Aircraft Service Manual

Service Schedule

Inspection Schedule

Engine Instruction & Maintenance Manual

Propeller Instruction Manual

Airworthiness Limitations

- Mandatory Replacement Times
- Structural Inspection Intervals
- Structural Inspection Procedures

FOREWORD

This manual contains JABIRU recommended procedures and instructions for ground handling, servicing and maintaining. The following Jabiru aircraft models:

J160	-	Jabiru 2200 powered
J170	-	Jabiru 2200 powered

In Australia, either model may be registered either by CASA in the general aviation category as a “VH” prefix & have a MTOW of **540kg** or the AUF in the Ultralight category as a “19” prefix & have a MTOW of **540kg**. In countries other than Australia, other registration requirements will apply.

It is the owner’s responsibility to become fully aware of the particular maintenance requirements and limitations applicable to the appropriate registration.

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 posted on the JABIRU website or your local dealer of Distributor (as recorded by JABIRU) so that they have the latest authorised recommendations for servicing the aircraft. New owners of pre-owned aircraft should ensure that the transfer of their aircraft has been advised to JABIRU AIRCRAFT Pty Ltd or your local dealer of distributor. Existing owners should ensure that their postal address remains current.

In addition to the information in this Service Manual, vendor publications will periodically be available from JABIRU which describe disassembly, overhaul and parts breakdown of some of the various vendor equipment items. A listing of the available publications is issued from time to time in service letters.

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.

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.

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52	0	25/7/05	107	0	25/7/05	162		
53	0	25/7/05	108	0	25/7/05	163		
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Issue Notes

2.2 GENERAL DESCRIPTION

The JABIRU J160 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 is equipped with JABIRU, 4 cylinder, 4 stroke engines driving a wooden fixed pitch propeller.

2.3 AIRCRAFT SPECIFICATIONS

Leading particulars of this aircraft, with dimensions based on gross weight, are given in Figure 1-1. 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.

2.4 CENTRE OF GRAVITY LIMITATIONS

The JABIRU is a very light aircraft. 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.

2.5 TORQUE VALUES

A chart of recommended torque values is shown in Figure 1-2. These torque values are recommended for all service 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.

2.6 AIRCRAFT SPECIFICATIONS

Table 1. J160 Specifications

Model	J160-A	J160-C
Aircraft Maximum Weight	540kg (1190lb)	540kg (1190lb)
Fuel Capacity	135 litres	135 litres
Fuel Type	AVGAS 100/130. MOGAS with Octane Rating 95 RON or above may be used if AVGAS is not available. Fuels Containing Alcohols (Ethanol etc) will damage the fuel tank sealant and **MUST NOT BE USED IN JABIRU AIRCRAFT**	
Oil Capacity	2.3 litres	2.3 litres

Model	J160-A	J160-C
Oil Type	Refer Engine Manuals	Refer Engine Manuals
Engine Model (Refer To Appendix I For Engine Data)	Jabiru 2200	Jabiru 2200
Propeller Type	Jabiru 2-bladed Wooden	Jabiru 2-bladed Wooden
Propeller Diameter	60” dia (1524mm)	60” dia (1524mm)
Propeller Pitch	Jabiru 44” pitch (1117mm)	Jabiru 42” pitch (1067mm)
Wheel Sizes Standard	500 x 6” rim	500 x 6” rim
Tyres Standard	6” wide, 6 Ply	6” wide, 6 Ply
Tyre Pressures Standard - Mains	179 kpa (26 psi)	179 kpa (26 psi)
Tyre Pressures Standard - Nose	137 kpa (20 psi)	137 kpa (20 psi)
Wheel Alignment (At Gross Weight) Camber Toe In	 0” 0”	 0” 0”
Battery Location	In Engine Compartment	In Engine Compartment

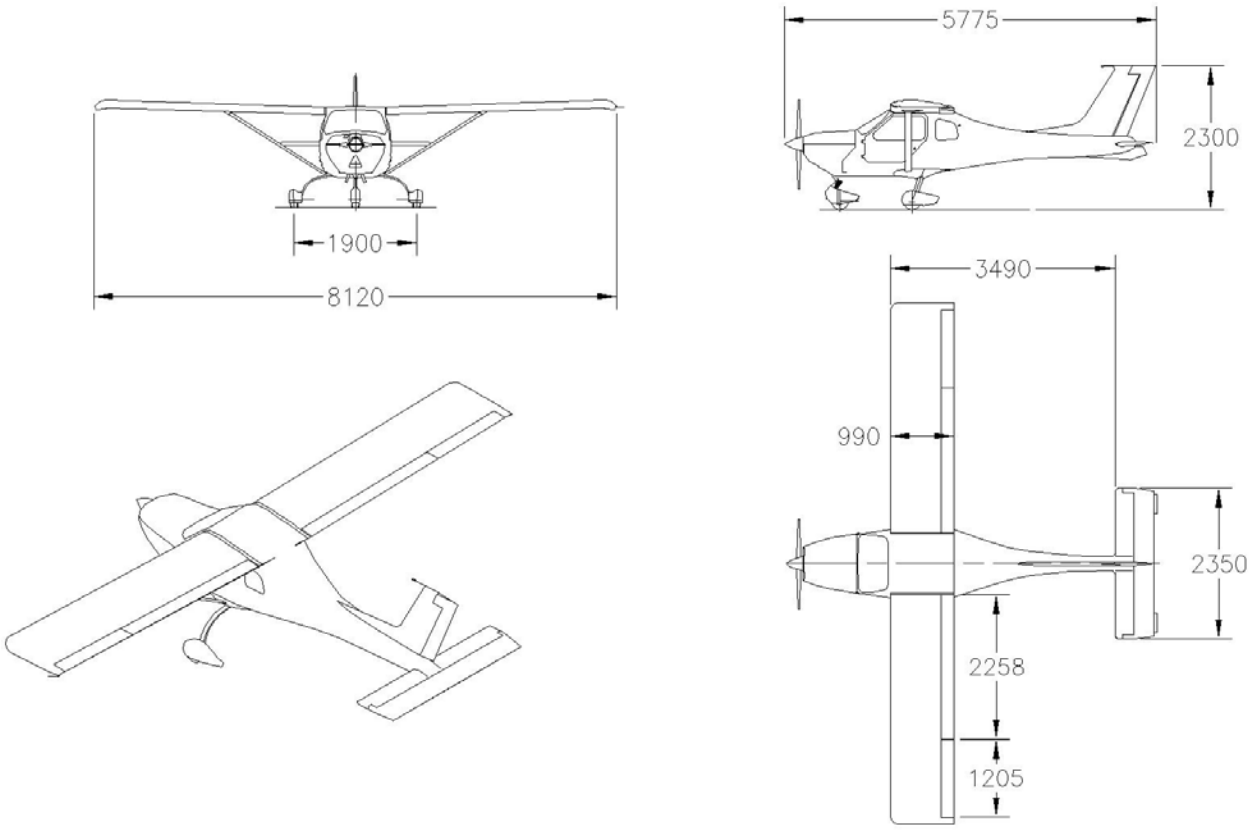


Figure 1. J160 General Arrangement

Table 2. J170 Specifications

Model	J170-A (Aust Kit)	J170-UL (Europe Kit)	J170-SP (USA LSA)	J170-SPC (Canada LSA)
Aircraft Maximum Weight	540kg (1190lb)	450kg (992lb)	540kg (1190lb)	540kg (1190lb)
Fuel Capacity	135 litres	75 litres	135 litres	135 litres
Fuel Type	AVGAS 100/130. MOGAS with Octane Rating 95 RON or above may be used if AVGAS is not available. Fuels Containing Alcohols (Ethanol etc) will damage the fuel tank sealant and **MUST NOT BE USED IN JABIRU AIRCRAFT**			
Oil Capacity	2.3 litres	2.3 litres	2.3 litres	2.3 litres
Oil Type	Refer Engine Manuals	Refer Engine Manuals	Refer Engine Manuals	Refer Engine Manuals
Engine Model (Refer To Appendix I For Engine Data)	Jabiru 2200	Jabiru 2200	Jabiru 2200	Jabiru 2200
Propeller Type	Jabiru 2-bladed Wooden	Jabiru 2-bladed Wooden	Jabiru 2-bladed Wooden	Jabiru 2-bladed Wooden
Propeller Diameter	60” dia (1524mm)	60” dia (1524mm)	60” dia (1524mm)	60” dia (1524mm)
Propeller Pitch	Jabiru 44” pitch (1117mm)	Jabiru 42” pitch (1067mm)	Jabiru 44” pitch (1117mm)	Jabiru 44” pitch (1117mm)
Wheel Sizes Standard	500 x 6” rim	400 x 4” rim	500 x 6” rim	500 x 6” rim
Tyres Standard	6” wide, 6 Ply	4” wide, 4 ply	6” wide, 6 Ply	6” wide, 6 Ply
Tyre Pressures Standard - Mains	179 kpa (26 psi)	179 kpa (26 psi)	79 kpa (26 psi)	79 kpa (26 psi)
Tyre Pressures Standard - Nose	137 kpa (20 psi)	137 kpa (20 psi)	137 kpa (20 psi)	137 kpa (20 psi)
Wheel Alignment (At Gross Weight) Camber Toe In	 0” 0”	 0” 0”	 0” 0”	 0” 0”
Battery Location	In Engine Compartment	In Engine Compartment	In Engine Compartment	In Engine Compartment

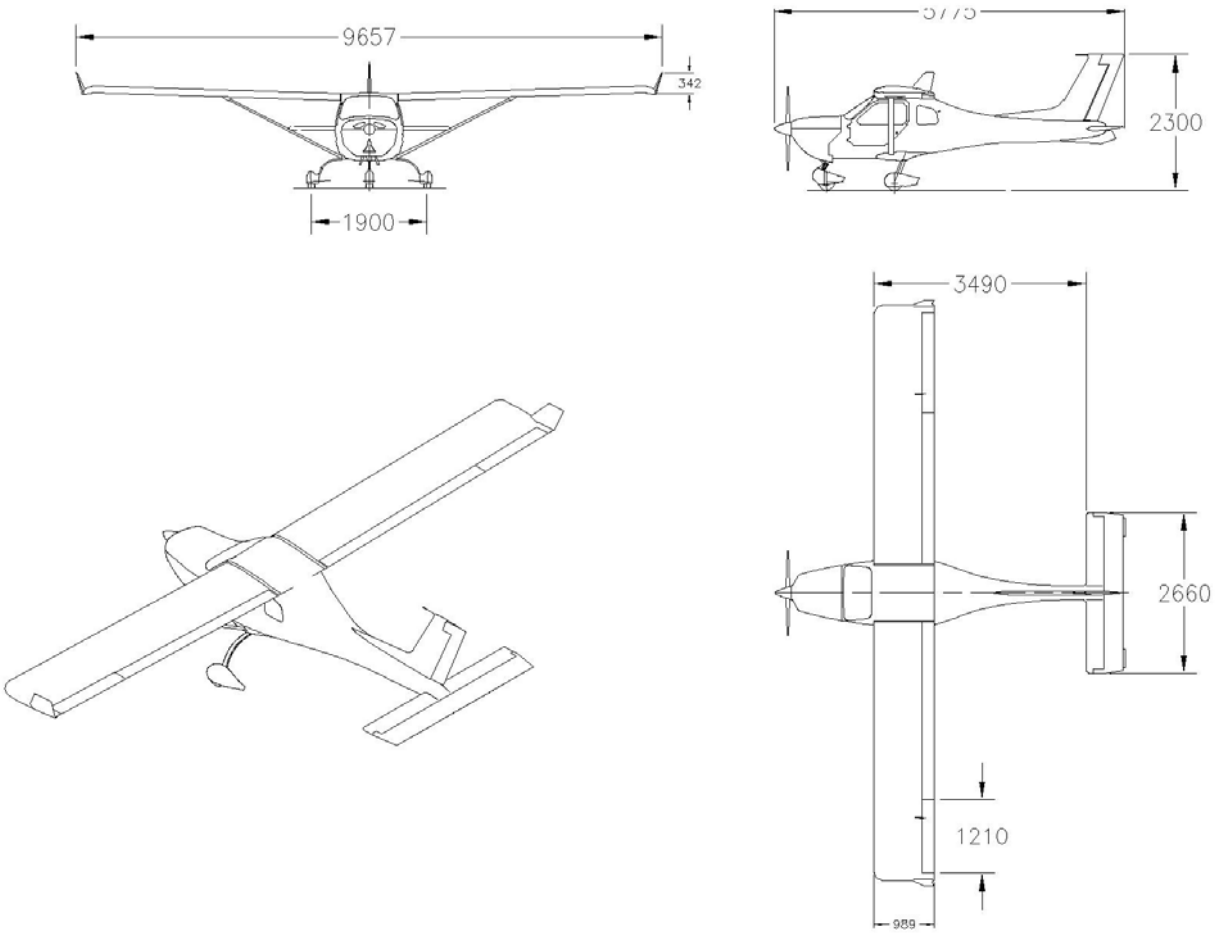


Figure 2. J170 General Arrangement

2.7 RECOMMENDED TORQUE VALUES (IN FIBREGLASS)

Table 3. Recommended Bolt Torque Values

BOLT SIZE	TORQUE (INCH.LB)
AN3	20 - 25 (2 FT LB)
AN4	50 - 70 (4-5 FT LB)
AN5	100 –140 (8-12 FT LB)
AN4 PROPELLOR	72 (6 FT LB)

- These values relate only to steel nuts on oil-free cadmium plated threads.
- For Engine Bolt Torque Values see Engine Instruction & 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.

CAUTION

GENERAL RULE: DO NOT REUSE SELF-LOCKING NUTS

3 Section 3 - Ground Handling, Servicing, Lubrication & Inspection

3.1 GROUND HANDLING

3.1.1 TOWING

The JABIRU aircraft is very light and should always be moved by hand.

Moving the aircraft is accomplished by using the wing struts or prop hub or landing gear struts as push points together with the solid rear fuselage join of the fin to the tail plane.

CAUTION

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

When pushing at the join of the fin and Tail Plane, 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.

CAUTION

When moving the aircraft, never turn the Nose Wheel more than 15 degrees either side of centre or Nose Gear may be damaged.

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 and nose wheel lifted off the ground if necessary.

CAUTION

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!

3.1.2 JACKING

JABIRU is a very light aircraft. Before jacking, ensure that it is as light as possible by removing luggage and any unnecessary fuel.

3.1.2.1 JACKING MAIN GEAR

1. Remove main gear spat on the side to be jacked or both spats if both wheels to be jacked.

2. 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, at the outboard part of the wing strut attachment or towards the wing tip. Be careful lifting at the Wing Tip.

3. 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.

4. Repeat for other side if necessary.

The above procedure 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. Obtain a trestle, 20ltr drum or similar object 600mm high.

2. Mount a solid foam block, sandbag, pillow or similar compliant material on top of the trestle. (compliant material should distribute load over minimum 150 square centimetres) Place under the lower wing strut attachment.

3. Support under both wings at the Wing Spar to prevent the aircraft from rocking. Ensure that no fittings are strained.

3.1.2.2 JACKING NOSE GEAR

1. Push down on tail Plane (NOT THE ELEVATOR) until nose gear is off the ground.

2. Place trestle or drum under rear fuselage together with absorbent material such as foam block, sandbags or a pillow.

CAUTION

Ensure trestle does not foul Ventral Fin.

3. Weigh down tail plane with sandbags or similar heavy absorbent (not hard – hard items like bricks are likely to damage the aircraft) material.

CAUTION

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

3.1.3 HOISTING

This procedure should not be necessary for most service or maintenance procedures. Should hoisting be necessary:

1. Drain Fuel from both wings & Remove wings. See details below

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.

3.1.4 LEVELLING

Method 1
For both lateral and longitudinal levelling use a spirit level on either side of the lower door sills.

Method 2
Use the join line of the cowl top & bottom halves.

3.1.5 PARKING

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.

3.1.6 TIE DOWN

When mooring the aircraft in the open, head into wind if possible. Secure control surfaces by tying the control handle back firmly with a seat belt.

Then:
1. Tie ropes to the top end of each wing strut. 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.

3.1.7 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!

Store under cover, away from direct sunlight as ultra-violet rays damage composite structures.

In addition, the Pitot tube, static air vent, air vents, openings in the engine cowl and other similar openings should have protective covers fitted to prevent entry of foreign materials and beings (especially wasps).

3.1.8 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.

3.1.9 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 2.1.7), plus:

- For temporary storage, fill fuel tank with correct grade of gasoline (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.

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.

5. Remove battery and store in a cool dry place. Service the battery periodically and charge as required.

   NOTE: It is recommended that a battery which is not 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.

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

Rotate the propeller 10 – 12 times, leaving it in the horizontal position.

CAUTION

Ensure that the Master and Ignition Switches are OFF!

7. Install spark plugs and connect leads.

8. Seal exhaust pipes. Attach a red streamer to each. DO NOT seal fuel tank breathers.

9. Place protective covers over pitot tube, static source vents, air vents and openings in engine cowl to prevent the entry of foreign material or beings (especially wasps).

10. Attach a warning placard to the propeller stating that vents and breathers have been sealed. The engine must not be started with the seals in place.

11. 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!

3.1.10 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).

3.1.11 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 several revolutions to clear excess preservative oil from cylinders.

CAUTION

Ensure that the Master and Ignition Switches are OFF!

8. Install spark plugs – torque to 20 nm (180 inch/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 fuel tank breather is clear.

14. Perform a thorough pre-flight inspection.

15. Start and warm engine.

3.2 SERVICING

Servicing requirements are shown in the service table below. The following paragraphs supplement this table by adding details not included.

Note that Inspection Requirements are detailed at Paragraph 3.5.

3.2.1 SERVICING SCHEDULE

3.2.1.1 PRE-FLIGHT:

- Refer to Flight Manual

3.2.1.2 25 HOUR SERVICE

- Refer to Engine Instruction & Maintenance Manual

3.2.1.3 50 HOUR SERVICE

- Refer to Engine Instruction & Maintenance Manual

3.2.1.4 100 HOUR SERVICE

- Refer to Engine Instruction & Maintenance Manual

3.2.1.5 OTHER INSPECTION & MAINTENANCE PROCEDURES:

- Refer to Engine Instruction & Maintenance Manual.

- Replace flexible oil & fuel line in engine compartment every 2 years or when visible deterioration (cracking, hardening) occurs.

3.2.2 FUEL

The fuel tanks should be filled immediately after flight to lessen condensation of moisture. The tank capacity is listed in the Aircraft Specifications Above.

3.2.3 FUEL DRAIN

A fuel drain is located in the Left & Right hand fuel tanks near the wing root. Drain fuel after each refuelling to ensure moisture and contaminants are not present.

3.2.4 CARBURETTOR AIR FILTER

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 50 hours of engine operating time and more frequently if warranted by the operating conditions. Clean only with compressed air. Under extreme operating conditions, daily servicing of the filter is recommended.

3.2.5 BATTERY

The Battery is a gel 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.

Tighten cable and terminal connections with a wire brush, then coat with petroleum jelly before connecting cables. Check the battery every 50 hours (or at least every 30 days), more often in hot weather. Inspect the Battery Box and attachments. Clean and remove any signs of spillage or corrosion.

3.2.6 TYRES

Maintain tyre pressure at the air pressure specified in Aircraft Specifications above. When checking tyre pressure, examine tyres for wear, cuts, bruises and slippage. Remove oil, grease and mud from tyres with soap and water.

NOTE: Recommended tyre pressures should be maintained, especially in cold weather. Remember that any drop in temperature of the air inside the tyre causes a corresponding drop in tyre pressure.

3.2.7 HYDRAULIC BRAKES

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.

Refer to paragraph 6.8 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.

3.3 CLEANING

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

3.3.1 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.

3.3.2 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.

3.3.3 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.

3.3.4 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.

3.3.5 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.

3.3.6 PROPELLER

Wash with soap and water, rinse with clean water and dry with cloth or chamois. **Do not use a wax based substance as this would make it almost impossible to refurbish the prop if need at a later stage.**

3.3.7 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 6. Discard cracked wheel halves, flanges or hubs and install new parts.

3.4 LUBRICATION

There are no lubrication requirements for the JABIRU other than those detailed in Appendix 1.

3.4.1 WHEEL BEARING – MAINS AND NOSE

At each 100 hour inspection, jack the wheel, spin the wheel and check for free running and any play on the shaft. Remove and replace if there is any sign of binding or wear.

3.5 2.5 INSPECTION

3.5.1 INSPECTION CHARTS

The chart at Paragraph 3.5.2 shows the recommended intervals at which items are to be inspected.

As shown in the chart, there are items to be inspected each 50 hours, each 100 hours and each 200 hours. There are also special inspection items which require inspection of servicing at intervals other than 50, 100 and 200 hours.

The engine Instruction Manual also details engine inspection schedules and should be consulted in addition to this chart.

- When conducting an inspection at 50 hours, all items marked under EACH 50 HOURS would be inspected, serviced or otherwise completed as necessary to ensure continuous airworthiness.

- At each 100 hours, the 50 hours items would be completed in addition to the items marked under EACH 100 HOURS as necessary to insure continuous airworthiness.

- An inspection conducted at 200 hours would likewise include the 50 hour items and 100 hour items in addition to those at EACH 200 HOURS.

- A complete aircraft inspection includes all 50, 100 and 200 hour items together with those shown in the Engine Instruction Manual.

3.5.2 INSPECTION GUIDELINES

3.5.2.1 MOVEABLE PARTS

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.

3.5.2.2 FLUID LINES AND HOSES

leaks, cracks, kinks, chafing, proper radius, security, corrosion, deterioration, obstruction and foreign matter.

3.5.2.3 METAL PARTS

security of attachment, cracks, metal distortion, broken welds, corrosion, and any other apparent damage.

3.5.2.4 WIRING

security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration and corroded terminals.

3.5.2.5 BOLTS IN CRITICAL AREAS

correct torque in accordance with torque values given in the chart in Section 1, when installed or when visual inspection indicates the need for a torque check.

NOTE: Torque values listed in section 1 are derived from 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.

3.5.2.6 FILTERS, SCREENS AND FLUIDS

cleanliness, contamination and/or replacement at specified intervals.

3.5.2.7 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
- Radio Station License
- Pilot License/Certificate including Medical Certificate (if appropriate).

3.5.2.8 ENGINE 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:

1. Engine temperatures and pressures.

2. Static RPM. (Also refer to Engine Instruction Manual).

3. Magneto drop. (Also refer to Engine Instruction Manual).

4. Engine response to changes in power.

5. Any unusual engine noises.

6. Fuel shut-off valve; operate engine in ON position and in OFF position long enough to ensure shut-off functions properly.

7. 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.

3.5.3 INSPECTION CHART

IMPORTANT

READ ALL INSPECTION RQUIREMENTS PRIOR TO USING THESE CHARTS.

Table 4. Inspection Chart

		Annual Inspection	Each 200 Hours	Each 100 Hours	Each 50 Hours	
PROPELLER						
1	Spinner			*		*
2	Spinner Flange			*		*
3	Spinner screws			*		*
4	Propeller			*		*
5	Propeller bolts/nuts - Tension					*
6	Spinner / Prop Tracking			*		*
ENGINE COMPARTMENT						
	Check for oil, fuel, exhaust & induction leaks, then clean entire engine & compartment before inspection.					
1	Carburetor air filter			*		*
2	Engine baffles and air ducts					*
3	Cylinders					*
4	Crankcase & front crankcase seal					*
5	Hoses, lines and fittings			*		*
6	Intake and exhaust systems					*
7	Ignition harness, distributor caps & rotors					*
8	Spark plugs			*		*

		Annual Inspection	Each 200 Hours	Each 100 Hours	Each 50 Hours	
9	Compression check or leak-down check			*		*
10	Electrical wiring					*
11	Fuel pump			*		
12	Engine controls and linkages			*		*
13	Engine mounts, mount structure			*		*
14	Starter, solenoid and electrical connections			*		*
15	Coils and electrical connections			*		*
16	Carburettor heat system			*		*
17	Throttle and linkage			*		*
18	Carburettor			*		*
19	Oil system tubes and hoses			*		*
20	Firewall					*
21	Engine cowlings and clips			*		*
22	Exhaust system – including muffler		*			*
23	Head bolt tension					*
24	Oil & filter change		*			*
25	SCAT hose condition			*		*
Fuel System						
1	Fuel filters, drain valves, carburetor bowl			*		*
2	Electronic fuel boost pump and fittings					*
3	Fuel lines and connectors			*		*

		Annual Inspection	Each 200 Hours	Each 100 Hours	Each 50 Hours
4	Fire sleeves		*		*
5	Fuel tank vents, caps & placards		*		*
6	Fuel Tanks		*		*
7	Fuel shut-off valve & placards		*		*
	Landing Gear				
1	Main gear wheels & fairings	*			*
2	Nose gear wheel, steering links, tension links & fairings	*			*
3	Wheel bearings		*		*
4	Nose gear strut	*			*
5	Nose gear housing & bushes			*	
6	Main gear struts, clamps, bolts & nuts	*			*
7	Tyres & tubes		*		*
8	Brake fluid, hoses, linings, discs, brake assemblies & master cylinder		*		*
9	Brake operational check	*			*
	Airframe				
1	Aircraft exterior		*		*
2	Aircraft structure		*		*
3	Windows, windshield, doors & seals		*		*
4	Seatbelts & shoulder harnesses		*		*
5	Seat structure		*		*
6	Instruments & markings		*		*

		Annual Inspection	Each 200 Hours	Each 100 Hours	Each 50 Hours
7	Instrument plumbing & wiring			*	*
8	Instrument panel, shock mounts, decals & labels				*
9	Ventilation system			*	*
10	Cabin upholstery, trim				*
11	Switches, fuses			*	*
12	Pitot & static system slips			*	*
13	Radio, intercom & headsets			*	*
14	Antenna & cable			*	*
15	Battery, battery cradle & cables			*	*
	Control Systems In addition to the items listed below, always check for correct direction of movement (particularly if controls have been disconnected) and correct travel				
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		*		*

		Annual Inspection	Each 200 Hours	Each 100 Hours	Each 50 Hours	
10	Control horns, hinges & hinge lock tabs.		*			*

4 Section 4 - Fuselage

4.1 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.

4.2 WINDSHIELD AND WINDOWS

4.2.1 DESCRIPTION

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

IMPORTANT

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.

4.2.2 CLEANING

Refer to Section 3.

4.2.3 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 effect the reparability due to impairing bonding.

4.2.4 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.

4.2.5 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.

4.2.6 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. An unfluted drill should be used.

4.2.7 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.

4.2.8 INSTALLATION

1. Ensure all old epoxy resin has been removed from the fuselage sealing strips (around the window frames).

2. 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.

3. Wet the window frame joggle with raw epoxy resin. Apply a bead of Epoxy & Flock around the outer edge of the windscreen.

4. Place windscreen accurately over the sealing strips and locate with one screw top and bottom.

5. Fit other screws.

6. Take care not to crack windscreen when installing. DO NOT over tighten screws – cracking will result.

4.3 CABIN DOORS

4.3.1 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 Figures 4 and 3 below.

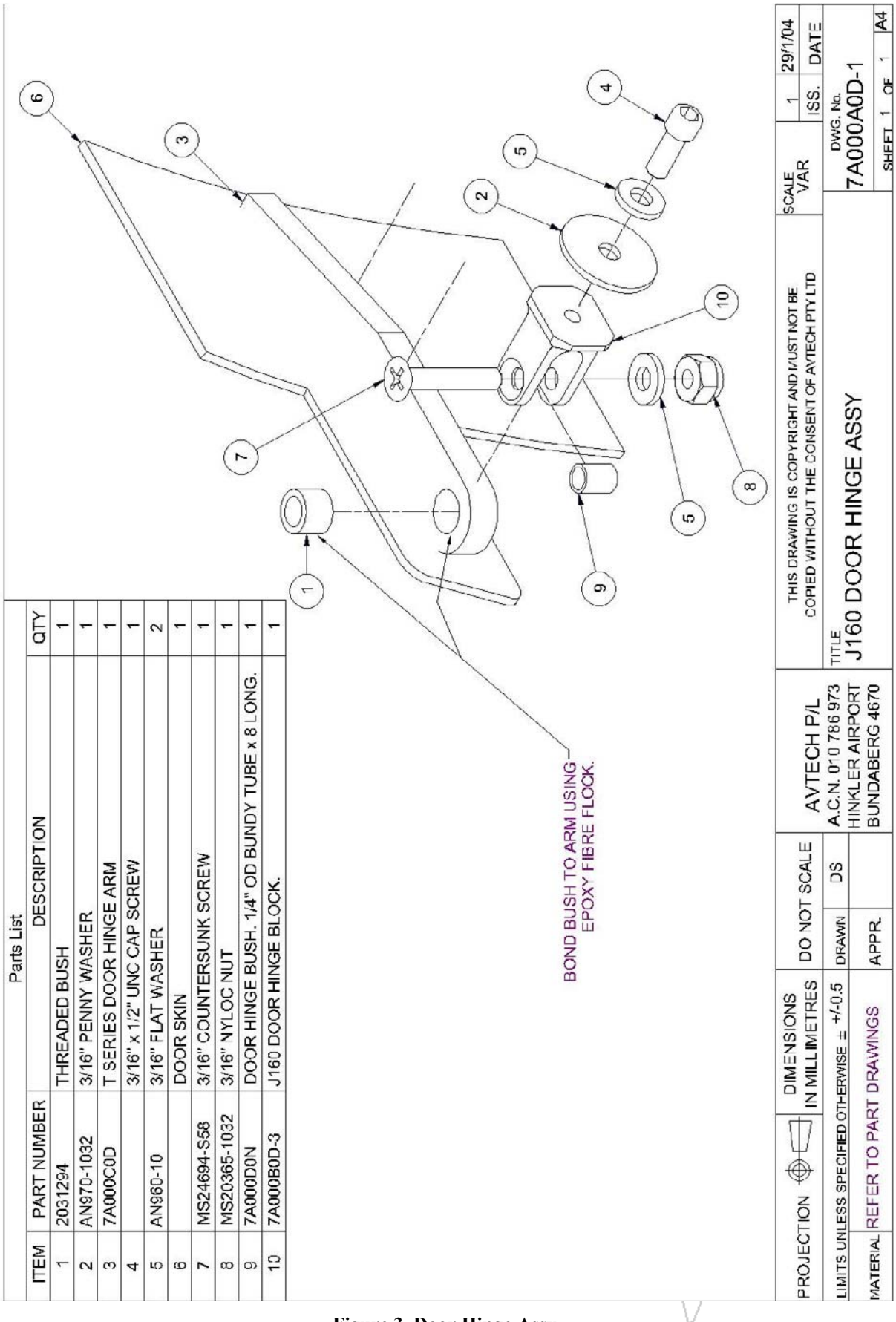


Figure 3. Door Hinge Assy

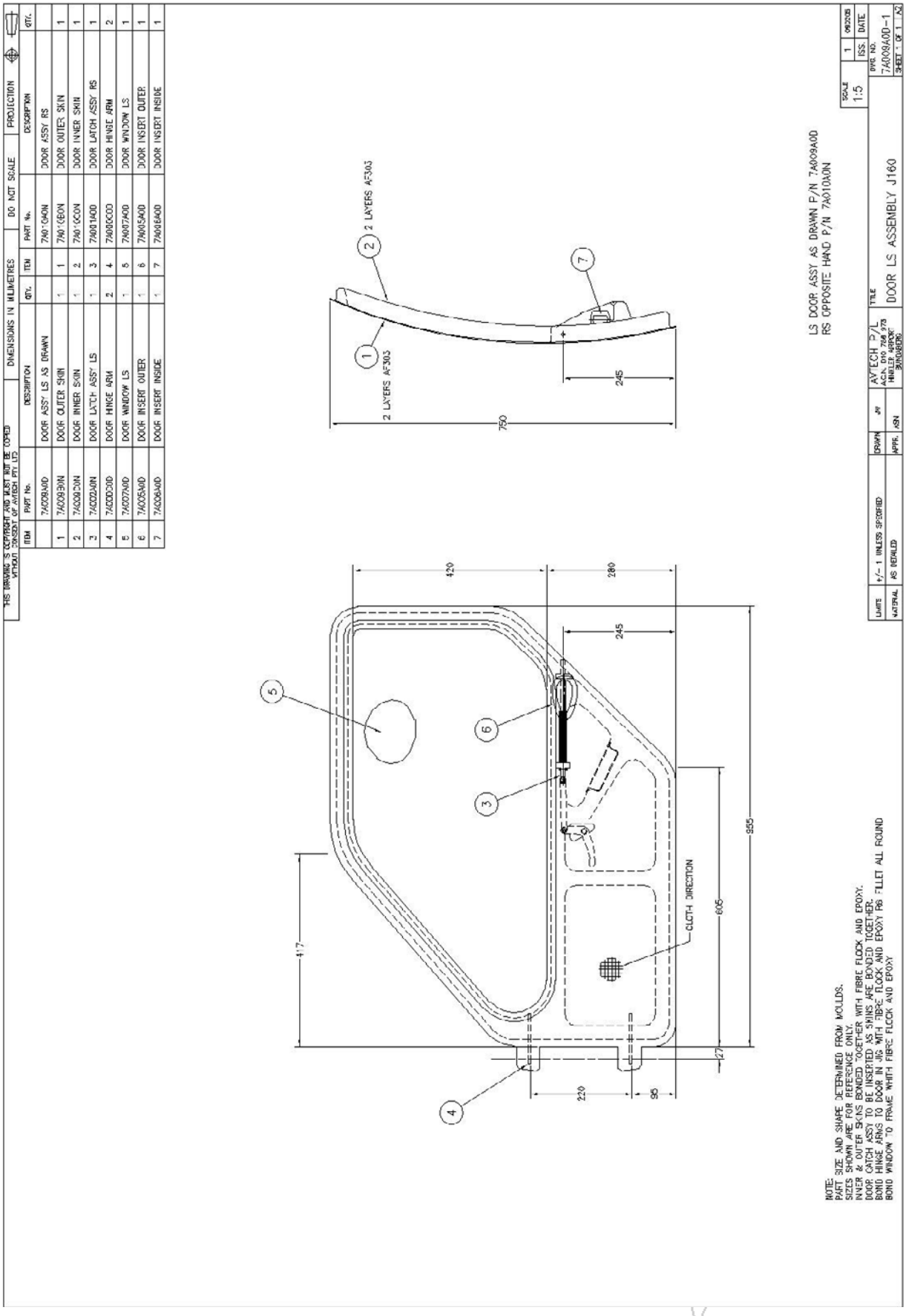


Figure 4. Door Assembly

4.3.2 ADJUSTMENT

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

4.3.3 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.

