



# **CC11-100 AIRCRAFT MAINTENANCE MANUAL**

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Registration Number: NXXXXX**

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## Record of Revisions

Rev.	Change	Date	Prepared By	Approved By
NC	Initial Issue	07/06/2006	BdB	BdB
A	Reformatted to meet ASTM F2483-05.	08/09/2006	MO	DAS
B	Revised Section 6.1 to clarify maintenance authorization.	01/29/2008	SJT	SJH
C	Entire Manual Revised	04/27/2009	SJH	SJH
D	Revised 6.A. Revised Chapter 11.	07/10/2009	SJT	SJH
E	Revised Sections 5.2, 5.4.7, 5.4.8, 5.4.11, 5.4.13, 5.4.14, 5.6, 6.1, 6.2, 6.3.1, 6.3.8, 6.3.10, 6.3.11, 6.3.16, 6.3.17, 6.3.19, 6.3.24, and 6.A.	08/02/2010	SJT	SJH
F	Revised Sections 5.2, 5.3, 5.4.7, 5.4.13, 6.3.4, 6.3.11, 6.3.23, and Appendix 6.A	10/01/2010	SJT	SJH
G	Revised Sections 6.3.5, 6.5, and Appendix 6.A. Added Section 5.4.15	01/31/2011	SJT	ECL

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## List of Effective Pages

Rev	Pages	Change	Date	Prepared By	Approved By
NC	All	Initial Issue	07/06/2006	BdB	BdB
A	All	Reformatted to meet ASTM F 2483-05.	08/09/2006	MO	DAS
B	6.1	Added Maintenance Table and clarification	01/29/2008	SJT	SJH
C	All	Entire Manual Revised	04/27/2009	SJH	SJH
D	6.A.A3 11.2	Added Exhaust Bolt Check to Engine Group. Added 11.4 for Obtaining Latest Safety Information.	07/10/2009	SJT	SJH
E	5.2 Pg 3 Pg 4 Pg 8 Pg 12 5.4.7 Pg 2 5.4.8 Pg 2 5.4.11 Pg 2 5.4.13 Pg. ALL 5.4.14 Pgs 3 - 10 5.6 Pg 2 6.1 Pg. ALL 6.2 Pg 3 6.3.1 Pg 2 6.3.8 Pg 3 Pg 5 Pg 6 6.3.10 Pg 2 - 4 6.3.11 Pg 2 - 14 6.3.16 ALL  6.3.17 Pg 5 - 9 6.3.19 Pg 3 - 4  6.3.24 Pgs 2, 4-5 6.A Pg A1 Pg A5 Pg A9	Updated Figure 5.2.1 Revised to correct dimensions. Removed O-200-D from Engine Specs. Updated 8.6 for Metal and Composite. Clarified Tire Options. Updated engine photo. Updated Propeller list. Updated all Avionic Information. Added antenna locations. Updated all schematics for Avionics, Intercoms, Dynon and Lighting Options Updated Painting. Updated Authorization Table Updated Tire PSI chart Added ME-406 ELT Revised Figure 6.3.8.1. Revised bolt and washer quantities. Revised title to "3200-Type". Updated Troubleshooting chart for Engine does not start, rough running, and Note. Renamed 2.1 to Pin Vice Throttle Cable. Added 2.2 for Heavy Duty Throttle Cable. Reformatted Sections to General, Wood Propeller, and Maintenance. Added Needle Bearing info and Figure 6.3.17.2. Updated battery information. Reformatted Sections to Landing and Taxi Lights, Incandescent NAV/Anti-Collision, and LED NAV/Anti-Collision. Added Propeller position for storage and mooring. Revised Oil to 6 quarts. Added ME-406 ELT. Revised Oil Quantity to 6 quarts.	08/02/2010	SJT	SJH

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Rev	Pages	Change	Date	Prepared By	Approved By
F	5.2 Pg 3 Pg 4 5.3 Pg 3 & 5 5.4.7 Pg 2 5.4.13 Pg 4 6.3.4 Pg 4 Pg 5 Pg 6 6.3.11 Pg 15 6.3.23 Pg 1 16.A Pg A5	Added note to Figure 5.2.1. Added Amphib Gross Weight. Added Wheel Base with 3X3 Gear. Corrected typo to 6.A. Reworded approved tires. Added VSI to Table 5.4.6.1 on Performance VFR Panel. Clarified Wing Removal. Corrected type to 5.2.8. Clarified Wing Installation. Corrected Reference to Figure 6.3.11.10. Added Table 6.3.23.2 for 3X3 Gear. Added REF to SB00015.	10/01/2010	SJT	SJH
G	5.4.15 All 6.3.5 Pg 7 6.5.1 Pg 1 6.A Pg A5	Added "SEAT" section. Corrected Typographical spelling. Corrected Footer. Revised Item 6 to "Seats". Added rear seat information.	01/31/2011	SJT	ECL

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## **1 SCOPE**

### **1.1 General**

This manual has been prepared by Cub Crafters, Inc. in accordance with the standards of ASTM F2483. The manual provides the practices for the servicing and the maintenance of Cub Crafters' CC11-100 Sport Cub Light Sport Aircraft (LSA) and guidance for the qualifications necessary to perform the various levels of maintenance. It provides practices and guidance for servicing and maintenance that can be performed by a qualified pilot and owner, the preventive maintenance requirements of a 100-hour and an annual inspection, and the corrective line maintenance actions for the repairs, alterations, and the removal and re-installation of components.

### **1.2 Pilot/Owner Servicing and Maintenance**

This manual identifies servicing and maintenance actions, which can be performed by the owner/pilot, as identified in ASTM F2483, and who holds a light sport aircraft pilot's certificate (or greater) and who may not have received any specific authorized Sport Cub training. The maintenance actions authorized in this manual comply with the intent of FAA 14 CFR Part 43.3 with regard to preventive maintenance.

### **1.3 Preventive Maintenance**

This manual identifies the Sport Cub preventive maintenance tasks, which are to be accomplished by qualified personnel, and include the actions for the 100-hour inspection and the annual inspection.

### **1.4 Corrective Maintenance & Alterations**

This manual identifies the line maintenance, minor repair, and minor alteration tasks that can be accomplished by a holder of an LSA repairman certificate with either an inspection or maintenance rating.

No heavy maintenance, major repairs, or major alterations, as outlined in ASTM F2483 Sections 7 through 9, or in this maintenance manual, are authorized at this time, for this Sport Cub aircraft.

Any heavy maintenance, major repairs, or major alterations, as outlined in ASTM F2483 Sections 7 through 9, can only be performed by Cub Crafters, Inc. or only as provided by Cub Crafters' approved engineering data.

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## 2 REFERENCE DOCUMENTS

ASTM F2483 – Standard Practice for Maintenance and the Development of Maintenance Manuals for Light Sport Aircraft

ASTM F2245 – Specification for the Design and Performance of a light Sport Aircraft.

ASTM F2295 – Practice for Continued Operational Safety Monitoring of a Light Sport Aircraft

14 CFR Part 43 – Maintenance, Preventive Maintenance, Rebuilding, and Alteration

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### 3 TERMINOLOGY

#### (1) DEFINITIONS

- (a) LSA Airplane (Light Sport Aircraft Airplane) – a powered fixed wing aircraft designed per Specification F 2245 that is manufactured and delivered ready to fly. The Light Sport Aircraft is also defined by 14 CFR 1.1
- (b) Annual Condition Inspection – detailed inspection accomplished once a year on a LSA in accordance with instructions provided in the maintenance manual supplied with the aircraft. The purpose of the inspection is to look for any wear, corrosion, or damage that would cause an aircraft to not be in a condition for safe operation.
- (c) A&P – airframe and powerplant mechanic as defined by 14 CFR Part 65 in the U.S. or equivalent certification in other countries.
- (d) FAA – United States Federal Aviation Administration.
- (e) Heavy Maintenance – any maintenance, inspection, repair, or alteration a manufacturer has designated that requires specialized training, equipment, or facilities.
- (f) Line Maintenance – any repair, maintenance, scheduled checks, servicing, inspections, or alterations not considered heavy maintenance that is approved by the manufacturer and is specified in the manufacturer's maintenance manual.
- (g) LSA Repairman Inspection – U.S. FAA certificated repairman (light sport aircraft) with an inspection rating, defined by 14 CFR Part 65, authorized to perform the annual condition inspection on experimental light sport aircraft, or an equivalent rating issued by other civil aviation authorities.
- (h) Discussion – Experimental LSA do not require the individual performing maintenance to hold any FAA airman certificate in the U.S.
- (i) LSA Repairman Maintenance – U.S. FAA certificated repairman (light sport aircraft) with a maintenance rating as defined by 14 CFR Part 65, authorized to perform line maintenance on aircraft certificated as special LSA aircraft. Authorized to perform the annual condition/100-hour inspection on an LSA, or an equivalent rating issued by other civil aviation authorities.

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- (j) Maintenance Manual(s) – manual provided by an LSA manufacturer or supplier that specifies all maintenance, repairs, and alterations authorized by the manufacturer.
- (k) Major Repair, Alteration, or Maintenance – any repair, alteration, or maintenance for which instructions to complete the task excluded from the maintenance manual(s) supplied to the consumer are considered major.
- (l) Manufacturer – any entity engaged in the production of an LSA or component used on an LSA.
- (m) Minor Repair, Alteration, or Maintenance – any repair, alteration, or maintenance for which instructions provided for in the maintenance manual(s) supplied to the consumer of the product are considered minor.
- (n) Overhaul – maintenance, inspection, repair, or alterations that are only to be accomplished by the original manufacturer or a facility approved by the original manufacturer of the product.
- (o) Overhaul Facility – facility specifically authorized by the aircraft or component manufacturer to overhaul the product originally produced by that manufacturer.
- (p) Repair Facility – facility specifically authorized by the aircraft or component manufacturer to "repair the product originally produced by that manufacturer.
- (q) 14 CFR-Code of Federal Regulations Title 14 Aeronautics and Space also known as the "FARs" or Federal Aviation Regulations.
- (r) 100-hour inspection – same as an annual condition inspection, except the interval of inspection is 100 h of operation instead of 12 calendar months. This inspection is utilized when the LSA is being used for commercial operations such as flight instruction or rental, or both.

**(2) ACRONYMS**

- (a) POH – pilot operating handbook.
- (b) LSA (Light Sport Aircraft)—used herein to refer to both LSA airplanes and LSA airplane kits.

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## **4      SIGNIFICANCE AND USE**

The purpose of this maintenance manual is to provide guidance to owners, mechanics, airports, regulatory officials, and aircraft and component manufacturers who may accomplish maintenance, repairs, and alterations on the Cub Crafters CC11-100 Light Sport Aircraft.

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**CHAPTER**

**5**

**AIRCRAFT  
MAINTENANCE  
MANUAL**

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**5      AIRCRAFT MAINTANENCE MANUAL**

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5.2 ..... GENERAL: SPECIFICATIONS & DATA

5.3 ..... PERIODIC & ANNUAL INSPECTION REQUIREMENTS

5.4 ..... MAINTENANCE, REPAIR & ALTERATIONS of PRIMARY STRUCTURES

5.5 ..... STRUCTURAL REPAIRS

5.6 ..... PAINTING & COATINGS

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5.1    FORMAT & GUIDANCE FOR THE USE OF THIS MANUAL

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# **CUB CRAFTERS, INC. CC11-100 MAINTENANCE MANUAL**

## **1 GENERAL**

Cub Crafters, Inc. prepared this aircraft maintenance manual. It contains the information that a trained mechanic will need to maintain the aircraft in an airworthy condition.

The Aircraft Maintenance Manual was prepared to meet the ASTM F2483 Standard Specification requirements. The format of the manual is designed to be familiar to most modern aircraft mechanics.

This maintenance manual does not reflect part numbers and cannot be used for ordering replacement parts.

The wiring schematics that have been included in the manual are for general information purposes only. Aircraft will have optional equipment for which there will be specific drawings that will either be included with the aircraft's documentation on delivery or be available from Cub Crafters, Inc.

## **2 LAYOUT OF THE MANUAL**

This maintenance manual is divided into chapters. The chapter numbers appear at the foot of each page.

Each chapter contains its own table of contents. Where the systems are complex, the table of contents will be found in the sub chapter (as is the case of Chapter 6).

## **3 WARNINGS, CAUTION AND NOTES**

### **WARNING**

**AN OPERATING PROCEDURE, PRACTICE, OR A CONDITION, WHICH, IF NOT CORRECTLY FOLLOWED OR REMEDIED, COULD RESULT IN SERIOUS PERSONAL INJURY OR LOSS OF LIFE.**

### **CAUTION**

**An operating procedure, practice, or a condition, which, if not strictly observed or corrected, could result in destruction of, or damage to equipment.**

### **NOTE**

An operating procedure, practice, or condition, which is important to emphasize.

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#### **4 REVISION SERVICE**

The Maintenance Manual will be made available to aircraft owners and repair shops on a subscription basis. Revisions will be sent to registered subscribers as they become available.

Revisions may also be obtained by submitting a request to:

Cub Crafters, Inc.  
Address:..... 1918 S. 16th Avenue  
                                    Yakima WA 98903  
                                    USA  
Telephone: ..... (509) 248-9491  
Telephone: ..... (877) 484-7865  
Fax: ..... (509) 248-1421  
Website:..... [www.cubcrafters.com](http://www.cubcrafters.com)  
Email:..... [support@cubcrafters.com](mailto:support@cubcrafters.com)

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**5.2 GENERAL: SPECIFICATIONS AND DATA**

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## **1. GENERAL**

The location of any point on the aircraft is identified in a three axis grid as follows (Reference Figure 5.2.1):

- FS - Fuselage Station is a horizontal reference designation starting in front of the nose of the airplane at a point 60 inches ahead of the wing leading edge.
- WL - Water Line is a vertical reference designation measured parallel to the ground from a point 38.53 inches below the center of the bolts that attach the landing gear to the fuselage.
- BL - Buttock Line is a horizontal reference designation starting at the airplane centerline. When the aircraft is viewed from above, the letters "L" and "R" indicates whether the point is to the left or the right of the centerline.
- WS - Wing Station is measured outboard from the center of the respective wing attachment bolt to the wing tip. The letters "L" and "R" designate left or right wing respectively.

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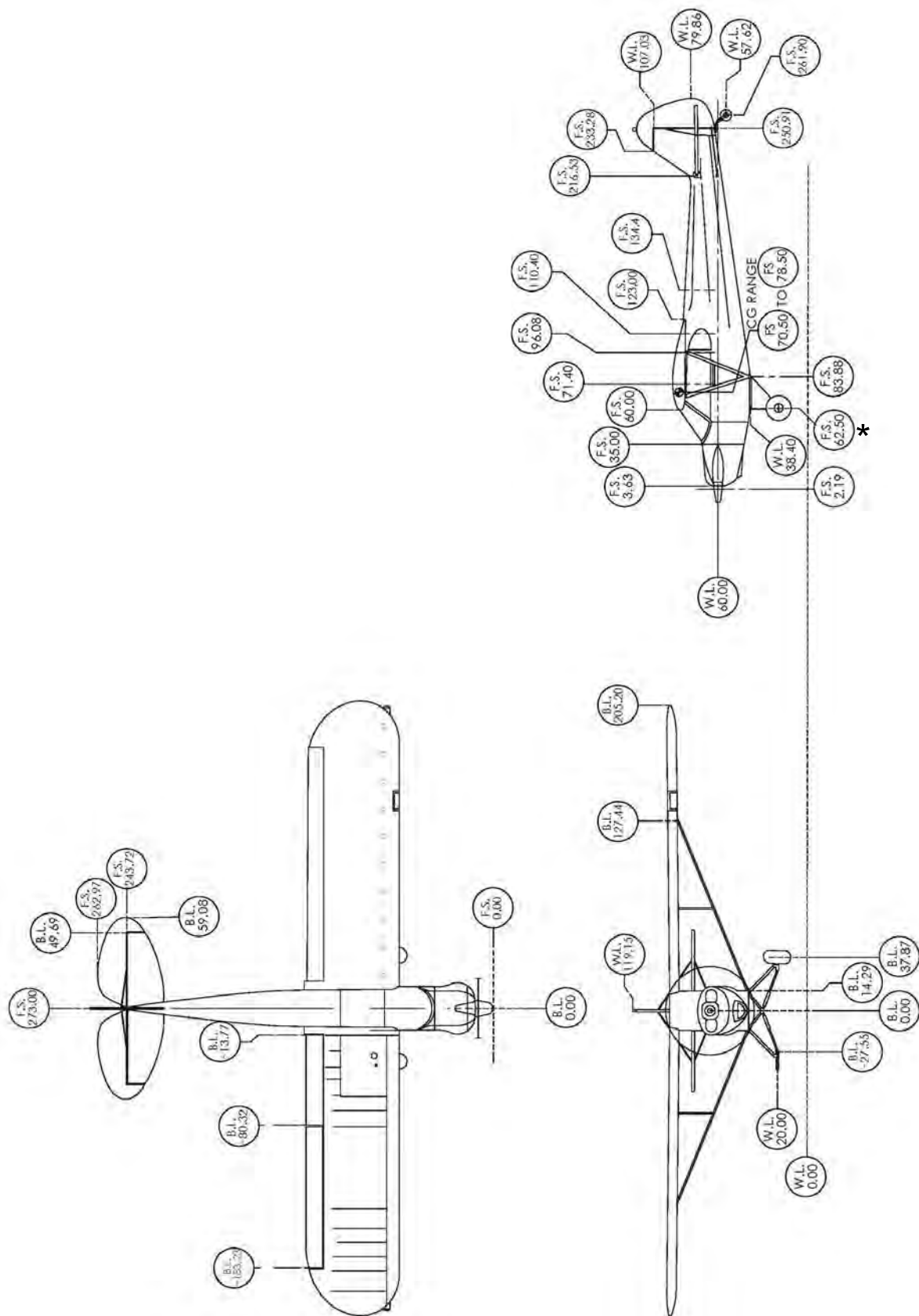


Figure 5.2.1: Aircraft Geometry

\* - 3X3 Landing Gear is at F.S. 59.50

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**MAIN DIMENSIONS**

Span ..... 411 in.  
Length (level flight attitude) ..... 273 in.  
Length (three point attitude) ..... 290 in.  
Height ..... 114 in. Max  
Height (tail wheel on ground, propeller blade vertical at top)\* ..... 84.5 in.  
Propeller Ground Clearance\* ..... 23 in.  
Design Gross Weight (Wheels) ..... 1320 lbs  
Design Gross Weight (Seaplane/Amphibs) ..... 1430 lbs

\*With Sensenich Wood Propeller Company model W72GK-44 Wood Composite  
Propeller and 6.00x6 wheels

**(2) WINGS**

Type ..... Externally Braced, High Wing  
Airfoil Section ..... USA 35B Mod at Root and Tip  
Chord at Root ..... 63 in.  
Dihedral (measured on underside of front spar) ..... 0.75°  
Area ..... 179 sq ft  
Aspect Ratio ..... 6.50

**(3) AILERONS**

Area (Both ailerons) ..... 19.25 sq ft

**(4) FLAPS**

Area (Both flaps) ..... 12.60 sq ft.

**(5) HORIZONTAL STABILIZER**

Span ..... 118 in.  
Maximum Chord ..... 27 in.  
Incidence (in neutral position) ..... -2.5°  
Dihedral ..... 0°  
Area (including elevators) ..... 14.10 sq ft.

**(6) FIN AND RUDDER**

Area ..... 11.22 sq ft.

**(7) LANDING GEAR**

Wheel Track (main to main) ..... 75.74 in.  
Wheel Base (main to tail) ..... 199.4 in.  
Wheel Base (main to tail with 3x3 Landing Gear) ..... 202.4 in.

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**(8) CONTROL SURFACE TRAVELS AND CABLE TENSION SETTINGS**

**(a) Aileron**

Aileron Up .....  $18^{\circ} \pm 2^{\circ}$   
Aileron Down .....  $18^{\circ} \pm 2^{\circ}$   
Aileron Cable Tension .....  $40 \pm 5$  lbs.

**(b) Flaps**

First Notch .....  $15^{\circ} \pm 3^{\circ}$   
Second Notch .....  $35^{\circ} \pm 3^{\circ}$   
Third Notch .....  $50^{\circ} \pm 3^{\circ}$

**(c) Stabilizers**

Neutral Setting .....  $-2.5^{\circ}$  relative to longitudinal axis  
Stabilizers Up .....  $2.5^{\circ} \pm 0.5^{\circ}$   
Stabilizers Down .....  $4^{\circ} \pm 0.5^{\circ}$

**(d) Elevators**

Elevator Up .....  $25^{\circ} \pm 2^{\circ}$   
Elevator Down .....  $15^{\circ} \pm 2^{\circ}$   
Elevator Cable Tension .....  $60 \pm 2$  lbs.

**(e) Rudder**

Rudder Left .....  $25^{\circ} \pm 2^{\circ}$   
Rudder Right .....  $25^{\circ} \pm 2^{\circ}$

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## **2. EQUIPMENT LIST**

This section provides a list of components and equipment that the operator is likely to change on the aircraft.

<b>Description</b>	<b>Ref. In AMM</b>
6.00x6, 8.00x6, 8.50x6, 26"x6, 29"x6 main wheel and tires	5.4.6 or 6.3.7
Main landing gear without wheels and tires	5.4.6 or 6.3.7
Tail wheel with tire	5.4.6 or 6.3.7
Sensenich Wood Propeller Company model W72GK-44 72" McCauley 71-41 Metal Propeller McCauley 75-38 Metal Propeller Sensenich Ground Adjustability Composite Propeller, 72" Catto Propellers Wood/Fiberglass Composite	5.4.11 or 6.3.16

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**3. PURCHASE PARTS SOURCE LISTS**

**3.1 Consumable or Frequently Replaced Items**

<b>Description</b>	<b>Part Number (Reference purpose)</b>	<b>Source</b>
Engine Oil Filter (if equipped)	K&N HP1008	Cub Crafters or Local Auto Parts Store
Brake Fluid	MIL-H-5606G (Aeroshell #41)	Cub Crafters or Aircraft Parts Store
Air Filter	SC54108-001	Cub Crafters

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**4. ENGINE SPECIFICATIONS AND DATA**

<b>Engine Model</b>	<b>O-200-A</b>
Number of Cylinders	4
Bore & Stroke	4.062 in x 3.875 in
Compression Ratio	7.0:1
Piston Displacement	201 in <sup>3</sup>
Rated Power at Sea Level	100 HP @ 2750 RPM
Maximum Pressure at Rated RPM	29.3 in. Hg.
Oil Pressure at Cruising	30-60 psi
Minimum Idling Oil Pressure	10 psi
Minimum Oil Temperature	75° F
Maximum Oil Temperature	240° F(detergent oil)
Maximum Cylinder Head Temperature	525° F
Engine Weight – Dry	190 lb
Oil Sump Capacity	6 quarts
Recommend TBO	1800 hours
Engine Mount Torque Value	180-190 in-lbs

Refer to Teledyne-Continental Motor's Engine Operator's Manual for the operating limits.



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## **5. WEIGHT AND BALANCE DATA**

Refer to CC11 Pilot's Operating Handbook and Airplane Flight Manual, SC10000AFM, Section 6 for the Weight and Balance Data.

## **6. TIRE INFLATION**

Refer to section 6.2.3 of this manual for the tire inflation data.

## **7. APPROVED OILS AND CAPACITIES**

Refer to the POH or Section 6.2.3 of this manual for the approved oil and capacity data.

## **8. RECOMMENDED FASTENER TORQUES**

### **8.1 General Torque Values**

This chapter gives the requirements for torquing the fasteners.

No lubricating or anti-seize compounds are to be applied to threaded fasteners except when specified. At the time of installation, the threads must be clean and free of corrosion, paint or any products other than those applied by the fastener's manufacturer

### **8.2 Definitions**

**Running Torque:** The average torque developed after the fastener is at least one full thread through the nut, but prior to the tightening of the joint (also called self-locking torque, locking torque, friction drag torque).

**Assembly Torque:** The torque required by design engineering in order to create the desired axial load on the bolt/nut assembly (also called tightening torque or installation torque).

### **8.3 Torquing Requirement**

Whenever possible, the nut shall be turned during torquing.

Where it is necessary to tighten the fastener assembly from the head, the installation torque shall be the maximum torque indicated in Chapter 5.2.9.7 + 10 percent.

**Note**

This is only applicable for fasteners greater than 3/16" in diameter.

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When nuts are to be secured to fasteners by means of cotter pins or lock wire, the low side of the specified torque range shall be approached for tightening. If necessary, tightening shall be continued until the next slot aligns with the hole.

Nuts shall not be loosened to obtain the required alignment.

The maximum torque shall not be exceeded.

Threaded fasteners which have been torqued above the maximum value specified **shall not** be backed off and re-torqued but shall be removed, rejected and rendered unserviceable.

If there is any doubt a fastener has been under-torqued, the nut shall be backed off one complete rotation (360°) maximum and retightened to the specified value; the bolt, screw or stud must not be allowed to rotate.

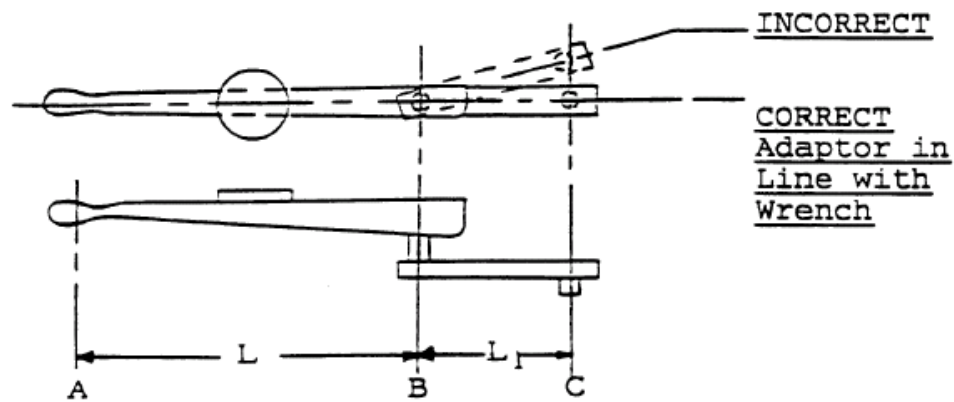
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#### **8.4 Use of Torque Wrenches and Adaptors**

All final torquing shall be carried out with certified torque wrenches or torque screwdrivers.

When adaptors or extensions are used on manually operated torque wrenches, they shall be aligned as shown in Figure 5.2.2 and the dial reading required shall be calculated from the following formula:

$$\text{Dial Reading} = \frac{\text{Specified Torque} \times L}{L + L_1}$$



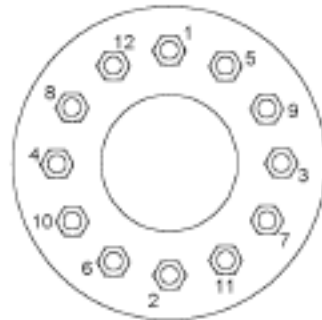
- A = fulcrum point of handle
- B = centre line of wrench drive
- C = centre line of adaptor or extension drive
- L = distance from fulcrum point of handle to centre line of wrench drive
- L<sub>1</sub> = distance from centre line of wrench drive to centre line of adaptor or extension drive

**Figure 5.2.2: Use of Torque Wrenches**

Dimensions must be measured in the same units (i.e. both in inches, both in feet, etc.) for each calculation. Different units must not be mixed.

