is to be with a new instrument, an exchange one, or an original instrument is to be repaired must be decided on the basis of the individual circumstances.
- 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.

### 12.2 Instrument Panel

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

#### 12.2.1 Description

- The instrument panel consists of a fascia panel which attaches to the panel mount and contains all the instruments. The fascia may be made from aluminium or composite materials.

#### 12.2.2 Instrument Panel Removal & Installation



- To remove the fascia:
  - Remove the screws holding the fascia to the fibreglass panel mount.
  - Carefully draw the fascia aft. Normally there is sufficient slack in the electrical loom and instrument lines for the fascia to move aft by around 100mm. Cushions or similar must be used to support the fascia – taking care not to scratch the face or damage any instruments. This position is usually the best to carry out any necessary maintenance, adjustment or repairs to instruments etc.
  - Disconnect the panel. Ensure that all wires and lines etc are clearly marked to aid re-assembly. Note that air lines tend to be a tight fit and a heat gun or similar may be necessary to soften the lines to allow removal.
  - Remove the fascia.
  - Assembly is the reverse of the above procedure.

#### **WARNING**

**When removing fascia it is common for some wires connecting to switches on the bottom of the panel to be dislodged. Ensure all wires are securely re-connected before fitting fascia.**

**Take care not to strain, bend or damage any wires or lines.**

While working within the instrument panel ensure that the starter motor system or main battery is disconnected so that the motor cannot be started accidentally via a short or similar.

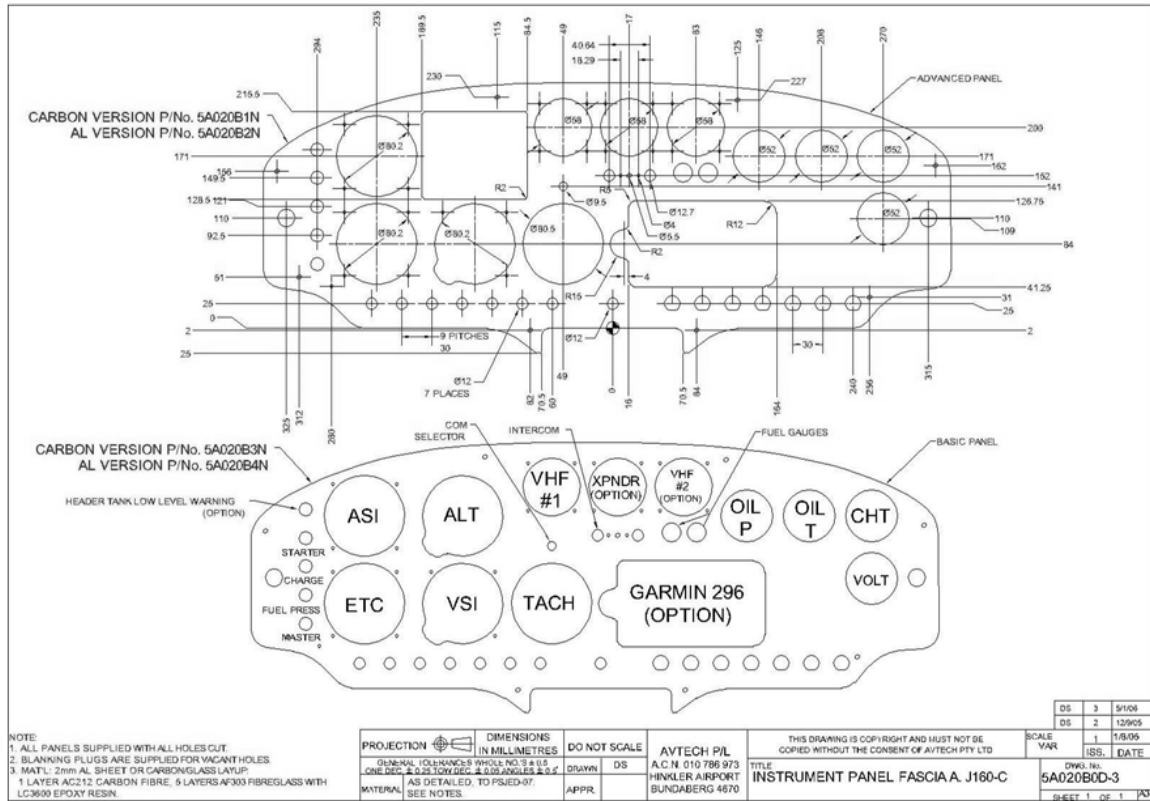


Figure 113 – Instrument Panel Layout Type 1

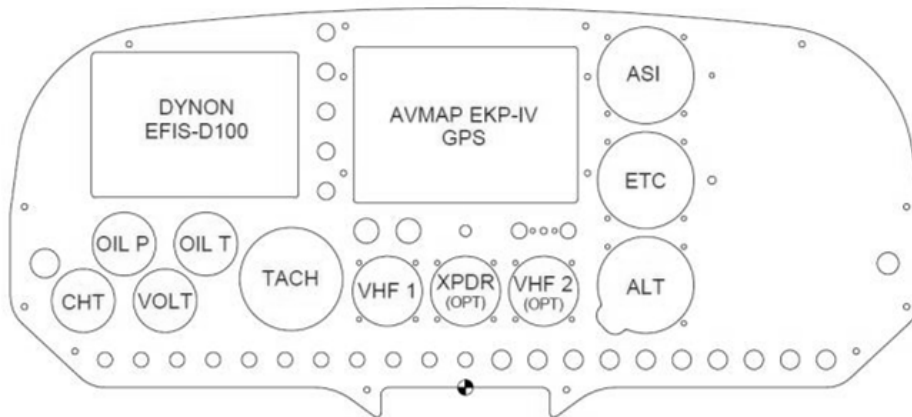


Figure 114 – Instrument Panel Layout Type 2

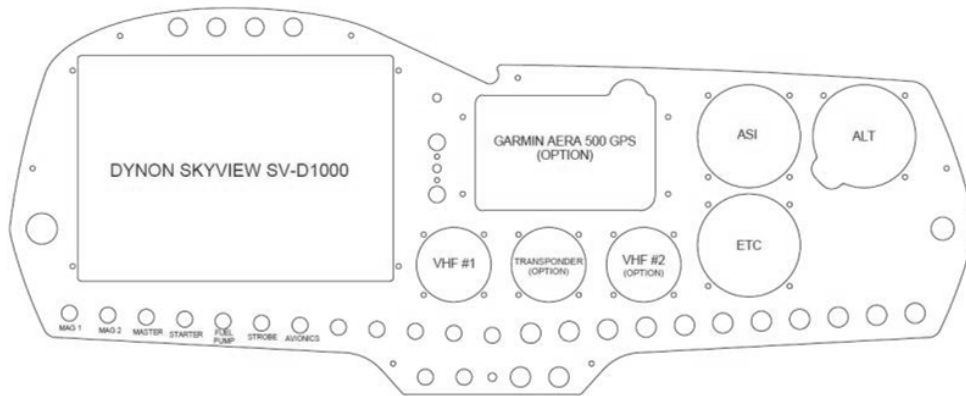


Figure 115 – Instrument Panel Layout Type 3

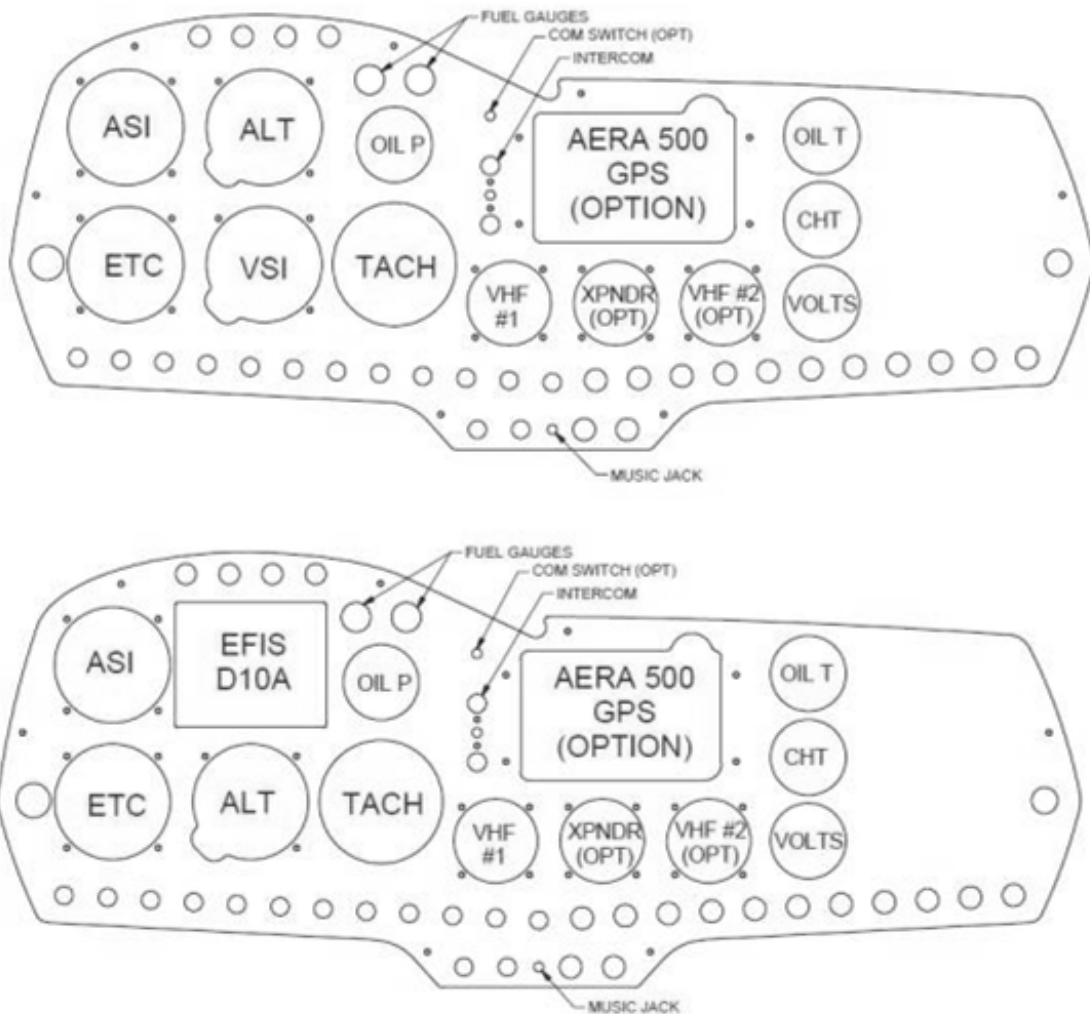


Figure 116 – Instrument Panel Layout Type 4

### 12.3 Instrument Panel Mount

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

12.3.1 Description

- The instrument panel mount is a fibreglass moulding which is secured to the firewall. The instrument panel fascia secures to this mount and it also supports the panel throttle assembly (where equipped).

12.3.2 Instrument Panel Removal & Installation



- To remove the fibreglass panel mount from the firewall:
  - Remove the fascia as noted above.
  - Remove the top engine cowl to allow access to the forward side of the firewall.
  - Where equipped, disconnect the panel mount throttle. If required the throttle assembly can remain inside the panel mount when it is removed – full disassembly is not necessary.
  - Remove the bolts holding the panel mount to the firewall.
  - Remove the panel mount.
  - Assembly is the reverse of the above procedure.

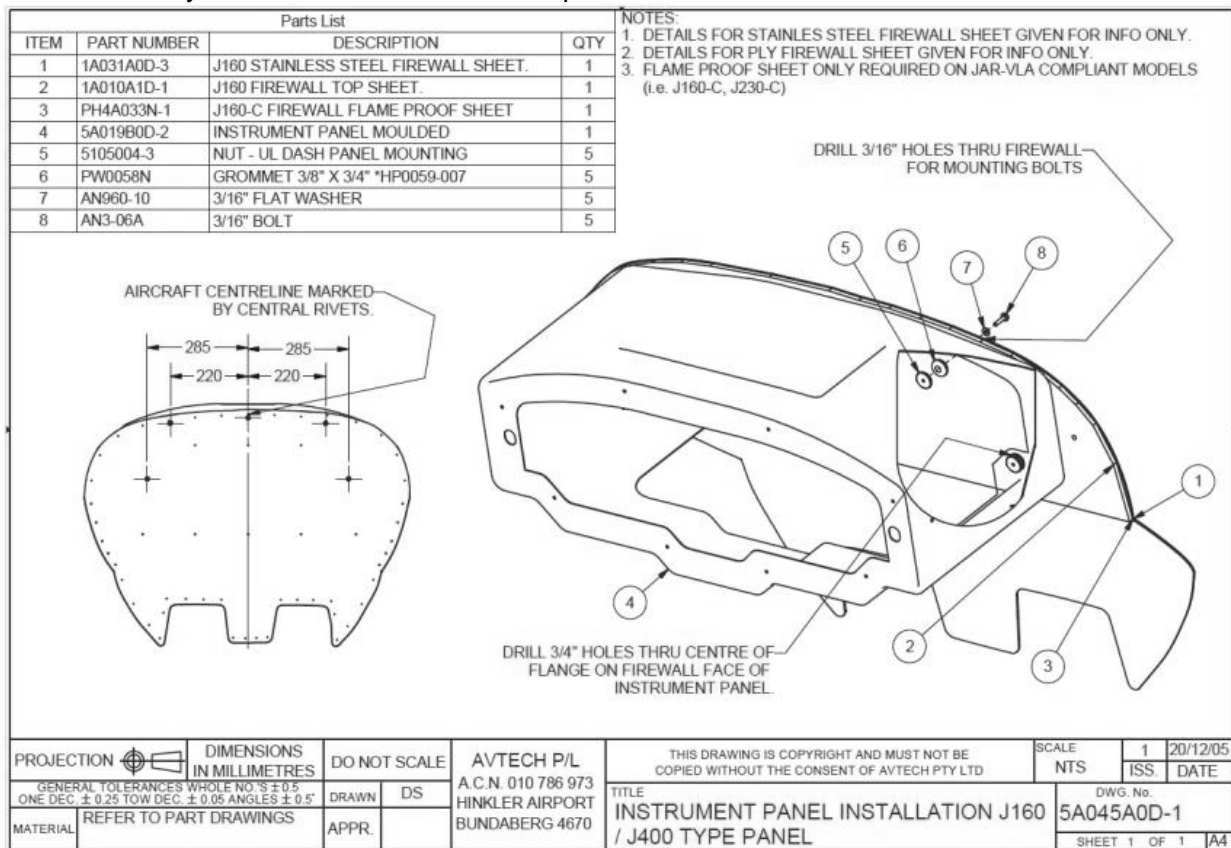


Figure 117 – Instrument Panel Mount Installation

12.4 Instruments

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

12.4.1 Description

- Jabiru Aircraft are equipped with a wide range of instruments depending on specification. Generally, all instruments are secured to the panel fascia with screws inserted through the panel face.
- In some cases rack mounts are used where the instrument is held in a rack which, in turn, is secured to the fascia or to the fibreglass panel mount.