3.1.1 Cabin Door Latches

There is one main latch on each door of a simple spring type. This is complemented by two Aluminium catches at the top front quadrant of each door. An assembly drawing of the latch mechanism is provided as Figure 5 below.

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

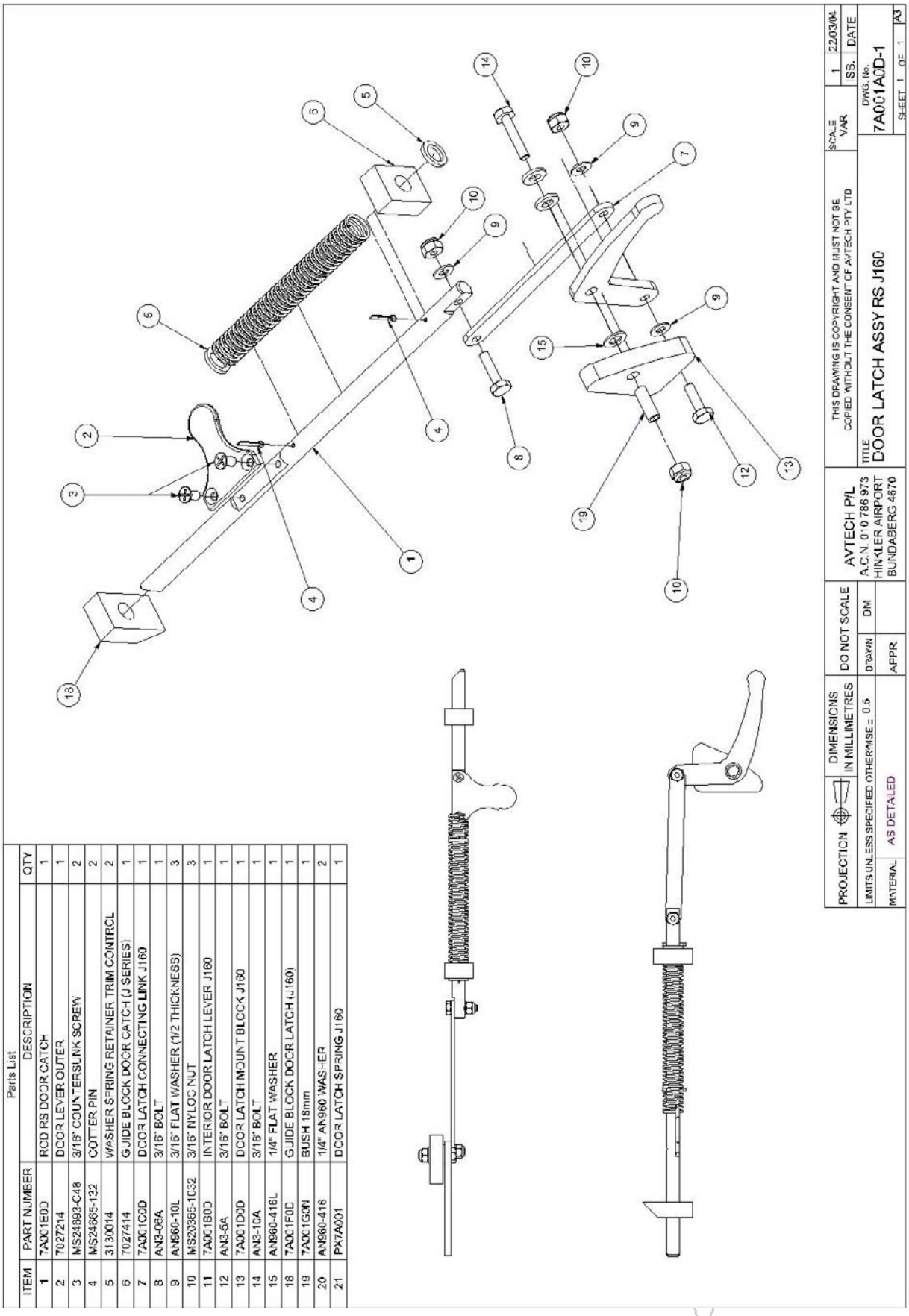


Figure 5. Door Latch Mechanism Assembly

4.3.4 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 JABIRU registered owners by quoting the aircraft Serial Number.

4.4 SEATS

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.

WARNING
DO NOT MODIFY SEATS.

4.4.1 REPAIR

As seats are integral to the aircraft structure, any repair must be referred to JABIRU AIRCRAFT Pty Ltd.

4.5 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.

4.5.1 UPHOLSTERY CLEANING

The upholstery used in the J160-C has been treated with a flame retardant to meet the flammability requirements of CS-VLA (formerly JAR-VLA). This treatment will withstand 5 washes or dry cleans before requiring re-application. The washing of cabin upholstery must be noted in the aircraft's maintenance log book and the flame retardant re-applied by an authorized person after 5 washes.

4.6 SOUNDPROOFING

Soundproofing material is normally used on the Firewall.

In addition, a curtain of soundproofing material can be 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.

4.7 SAFETY PROVISIONS

4.7.1 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 of stitching is broken.

Attaching parts should be replaced with equivalent grade parts if excessively worn or defective.

5 SECTION 5 – Wings And Empennage

5.1 WINGS

Refer to Figures 6, 7, 8 and 9.

NOTE:

J170, J170-SP and J170-SPC models use the same wing assembly as shown for the J170-UL below in Figures 8 and 9, with the exception of the Bare Wing Assembly – which is P/No. 2095023 in place of 2A039A0D.

Each composite wing is a semi-cantilever, monocoque 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 a composite block heavily bonded to the reinforced wing skin and attaches to the main spar through the Wing End Plug. Both attachments are through stainless steel threaded bushes bonded into the attachment blocks.

5.1.1 REMOVAL

The JABIRU aircraft is designed with wings which are removable for storage or transport.

Wing removal is most easily achieved if two persons are available to handle the wing.

1. Remove wing root fairings.
2. Drain Fuel out of Quick Drain (Note: This will take some time)
3. Remove wing strut fairings – top and bottom.
4. Disconnect Pitot tube – RH wing only.
5. Unbolt flap control rods – 1 each wing.
6. Remove flap from wing so it does not crush the fuselage when lowering down.
7. Unbolt aileron control cables (2) from rear of control stick horn inside cabin.
8. Remove pin and clamp block from aileron control cable clamps at rear of seat – 1 each seat.
9. Loosen hose clamps from Fuel lines from Breather tubes, Fuel Gauge.
10. With one person supporting wing tip, unbolt top wing strut bolt and lower wing strut to the ground.
11. Lower wing tip to towards the ground making sure you do not crush the under side of the wing on the fuselage wing root. Ret the wing tip on a saw-horse or other suitable stand.

12. Unbolt and remove front wing attachment bolt.

13. Unbolt and remove rear wing attachment bolt.
Note: It may be necessary to rock the wing slightly while pulling attaching bolt, or carefully use a long drift punch to drive out attaching bolt.

14. Carefully remove wing by moving it out to clear the aileron cable from the fuselage.

15. Place wing on cushioned structure to avoid damage to wing strut attachment.

16. Unbolt lower wing strut bolt and remove wing strut.

17. Repeat Steps 5 – 16 to remove other wing.

5.1.2 REPAIR

The wing is a composite monocoque structure. All repairs must be referred to JABIRU AIRCRAFT Pty Ltd or our approved local agent.

5.1.3 INSTALLATION

1. Fit the lower strut attaching bolt, leaving the top end of the strut on the ground.

WARNING

Do Not Tighten nut or metal fatigue may result. Washer must be free to rotate.

2. Fit wing to fuselage, leaving wing tip on the saw-horse and routing aileron cable through hole in fuselage wing root.

3. Install front and rear wing attaching bolts/nuts.

4. Put top wing strut attaching bolt in your pocket.

5. Lift wing tip and install wing strut to wing strut attachment with bolt from pocket. Install nut.

WARNING

Do Not Tighten nut or metal fatigue may result. Washer must be free to rotate.

6. Connect all fuel lines to wing, fuel gauge making sure there are no lines that have kinked.

7. Put about 10lts of fuel in each tank & check for any leaks.

8. Attach flap to wing ensuring all bushes are in place.

9. Install bolt/nut in flap control rod.

10. Install bolt/nut in aileron control cable on main control stick horn.

11. Install clamp block and pin in aileron control cable clamp at rear of seat.

12. On RH wing, reconnect Pitot tube.

13. Replace wing strut fairings – top and bottom.

14. Replace wing root fairings.

15. Perform a fuel flow test. Disconnect the fuel line from the mechanical fuel pump in the engine compartment. Have a second person catch any fuel that flows out of the line in a container with accurate volume marks. Turn electric fuel pump on and pump fuel through the lines into container. Ensure there is about 1 litre per minute flow rate.

NOTE: After carrying out the fuel flow test, check that both wing tanks are feeding fuel by turning off both wing tanks, pumping about a litre out of the header tank, then turning the left wing tap on. The wing tank will gravity feed to the header tank, and it should re-fill within approximately 1-2 minutes. This must be repeated for the right wing. If a wing is not flowing correctly, check lines for kinks, blockages & airlocks.

Ensure both wing taps are wired in the "ON" position using fuse wire before returning the aircraft to service.

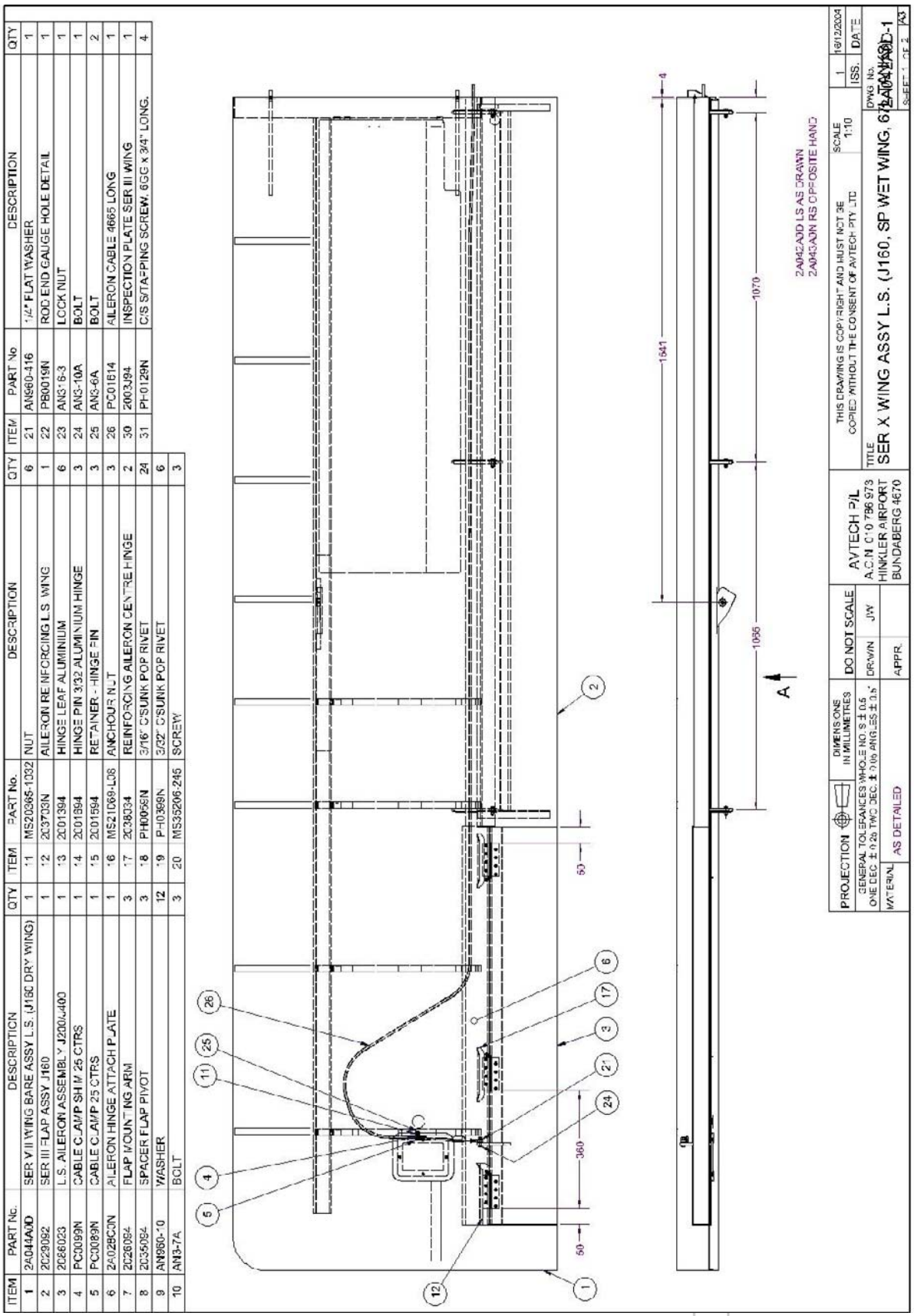


Figure 6. J160 Wing Assembly Sheet 1

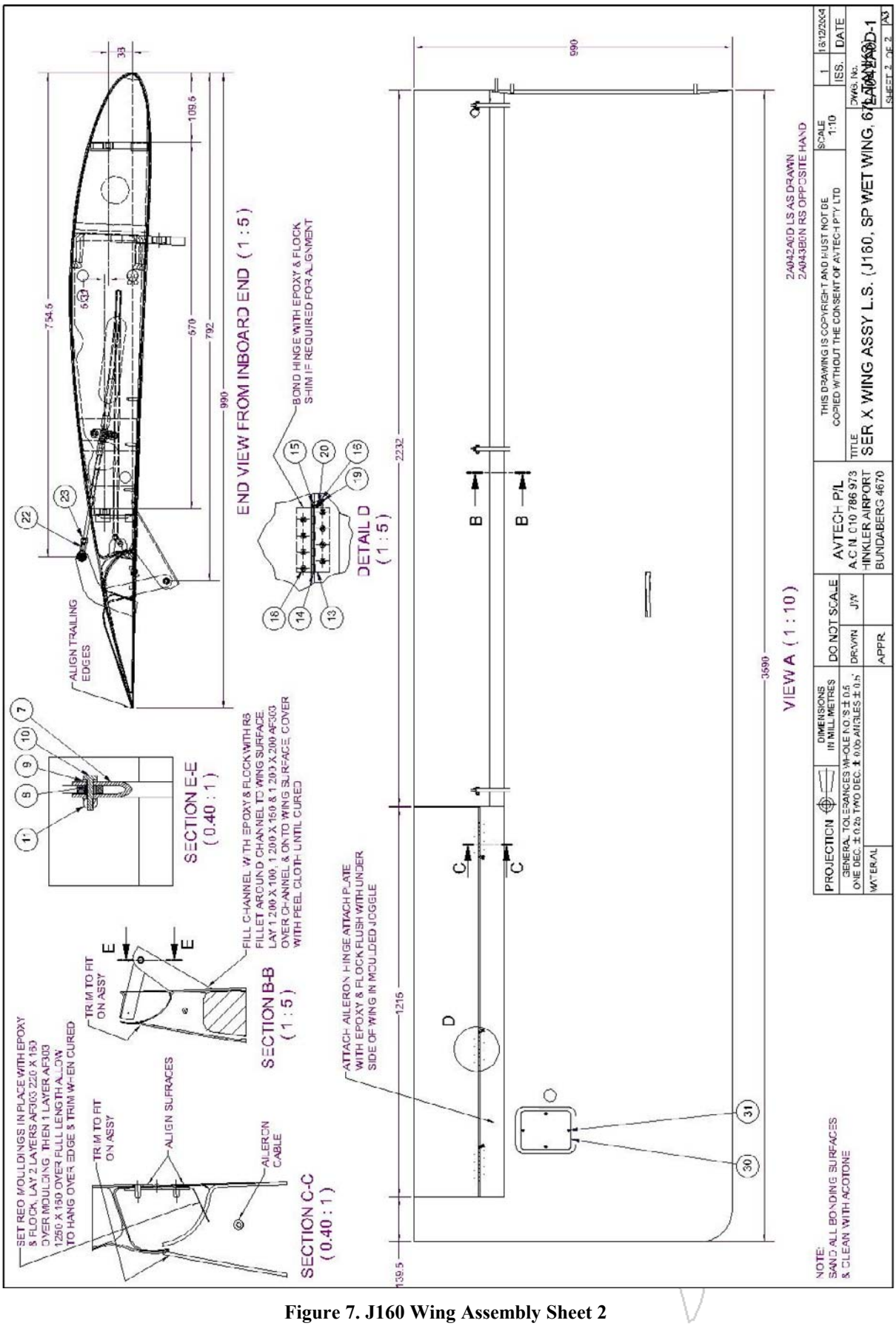


Figure 7. J160 Wing Assembly Sheet 2

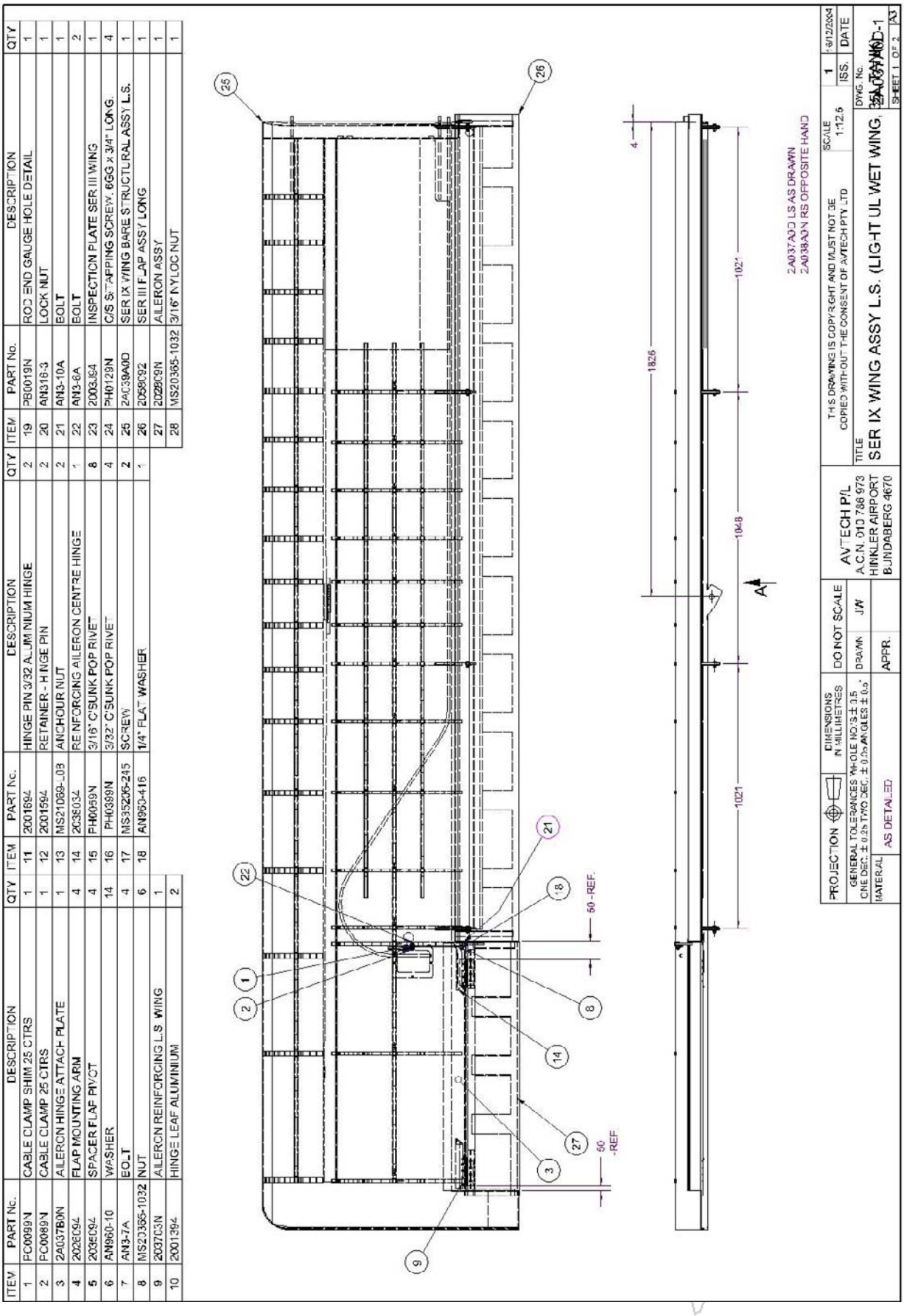


Figure 8. J170-UL Wing Assy Sheet 1

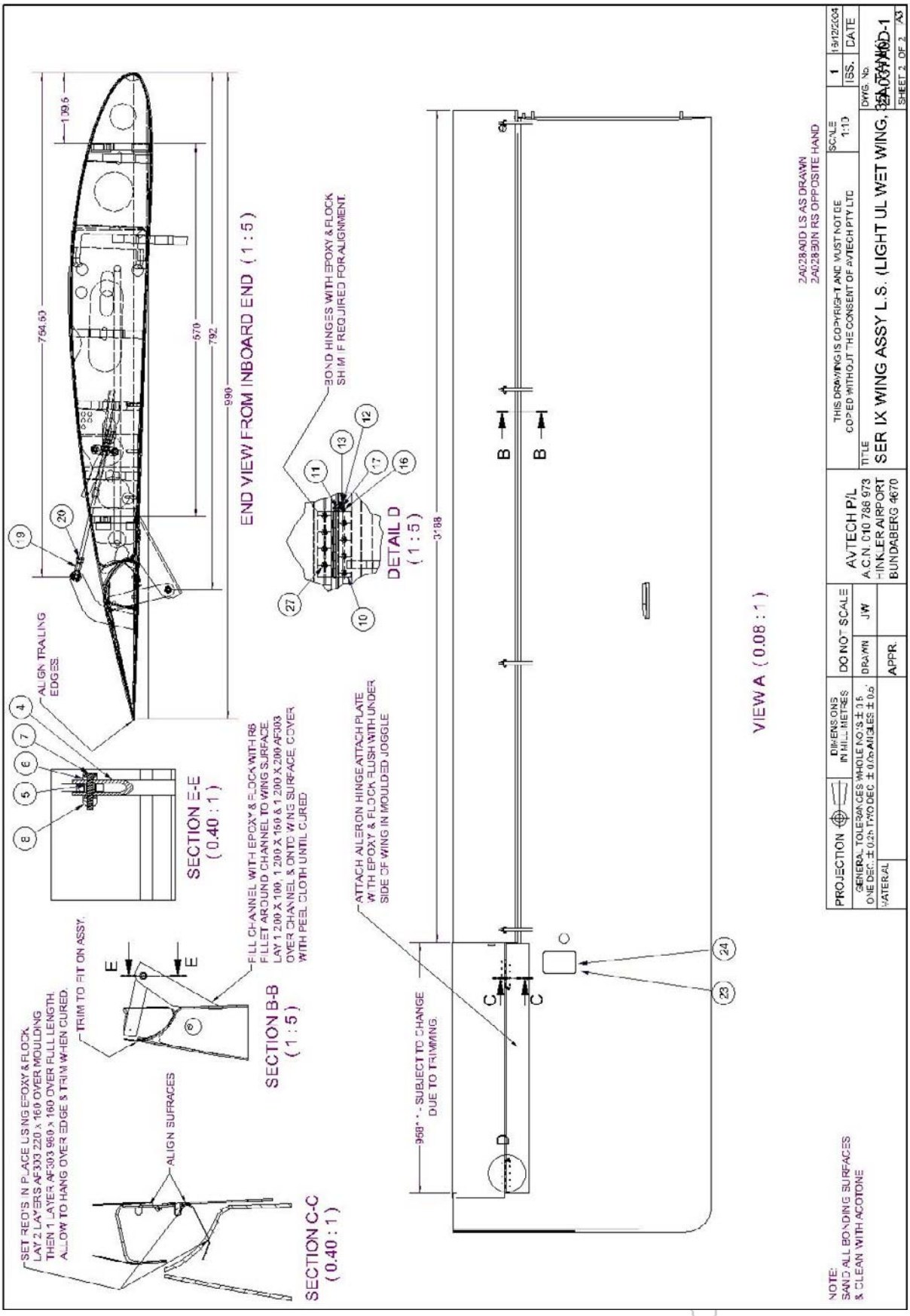


Figure 9. J170-UL Wing Assy Sheet 2

5.2 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 riveted 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.

5.2.1 REMOVAL AND INSTALLATION

See Wing Removal (Paragraph 5.2.1) and Wing Installation (Paragraph 5.2.3).

5.2.2 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.

5.3 FIN

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

5.3.1 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.

5.4 HORIZONTAL STABILISER

The horizontal stabiliser is a moulded monocoque structure of rigid cellular polystyrene bonded to a fibreglass skin and rear spar. Refer to Figure 30.

5.4.1 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.

6 SECTION 6 – LANDING GEAR and BRAKES

6.1 LANDING GEAR

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 are optional equipment.

6.2 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.
	Bent axle stubs	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
	Bent axle stubs	Install new part (s)
	Dragging Brakes	Refer to Para. 6.8

6.3 MAIN GEAR

Figures 10, 11 an 12 illustrate the main landing gear. The illustrations should be used in conjunction with the following procedures during removal and installation of component parts.

WARNING: Check looseness of main U/C beams by lifting each wing and trying to move beam back and forth. If movement, tighten clamp bolts (2) evenly to take beam movement out. Do not over tighten or exceed 3 threads clear on the nuts (use extra washers). Over tightening can cause bolt fracture and failure to tighten both can also cause bolt failure. (See Torque Value Figure 1-2).

The wheels comprise two wheel halves which are assembled as shown in Figure 11. During assembly of the main wheels the through-bolts/nuts should be tightened to the value specified in Table 3.

The assembly of the wheels to the undercarriage leg is shown in Figure 12.

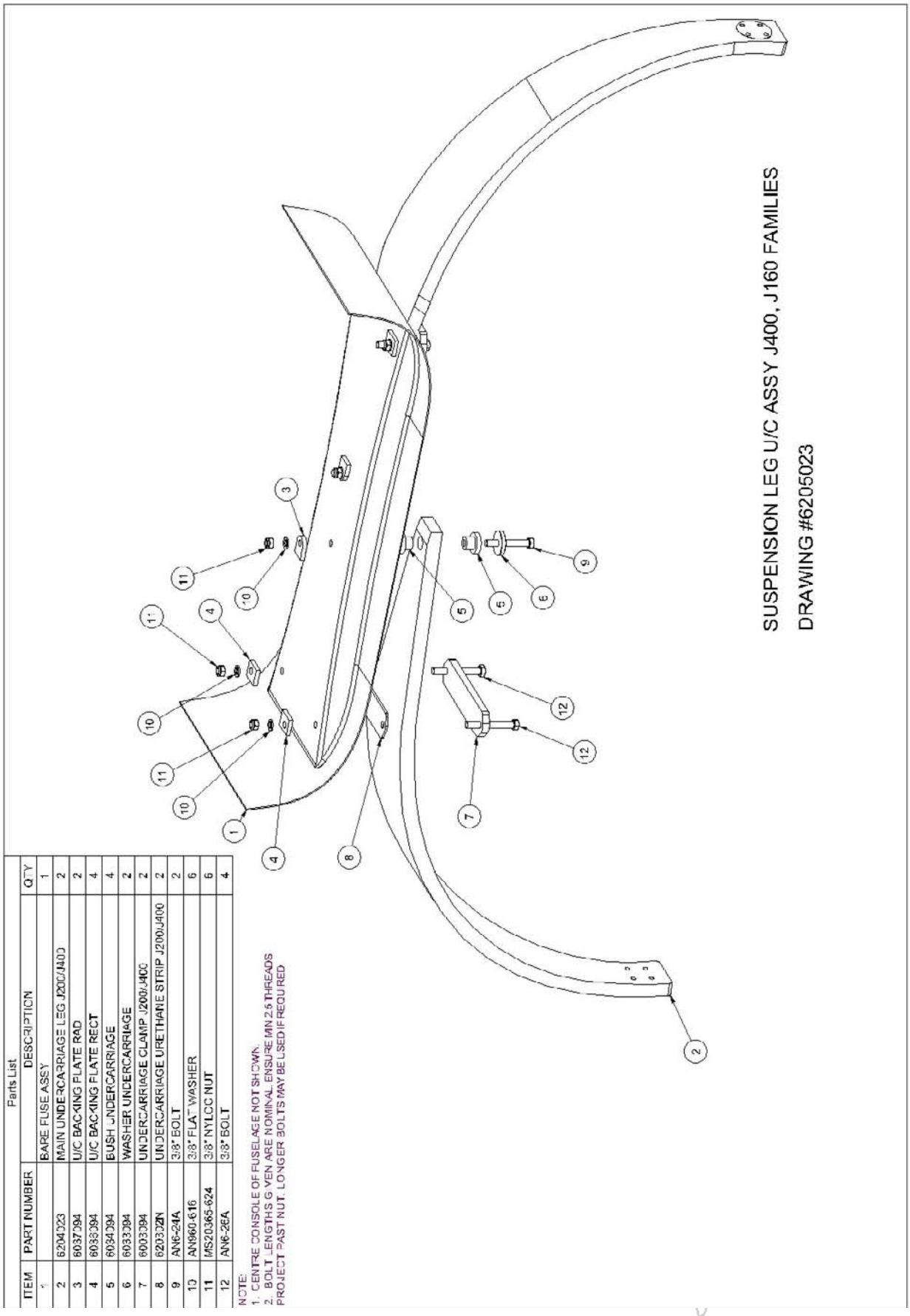


Figure 10. Main Undercarriage Assembly

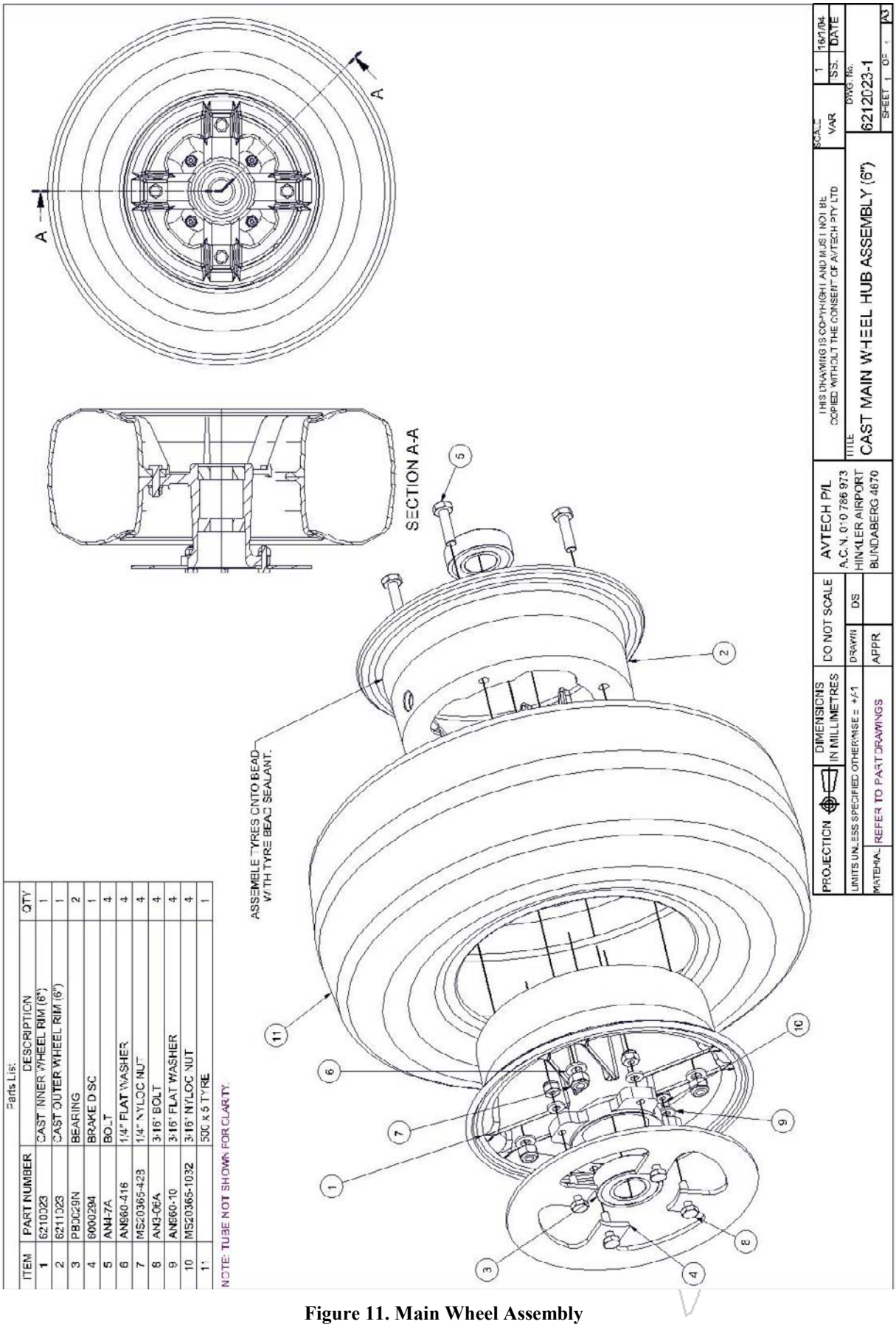


Figure 11. Main Wheel Assembly

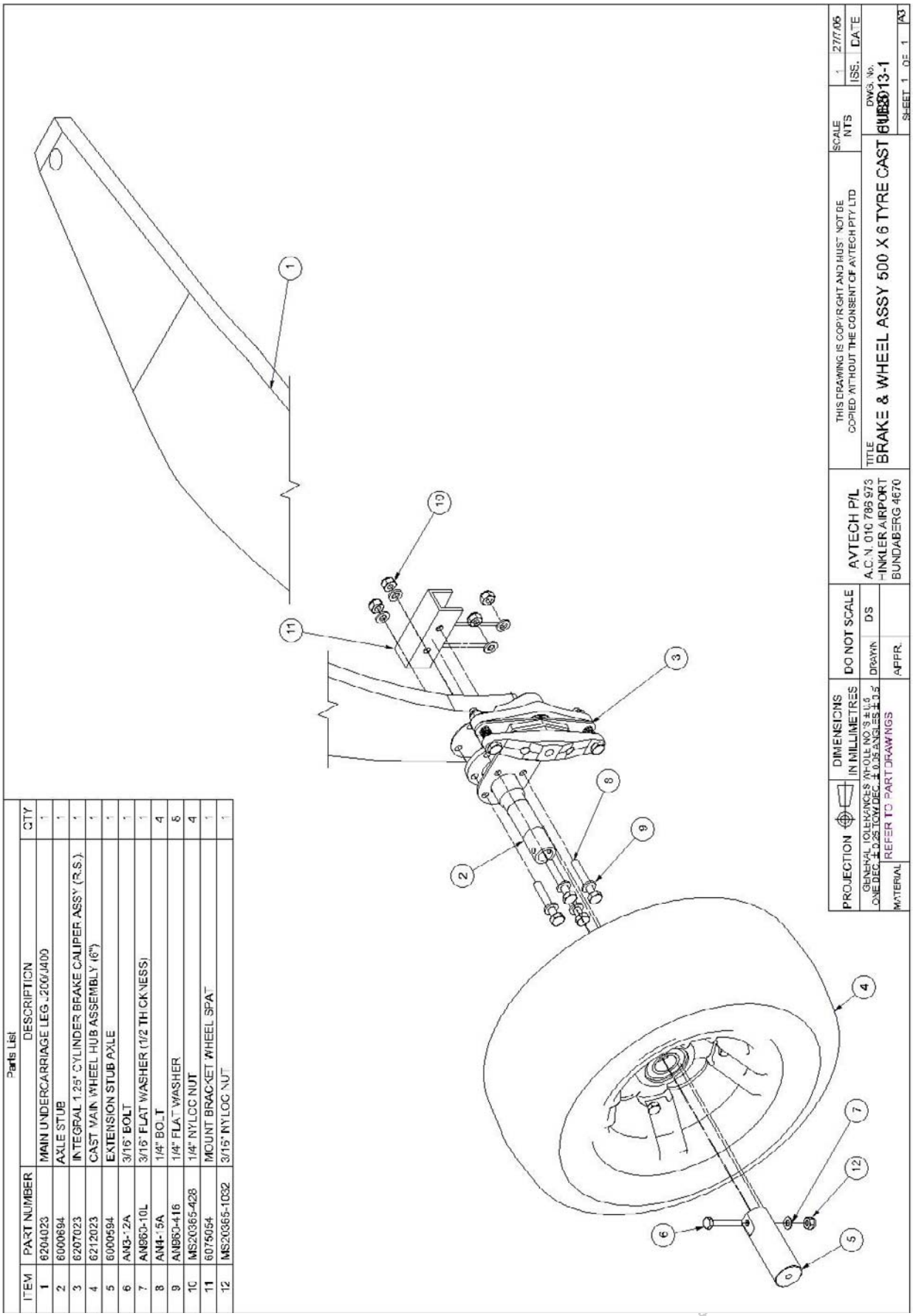


Figure 12. Main Wheel to Leg Assy

6.3.1 REMOVAL

The following procedural steps remove one side of the landing gear as a complete assembly. Refer to applicable paragraphs for removal of the individual components.