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## 8.5 Torquing Patterns



TYPICAL CIRCULAR PATTERN TORQUING SEQUENCE



TYPICAL LINEAR PATTERN TORQUING SEQUENCE

**Figure 5.2.3: Torque Pattern**

Whenever applicable, the following pattern must be followed when torquing fasteners:

## 8.6 Specific Torque Requirements

Item	Chapter/Section Reference	Minimum Dry Torque Inch Pounds	Maximum Dry Torque Inch Pounds
Sensenich Wood Propeller Company W72GK-44	6.3.16	175	225
McCauley Metal Propeller	6.3.16	300	360
Sensenich Composite Propeller	6.3.16	340	360
Spark Plugs	6.3.18	300	360

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**8.7 General Torque Values**

BOLTS - STEEL TENSION					BOLTS - STEEL TENSION				BOLTS - ALUMINUM			
AN3 THRU AN 20 AN42 THRU AN49 AN73 THRU AN81 AN173 THRU AN186 MS20033 THRU MS20046 MS20073 MS20074 AN509 MS24694 AN525 MS27039					MS20004 THRU MS20024 NAS 144 THRU NAS158 NAS333 THRU NAS340 NAS538 THRU NAS590 NAS624 THRU NAS644 NAS1303 THRU NAS1320 NAS172 NAS174 NAS517  <b>STEEL SHEAR BOLT</b> NAS464 NAS1103 NAS1104 NAS1105				AN3DD THRU AN20DD AN173DD THRU AN186DD AN509DD AN525D MS27039D MS24694DD			
NUTS - STEEL					NUTS - STEEL				NUTS - ALUMINUM			
TENSION		SHEAR			TENSION		SHEAR		TENSION		SHEAR	
AN363 AN365 NAS1021 MS21045 MS20365 MS20500 NAS679		AN364 MS20364 NAS1022 NAS1024-1030 NAS1067-1068 NAS680-687 NAS696-698			AN363 AN365 MS20365 MS21045 NAS1021 NAS1291 NAS679		AN364 NAS1022 MS20364		AN365D NAS1021D		AN364D NAS1022D	
THREAD SIZE (FINE)	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
10-32	38	43	30	33	43	48	33	38	28	33	23	28
1/4-28	80	100	60	70	110	130	80	90	60	75	45	60
5/16-24	160	200	120	145	180	205	130	150	100	125	85	100
3/8-24	240	270	175	190	280	330	200	230	155	190	125	150
7/16-20	550	600	370	400	620	730	400	500	280	380	210	270
THREAD SIZE (COARSE)	MIN.	MAX.	MIN.	MAX.								
8-32	27	30	22	24								
10-32	38	43	30	33								
1/4-20	70	80	55	60								
5/16-18	140	150	108	115								
3/8-16	240	265	175	190								
7/16-14	335	355	240	255								

**Table 5.2.1: Torque Values (Friction drag torque already included)**

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## **9. GENERAL SAFETY INFORMATION**

There are many hazards inherently present when performing any maintenance task on this aircraft. To minimize the risk to both yourself and others, begin by thinking through each task that is to be performed before starting any work. Using common sense, think of ways to avoid these hazards. Remember also that many accidents happen because of carelessness. Be sure to also use the right tool for the task at hand and to use the proper personal protective equipment. Such equipment may include, but is not limited to:

- Eye protection – safety glasses, goggles, and face shield
- Gloves
- Hearing protection – ear plugs or muffs
- Apron
- Protective footwear with non-slip soles

You should also keep on hand a suitable fire extinguisher, absorbent material to contain spills, an eyewash bottle, and a general-purpose first aid kit. It is also advisable to have on hand the material safety data sheet (MSDS) for all products and chemicals that will be used during the servicing of the aircraft.

Some other general rules to follow are:

- Never leave the ignition switch or the master switch turned on when the engine is not running. Doing so could allow the engine to fire if the propeller were rotated by hand.
- Never operate the engine with untrained personnel around – everyone who is essential to be in the area should be reminded that a spinning propeller may be lethal yet almost invisible. Remove hats when running the engine to keep them from being removed by the propeller slipstream.
- Remove any loose clothing, such as neckties and scarves. Tuck in your shirt and secure any long hair to prevent them from becoming tangled in power tools.
- Remove all jewelry. Not only can items such as rings, watches, and necklaces become caught in rotating tools, they can also conduct electricity and may cause a short circuit. This could result in burns or damage to electrical circuits.
- Disconnect the negative lead from the battery when doing any electrical work that does not involve troubleshooting the electrical systems. This will reduce the risk of a short circuit or even a fire.
- The lead acid battery will emit hydrogen gas when charging, which is highly flammable. Any nearby source of ignition such as sparks or an open flame can result in an explosion. Keep all ignition sources away from the battery.
- Aviation gasoline is also highly flammable. When working with the fuel system, always work in a well-ventilated environment. Any nearby source of ignition such as sparks or an open flame can result in a fire or explosion. Keep all ignition sources away. Always ground the airframe to a suitable earth ground during fueling/defueling operations to reduce the risk of a static discharge ignition source.
- When working with the landing gear, always support the aircraft properly with jacks. Do not work underneath the aircraft unless it is properly supported.

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## 10. FLIGHT SAFETY REPORTING INSTRUCTIONS


This form is to be used for the owner/operator of the aircraft to provide information to Cub Crafters, Inc. of any safety of flight or service difficulty experienced with the aircraft in accordance with ASTM F2295. Additional forms may be obtained by writing or calling Cub Crafter's customer service department at 509-248-9491.

It is the responsibility of the owner/operator to notify Cub Crafters of any safety of flight issue or significant service difficulty upon discovery.

After completing the form below, e-mail or mail it to:

Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903  
[support@cubcrafters.com](mailto:support@cubcrafters.com)

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		CONTINUED OPERATIONAL SAFETY REPORTING FORM	
<i>Print or type all entries</i>			
NAME (Last, First and Middle)		AIRCRAFT MODEL	
ORGANIZATION (If applicable)		AIRCRAFT SERIAL NUMBER	
ADDRESS (Number, street, city, state, and postal code)		AIRCRAFT REGISTRATION NUMBER	
PRIMARY TELEPHONE NUMBER	ALTERNATE TELEPHONE NUMBER	E-MAIL ADDRESS (optional)	
DESCRIPTION OF SAFETY OF FLIGHT ISSUE OR SIGNIFICANT SERVICE DIFFICULTY (Describe in detail. Use additional pages if necessary.)			
SIGNATURE		DATE	

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**5.3 PERIODIC AND CONDITION INSPECTION REQUIREMENTS**

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(1) Visual Inspection .....	2
(2) Operational Inspection .....	3
(3) Functional Inspection .....	3
2. CONDITION INSPECTION TASKS.....	5
3. PERIODIC INSPECTION TASKS.....	5

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## **1. GENERAL**

This section is intended to serve as a guide for a certified airframe and powerplant mechanic to perform routine maintenance on the aircraft. It is the responsibility of the owner and/or the operator to maintain the aircraft in an airworthy condition and ensure that all applicable Safety Directives, Safety Alerts, and Service Bulletins have been complied with. Furthermore, it is the responsibility of the owner and/or the operator to ensure that the airplane is inspected as specified in Parts 43 and 91 of the Federal Aviation Regulations. This inspection guide is not intended to replace the good judgment of a certified airframe and powerplant mechanic.

The guide will make reference to service information provided by other vendors, such as the manufacturer of the engine. The persons performing the maintenance on the aircraft must ensure that they have the latest editions of these publications. This guide will not make reference to revision levels of vendor publications.

This guide will be applicable to the aircraft in the configuration it left Cub Crafters when it was first delivered and it may not cover modifications made to the aircraft subsequently.

### **Inspection Groups and Criteria**

#### **(1) Visual Inspection**

Visual inspections will normally apply to those areas, surfaces, and/or items that become visible by the removal or opening of access doors, panels, fairings, or cowlings.

Visual Inspection criteria will normally consist of, but are not limited to the following criteria:

##### **(A) Moving Parts**

Proper operation, correct alignment, security, sealing, cleanliness, lubrication, adjustment, tension, travel, condition, binding, excessive wear, cracking, corrosion, deformation, and any other apparent damage.

##### **(B) Fabric Covered Parts**

Security, condition, cleanliness, wear, cracking, obstruction of drainage or vent holes, deformation, heat deterioration, fluid saturation, and any other apparent damage.

##### **(C) Metal Parts**

Security, condition of finish, cleanliness, distortion, fatigue cracks, cracked welds, corrosion, and any other apparent damage.

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(D) Fuel and Hydraulic Oil Lines and Hoses

Cracks, dents, kinks, loss of flexibility, deterioration, obstruction, chaffing, improper bend radius, cleanliness, security, and any other apparent damage.

(E) Electrical Wiring

Cleanliness, loose, corroded, or broken terminals, chaffed, broken, or worn insulation; security; heat deterioration, and any other apparent damage.

(F) Bolts and Nuts

Fretting, wear, damage, stretch, proper torque and safety wiring.

(G) Filters and Screens

Filters and screens shall be removed, cleaned, inspected for contamination, or replaced as applicable.

(H) Fuel Tank Areas

Evidence of leaks

Inspection forms in Appendix 6.A may be used as a guidance to perform the visual inspection.

(2) Operational Inspection

An operational inspection is a check intended to determine that a component or system is fulfilling its intended purpose. The operational inspection does not require quantitative tolerances.

(3) Functional Inspection

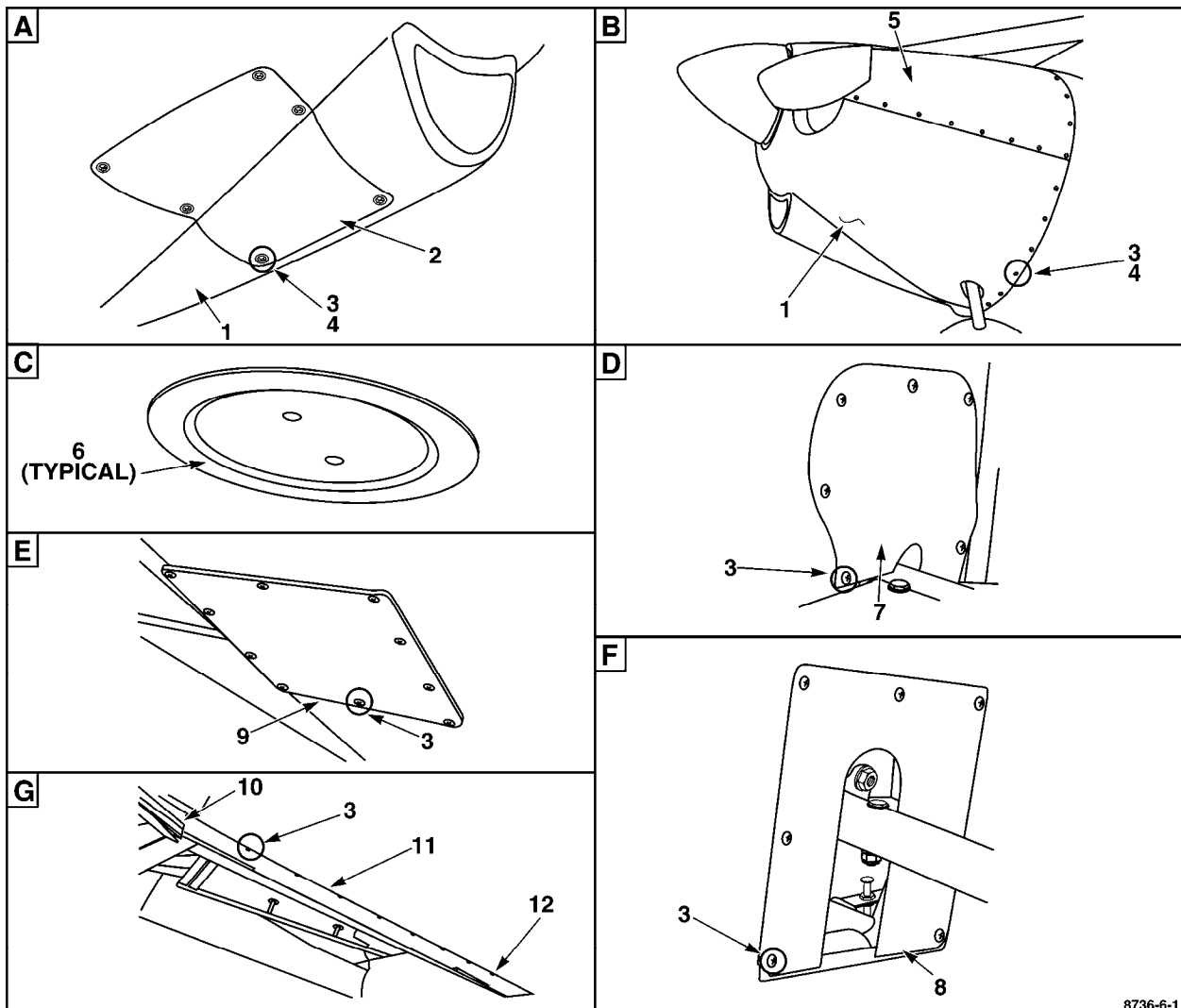
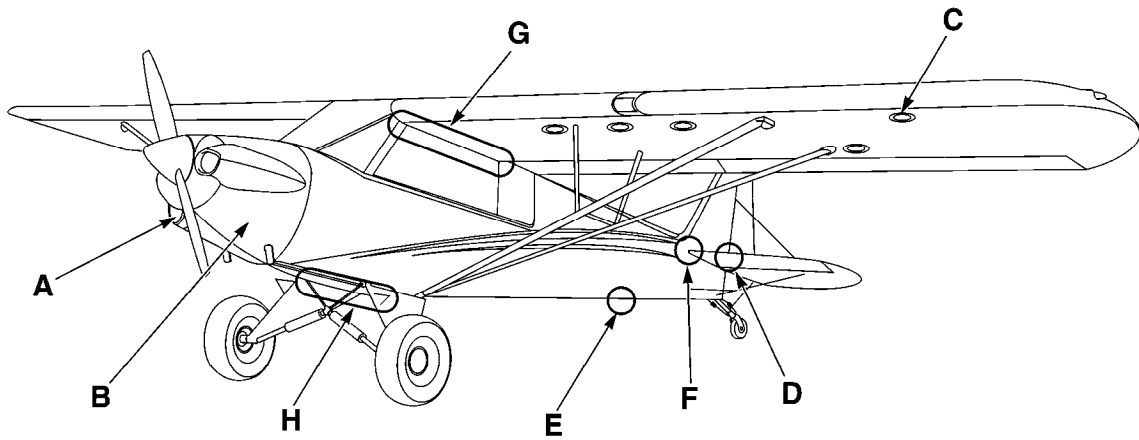
When called for by an inspection task, a functional inspection is a quantitative check to determine if one or more functions of a component perform within specified limits. The functional inspection is a comparative examination of a component or system against a specific standard.

**NOTE**

The operational and functional checks involve operating the engine and taxiing the aircraft. Therefore, whoever performs this check must be familiar with the aircraft and its systems and the risks and dangers of operating an aircraft on the ground. Attention is drawn to the fact that this aircraft has a tail wheel configuration and its behavior during taxiing is different from an aircraft with a nose gear. The operator must be familiar with taxiing a tailwheel aircraft before attempting to perform these checks.

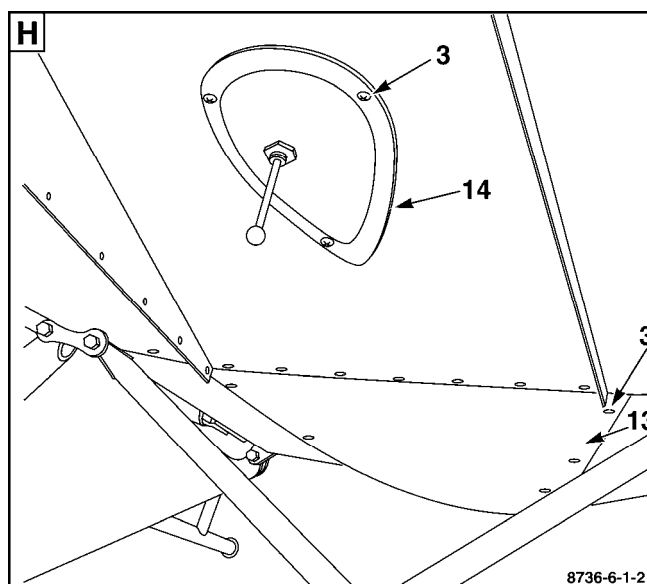
During the check, observe engine temperatures limitations.

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- |                                 |                            |
|---------------------------------|----------------------------|
| 1. LOWER ENGINE COWLING         | 8. INSPECTION COVER (2)    |
| 2. INSPECTION COVER             | 9. INSPECTION COVER (2)    |
| 3. SCREW                        | 10. WING TRIM EDGE (2)     |
| 4. WASHER                       | 11. WING TRIM STRIP (2)    |
| 5. UPPER ENGINE COWLING         | 12. WING TRIM END (2)      |
| 6. INSPECTION RING (5 INCH) (9) | 13. BELLY ELECTRICAL PANEL |
| 7. INSPECTION COVER (2)         | 14. ANTENNA MOUNT          |

## **2. CONDITION INSPECTION TASKS**

If the aircraft is registered in the United States, ASTM F2483 requires that all LSA category airplanes must undergo a complete inspection at least once every 12 calendar months. An authorized maintenance person, as described in ASTM F2483, must perform this inspection. A signed and dated record must be maintained as each inspection task is completed. When the last task of the inspection has been completed, the Inspection Report is to be signed off in the log book/maintenance record. The inspection items to be covered in the condition inspection are identical to the 100-hour Inspection items. The inspection interval to the next condition inspection may not exceed twelve calendar months. Refer to Appendix 6.A of this manual for the inspection forms.

## **3. PERIODIC INSPECTION TASKS**

If the aircraft is operated commercially (for hire) in the United States, it must also have an inspection every 100 flight hours. The 100-hour interval between inspections should never be exceeded by more than 10 hours, and then only if additional time is required to reach a place where the inspection can be satisfactorily accomplished. Additionally, the time the interval was exceeded must be included as flight hours in the next 100-hour interval. Inspection tolerances cannot be accumulated. Refer to Appendix 6.A of this manual for the inspection forms.

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**5.4 LINE MAINTENANCE, REPAIRS, AND ALTERATIONS OF PRIMARY  
STRUCTURES**

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5.4.2 ..... FUSELAGE

5.4.3 ..... WINGS

5.4.4 ..... EMPENNAGE

5.4.5 ..... FLIGHT CONTROLS

5.4.6 ..... LANDING GEAR

5.4.7 ..... WHEEL & BRAKE ASSEMBLIES

5.4.8 ..... ENGINE MOUNT

5.4.9 ..... ENGINE

5.4.10 ..... FUEL SYSTEM

5.4.11 ..... PROPELLER

5.4.12 ..... UTILITY SYSTEMS

5.4.13 ..... AVIONICS AND INSTRUMENT SYSTEMS

5.4.14 ..... ELECTRICAL SYSTEMS

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**5.4.1            GENERAL**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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5.4.2 FUSELAGE

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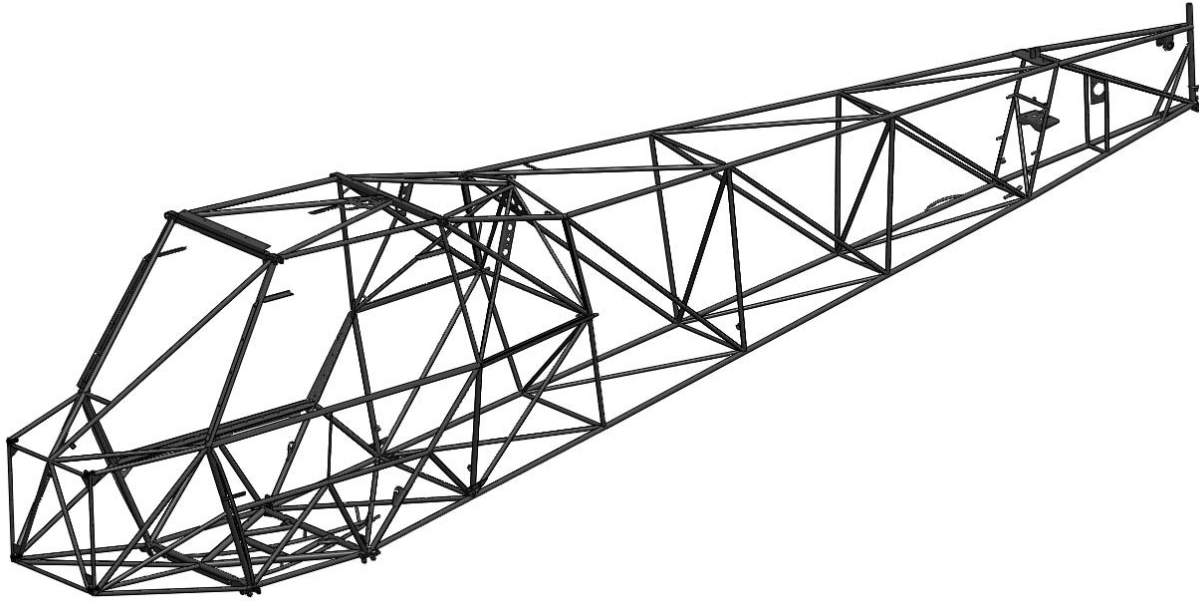
1 GENERAL.....2

2 MAINTENANCE.....2

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## **1 GENERAL**

The structure of the fuselage consists of a truss made of high-strength steel tubing. The members are joined together using inert gas fusion welding. The steel structure is powder coated to protect it from corrosion.



**Figure 5.4.2.1: Fuselage Frame**

## **2 MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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5.4.3 WINGS

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**1. GENERAL**

The wing is covered with fabric, has two extruded aluminum spars, pressed aluminum ribs, and aluminum leading and trailing edge skins. Rigidity is provided by drag wires and drag braces. The left wing panel houses an optional landing light. A stall warning vane is installed on the leading edge of the left wing. The wing incorporates slotted wing flaps inboard of the ailerons.

**2. MAINTENANCE**

Refer to Section 6.3.4 for maintenance and servicing of the wings. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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5.4.4 EMPENNAGE

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**1. GENERAL**

The stabilizers, elevators, and rudder are constructed of tubular steel with steel channel ribs. Stainless steel tie rods and fittings brace the horizontal stabilizers to the vertical stabilizer and fuselage.

The aircraft is trimmed in flight by changing the stabilizer's angle of incidence. The pitch trim is controlled by an electric servo, which moves the leading edge of the horizontal stabilizer up and down. The servo is actuated with a rocker switch located on the control stick.

**2. MAINTENANCE**

Refer to Section 6.3.5 for maintenance and servicing of the empennage. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**



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5.4.5 FLIGHT CONTROLS

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## **1. GENERAL**

The aircraft has conventional Frieese-type ailerons that are operated with a stick and actuated with cables. The surfaces have an aluminum structure and are covered with aluminum sheet.

The flaps are operated mechanically by moving a lever located in the upper, left-hand side of the cockpit ahead of the pilot. The flaps are slotted and have four detent positions: retracted, first notch (15°), second notch (35°), and full flaps (50°). The flap lever has a spring latch system that holds the flap in the selected position. To extend the flaps, depress the trigger and then move the lever down. To retract them, depress the trigger while simultaneously applying a slight back pressure. Smoothly move the handle forward and release the trigger.

## **2. MAINTENANCE**

Refer to Section 6.3.6 for maintenance and servicing of the flight control surfaces. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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5.4.6 LANDING GEAR

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2 MAINTENANCE.....2

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## **1 GENERAL**

The conventional landing gear is fixed (i.e. not retractable) and has a tailwheel. The main landing gear has bungee type shock absorbers or the optional Alpha Omega Suspension System. The landing gear legs are made from welded high strength steel tubing. Both main wheels are fitted with hydraulically operated disc brakes, actuated by pressing toe brakes at each crew position. The tailwheel has leaf springs, is steerable, and has the ability to caster through 360° via the rudder pedals.

## **2 MAINTENANCE**

Refer to Section 6.3.7 for maintenance and servicing of the landing gear. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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5.4.7 WHEEL AND BRAKE ASSEMBLIES

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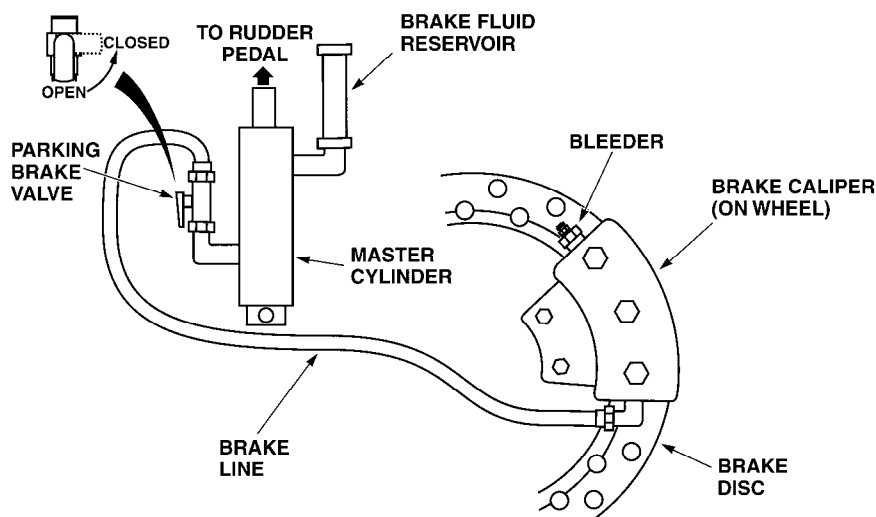
# CUB CRAFTERS, INC. CC11-100 MAINTENANCE MANUAL

## 1 GENERAL

The main wheels are of aluminum construction and are designed to be used with tires and tubes. The approved tire sizes are 6.00 x 6, 8.00 x 6, 8.50 x 6, 26" LSA Tundra, and 29" LSA Tundra.

Each main wheel is provided with a set of single disc brakes. The left and right systems are independent of each other. There is a valve at the front of each rudder pedal that operates the parking brake. The units form an integral part with the copilot's rudder brakes. To operate the parking brake, press the upper section of both rudder pedals and toggle the valve (vertical is open, horizontal is locked). The master cylinders push hydraulic fluid to the calipers where two pistons are displaced and force the brake linings against a disc. Each main wheel utilizes a Grove 6.00x6 caliper, secured by a four-hole backing plate.

The tail wheel swivels through 360 degrees and is steerable via the rudder pedals. It is mounted to the fuselage with steel spring leaves.



## 2 MAINTENANCE

Refer to Section 6.3.8 for maintenance and servicing of the wheel and brake assemblies. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903  
Tel: 509-248-9491  
[support@cubcrafters.com](mailto:support@cubcrafters.com)

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5.4.8 ENGINE MOUNT

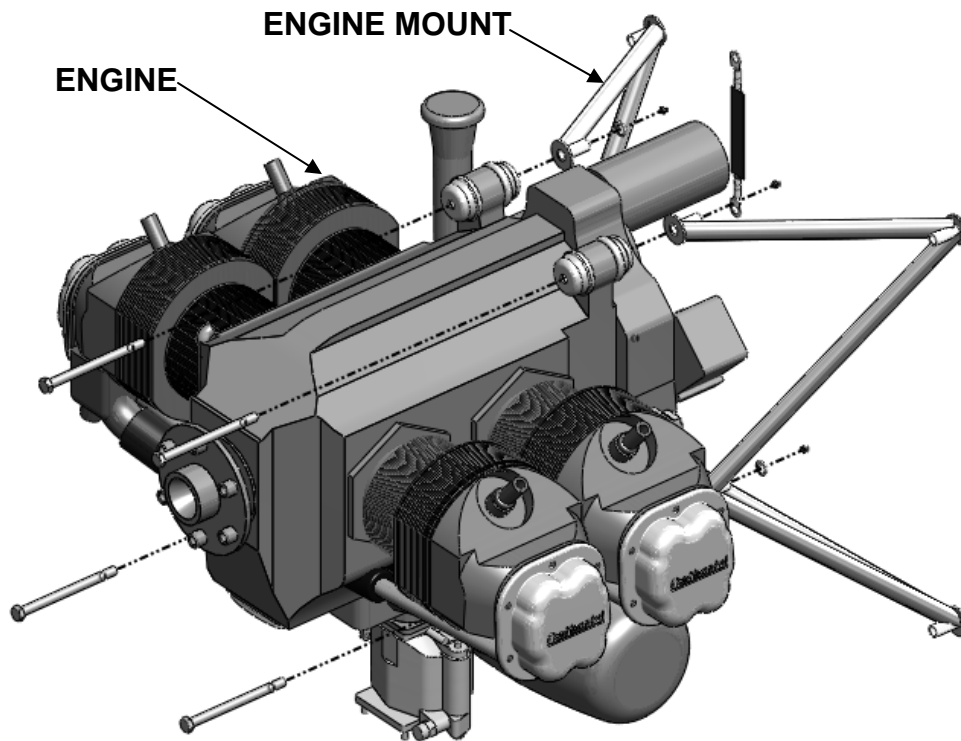
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**CUB CRAFTERS, INC.**  
**CC11-100 MAINTENANCE MANUAL**

## **1 GENERAL**

The structure of the mount is made of high-strength steel and the engine is attached to the mount through rubber mounts that help reduce vibration.



## **2 MAINTENANCE**

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**5.4.9. ENGINE**

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# **CUB CRAFTERS, INC.**

## **CC11-100 MAINTENANCE MANUAL**

### **1 GENERAL**

The aircraft is powered by a Teledyne-Continental Motors O-200 engine. This is an air-cooled, four cylinder powerplant that is capable of delivering up to 100 hp at 2750 RPM.