**12.4.2 Instrument Removal & Installation**



- To remove an instrument, disconnect wiring or plumbing to the instrument, remove instrument mounting screws and take instrument out from behind, or in some cases, from the front of the panel.
- In some cases, due to access, it may be easier to partially remove the panel fascia as noted above before attempting to remove instruments.
- For instruments mounted in a rack refer to the instrument manufacturer’s instructions for removal and installation procedures.
- In all cases when an instrument is removed, disconnected lines or wires should be protected. Cap open lines and cover pressure connections on instrument to prevent thread damage and entrance of foreign matter. Wire terminals should be insulated or tied up so that accidental ground or short-circuiting will not occur.
- Generally, the installation procedure is the reverse of the removal procedure. Ensure mounting screws and nuts are tightened firmly, but do not over-tighten, particularly on instruments having plastic cases. The same rule applies to connecting plumbing and wiring.

**12.5 Pitot & Static Systems**

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

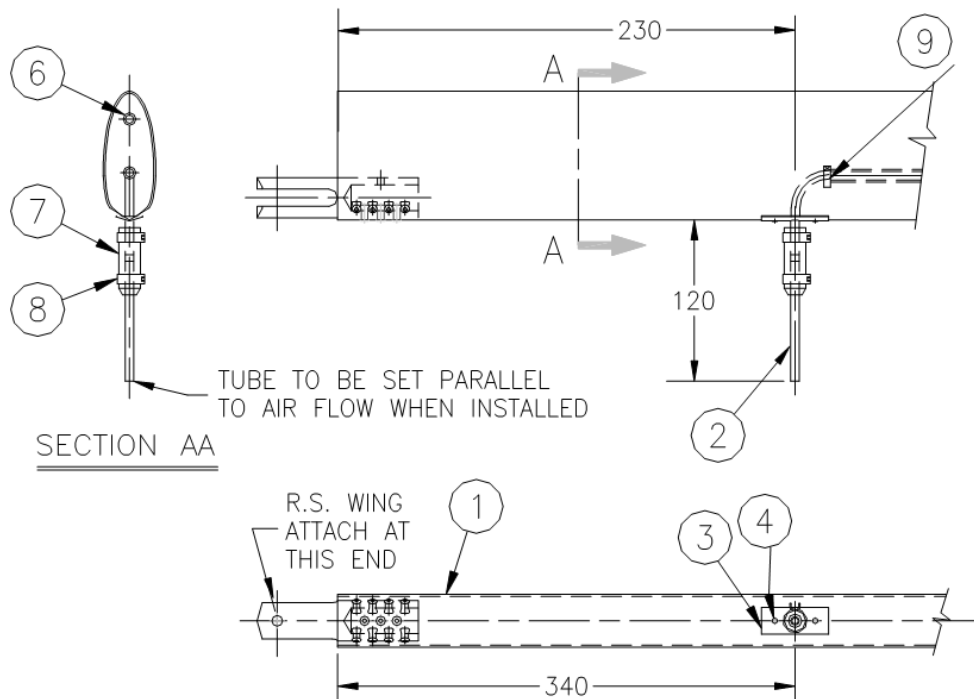
**12.5.1 Description**

- The pitot system conveys ram air pressure to the airspeed indicator.
- The static system vents the vertical speed indicator (if fitted), altimeter and airspeed indicator to atmospheric pressure through plastic tubing connected to a static port.
- In Jabiru Aircraft the pitot and static systems each have a water trap (or “low point”) fitted which must be checked during scheduled maintenance or after flying through rain.

**CAUTION**

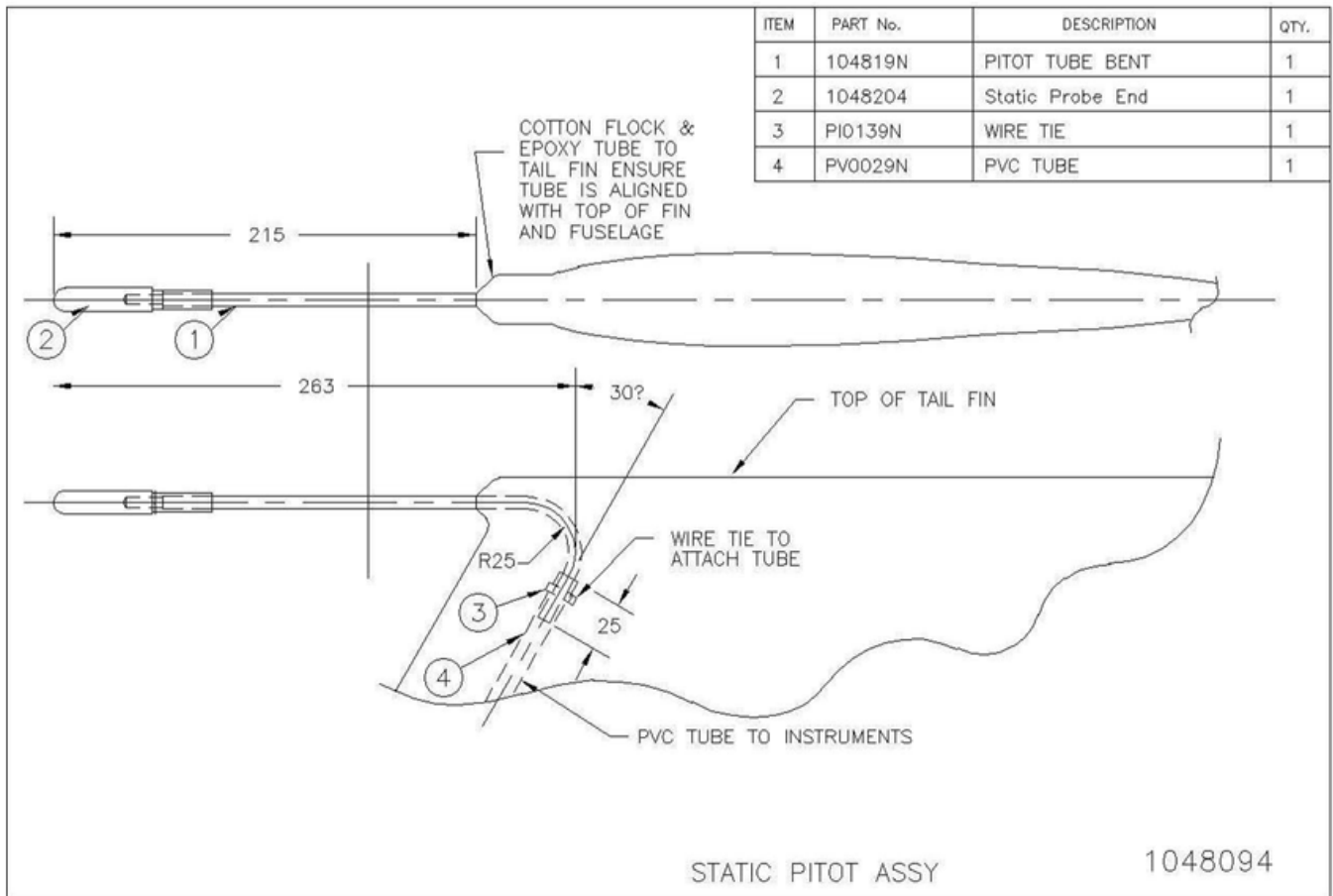
**Proper maintenance of pitot and static system is essential for proper operation of the altimeter, airspeed indicator and vertical speed indicator (if fitted). Leaks, moisture and obstructions in the pitot system will result in false airspeed indications, while static system malfunctions will affect readings of all three instruments. Cleanliness and security are the principal rules for system maintenance. The pitot tube and static ports MUST be kept clean and unobstructed.**





9	50449N	TUBE BENT PITOT	1
8		HOSE CLAMP *MS8242	2
7	504439N	HOSE COUPLING	1
6	PV0029N	PVC TUBE 1/4" ID	1
			1
4	PH0029N	RIVET	2
3	504429N	MOUNT PLATE PITOT TUBE	1
2	504419N	TUBE STRAIGHT PITOT	1
1	2000093	WING STRUT ASSY	1
ITEM	PART No.	DESCRIPTION	QTY.

Figure 118 – Pitot Assembly



**Figure 119 – Static Probe System Assembly**

**12.5.2 Pitot-Static Water Traps**

- A water trap is incorporated into both the pitot and the static systems for Jabiru Aircraft. This may take the form of the trap assembly shown below or of a “low point” where the tube is deliberately positioned in a “U-shape” with a connector at the lowest point in the U. Water collects at this point and can be drained by disassembling the fitting or by undoing the connection.
- The water trap for the static system is located inside the ventral fin (the fairing under the tail which covers the trim mechanism).
- The water trap for the pitot system is located inside the fairing at the lower end of the wing strut.
- Both traps should be inspected and, if necessary, drained during scheduled maintenance. In addition, if the aircraft is parked, flown or otherwise exposed to rain or moisture, the water traps should be checked and, if necessary, drained.