1. Jack the aircraft in accordance with the details given in Section 3.

2. Unbolt wheel end of flexible brake hose – catching brake fluid in a container.

3. Remove bolt/nut from top inboard end of undercarriage beam. Remove rubber bushes (2).

4. Remove bolts/nuts (2) from the clamp at bend in undercarriage beam.

5. Remove clamp.

6. Remove Undercarriage Leg Assembly.

6.3.2 INSTALLATION

The following procedural steps install the landing gear as a complete assembly. Refer to applicable paragraphs for installation of the individual components.

With aircraft jacked:

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 (See Torque Value in Table 3).

3. Tighten clamp bolts/nuts (2 OFF) (See Torque Value in Table 3).

4. Connect flexible brake line.

5. Top-up brake master cylinder with fresh brake fluid and bleed brakes – see Paragraph 6.8.5.

6. Lower aircraft

6.3.3 INSPECTION AND REPAIR

1. Inspect composite beam for damage indicated by cracks or delamination. Pay particular attention to the area around the centre bend and to areas around drilled holes.

2. Inspect bolts and nuts for signs of stress or bending – replace if in any doubt.

3. Inspect clamp for damage.

4. Inspect bolt seats in fuselage for signs of damage, wear or perishing.
   Repairs to the composite undercarriage beams must be referred to JABIRU AIRCRAFT Pty Ltd or our local approved agent.

6.3.4 MAIN WHEEL FAIRING REMOVAL AND INSTALLATION

1. Remove the machine screws around the join of the inner and outer sections of the fairing.

2. Remove the bolt on the outside of the fairing.

3. Remove the machine screws (2 OFF) on the inboard side of the leg.

4. Reverse the preceding steps for installation.

6.3.5 MAIN GEAR TOP FAIRING REMOVAL AND INSTALLATION

The fairing at the top of the main undercarriage leg is removed by removing the securing screws.

To install, reverse this procedure.

6.4 MAIN WHEEL

Refer to Figure 12

6.4.1 MAIN WHEEL REMOVAL

1. Jack aircraft as outlined in Section 3 above.

2. Remove speed fairing, if installed, in accordance with paragraph 6.3.4.

3. Remove outboard brake pad plate.

4. Remove lock bolt/nut through centre of axle and spacer.

5. Remove lock spacer.

6. Pull wheel from axle.

6.4.2 MAIN WHEEL DISASSEMBLY

1. Deflate tyre and break tyre beads loose from tyre rims.

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 bearing are “press-fit” in the wheel hub and should not be removed unless a new part is to be installed.

6.4.3 MAIN WHEEL INSPECTION, ASSEMBLY AND REPAIR

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.

5. Replace bearings.

6. Apply automotive wheel rim lubricant to the bead areas of the rim halves.

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 value specified in Table 3.

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.

10. Inflate tyre to seat tyre beads, then adjust to correct tyre pressure – Refer Aircraft Specifications above.

6.4.4 MAIN WHEEL INSTALLATION

1. Lightly coat axle with “Anti Sieze” or a Water Proof grease.

2. Place wheel assembly on axle.

3. Install spacer and lock bolt/nut through centre of axle.

4. Place outboard brake pad plate and springs in position and secure with bolts/nuts/washers.

5. Reconnect flexible brake line.

6. Refill brake master cylinder with fresh brake fluid.

7. Bleed brakes – Refer to Section 7.8.5.

8. Install speed fairing (if used) as outlined in Paragraph 7.3.4.

6.4.5 MAIN WHEEL STUB AXLE REMOVAL

1. Remove speed fairing (if installed) in accordance with Paragraph 7.3.4.

2. Remove wheel in accordance with Paragraph 5.4.1.

3. Disconnect flexible brake hose and drain brake fluid.

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.

6.4.6 MAIN WHEEL STUB AXLE INSTALLATION

1. Secure axle and inboard brake plate to composite leg, making sure that any wheel alignment shims are installed in their original position.

2. Install wheel assembly on axle in accordance with Paragraph 7.4.4.

6.4.7 MAIN WHEEL ALIGNMENT

Refer to Figure 13.

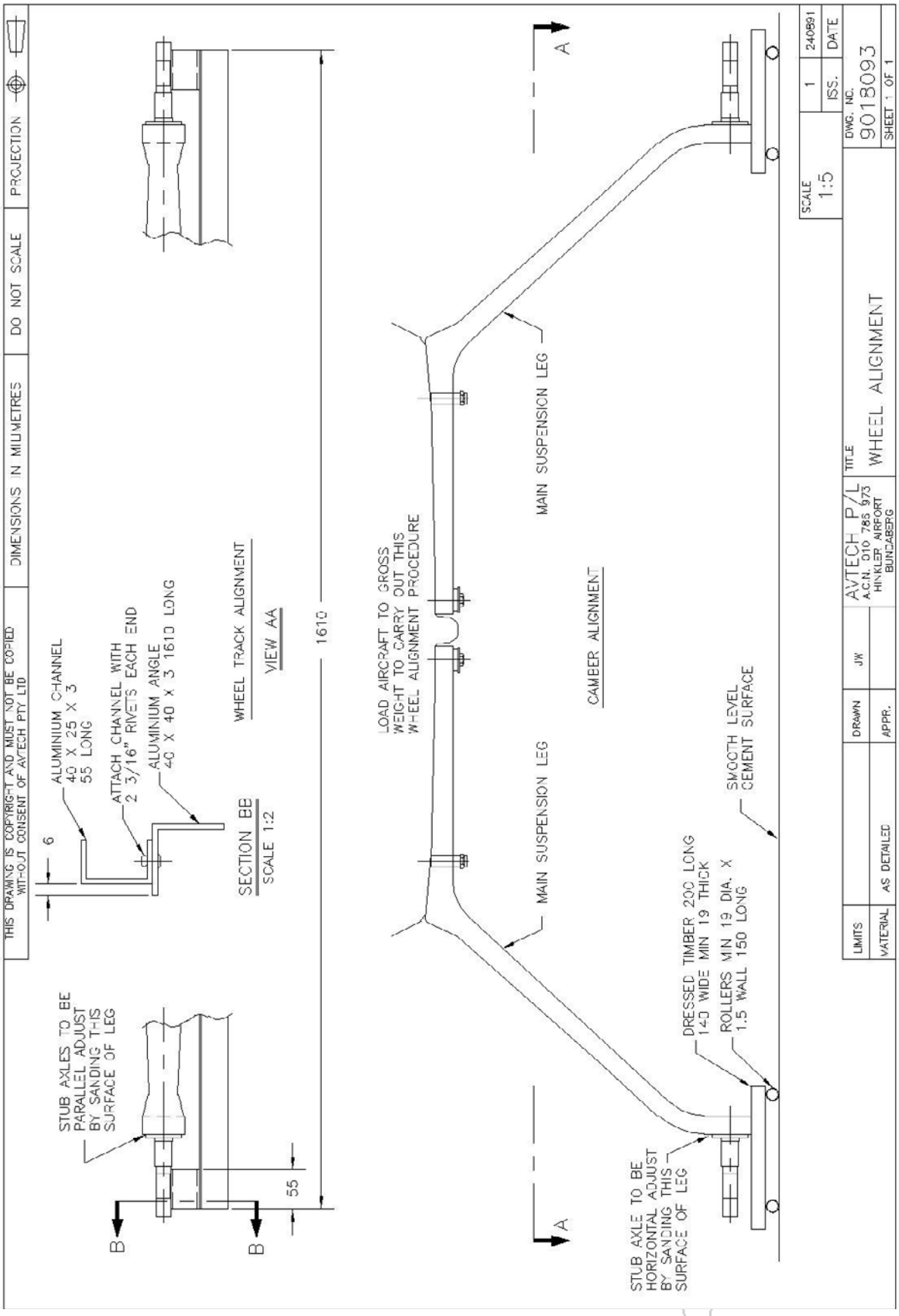


Figure 13. Main Wheel Alignment

6.4.8 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.

6.5 NOSE GEAR

The nose gear comprises a steerable nose wheel mounted on a welded steel assembly with an aluminium wheel yoke and a rubber spring system.

The steel tube is constrained within two Ertalite bushes mounted in an aluminium housing which is attached to the front of the firewall.

Nose wheel steering is achieved by connecting the rudder pedal assembly to the nose wheel steering link by push rods. The nosewheel is centred by springs.

A nose wheel speed fairing (wheel spat) is standard equipment.

Disassembly, inspection, repair and reassembly of the nose wheel assembly are described in separate paragraphs.

The wheel is in two halves which are joined by through-bolts to the wheel hub as shown in Figure 15. During assembly of the nose wheel, the through-bolts must be tightened evenly and torqued to the value specified in Table 3.

6.5.1 TROUBLE SHOOTING – NOSE LEG

Table 6. Trouble Shooting – Nose Leg.

Trouble	Probable Cause	Remedy
Nose wheel shimmy	Nose strut bolts loose	Tighten bolts
	Loose or worn steering link	Tighten, replace defective parts
	Nose wheel out of balance	Refer Paragraph 5.6.5
	Wheel bearings loose	Replace

6.5.2 NOSE GEAR REMOVAL AND INSTALLATION

See Figures 16 and 15.

1. Weight or tie-down tail of aircraft to raise nose wheel off floor.

2. Disconnect nose wheel steering pushrods and steering cross beam.

3. Unbolt steering cross beam.

4. Remove upper collar / steering yoke (dependant on aircraft S/No.) from the top of the leg.

5. Disconnect the nosewheel centring mechanism.

6. Pull the nose wheel strut assembly down from the bushes in the fuselage.

7. To install the nose gear, reverse the preceding steps.

6.5.3 NOSE GEAR INSPECTION AND REPAIR

1. Inspect steel tube and attachments for dents and straightness.

2. Inspect rubber spring assembly for damage or perishing of the rubber, or delamination of the rubber from the aluminium spacers between the rubber blocks.

3. Inspect aluminium wheel yoke for damage or bending.

4. Inspect bolts/nuts for torque – see torque values Table 3.

5. Repairs to the welded nose leg assembly beam must be referred to JABIRU AIRCRAFT Pty Ltd or our approved local agent.

6.5.4 NOSE WHEEL SPEED FAIRING REMOVAL AND INSTALLATION

1. Remove the machine screws around the forward and rear sections of the fairing and remove the front section.

2. Loosen the axle nuts and remove the rear section.

3. Reverse the preceding steps for installation.

6.6 NOSE WHEEL

6.6.1 NOSE WHEEL REMOVAL AND INSTALLATION

1. Weight or tie-down tail of aircraft to raise the nose wheel off the floor.

2. Remove nose wheel axle bolt.

3. Pull nose wheel assembly from yoke.

4. Reverse the preceding steps to install nose wheel. Tighten axle bolt.

6.6.2 NOSE WHEEL DISASSEMBLY

Completely deflate tyre and break tyre beads loose at wheel rim. Refer to Figure 15.

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.

6.6.3 NOSE WHEEL INSPECTION AND REPAIR

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. **DO NOT** clean with solvents as it will remove the packing.

4. Refit bearings.

6.6.4 NOSE WHEEL REASSEMBLY

1. Replace bearings in wheel hub.

2. Apply automotive wheel rim lubricant to the tyre bead faces on the inside of the wheel rims.

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 value specified in Table 3.

WARNING

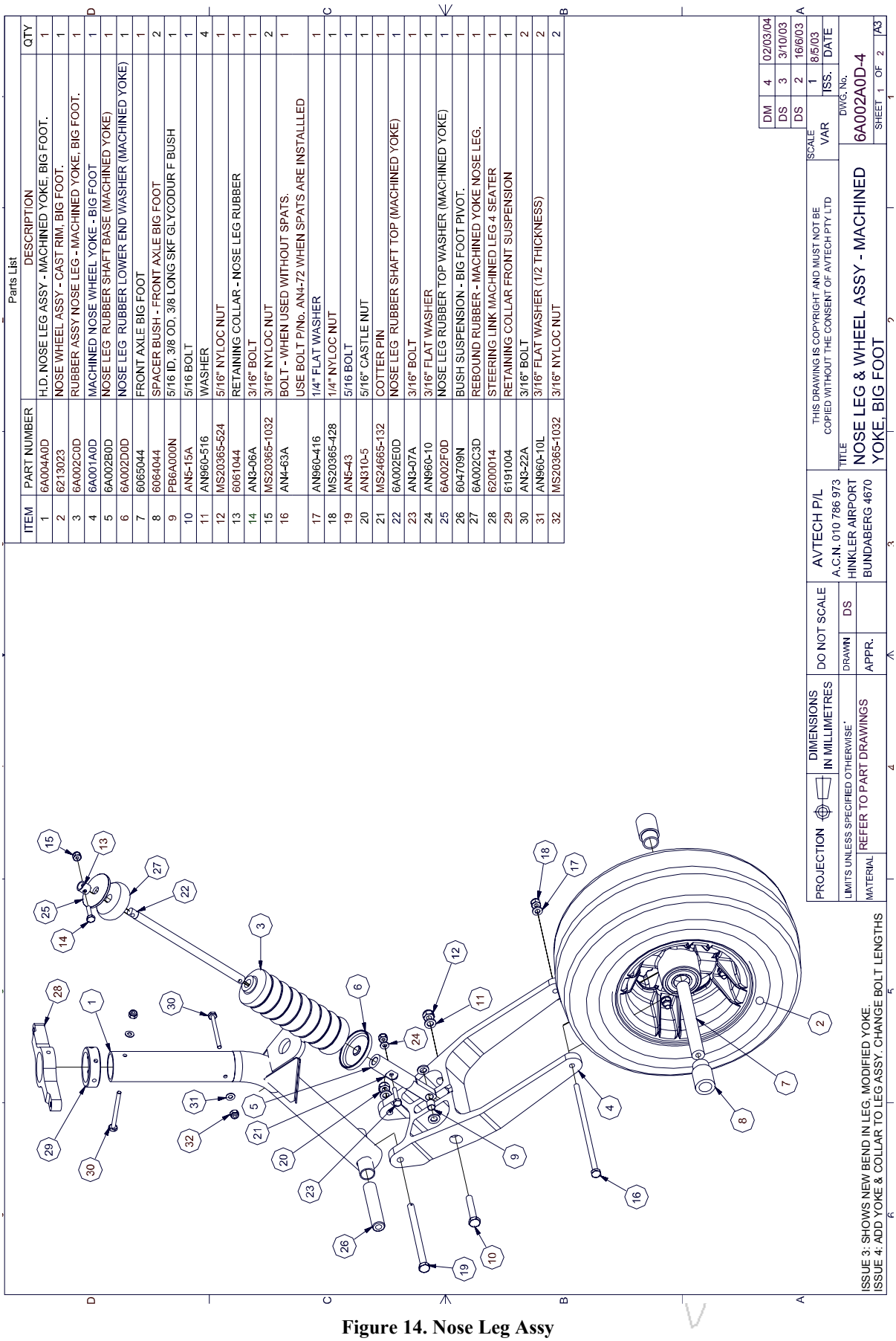
Ensure tube is not pinched between wheel halves during assembly. Uneven or improper torque of through-bolt nuts can cause failure of bolts with resultant wheel failure.

5. Insert through-bolts through brake disc and position disc on the inner wheel hub flange.

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

6.6.5 WHEEL BALANCING

Refer to Paragraph 6.4.8 for wheel balancing information.



Parts List

ITEM	PART NUMBER	DESCRIPTION	QTY
1	6A004A0D	H.D. NOSE LEG ASSY - MACHINED YOKE, BIG FOOT.	1
2	6213023	NOSE WHEEL ASSY - CAST RIM, BIG FOOT.	1
3	6A002C0D	RUBBER ASSY NOSE LEG - MACHINED YOKE, BIG FOOT.	1
4	6A001A0D	MACHINED NOSE WHEEL YOKE - BIG FOOT	1
5	6A002B0D	NOSE LEG RUBBER SHAFT BASE (MACHINED YOKE)	1
6	6A002D0D	NOSE LEG RUBBER LOWER END WASHER (MACHINED YOKE)	1
7	6065044	FRONT AXLE BIG FOOT	1
8	6064044	SPACER BUSH - FRONT AXLE BIG FOOT	2
9	PB6A000N	5/16 ID, 3/8 OD, 3/8 LONG SKF GLYCODUR F BUSH	1
10	AN5-15A	5/16 BOLT	1
11	AN960-516	WASHER	4
12	MS20365-524	5/16" NYLOC NUT	1
13	6061044	RETAINING COLLAR - NOSE LEG RUBBER	1
14	AN3-06A	3/16" BOLT	1
15	MS20365-1032	3/16" NYLOC NUT	2
16	AN4-63A	BOLT - WHEN USED WITHOUT SPATS. USE BOLT P/No. AN4-72 WHEN SPATS ARE INSTALLED	1
17	AN960-416	1/4" FLAT WASHER	1
18	MS20365-428	1/4" NYLOC NUT	1
19	AN5-43	5/16 BOLT	1
20	AN310-5	5/16" CASTLE NUT	1
21	MS24665-132	COTTER PIN	1
22	6A002E0D	NOSE LEG RUBBER SHAFT TOP (MACHINED YOKE)	1
23	AN3-07A	3/16" BOLT	1
24	AN960-10	3/16" FLAT WASHER	1
25	6A002F0D	NOSE LEG RUBBER TOP WASHER (MACHINED YOKE)	1
26	604709N	BUSH SUSPENSION - BIG FOOT PIVOT.	1
27	6A002C3D	REBOUND RUBBER - MACHINED YOKE NOSE LEG.	1
28	6200014	STEERING LINK MACHINED LEG 4 SEATER	1
29	6191004	RETAINING COLLAR FRONT SUSPENSION	1
30	AN3-22A	3/16" BOLT	2
31	AN960-10L	3/16" FLAT WASHER (1/2 THICKNESS)	2
32	MS20365-1032	3/16" NYLOC NUT	2

Figure 14. Nose Leg Assy

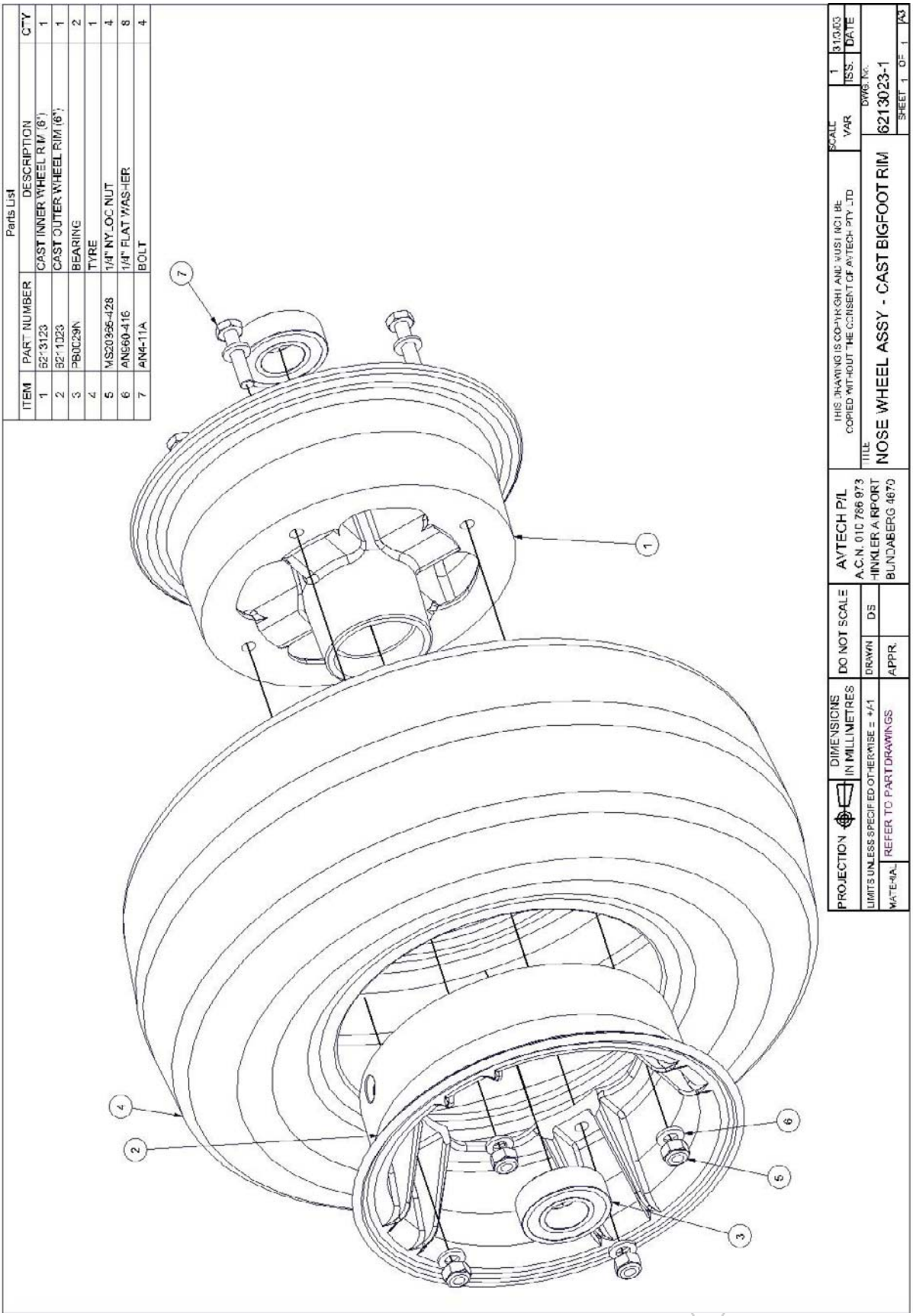


Figure 15. Nose Wheel Hub Assembly

6.7 NOSE WHEEL STEERING SYSTEM

6.7.1 5.7.1 STEERING CENTRING ASSEMBLY

The Nosewheel Centring Assembly consists of springs which are compressed when the nose leg is moved to the left or the right. Repair is limited to replacement of parts.

6.7.2 NOSE WHEEL STEERING ASSEMBLY

Refer to Figure 15.

The Nosewheel Steering Assembly comprises of two Steering push rods attaching the Rudder Pedals and the Steering Link.

Repair is limited to the replacement of parts.

6.8 BRAKE SYSTEM

The hydraulic brake system consists of one master cylinder located between the seats in the main longitudinal beam, flexible hoses connecting the master cylinder to each wheel brake cylinder and the single disc, floating-cylinder type brake assembly, located at each main landing gear wheel.

6.8.1 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.
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

6.8.2 BRAKE MASTER CYLINDER

The brake master cylinder, located between the seats on the front of the main longitudinal beam, is actuated by applying rearward pressure to the brake handle. A small reservoir is incorporated into the master cylinder for the fluid supply.

6.8.2.1 BRAKE MASTER CYLINDER REMOVAL & INSTALLATION

1. Remove the flexible hose from one wheel brake assembly and drain the hydraulic fluid from the brake system.

2. Unbolt pushrod & remove brake handle.

3. Disconnect flexible hose at master cylinder.

4. Unbolt master cylinder retaining bolts (2).

5. Plug or cap hydraulic fittings and hoses to prevent the entry of foreign material.

6. Reverse the preceding steps to install brake master cylinder, then fill and bleed brake system in accordance with Paragraph 6.8.5.

6.8.2.2 BRAKE MASTER CYLINDER REPAIR

Figure 19 may be used as a guide during disassembly, repair and reassembly of the brake master cylinder.

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.

6.8.3 HYDRAULIC BRAKE LINES

These lines are flexible hoses connected through a tee-piece.

Repair is limited to replacement.

6.8.4 WHEEL BRAKE ASSEMBLIES

The Wheel Brake Assemblies use a disc which is attached to the main wheel hub with through-bolts and a floating brake assembly (Refer to Figure 18 for caliper details, Figure 12 for installation of the caliper to the leg).

6.8.4.1 REMOVAL

The Wheel brake assemblies can be removed by disconnecting the brake hose and unbolting the brake cylinder from the backing plate. The brake disc is removed after the wheel is removed and disassembled. Refer to Figure 18 for disassembly of either wheel brake assembly.

6.8.4.2 WHEEL BRAKE INSPECTION AND REPAIR

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 bucket 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.

6. Inspect wheel brake disc for a minimum thickness of 2mm. If brake disc is below minimum thickness, install a new part.

6.8.4.3 WHEEL BRAKE INSTALLATION

1. Place brake cylinder assembly in position on backing plate.

2. Install bolts, springs, outboard pad and nuts/washers.

3. Reconnect flexible hose.

4. Fill master cylinder reservoir with brake fluid.

5. Bleed brakes – Refer to Paragraph 6.8.5.

6.8.4.4 BRAKE LINING INSTALLATION

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. Punch out all rivets securing the lining to the pad plate.

NOTE:
A replacement kit for brake pads and rivets is available from JABIRU

4. Clamp the flat side of an anvil in a vice.

5. 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 the anvil.

6. 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.

7. Realign the lining of the pad plate and install and set rivets in the remaining holes.

8. Replace the brake pad and refix with through-bolts and springs.

To replace inboard lining:

1. Remove wheel assembly – see Paragraph 6.4.1.

2. Remove stub axle – see Paragraph 6.4.5.

3. Remove brake cylinder backing plate.

4. Replace lining in accordance with steps 3-7 above.

5. Install axle and wheel assembly – see Paragraph 6.4.6.

6. Install outboard brake pad and refix with through-bolts and springs.

6.8.5 BRAKE SYSTEM BLEEDING

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 re torque. 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. When air is fully expelled, tighten bleed nipples & check fittings for leaks.

5. Repeat steps 1-4 for other side brake.

WARNING

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

6.8.6 BRAKE PAD ADJUSTMENT

Brake Pads may be adjusted by removing the Main Wheel Spats and tightening the brake pad attaching bolts and nuts until the wheel just rotates freely.

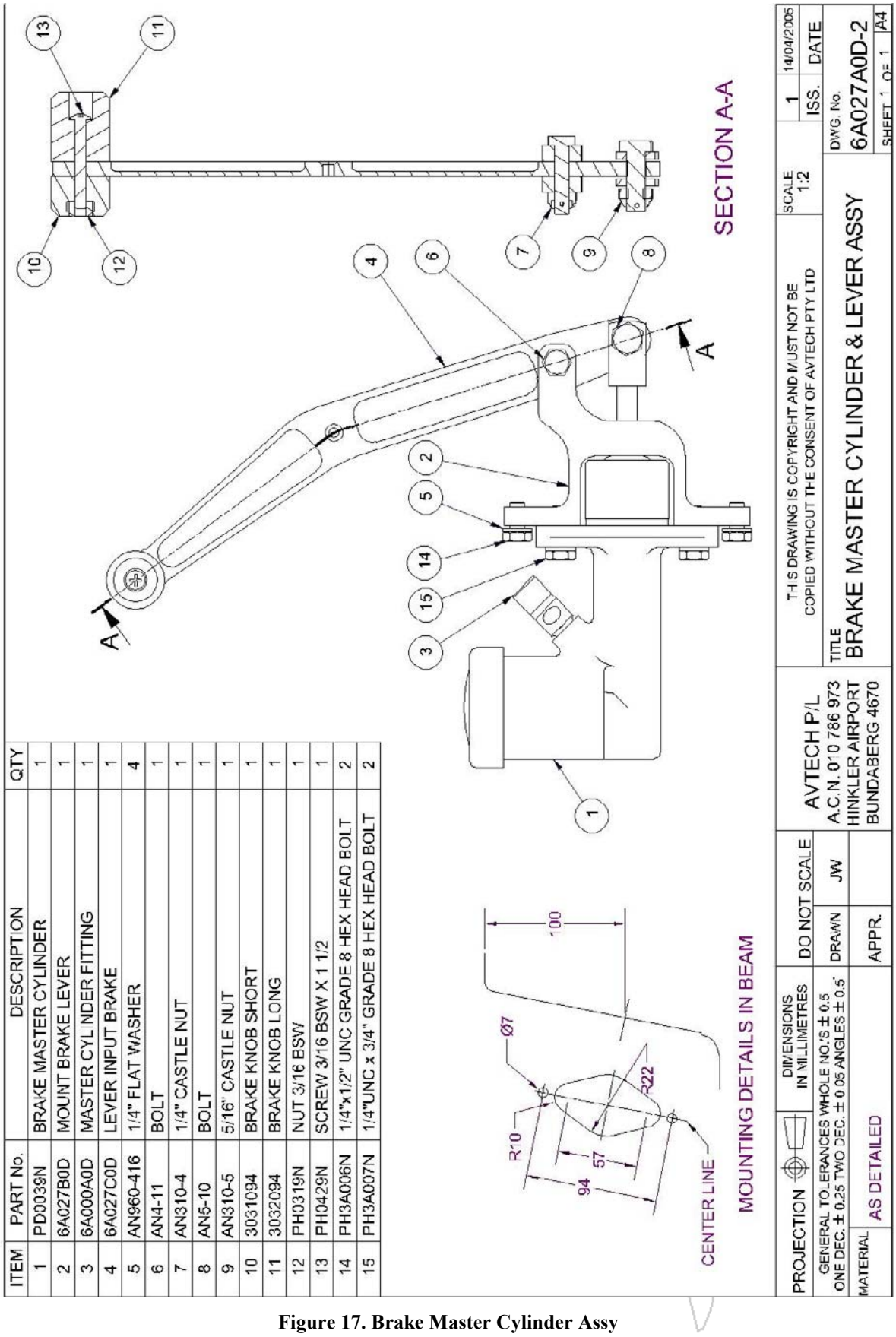
6.8.7 PARKING BRAKE

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 Paragraph 6.8.6.

2. Bleed air from brake system as described in Paragraph 5.8.5.

Figure 16. Brake Calliper Assy



ITEM	PART No.	DESCRIPTION	QTY
1	PD0039N	BRAKE MASTER CYLINDER	1
2	6A027B0D	MOUNT BRAKE LEVER	1
3	6A000A0D	MASTER CYLINDER FITTING	1
4	6A027C0D	LEVER INPUT BRAKE	1
5	AN960-416	1/4" FLAT WASHER	4
6	AN4-11	BOLT	1
7	AN310-4	1/4" CASTLE NUT	1
8	AN5-10	BOLT	1
9	AN310-5	5/16" CASTLE NUT	1
10	3031094	BRAKE KNOB SHORT	1
11	3032094	BRAKE KNOB LONG	1
12	PH0319N	NUT 3/16 BSW	1
13	PH0429N	SCREW 3/16 BSW X 1 1/2	1
14	PH3A006N	1/4"x1/2" UNC GRADE 8 HEX HEAD BOLT	2
15	PH3A007N	1/4"UNC x 3/4" GRADE 8 HEX HEAD BOLT	2

Figure 17. Brake Master Cylinder Assy

7 SECTION 7 - AILERON CONTROL SYSTEM

7.1 AILERON CONTROL SYSTEM

Refer to Figure 20.

The aileron control system is comprised of a control column and two enclosed push-pull cables fitted with spherical bearings.

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. See Figure 20.