A throttle controls power to the engine. Each crew member is provided with a throttle on the left side of the cockpit. The air-to-fuel mixture is adjusted manually with a control on the left side of the instrument panel. Pulling the mixture control all the way back operates a cut-off valve on the carburetor that stops the supply of fuel to the engine. The mixture control should always be used to stop the engine.

### **2 ENGINE SERVICING**

Refer to Section 6.3.10 and to publications by Teledyne-Continental Motors for servicing, maintenance, and overhaul of the engine.

### **3 ENGINE MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

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5.4.10. FUEL SYSTEMS

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## **1. GENERAL**

The aircraft is equipped with two 12.5 US gallon fuel tanks located within the wings. The total usable fuel is approximately 12.0 US gallons per tank. The tank is made of aluminum. The fuel system has a sump and drain located in the bottom right side of the fuselage aft of the door opening. This should be drained before each flight to test for water and sediment in the fuel system. The fuel system is a gravity flow system with no separate boost pump. Fuel drains from the wing tanks through a selector valve and fuel strainer to the carburetor.

There is an engine fuel primer system that may be used to start the engine, especially in cold conditions. The fuel primer draws fuel from the strainer by means of a hand-operated pump on the instrument panel and injects it into three cylinders for starting.

The fuel flows from the tanks into a selector valve that has four positions and is located on the lower, left side of the cockpit:

- Both - The engine is fed by both fuel tanks
- Left - Fuel is supplied by the left tank.
- Right - Fuel is supplied by the right tank.
- Off - Fuel supply to the engine is cut off.

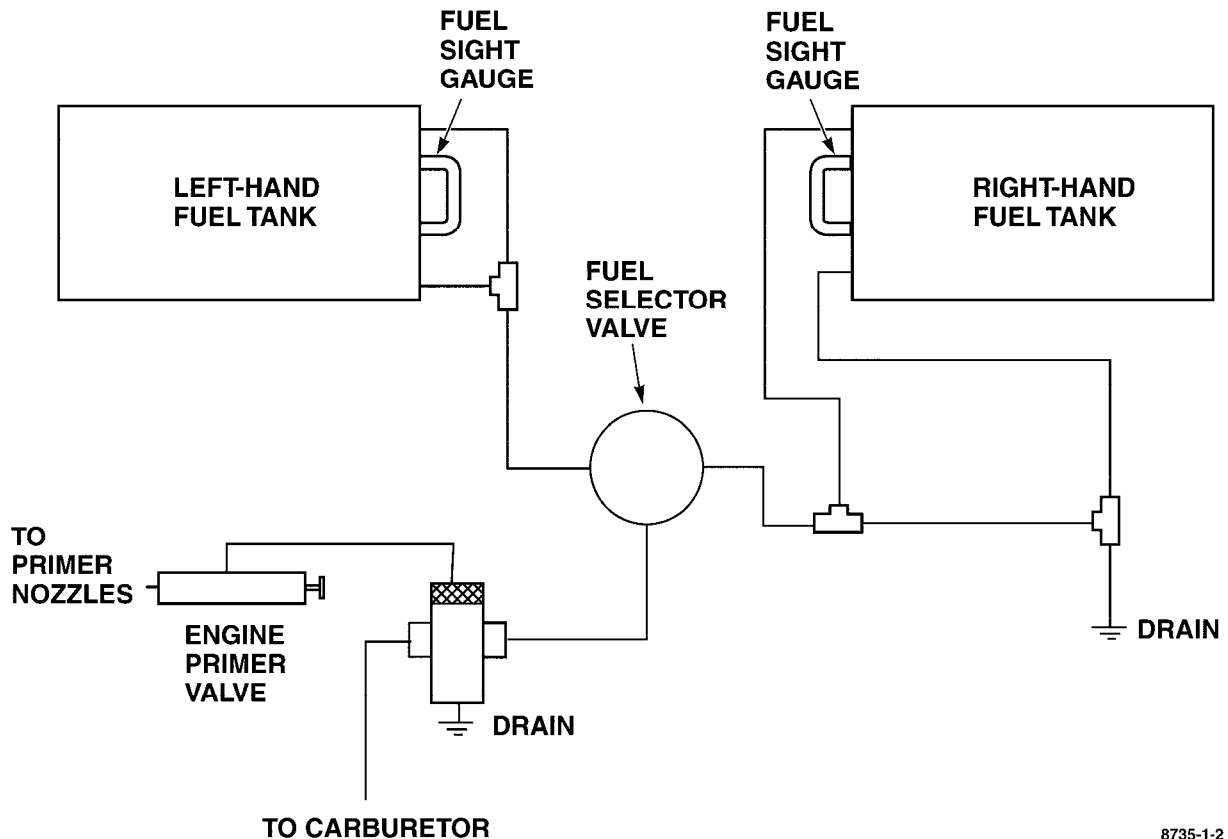
Fuel may flow from one tank to the other when the selector is in either the OFF or the BOTH position. When parking the aircraft on a slope, leave the selector on either the left or the right position to prevent cross feeding and possibly overfilling the lower of the two tanks.

The engine may be operated in the Both, Left, or Right positions. However, the Both position is required for takeoff and landing.

Fuel quantity is determined with two sight gauges located on either side of the cockpit at the wing root. The ventilation of the tanks is through tubes located on each of the fuel tank caps. The vented caps should face forward.

Prior to refueling the aircraft, connect the fueling equipment's grounding wire to either of the wing tie downs or the engine exhaust pipe. This will ensure there is no electrical potential difference between the aircraft and the fueling equipment and will minimize the risk of electrical sparks when the aircraft is being refueled.

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## **2 MAINTENANCE**

Refer to Section 6.3.15 for the maintenance of fuel system. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

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5.4.11. PROPELLER

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## **1. GENERAL**

The standard aircraft comes with a Sensenich Wood Propeller Company model W72GK-44 72-inch diameter, 54-44-inch pitch Wood Propeller.

Other propeller options are:

- McCauley 71-41 Metal Propeller
- McCauley 75-38 Metal Propeller
- Sensenich Ground Adjustability Composite Propeller, 72"
- Catto Propellers Wood/Fiberglass Composite Propeller.

## **2 MAINTENANCE**

Refer to Section 6.3.16 or to the manufacturer's instructions for the maintenance of all propellers.



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**5.4.12.        UTILITY SYSTEMS**

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**1. GENERAL**

The aircraft is equipped with a cabin heat system. Hot air for heating the cabin is supplied by a heat exchanger located around the engine exhaust. On newer models, there is a small “ram air” scoop in the cowling inlet that provides air for the cabin heat system. Hot air enters the cabin through an opening on floorboard. To select the heater, the control on the upper right part of the instrument panel must be pulled aft.

**2 MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
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**5.4.13            INSTRUMENTS AND AVIONICS SYSTEMS**

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**CUB CRAFTERS, INC.**  
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## 1 GENERAL

The aircraft is equipped with the instrument panel that contains all flight, navigation, and engine instruments that are required for VFR operations. Table 5.4.6 summarizes the equipment installed on the aircraft.



**Figure 5.4.6.1: Standard Instrument Panel**



**Figure 5.4.6.2: Deluxe VFR Instrument Panels**

Top Panel Shown with GPSMAP 396/495/496

Bottom Panel Shown with aera™ 550/560

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**Figure 5.4.6.3: Performance VFR Instrument Panel**



**Figure 5.4.6.4: Deluxe Flat Instrument Panel**



**Figure 5.4.6.5: Executive Glass Instrument Panel**

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<b>INSTRUMENTS/GAUGES</b>	<b>AVIONICS SYSTEM</b>
<b>Standard Instrument Panel</b>	
Tachometer	Garmin SL40 COM
Altimeter	
Air Speed Indicator	
Oil Pressure / Temperature Gauge	
Inclinometer (skid/slip indicator)	
<b>Deluxe VFR Instrument Panel</b>	
Tachometer	Garmin SL40 COM
Altimeter	Garmin GPS (396, 495, 496, aera™ 550 or aera™ 560)
Airspeed Indicator	Garmin Transponder (GTX327 or GTX330)
Oil Pressure / Temperature Gauge	PM1200 Intercom (Optional)
Vertical Speed Indicator	
Turn and Bank Indicator	
<b>Performance VFR Instrument Panel</b>	
Airspeed Indicator	Becker COM
Digital Tachometer	Becker Transponder
Altimeter	Garmin GPS (695, 696, GDU370 or GDU375)
Inclinometer (skid/slip indicator)	PM1200 Intercom
Fuel Flow	
Vertical Speed Indicator	
Digital Oil Pressure/Temperature	
<b>Deluxe Flat Instrument Panel</b>	
Airspeed Indicator	Garmin SL40 COM
Clock	Garmin GPS (396, 495 or 496)
Dynon D-180 EFIS and EMS	Garmin Transponder (GTX327 or GTX330)
	PM1200 Intercom (Optional)
<b>Executive Glass Instrument Panel</b>	
Airspeed Indicator	Garmin SL40 COM
Dynon D-180 EFIS and EMS	Garmin GPS (695, 696, GDU370 or GDU375)
	Garmin Transponder (GTX327 or GTX330)
	PM3000 Intercom

**Table 5.4.6.1: Instrument and Avionics Equipment List**

## 2 INSTRUMENTS

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
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### 3 COM SYSTEM

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

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#### 3.1. Garmin SL40 COM

Garmin SL40 incorporates pilot friendly features such as active and standby flip-flop frequency tuning, direct sunlight-readable alphanumeric display, easy access to National Weather Service broadcasts, a two-place intercom, etc. Its frequency monitor function allows you to check ATIS or emergency frequencies – without leaving the assigned ATC channel.



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### 3.2. Becker COM

1. The Becker AR 4201 is an extremely small and light-weight transceiver which offers 760 channels. A standby frequency and 99 memories can be easily programmed and recalled. The AR 4201 has an intercom, panel-lighting, voltage indicator, an AF-input as well as an automatic test-routine as standard functions. The clear, sunlight readable LCD display shows the active frequency and either the standby frequency, the memory channel used or the supply voltage.



### 3.3. PM1200 Intercom

The PM1200 is a two-place remote mount intercom designed to reduce noise that is picked up by the microphone, dynamically reducing the background noise heard in the headset when the VOX is opened.



### 3.4. PM3000 Intercom

The PM3000 is a two-place panel mount intercom designed allow the pilot and co-pilot/passenger to communicate and listen to great hi-fi stereo music.





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## **4 NAVIGATION SYSTEM**

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### **4.1. Garmin GTX 327 Transponder**

The GTX 327 is a solid-state Mode C digital transponder. It is TSO certified and its transmitter provides 200 watts nominal power output. The GTX 327 has a DSTN Liquid Crystal Display and a numeric keypad with a dedicated VFR code button. The GTX 327 also offers timing and display functions such as flight time and count-up and count-down timers, as well as current pressure altitude.



### **4.2. Garmin GTX 330 Transponder**

The GTX 330 is a solid-state Mode C digital transponder. It is TSO certified, uses a DSTN Liquid Crystal Display and a numeric keypad with a dedicated VFR code button.

The GTX 330 is Mode S, IFR-certified with data link capability, including local traffic updates. The GTX 330 is able to receive FAA Traffic Information Services (TIS), including location, direction, altitude, and climb/descent information of nearby aircraft.

The GTX 330 also offers several timing and display functions: flight time, count-up and count down timers, and current pressure altitude. Other features include remote ident and auto standby, plus altitude monitor with voice alerting and an optional OAT (Outside Air Temperature) Probe.



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**NOTE**

The GTX 330 meets the requirements of Level 2 Mode-S to satisfy the upcoming European Mode-S mandate for Elementary Surveillance.

#### **4.3. Becker Mode-C Transponder**

The Becker ATC 4401 has a sunlight readable display. In addition to the transponder code, the display shows the current flight level if an encoding altimeter is connected and Mode-C is selected. One button allows you to recall two preselected codes.



#### **4.4. Garmin GPS Options**

The Garmin GPSMAP 396/495/496 is an all-in-one, versatile navigation system. This portable GPS navigator features a 256-color TFT screen that is easy to read in bright sun, a built-in base map, and Jeppesen aviation database.



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The Garmin aera™ 550/560 is easy-to-use with a 4.3 inch QVGA wide-format display with touchscreen interface. This portable GPS navigator features a high-resolution 9 arc-second terrain graphics. It is preloaded with SafeTaxi charts and AOPA Airport Directory.



The Garmin GPSMAP 695/696 is the ultimate portable MFD. This portable GPS navigator has a bright 7-inch diagonal high-definition sunlight readable display. You can quickly find and view all U.S. NACO departure procedures a built-in base map, and Jeppesen aviation database.



The Garmin GDU370/375 is an all-in-one, versatile navigation system. This portable GPS navigator features a 256-color TFT screen that is easy to read in bright sun, a built-in base map, and Jeppesen aviation database.



The 396, 496, 696, 560 or 375 GPS include an XM antenna and access, with a paid subscription, to XM WX Satellite weather. This allows pilots to have constant access to

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NEXRAF radar, lightning, METARs, TAFs, TFR, and more. In addition, these units offer XM Satellite Radio capabilities, featuring more than 150 digital channels of commercial free music; more than 30 channels of news, sports, talk and entertainment; and more than 20 dedicated channels of XM Instant Traffic and Weather.

#### **4.5. D180 FlightDEK**

The FlightDEK-D180 represents a brand new class of avionics that combines all EFIS and Engine Monitoring functions into a single, powerful instrument. The primary functions of EFIS includes attitude, airspeed, altitude, vertical speed, gyro-stabilized magnetic compass, slip/skid ball, turn rate, clock, timers and g-meter. The FlightDEK-D180's EMS replaces up to 16 different types of gauges. It continuously monitors up to 27 available sensor inputs that cover the engine, fuel and other miscellaneous systems and annunciate any abnormality immediately upon detection.



## **5 ANTENNAS**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

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**5.1. Antenna Locations**

**1. COM Antenna**

The COM antenna is attached to the belly panel directly underneath the pilot on the underside of the aircraft.

**2. Transponder Antenna**

The transponder antenna is a 3" long antenna located directly in front of the COM antenna.

**3. GPS Antenna**

The GPS antenna is attached to the upper side of the front seatbelt mounting plate located under the skylight.

**4. XM Antenna**

The XM antenna is attached to the upper side of the front seatbelt mounting plate located under the skylight.

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**5.4.14. ELECTRICAL SYSTEMS**

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## **1. GENERAL**

Refer to Chapters 6.3.17 and 6.3.19 for servicing of the electrical systems. No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

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[support@cubcrafters.com](mailto:support@cubcrafters.com)

## **2 ELECTRICAL POWER SYSTEMS**

### **(1) GENERAL**

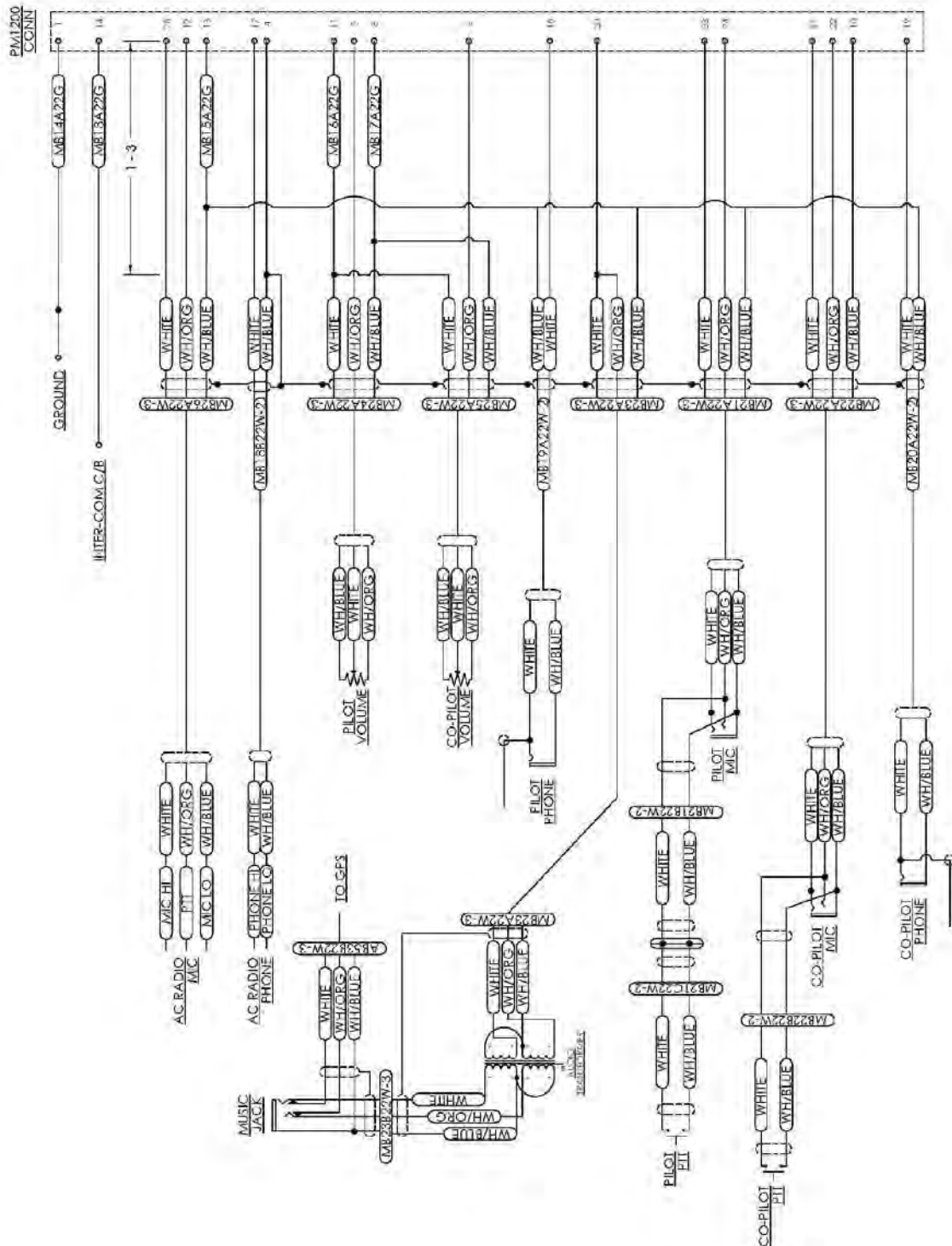
The aircraft uses a 14 volt DC electrical system with the power supplied by a 30 amp engine-driven alternator and a 12 volt storage battery.

In addition to the alternator and the battery, the electrical system consists of a solid-state linear regulator, master and starter solenoids, circuit breakers, and switches. The battery is located underneath the pilot's seat. Refer to Chapter 6.3.19 for the maintenance of electrical power systems.



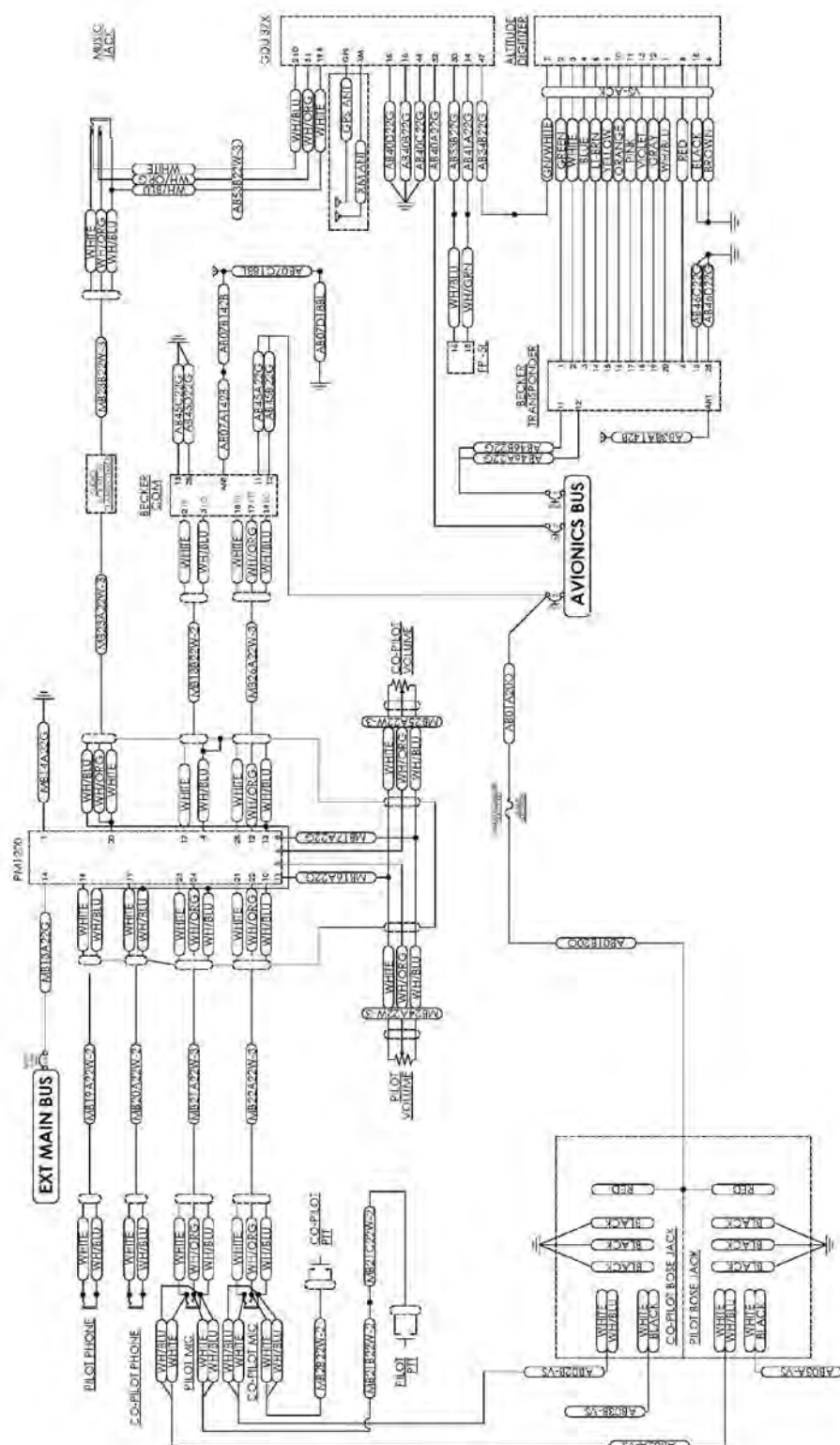


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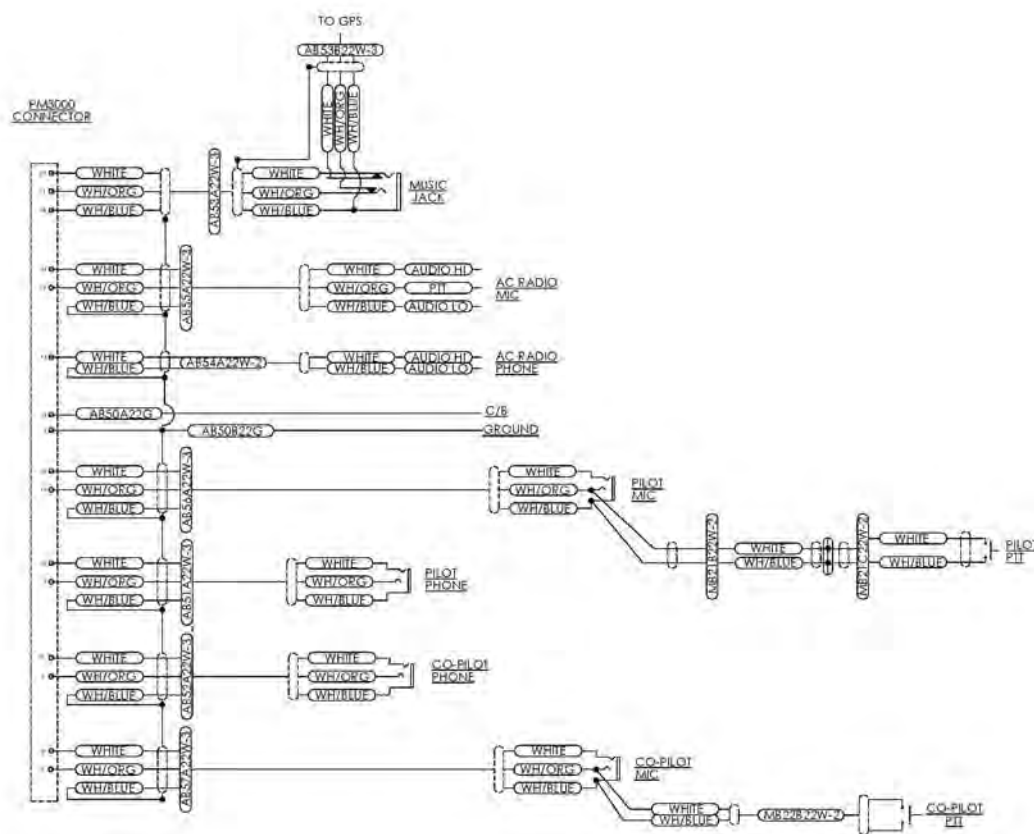
**Figure 5.4.14.2: Standard and VFR Avionics System Schematic w/ Intercom**

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**Figure 5.4.14.3: Performance Avionics System Schematic**

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**Figure 5.4.14.4: Executive Glass Avionics System Schematic**

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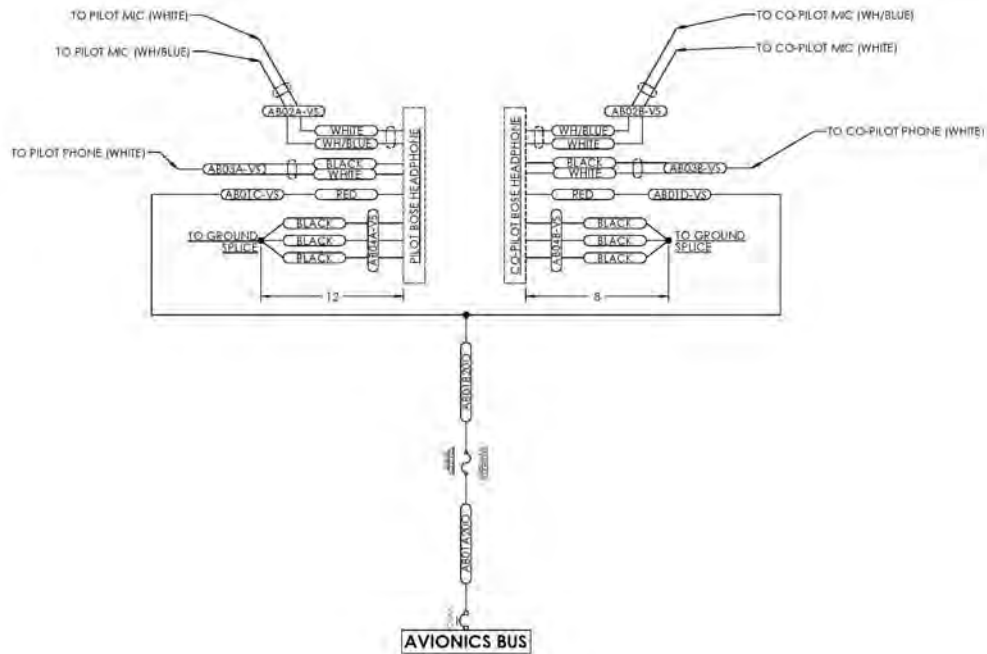