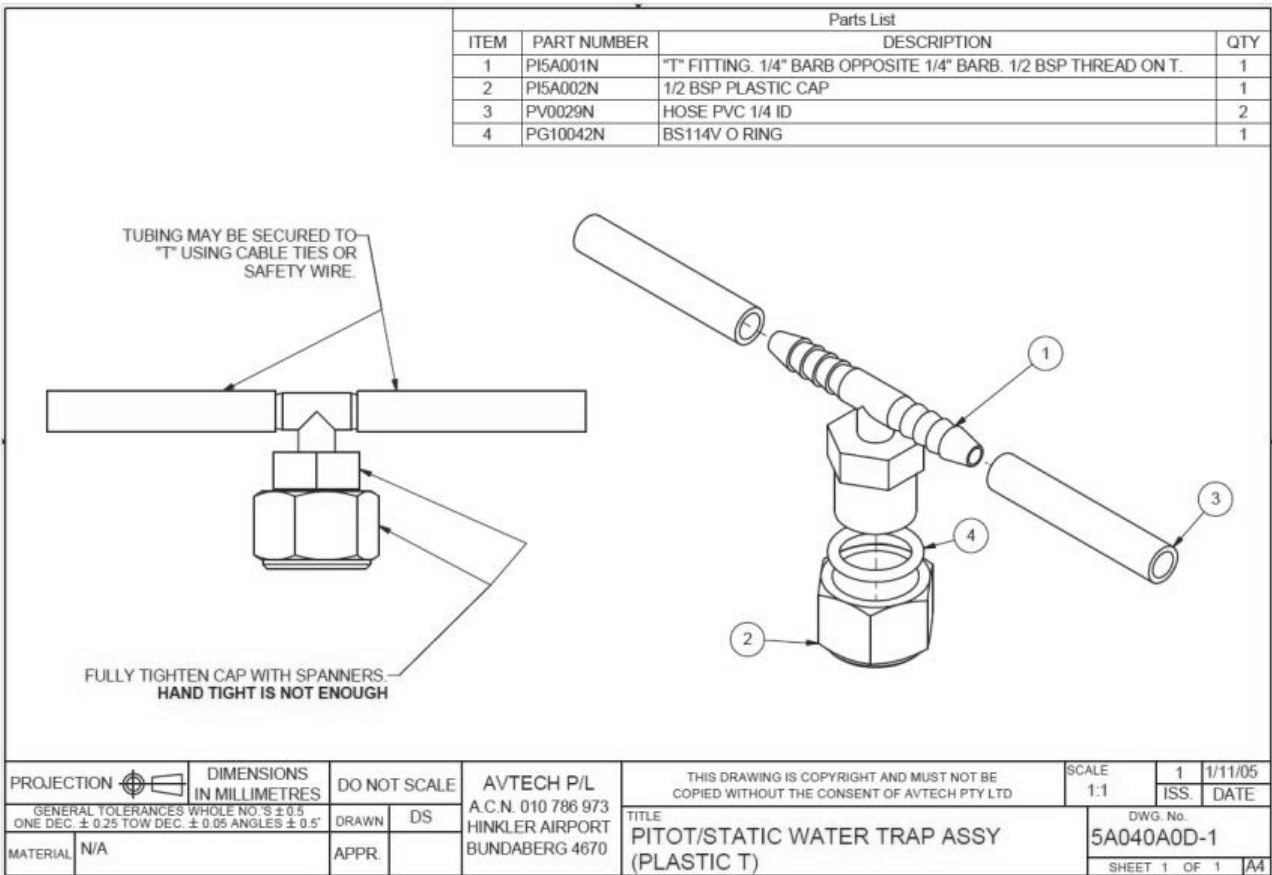


Figure 120 – Pitot / Static Water Trap

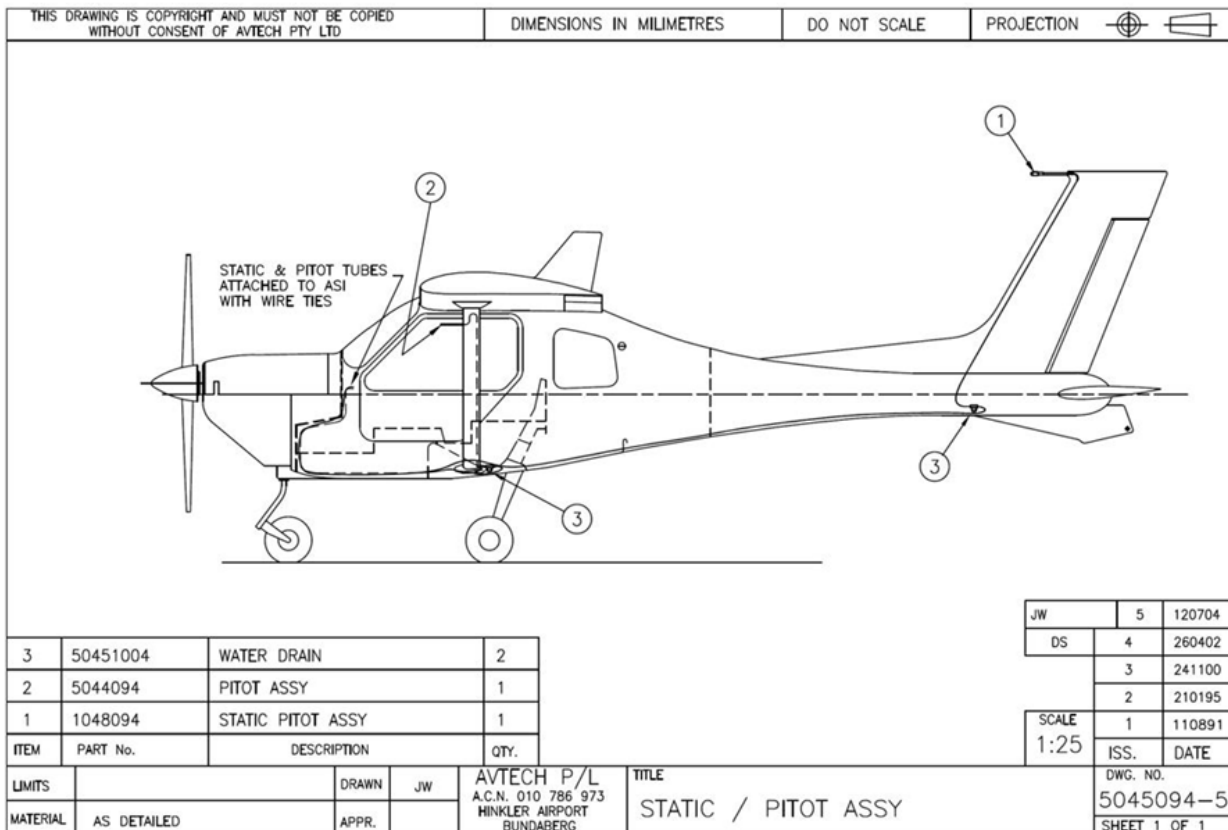


Figure 121 – Pitot-Static System – Water Trap Locations

### 12.5.3 Static Pressure System Inspection & Leakage Test



- The following procedures outline inspection and testing processes for the static pressure system.
- Before testing, ensure the static system is free from entrapped moisture by checking the low points of the system as noted above.
- Ensure the static system is free from restrictions by blowing through it. Restricted flow must be rectified immediately.
- Ensure no alternations of airframe have been made which would affect the relationship between air pressure in the static pressure system and true ambient static air pressure for any flight configuration. For example, ensure that the static probe at the tip of the tail is straight and that both the static ports are clear and open.
- Negative Pressure Test:
  - Attach a source of suction to static pressure source opening. Figure 122 shows one method of obtaining suction.
  - Slowly apply suction until the altimeter indicates a 1000-foot increase in altitude.

#### CAUTION

**When applying or releasing suction, do not exceed the range of either the vertical speed indicator or the airspeed indicator.**

- Cut off suction source to maintain a “closed” system for one minute. Leakage shall not exceed 100 feet altitude loss as indicated on the altimeter.
- If leakage rate is within tolerance, slowly release suction source.

**NOTE: If leakage rate exceeds maximum allowable, first tighten all connections, then repeat leakage test. If leakage rate still exceeds maximum allowable use the following procedure:**

- Fault Location Tests:
  - Disconnect static pressure lines from airspeed indicator and vertical speed indicator
  - Use suitable fittings to connect lines together so that the altimeter is the **only** instrument still connected into the static pressure system.
  - Repeat leakage test to check whether static pressure system or the bypassed instruments are the cause of the leakage. If instruments are at fault, they must be repaired by an “appropriately authorised repair station”, or replaced. If static pressure system is at fault, use the following procedure to locate the leakage:
    - Attach a source of positive pressure to the static source opening. Figure 122 shows one method of obtaining positive pressure.
    - Slowly apply positive pressure until altimeter indicates a 500-foot decrease in altitude and maintain this altimeter indication while checking for leaks.
    - To find leaks, coat line connectors and static source flange with solution of mild soap and water. Watch for bubbles to locate leaks.
    - Tighten leaking connections. Repair or replace parts found to be defective.
  - Reconnect airspeed and vertical speed indicators into static pressure systems and repeat negative pressure test detailed above.

#### CAUTION

**Do not apply positive pressure with airspeed indicator or vertical speed indicator connected to the static pressure system.**

### 12.5.4 Pitot System Inspection & Leakage Test



- Note that for aircraft equipped with the Dynon Angle of Attack pitot head it is necessary to remove the pitot head before leak-testing the pitot system.

- Ensure the pitot system is free from restrictions by blowing through it. Restricted flow must be rectified immediately.
- Ensure no alternations of airframe have been made which would affect pressure present in the pitot system during flight. For example, ensure that the pitot probe on the wing strut is straight and that the static opening at the tip is clear and open.
- To check pitot system for leaks:
  - Place a piece of rubber or plastic tubing over pitot tube, close opposite end of tubing and slowly roll up tube until airspeed indicator registers in the cruise range.
  - Secure tube and after a few minutes recheck airspeed indicator. Any leakage will have reduced the pressure in the system, resulting in a lower airspeed indication.
  - Slowly unroll tubing before removing it, so pressure may be released gradually - otherwise instrument may be damaged.
  - If the test reveals a leak in the system, check all connections for tightness.

**12.5.5 Blowing Out Lines**

- Condensation may collect at points in the pitot system and produce a partial obstruction. To clear line, disconnect airspeed indicator. Using low pressure air, blow from indicator end of line toward pitot tube.

**CAUTION**

**Never blow through pitot or static lines towards the instruments.**

- Like pitot lines, static lines must be kept clear and connections tight. When necessary, disconnect static line at first instrument to which it is connected, then blow the line clear with low pressure air. Check all static pressure lines for tightness. If hose or hose connections are used, check for general condition and clamps for security. Replace hose which has cracked, hardened or shows signs of deterioration.

**12.5.6 Removal & Installation Of Components**



- To remove pitot mast probe, remove the two rivets fastening it to the wing strut and pull it out from the strut far enough to disconnect the pitot line.
- For details of the Dynon pitot, refer to Section **Error! Reference source not found.**
- The static probe is fixed and cannot be removed. Limited access may be available through the fin top strobe mount (where equipped) – otherwise an access hole must be cut into the fin. Consult Jabiru Aircraft or our local approved representative before making access holes.
- In all cases, installation of tubing will be simplified if a guide wire is drawn in as the tubing is removed. When replacing tubing and fittings, tighten connections firmly, but avoid over-tightening and distortion of fittings or tubing.

**12.5.7 Trouble Shooting – Pitot Static System**

**Table 9 – Trouble Shooting – Pitot-Static System**

Trouble	Probable Cause	Remedy
Low or sluggish airspeed indication (normal airspeed and vertical speed)	Pitot tube obstructed, leak or obstruction in pitot line	Test pitot tube and line for leaks or obstructions. Blow out tube and line, repair or replace damaged line.
Incorrect or sluggish response (all 3 instruments)	Leaks or obstruction in static line	Test line for leaks and obstructions. Repair or replace line, blow out obstructed line.



**12.5.8 Trouble Shooting – Airspeed Indicator**

**Table 10 – Trouble Shooting – Airspeed Indicator**

<b>Trouble</b>	<b>Probable Cause</b>	<b>Remedy</b>
Hand fails to response	Pitot pressure connection not properly connected to pressure line from pitot tube	Test line and connections for leaks. Repair or replace damaged line, tighten connections
	Pitot or static lines clogged	Check line for obstructions. Blow out lines.
Incorrect indication or hand oscillates	Leak in pitot or static lines	Test lines and connections for leaks. Repair or replace damaged lines, tighten connections.
	Defective mechanism or leaking diaphragm	Substitute known-good indicator and check reading. Replace instrument.
Hand vibrates	Excessive vibration	Check panel shock mounts. Replace defective shock mounts
	Excessive tubing vibration	Check clamps and line connections for security. Tighten clamps and connections, replace tubing with flexible hose.

**12.5.9 Trouble Shooting – Altimeter**

**Table 11 – Trouble Shooting – Altimeter**

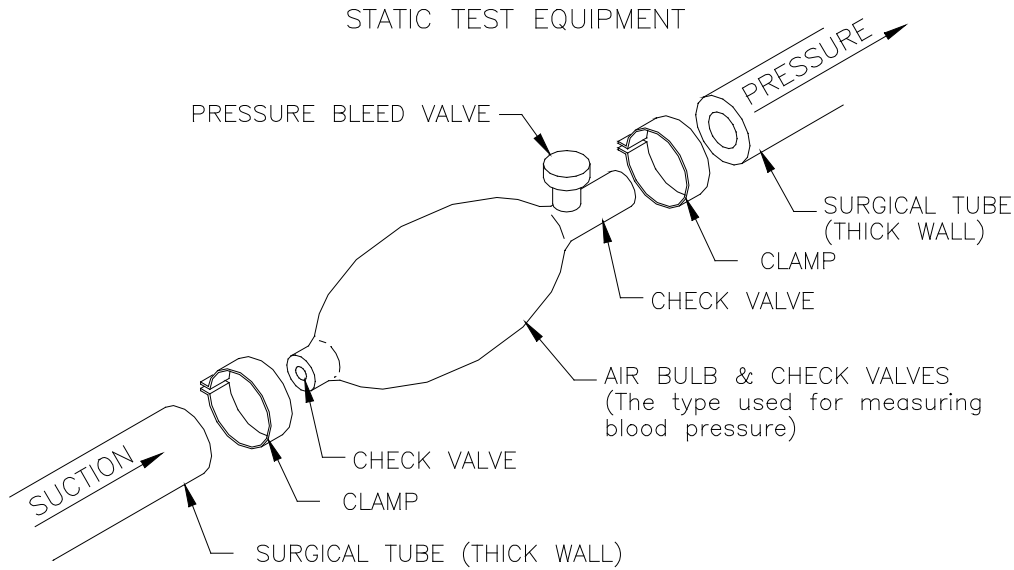
<b>Trouble</b>	<b>Probable Cause</b>	<b>Remedy</b>
Instrument fails to operate	Static line plugged	Check line for obstructions. Blow out lines
	Defective mechanism	Substitute known-good altimeter and check reading. Replace instrument
Incorrect indication	Hands not carefully set	Reset hands with knob
	Leaking diaphragm	Substitute known-good altimeter and check reading. Replace instrument.
	Pointers out calibration	Compare reading with known-good altimeter. Replace instrument
Hand oscillates	Static pressure irregular	Check lines for obstruction or leaks. Blow out lines, tighten connections.
	Leak in airspeed or vertical speed indicator installations	Check other instruments and system plumbing for leaks. Blow out lines, tighten connections



**12.5.10 Trouble Shooting – Vertical Speed Indicator**

**Table 12 – Trouble Shooting – Vertical Speed Indicator**

<b>Trouble</b>	<b>Probable Cause</b>	<b>Remedy</b>
Instrument fails to operate	Static line plugged	Check line for obstructions. Blow out lines.
	Static line broken	Check line for damage, connections for security. Repair or replace damaged line, tighten connections.
Incorrect indication	Partially plugged static line	Check line for obstructions. Blow out lines
	Ruptured diaphragm	Substitute known-good indicator and check reading. Replace instrument
	Pointer off zero	Reset pointer to zero
Pointer oscillates	Partially plugged static line	Check line for obstructions. Blow out lines
	Leak in static line	Test lines and connections for leaks. Repair or replace damaged lines, tighten connections.
	Leak in instrument case	Substitute known-good indicator and check reading. Replace instrument.
Hand vibrates	Excessive vibration	Check shock mounts. Replace defective shock mounts.
	Defective diaphragm	Substitute known-good indicator and check for vibration. Replace instrument.



TO APPLY SUCTION:–

- 1: Squeeze air bulb to expel as much air as possible
- 2: Hold suction hose firmly against static pressure tube opening
- 3: Slowly release air bulb to obtain desired suction, then pinch hose tightly to maintain suction in the system
- 4: After leak test, slowly release suction by allowing a small amount of air into static system, wait for vertical speed indicator to return to zero, and repeat as required.

TO APPLY PRESSURE:–

CAUTION: DO NOT APPLY PRESSURE WITH AIRSPEED INDICATOR OR VERTICAL SPEED INDICATOR CONNECTED TO STATIC SYSTEM

- 1: Hold pressure hose firmly against static pressure tube opening
- 2: Slowly squeeze air bulb to apply desired pressure to static system
- 3: Release pressure slowly by opening bleed valve

Drawing 9017093/1 STATIC TEST EQUIPMENT

**Figure 122 – Static System Test**

## 12.6 Alternate Static Source

Type of Maintenance:	Line Maintenance
Level of Certification:	LSA repairman (inspection or maintenance)

### 12.6.1 Description

- Jabiru Aircraft may be equipped with an alternate static source. This system is for Night-VFR aircraft so that, should the primary static source become blocked, the pilot may switch to an alternate supply.
- In the Jabiru this system consists of a section of the static tube which is exposed at the underside of the instrument at a position where the pilot can reach it in flight. Where a problem is detected the pilot reaches down and pulls on the tube, disconnecting it from the static probe in the tail. The aircraft instruments will now take cabin pressure as static pressure.



12.6.2 Removal & Installation



- Drill the rivets holding the fitting to the panel and remove.
- Disconnect static system tubes.
- For installation, reverse removal steps listed above.