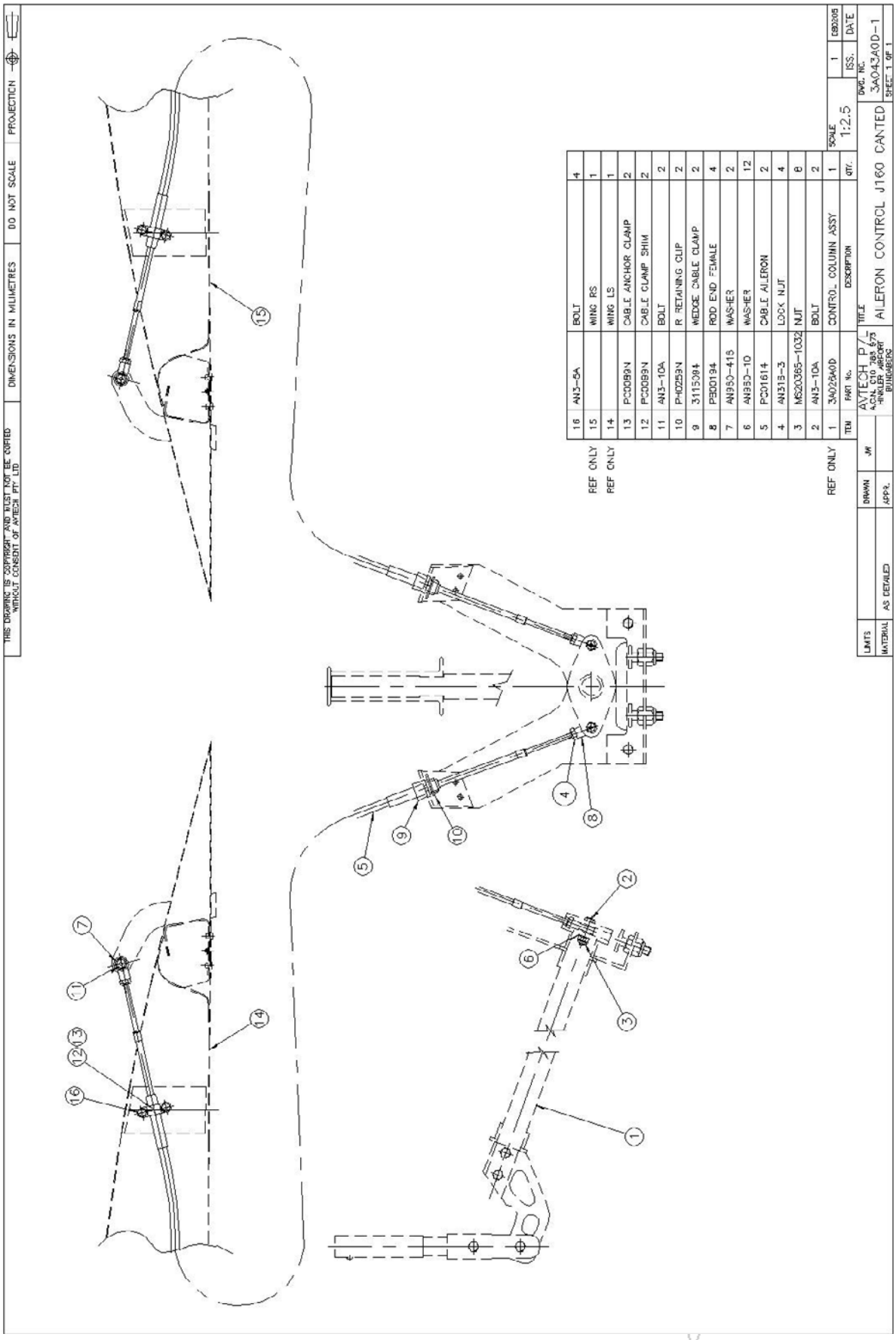


Figure 18. Aileron System Schematic

7.2 CONTROL COLUMN

Refer to Figure 21.

7.2.1 CONTROL COLUMN REMOVAL & INSTALLATION

The Control Column is a Primary Control and may not be removed or repaired without reference to JABIRU AIRCRAFT Pty Ltd or our local approved agent.

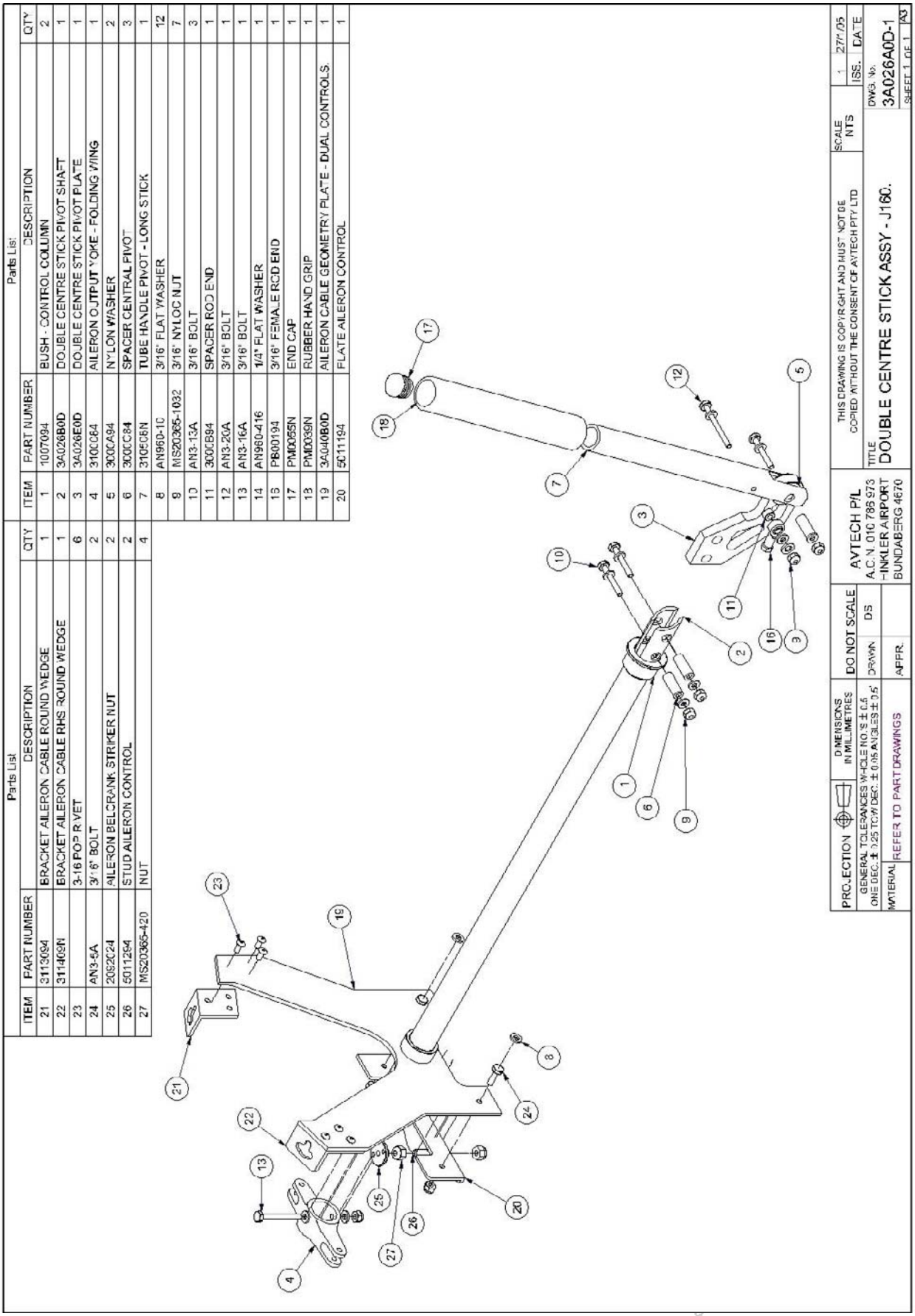


Figure 19. Control Column Assy

7.3 CONTROL CABLES

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.

7.3.1 CONTROL CABLE REMOVAL & INSTALLATION

Control Cables are Primary Control and may not be removed or repaired without reference to JABIRU AIRCRAFT Pty Ltd or our approved local agent.

7.4 AILERONS

Ailerons comprise a moulded and bonded monocoque structure embodying a composite control horn at the outboard end.

7.4.1 AILERON REMOVAL & INSTALLATION

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.

5. Reverse the preceding steps for installation.

7.4.2 AILERON INSPECTION & REPAIR

Inspect ailerons 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.

7.5 CONTROL RIGGING

1. 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.

2. Check UP travel on both ailerons using the Aileron Rigging Template (see Appendix 3).

3. Use the Aileron Control Stop adjustment (see Figure 22) to adjust the total aileron movement (ie. UP travel) and use cable adjustment as previously described to proportion UP and DOWN travel. The Aileron Control Stop should engage before the Aileron Arm hits the UP travel stop at the Wing Tip.

4. 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

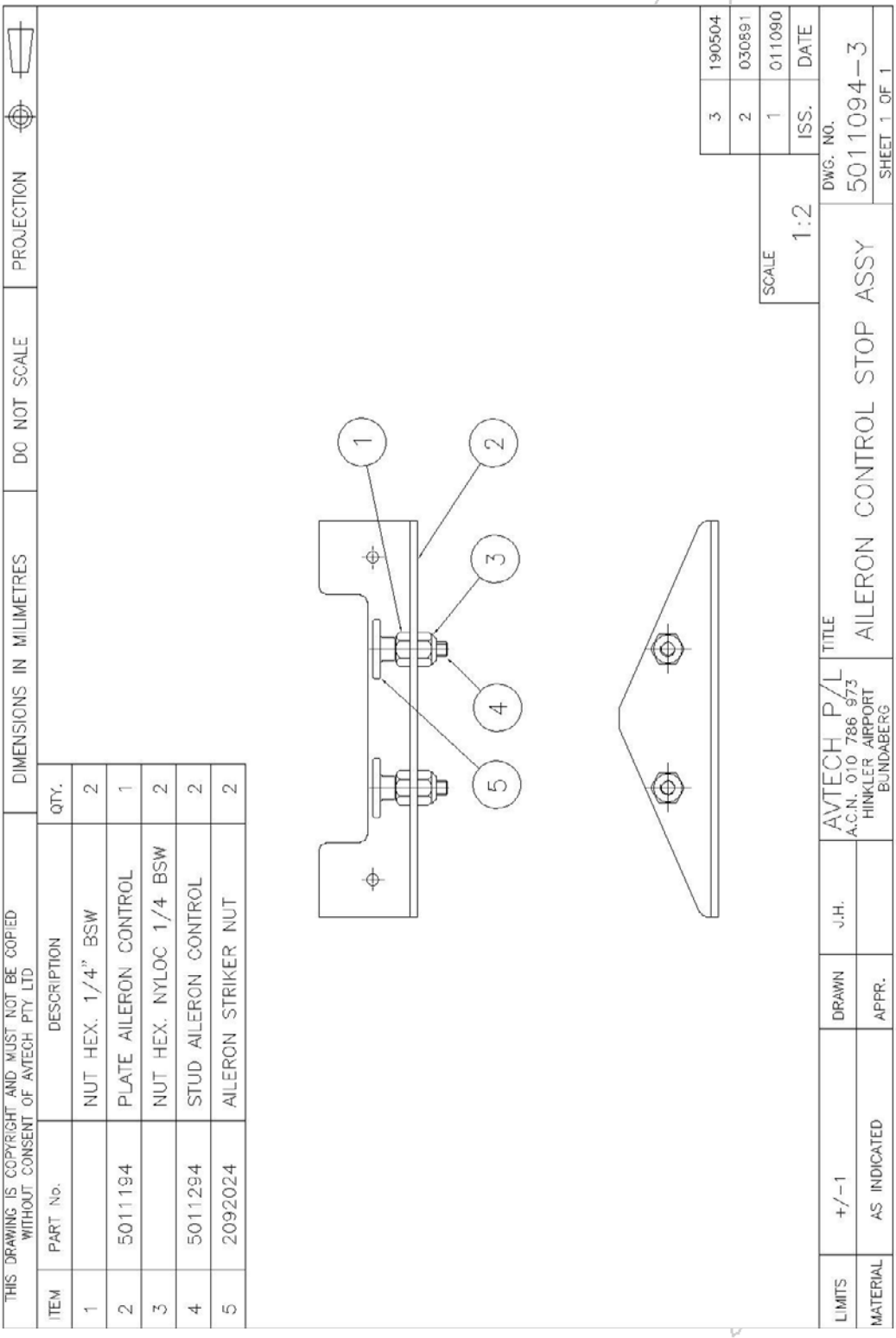


Figure 20. Aileron Stops

8 SECTION 8 - WING FLAP CONTROL SYSTEM

8.1 WING FLAP CONTROL SYSTEM

Refer to Figures 23 to 26.

The wing flap control system comprises a switch & position indicator mounted on the instrument panel, and a electronic linear actuator-driven common shaft assembly, with pushrods connecting to the flap control surface horns.

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.

8.1.1 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.

8.1.2 FLAP SWITCH ASSEMBLY

The flap position controlling switch uses a manual toggle switch with position indicator to control the flap deflection.

8.1.3 FLAP CROSS SHAFT ASSEMBLY

See Figure 26.

8.1.4 REMOVAL AND INSTALLATION

The Flap Controls are Primary Controls and may not be removed or repaired without reference to JABIRU AIRCRAFT Pty Ltd or our approved local agent.

8.1.5 FLAP CONTROL ROD

To remove, unbolt at both ends and remove. Reverse for installation.

8.2 FLAP

The flaps comprise a moulded and bonded monocoque structure embodying a composite control arm at the inboard end.

8.2.1 REMOVAL AND INSTALLATION

1. Unbolt rod end from flap control arm.

2. Remove each flap hinge bolt and spacer.

3. Remove Flap.

4. Reverse the preceding steps for installation. Replace all three nyloc nuts and torque in accordance with Table 3.

8.2.2 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.

8.2.3 FLAP RIGGING – J170-SP MODEL

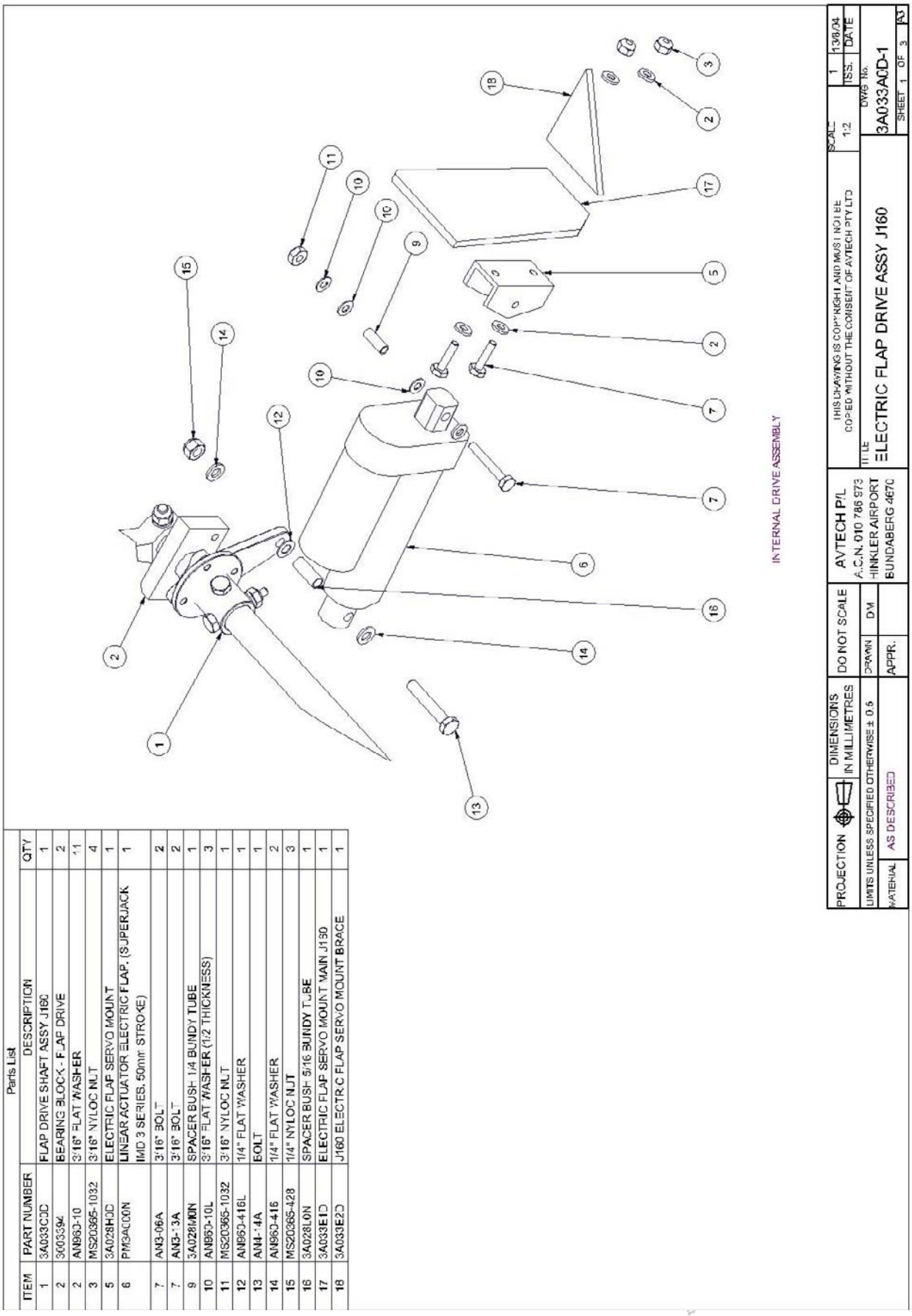
The J170-SP has a special requirement for it's wing flap rigging. To attain the required "clean" stall speed, the J170-SP must have it's flaps rigged using a special template, P/No. 8206Q5N.

8.2.4 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.



Parts List

ITEM	PART NUMBER	DESCRIPTION	QTY
1	3A033C0D	FLAP DRIVE SHAFT ASSY J160	1
2	3003394	BEARING BLOCK - FLAP DRIVE	2
2	AN960-10	3/16" FLAT WASHER	11
3	MS20365-1032	3/16" NYLOC NUT	4
5	3A028H0D	ELECTRIC FLAP SERVO MOUNT	1
6	PM3AC00N	LINEAR ACTUATOR ELECTRIC FLAP, (SUPERJACK IMD 3 SERIES, 50mm STROKE)	1
7	AN3-06A	3/16" BOLT	2
7	AN3-13A	3/16" BOLT	2
9	3A028M0N	SPACER BUSH 1/4 BUNDY TUBE	1
10	AN960-10L	3/16" FLAT WASHER (1/2 THICKNESS)	3
11	MS20365-1032	3/16" NYLOC NUT	1
12	AN960-416L	1/4" FLAT WASHER	1
13	AN4-4A	BOLT	1
14	AN960-416	1/4" FLAT WASHER	2
15	MS20365-428	1/4" NYLOC NUT	3
16	3A028L0N	SPACER BUSH 5/16 BUNDY TUBE	1
17	3A033E1D	ELECTRIC FLAP SERVO MOUNT MAIN J130	1
18	3A033E2D	J160 ELECTRIC FLAP SERVO MOUNT BRACE	1

Figure 21. Flap Controls – Sheet 1

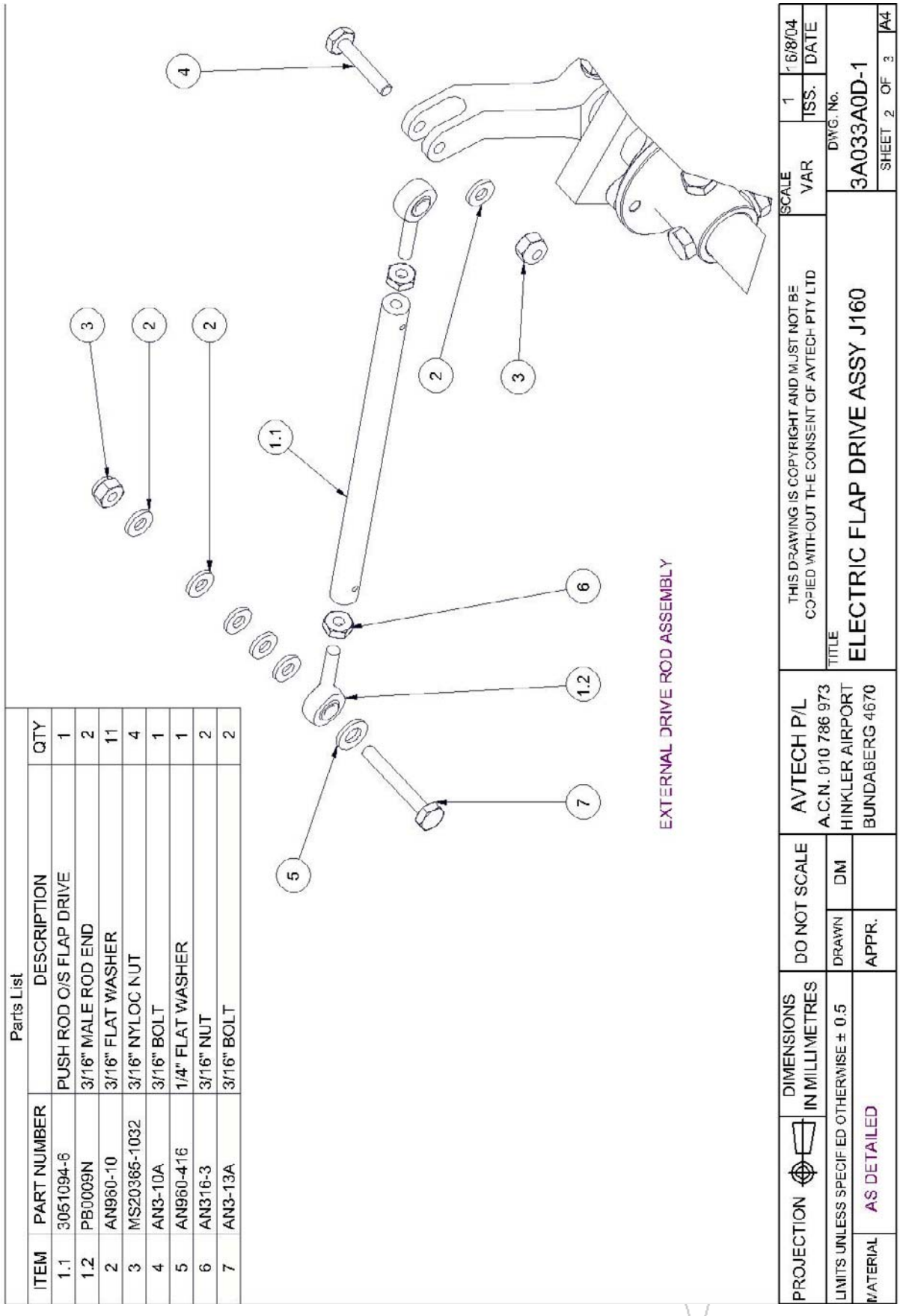


Figure 22. Flap Controls – Sheet 2

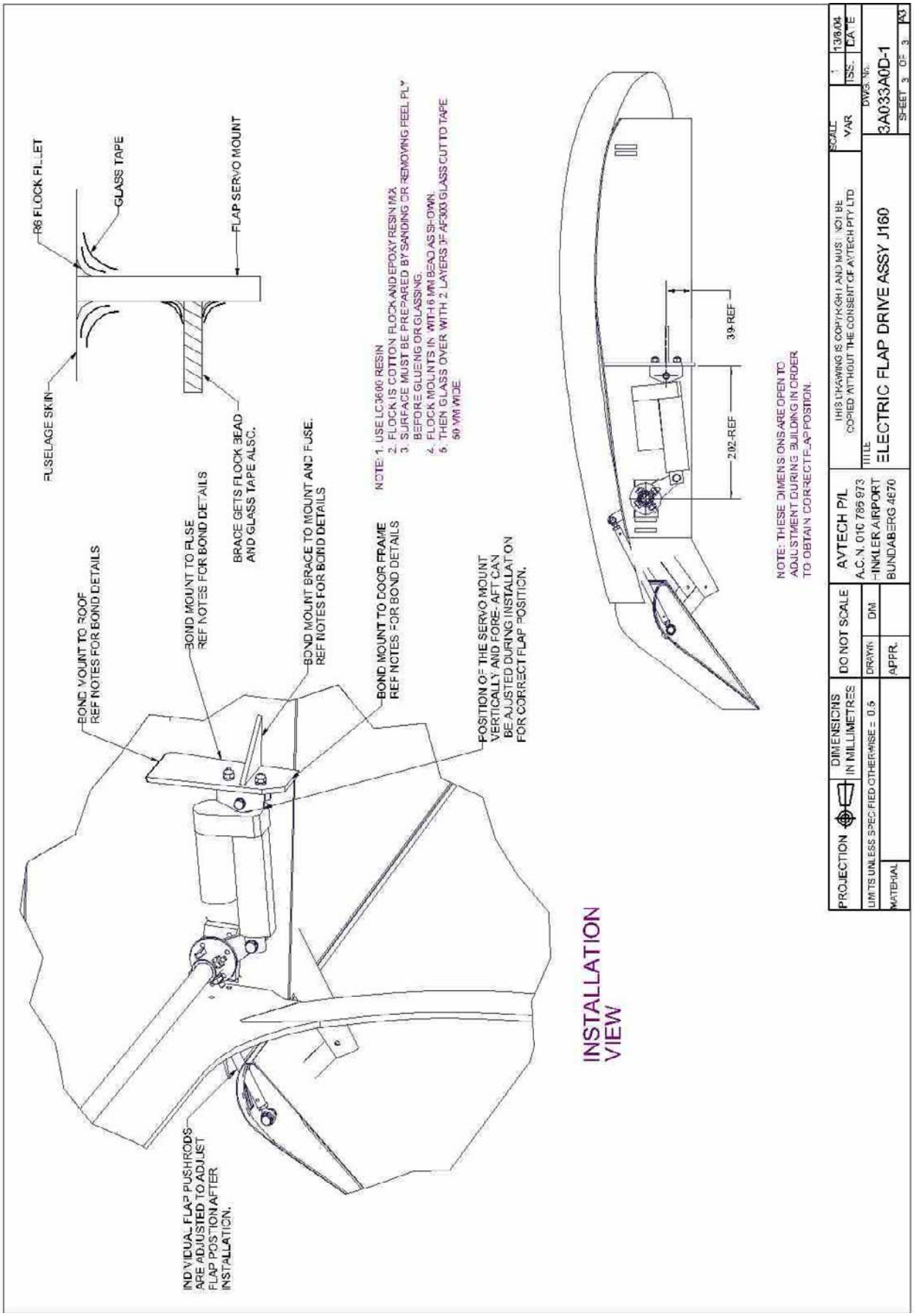


Figure 23. Flap Controls – Sheet 3

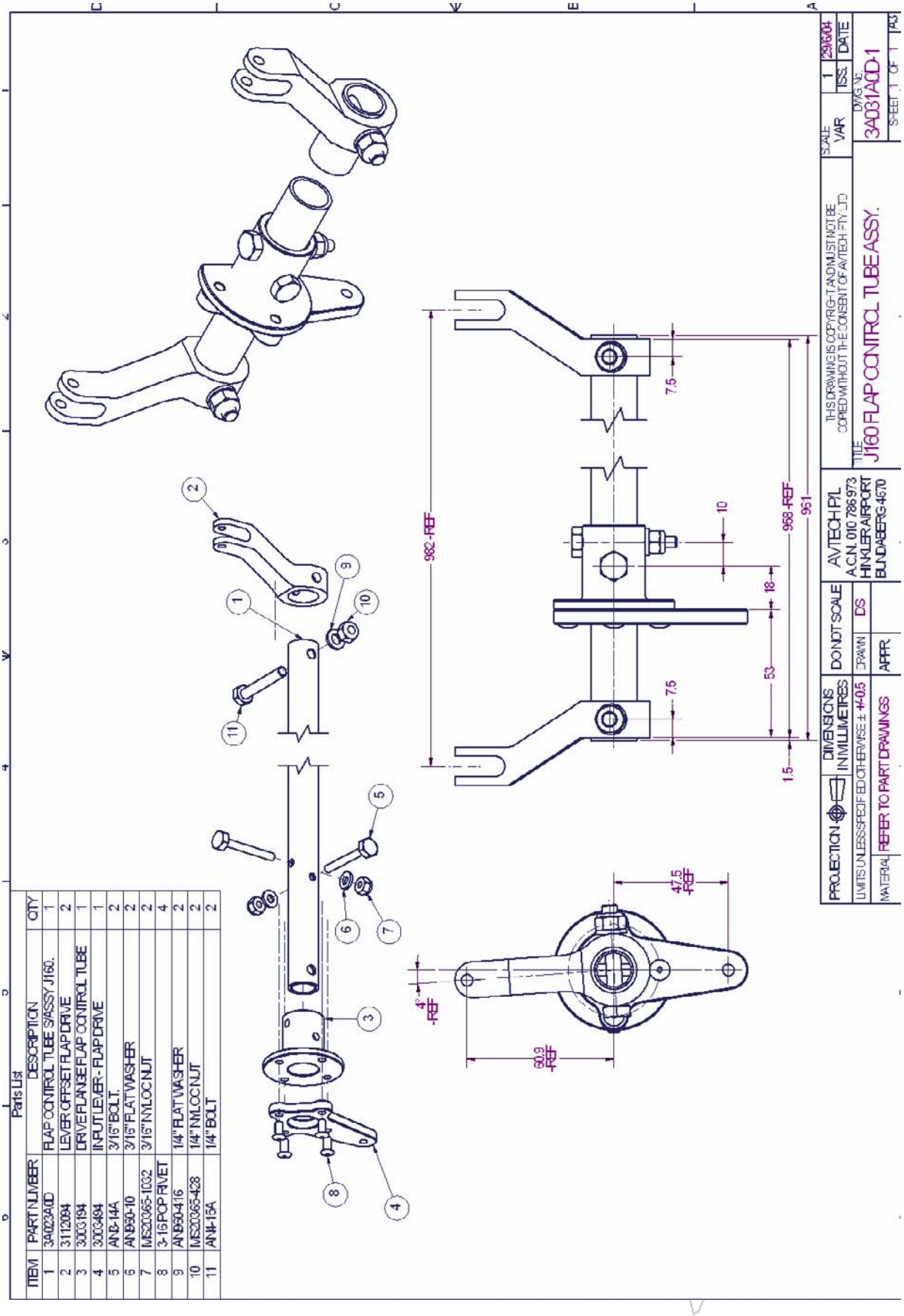


Figure 24. Flap Cross Tube Assy

SECTION 9 – ELEVATOR CONTROL SYSTEM

8.3 ELEVATOR CONTROL SYSTEM

See Figures 27, 28 and Figure 27.

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

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.

8.4 CONTROL COLUMN DESCRIPTION

Refer to Figure 21.

8.4.1 REMOVAL AND INSTALLATION

Refer to Paragraph 7.2.1.

8.5 ELEVATOR

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 Paragraph 9.6.

Note that the J170 models use a wider-span horizontal tail and elevator than the J160. This elevator is driven by the same control assembly as the J160.

8.5.1 REMOVAL AND INSTALLATION

1. Unbolt cable from control horn.

2. Unbolt trim linkage from control horn.

3. Loosen screws in hinge pin retainers and lift hinge pin retainers from hinge pins. It is not necessary to remove these parts.

4. Remove hinge pins.

5. Remove Elevator.

6. Reverse the preceding steps for installation.

8.5.2 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.

Repairs must be referred to JABIRU AIRCRAFT Pty Ltd or our approved local agent.

8.6 CONTROL CABLE AND ATTACHMENTS

8.6.1 REMOVAL AND INSTALLATION

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.

8.7 RIGGING

1. Refer to Figure 31

2. Using the factory anchor points, make sure each end of the cable is secure.

3. Set the full up travel first using the factory templates. Making sure the control column is hard back. Adjust the female ball ends in or out if adjustment is needed.

4. To establish the neutral position, align balance horn with horizontal stabiliser.

5. Adjust cable rod ends to achieve UP and DOWN travel using the Elevator Rigging Template (see Appendix 3).

6. **DO NOT** move the Cable Anchors – These are factory set.