Figure 5.4.14.5: PM1200 Intercom System

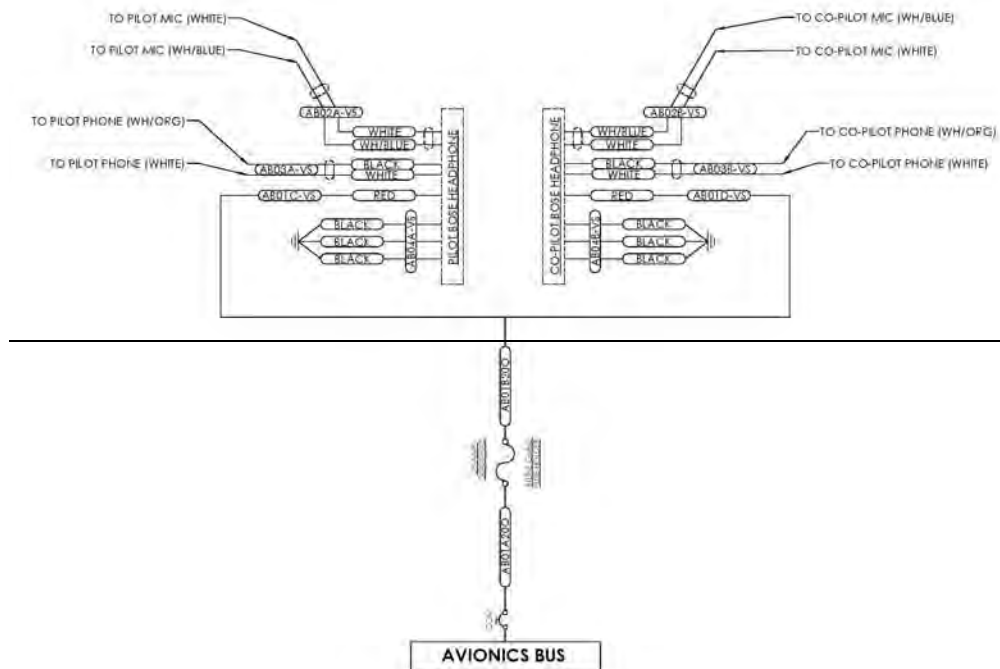
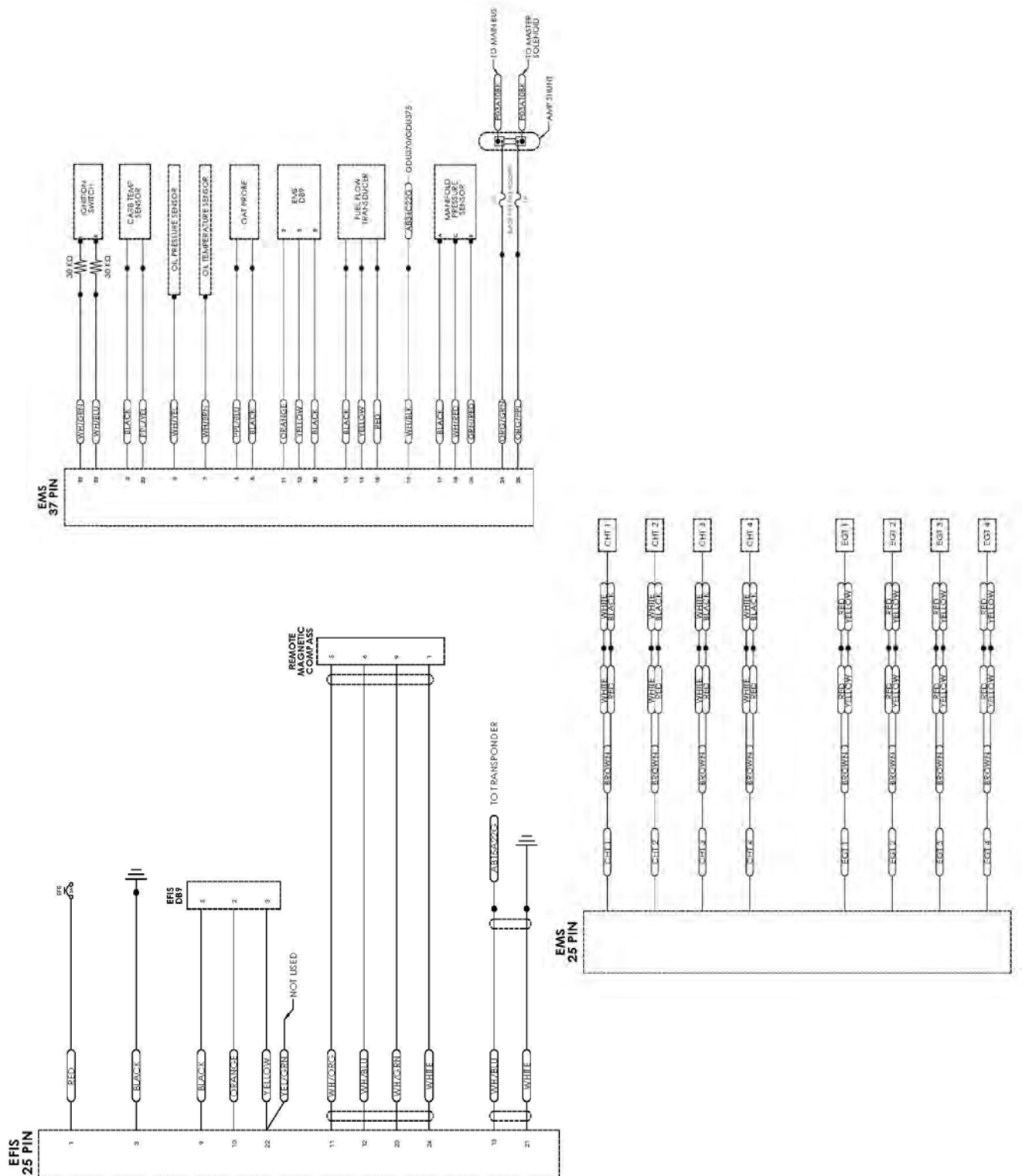


Figure 5.4.14.6: PM3000 Intercom Systems

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**Figure 5.4.14.7: Dynon Schematic**

### 3 LIGHTING SYSTEMS

Optional anti-collision light assemblies may be installed on each wingtip. These consist of navigation light and a strobe light.

An optional landing light may be mounted in the leading edge of the left wing. Refer to Section 6.3.19 for the maintenance of Lighting Systems.

The diagram illustrates the electrical system for the aircraft's lighting. It is divided into two main sections: the **LIGHTING SYSTEM** and the **STROBE OPTION**.

**LIGHTING SYSTEM:**

- Power Source:** A 10V 10W AC source is connected to the **LIGHTING BUS**.
- Landing Light:** A 10V 10W AC source is connected to the **LIGHTING BUS**. The wiring includes components labeled L601A 10W, L601B 10W, L601C 10W, and L601D 10W. A switch labeled SP74001-001 (CPI) is also shown.
- Position Lights:**
  - RED POSITION:** Connected to the **LIGHTING BUS** via L602A 10W, L602B 10W, and L602D 10W. The output is labeled RED and BLACK.
  - GREEN POSITION:** Connected to the **LIGHTING BUS** via L604A 10W, L604B 10W, and L604D 10W. The output is labeled RED and BLACK.
  - WHITE POSITION:** Connected to the **LIGHTING BUS** via L605A 10W, L605B 10W, and L605D 10W. The output is labeled BLUE.
- Red/White Beacon:** Connected to the **LIGHTING BUS** via L606A 10W, L606B 10W, and L606D 10W. The output is labeled RED.

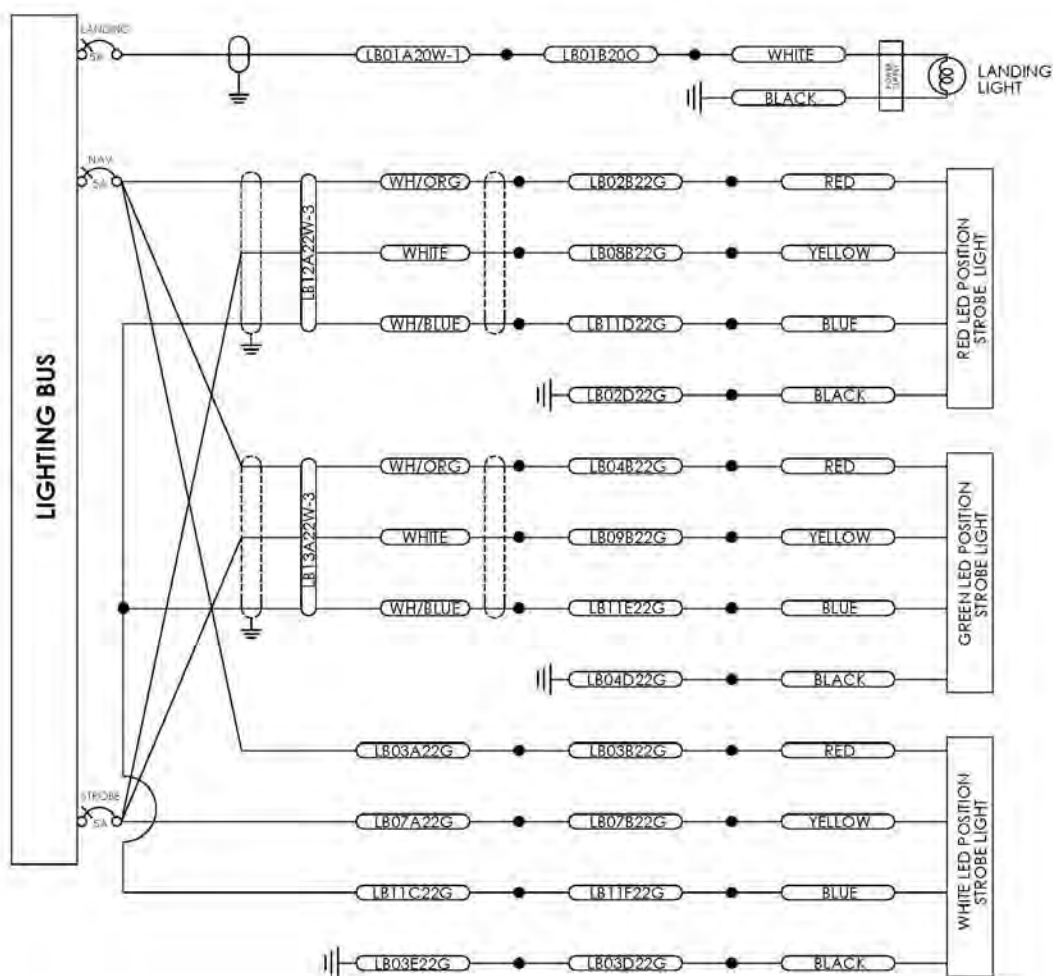
**STROBE OPTION:**

- Power Source:** A 10V 10W AC source is connected to the **LIGHTING BUS**.
- Strobe Lights:**
  - STROBE:** Connected to the **LIGHTING BUS** via L607A 10W and L607B 10W.
  - STROBE BUS:** A central bus for the strobe lights, connected to the **LIGHTING BUS** via L608A 10W and L608B 10W.
- Wing Lights:**
  - WING LIGHTS:** Connected to the **STROBE BUS** via L609A 10W, L609B 10W, and L609D 10W. The output is labeled WHITE, BLACK, RED, and SHIELD.
  - WING LIGHTS:** Connected to the **STROBE BUS** via L610A 10W, L610B 10W, and L610D 10W. The output is labeled WHITE, BLACK, RED, and SHIELD.
  - WING LIGHTS:** Connected to the **STROBE BUS** via L611A 10W, L611B 10W, and L611D 10W. The output is labeled WHITE, BLACK, RED, and SHIELD.
- Other Lights:**
  - RUDDER:** Connected to the **STROBE BUS** via L612A 10W, L612B 10W, and L612D 10W. The output is labeled WHITE, BLACK, RED, and SHIELD.
  - WING LIGHTS:** Connected to the **STROBE BUS** via L613A 10W, L613B 10W, and L613D 10W. The output is labeled WHITE, BLACK, RED, and SHIELD.
  - WING LIGHTS:** Connected to the **STROBE BUS** via L614A 10W, L614B 10W, and L614D 10W. The output is labeled WHITE, BLACK, RED, and SHIELD.

The diagram also shows a **MAIN BUS** connected to the **LIGHTING BUS** and a **STROBE BUS** connected to the **STROBE** and **STROBE BUS** components.

Manual number SC10000AMM  
Date: 08/02/2010

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**Figure 5.4.14.9: LED Lighting System Schematic (S/N 00107 and on)**



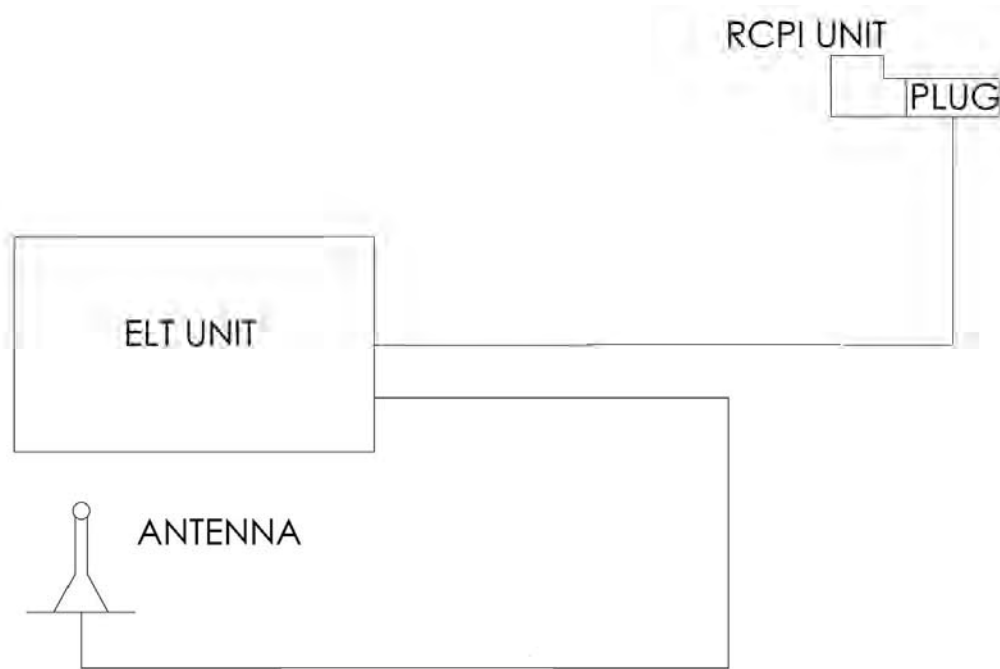
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**4 EMERGENCY SYSTEMS: ELT**

**(1) GENERAL**

The aircraft is supplied with an emergency locator transmitter (ELT) that meets TSO C91a. The ELT is mounted directly underneath the pilot's seat and may be accessed through an opening on the forward side of the seat column. RCPI Unit is optional and wiring may not be present.

**(2) SCHEMATIC**



**Figure 5.4.14.10: ELT Schematic**

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**5.4.15 SEATS**

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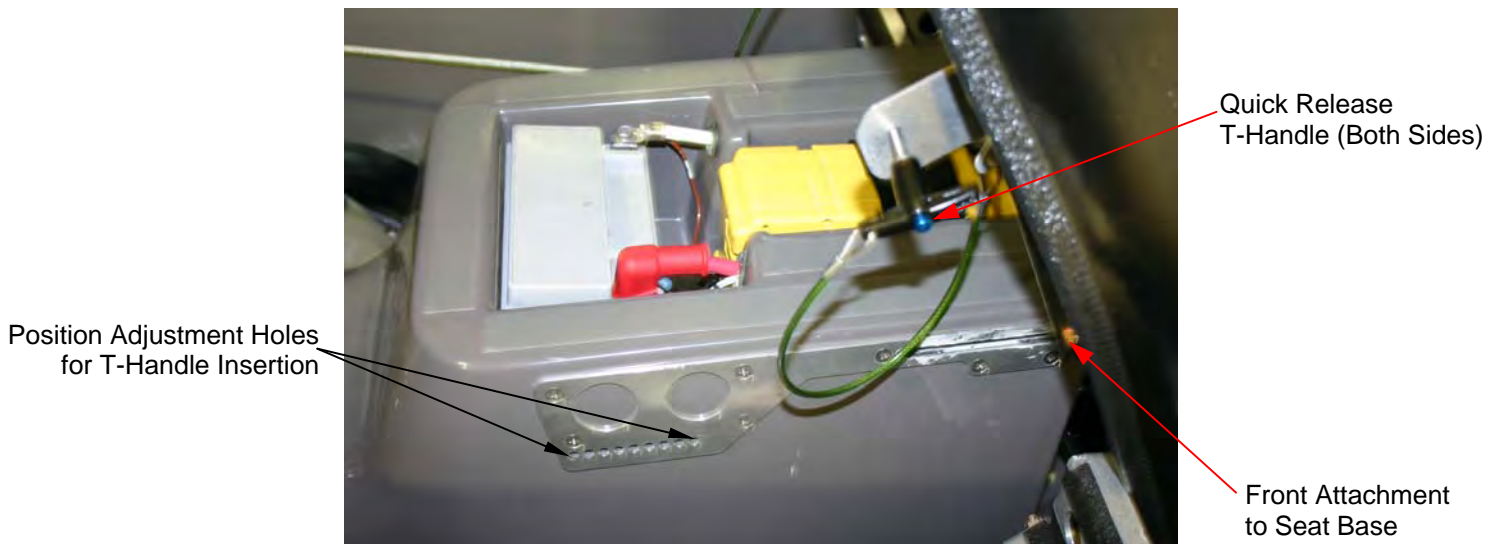
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**1. GENERAL**

The front seat is made from composite with a foam cushion and covered with either canvas or leather material. It is attached to the seat base at the front with screws on both sides. There are two quick-release T-Handle pins, one on each side, at the rear of the seat to adjust the seat position. See Figure 1 and 2.

**WARNING:**  
**T-HANDLES MUST BE SECURED IN PLACE PRIOR TO TAKE OFF.**



**Figure 1 - Front Seat Attachment**



**Figure 2 - Front Seat**

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The rear seat is made of fabric with inserted composite stringers. The seat is attached in front by a steel cross bar. The steel cross bar is held in place to the floorboard by two cinched nylon straps. The top of the rear seat is secured in place by straps integrated into the seat. The upper straps are wrapped around the fuselage tubes above and incorporate a slide adjuster. See Figure 3.

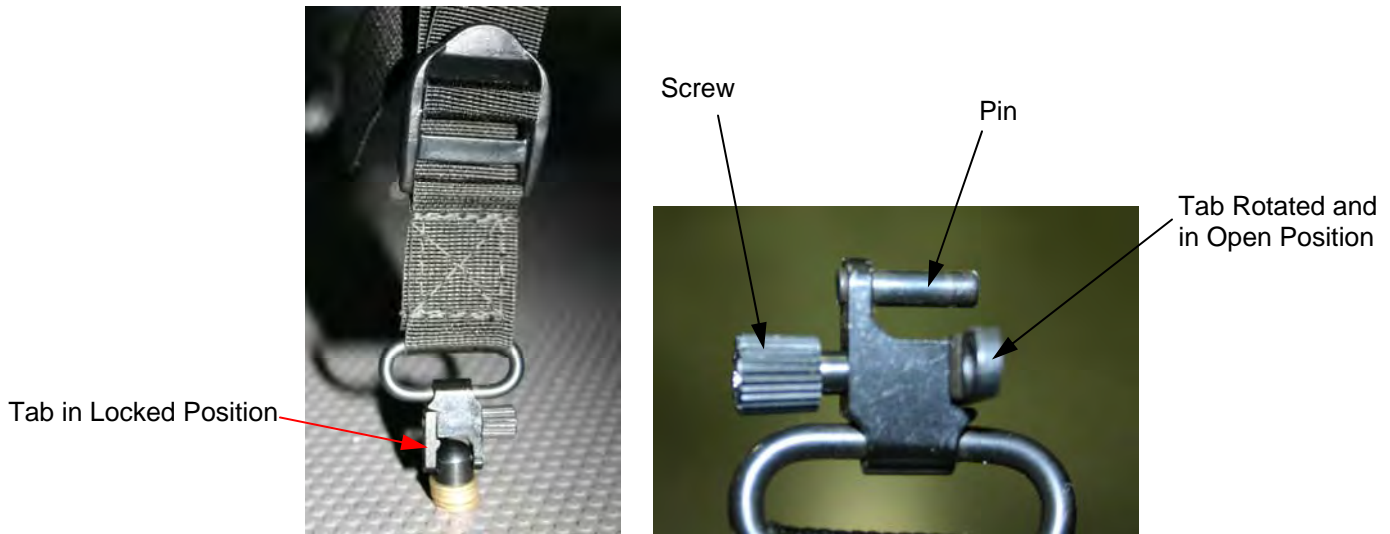


**Figure 3 - Rear Sling Seat Installed**

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**2. REAR SEAT STOWAGE**

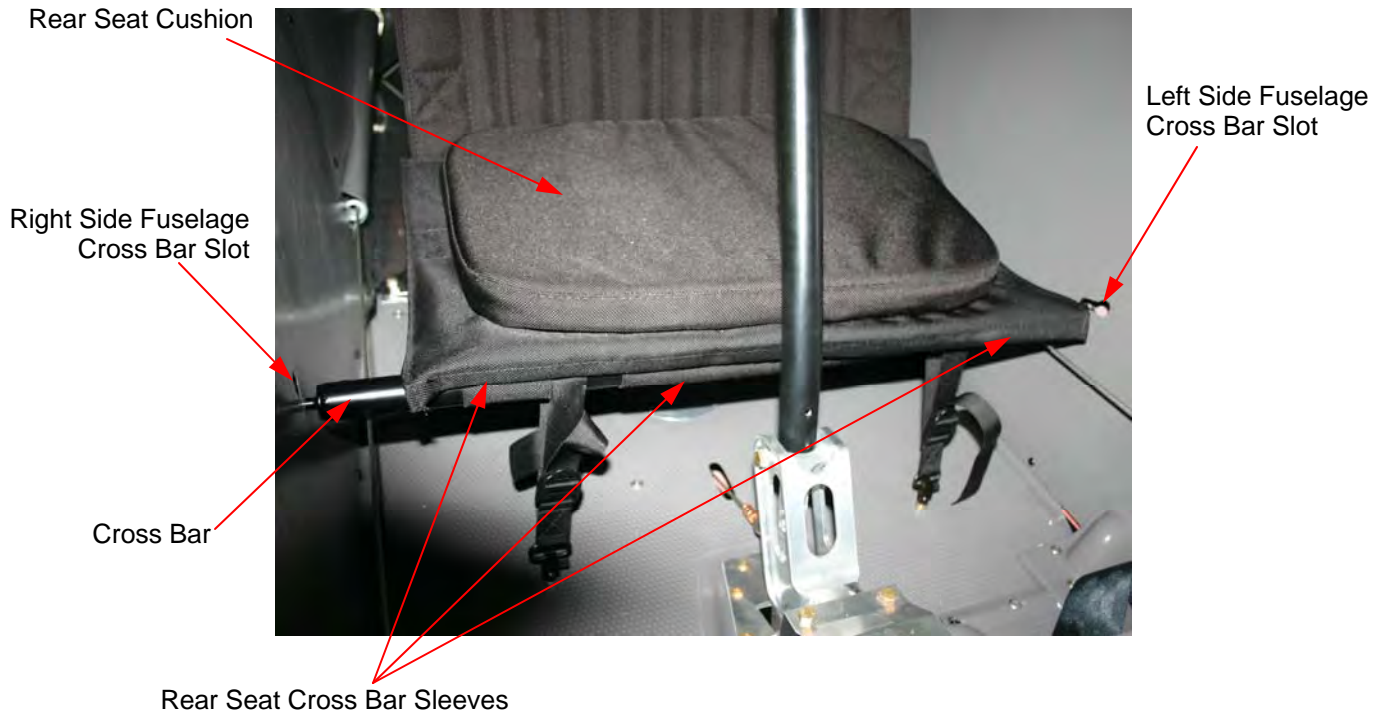
Disconnect the two cinched nylon straps holding the seat cross bar in place. Unscrew and push the screw in to allow the tab to rotate and slide pin out of seat base connector. See Figure 4.



**Figure 4 - Cross Bar Strap Attachment**

Remove cross bar from fuselage slots. Slide the seat straps and nylon straps off of the cross bar. Place and secure cross bar in aft storage compartment. Remove cushion from seat. See Figure 5.

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**Figure 5 - Rear Cross Bar and Strap Attachment**

Fold rear seat up and stow in sling seat holder. Place seat cushion and cross bar straps in sling seat holder. See Figure 6.



**Figure 6 - Rear Seat Stowage in Sling Seat Holder**

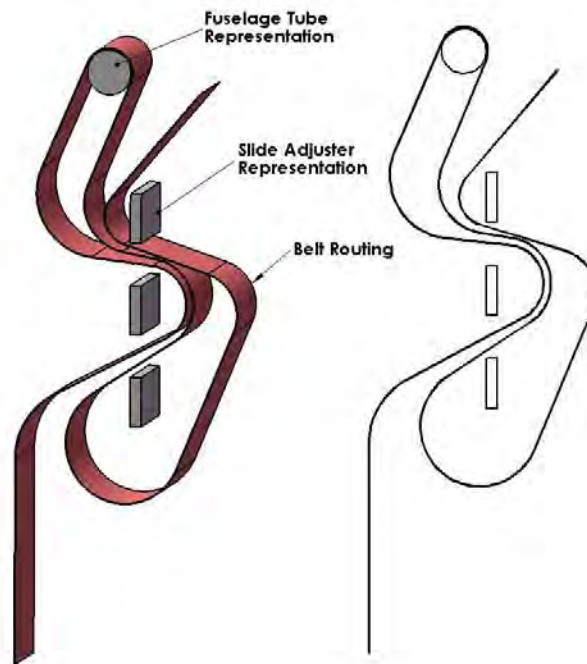
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### **3. REAR SEAT INSTALLATION**

Slide the seat straps and nylon straps on to the cross bar in the correct order. Install the cross bar in to the fuselage slots. See Figure 5.

Connect the two cinched nylon straps to the floorboard to hold the seat cross bar in place. See Figure 4. Install the seat cushion by lining up the hook and loop tape on the bottom of the seat cushion and top of rear seat.

Ensure the straps in front of the seat are cinched tight enough to hold cross bar in slots at either end. Ensure the top straps are secure and verify proper routing of straps around fuselage tube and through slide adjuster. See Figure 7.



**Figure 7 - Rear Seat Upper Strap Routing**

### **4. MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
[support@cubcrafters.com](mailto:support@cubcrafters.com)



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**5.5 STRUCTURAL REPAIRS**

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**1. GENERAL**

No major repair structural repairs or structural alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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5.6 PAINTING AND COATINGS

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**1. GENERAL**

For repair and maintenance of painting in details, refer to Poly-Fiber, Inc.'s "How to Cover An Aircraft Using the Poly-Fiber System" Procedure Manual.

**2. PAINTING**

**2.1 Preparation**

**(1) PREPARATION OF METAL**

- (a) Sand surfaces with 180-320 grit sandpaper & very fine red Scuffpads.
- (b) Degrease components with DX330 per manufacturer's instructions.
- (c) Mix and apply PPG Metal Primer DX1787 and DX1788 per manufacturer's instructions.
- (d) Allow primer to dry at 140°F for 20 minutes.
- (e) Sand primed surface. Use 400 grit sandpaper in areas where DUHS will be used, or 600 grit sandpaper where PolyTone will be used.

**(2) PREPARATION OF COMPOSITES**

- (a) Degrease components with an alcohol based cleaner per manufacturer's instructions.
- (b) Sand with 400 grit sandpaper, blow and tack off.

**(3) PREPARATION OF FABRIC**

- (a) Smooth any edges with a small iron. Use dry 400-grit sandpaper to smooth tape and doubler edges and remove surface dust bumps. 3M 8500 Sealant or equivalent can be used to cover seams in corners, as needed.

**2.2 Painting**

**(1) GENERAL**

- (a) The final finish is either a polyurethane DUHS paint from PPG or PolyTone paint.
- (b) Mix the DUHS paint in accordance with the PPG's application guide.
- (c) Spray the first coat with a HVLP gun with a 30-50 psi inlet pressure. Allow first coat to become hand slick, then apply a second coat.
- (d) After a minimum of 15 minutes (or after the paint has flashed off), bake the surface for a minimum of 30 minutes @ 120°F ±10° or air dry at 70°F for approximately eight hours.

# **CHAPTER**

# **6**

## **LINE MAINTENANCE, REPAIRS, AND ALTERATIONS**

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6.1 GENERAL

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**1. AUTHORIZATION TO PERFORM LINE MAINTENANCE, REPAIRS, ALTERATIONS, AND INSPECTIONS**

Table 6.1.1 shows the certifications required to perform line maintenance, repairs, alterations, and inspections on CubCrafters CC11-100 SPORT CUB aircraft, as defined by ASTM F2483 Section 3.1.12. Guidance for accomplishing such maintenance, repairs, alterations, and inspections is contained in this manual; and is to be accomplished in accordance with the practices contained in FAA Advisory Circular 43.13.