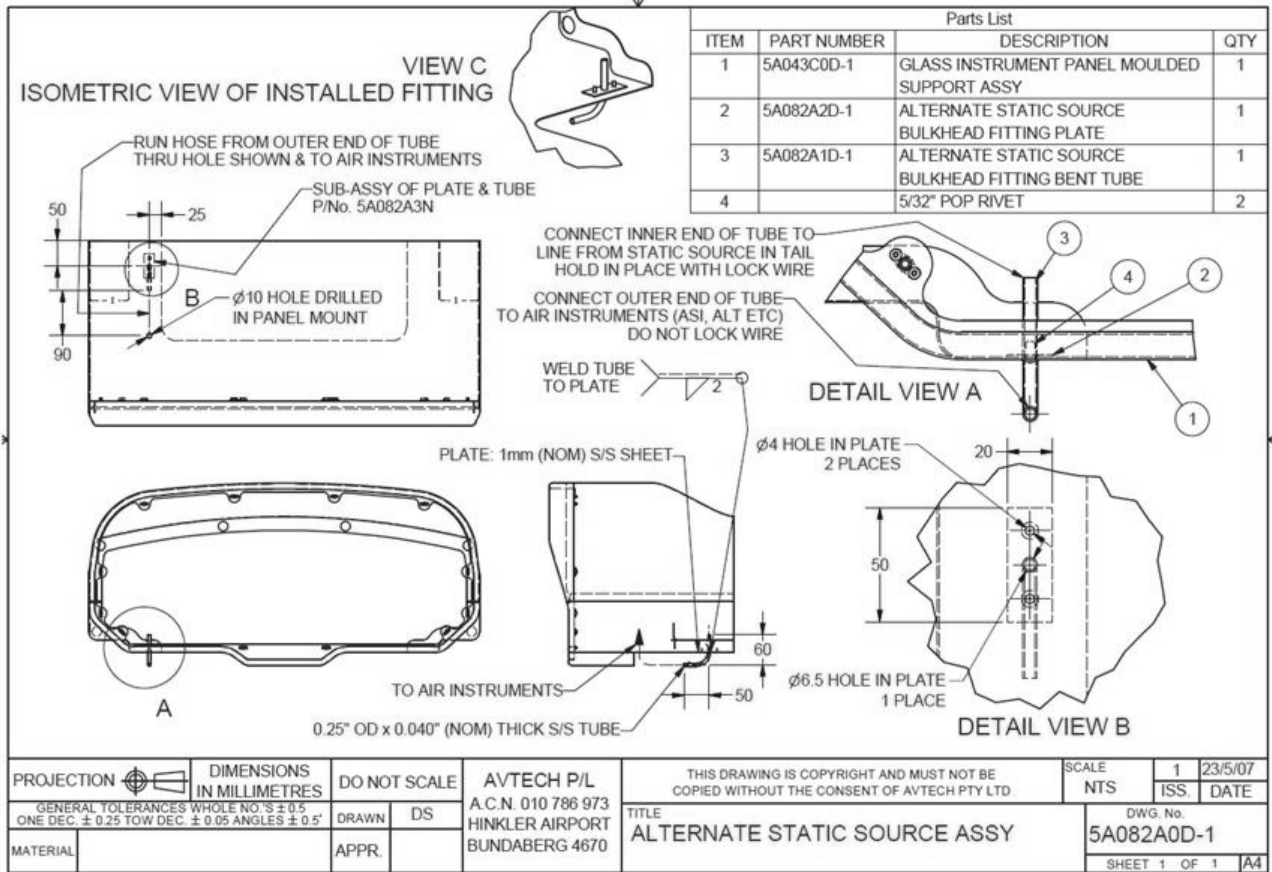


Figure 123 – Alternate Static Source Assy

12.7 Analogue Tachometer

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

12.7.1 Description

- Jabiru Aircraft may be equipped with an analogue tachometer or a digital RPM read-out as a part of an engine monitoring system.
- Analogue tachometers are driven by a variety of sensors, depending on the aircraft model. In some the sensor is positioned so that the teeth of the flywheel ring gear pass close by and produce a signal. In others the same sensor reads off metal tags bolted to the flywheel. Finally, in some aircraft a sensor is mounted on the alternator mount plate and produces a signal from the ignition magnets.
- Refer to the Engine Maintenance Manual for additional details.

12.7.2 Removal & Installation



- Remove the instrument panel fascia as detailed above.
- Disconnect the instrument.

- Undo the fasteners and remove the instrument from the fascia.
- For installation, reverse removal steps above.

**Table 13 – Trouble Shooting – Tachometer**

Trouble	Probable Cause	Remedy
Instrument fails to operate	Circuit breaker open	Check master and avionics circuit breakers. Re-set if necessary.
	Defective mechanism	Substitute known-good tachometer and check reading. Replace instrument
Incorrect indication	Sensor not positioned correctly	Adjust sensor per Engine Manual Instructions.
	Analogue Tacho: Incorrectly set dip-switches or tachometer programming.	Check switch positions / programming as appropriate to the tachometer. Refer to engine manuals.

## 12.8 Digital Displays

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

- Digital displays are optional in Jabiru Aircraft.
- Jabiru recommend Dynon Avionics Products.
- Electronic Flight Information Systems (EFIS) and Engine Monitoring Systems (EMS) are used.
- EFIS systems are a multi-function flight data display. The instrument shows parameters including: airspeed, true airspeed, outside air temperature, altitude, heading, artificial horizon, turn coordinator, heading markers, vertical speed etc.
- EMS systems are multi-function engine data displays. The instrument shows parameters including: CHT, EGT, oil temperature, oil pressure, system voltage, RPM, fuel level, fuel flow, system voltage, fight timers etc.
- Setup of these instruments must be carried out in accordance with manufacturer’s instructions.

### 12.8.1 Removal & Installation



- Remove the instrument panel fascia as detailed above.
- Disconnect the instrument.
- Undo the fasteners and remove the instrument from the fascia.
- For installation, reverse removal steps above.

### 12.8.2 Troubleshooting

- The following points reflect areas which commonly cause issues with the digital instruments used in Jabiru Aircraft. For more comprehensive installation, operation and troubleshooting data refer to the operator’s instructions.



**Table 14 – Trouble Shooting – Digital Instruments Gauges**

Trouble	Probable Cause	Remedy
Instrument fails to operate	Circuit breaker(s) open	Check master and avionics circuit breakers. Re-set if necessary.
	Defective mechanism	Substitute known-good instrument and check reading. Replace instrument
Inaccurate or non-functioning OAT / heading data	Firmware of remote compass does not match main instrument	Update firmware of system
	OAT Sensor incorrectly set	Set OAT sensor settings per manufacturer's data
	Heading calibration not carried out	Perform heading calibration per manufacturer's instructions.
Oil pressure inaccurate / fluctuating	Poor quality earth connection between display and engine	Check connection, replace / improve as required.
Tachometer inaccurate / fluctuating	Wrong number of pulses set in tachometer setup	Correct settings per manufacturer's instructions.
	No resistor between display and alternator – some displays only	Some displays require a resistor be installed between the display and the alternator. Check manufacturer's installation instructions and ensure resistor is fitted where required.
GPS Data not displayed	No GPS source fitted	Install GPS
	Connection between GPS and display failed	Check and repair connection
	Settings on Display or GPS incorrect	Check settings and correct to match manufacturer's recommendations.

## 12.9 Magnetic Compass

- The Magnetic Compass is liquid-filled, with expansion provisions to compensate for temperature changes. It is equipped with compensating magnets adjustable from the front of the case. No maintenance is required on the compass except an occasional check on a compass rose for adjustment and compensation.

## 12.10 Gyro Instrument Package (Option)

- A vacuum pump driven Artificial Horizon and Directional Gyro, together with an electric Turn Coordinator, is available as an option.
- Where this option is provided, a different instrument panel fascia is fitted.
- Repair should only be performed by an approved instrument workshop.



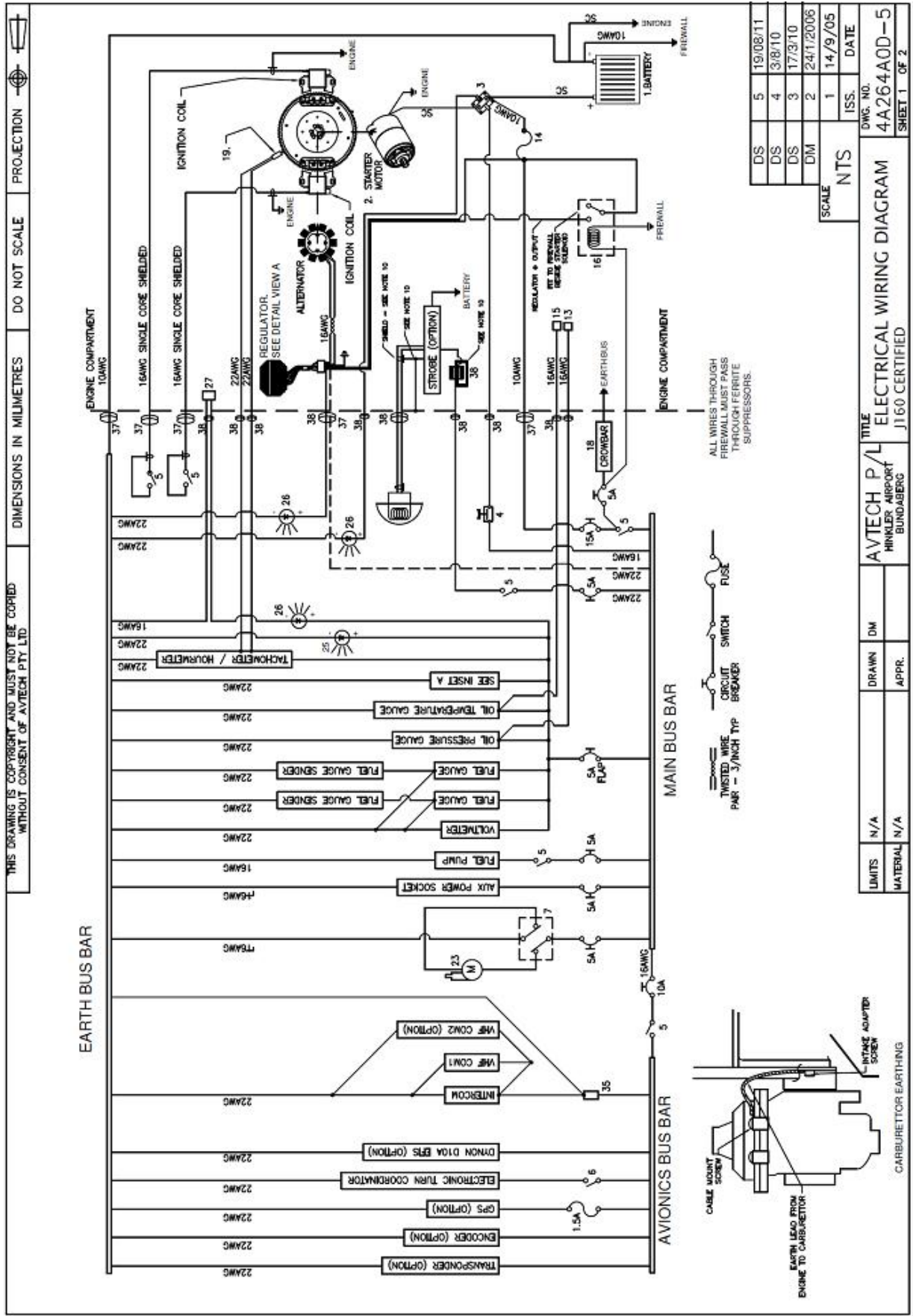
## 13 Electrical Systems

### 13.1 Electrical Power Supply System

- Electrical energy for the aircraft is supplied by a 12 volt, direct-current, single-wire, negative ground electrical system.
- A 12-volt battery supplies power for starting and furnishes a reserve source of power in the event of electrical power system failure.
- An engine-driven Alternator is the normal source of power during flight and maintains a battery charge controlled by a voltage regulator. A 200 Watt alternator is fitted.
- The following paragraphs provide brief descriptions of the elements of the electrical system. They should be read in conjunction with the Wiring Diagrams below.
- 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.

#### 13.1.1 Wiring Diagrams

- The wiring diagram for a standard aircraft is shown in Figure 124 and Figure 125.
- The wiring diagram for night-VFR lighting is shown in Figure 126 and Figure 127.



DS	5	19/08/11
DS	4	3/8/10
DS	3	17/3/10
DM	2	24/1/2006

SCALE	NTS
ISS.	1
DATE	14/9/05
DWG. NO.	4A264A0D-5
TITLE	ELECTRICAL WIRING DIAGRAM
J160 CERTIFIED	

AVTECH P/L	AVTECH P/L	DM	DM
HINKLER AIRPORT	HINKLER AIRPORT	APPR.	APPR.
BUNDBERG	BUNDBERG		
LIMITS	N/A		
MATERIAL	N/A		

Figure 124 – Wiring Diagram Sheet 1.