7. Ensure lock nut is tight on rod ends and that cable is visible through hole in spherical bearing.

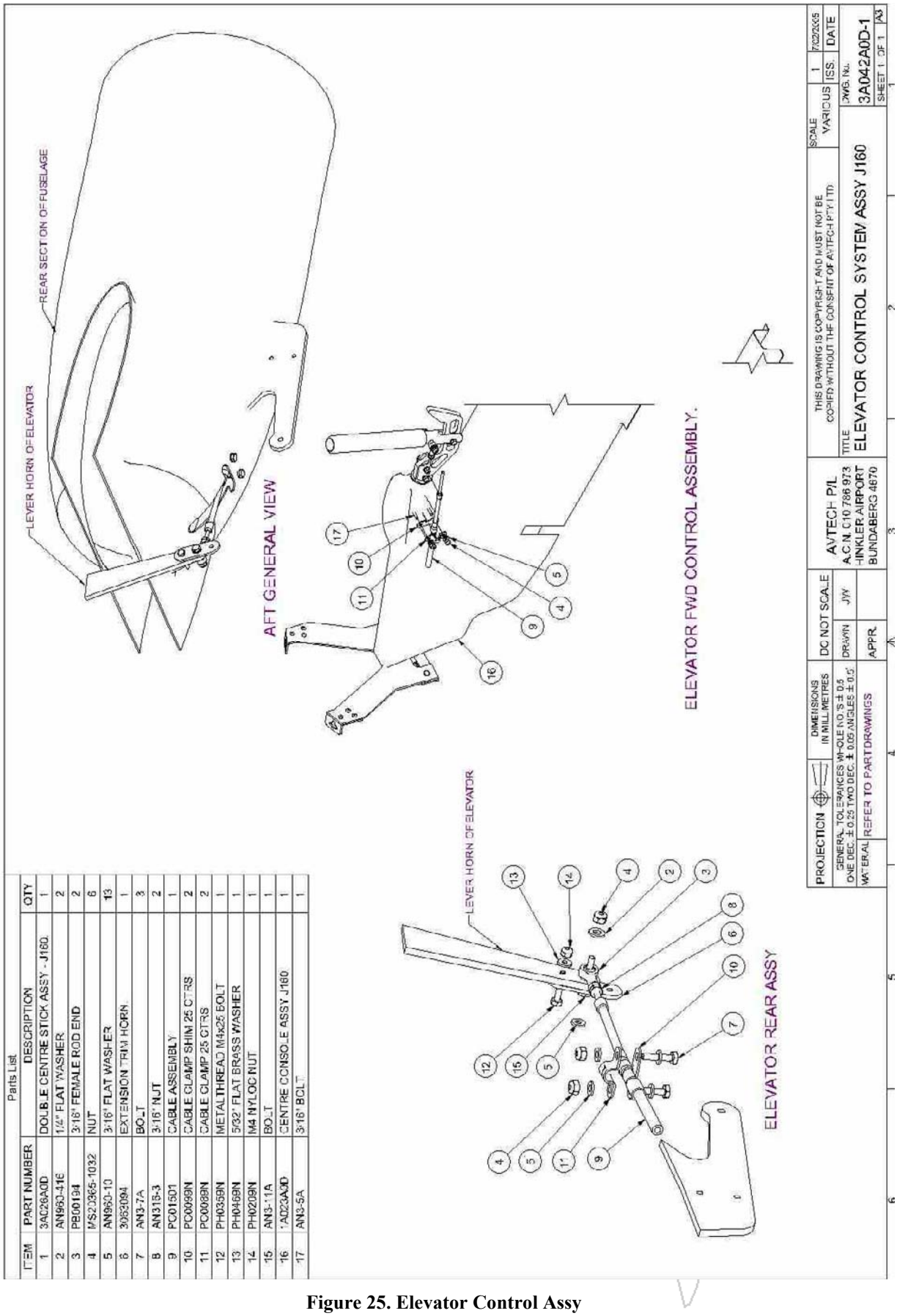


Figure 25. Elevator Control Assy

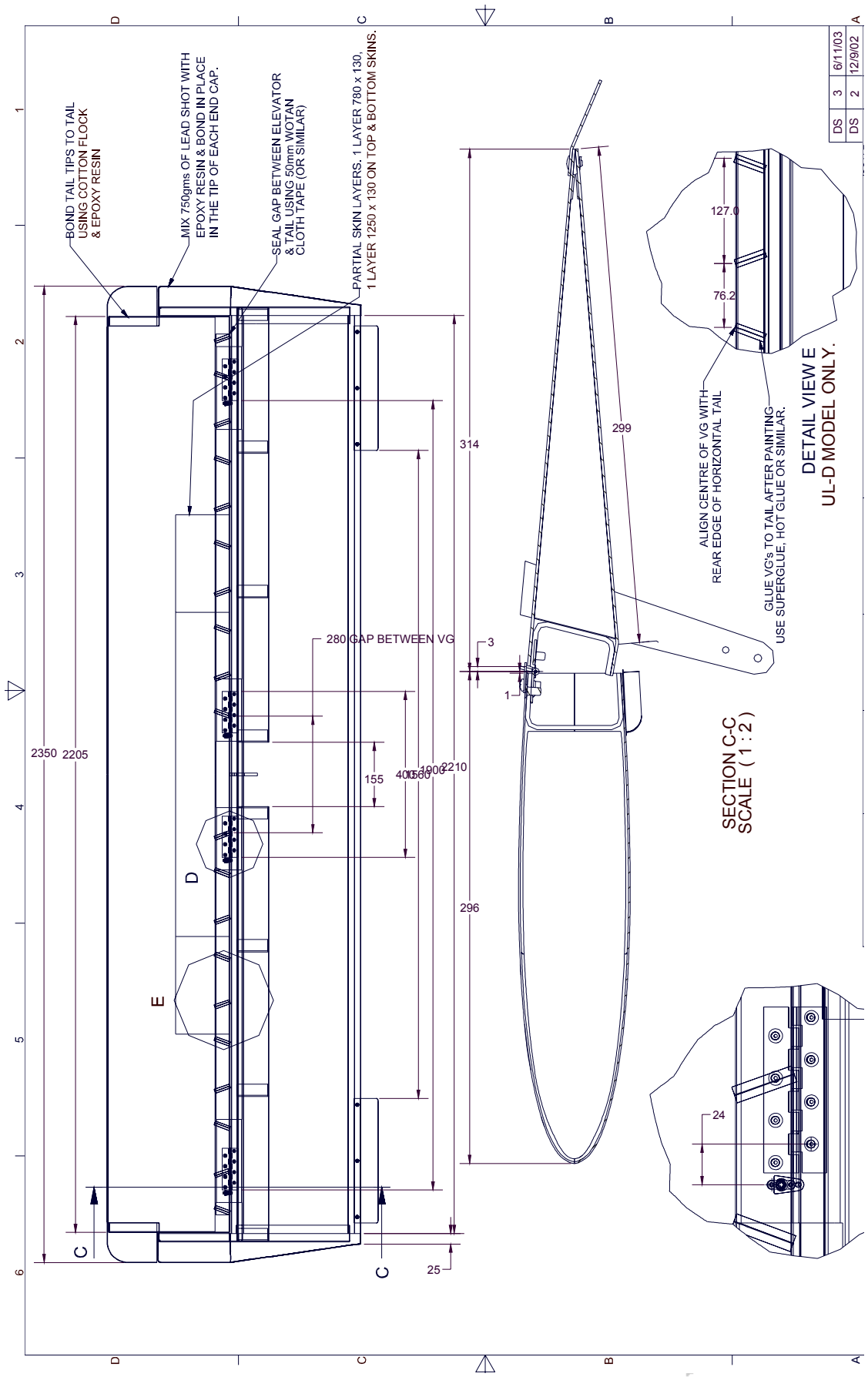


Figure 26. J160 Models - Horizontal Tail & Elevator Assy

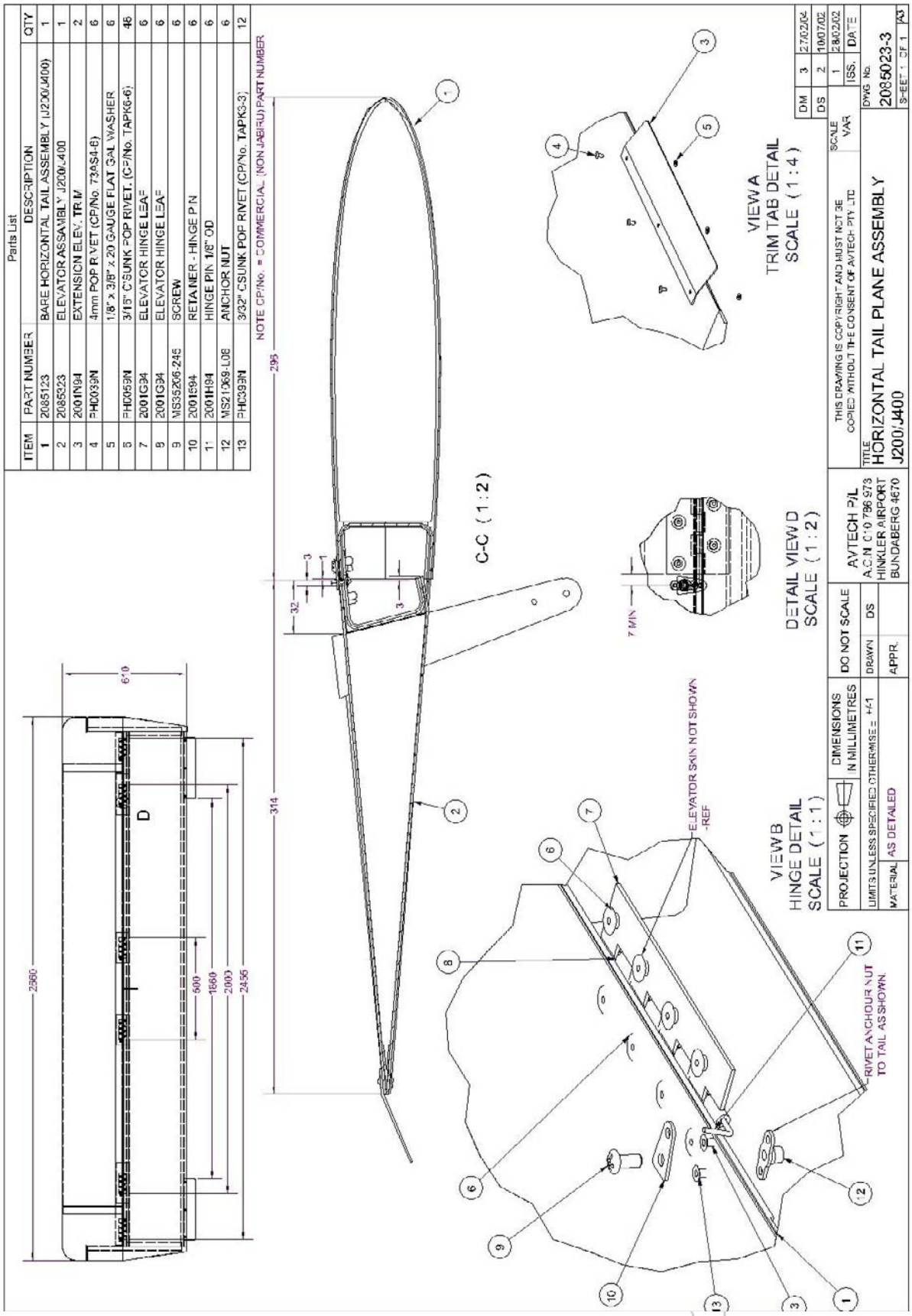


Figure 27. J170 Models - Horizontal Tail & Elevator Assy

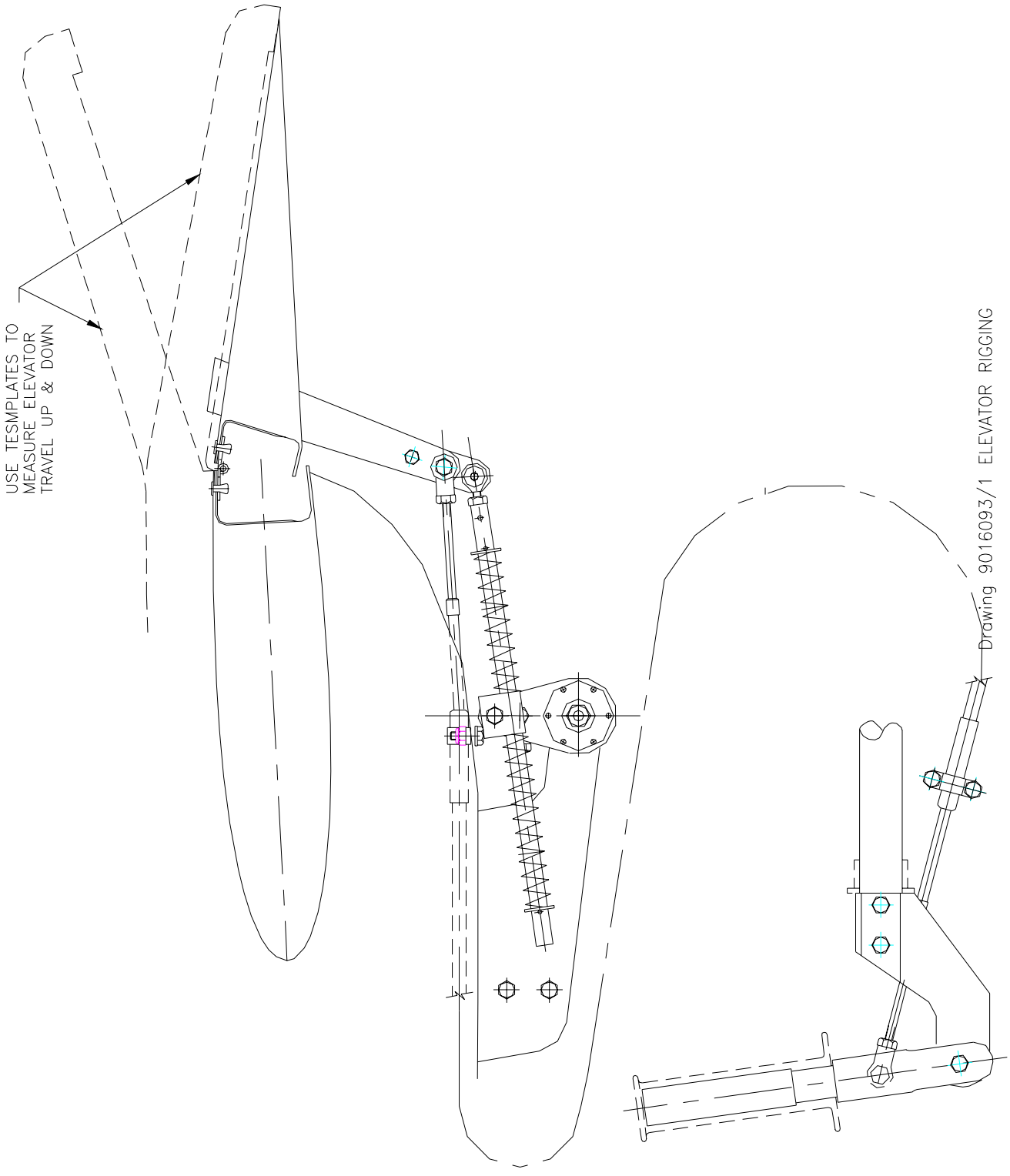


Figure 28. Elevator Travel Limits

8.8 ELEVATOR TRIM CONTROL SYSTEM

See Figure 33.

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.

8.8.1 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.
See Figure 32.

WARNING

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

8.8.2 TRIM HANDLE ASSEMBLY

See Figure 32.

8.8.3 CONTROL CABLE AND ATTACHMENTS

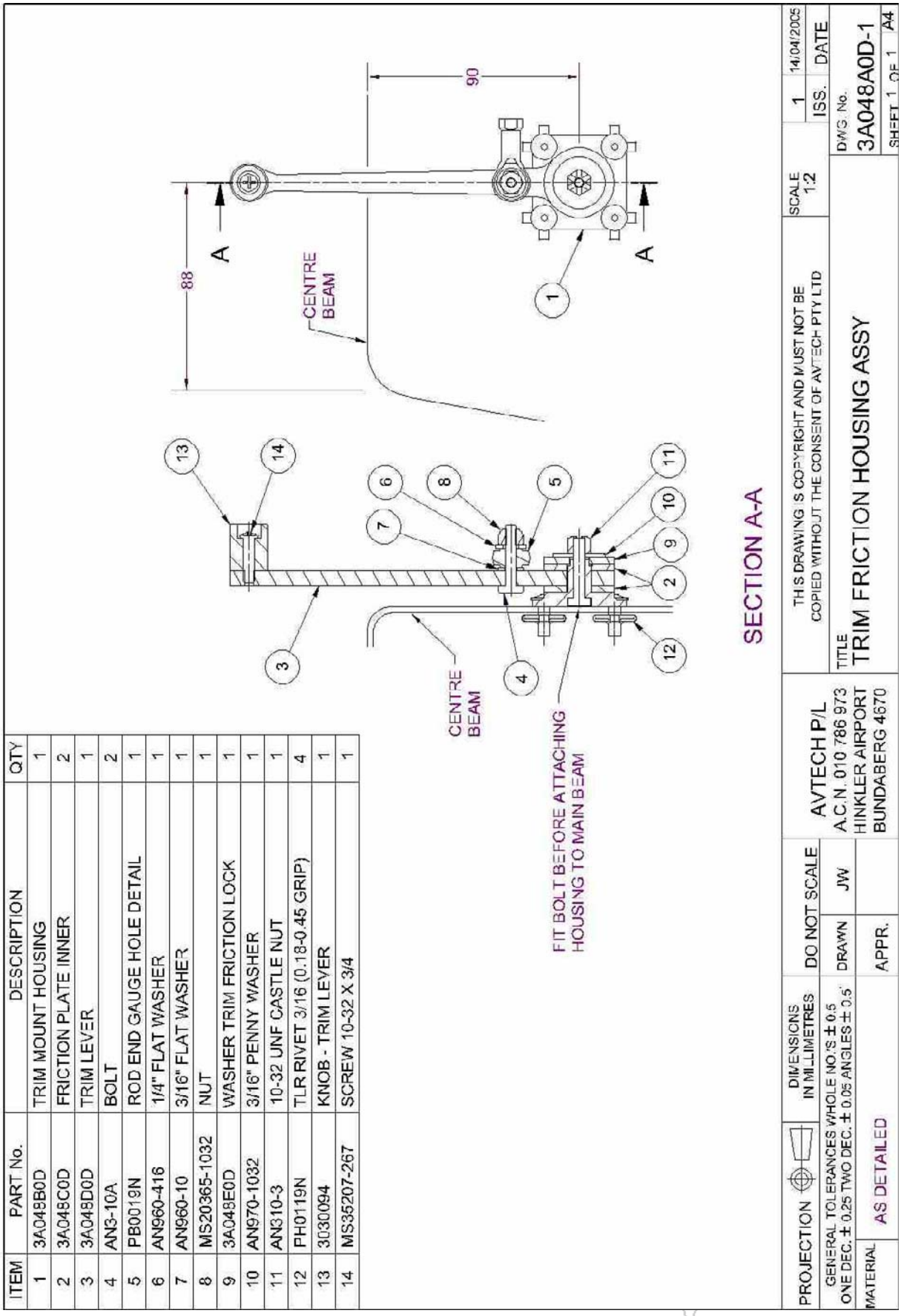
The control cable is of the enclosed push-pull type with the cable bolted directly to the Trim Horn Extension at the rear end and to the trim control lever at the lever end. To operate, outer covers of the cable must be clamped firmly at both ends.

8.8.4 REMOVAL AND INSTALLATION

The Trim 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.

8.8.5 INSPECTION AND REPAIR

Inspect Trim system generally for security and any signs of wear. Pay particular attention to the bearing blocks, friction plates, bearing, springs, cable and attachments.



ITEM	PART No.	DESCRIPTION	QTY
1	3A048B0D	TRIM MOUNT HOUSING	1
2	3A048C0D	FRICTION PLATE INNER	2
3	3A048D0D	TRIM LEVER	1
4	AN3-10A	BOLT	2
5	PB0019N	ROD END GAUGE HOLE DETAIL	1
6	AN960-416	1/4" FLAT WASHER	1
7	AN960-10	3/16" FLAT WASHER	1
8	MS20365-1032	NUT	1
9	3A048E0D	WASHER TRIM FRICTION LOCK	1
10	AN970-1032	3/16" PENNY WASHER	1
11	AN310-3	10-32 UNF CASTLE NUT	1
12	PH0119N	TLR RIVET 3/16 (0.18-0.45 GRIP)	4
13	3030094	KNOB - TRIM LEVER	1
14	MS35207-267	SCREW 10-32 X 3/4	1

Figure 29. Elevator Trim Handle Assy

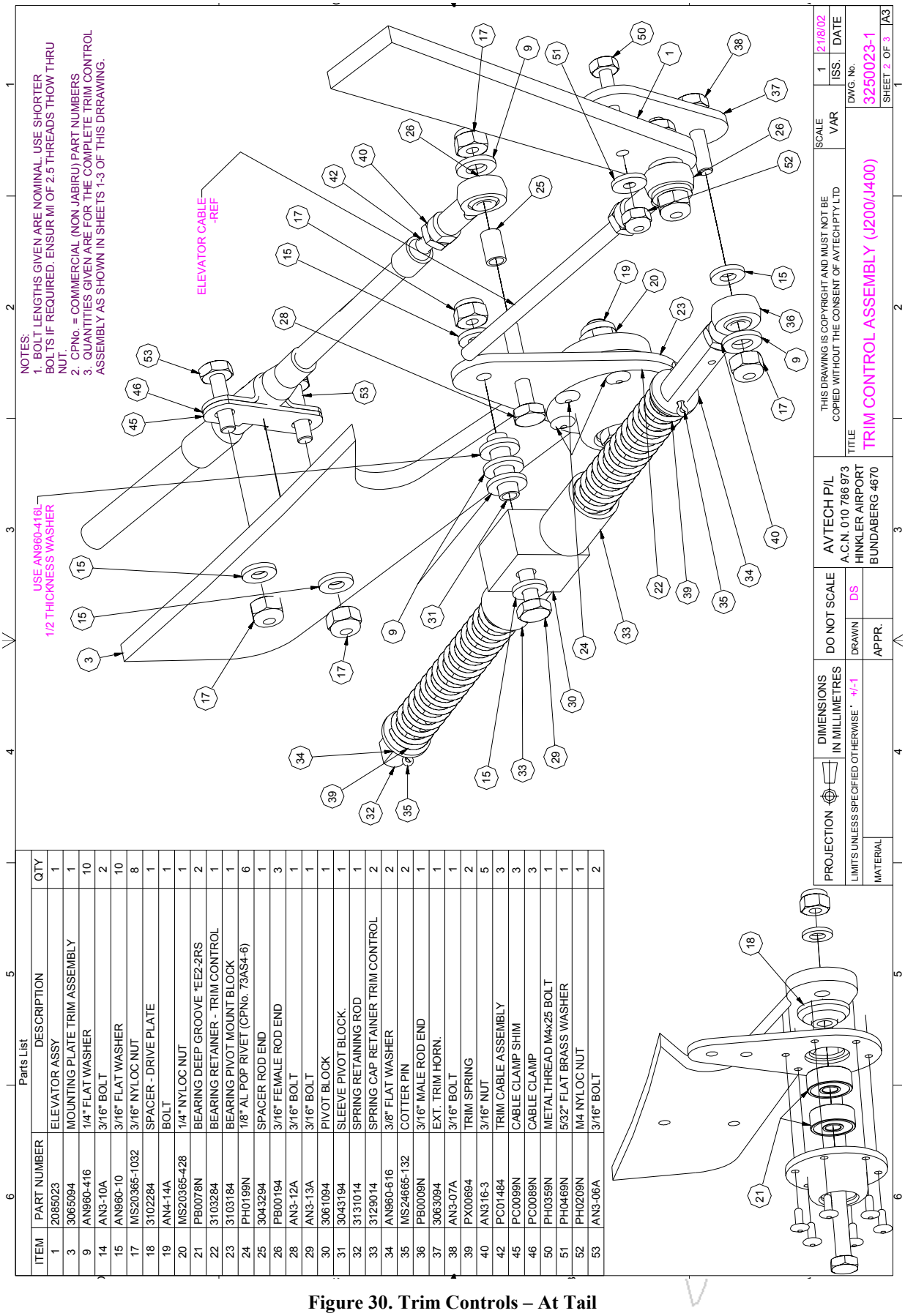


Figure 30. Trim Controls – At Tail

9 SECTION 10 – RUDDER CONTROL SYSTEM

9.1 RUDDER PEDAL SYSTEM

Refer to Figure 33.

Rudder control is maintained through the use of rudder pedals which also control nose wheel steering. The system is comprised of rudder pedals, two push rods, a centring mechanism and an enclosed push-pull cable.

9.1.1 REMOVAL AND INSTALLATION

1. Unbolt push-pull cable.
2. Unbolt both steering push rods.
3. Unbolt rudder pedal bearings.
4. Remove cover plates and nylon bearings.
5. Remove both pedal bars.
6. Reverse the preceding steps for installation.

9.1.2 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.

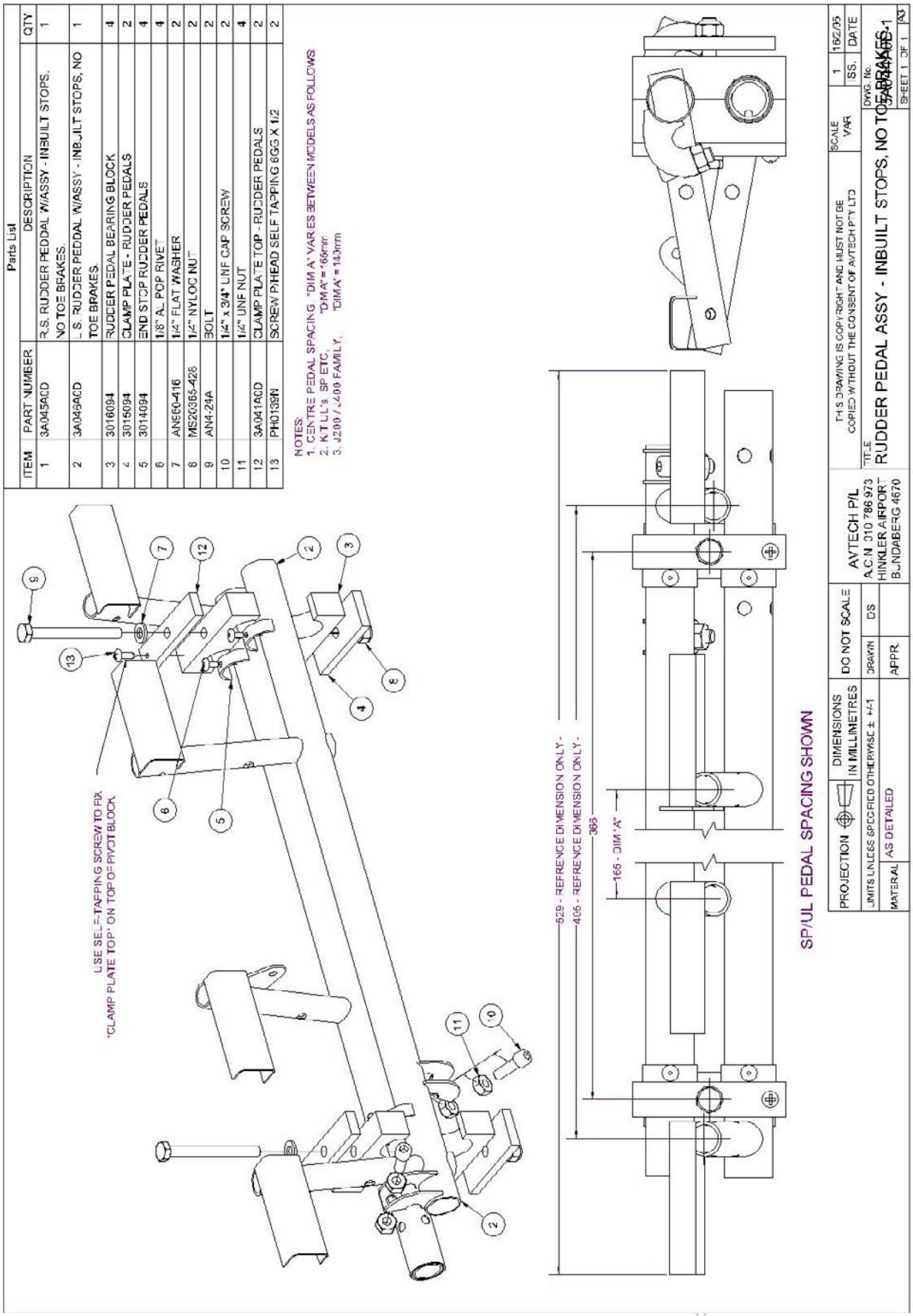


Figure 31. Rudder Pedal Assy

9.2 RUDDER

See Figures 37 and 38.

9.2.1 REMOVAL & INSTALLATION

1. Unbolt push-pull cable from rudder horn.

2. Loosen screws in hinge pin retainers & lift retainer from hinge pin. It is not necessary to remove these parts.

3. Remove hinge pins.

4. Remove rudder.

5. Reverse the preceding steps for installation.

9.2.2 INSPECTION & REPAIR

Inspect rudder 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.

9.3 CONTROL CABLE & ATTACHMENTS

The control cable is of the 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.

9.3.1 REMOVAL & INSTALLATION

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.

9.4 RIGGING

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. Scribe 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 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.

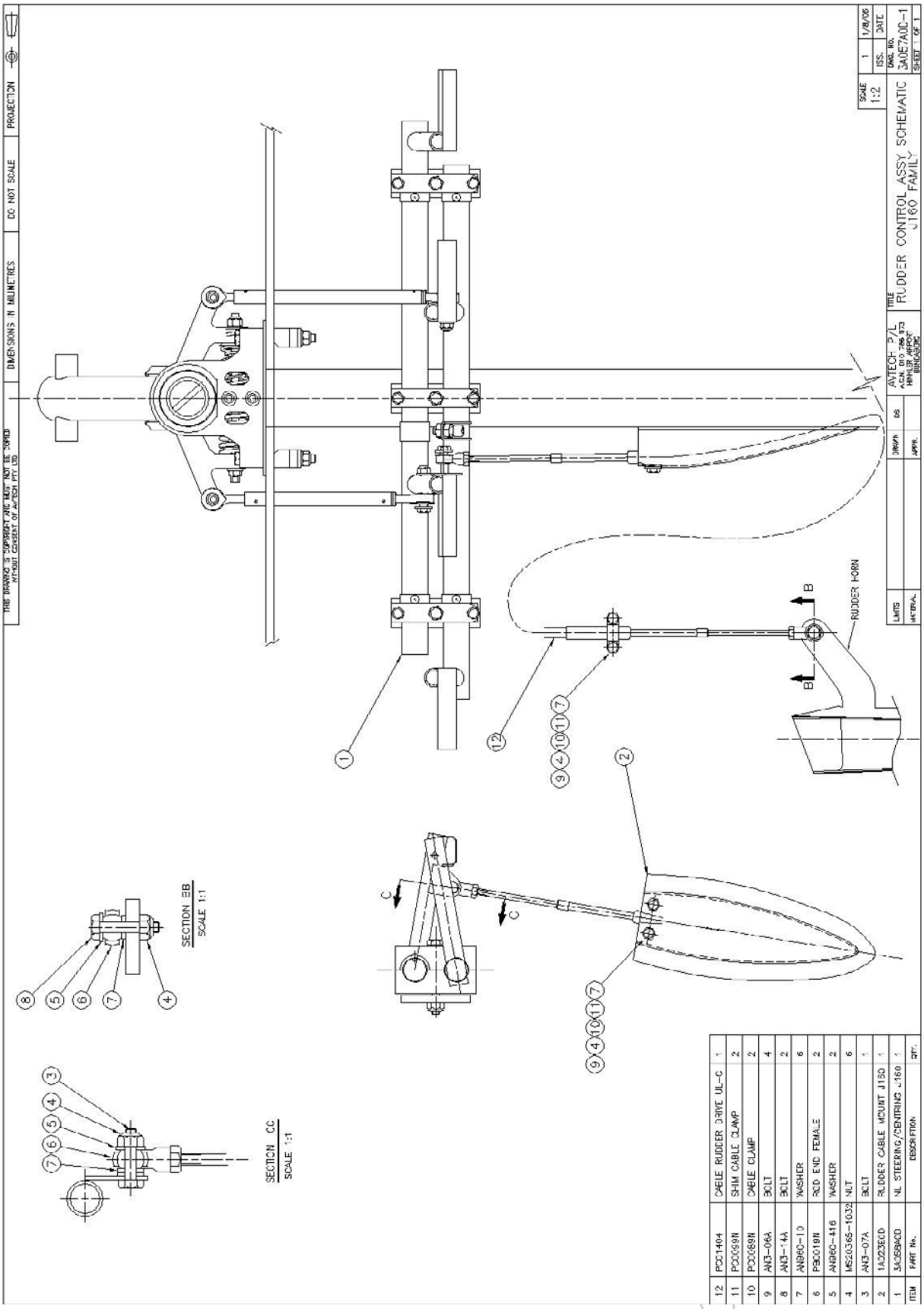


Figure 32. Rudder System Schematic

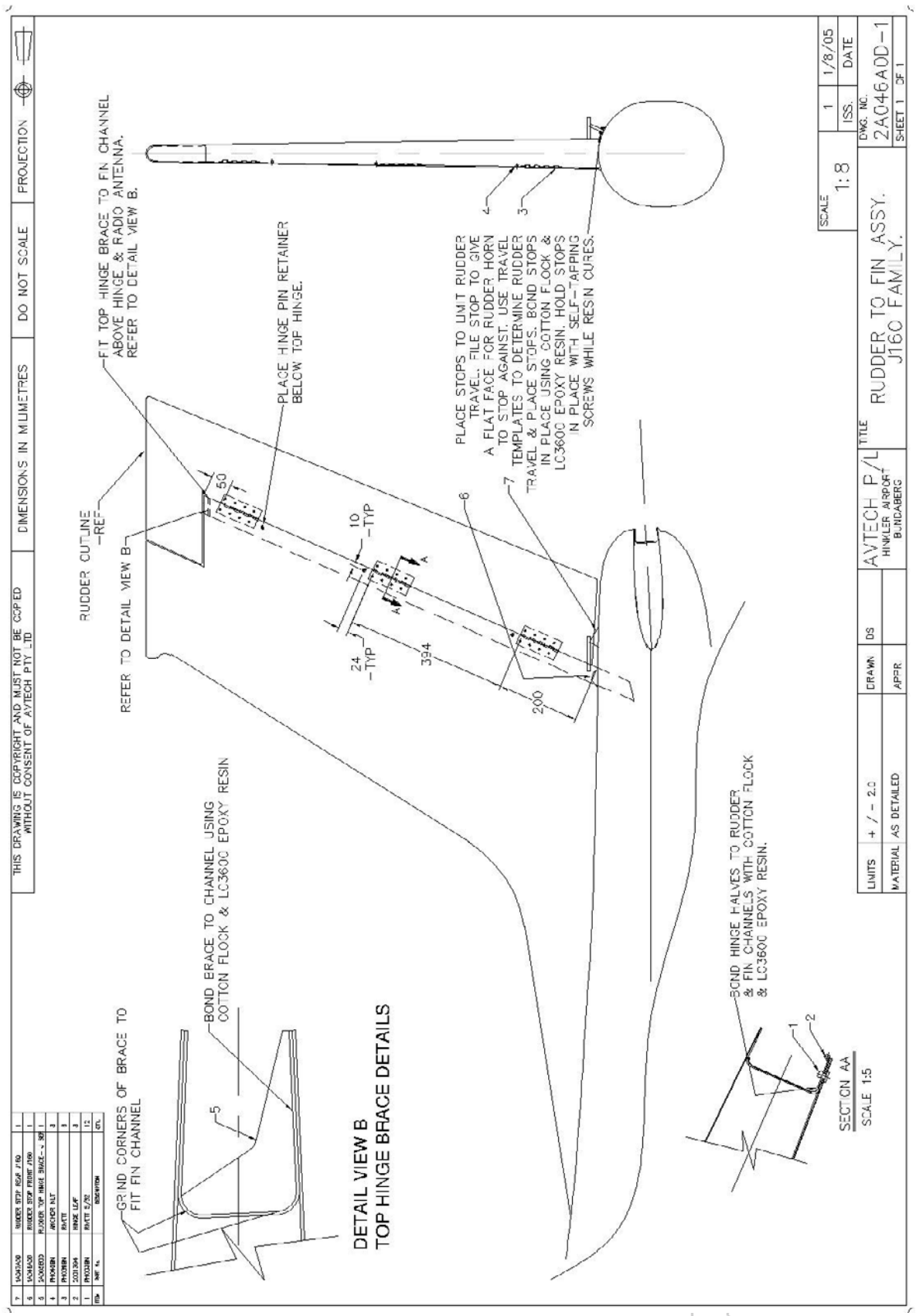


Figure 33. Rudder Installation

10 Section 11 – Engine & Engine Installation

10.1 ENGINE COWLS

The engine cowls comprise both an Upper and Lower composite structure.