**CUB CRAFTERS SPORT CUB MAINTENANCE BREAKDOWN**

DESCRIPTION	OWNER / OPERATOR OR ABOVE	LSA REPAIRMAN-I, REPAIRMAN-M, A&P, OR REPAIR STATION	REPAIRMAN-M, A&P, OR REPAIR STATION	HEAVY- A&P OR REPAIR STATION
<b>AIRCRAFT COVERING</b>				
Minor Repairs	X		X	
Major Repairs			X	
<b>AIRCRAFT PAINTING</b>				
Minor Repairs	X		X	
Major Repairs			X	
<b>AIRCRAFT TASKS</b>				
Rigging Wings				X
Rigging Tail Brace Wires				X
Rigging Tail Control Surfaces				X
Jacking Aircraft	X			
Condition Inspection		X		
100 Hour Inspection			X	
Preventive Maintenance	X		X	
Lubrication	X			
<b>PREPARATION</b>				
For Storage			X	
For Use			X	
For Shipment			X	
<b>SYSTEM DIAGRAMS</b>				
Electrical System			X	
Standard Avionics System			X	
Avionics System – Intercom			X	
Lighting System			X	
ELT Schematic			X	
Brake System			X	
Fuel System			X	

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DESCRIPTION	OWNER / OPERATOR OR ABOVE	LSA REPAIRMAN-I, REPAIRMAN-M, A&P, OR REPAIR STATION	REPAIRMAN-M, A&P, OR REPAIR STATION	HEAVY- A&P OR REPAIR STATION
<b>FLIGHT CONTROLS</b>				
Aileron Controls			X	
Elevator Controls			X	
Flap Controls			X	
Rudder Pedals/Controls			X	
<b>WING INSTALLATION</b>				
Wingtip Lights	X			
Landing Light	X			
Vortex Generators			X	
Tie-Down Ring			X	
Front Wing Strut			X	
Rear Wing Strut			X	
Ailerons			X	
Flaps			X	
Pitot Tube			X	
Stall Warning			X	
Fuel Tanks			X	
Wing Assembly			X	
<b>ENGINE INSTALLATION</b>				
Engine Assembly	Cub Crafters or Cub Crafters Delegate			
Air Filter	X		X	
Exhaust System			X	
Oil Cooler			X	
Oil Filter and Oil Change	X			
Alternator			X	
Magnetos			X	
Carburetor			X	
Starter			X	
Propeller –Spinner			X	
<b>FUSELAGE</b>				
Cowling Removal	X			
Cowling Repair			X	
Firewall Components			X	
Fuel Lines, Fittings, and Parts			X	
Fuel Selector Valve			X	
Fuel Filter			X	

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DESCRIPTION	OWNER / OPERATOR OR ABOVE	LSA REPAIRMAN-I, REPAIRMAN-M, A&P, OR REPAIR STATION	REPAIRMAN-M, A&P, OR REPAIR STATION	HEAVY- A&P OR REPAIR STATION
Fuel Drain	X			
Front Seat Assembly			X	
Front Seat Shoulder Harness	Cub Crafters or Cub Crafters Delegate			
Rear Seat Assembly			X	
Rear Seat Shoulder Harness	Cub Crafters or Cub Crafters Delegate			
Brake Master Cylinder			X	
Brake Lines and Fittings			X	
Windshield			X	
Sky Light			X	
Front Windows	X			
Rear Windows	X			
Window Assembly	X			
Door Assembly (with Latch)			X	
Battery	X			
ELT Assembly			X	
ELT Battery	X			
ELT Antenna			X	
Instrument Panel Assembly			X	
Instrument Panel Wiring			X	
Airspeed Indicator			X	
Altimeter			X	
Compass			X	
Tachometer			X	
Oil Temperature Gauge			X	
Oil Pressure Gauge			X	
Inclinometer			X	
Voltage Warning Light			X	
Mixture Control			X	
Cabin Heat Control			X	
Master Switch			X	
Circuit Breakers			X	
Avionics Master Switch			X	
12 VDC Auxiliary Plug			X	

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DESCRIPTION	OWNER / OPERATOR OR ABOVE	LSA REPAIRMAN-I, REPAIRMAN-M, A&P, OR REPAIR STATION	REPAIRMAN-M, A&P, OR REPAIR STATION	HEAVY- A&P OR REPAIR STATION
Radio Antenna			X	
Garmin GPS (Removal)	X			
COM Radio (Removal)	X			
Intercom (Removal)	X			
Bose Headset Wiring			X	
Dynon Flight DEK-D180			X	
Transponder (Removal)	X			
Vertical Speed Indicator			X	
Turn and Bank Indicator			X	
Engine Primer			X	
Clock			X	
Landing Gear Installation			X	
Struts and Bungees			X	
Landing Gear			X	
Wheel and Tires			X	
Tire Inflation	X			
Brake Assembly			X	
Tail Wheel Assembly			X	
Steerable Tail Wheel			X	
Trim Motor			X	
Tail Brace Wires			X	
Horizontal Stabilizer			X	
<b>MISCELLANEOUS</b>				
Placards and Data Plates	X			

**TABLE 6.1.1**

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**2.     FAA AUTHORIZATION FOR PILOT/OWNER TO PERFORM LINE  
         MAINTENANCE TASKS**

The tasks listed in this Manual, and considered to be Minor Maintenance, Repairs, or Alteration tasks - as defined in ASTM F2483 Section 3.1.12 - and may be performed by the Pilot/Owner and who is the holder of an FAA Sport Pilot, Recreational Pilot, Private Pilot, Commercial, or Airline Transport Pilot Certificate.

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6.2 LINE MAINTENANCE TASKS

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**1. 100 HOUR INSPECTION**

Refer to section 5.3.3 of this manual for 100 Hour Inspection requirements

**2. CONDITION INSPECTION**

Refer to section 5.3.2 of this manual for Condition Inspection requirements

**3. SERVICING OF FLUIDS**

This information gives the general servicing procedures and maintenance practices that are to be used when servicing the airplane. For additional detailed information concerning unit servicing of the various airplane systems and components, refer to the applicable chapters. For electrical wiring diagrams, refer to the Wiring Diagram Manual.

The intervals specified in Section 6A are considered adequate to meet average requirements under normal operating conditions. However, it is advisable to shorten the service and maintenance intervals when operating under abnormal environmental conditions, such as high humidity and moisture, salt water environments, dusty atmospheric conditions, extreme temperature ranges, unimproved airport facilities, or other unusual operating requirements. In salt water areas, special care should be taken to keep the engine, accessories, and airframe clean to help prevent oxidation.

**CAUTION**

**The operation of the airplane can be seriously impaired if unapproved or contaminated fuel, oil, fluids, lubricants or materials are used. Adherence to instructions, cautions, and warnings can avoid injury to personnel and damage to the airplane or associated equipment.**

Mixing of various brands, types, and weights of materials should be avoided. Specified lubricants will meet requirements for extreme hot or cold temperature operations. Use of substitutes or other lubricants may cause a malfunction when operating in extreme temperature conditions, or may cause excessive wear due to improper lubrication.



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Item	Specifications		Capacity
<b>Fuel</b>	Aviation Grade 100/100LL		25 US Gallons Total 24 US Gallons Usable
<b>Oil (See note below)</b>	Average Ambient Temperature	SAE J-1966 non-dispersant mineral oil and SAE J-1899 ashless-dispersant oil grades	6 Quarts
	Above 40°F	SAE 40 or SAE 50	
	Below 40°F	SAE 20W-50 or SAE 15W-50	
<b>Hydraulic Fluid</b>	MIL-H-5606G		As required
<b>Main Tire Pressure</b>	6.00 x 6	Dry Air	29 ± 2 psi
	8.00 x 6	Dry Air	23 ± 2 psi
	8.50 x 6	Dry Air	18 ± 2 psi
	26" Airstreak Tundra Tires	Dry Air	6 - 12 psi
	29" Airstreak Tundra Tires	Dry Air	6 - 12 psi
<b>Tail Wheel Pressure</b>	ABW 3200-Type	Dry Air	50 - 60 psi
	ABW-3200B "Tundra"	Dry Air	8 - 20 psi

**Table 6.2.1: Fuel, Oil, Brake Fluid, and Tire Pressures**

**NOTE**

The engine must be operated on mineral (non-detergent) oil (MIL-C-6529 Type II) during the first 25 hours of operation.  
For further information, refer to the Teledyne-Continental Service Manual.

**CAUTION**

Use only oils conforming to Teledyne-Continental Motors Specification MHS-24 after break-in period.  
For further information, refer to Teledyne-Continental Service Manual

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<b>LUBRICATION CHART</b>		
<b>ITEM</b>	<b>SUGGESTED</b>	<b>SPEC</b>
<b>ENGINE</b>		
Engine Oil	Appropriate for temperature	See Table 6.2.1
Spark Plug Thread Lubricant	Champion Aerospace # 2612	
Oil Filter Gasket	Dow Corning 4 Lubricant	MIL-S-8660C
<b>COCKPIT</b>		
Hydraulic Fluid (Brake)	Any Brand	MIL-H-5606
Control Stick Pivot Points Torque Tube Bearings	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Elevator Pulley Shafts and Bushings	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Aileron Pulley Shafts and Bushings	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Rudder Pedal Pivot Points Brake Pedal Pivot Points	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Flap Handle Shaft	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Door Hinges	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Fuel Fittings with Pipe Threads	EZ TURN Lubricant	MIL-G-6032D
Fuel Selector O-Rings	Dow Corning 4 Lubricant	MIL-S-8660C
<b>FUSELAGE</b>		
Flap Rod Ball Ends	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Stabilizer Jackscrew	Mobilgrease 28	MIL-G-81322E
Trim Pulley Shafts	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Fuel Fittings with Pipe Threads	EZ TURN Lubricant	MIL-G-6032D
<b>LANDING GEAR</b>		
Main Landing Gear Shock Strut Pivot Points	LPS 2	MIL-C-16173E GRADE 3 CLASS I

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<b>LUBRICATION CHART</b>		
<b>ITEM</b>	<b>SUGGESTED</b>	<b>SPEC</b>
Main Landing Gear Pivot Points	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Main Wheel Bearings	Mobilgrease 28	MIL-G-81322E
Tail Wheel Swivel	Mobilgrease 28	MIL-G-81322E
Tail Wheel Bearings	Mobilgrease 28	MIL-G-81322E
<b>EMPENNAGE</b>		
Stabilizer Tube Liners	Mobilgrease 28	MIL-G-81322E
Elevator Hinge Pins	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Rudder Hinge Pins	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Fuel Fittings with Pipe Threads	EZ TURN Lubricant	MIL-G-6032D
<b>WING</b>		
Aileron and Flap Hinge Pins	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Aileron Pulley Shafts and Bushings	LPS 2	MIL-C-16173E GRADE 3 CLASS I
Flap Crossbar Bushings, Arm, Pushrod, and Hinge Pivot Points	LPS 2	MIL-C-16173E GRADE 3 CLASS I

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**6.3 REMOVAL & REPLACEMENT OF COMPONENTS**

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6.3.3 ..... FUSELAGE

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6.3.23 ..... WEIGHING

6.3.24 ..... PARKING AND MOORING

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### 6.3.1 GENERAL

This section describes the removal method and replacement of components for line maintenance, repairs, and alterations. For maintenance and repair of primary structures, see Section 5.4.

This section also lists the components that Cub Crafters recommends be replaced at specified intervals. Whenever this is carried out, ensure that the following information is properly recorded in the airplane maintenance log:

- Date of removal, installation, or overhaul of the component.
- Time on the component since last overhaul (if appropriate).
- Aircraft's flight hours.

#### (1) Replacement Times

	ITEM	INTERVAL	REPLACE	OVERHAUL	REF. IN THIS MANUAL	NOTES
1	Engine	2000 Hours		X		Refer to the latest revision of the manufacturer's maintenance manual
2	Propeller				5.4.4, 6.3.16	See manufacturer's maintenance Manual
3	B & C Alternator	At engine overhaul		X		
4	Starter	At engine overhaul		X		
5	Exhaust System	1000 Hours		X		
6	Induction Air Box	2000 hours/ engine overhaul, whichever comes first	X			
7	Flexible Fuel Lines	12 years/ engine overhaul, whichever comes first	X			
8	Flexible Oil System Lines	12 years or engine overhaul, whichever comes first	X			

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	ITEM	INTERVAL	REPLACE	OVERHAUL	REF. IN THIS MANUAL	NOTES
9	Emergency Locator Transmitter Batteries	After 1 hour of cumulative transmitting. Date Marked on the Batteries by Duracell.	X		Chapter 5.4.7	Refer to ACK Technologies Model E-01 or Artex ME-406 Installation and Operation Manual
10	Remote ELT Switch Battery (if installed)	8 years Lithium 4 years Alkaline	X			
11	Fire Extinguisher	12 years from date of manufacture	X			Applicable to model RT A400. Replace if gross weight is less than 17.7 oz.
12	Rubber Engine Mount Bushings	At engine overhaul	X			
13	Landing Gear Bungees	5 Years	X			Replace more frequently when bungees are no longer strong enough to return the landing gear to its stops or whenever they are frayed or damaged



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### 6.3.2 Jacking the Airplane

#### (1) TOOLS EQUIPMENT AND SUPPLIES

Description	P/N or Spec.	Supplier	Purpose
Floor Jack	-	Any Source	Jack Main Wheels
Wooden Saw Horse or Bench	-	Any Source	Place Under Tail
Wing Jack	-	Any Source	Jack From Wing

**CAUTION**

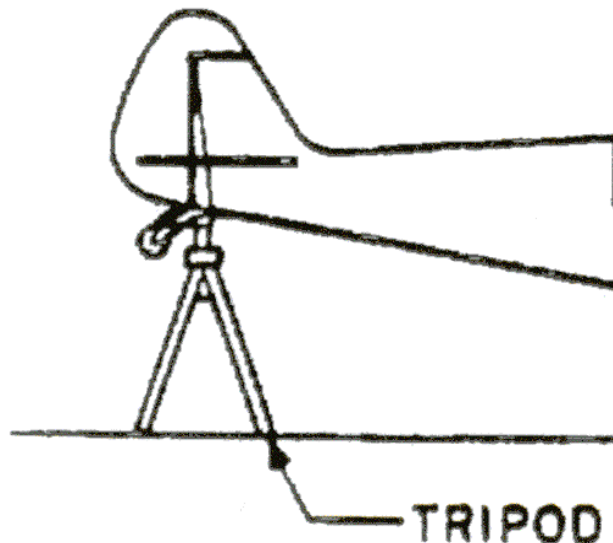
**Do not jack the aircraft outside or in an open hangar with winds in excess of 10 knots.**

**NOTE**

Raise airplane no more than required for the maintenance being performed

#### (2) RAISING THE TAIL

- (a) Set the parking brakes and place chocks under main wheels.
- (b) Grab under the empennage and raise the airplane to place a tripod or saw horse under the tail wheel springs, as indicated in Figure 6.3.2.2.



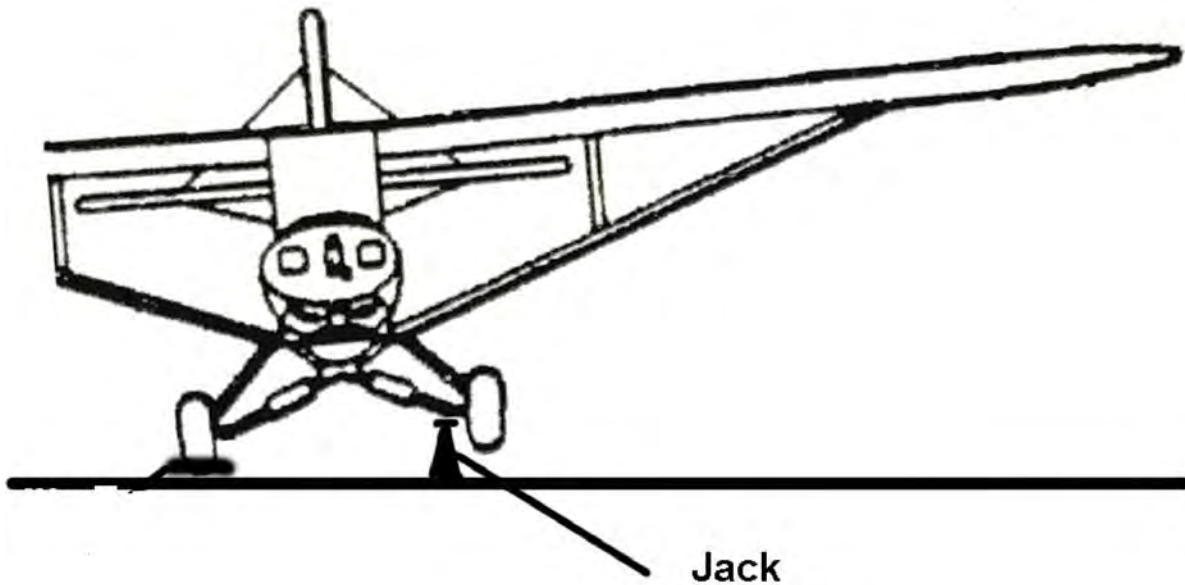
**Figure 6.3.2.1: Raising the Tail**

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**(3) RAISING THE AIRCRAFT FROM THE LANDING GEAR**

**Use this method to service the wheels and brakes.**

- (a) Place a chock under the opposite main wheel and tail wheel.
- (b) Place a jack under the main axle as shown in Figure 6.3.2.2.



**Figure 6.3.2.2: Jacking from Main Axle**

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**(4) RAISING THE AIRCRAFT FROM THE WING**

**Use this method for complete removal of landing gear leg.**

- (a) Place chock under opposite main wheel and tail wheel.
- (b) Place jack between the main lift strut wing attachment point and the tie down (Refer to 6.3.2.3). Jack one side at a time. Jacking both sides simultaneously is to be avoided.



**Figure 6.3.2.3: Jacking from the Wing**

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6.3.3 FUSELAGE

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**1 FUSELAGE**

**(1) INSPECTION**

See inspection forms in Appendix 6.A to perform periodic inspection tasks.

**(2) REPAIR**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
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**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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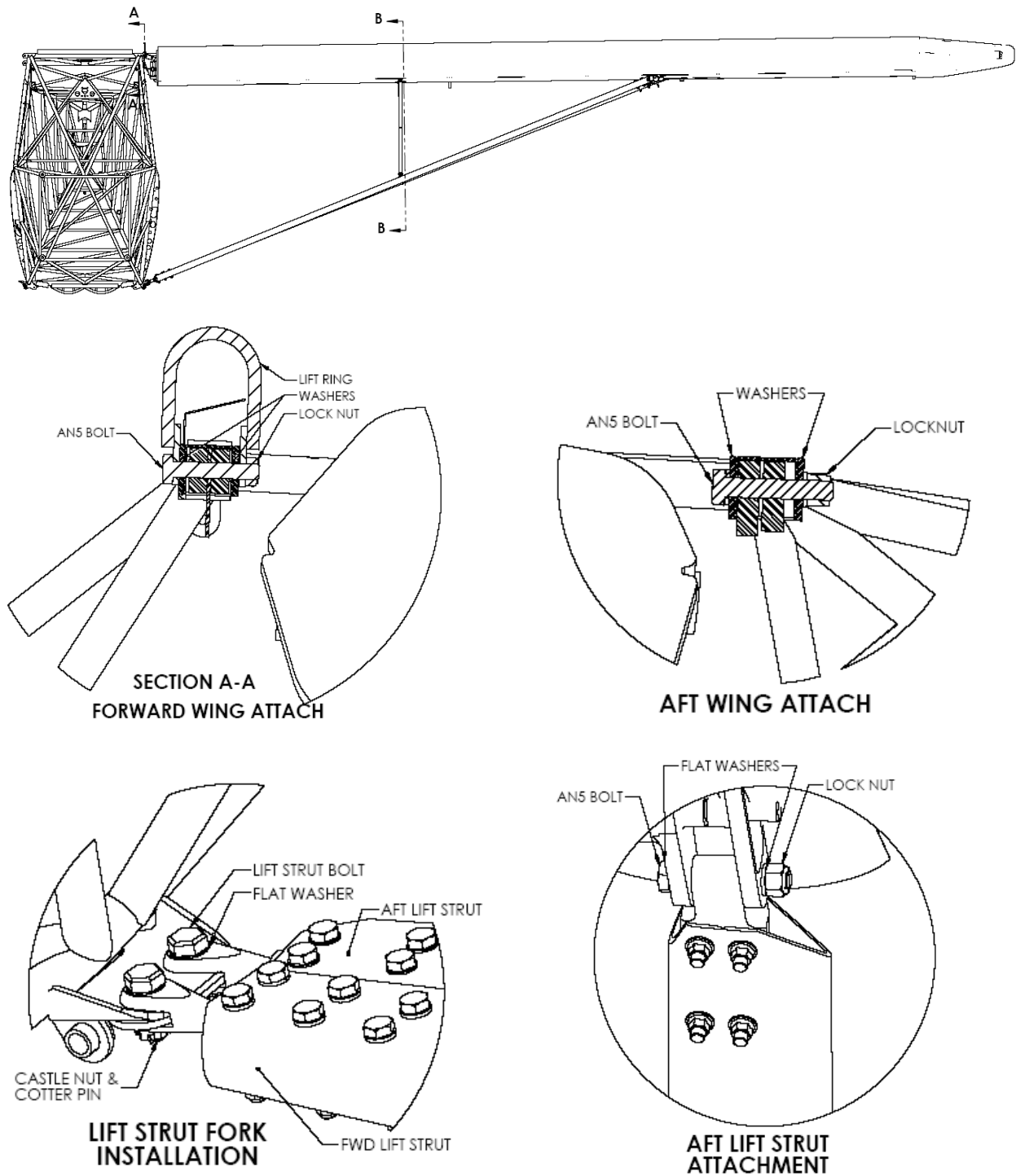
**6.3.4 WINGS**

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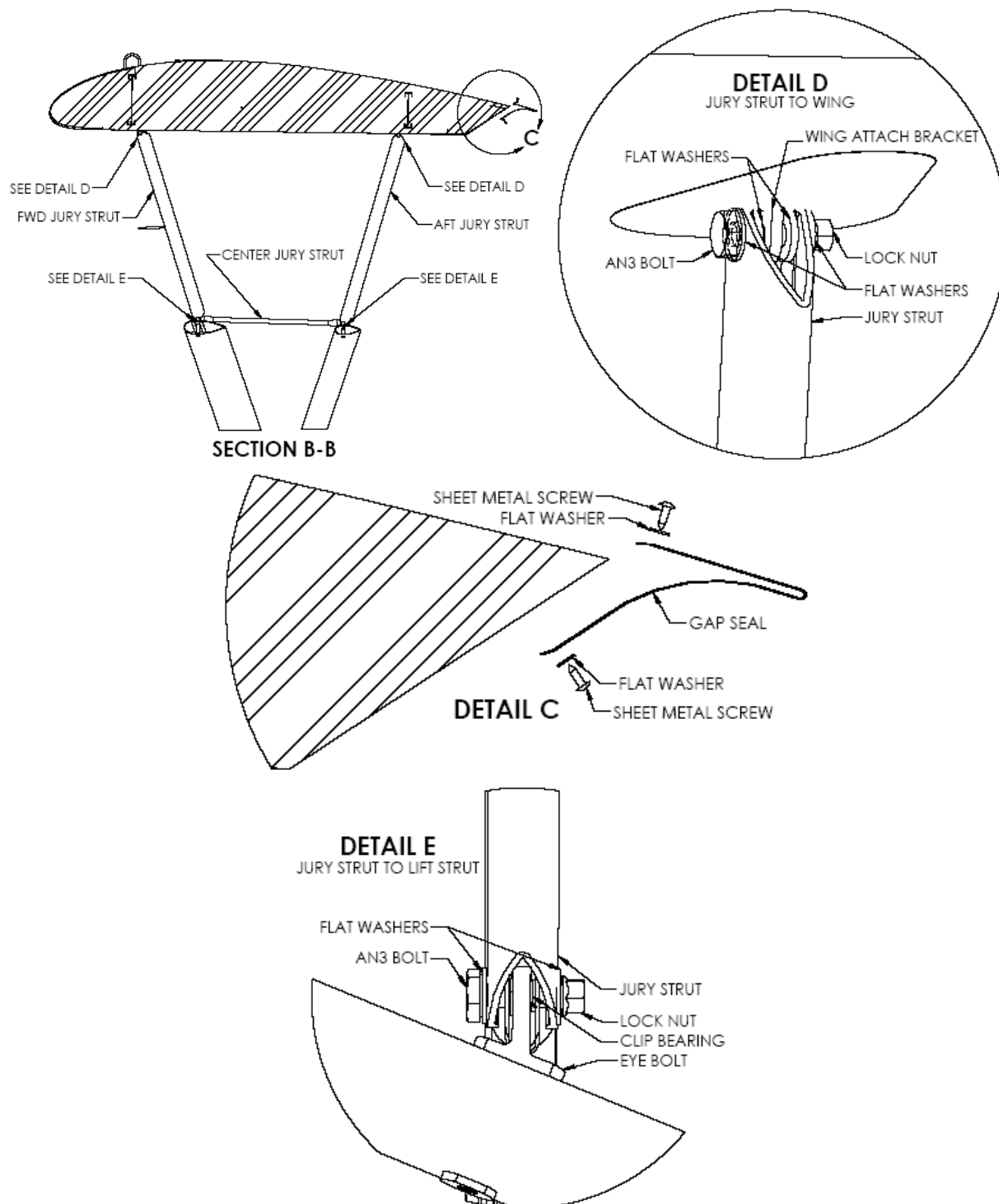
**1. SERVICING**



**Figure 6.3.4.1 Wing Installation**



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**Figure 6.3.4.1 Wing Installation (Continued)**

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(1) REMOVAL

**CAUTION**

**Before removing the wings, set the parking brakes and chock the wheels.**

- (a) Remove the front wing root, rear wing root, wing/root panel interface, skylight, and turtle deck.
- (b) Drain the fuel tank(s) and disconnect the fuel supply and gauge lines inboard ends at the wing root. Cover all exposed ends of tubing and hoses with tape to prevent contamination of the fuel from dirt or debris.
- (c) Disconnect the pitot air tube at the wing root(left side only) .
- (d) Disconnect the appropriate wiring, stall warning system, navigation, and landing light at the wing root butt splices.
- (e) Remove the wing pulley inspection plate covers from the wing. Remove pulley and aileron upper cable attachment.
- (f) Remove fairleads from wing strut. Disconnect the lower aileron control cables from the torque tube link on the below the control stick.
- (g) If the wing or wings are to be fully removed, cut and remove the upper aileron crossover cable.
- (h) Disconnect the flap control rod from the flap lever arm and flap. .

**NOTE**

The flaps and ailerons may be removed from the wings at this point.  
See Section 6.3.6 Flight Controls.

- (i) Unbolt and remove the jury strut braces. They are secured to the wing from the middle of the struts. Mark the struts LH and RH so they may be reinstalled in the same location.

**CAUTION**

**To accomplish removal and installation of the wings, at least three people will be required.**  
**Use one person to support the outboard portion of the wing and one person to support the inboard end while the third removes the attaching hardware.**

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- (j) With a person holding the wing and one person holding the rear lift strut, remove the lower and upper rear lift strut bolts and separate the strut from the fuselage.
- (k) Remove the nuts from the wing and strut attachment bolts.
- (l) Remove the lower and upper front lift strut bolts and separate the strut from the fuselage.
- (m) Remove the wing from the fuselage.
- (n) Rest the wing on the leading edge using soft pads along the leading edge or place horizontally on padded sawhorses so as not to dent or damage the surfaces.
- (o) Repeat all the procedures on the opposite wing, if necessary.

**(2) INSTALLATION**

- (a) Support the wing at the outboard end and at the wing root.
- (b) Align the wing root attachment points with the fuselage attachment points and insert bullets. (It is easier to temporarily secure the wing with bullets of the same diameter as the bolts and then push the bullets out with the bolts.)
- (c) Position the front strut fork on the fuselage attachment point and align the hole with a bullet.
- (d) Align the top hole of the front strut with the wing attachment hole and secure with a bullet.
- (e) Position the rear strut fork on the fuselage attachment point, align the hole with a bullet; align the top hole of the rear strut with the wing attachment point and secure with a bullet.
- (f) Repeat the procedure on the opposite wing if necessary.
- (g) Apply a light coat of grease to the wing attachment bolts before installation.
- (h) Press out the bullets at the wing to fuselage attachment points with the proper bolts. Secure the bolts using the appropriate washers and nuts. Torque the nuts to 160-200 in. lbs. (Refer to Section 5.2.8.)
- (i) Press out the bullet at the wing to front strut attachment point with the proper bolt. Slide the spacer and pulley bracket over the end and secure using the appropriate washer and nut. Torque to 160-200 in. lbs. (Refer to Section 5.2.8.)
- (j) Press out the bullet at the wing to rear strut attachment point with the proper bolt. Secure using the appropriate washer and nut. Torque to 160-200 in. lbs. (Refer to Section 5.2.8.)