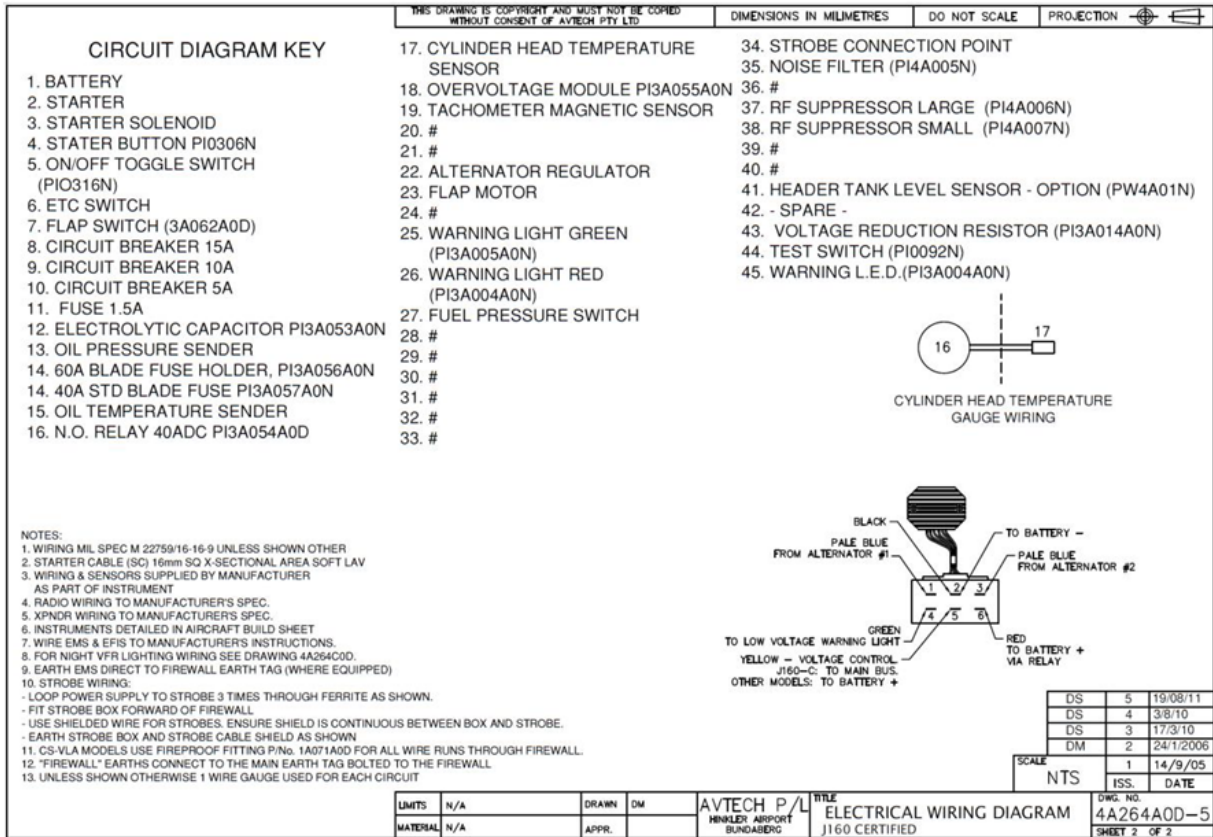


Figure 125 – Wiring Diagram Sheet 2.

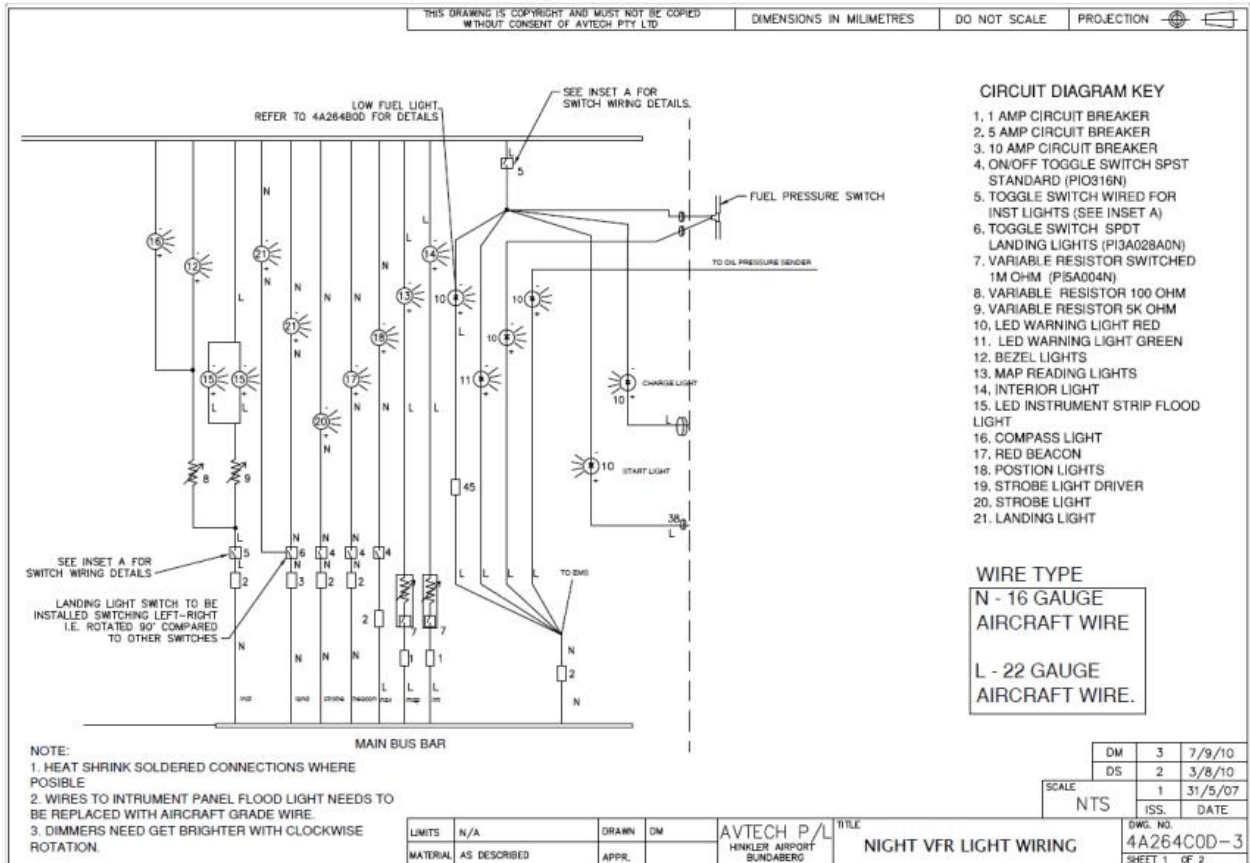


Figure 126 – Night-VFR Lighting Sheet 1

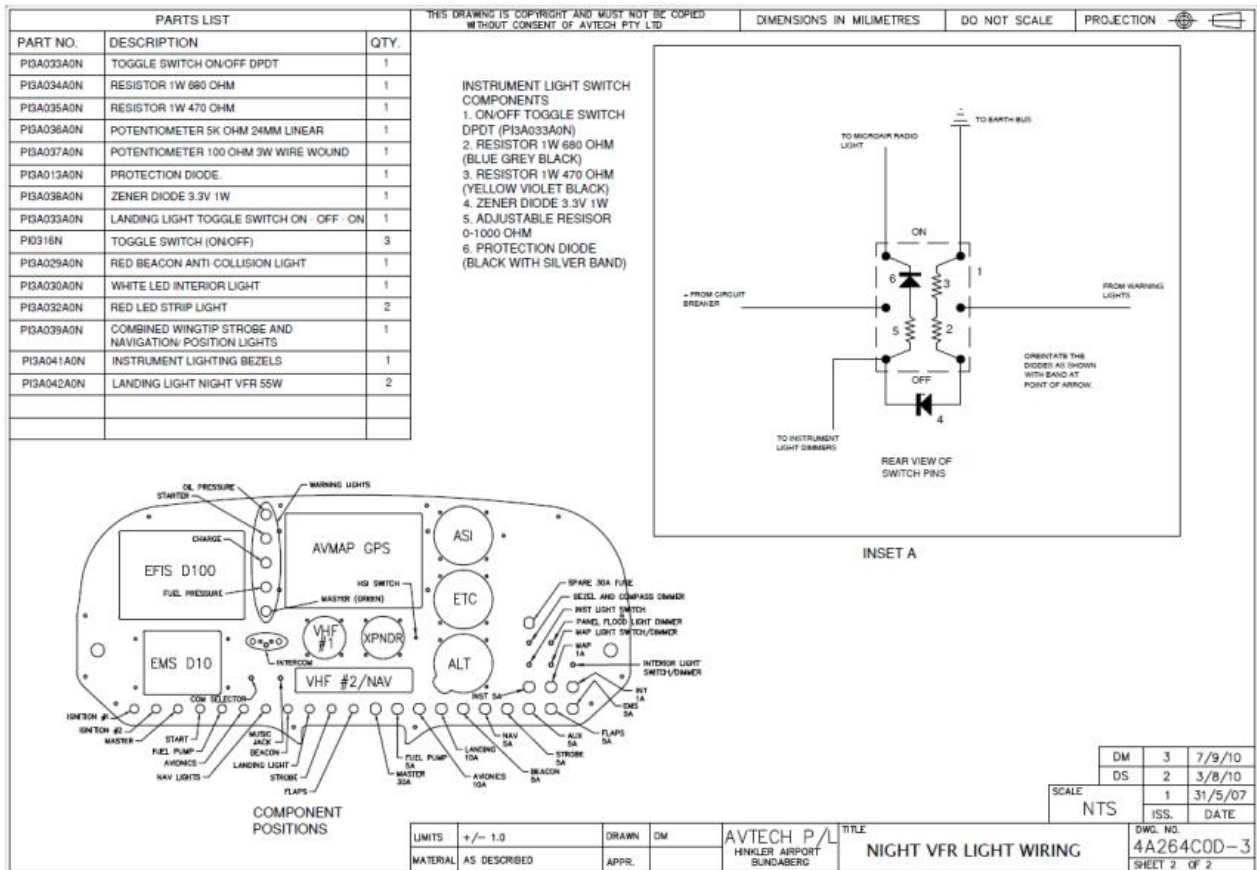


Figure 127 – Night-VFR Lighting Sheet 2

## 13.2 Minor Electrical Equipment

### 13.2.1 Bus Bars

- Electrical power for electrical equipment and installations is supplied through Bus Bars. The bus bars are mounted to the circuit breakers inside the main panel.
- Access is gained by removing the main instrument panel fascia.

### 13.2.2 Master Switch

- When using a key switch, the Master Switch activates a relay which in turn powers the bus bars. When using a toggle switch, it activates the power direct from the battery.
- Refer to Wiring Diagram for details.

### 13.2.3 Starter Solenoid

- The starter solenoid is a sealed unit. Service is limited to inspection of terminals for security and replacement of the unit.
- Note that the body of some starter solenoids used in Jabiru Aircraft form the earth connection. If there is excess resistance between the solenoid body and the electrical system earth then a connection will not be made and solenoid issues will result.
- Later solenoids have a separate connector for the earth – i.e. they do not earth through the solenoid body.
- To determine which solenoid is which check for continuity between the earth pole and the body of the solenoid. No continuity indicates the need for a separate earth connection.



### 13.2.4 Voltage Regulator

- The voltage regulator is a sealed unit. Service is limited to inspection of terminals for security and replacement of the unit.

### 13.2.5 Strobe System (Option)

- A strobe light may be installed in the tip of the tail fin or on the wingtips.
- The power source for the strobe light is located in the engine bay.
- For best noise suppression, ferrite beads must be fitted to the power & earth wires leading to the power supply. Shielded wires must be used for the connection to the lights themselves and the shielding must be electrically continuous between the light and the control box. Ensure the box itself is connected to the aircraft's earth with minimum impedance. Refer to Figure 124 and Figure 125

### WARNING

**The strobe system is a high-voltage device. Do Not remove or touch tube assembly while in operation. Wait at least 5 minutes after turning off power before commencing any activity near the strobe light.**

### 13.2.6 AUXILIARY Power Socket

- The Jabiru is fitted with an auxiliary power socket that accepts a 12V cigarette lighter plug. The circuit breaker for this plug is rated a 5 Amps.

## 13.3 Battery System

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

### 13.3.1 Description

- The battery is 12-volts and approximately 16 ampere-hour capacity. The battery is mounted in the engine compartment.
- The battery box is located on the firewall in the engine compartment.

### 13.3.2 Removal And Installation



1. Disconnect the battery security strap.
2. Disconnect the ground cable from the negative battery terminal (black insulation).

### WARNING

**When installing or removing battery, always observe the proper polarity with the aircraft electrical system (negative to ground). Reversing the polarity, even momentarily, may result in failure of semi-conductor devices (alternator diodes, radio protection diodes and radio transistors).**

3. Disconnect the cable from the positive battery terminal.
4. Lift the battery out of the battery box.
5. To replace the battery, reverse this procedure.

### 13.3.3 Cleaning The Battery

- For maximum efficiency the battery and connections should be kept clean at all times.
  1. Remove the battery and connections in accordance with the preceding paragraph.
  2. Wipe the battery cable ends, battery terminals and the entire surface of the battery with a clean cloth moistened with a solution of bicarbonate of soda (baking soda) and water.
  3. Rinse with clear water, wipe off excess water and allow battery to dry.
  4. Brighten up cable ends and battery terminals with emery cloth or a wire brush.
  5. Install the battery in accordance with the preceding paragraphs.

6. Coat the battery terminals with petroleum jelly or an ignition spray product to reduce corrosion.

#### 13.3.4 Battery Trouble Shooting

- Trouble shooting is limited to inspection of wiring and terminals, battery charge condition and battery solenoid.

### 13.4 ELECTRICAL LOAD ANALYSIS (Ela)

#### 13.4.1 Factory-Built Variants

- An ELA has been carried out as part of the aircraft's certification basis. Any changes to the electrical system which affect the ELA require a new ELA to be raised. This work may only be carried out by Approved Personnel in conjunction with a CAR 35 Authorised Person (or equivalent) Engineering Order. Note that this applies in Australia – in other countries the local Airworthiness Authority must be consulted for procedures.

#### 13.4.2 Non Factory-Built Variants

- For VFR Daylight only operations, an Electrical Load Analysis is not required as failure of the electrical generation system would have a limited effect on the length of time of radio transmissions and no effect on aircraft performance as the engine electrical system is totally isolated from the power supply and is self-sustaining. The battery is only used to crank the engine for starting.
- For other operations the builder / operator must ensure that the electrical system is adequate and meets all regulatory requirements for the type of operation undertaken.

### 13.5 Radio Installation

#### 13.5.1 Description

- Jabiru Aircraft are equipped as standard with a VHF radio.
- The main VHF radio antenna is installed within the spar at the rear of the tail fin. It consists of two sections as shown in Figure 128.
- Where equipped, second VHF antennas are fitted at the rear of the cabin – refer to Figure 129 and Figure 130
- The radio system diagram is provided with the radio manuals.