The Upper Cowl is fitted with five locating Cam Locks, two at the front & three at the rear of the cowlings. The Lower Cowl is attached to the Fuselage with 8 machine screws mounting into anchor nuts.

10.1.1 ENGINE COWLS – REMOVAL & INSTALLATION

10.1.1.1 UPPER COWL

Refer to Figure 39.

1. Remove the Cam Locks from the front & rear of the cowling.

2. Remove Hinge Pin.

3. Grasping the cowl around the front nose, pull carefully upwards and forwards until the lower edge of the cowl clears the upper edge of the Spinner, then pull forward.

4. Remove the cowl.

5. Replace the cam locks in the cowling to ensure they are not misplaced.

NOTE:

Always ensure that the cowl is placed in a position where it can not 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 engine.

10.1.1.2 LOWER COWL

Refer to Figure 40.

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.

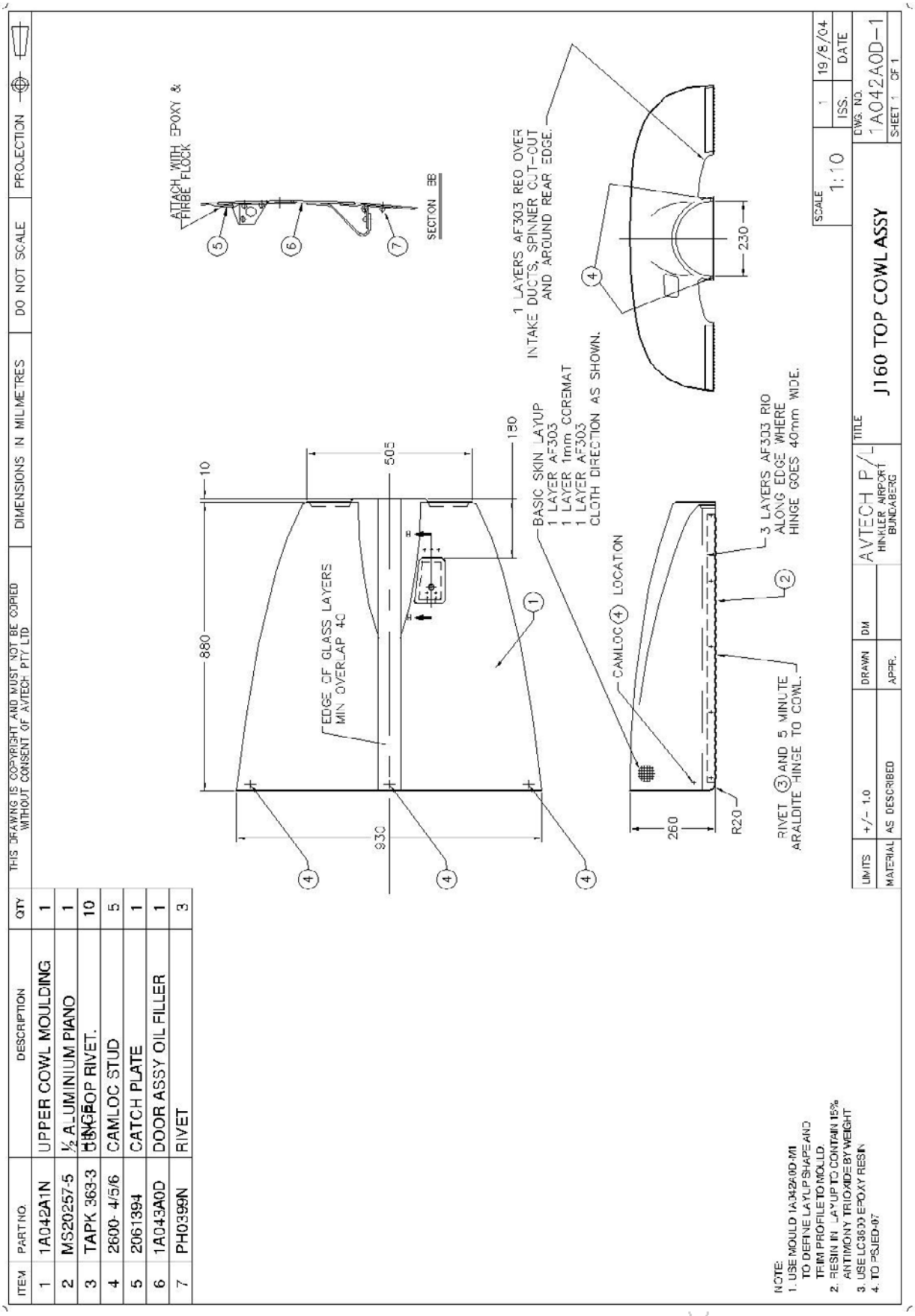


Figure 34. Upper Cowl Assy

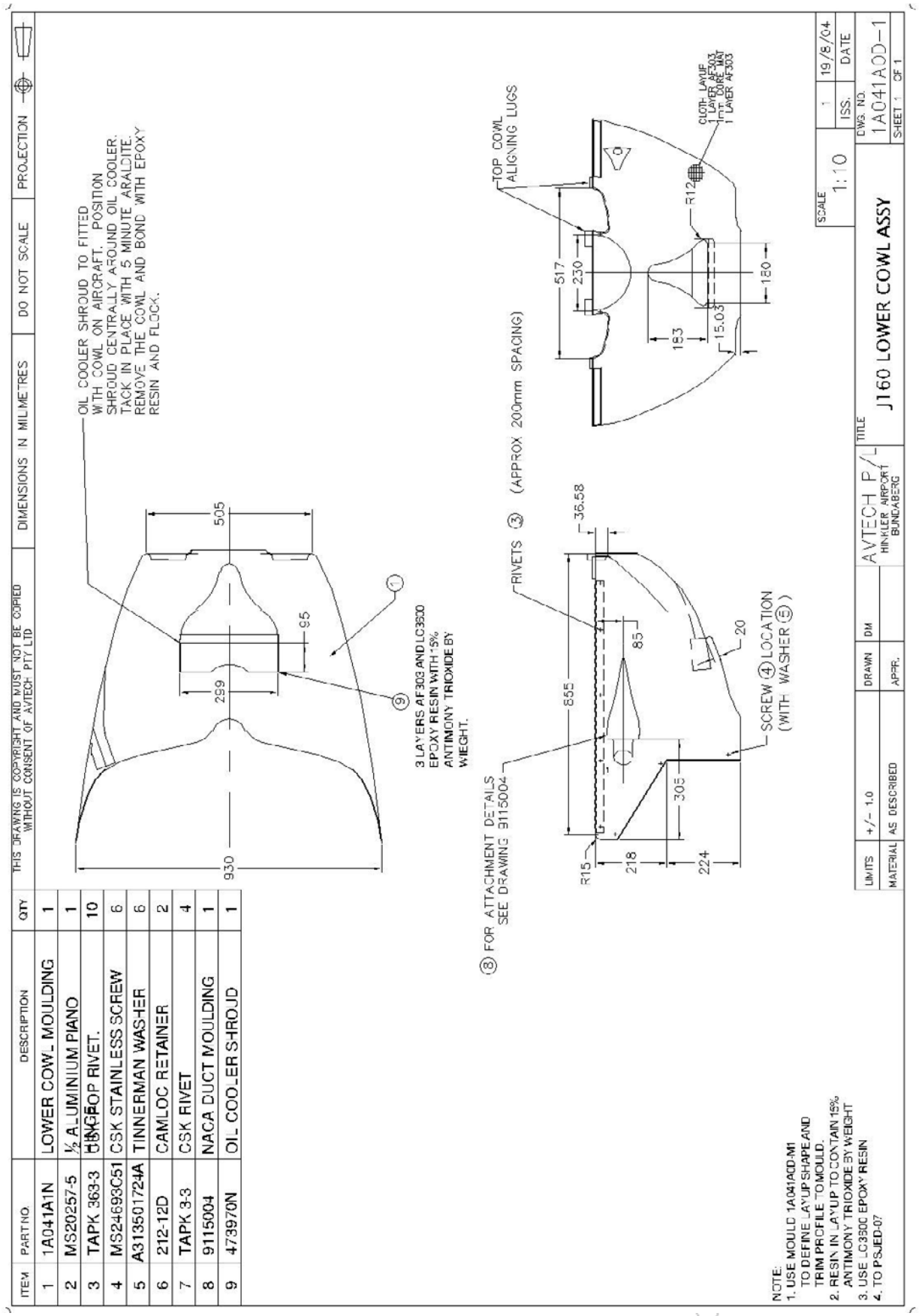


Figure 35. Lower Cowl Assy

10.1.2 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 cowling 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.

10.1.3 REPAIR

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

10.2 ENGINE

The engine is a JABIRU, 4-cylinder, 4-stroke, air-cooled, driving a fixed-pitch wooden propeller. The front Starboard cylinder is numbered 1, the front Port is numbered 2, the centre Starboard is numbered 3, the centre Port is numbered 4, the rear Starboard is numbered 5 and the rear Port cylinder is numbered 6.

Refer to Engine Instruction & Maintenance Manual for detailed engine data.

For repair & overhaul of the engine, refer to the applicable publication issued by Jabiru Aircraft Pty Ltd.

10.2.1 ENGINE DATA

Refer Engine Instruction & Maintenance Manual

10.2.2 ENGINE TROUBLE SHOOTING

Refer Engine Instruction & Maintenance Manual

10.2.3 ENGINE CLEANING

Refer Paragraph 3.3.5

10.2.4 ENGINE ACCESSORIES REMOVAL

Removal of engine accessories for inspection involves stripping the engine of parts, accessories & components as appropriate. During removal of all parts, carefully examine & tag defective parts for repair or replacement with a new part.

NOTE:

All openings exposed by the removal of an item should be closed by installing a suitable cover or cap over the opening. This will prevent the entry of foreign particles. If suitable covers are not available, tape should be used to cover the opening.

10.2.5 INSPECTION

For specific items to be inspected and for periodic inspection details, refer to Engine Instruction & Maintenance Manual.

1. Visually inspect the engine for loose bolts, nuts, cracks, leaks & cooling fin damage.

2. Inspect baffles, baffle seals & brackets for cracks, deterioration or damage.

3. 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.

NOTE:

Avoid excessive flexing & sharp bends when examining hoses for stiffness.

4. 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.

5. For major engine repairs, refer to JABIRU AIRCRAFT Pty Ltd or an Approved Jabiru Service Centre.

10.2.5.1 FLEXIBLE HOSES

Leak Test

- After each 50 hours of operation, flexible hoses should be checked for leaks.
- Examine the exterior of hoses for evidence of leakage or wetness.
- Replace any doubtful hoses.

Replacement

- 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.

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.

10.3 COOLING AIR BAFFLES

The baffles installed around the engine direct the cooling air flow to the radiator 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.

10.3.1 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. Replace defective parts.

10.3.2 COOLING AIR BAFFLE REMOVAL & INSTALLATION

Baffles are removed by unbolting from the engine and removing tension springs and their attaching wires.

Reverse the preceding steps for installation.

10.3.3 REPAIR

Repair of baffles is limited to the replacement of rubber seals. These may be replaced by removing the existing rubber seals, rubbing back the bonding face of the fiberglass baffles to bare glass (using 80 grit sandpaper or similar) and bonding new rubber strips in place with 5-Minute Araldite.

10.4 ENGINE MOUNT

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.

Spaces are used to correctly align the engine. Ensure that they are correctly marked on removal and correctly replaced on reassembly.

IMPORTANT

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

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.

10.5 ENGINE FUEL SYSTEM

10.5.1 FUEL SYSTEM GENERAL

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 & instruction manual for carburettor jet removal, idle adjustment and carburettor bowl cleaning procedures.

WARNING

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

10.5.2 CS-VLA AIRCRAFT FUEL SYSTEM

1. A schematic drawing of the system is shown as Figure 46

2. The fuel filter and auxiliary electronic fuel pump are mounted inside the header tank enclosure.

3. All fuel lines inside the cabin are housed within plastic sheath.

4. The main fuel valve is located on the Main Beam in the cabin.

10.5.3 J160 / J170 FUEL SYSTEM – NON CS-VLA VARIANTS

1. A schematic drawing of the system is shown as Figure 47.

2. The fuel filter and auxiliary electronic fuel pump are mounted in a fiberglass moulding immediately above the rudder pedals.

3. The main fuel valve is located on the Main Beam in the cabin.

10.6 SPARK PLUGS

Refer to Engine Instruction & Maintenance Manual

10.7 ENGINE CONTROLS

10.7.1 RIGGING

When adjusting any engine control, it is important to check that the control slides smoothly throughout its full range of travel & that the lever or knob moves through its full range of travel.

10.7.2 CS-VLA THROTTLE SYSTEM

The throttle system used is shown in Figure 41.

10.7.3 J160 / J170 THROTTLE – NON CS-VLA VARIANTS

The throttle controls are shown at Figure 42.

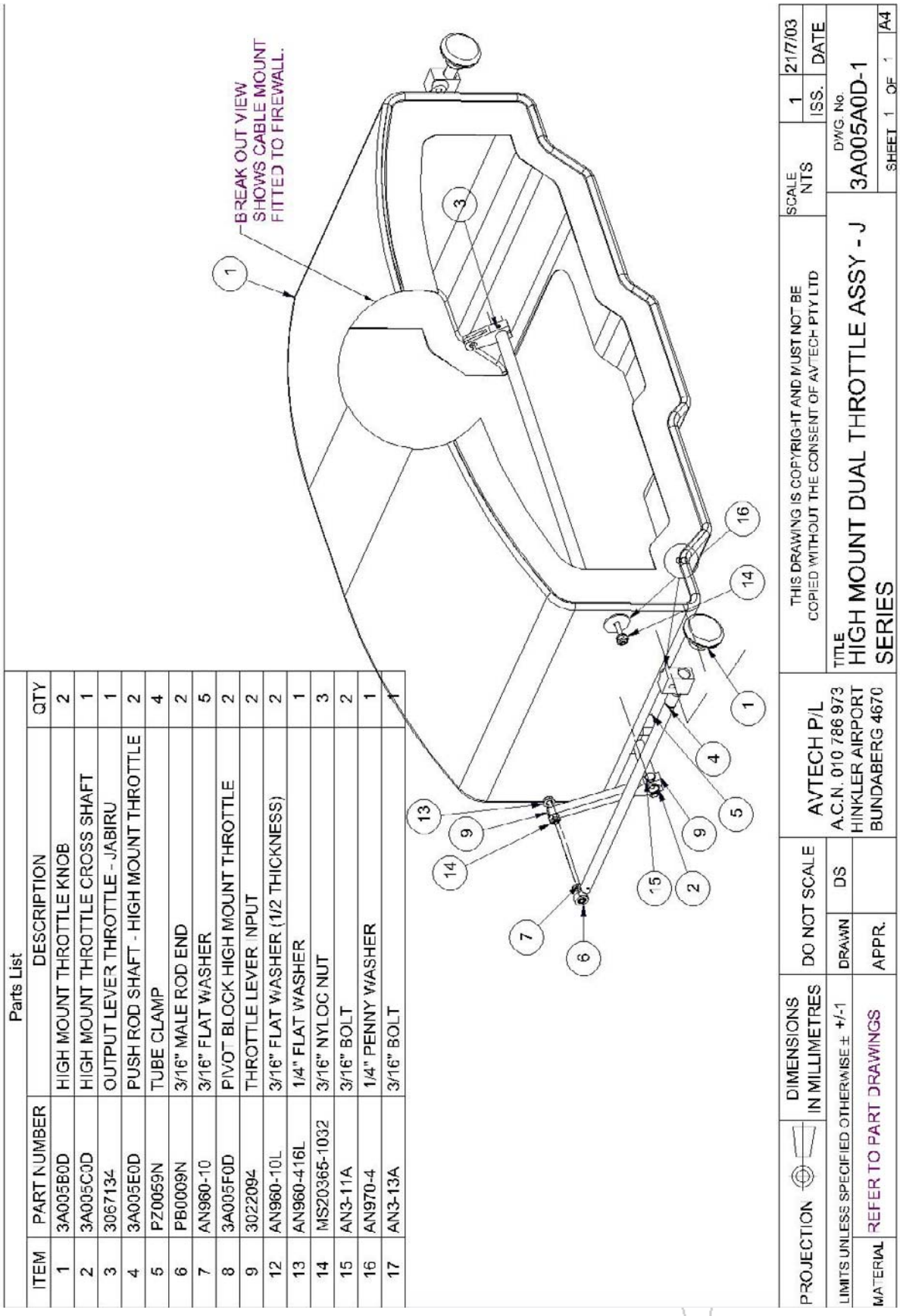
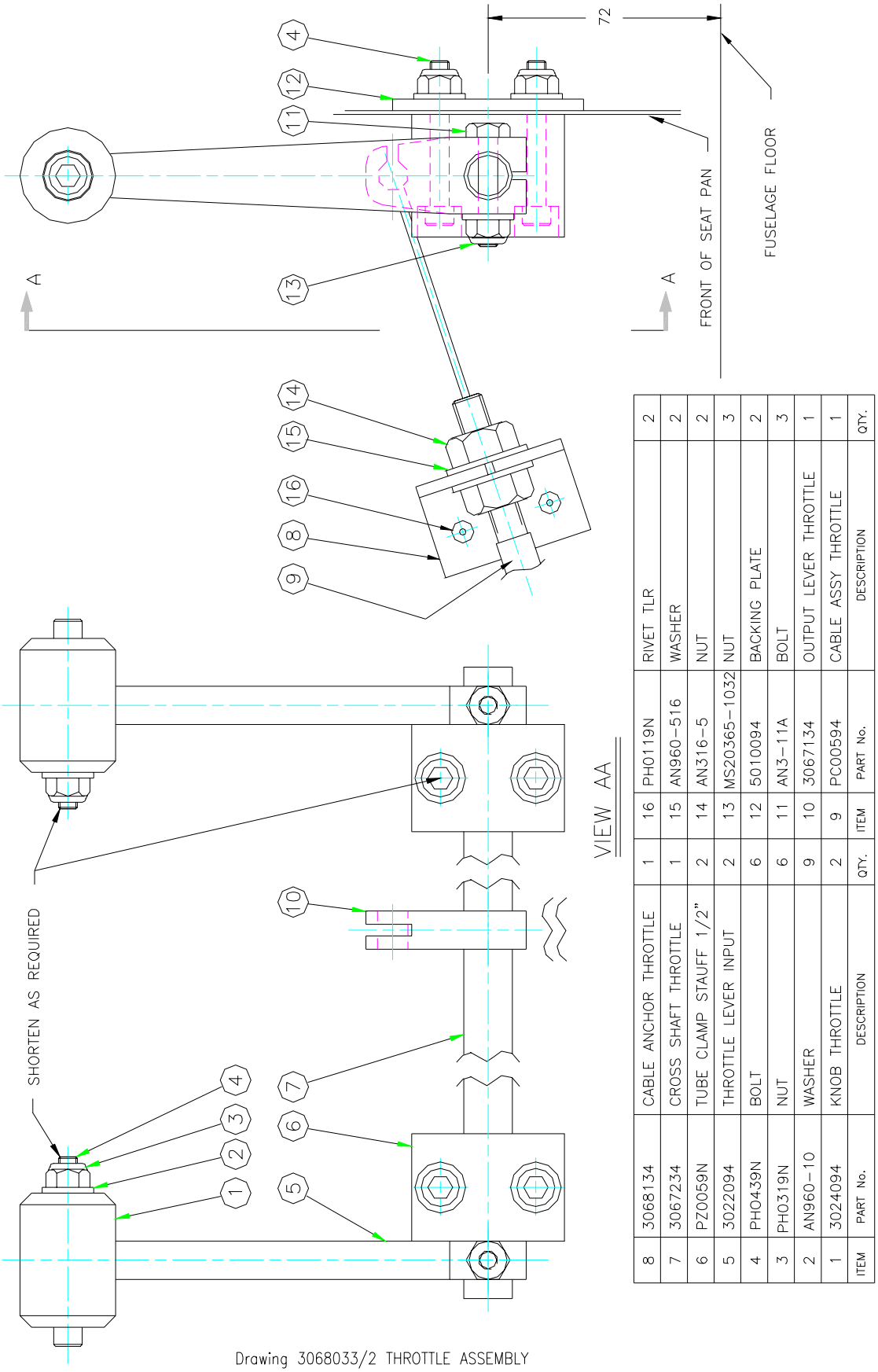


Figure 36. CS-VLA Variant Throttle (Panel Mounted)



ITEM	PART No.	DESCRIPTION	QTY.
8	3068134	CABLE ANCHOR THROTTLE	1
7	3067234	CROSS SHAFT THROTTLE	1
6	PZ0059N	TUBE CLAMP STAUFF 1/2"	2
5	3022094	THROTTLE LEVER INPUT	2
4	PH0439N	BOLT	6
3	PH0319N	NUT	6
2	AN960-10	WASHER	9
1	3024094	KNOB THROTTLE	2

ITEM	PART No.	DESCRIPTION	QTY.
16	PH0119N	RIVET TLR	2
15	AN960-516	WASHER	2
14	AN316-5	NUT	2
13	MS20365-1032	NUT	3
12	5010094	BACKING PLATE	2
11	AN3-11A	BOLT	3
10	3067134	OUTPUT LEVER THROTTLE	1
9	PC00594	CABLE ASSY THROTTLE	1

Figure 37. Non CS-VLA Variant Throttle (Seat Mounted)

10.7.4 CHOKE

The Choke Control is located in the main instrument panel & is connected to the carburettor by a control cable.

10.7.5 AIR INTAKE SYSTEM & CARBURETOR HEAT

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.

The air filter should be cleaned every 50 hours or more regularly if the engine is operated in dusty conditions. Refer Paragraph 11.9.

Refer to Figure 43.

ITEM	PART No.	DESCRIPTION	QTY.
1	4790800N	AIR INLET HOUSING	1
2	NAS697A08	2 LUG ANCHOR NUT	4
3	PH0399N	RIVET	8
4	4265844N	RUBBER FLAP	1
5	4265544N	BACKING STRIP	1
6	PH0399N	RIVET	3
7	4790904	FLAP ASSY	1
8	4028594	SPACER BLOCK CABLE	1
9	PH0359N	METAL THREAD M4 X 25	3
10		SPRING	1
11	4791000N	AIR INLET TUBE 57 DIA	1
12	PH0209N	NUT NYLOCK M4	4
13		NUT M4	2
14		METAL THREAD M4 X 20	1
15	4028894	LEVER	1
16		ROLL PIN Ø2.5 X 15	1
17	4028994	EXTERNAL PIVOT BLOCK	1
18		SCREW C/SUNK M4 X 12	2
19	479110N	HOT AIR INLET TUBE 57 DIA	1
20	4028894	PIVOT BLOCK	1
21	PH0199N	SCREW SELF TAPPER	2

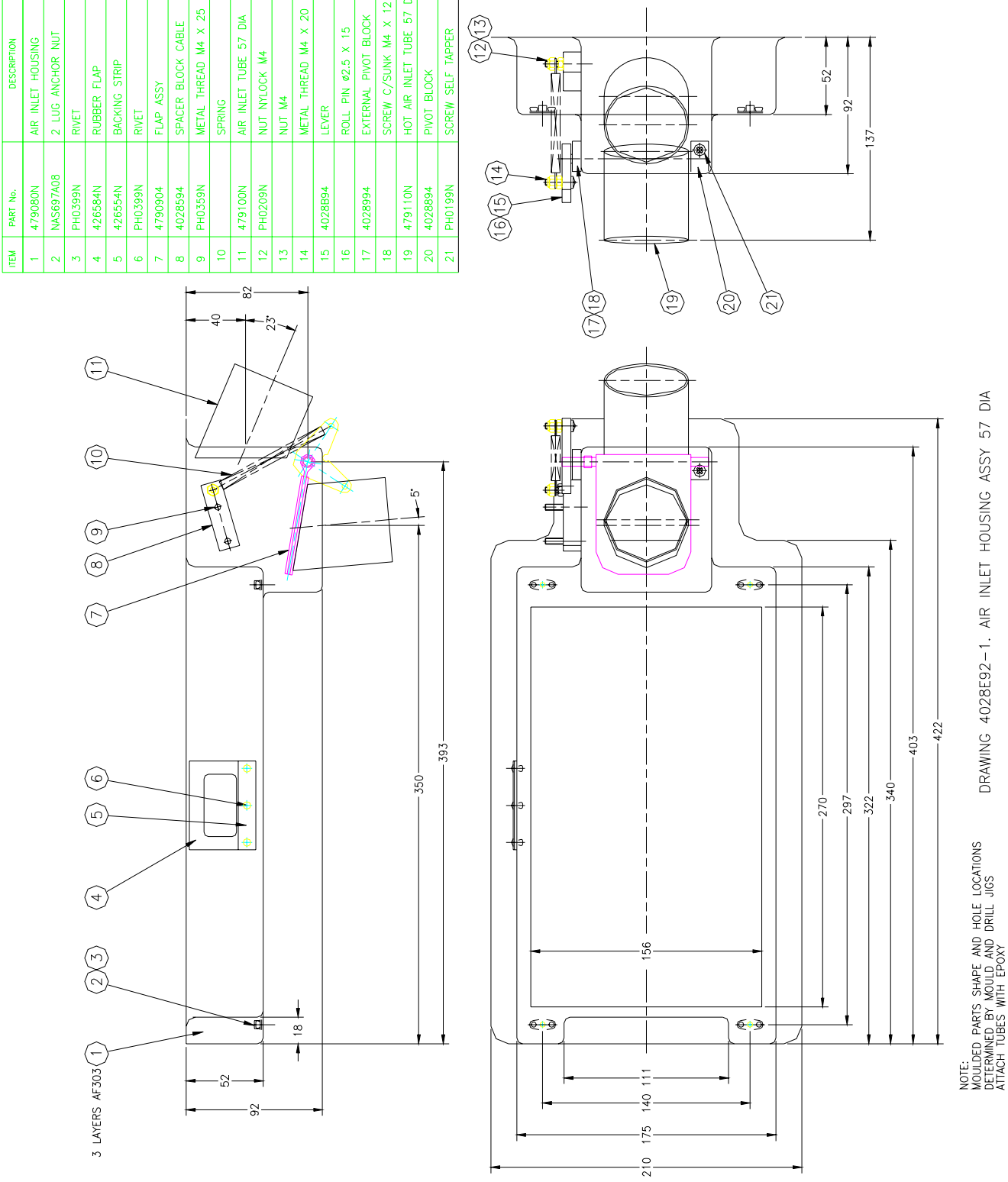


Figure 38. Carburetor Heat Box

10.8 EXHAUST SYSTEM

The exhaust system consists of front and rear exhaust manifolds attached to the engine block and a muffler assembly and springs which attach the muffler to the manifolds. Refer to Figure 44

10.8.1 EXHAUST SYSTEM REMOVAL AND INSTALLATION

1. Remove both top and bottom engine cowls.

2. 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 ¼" bar stock is ideal.

3. Remove muffler assembly.

4. If necessary, remove exhaust manifolds from engine.

5. Reverse the preceding steps for installation.

10.8.2 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 50 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.

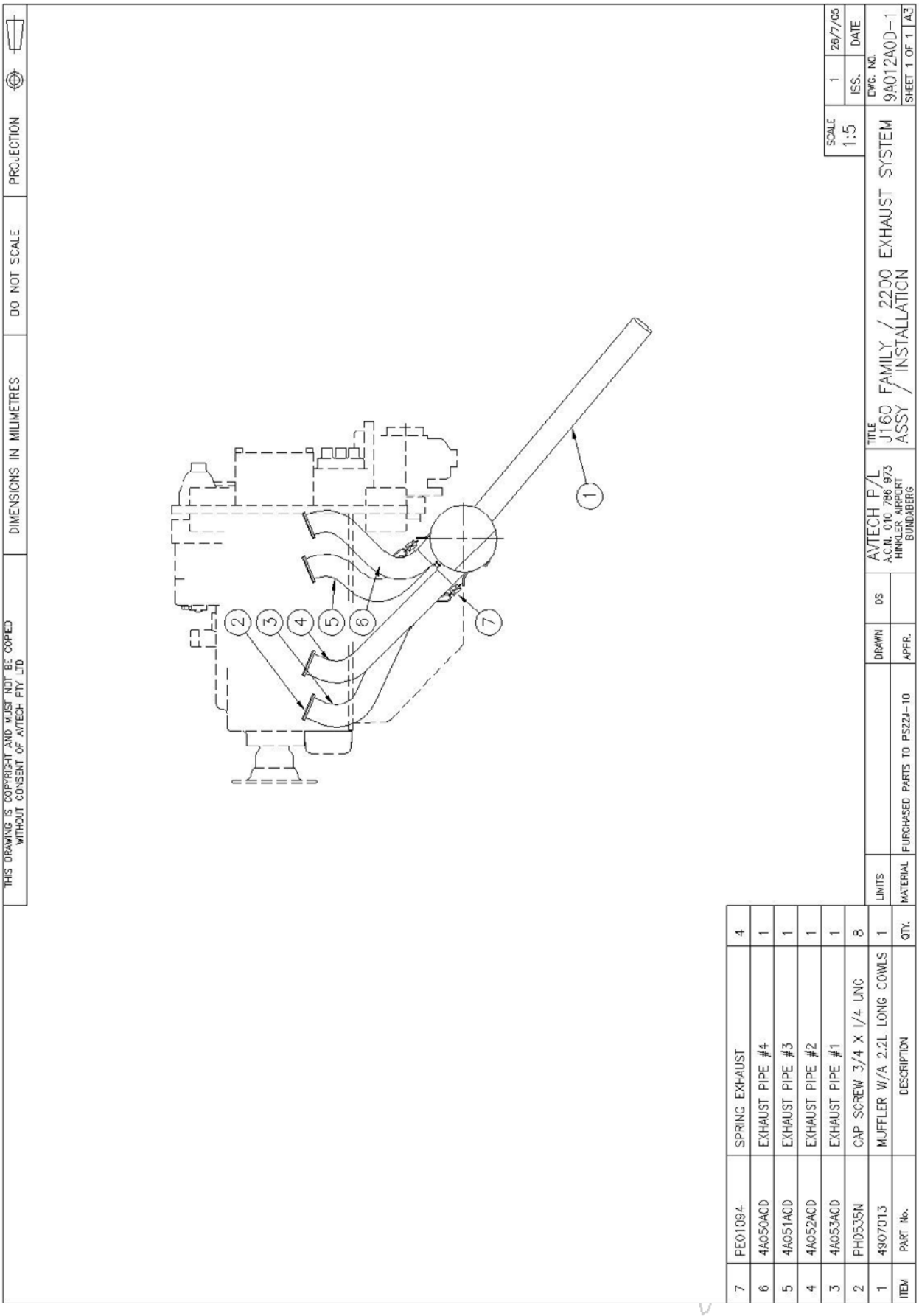


Figure 39. Exhaust System

10.9 EXTREME CLIMATIC CONDITIONS

10.9.1 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 daily as outlined in Paragraph 11.7.5.

10.9.2 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.

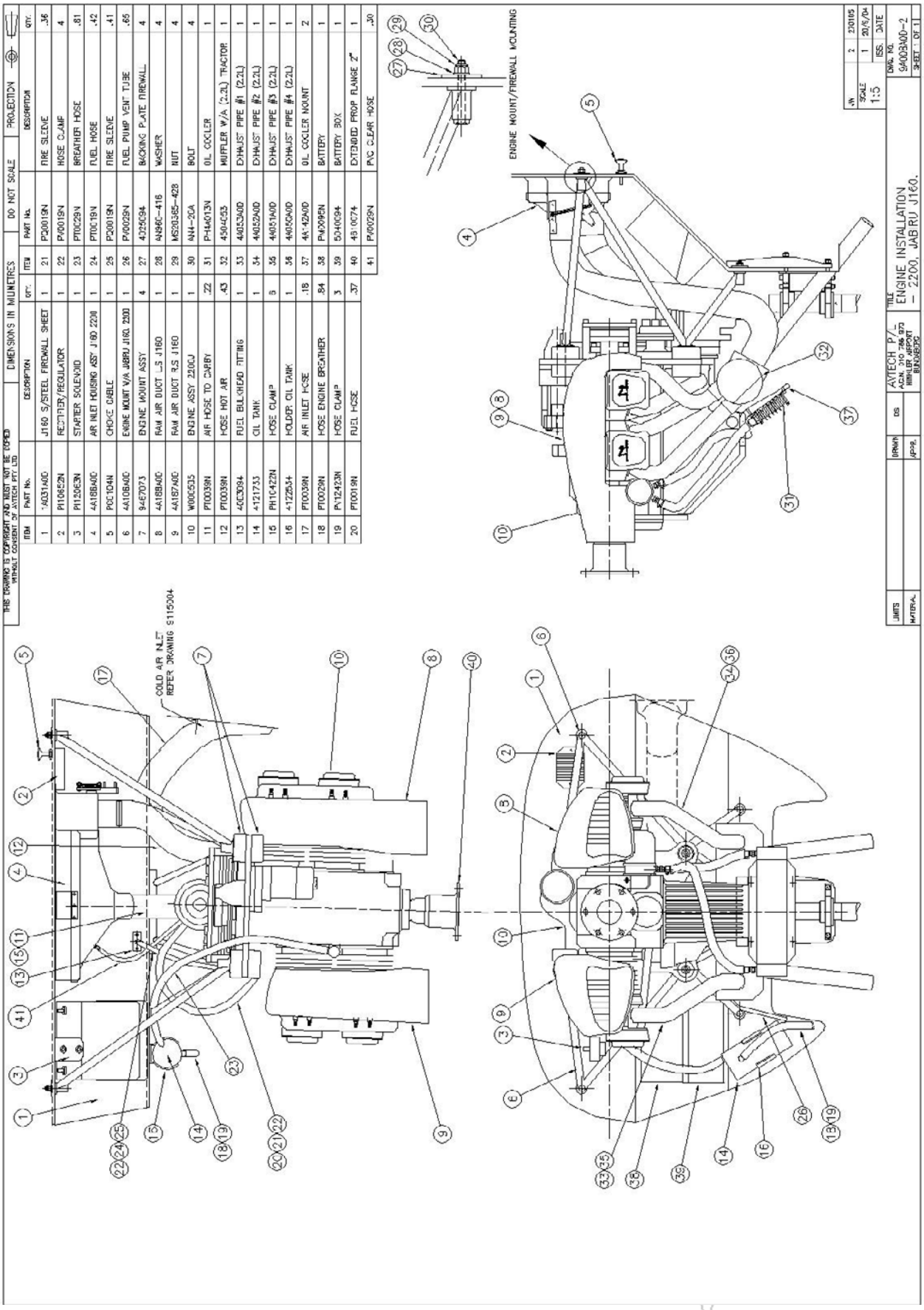


Figure 40. Engine Installation

11 SECTION 12 – FUEL SYSTEM

11.1 DESCRIPTION

Refer to Figures 46 and 47 for system schematic details.