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- (k) Support the outboard end of the wing and remove the lower strut bullets. Insert the proper bolts. Torque the nut to 95 in. lbs, torque up to the nearest castellation, and safety with a cotter pin.
- (l) Check the dihedral angle in accordance with Section B. Adjust if necessary.
- (m) Check the wing washout in accordance with Section B. Adjust if necessary.
- (n) Install the jury struts making sure the longer vertical tube is in front. Secure using the appropriate bolt, washer, and nut then torque the top bolt to 38-43 in. lbs, bottom bolt to 23-28 in. lbs.
- (o) Install new aileron upper cable and install to aileron horns.
- (p) Connect the flap to flap control rod. Connect the control arm to the flap handle lever. .
- (q) Route the lower aileron cable down the strut.
- (r) Install the associated pulley and fairleads. Make sure the cable is not hooked on a strut.
- (s) Connect the lower aileron control cables to the torque tube link. Ensure that the nuts have the appropriate cotter pins.
- (t) Connect the pitot air tube at the wing root. Reconnect the stall warning system, navigation, and landing light wires at the wing root.
- (u) Remove the tape from the fuel line ends, reconnect the fuel supply, and gauge lines at the wing root. Torque the ¼ inch hose clamps to 10-14 in. lbs. Reconnect plastic fuel line fittings, torque to finger tight plus 1 ½- 2 additional revolutions.
- (v) Ensure that the aileron cables are not rubbing or hung up. Check to verify the cable tension is  $40 \pm 5$  lbs and, if needed, adjust in accordance with Section 6.3.6.3 Ailerons.
- (w) Install the wing pulley inspection plate covers.
- (x) Reinstall the front wing root, rear wing root, turtle deck, skylight, and wing/root panel interface.

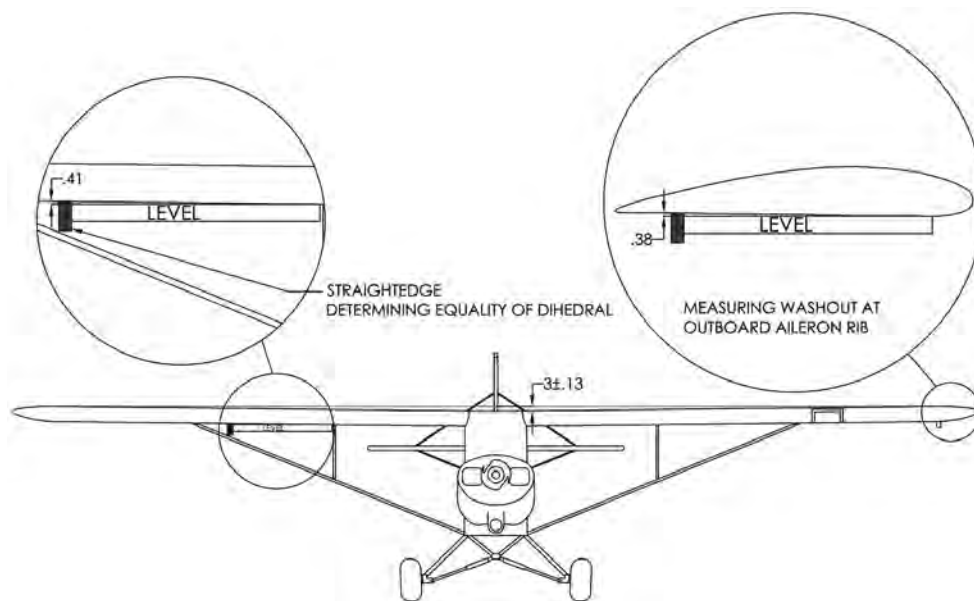
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## **2. RIGGING THE WINGS**

### **(1) PREPARATION**

The aircraft must be level longitudinally and laterally prior to setting or adjusting the dihedral or the washout angles. Refer to the leveling procedure described in Section 6.3.22.

### **(2) DIHEDRAL ANGLE**



**Figure 6.3.4.2 Dihedral Angle and Washout**

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- (a) Remove the front wing root fairings.
- (b) Stretch a string from wing tip to wing tip above the front spar and pull tight and secure.
- (c) Measure down from the string to the top of the inboard edge of the front spar cap (Figure 6.3.4.2). The measurement should be 3 inches plus or minus 0.13 (1/8) inches. This adjustment is accomplished by turning the forks in or out. However, prior to making any adjustment, proceed to step (d) and (e).
- (d) To determine that each wing panel has the same dihedral, hold a straightedge on the end of a 30-inch level so that one end of the straightedge protrudes 0.41 (13/32) of an inch above the level (see Figure 6.3.4.2). Place the level combination along the front spar bottom between the lift strut and jury strut attachment fittings as illustrated in Figure 6.3.4.2. The bubble should be approximately centered. Check the opposite wing panel in the same manner.
- (e) If the dihedral angle is not equal for both wing panels, adjust the threaded fork on the lower end of the front strut until the dihedral angle is the same. Recheck the total dihedral and readjust as necessary.
- (f) Record the actual results in the aircraft logbook.

**(3) WASHOUT ANGLE**

- (a) Check the washout of each wing by holding a straightedge on the end of a 30-inch level so that one end of the straightedge protrudes 0.38 (3/8) inches above the level (See Figure 6.3.4.2). Place this combination along the bottom surface of the full rib next to the outboard end of the aileron. The level end with straightedge space should fit to the rear of the rib while the other end of the level should be placed under the front spar.
- (b) To obtain the proper washout, adjust the threaded fork at the lower end of the rear strut at the fuselage end until the bubble is centered.
- (c) Repeat on the opposite wing if needed.
- (d) Record the actual results in the aircraft logbook.

**CAUTION**

**There should not be more than 15 threads exposed on the lift strut forks.**

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### **3. VORTEX GENERATORS**

Each wing has 36 vortex generators on the top leading edge. The aircraft is allowed to fly with the following number of vortex generators missing:

- Not more than three vortex generators missing on an aircraft
- Not more than three vortex generators missing on a wing
- The missing vortex generators must not be next to each other

If a vortex generator should fall off, it must be glued on at the same location as follows:

- (e) Ensure that the area where the vortex generator fell off it is dry and free of grease and dirt.

**NOTE**

If the color of the vortex generator does not match the aircraft, it is advisable to paint the exposed part of the vortex generator prior to installation.

- (f) Clean the bottom surface of the vortex generator, removing any old adhesive.
- (g) Mask off the rectangular footprint of the vortex generator.
- (h) Reattach the vortex generator with Loctite Depend glue.
- (i) Remove masking and wipe off excess glue with cleaner

### **4. MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

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**6.3.5 EMPENNAGE**

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**1. INSPECTION**

**(1) FUSELAGE**

- (a) Visually inspect the fuselage longeron tubing and stringers for damage and corrosion.
- (b) Inspect all pulleys, guides, and fairleads for damage, cracks, or misalignment.
- (c) Check that the pulleys turn freely.
- (d) Replace damaged pulleys that bind and guides or fairleads that are cracked.
- (e) Check all control cables for wear or corrosion.
- (f) Inspect all turnbuckles and turnbuckle terminals for cracks, corrosion, improper safety and freedom of movement.
- (g) Damaged turnbuckles and control cables must be replaced.

**(2) TAIL SURFACES**

- (a) Inspect the steel structure for damage or pitting from corrosion.
- (b) Check the control surfaces for minor damage such as tears or holes in the fabric.
- (c) Repair fabric in accordance with Section 6.4.
- (d) Examine all drain holes. These must be kept open at all time so that accumulations of moisture will drain out of the control surfaces.

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**2. RUDDER**



1 - Springs      2 - Cables      3 - Wiring      4 - Hinge pins

**Figure 6.3.5.1 Rudder Installation**

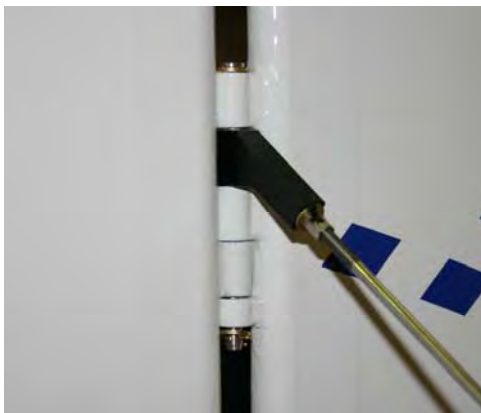
**(1) REMOVAL**

Refer to Figure 6.3.5.1

- (a) Unhook the tail wheel steering springs (1) from the rudder arm.
- (b) Disconnect the rudder cables (2) from the rudder horn.
- (c) Remove the rectangular inspection cover and disconnect the electrical wiring to the tail assembly (3).
- (d) Remove the hinge pins (4) and separate the rudder assembly from the fin.

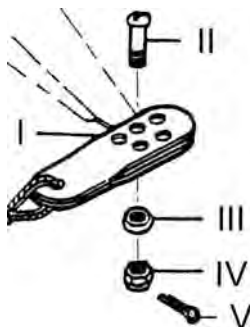
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(2) INSTALLATION



**Figure 6.3.5.2: Installation of Clevis Pins at Rudder Hinges**

- (a) Position the rudder hinges inline with the hinges on the fin and fasten with two clevis pins, wire pull bracket (top only), washers, and cotter pin. (Figure 6.3.5.2)
- (b) Reconnect the electrical wiring to the lights in the light (3).
- (c) Secure each rudder cable fitting (I Figure 6.3.5.3) to a rudder horn with a screw (II Figure 6.3.5.3), washer (III Figure 6.3.5.3) and nut (IV Figure 6.3.5.3). Make certain the connections pivot freely and that the rudder is centered when rudder pedals are inline with each other. Verify full rudder travel to the left and to the right can be obtained. Make any adjustments at the rear cable attach fitting (I Figure 6.3.5.3) by changing the hole through which the screw (II Figure 6.3.5.3) goes through the fitting (I Figure 6.3.5.3). Safety each nut (IV Figure 6.3.5.3) with a cotter pin (V Figure 6.3.5.3).



I - Cable Fitting  
II - Clevis Screw

III - Thin Washer  
IV - Castle Nut

V - Cotter Pin

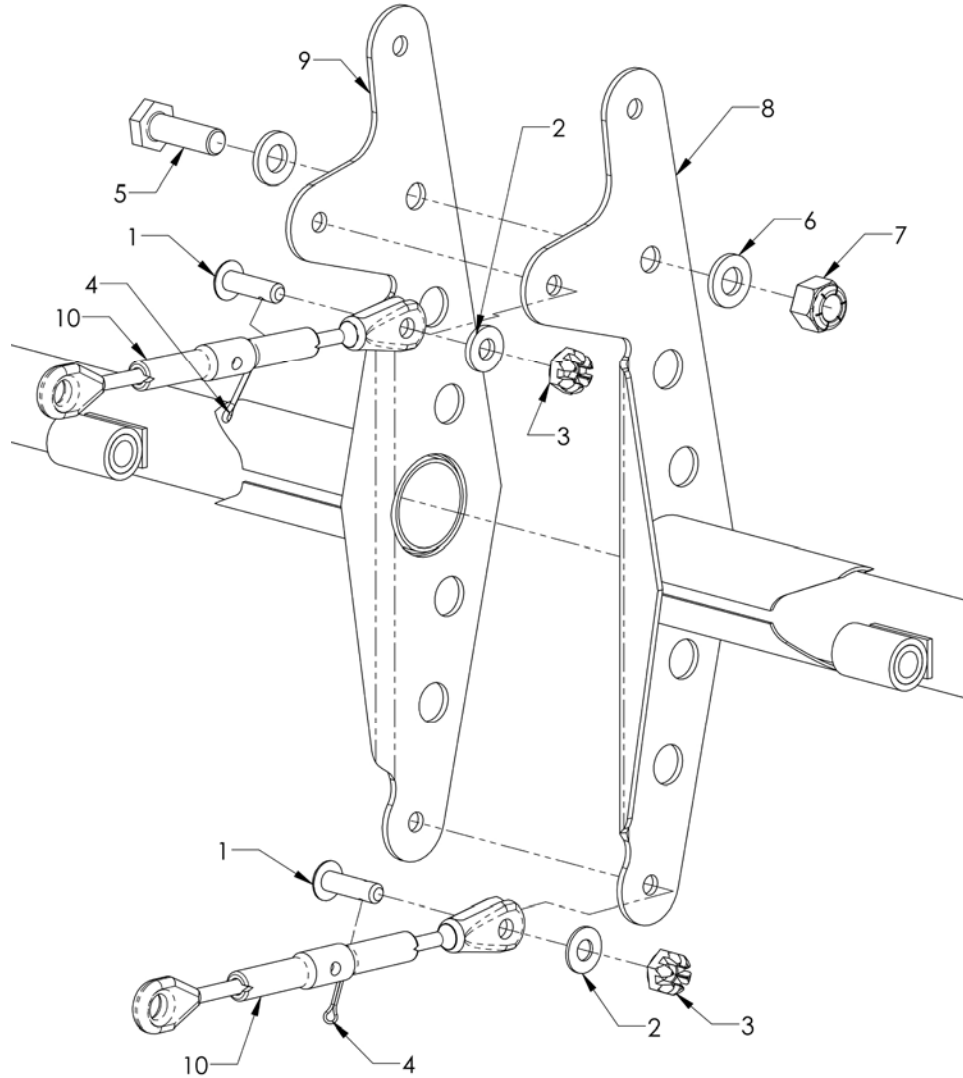
**Figure 6.3.5.3 Attachment of Rudder Cable Fitting**

- (d) Hook each tail wheel steering spring (1) to a rudder arm. Lubricate the hinge pins and pivot points with LPS-2 oil.
- (e) Install the rectangular inspection cover.

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### 3. HORIZONTAL STABILIZERS AND ELEVATORS

#### (1) ELEVATOR REMOVAL



- |   |                                     |                 |
|---|-------------------------------------|-----------------|
| 1 – Clevis Bolts                        | 2 – Washers                         | 3 – Castle Nuts |
| 4 – Cotter Pins                         | 5 – Bolt                            | 6 – Washers     |
| 7 – Lock Nut                            | 8 – Elevator Assembly – Left (Horn) |                 |
| 9 – Elevator Assembly – Right (Horn)    |                                     |                 |
| 10 – Elevator Control Cable Connections |                                     |                 |

**Figure 6.3.5.4 Elevator Horn Installation**

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Refer to Figure 6.3.5.4

- (a) Remove left hand and right hand tail inspection covers.
- (b) Remove the cotter pin (4), nut (3), and washer (2) on the top side of the elevator horns (8 & 9).
- (c) Carefully remove the clevis bolt (1) to disconnect the upper elevator cable connection (10).
- (d) Remove the cotter pin (4), nut (3), and washer (2) on the bottom side of the elevator horns (8 & 9).
- (e) Carefully remove the clevis bolt (1) to disconnect the lower elevator cable connection (10).
- (f) Remove the lock nut (7), washers (6), and bolt (5) and carefully separate the elevators from the stabilizer and fuselage.

(2) HORIZONTAL STABILIZERS REMOVAL

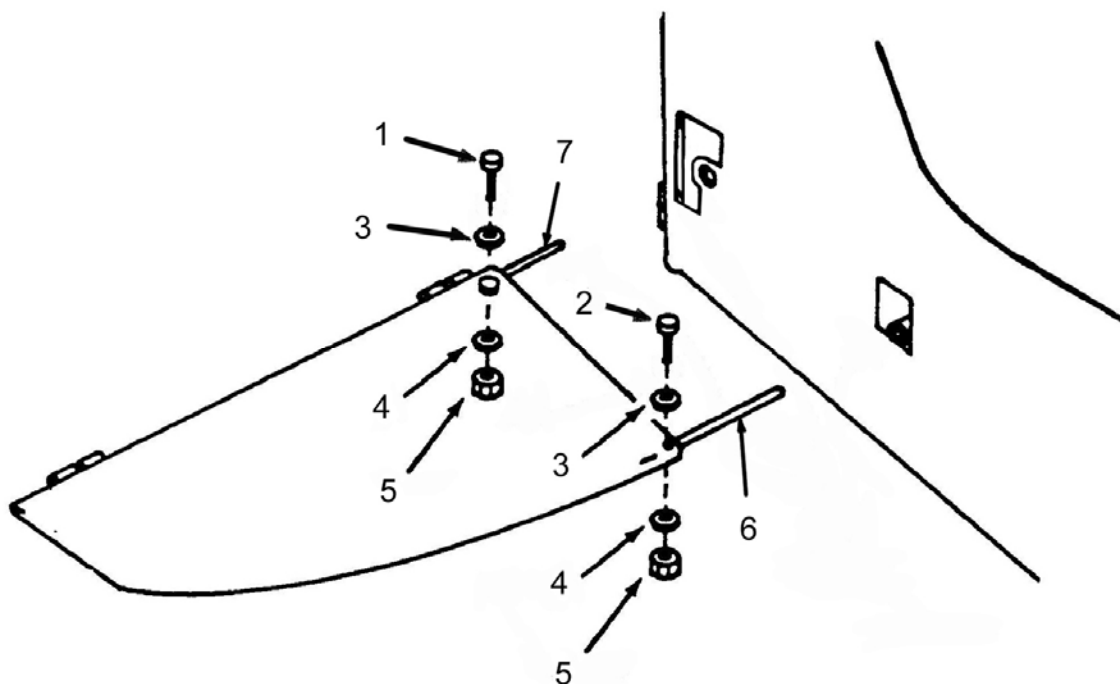


**Figure 6.3.5.5 Tail Brace Wires and Elevator Attachment**

- (a) Unbolt the upper and lower tail brace wire assemblies.
- (b) Unbolt the left stabilizer from the tubes and carefully pull it off.
- (c) Carefully slide the right stabilizer, together with the tubes, out of the mounting points in the fuselage.

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**(3) RIGHT HORIZONTAL STABILIZER INSTALLATION**



- |                 |                           |                          |
|-----------------|---------------------------|--------------------------|
| 1 - Long Bolt   | 4 - Thick Washer          | 7 - Rear Stabilizer Tube |
| 2 - Bolt        | 5 - Nut                   |                          |
| 3 - Thin Washer | 6 - Front Stabilizer Tube |                          |

**Figure 6.3.5.6 Horizontal Stabilizer Installation**

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Refer to Figure 6.3.5.6

- (a) Identify the right stabilizer (note that the fabric seam should be on the bottom of the surface). Lay the stabilizer on a suitable work surface and apply a thin coat of grease (MIL-G-81322E) to the inside ends of the front and rear tubes.
- (b) If the tail surfaces have been changed and new tubes are to be installed, complete the following steps;
  - Make a line around the front stabilizer tube (6), 2-7/8 inches from one end with a fine tip felt pen.
  - Make a line around the rear stabilizer tube (7), 2-1/2 inches from one end with a fine tip felt pen.
  - Slide the front tube liner (6) into the end of the stabilizer until the marks are even with the end of the stabilizer tube.
  - Drill a hole down through the topside of the stabilizer and tube with a #12 bit, using the predrilled hole in the stabilizer frame as a guide. **DO NOT DRILL CLEAR THROUGH AT THIS TIME.**
  - Insert a short 3/16-inch bolt or cleco into each hole to hold the alignment and turn the stabilizer frame over. It may be necessary to hold the alignment bolt in place with tape.
  - Drill a hole with a #12 bit through the stabilizer holes into the tube liners, remove the alignment bolts and drill clear through to "clean out" the holes.
  - Repeat the same steps for the rear tube liner (7).
- (c) Attach the front tube with a long bolt (1) and washer (3) inserted through the stabilizer and tube (6) and secure it with a washer (4) and nut (5). Torque the nut to 38-43 in. lbs.
- (d) Attach the rear tube with a bolt (2) and washer (3) inserted through the stabilizer and tube and secure it with a washer (4) and nut (5). Torque the nut to 38-43 in. lbs.
- (e) Apply a thin coat of grease (MIL-G-81322E) to the inside of the stabilizer attachment tubes on the airframe and slide the stabilizer on until it is tight against the mounting points.



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**(4) LEFT HORIZONTAL STABILIZER INSTALLATION**

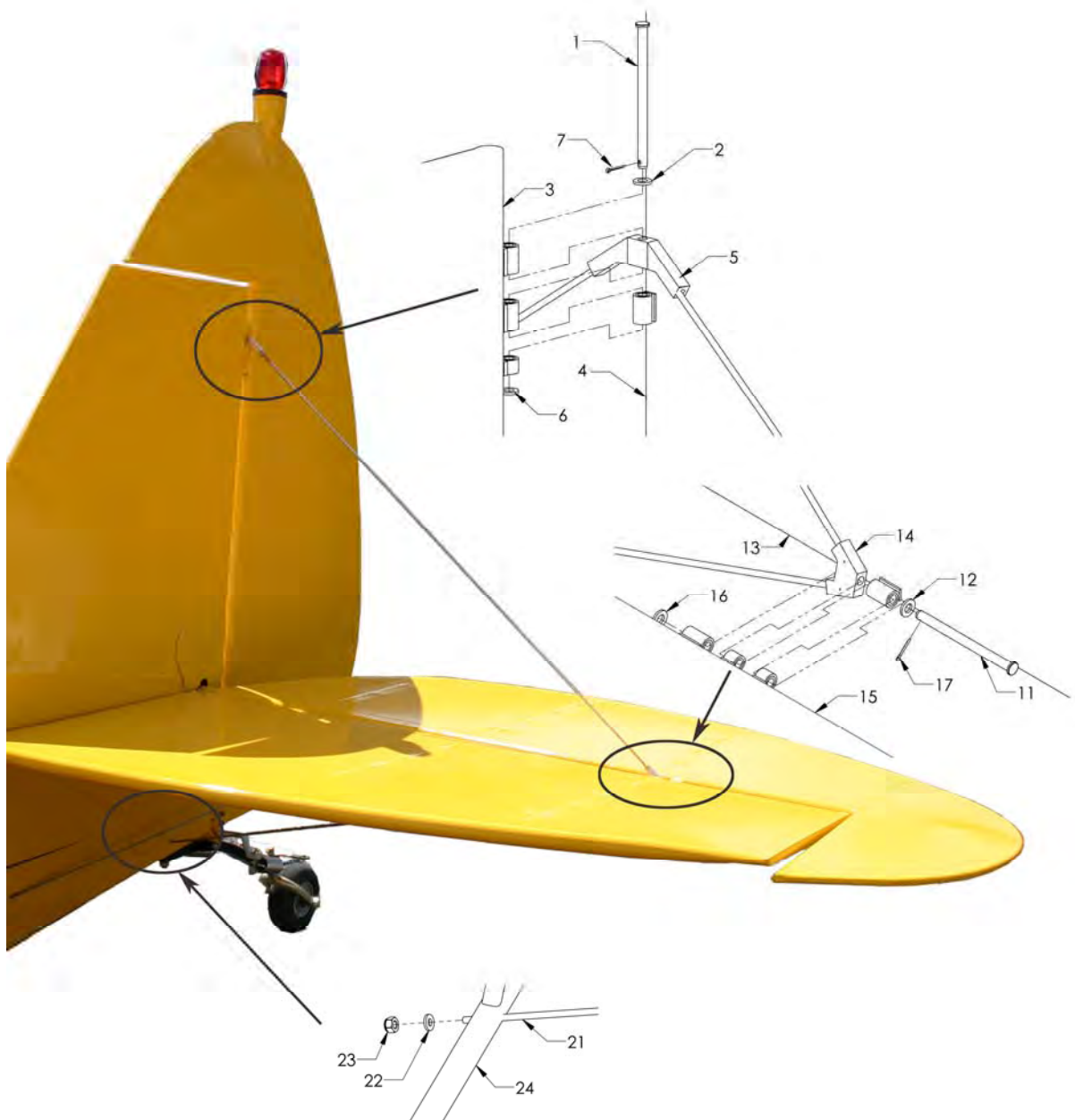
- (a) Apply grease (MIL-G-81322E) to the inside of the front and rear tubes of the right stabilizer and install it onto the ends of the tubes that protrude from the side of the fuselage. It may be necessary to have a second person hold the left stabilizer as a back up.
- (b) Make sure the sewn seams on the trailing edge of both stabilizers are on the bottom.
- (c) Make sure the stabilizer frame fits tightly against the fuselage attachments.
- (d) If the tail surfaces have been changed and new tube liners are installed complete the following;
  - Have a second person pull the front corners of the stabilizer together tight against the fuselage attachment yoke then drill a hole down through predrilled hole in top of the both front stabilizer tubes into the tube liner with a #12 bit.

**DO NOT DRILL CLEAR THROUGH.**

- Drill the holes up from the bottom through the stabilizer and liners and on up through the top to "clean out" the holes.
- (e) Attach with a long bolt (1) and washer (3) inserted down through the stabilizer and tube (6) and secure it with a washer (4) and nut (5). Torque the nut to 38-43 in. lbs.
- (f) Pump grease (MIL-G-81322E) into the stabilizer link assembly grease fittings (if equipped) until it starts to squeeze out.

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**(5) INSTALLING TAIL BRACE WIRES**



- |                  |                              |                          |                            |
|------------------|------------------------------|--------------------------|----------------------------|
| 1 – Clevis Pin   | 2 – Washer                   | 3 – Tail Fin             | 4 – Rudder                 |
| 5 – Fin Stringer | 6 – Washer                   | 7 – Cotter Pin           | 11 – Clevis Pin            |
| 12 – Washer      | 13 – Elevator                | 14 – Horizontal Stringer | 15 – Horizontal Stabilizer |
| 16 – Washer      | 17 – Cotter Pin              | 21 – Tail Brace Wire     | 22 – Washer                |
| 23 – Nut         | 24 – Fuselage Lower Longeron |                          |                            |

**Figure 6.3.5.7 Tail Brace Wire Installation**  
SHOWN WITH TOP MOUNTED RUDDER BEACON

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Refer to Figure 6.3.5.7

- (a) Set the tail of the aircraft on a sawhorse or a bench.
- (b) Remove the inspection cover located on the left side of fuselage beneath the horizontal stabilizer.
- (c) Position the long tail wires with the fin stringer (5) and insert a clevis pin (1) with washer (2) through the fin (3) and rudder (4). Secure with washer (6) and cotter pin (7).
- (d) Position the long tail wires with the horizontal stringer (14) on the horizontal stabilizer (15) and insert a clevis pin (11) with washer (12) through the elevator (13). Secure with washer (16) and cotter pin (17).
- (e) Repeat on the opposite side.
- (f) Insert the short tail wire (21) through the fuselage longeron (24). Secure with a washer (22) and nut (23) and torque to 38-43 in.-lbs.

**(6) RIGGING THE TAIL BRACE WIRES**

- (a) Set the tail of the aircraft on a sawhorse or bench.
- (b) Level the fuselage laterally (Refer to Section 6.2.22).
- (c) Hang a plumb bob from the top rudder hinge and line up the tip with the bottom rudder hinge.
- (d) If needed, adjust the tension of the tail brace wires to straighten the fin. Accomplish this by loosening the jam nut on either end of the wire and turn the brass barrel, (in to shorten the wire and out to lengthen it).
- (e) The tail brace wires must be tensioned while at the same time ensuring that the horizontal stabilizers remain horizontal and the fin vertical.
- (f) Lay a level along the rear spar of the stabilizers.
- (g) Adjust the tension of the tail brace wires such that a 0.44 (7/16) inch  $\pm$  0.063 (1/16) inch deflection may be reached when applying a load of 10  $\pm$  1 lbs at right angles at the center of either of the top wires.
- (h) Ensure that the rear spar of the stabilizer ends up level and the fin remains vertical at the rudder hinge centerline after tensioning.
- (i) The tolerance is  $\pm$  0.5 degree.
- (j) Tighten all eight jam nuts on the brass barrels.