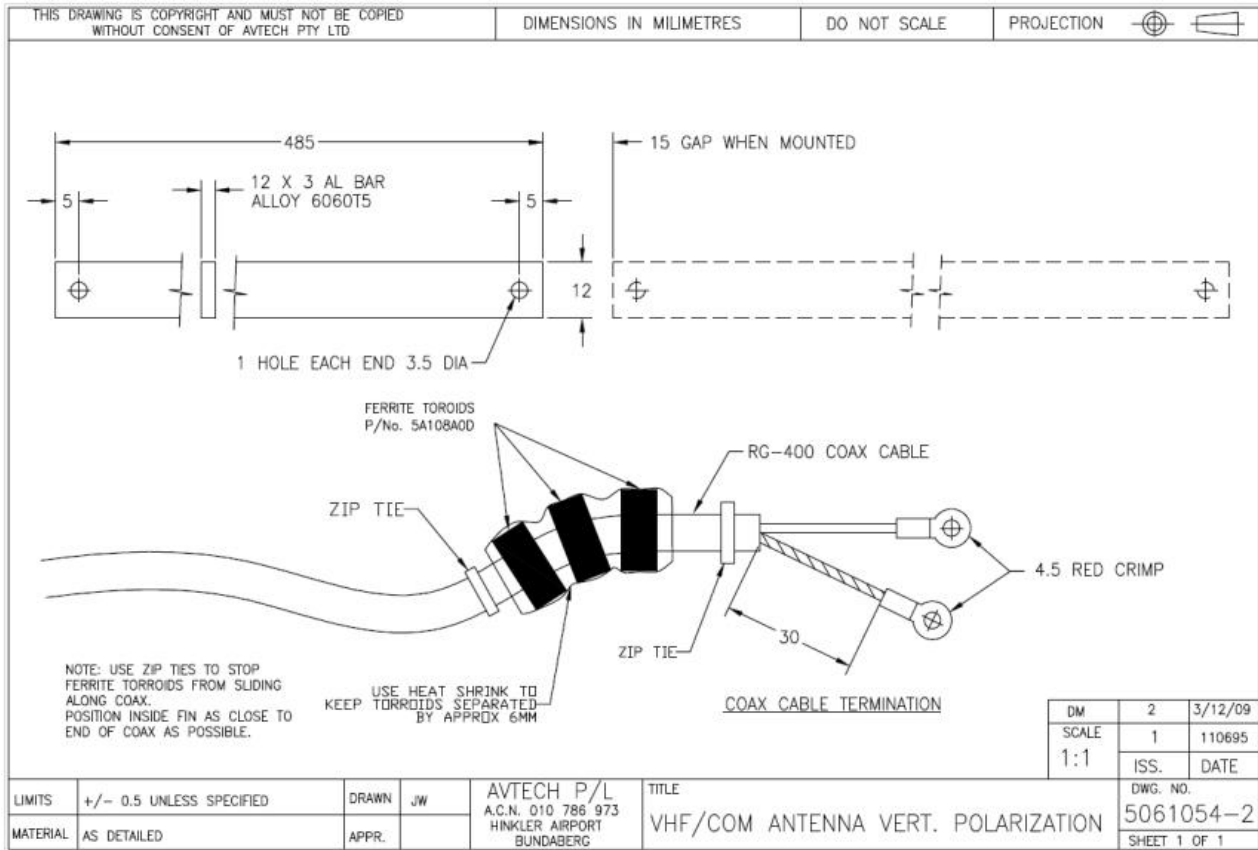


Figure 128 – VHF Antenna Installation

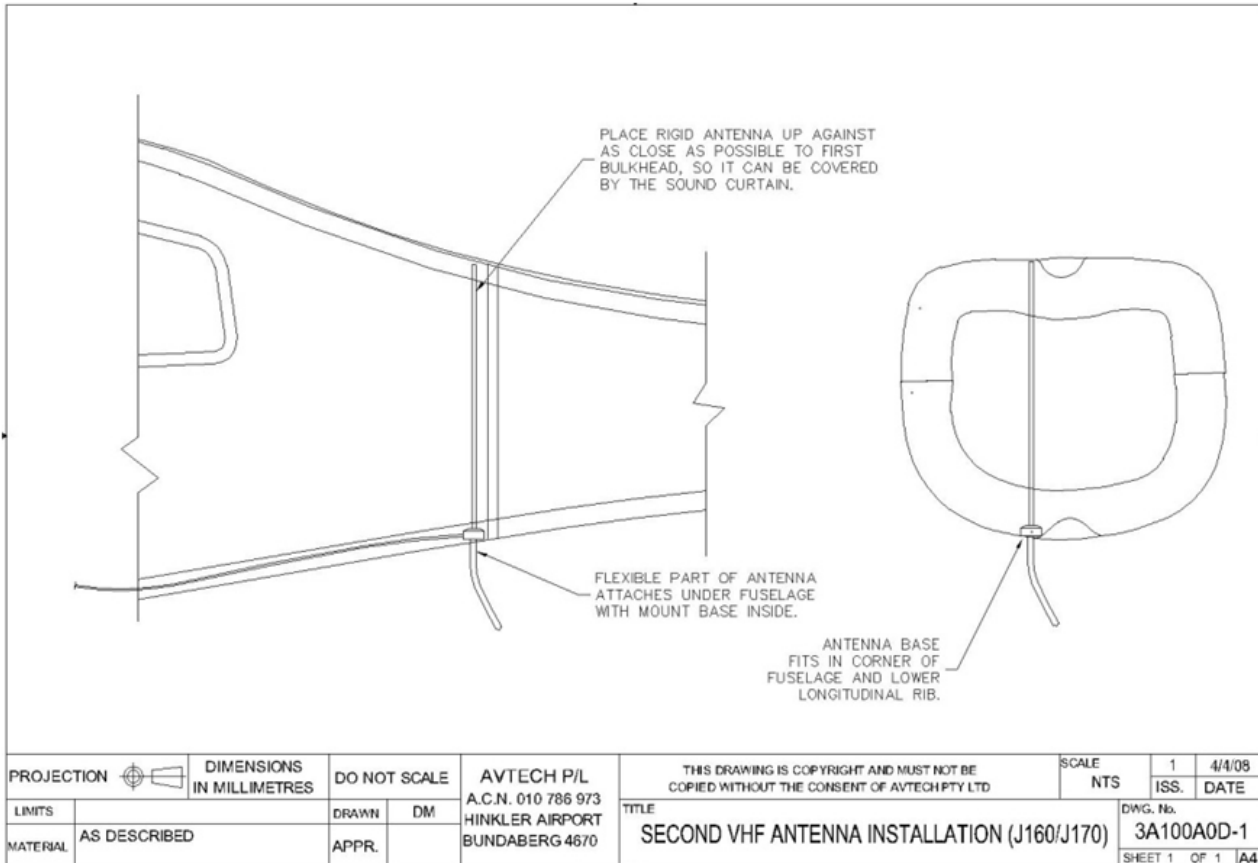


Figure 129 – Second VHF Antenna Installation (J120 / J160 Families)

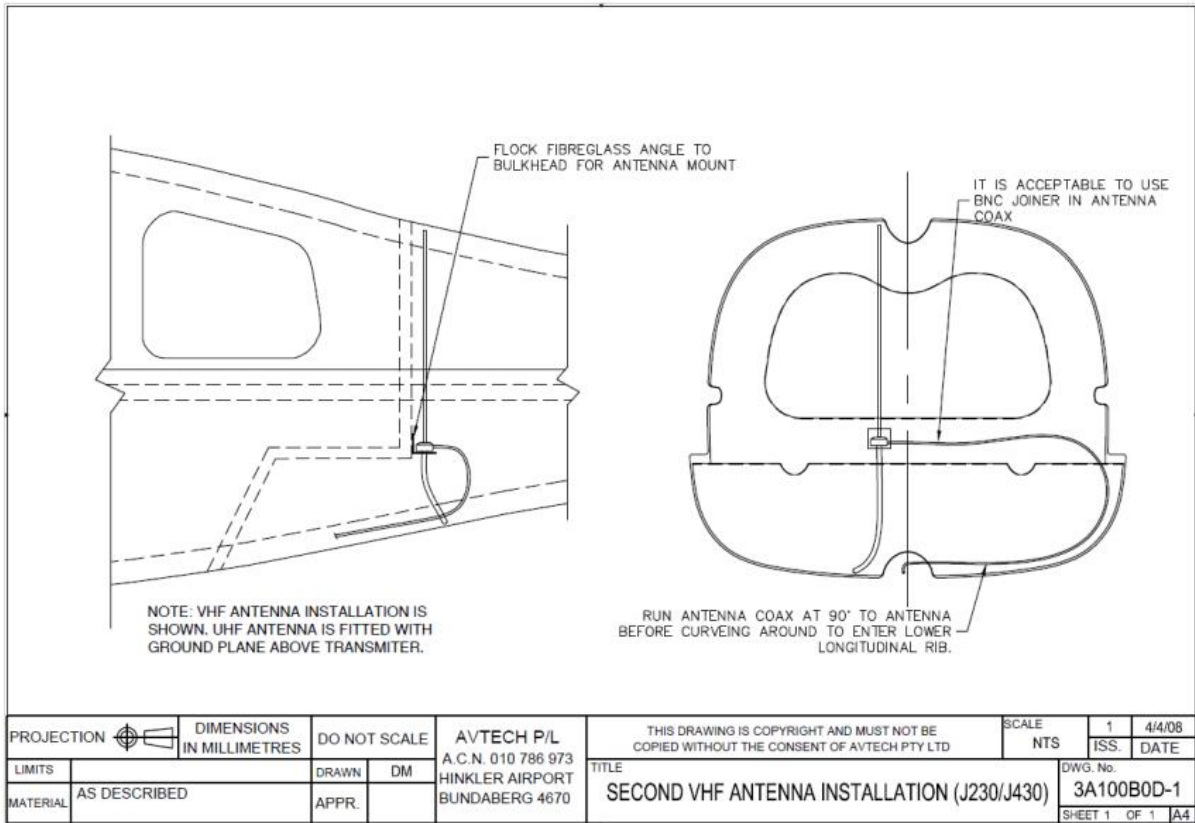


Figure 130 – Second VHF Antenna Installation (J230 Families)

### 13.6 Transponder

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

#### 13.6.1 Description

- A transponder is optional equipment for Jabiru Aircraft. This system consists of the transponder itself mounted to the instrument panel fascia, the encoder mounted to the firewall and the antenna fitted under the front of the aircraft.

#### 13.6.2 Removal & Installation



- Note that transponder calibration must be carried out by a CASA-authorized technician. All transponder maintenance must be carried out by qualified technicians.
- To remove transponder, move the mounting screws holding it to the panel fascia. Disconnect it from the wiring loom and draw it out under the panel. In some applications it may be necessary to remove the instrument panel fascia for access.
- To remove the encoder, undo the thumb-screw and remove it from its bracket. Disconnect the static tube and electrical loom.
- To remove the antenna: disconnect the BNC connector, loosen the lock nut and withdraw the assembly.
- For details of electrical connection refer to the transponder manufacturer's data.
- For installation: reverse removal steps above.

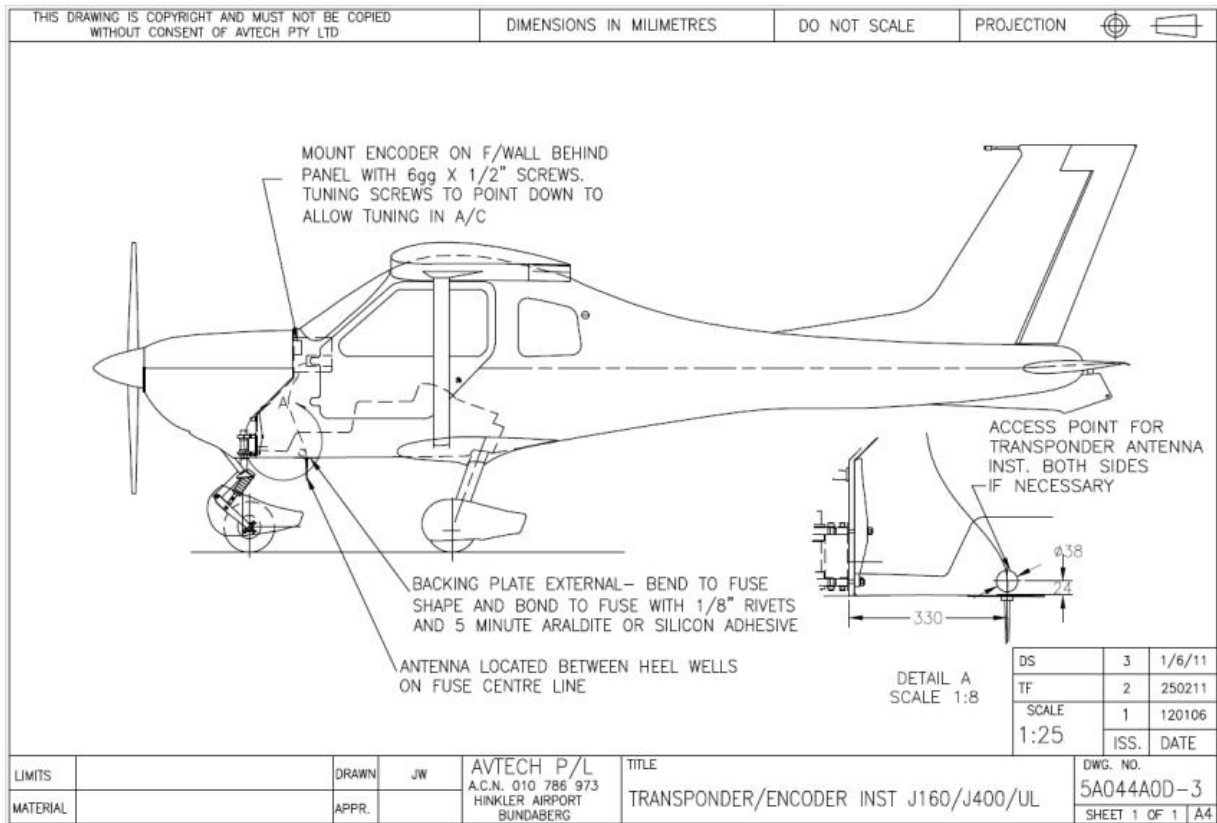


Figure 131 – Transponder Antenna Installation

## 15 Painting & Finishing

### 15.1 Exterior

Type of Maintenance:	Line Maintenance
Level of Certification:	Task Specific Training

#### 15.1.1 Painting



- The following painting procedure, as used at the Jabiru factory, had proven successful in ensuring good presentation of the aircraft.
- 2-part paint should be used for best results. Due to the variation between different paints, we recommend carefully following the pack recommendations relating to surface preparation and safety.
- Use a bare minimum of undercoat, preferably white or cream, and topcoat to keep weight down.
- If you have had no previous painting experience, a short course may be available from TAFE.