Fuel is pump-fed from two composite fuel tanks inside the wings, through a header tank, fuel filter & shut-off valves and through a bulkhead in the firewall to the carburettor. The primary fuel pump is attached to the engine. A secondary, electronic pump is mounted in the cabin (refer details below). Positive ventilation is provided by vented fuel caps. The airspaces of all tanks are connected to ensure even feeding.

11.1.1 CS-VLA AIRCRAFT FUEL SYSTEM

5. A schematic drawing of the system is shown as Figure 46.

6. The 5 Litre header tank is housed in an enclosure behind the seats. This enclosure is sealed from the cabin & vented overboard.

7. The fuel filter and auxiliary electronic fuel pump are mounted inside the header tank enclosure.

8. All fuel lines inside the cabin are housed within plastic sheath.

9. The main fuel valve is located on the Main Beam in the cabin.

10. Secondary valves are fitted between each wing tank and the header tank. These valves are for maintenance purposes only and must be wired into the “ON” position with electrical fuse wire during flight.

WARNING

Fuel valves between wing tanks and header tanks must be wired in the “ON” position using electrical fuse wire during flight.

11.1.2 J160 / J170 FUEL SYSTEM – NON CS-VLA VARIANTS

4. A schematic drawing of the system is shown as Figure 47

5. A 6 Litre header tank is mounted inside the right seat pan moulding. Note that for variants with sliding seats the 5 Litre header tank system used in the CS-VLA variants is used, fitted behind the seats.

6. The fuel filter and auxiliary electronic fuel pump are mounted in a fiberglass moulding immediately above the rudder pedals.

7. The main fuel valve is located on the Main Beam in the cabin.

8. Secondary valves are fitted between each wing tank and the header tank. These valves are for maintenance purposes only and must be in the “ON” position during flight.

WARNING

Fuel valves between wing tanks and header tanks must be in the "ON" position during flight.

11.1.3 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, defuelling, 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.

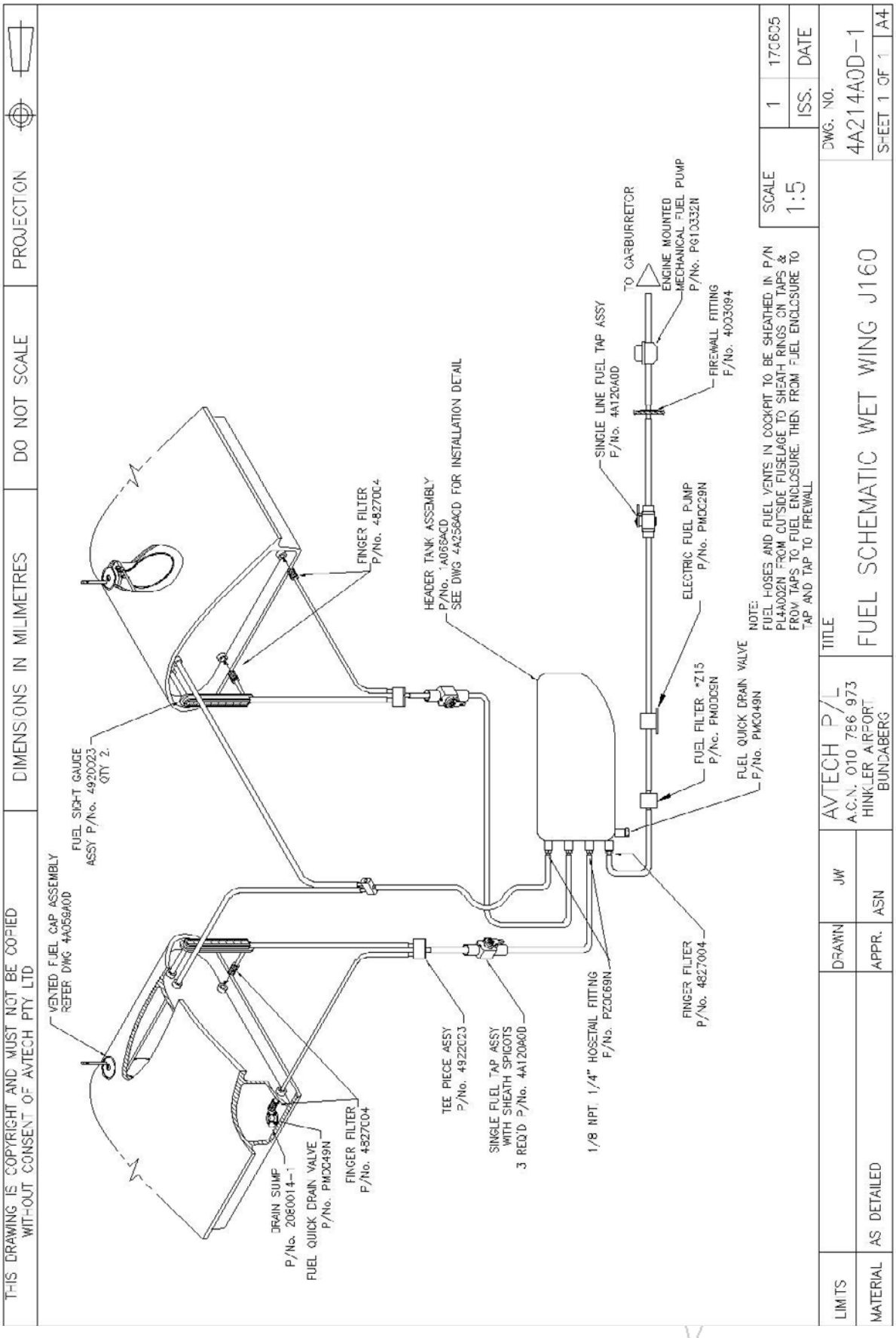


Figure 41. Fuel System Schematic – CS-VLA Variants

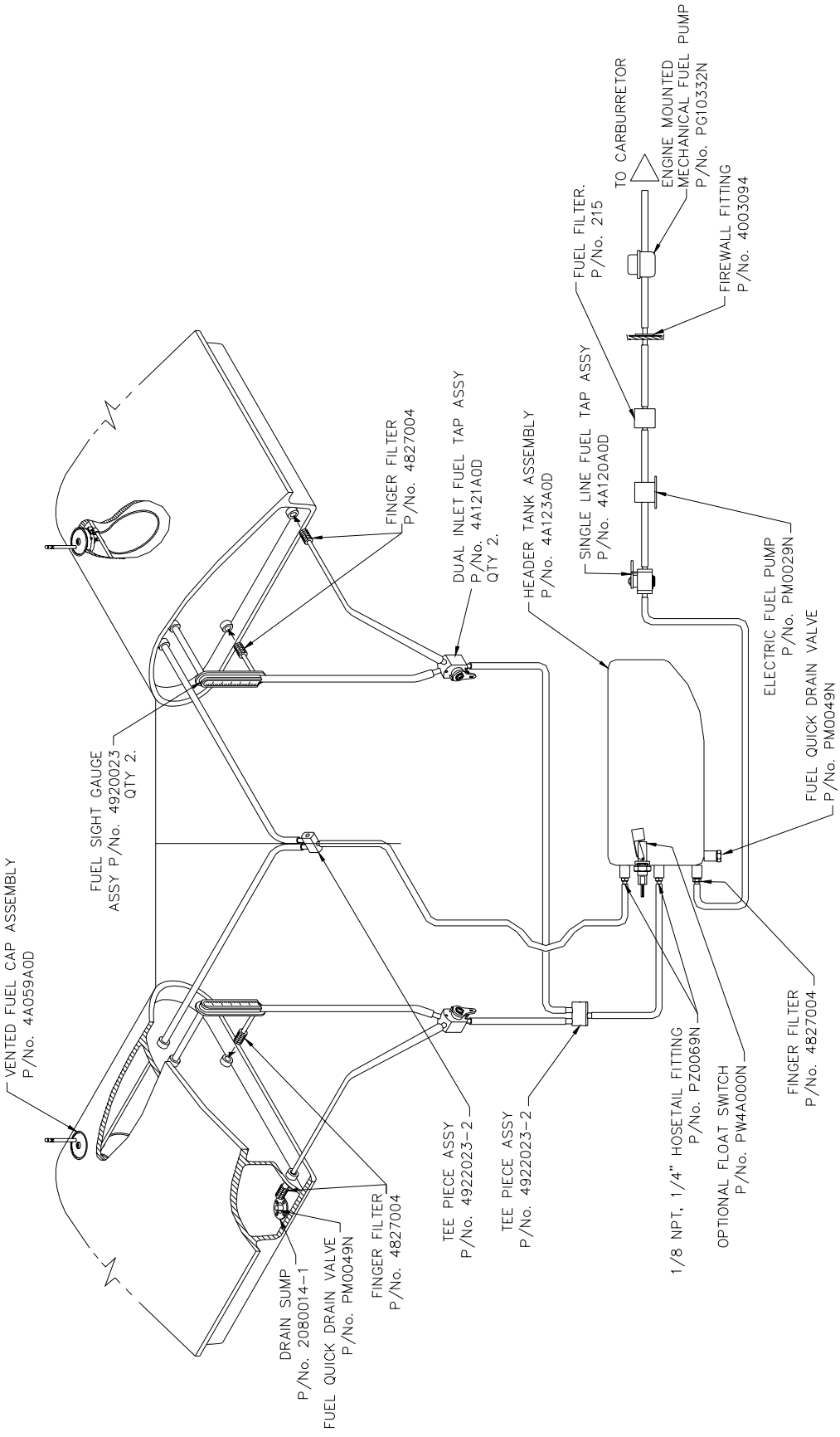


Figure 42. Fuel System Schematic – Non CS-VLA Variants

11.1.4 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	See Paragraph 11.3
	Water in fuel	Drain fuel tank sump, fuel lines and filter

11.2 FUEL TANK

11.2.1 DESCRIPTION

The composite fuel tanks are located in the left & right hand wings. A sump drain plug is provided in each wing root on the under side wing skin. A third sump drain plug is provided in the header tank (located behind the seats for CS-VLA models and under the right side seat in non CS-VLA variants). These three points must be checked as part of the daily inspection and after each refueling to drain and trapped water or sediment.

11.2.2 FUEL TANK REMOVAL & INSTALLATION

As the wing fuel tanks are part of the wing integrity, these fuel tanks can not be removed.

The header tanks may be removed if necessary to check outlet strainers etc.

11.2.2.1 HEADER TANK REMOVAL – CS-VLA MODELS

1. Break the fuse wire seal from the taps between the wing tanks and the header tank and turn OFF.

2. Remove the drain plug and drain the fuel from the header tank.

3. Remove the cover from the header tank enclosure.

4. Remove tank restraints.

5. Loosen hose clamps, remove hoses & remove tank.

6. Installation is the reverse of removal.

WARNING

Fuel valves between wing tanks and header tanks must be wired in the "ON" position using electrical fuse wire during flight.

11.2.2.2 HEADER TANK REMOVAL – NON CS-VLA VARIANTS

7. If fitted, break the fuse wire seal from the taps between the wing tanks and the header tank and turn OFF.

8. Remove the drain plug and drain the fuel from the header tank.

9. Remove the cover from the header tank enclosure. (note that in some cases this may require cutting the top out of the seat pan)

10. Remove tank restraints.

11. Loosen hose clamps, remove hoses & remove tank.

12. Installation is the reverse of removal.

WARNING

Fuel valves between wing tanks and header tanks must be in the "ON" position during flight.

11.3 FUEL VENTS

11.3.1 DESCRIPTION

Refer to Figure 48. Positive ventilation is provided by vented fuel caps. All three tanks are interconnected to ensure uniform breather pressure and even feeding from all tanks.

11.3.2 CHECKING

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 tank and tube.

1. Have an assistant hold a rubber glove or balloon over the vent tube on one cap.

2. 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.

3. Correct any blockage.

To check the breather line for the header tank:

1. Turn off taps between the wing tanks and the header tank.

2. Disconnect the fuel line from the mechanical fuel pump on the engine.

3. 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.

4. Correct any blockage & reassemble.

WARNING

Fuel valves between wing tanks and header tanks must be in the "ON" position during flight. CS-VLA variants must have these taps wired "ON" using electrical fuse wire.

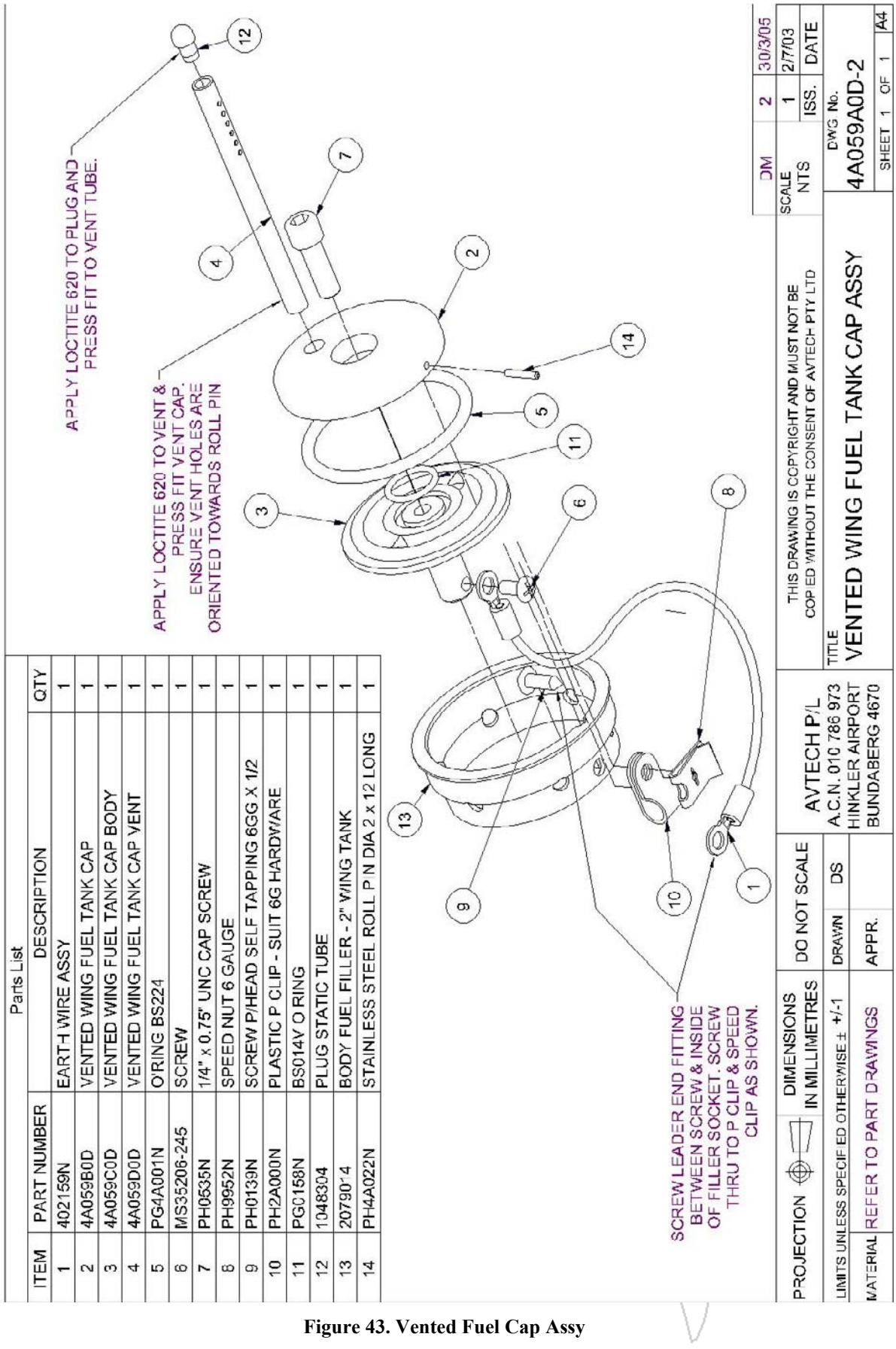


Figure 43. Vented Fuel Cap Assy

11.4 FUEL SHUT-OFF VALVE

See Figure 46 or 47, depending on model variant.

11.4.1 DESCRIPTION

The fuel shut-off valve is a two-position ON – OFF valve which is located in front of the main longitudinal beam.

11.4.2 FUEL VALVE REMOVAL & INSTALLATION

1. Turn OFF both taps between wing tanks and header tank. Cover both tank cap vents.

2. Remove fuel shut-off valve cover.

3. Remove shut-off valve handle.

4. Remove cover plate.

5. Disconnect and cap fuel lines at shut-off valve.

6. Remove shut-off valve.

7. Reverse the preceding steps for installation.

WARNING

Fuel valves between wing tanks and header tanks must be in the "ON" position during flight. CS-VLA variants must have these taps wired "ON" using electrical fuse wire.

Ensure wing tank cap vent covers are removed.

11.5 FUEL FILTERS

11.5.1 CS-VLA FILTER DESCRIPTION

The fuel filter is of the in-line type and is located inside the header tank enclosure behind the seats.

11.5.2 NON CS-VLA MODEL VARIANT FILTER DESCRIPTION

The fuel filter is of the in-line type and is located just inside the cabin above the rudder pedals.

11.5.3 CS-VLA MODEL FUEL FILTER REMOVAL & INSTALLATION

1. Turn fuel valves between wing tanks and header tank to OFF. Cover wing tank cap vents.

2. Try to kink to main fuel line above the fuel filter being careful not to damage.

3. Place a cloth beneath the filter to collect any fuel which may be split during removal of the filter.

4. Disconnect the fuel lines at both ends of the filter.

5. Remove filter.

6. Reverse the preceding steps for installation. Ensure waste cloth is removed.

WARNING

Fuel valves between wing tanks and header tanks must be wired in the "ON" position using electrical fuse wire during flight.

Ensure wing tank cap vent covers are removed.

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.

11.5.4 NON CS-VLA MODEL FUEL FILTER REMOVAL & INSTALLATION

7. Turn main fuel valve on the cabin main beam OFF.

8. Place a cloth beneath the filter to collect any fuel which may be split during removal of the filter.

9. Disconnect the fuel lines at both ends of the filter.

10. Remove filter.

11. Reverse the preceding steps for installation. Ensure waste cloth is removed.

WARNING

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.

11.6 FUEL PUMPS

11.6.1 PRIMARY PUMP

The Primary Fuel Pump is located on the Starboard rear of the Engine. Refer to engine Maintenance & Instruction Manual for details.

11.6.2 CS-VLA SECONDARY PUMP

A secondary, electronic pump is mounted inside the header tank enclosure behind the seats. This pump is a back-up to the Primary Pump. It is recommended that the Secondary Pump be engaged at least during take-off and landing.

11.6.3 NON CS-VLA SECONDARY PUMP

A secondary, electronic pump is mounted inside the centre console above the rudder pedals. This pump is a back-up to the Primary Pump. It is recommended that the Secondary Pump be engaged at least during take-off and landing.

12 SECTION 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 trouble shooting 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.

12.2 INSTRUMENT PANEL

The instrument panel assembly consists of a stationary panel. The lower part of the panel contains switches and circuit breakers which are not sensitive to vibration. The instruments are screw-mounted to the panel.

12.2.1 INSTRUMENT PANEL REMOVAL & INSTALLATION

The panel is secured to the Firewall and for normal maintenance is not considered removable. Access to instruments etc is gained by removing the panel facia containing the instruments from the facia.

1. Unscrew & remove the facia retaining screws from around the perimeter if the panel.

2. Remove the front facia. It is normally best to lie the facia on a cushion or similar while working to reduce the risk of damaging the instruments or facia.

3. Take care not to strain connections on wires or tubes.

4. Assembly is the reverse of the above procedure.

12.2.2 INSTRUMENTS

Refer to Figure 44.

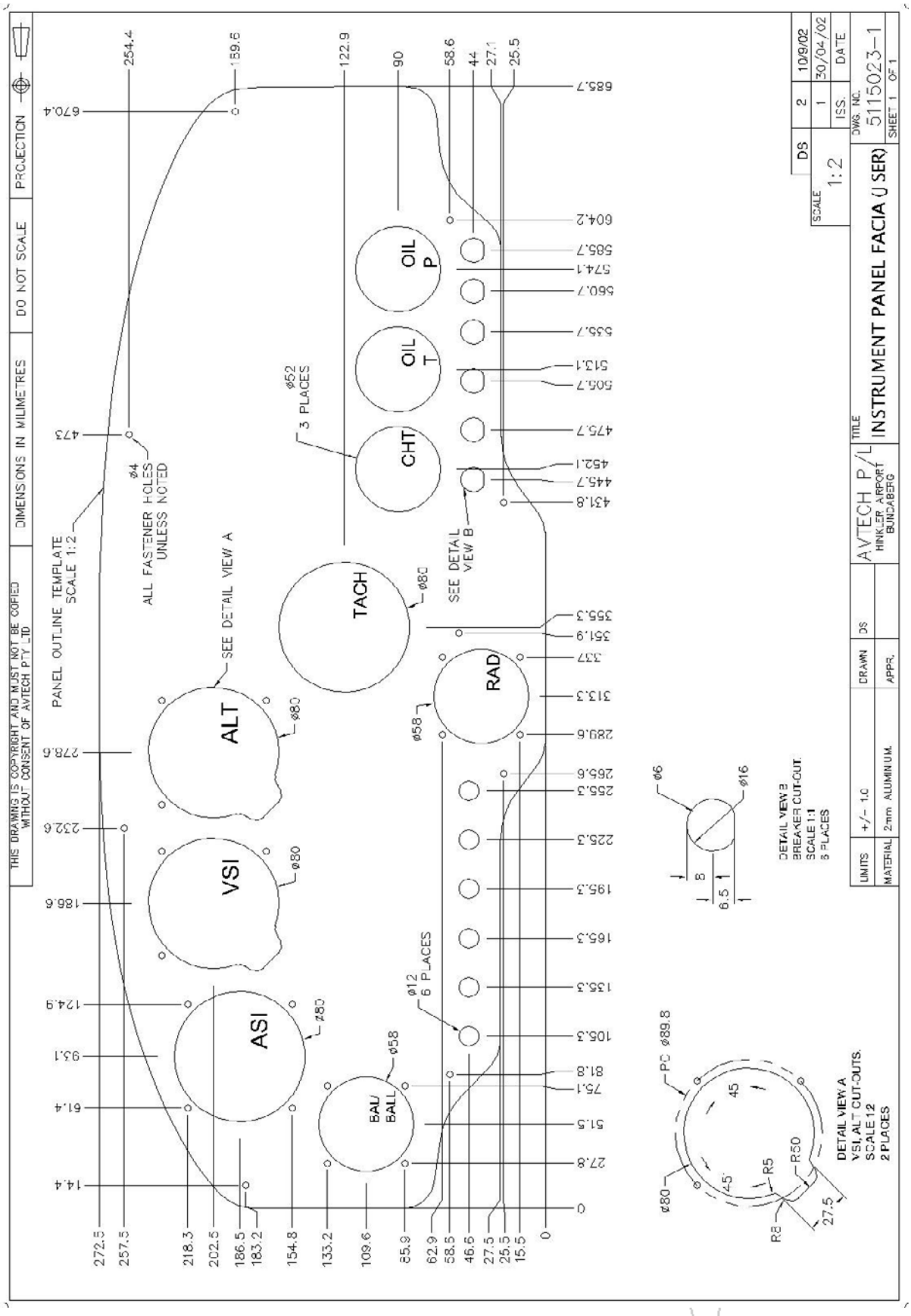


Figure 44. Instrument Panel Layout – Basic Panel

12.2.3 INSTRUMENT REMOVAL

Most instruments are secured to the panel with screws inserted through the panel face. To remove an instrument, disconnect wiring or pluming to the instrument, remove mounting screws and take instrument out from behind, or in some cases, from the front of the panel.

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.

12.2.4 INSTALLATION

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.

12.3 PITOT & STATIC SYSTEMS

Refer to Figures 48 and 49.

The pitot system conveys ram air pressure to the airspeed indicator. The static system vents vertical speed indicator (if fitted), altimeter and airspeed indicator to atmospheric pressure through plastic tubing connected to a static port.

12.3.1 PITOT – STATIC SYSTEM MAINTENANCE

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.

12.3.2 STATIC PRESSURE SYSTEM INSPECTION & LEAKAGE TEST

The following procedure outlines inspection and testing of the static pressure system, assuming that the altimeter has been tested and inspected in accordance with the current Regulations.

1. Ensure the static system is free from entrapped moisture and restrictions.

2. Ensure no alternations of airframe surface have been made which would effect the relationship between air pressure in the static pressure system and truce ambient static air pressure for any flight configuration.

3. Attach a source of suction to static pressure source opening. Figure 50 shows one method of obtaining suction.

4. 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 vertical speed indicator or airspeed indicator.

5. 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.

6. 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:

1. Disconnect static pressure lines from airspeed indicator and vertical speed indicator.

2. Use suitable fittings to connect lines together so that the altimeter is the only instrument still connected into the static pressure system.

3. 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.

4. Attach a source of positive pressure to the static source opening. Figure 50 shows one method of obtaining positive pressure.

CAUTION

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

5. Slowly apply positive pressure until altimeter indicates a 500-foot decrease in altitude and maintain this altimeter indication while checking for leaks. Coat line connectors and static course flange with solution of mild soap and water, watching for bubbles to locate leaks.

6. Tighten leaking connections. Repair or replace parts found to be defective.

7. Reconnect airspeed and vertical speed indicators into static pressure systems and repeat leakage test steps 3 through 6.

12.3.3 PITOT SYSTEM INSPECTION & LEAKAGE TEST

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.

12.3.4 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 may be kept clear and connections tight. When necessary, disconnect static line at first instrument to which it is connected, then blow 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.

12.3.5 REMOVAL & INSTALLATION OF COMPONENTS

To remove pitot mast, remove the two rivets fastening it to the wing strut and pull it out from the strut far enough to disconnect the pitot line.

The static mast is fixed and cannot be removed. To gain access to disconnect the static tube from the static mast remove the VHF antenna cover at the tope of the fin. Pitot and static tubing is removed in the usual manner.

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 overtightening and distortion of fittings or tubing.

12.3.6 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.

12.3.7 TROUBLE SHOOTING – AIRSPEED INDICATOR

Table 10. Trouble Shooting – Airspeed Indicator

Trouble	Probable Cause	Remedy
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.

12.3.8 TROUBLE SHOOTING – ALTIMETER

Table 11. Trouble Shooting – Altimeter

Trouble	Probable Cause	Remedy
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.

Trouble	Probable Cause	Remedy
	Leak in airspeed or vertical speed indicator installations	Check other instruments and system plumbing for leaks. Blow out lines, tighten connections

12.3.9 TROUBLE SHOOTING – VERTICAL SPEED INDICATOR (OPTION)

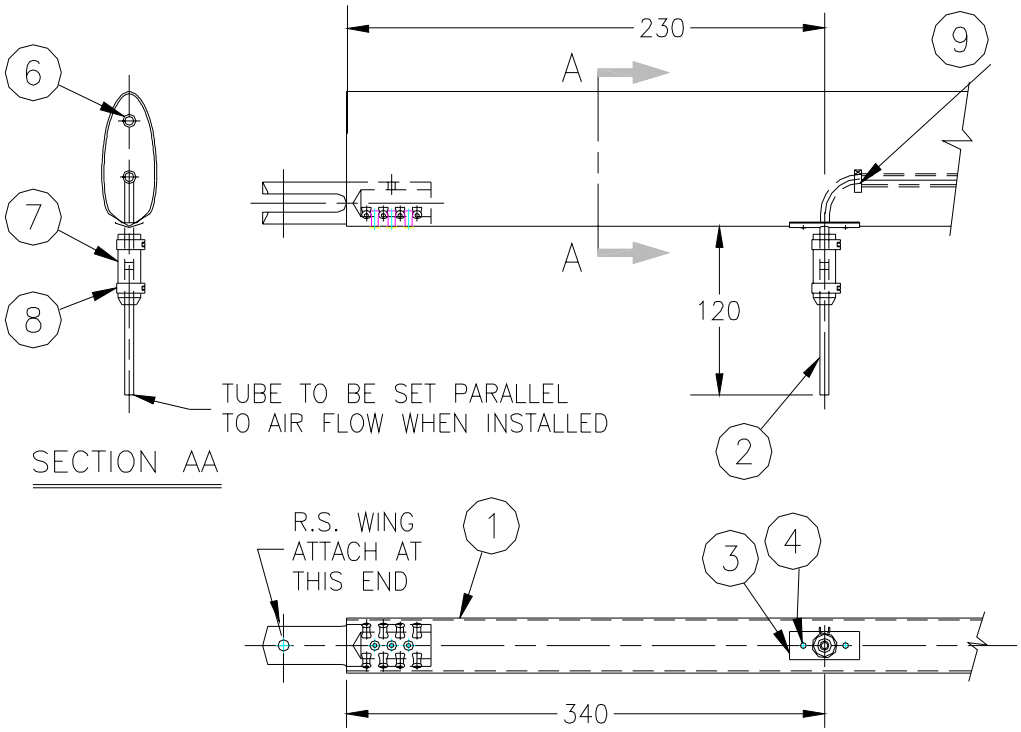
Table 12. Trouble Shooting – Vertical Speed Indicator (Option)

Trouble	Probable Cause	Remedy
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.

12.3.10 PITOT TUBE ALIGNMENT

Refer to Figure 48

For correct airspeed indication, pitot tube must be properly aligned. Open end of tube must be perpendicular to longitudinal axis of the aircraft. Refer to Figure 48 for alignment details.