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**(7) ELEVATOR INSTALLATION**

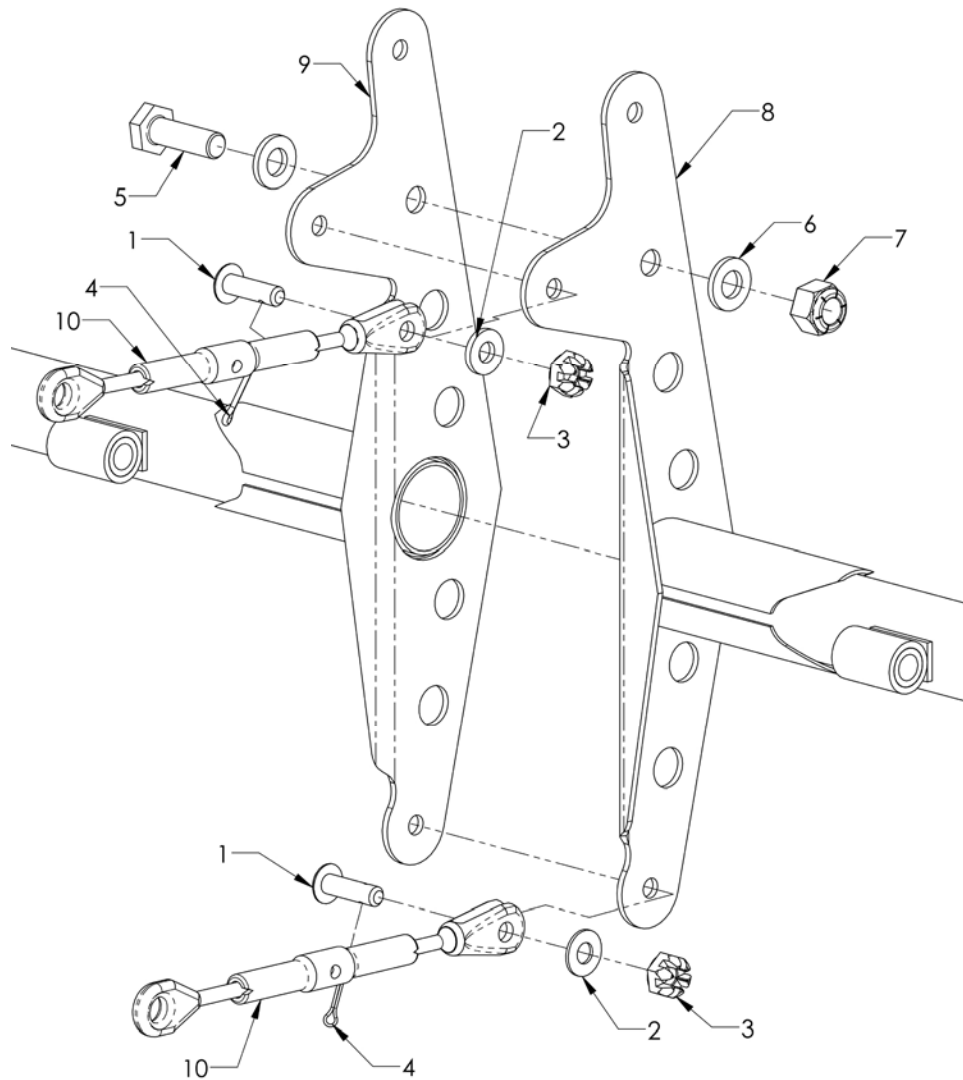
- (a) Identify which are the left and right elevators. The sewn seams are on the bottom trailing edge of each.



**Figure 6.3.5.8 Clevis Pin Installation on Elevator**

- (b) Install each elevator onto the matching hinges on the stabilizers using clevis pins, wire pull brackets, with a washer at each end of every pin, and then secure each with a cotter pin. (Figure 6.3.5.8)

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- |   |                                     |                 |
|---|-------------------------------------|-----------------|
| 1 – Clevis Bolts                        | 2 – Washers                         | 3 – Castle Nuts |
| 4 – Cotter Pins                         | 5 – Bolt                            | 6 – Washers     |
| 7 – Lock Nut                            | 8 – Elevator Assembly – Left (Horn) |                 |
| 9 – Elevator Assembly – Right (Horn)    |                                     |                 |
| 10 – Elevator Control Cable Connections |                                     |                 |

**Figure 6.3.5.9 Elevator Horn Installation**

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Refer to Figure 6.3.5.10

- (c) Connect the elevator horns (8 & 9) to the stabilizer and fuselage, and secure with the bolt (5), washers (6) and lock nut (7) at the top of the horns.
- (d) Attach the lower elevator cable connection (10) on the bottom of the elevator horns, and secure with the cotter pin (4), through the nut (3) with a washer (2). Tighten the nut finger tight temporarily.
- (e) Repeat on the upper elevator cable connection (10). Torque the nut (7) to 38-43 in. lbs
- (f) Check to verify proper elevator movement and routing of cables.
- (g) Safety each turnbuckle barrel with two wire lock clips, making sure that each clip end is locked in the hole. Alternatively, use the single wrap method with 0.032" stainless steel safety wire.
- (h) Reattach the left hand and right hand tail inspection covers.

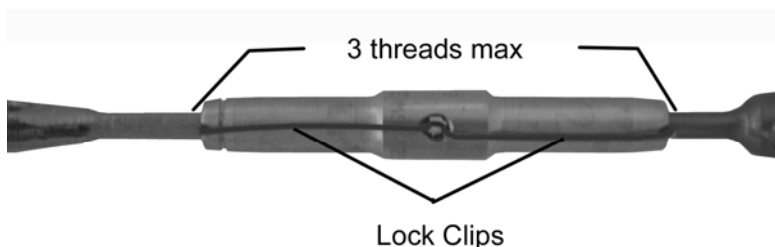
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#### **4. RIGGING THE TAIL CONTROL SURFACES**

##### **(1) ELEVATOR**

To rig the elevator, adjust both turnbuckles until:

- The stick clears the instrument panel by at least 1/8 inch when the stick is moved all the way forward (nose down);
- With the pilot's seat all way forward, the stick clears the base of the seat by at least 1/8 inch when the stick is moved all the way back (nose up) and,
- The cable tension is  $60 \pm 2$  lbs.



**Figure 6.3.5.10 Installing Safety Clips on Turnbuckles**

**CAUTION**

**Not more than three threads shall be visible at each end of the turnbuckle barrels.**

##### **(2) RUDDER**

- (a) Check that the rudder is centered when rudder pedals are inline with each other. Ensure that the rudder can travel through its full range, left and right. Rudder travel may be measured using a special protractor available at Cub Crafters for a nominal fee. The travel is not adjustable in the field. Contact Cub Crafters if adjustments to the travel are required. Make any adjustments at the rear cable attach fitting (I Figure 6.3.5.3) by changing the hole through which the screw (II Figure 6.3.5.3) goes through to the fitting (I Figure 6.3.5.3). Safety each nut (IV Figure 6.3.5.3) with a cotter pin (V Figure 6.3.5.3).
- (b) Make sure all castellated nuts and clevis pins are secured with cotter pins.

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**5. MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**



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**6.3.6            FLIGHT CONTROLS**

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## 1. GENERAL

The control surfaces of the aircraft must be rigged within the prescribed limits in order to maintain adequate margins of safety. This section specifies the procedures that must be used to rig the flight control surfaces. The flight controls consist of ailerons, rudder, elevators, and flaps.

## 2. TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
Control sticks are displaced when ailerons are in neutral	Control cables improperly rigged	Adjust control cables
Improper aileron travel	Control cables improperly rigged	Adjust control cables
	Torque tube incorrectly adjusted	Readjust torque tube
Lost motion in control sticks	Loose control cables	Take up slack on control cables
	Broken pulley	Replace broken pulley
	Worn holes in control stick stub or torque tube where they attach to each other	Replace worn control stick stub or torque tube
Excessive resistance to movement of control sticks	Control cables too taut	Adjust control cable tensions
	Pulleys binding	Replace damaged pulleys
Full elevator travel cannot be achieved	Pulleys binding	Replace damaged pulleys
Stabilizer does not move up or down when actuating the trim switch	Loose wiring	Secure wiring connections
	Broken switch	Replace switch
	Inoperative electric servo	Replace electric servo
Flaps do not move when flap control arm is actuated	Flap actuator tubes broken/disconnected	Replace/reconnect flap actuator tubes
Flap control arm cannot be actuated	Flap control arm release button not working properly	Repair release mechanism
Flaps do not move in unison	Flap actuator tube bent/misrigged	Replace/re-rig flap actuator arm
	Flap actuator tube rod end broken	Replace flap actuator tube rod end
Flaps won't stay in position at second or third notch	Flap handle lock has been bent	Replace flap handle lock
Stall warning comes on well above stalling speed	Stall warning vane not calibrated properly	Calibrate stall warning vane

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PROBLEM	PROBABLE CAUSE	REMEDY
Stall warning does comes on at a speed less than 6 mph above the stall	Stall warning vane not calibrated properly	Calibrate stall warning vane
Stall warning does not work	Problem in the electric circuit, switches or horn	Inspect and replace or repair damaged components

### **3. AILERONS**

#### **(1) REMOVAL**



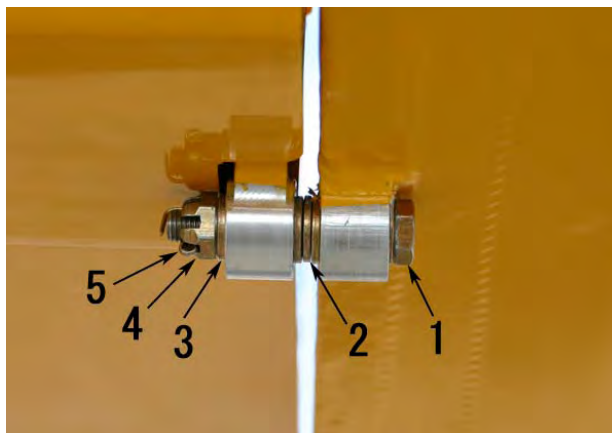
**Figure 6.3.6.1 Aileron Installation**

Refer to Figure 6.3.6.1

- (a) Disconnect both aileron control cables from the upper and lower aileron horns.
- (b) Remove the bolts while firmly holding the aileron.
- (c) Carefully remove the aileron from the wing panel.

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**(2) INSTALLATION**



1- Bolt  
4- Nut

2- Washers  
5- Cotter Pin

3- Washer

**Figure 6.3.6.2 Aileron Hinge**

Refer to Figure 6.3.6.2

- (a) Position the ailerons on the wing panels and secure with the bolts (1), washers (2 & 3), nuts (4) and cotter pins (5).

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1 - Aileron Control Cable  
4 - Wire-Lock Clip  
7 - Cotter Pin  
10 - Screw

2 - Hinge  
5 - Turnbuckle Fork  
8 - Thin Washer

3 - Turnbuckle Barrel  
6 - Castle Nut  
9 - Hinge Arm

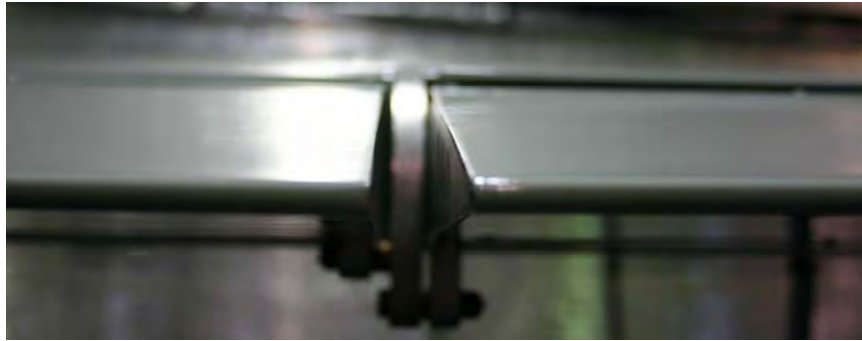
**Figure 6.3.6.3 Installation of Control Cable on Aileron Horn**

Refer to Figure 6.3.6.3

- (b) Attach each aileron control cable turnbuckle fork to the proper aileron horn with a screw (10), a thin washer (8), a nut (6) and a cotter pin (7).
- (c) The aileron travel should be rigged for  $18^{\circ} \pm 2^{\circ}$  up or down (Refer to section 5.2).
- (d) The cable tension must be  $40 \pm 5$  lbs. Refer to the next section, if adjustment is needed.

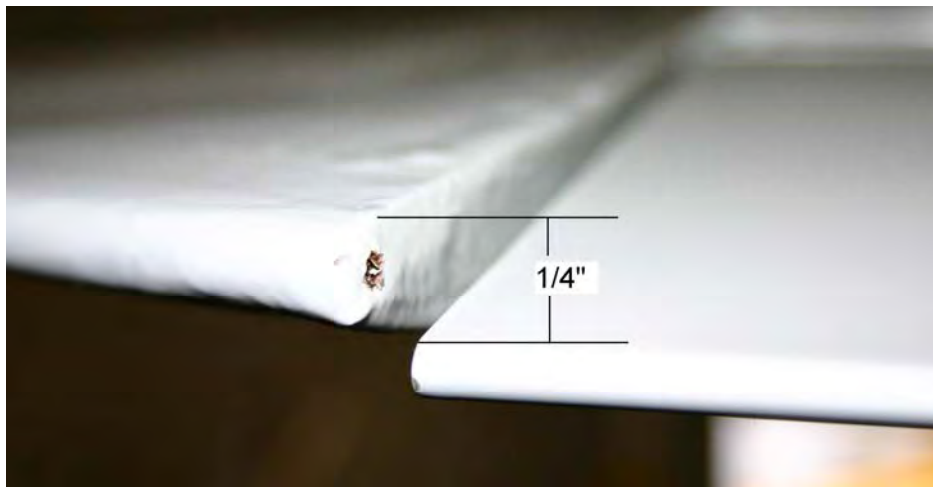
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**(3) RIGGING**



**Figure 6.3.6.4 Alignment of Aileron Trailing Edge with Flap Trailing Edge**

- (a) The neutral position of the ailerons is found by matching as closely as possible, the trailing edge of the ailerons with the trailing edge of the wing tip.



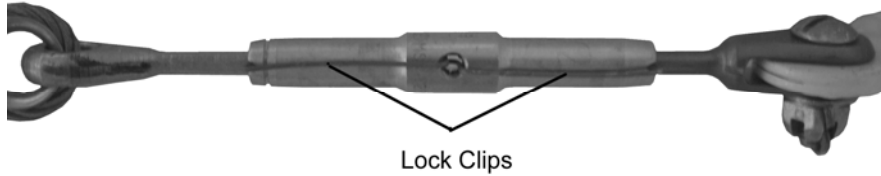
**Figure 6.3.6.5 Alignment of Aileron Trailing Edge with Wing Tip**

- (b) The ailerons must be rigged so that the top aft edge of the outboard end rib of either aileron does not extend more than 1/4-inch above or 1/4-inch below the top aft edge of the end wing rib with the control stick deflected right  $1^\circ \pm 1^\circ$  of vertical. (See Figure 6.3.6.5)
- (c) To raise the trailing edge of an aileron, take up the turnbuckle at the upper aileron horn and simultaneously let out the turnbuckle at the lower aileron horn.
- (d) The aileron trailing edge may be lowered by reversing the procedure. Ensure that the cable tension is  $40 \pm 5$  lbs. (Refer to Section 5.2).

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**CAUTION**

**Leave no more than 3 threads visible at each end of the turnbuckle barrels.**



**Figure 6.3.6.6 Safety of Turnbuckles**

- (e) Safety each turnbuckle barrel with 2 wire lock clips making sure the clip ends are locked in the hole (Figure 6.3.6.6). Alternatively use the single wrap method with .032 stainless safety wire.

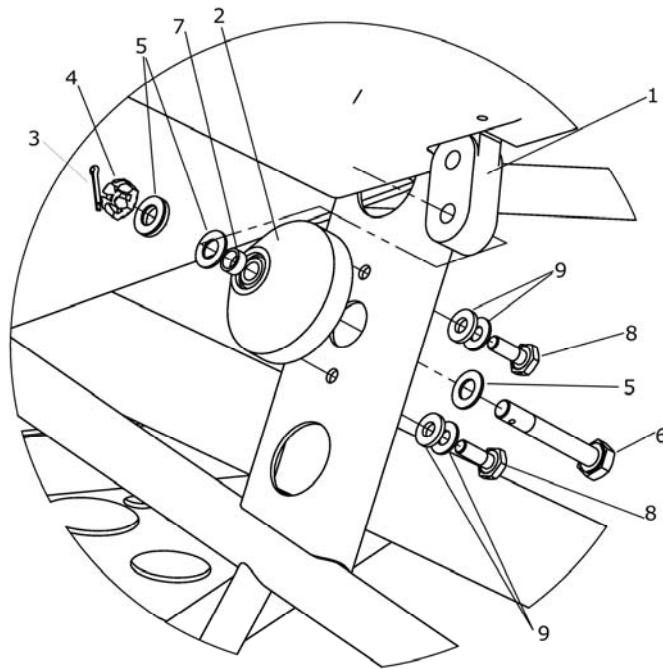
**NOTE**

Tight cables make stick action stiff while loose cables result in stick action that is too free and uncertain. Properly adjusted cables should not slap or wobble when the stick is moved back and forth in rapid succession.

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**4. FLAPS**

**(1) REMOVAL**

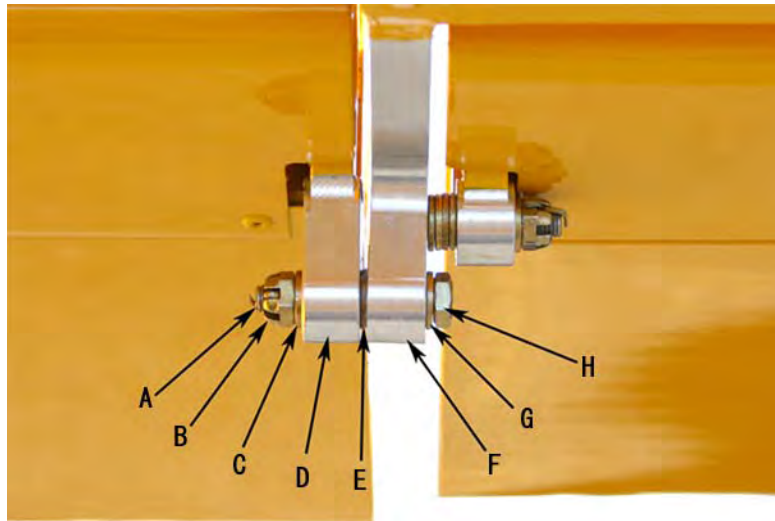


- |                   |                        |                |
|-------------------|------------------------|----------------|
| 1 – Flap Hinge    | 2 – Flap Cone Assembly | 3 – Cotter Pin |
| 4 – Castle Nut    | 5 – Washer             | 6 – Bolt       |
| 7 – Steel Bushing | 8 – Bolt               | 9 – Washers    |

**Figure 6.3.6.7 Flap Hinge**



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A – Cotter Pin	B – Castle Nut	C – Washer
D – Flap Hinge	E – Washer	F – Aileron Hinge
G – Washer	H – Bolt	

**Figure 6.3.6.8 Flap Hinge (continued)**

Refer to 6.3.6.7 and 6.3.6.8

- (a) Remove the cotter pin (3) and nut (4) holding the bolt (6) on the flap cone (2) and flap hinge (1); keep the bolt (6) in place temporarily.
- (b) Remove the cotter pin (A) and nut (B) holding the bolt (H) on the flap hinge (D) and aileron hinge (F)
- (c) Remove the outboard bolts first and carefully remove the flap by sliding it outboard.

**(2) INSTALLATION**



**Figure 6.3.6.9 Flap Installation**

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- (a) Ensure the flap rod connection eye is installed on the flap.
- (b) Using two people, slide flap inboard and onto the flap cone attach bolt. Install outboard attachment hardware.

Refer to Figure 6.3.6.7, Figure 6.3.6.8, and Figure 6.3.6.9.

- (c) At the inboard hinge (1 Figure 6.3.6.9), install washers, nut and cotter pin (4 and 3 Figure 6.3.6.7). Refer to Section 5.2 for torque value
- (d) At the outboard hinge (2 Figure 6.3.6.9), insert a washer and bolt (G & H Figure 6.3.6.8), pointing inboard, through the flap hinge, aileron hinge (D & F Figure 6.3.6.8) and washer (C Figure 6.3.6.8); fill any gap between the hinges (D & F Figure 6.3.6.8) with a thin or thick spacer washer (E Figure 6.3.6.8) as necessary.
- (e) Secure with a nut (B Figure 6.3.6.8) and a cotter pin (A Figure 6.3.6.8) snug nut to allow for proper flap and aileron function.

**NOTE**

It may be necessary to check the flap rigging depending on the parts that were removed.

**(3) RIGGING THE POSITION OF THE FLAPS**

- (a) Position and secure the ailerons in the neutral position. Note: ailerons must be properly rigged before rigging flaps.
- (b) Position the flap handle in the "UP" position.
- (c) Adjust the flap actuator tube rod end to fair the flap trailing edge with the aileron trailing edge in the neutral position.
- (d) Connect the flap actuator rod end to the flap nose rib by installing the flap actuator bolt with Locktite 601 or equivalent. Make sure the flap actuator rod end does not bind on the flap actuator bolt.
- (e) Tighten the flap actuator tube rod end jam nut.
- (f) Repeat steps a-e for opposite side.

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**5. FLAP HANDLE LOCK REPLACEMENT**

- (1) REMOVE RETAINING HARDWARE
- (2) INSTALL NEW FLAP HANDLE LOCK
- (3) CHECK FLAP MOVEMENT
  - (a) Ensure all flap positions are obtainable and there is no restriction to free movement in the flap handle system.
- (4) LUBRICATE
  - (a) Lubricate as required with LPS2 or white lithium grease.



**Figure 6.3.6.10 Flap Handle Lock Replacement**

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**6. MAINTENANCE**

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1918 South 16<sup>th</sup> Avenue  
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**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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**6.3.7 LANDING GEAR**

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**1 TROUBLESHOOTING**

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Landing Gear Sags	Bungees are no longer strong enough to return the landing gear to its stops	Replace bungee cords
Shocks Bottom on Landing	Inspect for weak bungee cords	Replace bungee cords
Tail Wheel does not respond to rudder pedal	Broken steering chains, links or springs	Replace defective steering chain, link, or spring
	Broken rudder control cables	Replace broken rudder control cables
Tail Wheel Shimmies	Steering springs have weakened	Replace weakened steering springs
	Tire worn	Replace tire
	Spring / chain tension	Springs should neither be slack or in tension when wheel is centered
	Tail wheel assembly has play or is loose	Ensure the tail wheel assembly is properly secured to the fuselage
	Tail wheel assembled incorrectly	Remove tail wheel assembly, dismantle, clean, and reassemble
Tail Wheel does not Swivel	Fork binds in bracket because of dirt or lack of lubricant	Disassemble, clean, reassemble, and lubricate
Tail Wheel does not absorb shock	Broken leaf spring	Replace leaf spring
	Tail wheel tire over inflated (applicable to optional Tail wheel only)	Reduce pressure to 38 psi.
Brakes drag	Pressure build up in system	Bleed off excess pressure
	Foreign matter wedged in brakes	Locate and remove
	Pistons cocked in cylinder	Inspect lining and/or disc for wear and replace as necessary
	Piston Does Not Retract	Remove Caliper and Inspect Piston O-Ring and Cylinder
	Back pressure due to malfunction of master cylinder or parking valve	Bleed hydraulic system and/or repair/replace master cylinder or parking valve
	Water or ice in hydraulic system	Flush and bleed hydraulic system (thaw ice first)

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PROBLEM	PROBABLE CAUSE	REMEDY
	Bent or cracked torque plate	Replace
	Corroded anchor bolts and/or torque plate bushings	Clean and lubricate or replace
Brakes drag (continued)	Warped brake disc; inspect by laying a straight edge across disc face	Replace and use caution during operation to prevent excessive energy input into brake
	Out of position / stuck lining	Repair or replace
	Restriction in hydraulic line	Isolate and remove restriction
	Lining not firmly seated flush against pressure / back plate	Deburr rivet hole on surface adjacent to lining
Brakes inoperative	Brake fluid level low	Replenish brake fluid
	Air in brake system	Bleed brake system
	Worn brake linings	Replace linings
	Defective caliper	Replace caliper
	Defective master cylinder	Replace master cylinder
	Leaky brake line connections	Tighten or replace connectors
Parking brake inoperative	Parking brake valve defective	Replace valve
Unable to obtain sufficient hydraulic brake pressure, excessive toe pedal travel, or spongy pedal	Air in hydraulic system	Check for source, then bleed hydraulic system
	Leak in system; brake, master cylinder, fittings, or lines	Locate leak and repair
	Defective brake line (ballooning)	Replace
	Defective master cylinder	Replace or repair
	Back plate bolts loose or not properly torqued, causing excessive brake deflection	Torque bolts to proper value
	Excessive rusting, scoring, or pitting of brake disc	Clean or replace disc
	Excessive back plate deflection caused by bent bolts or over torquing bolts	Check and replace bolts
	Incorrect lining and/or disc	Replace with correct parts
	Defective caliper	Rebuild caliper
Rapid disc and lining wear	Excessive rusting, scoring, or pitting of brake disc	Clean or replace disc
Rapid disc and lining wear (continued)	Excessive back plate deflection caused by bent bolts or over torquing bolts	Check and replace bolts
	Incorrect lining and/or disc	Replace with correct parts

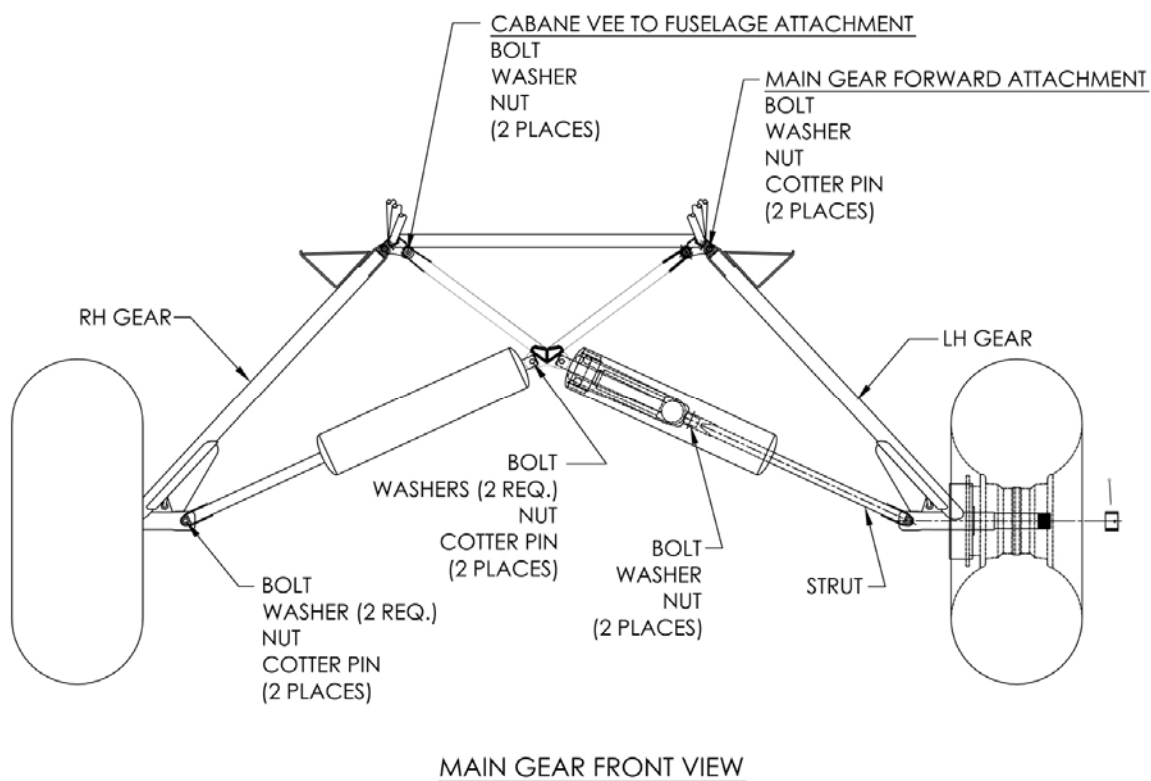
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PROBLEM	PROBABLE CAUSE	REMEDY
Brakes will not hold	Lining worn below minimum wear limits	Replace linings
	Discs worn below minimum wear limits	Replace discs
	Contaminated lining	Replace lining
Brakes will not hold (continued)	New lining installed with old disc, lining not seated in wear track creating partial contact with disc	Replace excessively worn disc
	Brake lining plate installed backwards	Remove, inspect, and install



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**2 MAIN LANDING GEAR**



**Figure 6.3.7.1 Main Landing Gear Arrangement**

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## **2.1 BUNGEE ASSEMBLY**

### **(1) REMOVAL**

- (a) Chock the main wheel on the opposite side of the landing gear that is to be worked on. Chock the Tail wheel. It is not recommended to carry this work out in windy conditions.
- (b) Remove the top bungee cover screws and slide the cover down until the lower bungee bolt is exposed (the bungee cords can be inspected at this point and if replacement is required accomplish the following steps).
- (c) Jack the aircraft by lifting the wing that is on the same side as the landing gear that is to be worked on. The jack is placed at the forward wing strut to spar attachment point on the desired side (see Section 5.3.2).
- (d) Remove the upper shock assembly attach bolt and lower the shock assembly.
- (e) Remove the bungee cover end from the shock assembly.
- (f) Remove the lower attach bolt and pull the shock out of the strut.