**NOTE: It is very easy to dramatically increase the weight of the aircraft with a heavy paint job. Care must be taken to use the absolute minimum amounts of filler, undercoat and topcoat. Certain brands of filler are significantly lighter than others – checking densities and using lighter materials can save around 5kg on a typical Jabiru airframe.**

#### 15.1.2 Materials Recommended

##### 15.1.2.1 PAINTS / FILLERS

- Top Coat                                5 Lts                                MUST BE WHITE
- Base Coat                                4 Lts                                Ensure compatibility with top coat.
- Polyester Filler                        4 kg
- Spot Putty                                1 lb tube                            Claw Glaze recommended

##### 15.1.2.2 SANDPAPER

- Note: aluminium oxide type most effective
- 1st all over sand                        150 grit                            20 3M Brand
- Bog Sand                                 120 grit                            20 3M Brand
- Spot Putty Sand                        180 grit                            20 3M Brand
- Final Sand                                320 grit                            20 3M Brand

#### 15.1.3 Painting EQUIPMENT REQUIRED

- Random Orbital Sander
- Gas Mask
- Compressor
- Spray Gun

#### 15.1.4 Painting Procedure:

1. Wash all parts to remove release agent.

**Note: Prepare all parts separately and paint separately.**

2. Completely sand all outside surface area with 150 grit to give paint adhesion. The factory uses a Random Orbital Sander and 150mm Stickit discs.

**Note: Ensure that glass is not cut into in the sanding process**

3. Grind excess resin from joints being careful not to grind into fibreglass layers. Take care not to grind into the horn of any control surfaces.
4. A clean wire brush is used to search out any crab holes or pinholes. Give the entire aircraft a good scrub all over especially around corners etc.
5. Wear a breathing respirator with painting cartridges right from initial sanding through to painting.

**Hint: Body Filler sets quickly in high temperatures particularly when larger mixes are necessary. Use cold packs under the Body Filler board to extend setting time.**

6. Follow instructions carefully and experiment with setting times.
7. On large radius (e.g. sides of fuselage) an extra large homemade spatula (9" thin tin plate) is very handy when applying Body Filler.
8. When filling up to window edges, grind chamfer onto edge of window to give depth for bog adhesion.

### WARNING

**THE GEL COAT IS MICRO THIN, SO SANDING IS ALWAYS A CAREFUL PROCEDURE. IF GEL COAT IS INADVERTENTLY PENETRATED DO NOT CONTINUE SANDING INTO STRUCTURAL GLASS.**

9. With the surface satisfactorily prepared white primer is required only on the discoloured areas (i.e. Body Filled areas). Pin holes become evident after the primer is applied so use "spot putty" to fill. Be careful and meticulous to find all pin holes because primer and top coat will not fill holes.
10. Your final product can only be as good as your preparation. Remember, paint does NOT cover a multitude of sins.
11. The factory uses a low-pressure pot gun for spraying at pressures from 60-100 psi.
12. It is mandatory that exterior colour is WHITE only broken if desired, by pin stripes on the vertical surfaces (i.e. Sides of fuselage) but not horizontal surfaces (i.e. top of wings or fuselage) as the heat build up under the tape in hot sun is considerable.
13. After filling all pinholes spray another coat of primer on the discoloured areas. An all over primer coat is not required over the gel coat as gel coat is a sufficient undercoat.
14. The final rub is with 320 grit all over and if satisfied with the surface preparation (remember paint will simply change colour not hide lumps, bumps, scratches and holes) blow off the dust and give an all over wipe with a tack cloth to pick up the final dust particles.
15. Wash down the floor of the spray area to settle dust and proceed to spray as per your selected technique.
16. You are now ready to spray your final coat. GOOD LUCK!

### WARNING


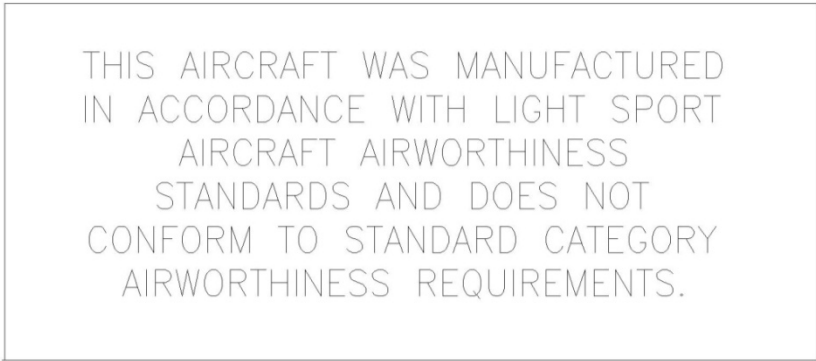


**The Jabiru aircraft is only approved to be painted in basic White colour, so as to minimise the effects of heat and ultra-violet light to the aircraft structure.**

**In addition, colour (including stripes etc) must not be applied to horizontal, upper surfaces.**

## 16 Placards

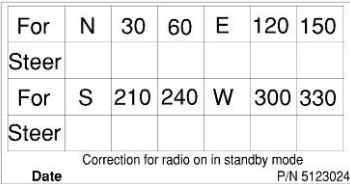

### 16.1 Model-Specific Decals

Table 15 – Model-Specific Decals




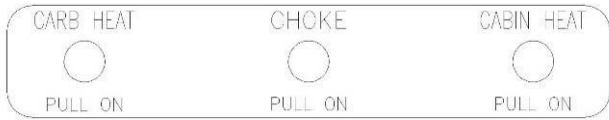
Decal Detail	Preview
Warning Placard J230-D P/No. 5A076A0D	 <p>Fitted above windscreen in front of wing carry through beam across to the left side.</p>
LSA Warning Decal J230-D Part of Instrument Panel Face	 <p>Fit adjacent to main warning placard (LSA models, see above)</p>
Nose Wheel Inflation. J230-D. P/No. 5A062A0D	 <p>Attach to left side of nose wheel spat.</p>
Main Wheel Inflation. J230-D. P/No. 5A061A0D	 <p>Attach to outsides of main wheel spats</p>





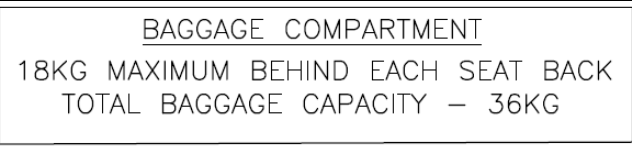


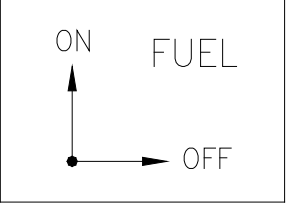

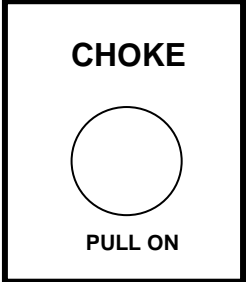
### 16.2 Placards General

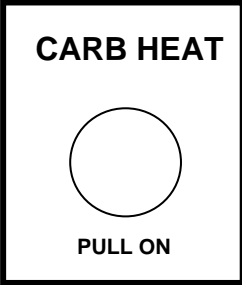
Table 16 – General Decals

Compass Card P/No. 5123024	 <p>Fit in compass card holder attached to compass.</p>
Baggage P/No. 5111154	 <p>Position as noted in Flight Manual.</p>



<p>Loading Limitations 600kg P/No 5A073A0D J230-D</p>	<p><u>LOADING LIMITATIONS</u></p> <ol style="list-style-type: none"> <li>Maximum Gross weight of aircraft is not to exceed 600 kg.</li> <li>All baggage must be stowed either on the passenger seats, or on the floor behind the front seats. Do not load above the level of the seat backs.</li> <li>Pilots must use Load &amp; Trim Sheet given in the Pilot Operating Handbook to check trim.</li> </ol> <p>Fitted on inside of fuselage of RHS of cabin below rear quarter window.</p>
<p>Engine Oil Details. P/No. 5A008A0D 1 OFF</p>	<p>ENGINE OIL AEORSHELL W100 – SUMMER AEROSHELL 15W50 – WINTER OR EQUIVALENT AIRCRAFT GRADE DETERGENT ENGINE OIL DO NOT USE AUTOMOTIVE GRADE OILS</p> <p>Attach to upper cowl beside oil door or to oil door itself.</p>
<p>Trim Position P/No. 5A031A0D (1 OFF)</p>	 <p>Fit to centre console beside of elevator fwd stop, between trim levers.</p>
<p>Trim Position P/No5024094</p>	 <p>Fitted on the Top of the Main Beam Beside the trim control</p>
<p>Brake On P/No. 5A031B0D</p>	 <p>Fit to centre console beside brake lever, arrow pointing aft.</p>
<p>Carby Heat P/No 5A030A0D</p>	 <p>Integral to Instrument Panel Face</p>
<p>No Step P/No. 5A006A0D Qty 2 required.</p>	<p>NO STEP</p> <p>Fit to top of main wheel spats</p>
<p>Earth on Exhaust P/No. 5029094</p>	<p>EARTH ON EXHAUST</p> <p>Attach to the lower fuselage on the pilot's side immediately above the exhaust outlet pipe.</p>

Dipstick Inside P/No. 5A007A0D	<div style="text-align: center;">  <p>Fit to outside of oil door in upper engine cowl.</p> </div>
Owner's Manual P/No 5036194	<div style="text-align: center;">  <p>Fitted to Inside of RH Door above the Door Pocket.</p> </div>
Door Open LHS P/No5027094	<div style="text-align: center;">  <p>Fitted to the Outsides of LH Door Above the Door Catch Lever</p> </div>
Door Open RHS P/No 5028094	<div style="text-align: center;">  <p>Fitted to the outside of RH Door Above the Door Catch Level</p> </div>
Loading Limitations P/No 5A037A0D.	<div style="text-align: center;">  <p>Fit to right side of fuselage between window and beam.</p> </div>
No Smoking P/No. 5A035A0D	<div style="text-align: center;">  <p>Fit to instrument panel.</p> </div>
Fuel Contents P/No. 5A022A0D  Where Equipped	<div style="text-align: center;">  <p>Fitted to sight glasses of wing fuel tanks.</p> </div>
Fuel Tap Position P/No 502319N Where Equipped	<div style="text-align: center;">  <p>Fitted on the Main Beam in front of the Fuel SELECTOR Valve</p> </div>
Fuel Tap Position P/No 5023094 Where Equipped	<div style="text-align: center;">  <p>Fitted to the left-hand of the console adjacent to the fuel valve</p> </div>
Choke Cable P/No5051094 Where Equipped	<div style="text-align: center;">  <p>Integral to Panel Face at the base of the choke cable.</p> </div>

<p>Carb Heat P/No 5026194 Where Equipped</p>	<div style="text-align: center;">  <p><b>CARB HEAT</b></p> <p>PULL ON</p> </div> <p>Integral to Panel Face at the base of the CARBY Heat Cable.</p>
<p>Static Port (P/No 5043094)</p>	<div style="text-align: center;"> <p><b>STATIC VENT KEEP CLEAR</b></p> </div> <p>Attach to LHS of Vertical Fin in line with Static Tube</p>
<p>Door Lean. P/No. 5A013A0D</p>	<div style="text-align: center;"> <p>DO NOT LEAN ON DOOR</p> </div> <p>Fit to top of doors.</p>
<p>Fuel Grade P/No 5091344</p> <p>2 OFF</p>	<div style="text-align: center;"> <p>FUEL</p> <hr/> <p>AVGAS 100LL 67 LITRE CAPACITY EARTH ON POST</p> </div> <p>Attach to top skin of wing adjacent to Fuel Filler Cap.</p>
<p>Wing Bolt Tightening P/No 5039094 Qty 8 Required</p>	<div style="text-align: center;"> <p><b>DANGER DO NOT TIGHTEN</b></p> </div> <p>Attach to the fuselage and wings beside each wing, and lift strut attachment fitting.</p>

## 17 Fairings

Type of Maintenance:	Line Maintenance
Level of Certification:	Owner

### 17.1 Description

- Jabiru Aircraft are fitted with fairings around the wing roots, wing struts, under the fuselage and wheel spats. The ventral fin under the tail is also considered a fairing.
- These fairings are attached using screws. In some cases self-tapping screws are used to attach the fairing directly to the airframe. In other cases threaded inserts are glued into the fuselage and the fairing screws fit into these inserts - Figure 41 shows these inserts as used to fit the inspection hatch to the wing. Finally, in some cases anchor nuts are fitted to the aircraft or to a fairing section and the remaining fairing attached to the anchor nuts using machine screws.
- 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.

#### 17.1.1 Removal And Installation



- Remove screws holding fairing to aircraft.

**NOTE: some fairings – usually the engine cowls or the ventral fin – may be fitted with lead ballast. Care must be taken when removing fairings containing lead to ensure that they are adequately supported while the screws are being removed to ensure no damage is inflicted to the aircraft or fairing.**

- The fairings can be removed once these screws have been taken out. When removing the wing strut fairings care should be taken to avoid scratching the strut.
- Installation is the opposite of removal. Care should be taken when tightening self tapping screws as when screwing into fibreglass it is very easy to strip the hole so that it doesn't tighten.