ITEM	PART No.	DESCRIPTION	QTY.
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

Drawing 9024094/2 PITOT ASSEMBLY

Figure 45. Pitot Assembly

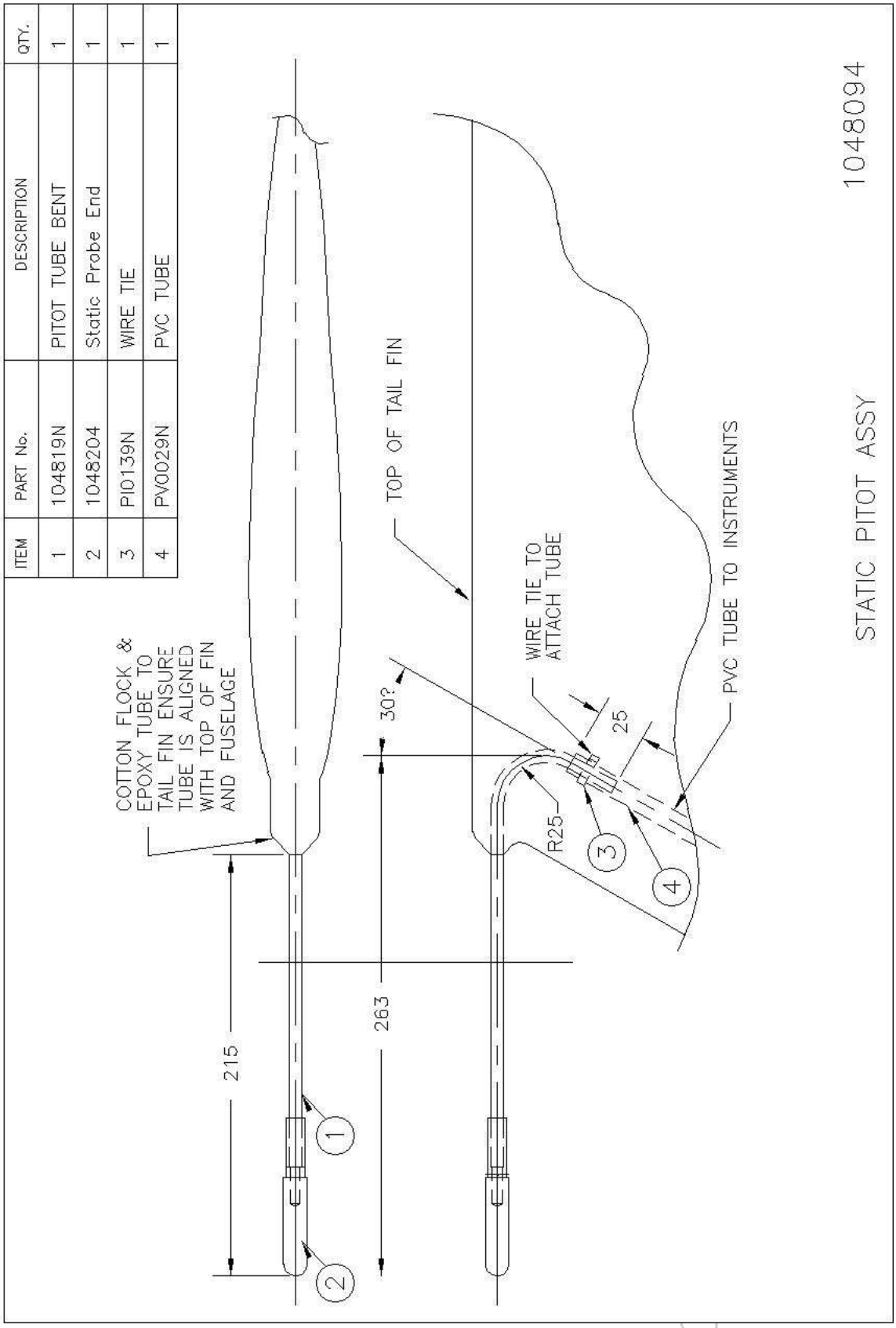
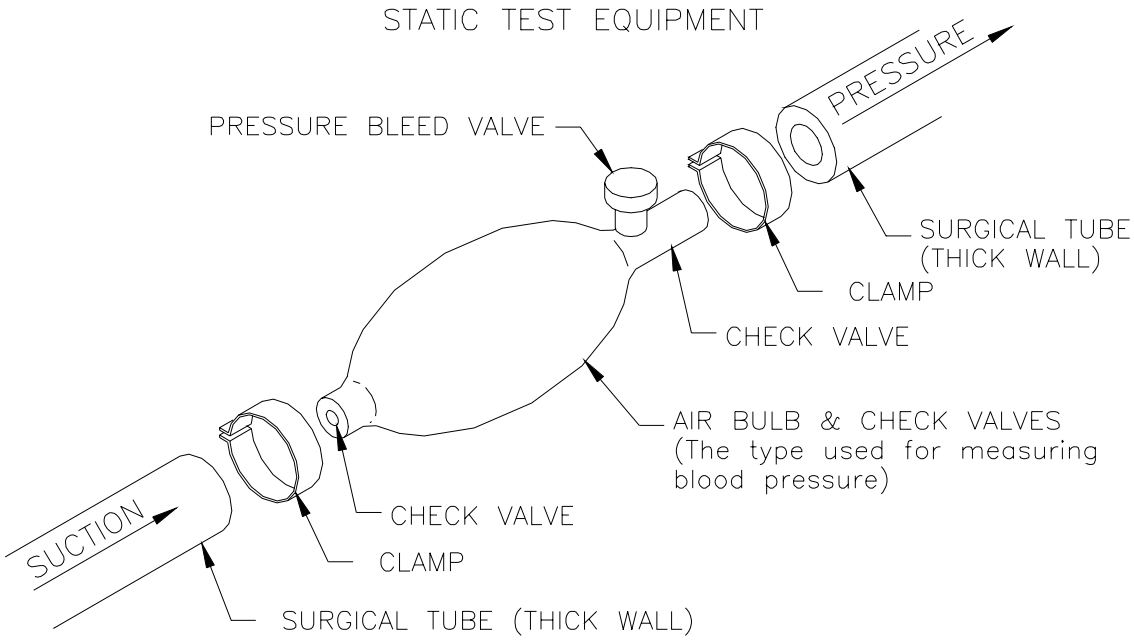


Figure 46. Static Probe System Assembly



TO APPLY SUCTION:-

1: Squeeze air bulb to expel as much air as possible
2: Hold suction hose firmly against static pressue 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 pressue 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 47. Static System Test

12.4 TACHOMETER

The tachometer is electronic and driven from a magnetic pick up. Should the tachometer fail to operate:

1. Check 10amp instrument fuse and replace if necessary.

2. Check 30amp main fuse and replace if necessary.

3. Remove Instrument Panel (see Paragraph 13.2.3) and check cable terminals for security.

4. Check wiring (see Wiring Diagram Figure 51).

5. Check correct installation of magnetic sensor on engine (Refer to engine Instruction & Maintenance Manual)

Should the instrument give incorrect readings:

1. Check 10amp instrument fuse and replace if necessary.

2. Check 30amp main fuse and replace if necessary.

3. Check correct installation of magnetic sensor on engine (Refer to engine Instruction & Maintenance Manual)

4. Refer to an Authorised Service Centre to have Alternator and Regulator checked.

5. Refer instrument to VDO Service Centre or JABIRU AIRCRAFT Pty Ltd for inspection and possible repair.

12.5 OIL PRESSURE GAUGE

The Oil Pressure Gauge is an electronic instrument. Should the instrument fail to operate:

1. Check 10amp instrument fuse and replace if necessary.

2. Check 30amp main fuse and replace if necessary.

3. Remove Instrument Panel (see Paragraph 13.2.3) and check cable terminals for security.

4. Check wiring at Sender for security.

5. Replace Sender.

6. Replace Gauge.

12.6 OIL TEMPERATURE GAUGE

The Oil Temperature Gauge is an electronic instrument. Should the instrument fail to operate:

1. Check 10amp instrument fuse and replace if necessary.

2. Check 30amp main fuse and replace if necessary.

3. Remove Instrument Panel (see Paragraph 13.2.3) and check cable terminals for security.

4. Check wiring at Sender for security.

5. Replace Sender.

6. Replace Gauge.

12.7 CYLINDER HEAD TEMPERATURE GAUGE

The Cylinder Head Temperature Gauge is a Thermo-couple instrument and is not connected to the aircraft electrical system. See Wiring Diagram Figure 51. Should the instrument fail to operate:

1. Check for loose terminal connections and damage to wiring.

2. Replace thermo-couple.

3. Replace Gauge.

12.8 EXHAUST GAS TEMPERATURE GAUGE (OPTION)

The Exhaust Gas Temperature Gauge is a Thermo-couple instrument and is not connected to the aircraft electrical system. See Wiring Diagram Figure 51. Should the instrument fail to operate:

1. Check for loose terminal connections and damage to wiring.

2. Replace thermo-couple.

3. Replace Gauge.

12.9 HOURMETER

The Hourmeter is an electronic instrument. An optional Airspeed Switch may be fitted. Should the instrument fail to operate:

1. Check 10amp instrument fuse and replace if necessary.

2. Check 30amp main fuse and replace if necessary.

3. Remove Instrument Panel (see Paragraph 13.2.3) and check cable terminals for security.

4. Replace Gauge.

12.10 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.

12.11 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 facia is fitted.

Repair should only be performed by an approved instrument workshop.

13 SECTION 14 – ELECTRICAL SYSTEMS

13.1 ELECTRICAL POWER SUPPLY SYSTEM

Electrical energy for the aircraft is supplied by a 14 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.

The following paragraphs provide brief descriptions of the elements of the electrical system. They should be read in conjunction with the Wiring Diagram at Figure 51.

13.2 WIRING DIAGRAM

The Wiring Diagram is shown at Figure 51.

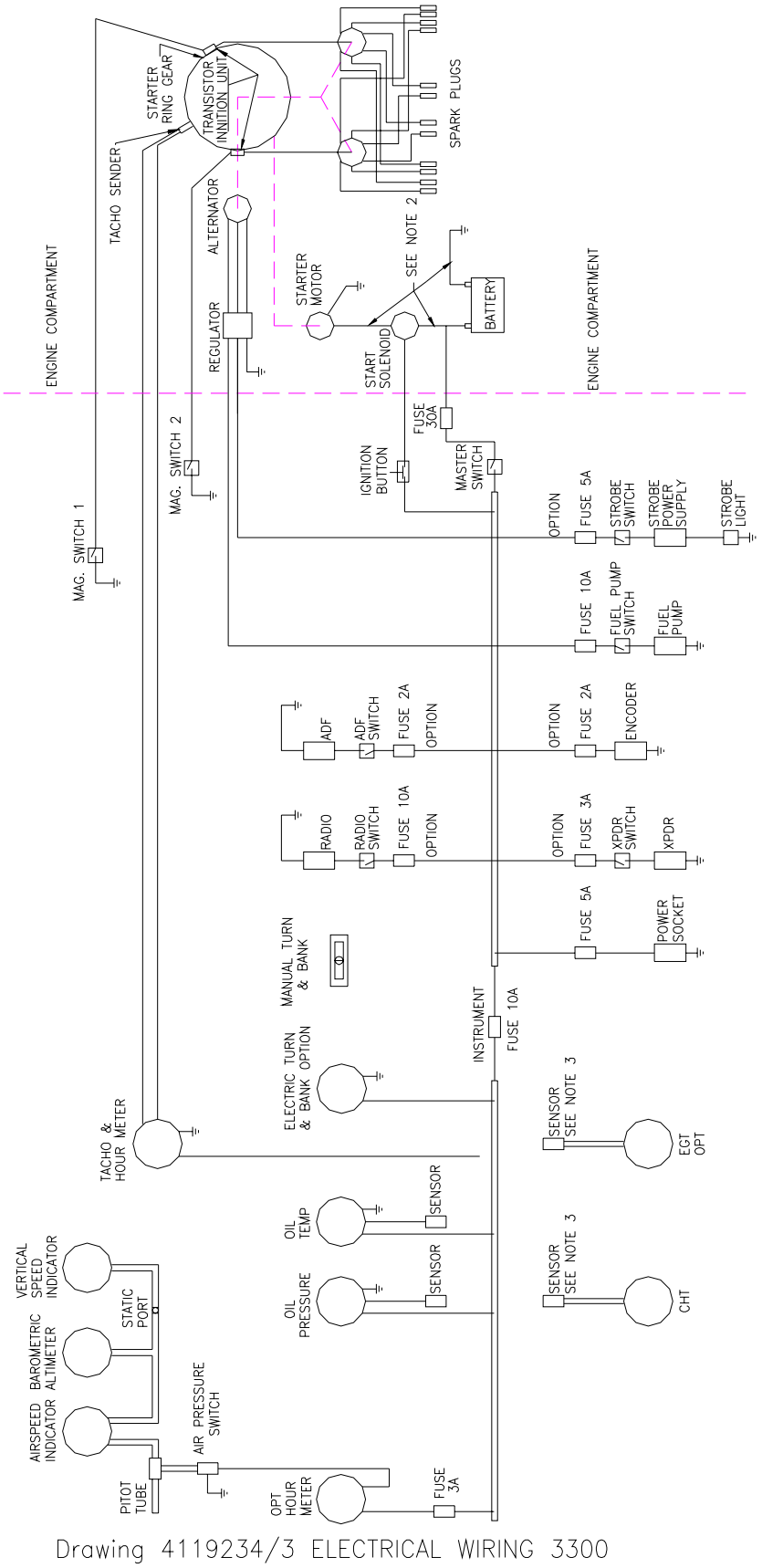


Figure 48. Wiring Diagram

13.3 BUS BARS

Electrical power for electrical equipment and installations is supplied through Bus Bars. The bus bars are mounted at the rear of the lower instrument panel. Access is gained by removing the main instrument panel (see Paragraph 13.2.3).

13.3.1 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 at Figure 51.

13.4 BATTERY POWER SYSTEM

Refer also to Wiring Diagram at Figure 51.

13.4.1 BATTERY

The battery is 12-volts and approximately 20 ampere-hour capacity. The battery is mounted in the engine compartment and is vented overboard.

13.4.2 BATTERY TROUBLE SHOOTING

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

13.4.3 REMOVAL AND INSTALLATION

1. Disconnect the battery security strap.

2. Disconnect battery drain.

3. 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).

4. Disconnect the cable from the positive battery terminal.

5. Lift the battery out of the battery box.

6. To replace the battery, reverse this procedure.

13.4.4 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.

13.4.5 BATTERY BOX

The battery box is located on the firewall in the engine compartment.

13.5 STARTER SOLENOID

The starter solenoid is a sealed unit. Service is limited to inspection of terminals for security and replacement of the unit.

13.6 VOLTAGE REGULATOR

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

13.7 STROBE SYSTEM (OPTION)

A white strobe light may be installed in the rear lower fuselage or in the cabin roof. The power source for the strobe light is located behind the fuel tank.

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.

13.8 ELECTRICAL LOAD ANALYSIS

As this aircraft is only certified 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.

13.9 RADIO WIRING DIAGRAM (OPTION)

The optional aircraft radio system diagram is provided with the radio manuals.

13.9.1 VHF ANTENNA INSTALLATION

The VHF antenna used consists of two aluminium bars permanently bonded in place inside the spar channel of the vertical fin. Figure 49 shows the position details of the two bars.

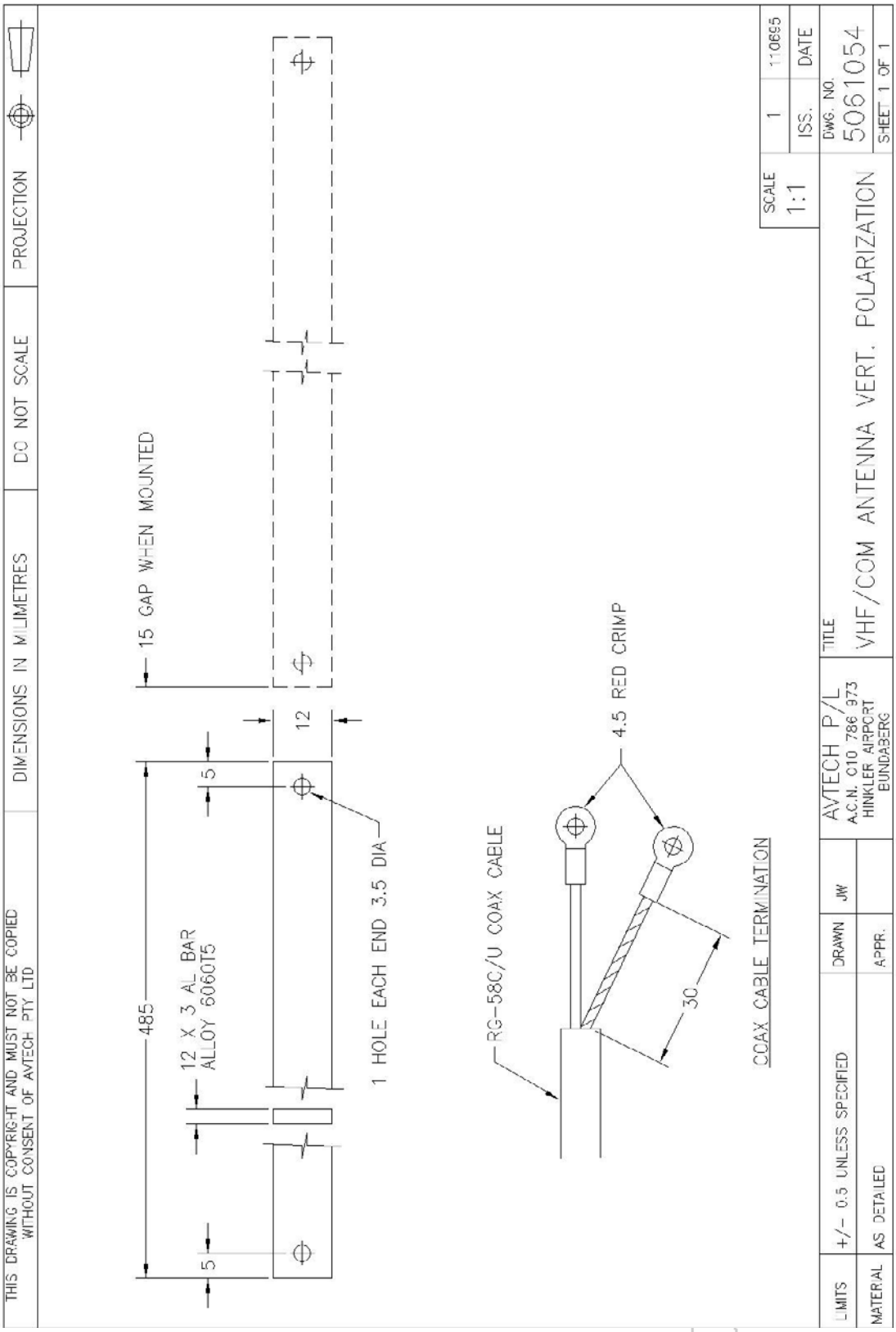


Figure 49. VHF Antenna Installation

14 SECTION 15 – PAINTING & FINISHING

14.1 INTERIOR

The interior is painted with BERGER Matt Vinyl – Standard colour is Fumosus A154 – Grey.

14.2 EXTERIOR

14.2.1 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 that others – checking densities and using lighter materials can save around 5kg on a typical Jabiru airframe.

14.2.2 MATERIALS RECOMMENDED

14.2.2.1 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

14.2.2.2 SANDPAPER

Note: aluminum 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

14.2.3 PAINTING EQUIPMENT REQUIRED

- Random Orbital Sander (approximately A$70.00)
- Gas Mask
- Compressor

- Spray Gun

14.2.4 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 fiberglass 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 discolored 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 color is WHITE only broken if desired, by pin strips 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 discolored 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 color 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 final coat. GOOD LUCK!

WARNING

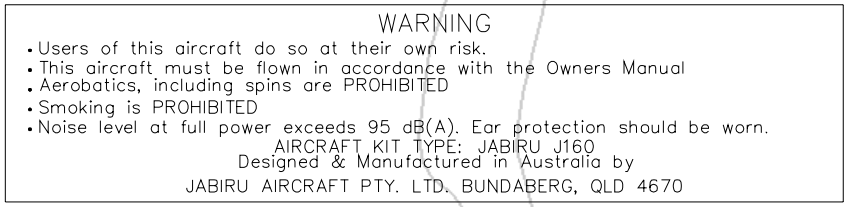
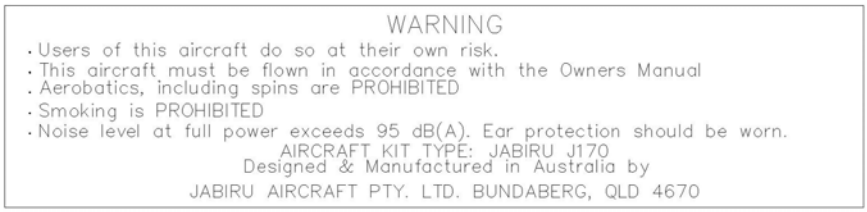
The Jabiru aircraft is only approved to be painted in basic White colour, so as to minimise the effects of heat and ultra-violet light to the aircraft structure.

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

15 SECTION 16 - PALCARDS

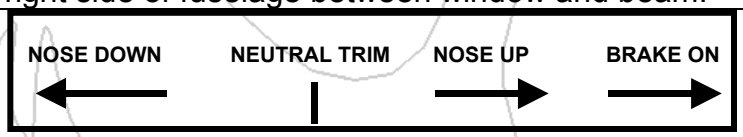
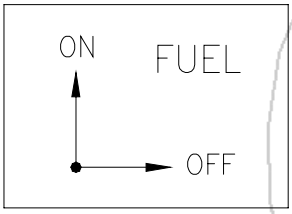
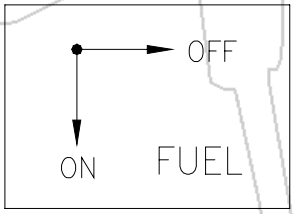
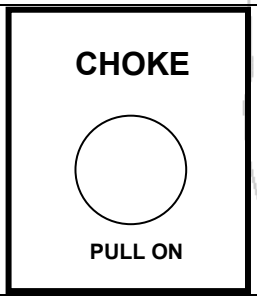
15.1 COCKPIT PLACARDS GENERAL

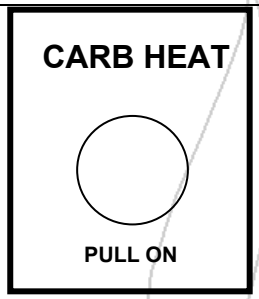
Table 13. General Cockpit Decals

Decal Detail	Preview
J160 Warning Placard P/No 5A011A0D	 Fitted on the rear Face of the Forward Wing Spar Carry-through Beam in the Cabin Ceiling.
J170 Warning Placard P/No 5A015A0D	 Fitted on the rear Face of the Forward Wing Spar Carry-through Beam in the Cabin Ceiling.
Owners Manual P/No 5036194	 Fitted to Inside of RH Door above the Door Pocket.
Door Open LHS P/No5027094	 Fitted to the Outsides of LH Door Above the Door Catch Lever
Door Open RHS P/No 5028094	 Fitted to the outside of RH Door Above the Door Catch Level
Door String Placard P/No5026094	 Fitted on Inside of both Doors Above Door Handle.
Fuel Contents	Fitted to sight glasses of wing fuel tanks.

15.2 COCKPIT CONTROL DECALS

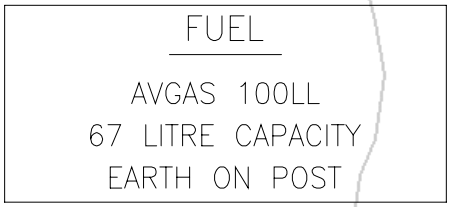
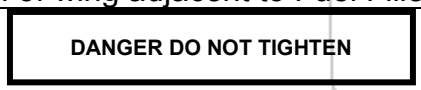
Table 14. Cockpit Control Decals

Decal Detail	Preview
Loading Limitations P/No 5098894	 Fit to right side of fuselage between window and beam.
Trim Position P/No5024094	 Fitted on the Top of the Main Beam Beside the trim control
Fuel Tap Position P/No 502319N	 Fitted on the Main Beam in front of the Fuel SELECTOR Valve
Fuel Tap Position P/No 502329N	 Fitted on the rear of the fuselage beam next to the wing tank valves
Choke Cable P/No5051094	

Decal Detail	Preview
	Fitted at the base of the choke cable.
Carby Heat P/No 5026194	 Fitted at the base of the CARBY Heat Cable.

15.3 EXTERNAL FUSELAGE

Table 15. External Fuselage Decals

Decal Detail	Preview
Static Port (P/No 5043094	 Attach to LHS of Vertical Fin in line with Static Tube
Electrical Earthing P/No 5078064	 Attach above the Earthing Pole adjacent to the Fuel Filler Cap.
Fuel Grade P/No 5091344 2 OFF	 Attach to top skin of wing adjacent to Fuel Filler Cap.
Wing Bolt Tightening P/No 5039094 Qty 8 Required	 Attach to the fuselage and wings beside each wing, and lift strut attachment fitting.

16 APPENDIX I - JABIRU 2200 ENGINE

Appendix 1 of this Manual is the Instruction and Maintenance Manual for the Jabiru 2200 engine.

Please insert your copy of the INSTRUCTION AND MAINTENANCE MANUAL that comes with your engine into this section if you are printing this out.

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17 APPENDIX II - JABIRU ENGINE PARTS BOOK

Please insert your copy of the INSTRUCTION AND MAINTENANCE MANUAL that comes with your engine into this section.

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18 APPENDIX III – ENGINE INSTALLATION MANUAL

Please insert your copy of the INSTALLATION MANUAL that comes with your engine into this section.

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19 APPENDIX IV – PROPELLER SERVICE MANUAL

19.1 APPROVED INSTALLATIONS

The following combinations are approved.

Table 16. Approved Propeller Installations

Airframe	Engine	Propeller	Dia x Pitch	Remarks/Limits
Jabiru J160	Jabiru 2200	C000	1524 x 1117 (60” x 44”)	Not above 3300 RPM
Jabiru J160-C	Jabiru 2200	C000	1524 x 1067 (60” x 42”)	Not above 3300 RPM
Jabiru J170	Jabiru 2200	C000	1524 x 1117 (60” x 44”)	Not above 3300 RPM
Jabiru J170-SP	Jabiru 2200	C000	1524 x 1067 (60” x 42”)	Not above 3300 RPM
Jabiru J170-SPC	Jabiru 2200	C000	1524 x 1067 (60” x 42”)	Not above 3300 RPM
Jabiru J170-UL	Jabiru 2200	C000	1524 x 1117 (60” x 44”)	Not above 3300 RPM

19.2 IDENTIFICATION STAMPINGS

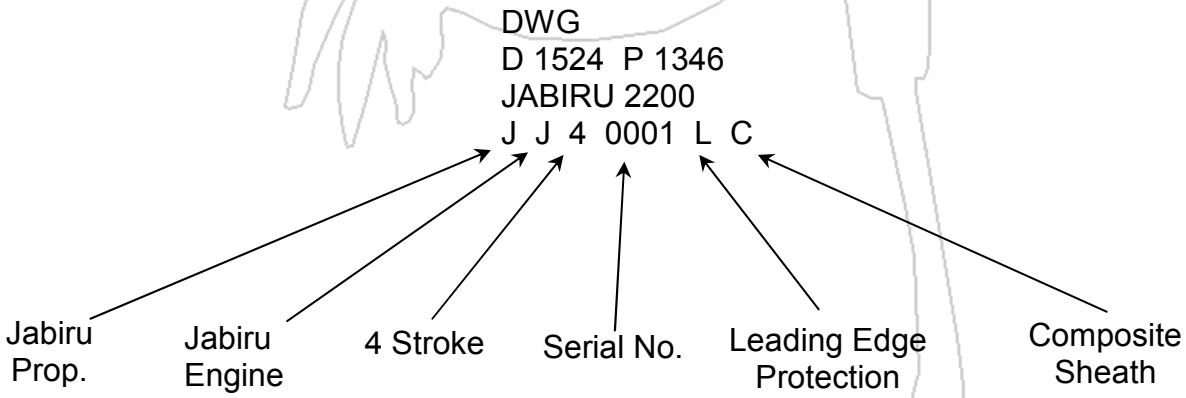
Each propeller is marked with the particulars indicated below:

1. The Propeller Drawing No.

2. The diameter and pitches in metres, proceeded by the letters "D" and "P" respectively.

3. The type of engine for which the propeller has been designed.

4. Manufacturing Serial No.



19.3 DESCRIPTION

The Propellers are constructed from 3 laminations of approved species timber and are manufactured in accordance with the relevant approved Drawing. They are single piece 2 blade propellers with an inlaid leading edge (urethane).

The propeller finish is a composite sheath, and clear epoxy paint (JABIRU Part No. PP0039N).

WARNING

In countries other than Australia, different registration requirements will apply. It is the owner's responsibility to become fully aware of the particular maintenance requirements and limitations applicable to the appropriate registration.

WARNING

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

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

19.4 INSTALLATION

Refer to Figure 52.

The Propeller is bolted to the Propeller Drive Flange with 6 x AN4 aircraft grade bolts attaching to Nyloc Nuts. There are 8 Belleville Washers between the Aluminium Propeller Flange and each nut. These Belleville washers must be fitted in pairs as shown in the attached drawing.

Bolts should be torqued to 6 nm (72 inch/lbs) in a standard torque sequence.

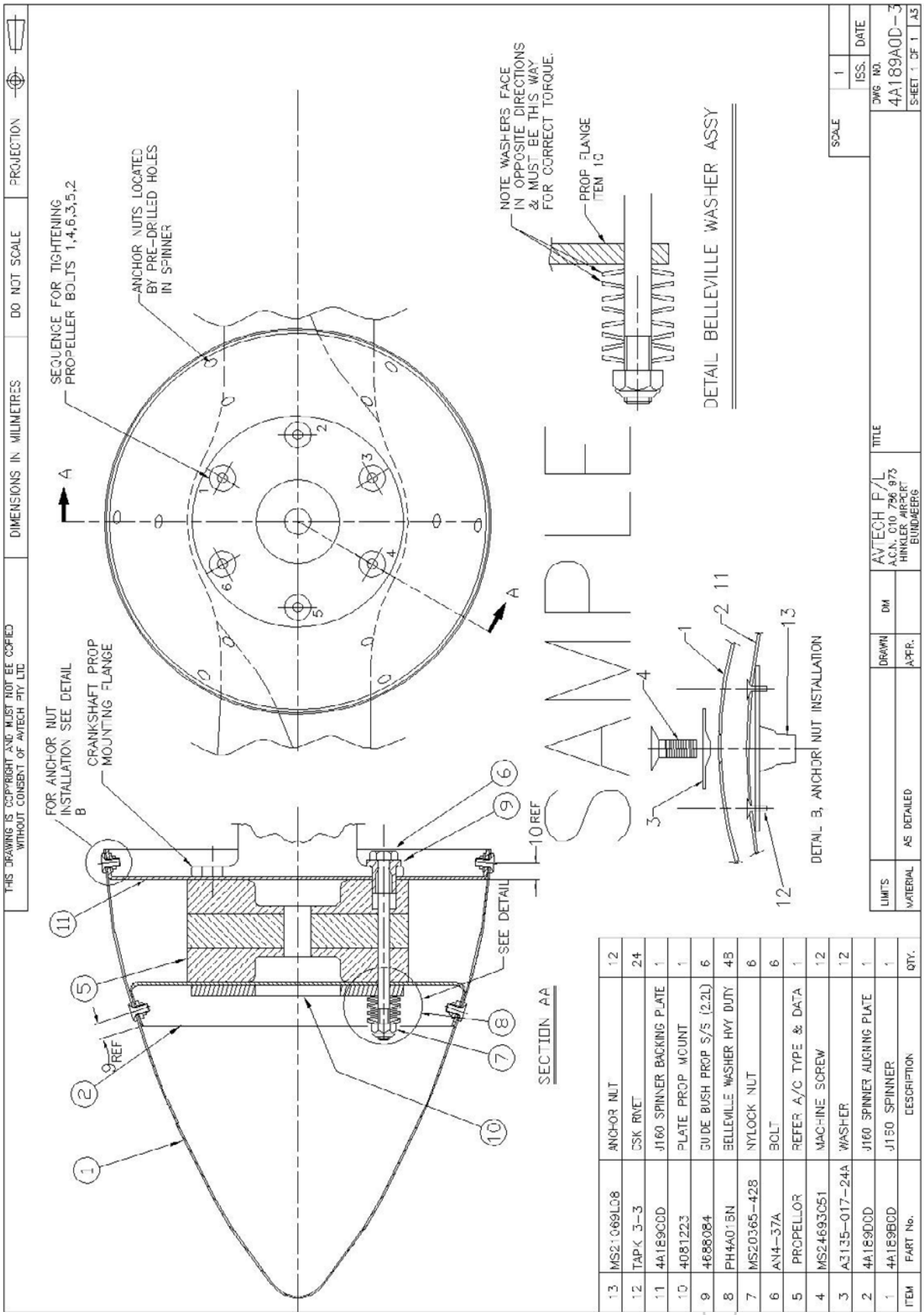


Figure 50. Propeller Installation

IMPORTANT

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.

19.5 TO REMOVE EXISTING PROPELLER

1. Remove Machine Screws and Tinnerman Washers from Spinner.

2. Remove Spinner.

3. Unbolt Propeller Bolts - 6 off.

4. Remove Bolts, Spinner Flange , Aluminium Propeller Flange, Belleville Washers and Propeller.

19.6 TO ASSEMBLE AND REPLACE PROPELLER ASSEMBLY

1. Ensure that Propeller drive bushes – 6 off, are in place in the Crankshaft Propeller Flange. Fit the rear spinner backing plate to the flange.

2. Fit propeller to flange. Ensure that the drive pins are snug fit in the propeller. Loose pins can cause propeller fretting and engine damage.

3. Fit Propeller Bolts - 6 off.

4. Fit front spinner backing plate to front of propeller. The fit Aluminium Propeller Flange, Belleville Washers - 42 off: (8 per Bolt: assembled in pairs as shown)

5. Progressively tighten bolts ensuring equal distribution of load and in a normal criss-cross torque sequence.

6. Using Torque Wrench, tighten Bolts to 6nm (72 inch/lbs.

7. Check tracking of Propeller by locating a fixed object on a flat floor so that it just clears the Propeller tips when rotating the Propeller by hand. Check that each blade clears the object by the same amount. If the Propeller is outside the approved tolerance, refer to JABIRU Aircraft Pty Ltd or a JABIRU Approved Service Centre.

   Maximum Tracking Error Tolerance is +/- 2mm.

8. Locate Spinner on Spinner Flange and fix with Machine Screws through tinnerman Washers.

9. Check Spinner for balance by locating a fixed object on a flat floor to just clear the lower edge of the front dome of the Spinner. Rotate the propeller by hand and check that the Spinner runs true.

10. Correct any imbalance by loosening and retightening Machine Screws.

19.7 SERVICING AND REPAIRS

Any service or repair must take account of the risk of subsequent Propeller failure. Therefore repairs are limited to the filling of small nicks in the Propeller. Maximum size of nicks approved for repair is:

- Those in Leading Edge: 4mm deep x 20mm long
- Those across the drive Face (flat sides) : 2mm deep x 6mm diameter or scratches not more than 0.5mm deep.

Repairs must also take account of the changes to balance of the Propeller and therefore the Propeller should be removed in accordance with the procedure described above. It must be checked for balance (see Paragraph 8) prior to refitting (see Paragraph 6), checked for tracking after reassembly (see Paragraph 6.4) and the Spinner checked for balance after reassembly (see Paragraph 6.7).

Only nicks within the size tolerances described above may be repaired. All propellers with cracks or splits (or any delamination of the composite sheath in the case of sheathed Propellers) must be either Rejected as unserviceable or returned to JABIRU Aircraft Pty Ltd or our local approved agent for assessment and possible repair.

In composite leading edges, nicks of a size described above may be repaired by filling with epoxy resin and Fibreflock using the procedure outlined below (Propeller Repair Kit is available from JABIRU as Part No. PP0049N):

1. Remove Propeller as per Paragraph 5.

2. Sand nick with abrasive paper to remove any fractured particles.

3. Mix resin carefully and thoroughly (equal parts resin and hardener) and thicken with Fibreflock to form a paste.

4. Apply paste to sanded nick and allow to cure in low moisture environment for 24 hours.

5. Lightly and carefully sand excess cured resin to a smooth surface matching exactly the previous aerofoil.

6. Refurbish with clear Epoxy paint (JABIRU Part No. PP0069N).

7. Rebalance Propeller (see Paragraph 8).

8. Reassemble and replace Propeller and Spinner (see Paragraph 6).

9. Check Propeller tracking and Spinner balance (see Paragraph 6).

10. Damaged urethane leading edges should be referred to Jabiru Aircraft Pty Ltd for repair.

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 V – AIRWORTHINESS LIMITATIONS

20.1 GENERAL

This Section sets forth each mandatory replacement time, structural inspection interval and related structural inspection procedure.

20.2 MANDATORY REPLACEMENT TIME

The following components MUST be replaced at the intervals described hereunder.

Table 17. Mandatory Replacement Times

Description	Part No.	Interval (Hours)
Rudder Cable	PC01714-2	2500
Elevator Cable	PC01814-1	2500
Aileron Cable (2)	PC01614-2	2500

20.3 STRUCTURAL INSPECTION INTERVALS

A visual inspection should be conducted each 100 hours in accordance with the Inspection Schedules detailed at Paragraph 2.3 of the Service Manual.

- This inspection should identify the commencement of any structural deterioration which will be evidenced by cracking of the paintwork, whiting of unpainted areas, movement of wing attachments and threaded bushes, movement of undercarriage attachments, loosening of firewall/engine attachments.

- Wing struts should be inspected for loose rivets, excessive clearance in wing strut attachments or corrosion.

- Cable clamps should be inspected for evidence of movement and security.

20.4 INSPECTION PROCEDURES

All inspection is by visual means.

Refer Paragraph 3 above and Paragraph 3.3 of the Service Manual