#### 17.1.2 Repair

- The fairings on Jabiru Aircraft are made from 2-3 layers of 300gram/m<sup>2</sup> twill weave fibreglass and epoxy resin. When damaged they may be repaired using an equivalent layup across the damage and normal fibreglass repair techniques. Once repaired refer for repainting and filling techniques.
- Self tapper holes that become stripped may be repaired using the next size up self tapper (from 6 gauge to 8 gauge) however it is not recommended to go any larger.
- The hole may be filled using 5-minute Araldite and redrilled again to the original, smaller size again. If the hole has been exposed to oil or similar it will need to be cleaned with a solvent such as acetone prior to application of the filler.
- Threaded Inserts: some fairings are attached using threaded inserts (P/No. 5A048A1D) rather than self-tapping screws. The threaded insert requires a larger drilled hole, and is bonded in using 5-minute Araldite. This then provides a secure threaded hole for removable fairings to be attached. In the case that a threaded insert has become loose or fallen out, it can be repaired by bonding it back into the hole with 5-minute Araldite. If the hole has suffered damage and is too large, fill the hole in with Araldite and re-drill, then bond the insert.

## 18 Feedback Form

Any issues or corrections required of Jabiru publications are requested to be passed on to Jabiru in writing for incorporation in subsequent revisions. Emails to [info@jabiru.net.au](mailto:info@jabiru.net.au) are recommended.

The following form template may be used if desired.

## 19 Propeller Service Manual

Type of Maintenance:	Heavy Maintenance
Level of Certification:	A&P or LSRM (with task specific instruction)

### 19.1 Certified Propeller Models

- The J230-D uses the Jabiru composite scimitar propellers 4A484E0D must maintain their propeller in accordance with the most current revision of the Jabiru propeller Maintenance Manual JPM0001. The most current manual can be found at [www.jabiru.net.au](http://www.jabiru.net.au)

### 19.2 Approved Installations

- The following combinations are approved.

**Table 17 – Approved Scimitar Propeller Installations (Factory built Models)**

Propeller	Airframe	Engine	Propeller Flange	Dia x Pitch Specification	Limits
4A484E0D	Jabiru J230-D	Jabiru 3300	4662084 Family	1524 x 1321 (60" x 52")	Not Above 3300 RPM

### 19.3

### 19.4 Installing & Servicing

- Refer to the Jabiru Propeller Manual document JPM0001 for installation, removal, maintenance and inspections

### WARNING

**ENSURE IGNITION SYSTEM IS "OFF" BEFORE COMMENCING ANY WORK ON PROPELLER.**

**DO NOT RUN ENGINE WITH PROPELLER DISCONNECTED OR ENGINE DAMAGE WILL RESULT.**

### 19.5 Installation



- Refer to **Error! Reference source not found.** and the Jabiru Composite Scimitar Propeller Manual JPM00001.

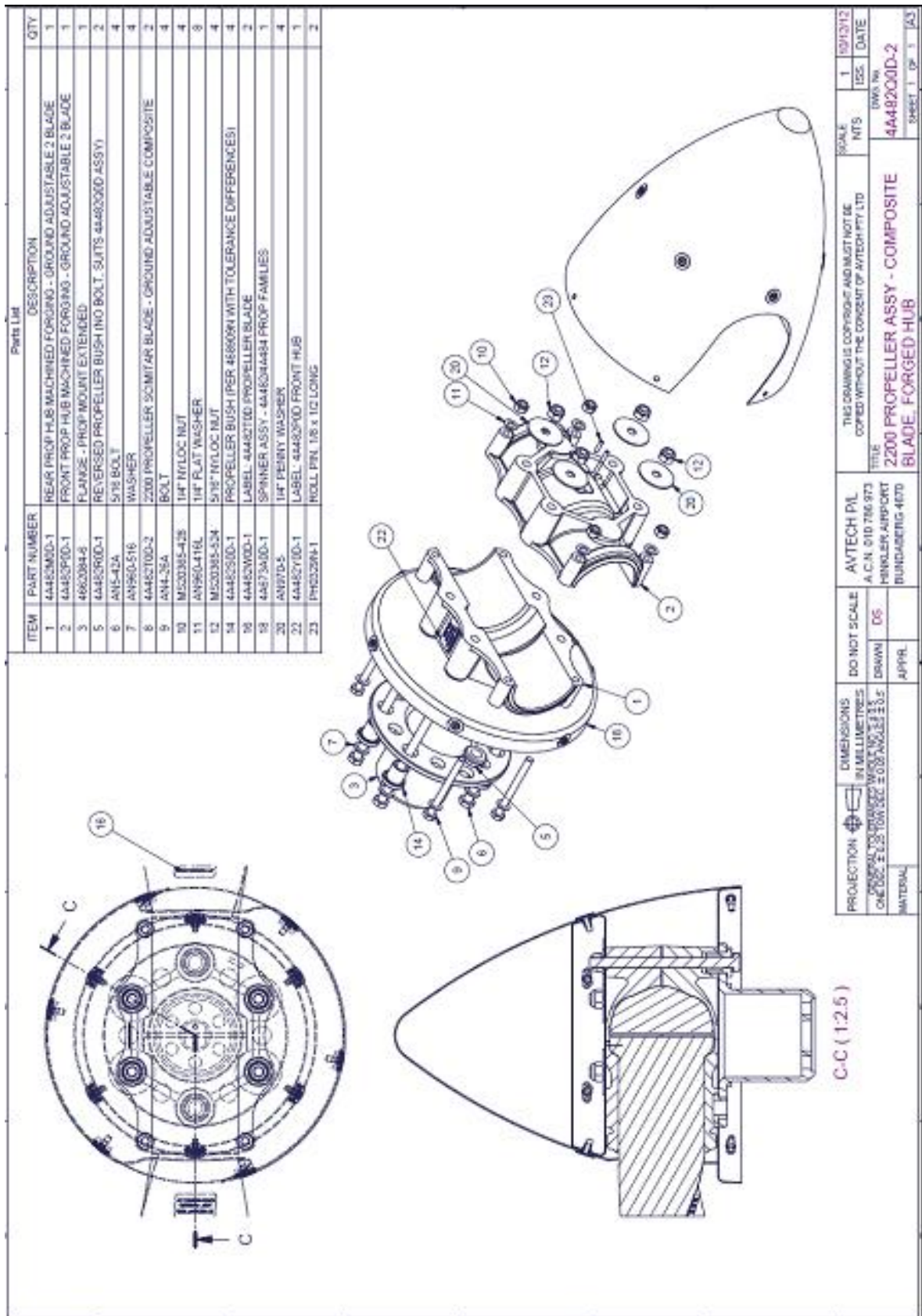


Figure 132 - Typical Scimitar propeller installation

## CAUTION

The Spinner is an important and integral part of the propeller Assembly. It is essential to ensure adequate engine cooling. The aircraft must not be flown with the Spinner removed.

### 19.6 To Remove Existing Propeller

1. Remove Machine Screws and Tinnerman Washers from Spinner.
2. Remove Spinner.
3. Consult the Jabiru Propeller Manual JPM001 for propeller removal

### 19.7 To Assemble And Replace Propeller Assembly

1. Consult the Jabiru Propeller Manual JPM001 for propeller installation. Servicing And Repairs



### 19.8 Propeller Balancing Procedure



- Propeller balance should be checked by locating a 16mm tube to firmly fit the centre mounting hole of the Propeller and balancing on "knife edges".
- Tolerances:
  - Imbalance shall not exceed the following limit whatever the position of the Propeller in the plane of rotation: 750 mm-gms (approximately 1 gm at the tip).
- The balance may only be corrected by the application of epoxy paint. Any other method of securing balance is PROHIBITED.
- Propellers outside these limits should be rejected as unserviceable or returned to JABIRU for assessment and possible repair.





## 20 Appendix B – Worksheets

The worksheet provided covers all inspection tasks required for 100 hour, 200 hour and annual inspections. Tasks listed 'Annual' need only be done annually. '200 hourly' tasks are to be completed at both annual and 200 hour inspection intervals, while '100 hourly' tasks are to be completed at all three inspection intervals; Annual, 200 hours and 100 hours. 'P' indicates pass, 'F' indicates fail, the 'Comments' column should be used to note condition, parts replaced, etc.

INSPECTION TYPE (circle).....100 hourly.....200 hourly.....Annual  
 CARRIED OUT BY (print name).....(signature).....(date).....

### 20.1.1 Propeller (refer to section 6.8)

Spinner – Remove and visually inspect for cracking, fraying, corrosion and other damage

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Spinner mount plates - Visually inspect for cracking, fraying, corrosion and other damage

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Spinner screws - Check for loose, missing, corroded or damaged fasteners and hardware

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Propeller - Visually check the condition of the propeller, looking for damage to the leading edge protection, glass de-lamination and cracks, splits or crushing of the propeller timber

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Tracking – Check propeller tracking, check spinner tracking (see section 19)

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Propeller bolts/nuts – Check tension, re-tension if required (see section 19)

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

### 20.1.2 Engine Compartment (refer to section 6.9)

Carburettor air filter – check if dirty or damaged, clean with compressed air

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Engine baffles and air ducts – check for cracking, fraying, rubbing, security. Check rubber seals

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Oil hoses, lines, fire-sleeve & fittings – Check for hardening, cracking, leakage or deterioration

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel hoses, lines, fire-sleeves & fittings – Check for hardening, cracking, leakage or deterioration,.

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

SCAT hoses – Check condition

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Electrical wiring – Check wires are secure, check wires and connectors for damage/degradation

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Engine Controls and linkages – Check for smooth operation through full travel

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Engine mounts and Mount structure and rubbers – Inspect for cracking and other degradation

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Starter, solenoid and electrical connections – Check Insulations, wires and fittings

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Coils and electrical connections – visually inspect, ensure connections are secure

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Carburettor heat system – Remove SCAT hose check correct movement and seal

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Firewall – Ensure all fitting are secure and filled with fireproof putty, ensure no missing screws/rivets, and ensure no holes through firewall.

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Exhaust System (including muffler) – check restraining springs and tabs. Check for cracks, dents, leakage and other damage.

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel Pressure warning light (if equipped) – Check correct function

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Cabin heat system – Check control valve sealing, check heat exchanger is secure on tailpipe

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Engine cowlings and clips – Check fasteners, inspect cowl for cracks, fraying, rubbing etc

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

### 20.1.3 Fuel System (refer to section 6.10)

Fuel filters, drain valves, carburettor bowl – Check valves for leakage, check and replace fuel filters at required intervals, remove and inspect carburettor bowl for contaminants.

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Electronic boost pump – Check correct function and sufficient flow rate

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel lines and connectors – Check for signs of deterioration, obstruction, foreign matter etc

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fire sleeves – Check condition and length of fire sleeves

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel line sheath inside cabin – Check sheaths are secure, check for rips, tear, leakage etc.

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel tank caps & placards – Check caps function properly and placards are in place

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel tank vent ball valve – Check correct function

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel tanks – Inspect for signs of leakage or damage on tanks and wing root fittings and lines

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Fuel shut-off valve & placards – Check correct function and ensure placards are in place

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

### 20.1.4 Landing Gear (refer to section 6.11)

Shockwave indicator tripped (if fitted)

<b>YES</b>	<b>NO</b>	<b>N/A</b>	Comments:	<b>100 hourly</b>

Main gear wheels & fairings – Remove fairings, inspect fairings and wheels for damage

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Nose gear wheel, steering links, tension links and fairings - Inspect for damage

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Wheel bearings – Check for smooth rotation

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Nose gear strut – Check for rubbing, cracks missing hardware etc

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Nose gear housing & bushes – Inspect for sign of wear

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Main gear legs, clamps, bolts & nuts – Check for rubbing, cracks, corrosion, missing hardware

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Main gear bolts – Replace as specified by intervals in section 6.3

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Tyres and tubes – Check pressure, examine for wear, cuts, bruises and slippage

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Brake fluid, hoses, linings, discs, brake assemblies & master cylinder(s)

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Rod ends – Check condition, freedom of movement

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Brake operational check

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

### 20.1.5 Airframe (refer to section 6.12)

Aircraft exterior – Inspect exterior for cracks, dents, abrasions, whitening of unpainted glass, etc

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Aircraft Structure – Inspect as described

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Windows, windshield, doors & seals – inspect for cracking, rubbing, degradation, etc

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Seatbelts and shoulder harnesses – Check condition and latch functions correctly

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Seat structure – Remove seat covers, check for cracks, de-lamination etc

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Instruments and markings – Inspect for security and signs of damage

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Instrument plumbing & wiring – Inspect for damage, kinks and security

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Instrument panel shock mounts, decals & warnings – inspect condition

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Fresh air ventilation system – check correct function and condition

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Cabin heat – check correct function and condition

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Cabin upholstery & trim – Inspect for condition

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Switches and fuses – inspect for condition, function and security

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Pitot & Static system – Check condition, leaks and blockages

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Radio intercom & headsets - check correct function and condition

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Antenna & cables – Check condition

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Door catches – Check condition and function

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Stall warning – Check correctly functions

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Battery, battery cradle & cables – Check condition

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Carbon monoxide detector (if fitted) – within expiry

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Emergency beacon – within useful life, test in accordance with manufacturer's instructions

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Landing / Taxi light alignment – (Night VFR equipped aircraft only)

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

### 20.1.6 Control Systems (refer to section 6.13)

Controls – Full & free movement, correct direction of travel without interference

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Clamps and Cables – Check correct assembly, indexed, hardware in good condition

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Rod ends – Inspect for condition and security

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Trim controls and cables - Check all hardware and cables, ensure good condition and secure

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Travel stops – Check they are correctly adjusted and secure

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Decal & labels – Ensure they are in place and in good condition

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Flap control & linkages – Cycle flaps, ensure free & full travel movement

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Elevator controls & linkages – Check all hardware, ensure good condition and secure

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Rudder pedals & linkages - Check all hardware, ensure good condition and secure

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Exterior surface of control surfaces – Check for cracking, fraying and other damage

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Control horns, hinges, hinge lock tabs – check condition and wear, replace as required

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Aileron controls and linkages - Check all hardware, ensure good condition and secure

<b>P</b>	<b>F</b>	Comments:	<b>100 hourly</b>

Rigging check flight – Check all system for correct function

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Throttle controls – Check smooth operation and correct adjustment of friction

<b>P</b>	<b>F</b>	Comments:	<b>Annual</b>

Check control surface clearances – (as per section 6.17)

<b>P</b>	<b>F</b>	Comments:	<b>200 hourly</b>