### **(2) INSPECTION**

- (a) Check the bungee cords for broken bands, threads, and signs of weakness. Inspect the hydraulic strut for leaking fluid or damage.

**NOTE**

The bungees are replaced every five years (see Section 6.A).

- (b) If the cords need replacement, contact Cub Crafters for further information.
- (c) Replace any hardware that is excessively corroded or worn.

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**(3) INSTALLATION**

- (a) Insert the shock assembly in the strut. Insert a bolt with a washer through the shock and strut and place a washer and nut on the end of the bolt. Torque the nut to 160-200 in-lbs.
- (b) Place the bungee cover end over the top shaft of the shock assembly. Align with the top shock hole and the holes in the cabane vee and insert bolt.
- (c) Place the washer and the nut on the end of the bolt. Torque to 130 in-lbs. If necessary, tightened past this torque value to align the nut with the nearest hole in the bolt. Safety the nut with a new cotter pin.
- (d) Verify that all hardware is installed properly then lower the aircraft back to the ground.

**2.2 LANDING GEAR LEG**

**(1) REMOVAL**

- (a) Chock the main wheel on the opposite side of the landing gear that is to be worked on. Chock the Tail wheel. It is recommended to carry this work in a sheltered hangar.
- (b) Disconnect the brake line from the fuselage.
- (c) Jack the aircraft by lifting the wing that is on the same side as the landing gear that is to be removed. The jack is placed at the forward wing strut to spar attachment point on the desired side (see 07-00).
- (d) Remove the lower shock strut attach bolt.
- (e) Remove both upper landing gear bolts.

**(2) INSPECTION**

- (a) Inspect the landing gear and fuselage attachment points for cracks, damage, and oversized holes.
- (b) Replace or repair affected parts.
- (c) Inspect the brake backing plates for cracks or excessive wear.

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**(3) INSTALLATION**

- (a) Replace any hardware that is excessively corroded or worn.
- (b) Align the upper landing gear attachment holes with the corresponding ones in the fuselage.
- (c) If there is a gap between a landing gear leg and the corresponding fuselage ear, fill the gap with washers of the appropriate thickness.
- (d) Apply grease to slow corrosion and insert the upper landing gear bolts.
- (e) The rear bolt on the right landing gear is longer than the one on the left because the ear of the passenger step must be placed over the bolt end.
- (f) Place washers and nuts on the end of the bolts.
- (g) Align the hole at the bottom of the shock strut with the holes in the landing gear.
- (h) Apply grease to slow corrosion and insert the bolt with a washer under the head. Place washer and nut on the end of the bolt.
- (i) Torque all nuts to 130 in-lbs or if necessary, past this value so that the nuts may be aligned with the nearest hole on the corresponding bolt.
- (j) Safety the nuts with new cotter pins.
- (k) Verify that all the hardware is installed properly and lower the aircraft to the ground.
- (l) Reconnect the brake lines and tighten the fittings.
- (m) Service the brakes, if needed, to obtain the proper pedal travel (see Section 6.3.8).

**2.3 AOSS GEAR - OPTIONAL**

- (1) See Manufacturer's Maintenance Manual and other documentation.

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### **3 TAIL LANDING GEAR**

#### **3.1 STANDARD STEERABLE TAIL WHEEL**

##### **(1) Removal of Tail Wheel and Leaf Springs**



i - Nut  
iv - Clamp  
vii - Small Bolt (2)  
x – Bushing

ii - Washer (4)  
v - Small Nut (2)  
viii - Large Area Nut

iii - Long Bolt  
vi - Small Washer (2)  
ix - Bolt

**Figure 6.3.7.2 Standard Tail Wheel and Leaf Spring Installation**

- (a) Lift the tail section of the airplane and rest the fuselage on a bench so the tail landing gear clears the ground.
- (b) Disconnect the chain links from the tail wheel arms.
- (c) Remove the front tail spring attach nut (i) and washer (ii).
- (d) Disconnect the tail spring clamp (iv) by removing the nuts (v), washers (vi) and bolts (vii).
- (e) To separate the springs from the tail wheel, remove the large area nuts (viii), washers (ii), and bolts (x).

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(2) Disassembly of Tail wheel Bracket and Fork



**Figure 6.3.7.3 Standard Tail Wheel Assembly**

- (a) Remove the tire assembly from the fork by removing the nut and sliding the axle out.
- (b) Disengage the arm assembly, washers, and nut from the fork and bracket.

(3) Cleaning

Clean all metal parts (including the bearings) in a cleaning solution. Dry all parts with compressed air.

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(4) Inspection of Tail Wheel Components

See Figure 6.3.7.3

- (a) Check the leaf springs for damage or twisting.
- (b) Replace if condition dictates.
- (c) Inspect the arm assembly, fork, and bracket for excessive wear, cracks or other damage. Replace damaged parts.
- (d) Examine the washers for wear, scoring, or other damage. Replace if necessary.
- (e) Inspect the bearing and races for wear or damage. Replace if necessary.

(5) Minor Repairs of Tail Wheel Components

See Figure 6.3.7.3

The components that make up the tail wheel assembly may not be repaired except that minor realignments are permitted, such as minor dents and bends.

(6) Replacement of Parts

Replace all nuts that have been removed with new nuts.

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(7) Reassembly of Tail Wheel Bracket and Fork

See Figure 6.3.7.3

- (a) Hand apply grease to all internal parts and pack the bearing (15) with grease (MIL-G-81322E).
- (b) Place the arm assembly and washers on the fork and secure with the nut.
- (c) These last steps may be accomplished once the tail wheel assembly is installed back on the fuselage.
- (d) Check to verify proper tail wheel pivoting and tension.
- (e) Install the tire assembly on the fork by sliding the axle through the fork and tire assembly.
- (f) Secure with the nut.
- (g) Pump the tail wheel bracket assembly and axle full of grease (MIL-G-81322E) then wipe off the excess.

(8) Installation of Tail Wheel and Leaf Springs

See Figure 6.3.7.2

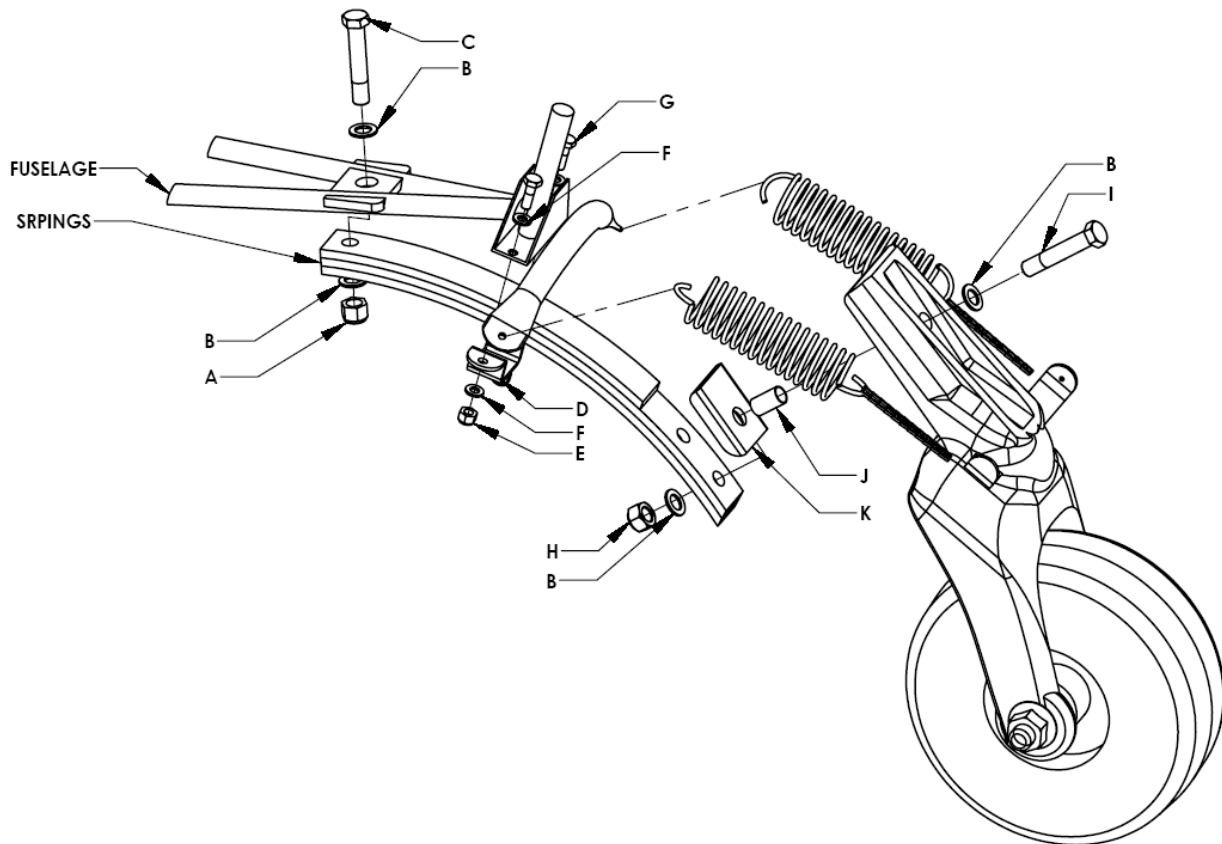
- (a) Position the tail wheel springs on the fuselage with long bolt (iii) and hold in place with a washer (ii) and a nut (i).
- (b) Install the small bolts (vii), clamp (iv), and small washers (vi) with the small nuts (v) only finger tight.
- (c) Insert the bushings (x) into the tail wheel assembly, if they were removed.
- (d) Insert the bolts (ix) through the bushings and tail wheel assembly.
- (e) Hold in place with two washers (ii) and two large area nuts (viii).
- (f) Tighten the large area nuts (viii) to 270-300 in-bs.
- (g) Tighten the nut (i) to 270-300 in-lbs.
- (h) Tighten the small nuts (v) to 70-100 in-lbs.
- (i) Reconnect the chain links to the tail wheel arms. The springs and chains should neither be slack nor have tension when the wheel is centered. It may be necessary to adjust the number of chain links to achieve this.
- (j) Lower the tail section to the ground.



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**3.2    OPTIONAL 3200-TYPE STEERABLE TAIL WHEEL**

**(1) Removal of Tail Wheel and Leaf Springs**



A - Nut  
D - Clamp  
G - Small Bolt  
J - Bushing

B - Washer  
E - Small Nut  
H - Large Area Nut  
K - Adapter Plate

C - Long Bolt  
F - Small Washer  
I - Bolt

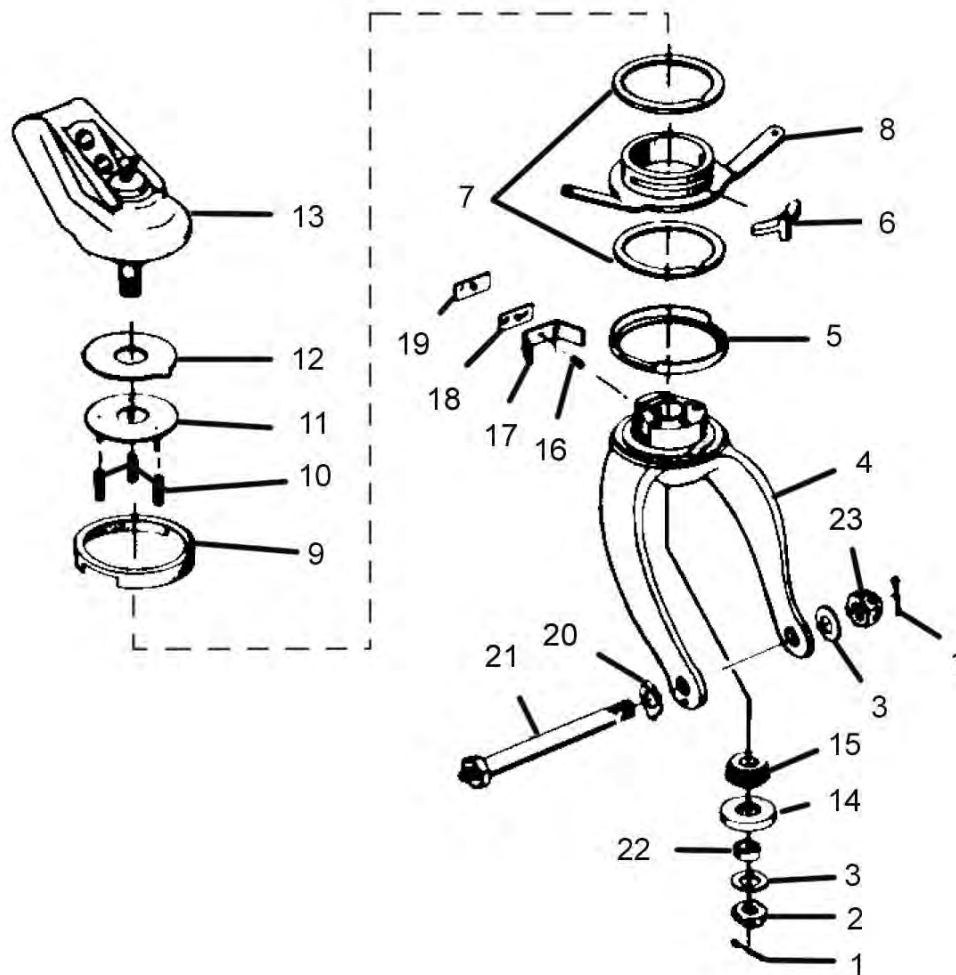
**Figure 6.3.7.4    3200-Type Tail Wheel and Leaf Spring Installation**

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- (a) Lift the tail section of the airplane and rest the fuselage on a bench so the tail landing gear clears the ground.
- (b) Disconnect the chain links from the Tail wheel arms.
- (c) Remove the front tail spring attach nut (A) and washer (B).
- (d) Disconnect the tail spring clamp (D) by removing the nuts (E), washers (F) and bolts (G).
- (e) To separate the springs from the tail wheel, remove the large area nut (H), washers (B), and bolt (I).

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(2) Disassembly of Tail Wheel Bracket and Fork



- |                    |                      |                         |
|--------------------|----------------------|-------------------------|
| 1 - Cotter Pin     | 2 - Short Castle Nut | 3 - Washer              |
| 4 - Fork Assy.     | 5 - Lower Dust Cap   | 6 - Pawl                |
| 7 - Thrust Washer  | 8 - Arm Assy.        | 9 - Upper Dust Cap      |
| 10 - Springs       | 11 - Thrust Plate    | 12 - Fiber Thrust Plate |
| 13 - Bracket Assy. | 14 - Grease Retainer | 15 - Bearing            |
| 16 - Pin           | 17 - Flat Spring     | 18 - Shim               |
| 19 - Shim          | 20 - Lock Washer     | 21 - Axle               |
| 22 - Spacer        | 23 - Castle Nut      |                         |

**Figure 6.3.7.5 3200-Type Tail Wheel Assembly**

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- (a) Remove the tire assembly from the fork by removing the cotter pin (1), castle nut (23), and washer (3) then sliding the axle (21) out.
- (b) At the bottom of the fork (4) remove the cotter pin (1), short castle nut (2), and washer (3). Carefully pull the fork (11) off of the bracket (1).
- (c) Separate the spacer (22), grease retainer (14), and the bearing (15) from the fork (4).
- (d) Disengage the lower dust cap (5), thrust washer (7), arm assembly (8), thrust washer (7), pawl (6), upper dust cap (9), springs (10), thrust plate (11), and fiber thrust plate (12) from the fork (4) and bracket (13).

(3) Cleaning

Clean all metal parts (including the bearings) in a cleaning solution. Dry all parts with compressed air.

(4) Inspection of Tail Wheel Components

See Figure 6.3.7.4 and Figure 6.3.7.5

- (a) Check the leaf springs for damage or twisting (Figure 6.3.7.4).
- (b) Replace if condition dictates.
- (c) Inspect the arm assembly (8, Figure 6.3.7.5), flat spring (17, Figure 6.3.7.5), fork (4, Figure 6.3.7.5), and bracket (13, Figure 6.3.7.5) for excessive wear, cracks or other damage. Replace damaged parts.
- (d) Examine the thrust washers (7, Figure 6.3.7.5) for wear, scoring, or other damage. Replace if necessary.
- (e) Inspect the bearing (15, Figure 6.3.7.5) and races for wear or damage. Replace if necessary.

(5) Minor Repairs of Tail Wheel Components

See Figure 6.3.7.5

The components that make up the tail wheel assembly may not be repaired except that minor realignments are permitted, such as minor dents and bends.

(6) Replacement of Parts

Replace all cotter pins that have been removed with new cotter pins.

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(7) Reassembly of Tail Wheel Bracket and Fork

See Figure 6.3.7.5

- (a) Hand apply grease to all internal parts and pack the bearing (15) with grease (MIL-G-81322E).
- (b) Place the lower dust cap (5) on the fork (4) and the thrust washer (7) on the fork (4) being sure to align the notch with the locking pin in the fork (4).
- (c) Position the pawl (6) on the arm (8) with the longest lobe down and place the arm assembly (8) on the fork (4).
- (d) Position the other thrust washer (7) and the upper dust cap (9) on the arm assembly (8).
- (e) Insert 3 springs (10) in the proper holes on the top of the fork (4) so the thrust plate (11) can be placed on top.
- (f) Position the fiber thrust plate (12) in the bracket (13) so the nub is aligned with the groove and insert the bracket assembly (13) into the fork (4) maintaining the alignment of all the interlocking parts.
- (g) Place the bearing (15), grease retainer (14), spacer (22), and washer (3) in the fork (4). Exert pressure on the bracket (13) to engage the short castle nut (2) with the bracket assembly post.
- (h) Tighten the nut (2) securely, back off to the first cotter pin hole in the bracket post, and secure with a cotter pin (1). These last steps may be accomplished once the tail wheel assembly is installed back on the fuselage.
- (i) Check to verify proper tail wheel pivoting and tension.
- (j) Install the tire assembly on the fork by sliding the axle (21) with the lock washer (20) through the fork and tire assembly.
- (k) Secure with a washer (3) and castle nut (23). Tighten the nut until there is no free play in the bearings and there is a slight amount of friction. Safety with a cotter pin (1).
- (l) Pump the tail wheel bracket assembly (13) and axle (21) full of grease (MIL-G-81322E) then wipe off the excess.

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(8) Installation of Tail Wheel and Leaf Springs

See Figure 6.3.7.4

- (a) Position the tail wheel springs on the fuselage with long bolt (C) and hold in place with a washer (B) and a nut (A).
- (b) Install the small bolts (G), clamp (D), and small washers (F) with the small nuts (E) only finger tight.
- (c) Insert the bushing (J) into the tail wheel assembly, if they were removed.
- (d) Insert the bolt (I) through the bushings and tail wheel assembly.
- (e) Hold in place with washer (B) and large area nut (H).
- (f) Tighten the large area nut (H) to 270-300 in-lbs.
- (g) Tighten the nut (A) to 270-300 in-lbs.
- (h) Tighten the small nuts (E) to 70-100 in-lbs.
- (i) Reconnect the chain links to the tail wheel arms. The springs and chains should neither be slack nor have tension when the wheel is centered. It may be necessary to adjust the number of chain links to achieve this.
- (j) Lower the tail section to the ground.

## **4 MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**

**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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**6.3.8 WHEEL & BRAKE ASSEMBLIES**

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## **1 MAIN WHEELS**

### **(1) REMOVAL**

- (a) Chock the main wheel on the opposite side of the landing gear that is to be worked on. Chock the tail wheel. It is not recommended to carry this work outside in windy conditions.
- (b) Remove the hubcap and the axle nut cotter pin.
- (c) Cut the safety wire and remove the brake back plate bolts.
- (d) Place a jack under the axle and raise the tire off the ground (See Section 6.2.4.2).
- (e) Remove the axle nut and wheel.
- (f) The bearings can be removed, cleaned and inspected without disassembling the wheel and removing the tire.

### **(2) WHEEL DISASSEMBLY**

See Figure 6.3.8.1

**CAUTION**

**Care must be taken to avoid damaging wheel halves when breaking tire beads loose.**

**WARNING**

**DO NOT ATTEMPT TO REMOVE VALVE CORE UNTIL TIRE HAS BEEN COMPLETELY DEFLATED. THE VALVE CORE WILL BE EJECTED AT A HIGH VELOCITY IF IT IS UNSCREWED BEFORE THE AIR PRESSURE HAS BEEN RELEASED.**

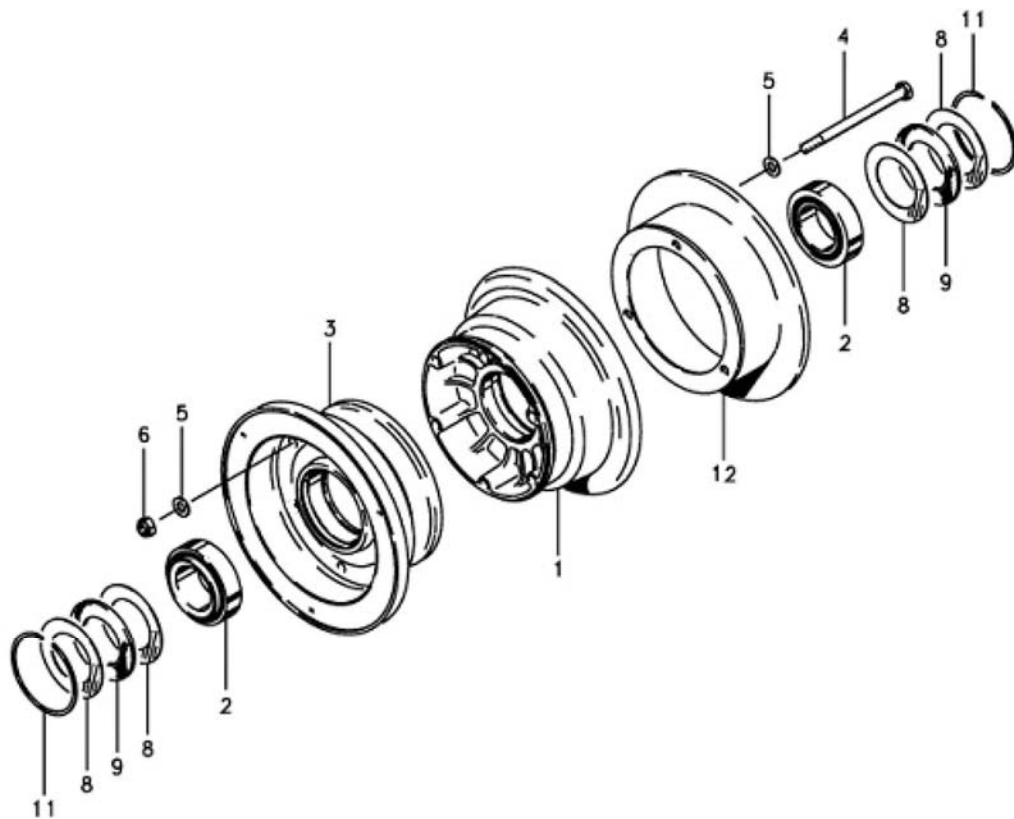
**WARNING**

**INJURY CAN RESULT WHEN ATTEMPTING TO SEPARATE WHEEL HALVES WITH THE TUBE INFLATED.**



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- (a) Deflate the tire.
- (b) Break the tire bead loose from the wheel.
- (c) Remove the wheel half nuts (6) and washers (5).
- (d) Pull the wheel halves (1, 3) apart being careful with the tubes valve stem.
- (e) Remove the snap ring (11), grease seals (8, 9) and bearing (2). Repeat on other wheel half.



1 - Inner Wheel Half	2 - Bearing	3 - Outer Wheel Half
4 - Bolt (3)	5 - Washer (6)	6 - Nut (6)
7 - Tire	8 - Grease Seal Ring (4)	9 - Grease Seal Felt (2)
10 - Tube	11 - Snap Ring	12 - Brake Disc

**Figure 6.3.8.1 Wheel**

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**(3) INSPECTION**

**(a) Axle**

- Visually inspect the axle to make sure there are no cracks or grooves.

**(b) Tire and Tube**

- Visually inspect the tires inside and outside for cuts, uneven or excessive wear, and penetration by foreign objects.
- Visually inspect the inner tube for wear, cuts or cracks. Pay close attention to the valve stem base.
- The tire should be removed when the tread is worn to the base of a groove. Tires with wear through the top fabric layer can only remain in service long enough to return to a maintenance base to be replaced.

**(c) Wheel Halves**

- Inspect the wheel halves for cracks or corrosion.

**(d) Discs**

- Inspect the brake disc attachment points for cracking or distortion.
- Minimum disc thickness is 0.220 in.

**(e) Bearings**

- Clean all metal parts (including the bearings) in a cleaning solution. Dry all parts with compressed air.
- Inspect the bearing and races for wear or damage. Replace if necessary.

**(f) Replace unserviceable parts as required.**

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**(4) WHEEL ASSEMBLY**

- (a) If a new tire or tube is used or the old one is sticky, dust the inside of the tire lightly with talcum powder.
- (b) Inflate the tube, inside the tire, with enough air to start to fill it out so it will not be pinched between the wheel halves.
- (c) Insert the outboard wheel half (1) over the valve stem and into the tire.
- (d) Mount the inner wheel half (1) onto the outer wheel half (3).
- (e) Secure the brake disc (12) using three bolts (4) with a washer (5) under each head.
- (f) Place a washer (5) and nut (6) on each bolt (4) and torque to 85-95 in-lbs.
- (g) Refer to Section 6.2 for proper tire inflation.
- (h) Allow time for the air trapped between the tube and tire to escape and recheck the pressure.
- (i) Pack the bearings with grease (MIL-G-81322E).
- (j) Insert the bearing (4), inner grease seal ring (8), grease seal felt (9), outer grease seal ring (8) and secure with a snap ring (11). Repeat on the opposite side.

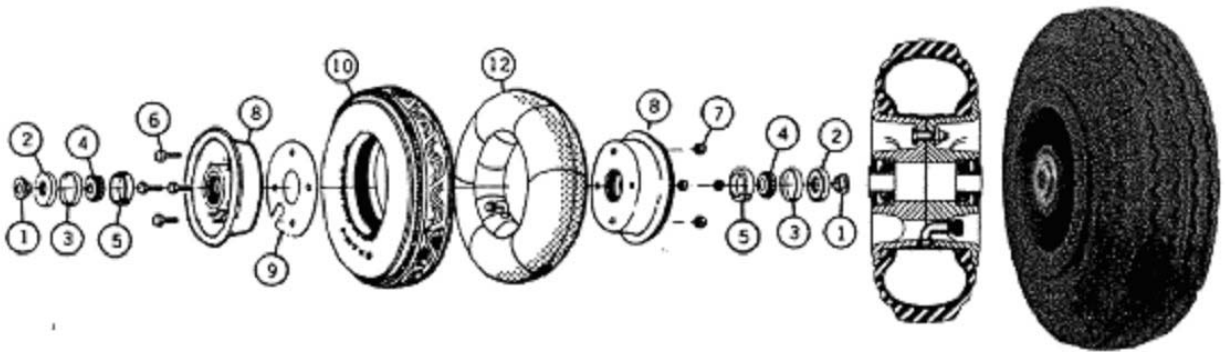
**(5) MAIN WHEEL INSTALLATION**

- (a) Place the wheel on axle and tighten the axle nut so the tire will turn 1 ½ -2 times after a good spin.
- (b) Safety with a cotter pin.
- (c) Verify the tire pressure (Section 6.2).
- (d) Safety the axle nut with a cotter pin. Verify before attaching the hubcaps.
- (e) Position the brake back plates, insert the bolts, and torque to 65-75 in-lbs.
- (f) Safety the bolts in pairs with 0.032 safety wire.
- (g) Lower the aircraft to the ground.

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2 TAIL WHEEL

2.1 3200-Type Wheel



1 - Spacer	2 - Grease Retainer	3 - Inner Spacer	4 - Bearing
5 - Bearing Race	6 - Bolt	7 - Nut	8 - Hub
9 - Gasket	10 - Tire	11 - Tube	

Figure 6.3.8.2 Tail Wheel Assembly

**CAUTION**

Care must be taken to avoid damaging wheel halves when breaking tire beads loose.

**WARNING**

DO NOT ATTEMPT TO REMOVE VALVE CORE UNTIL TIRE HAS BEEN COMPLETELY DEFLATED. IF IT IS UNSCREWED BEFORE THE AIR PRESSURE HAS BEEN RELEASED, THE VALVE CORE WILL BE EJECTED AT A HIGH VELOCITY.

**WARNING**

INJURY CAN RESULT WHEN ATTEMPTING TO SEPARATE WHEEL HALVES WITH THE TUBE INFLATED.

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Refer to Figure 6.3.8.2

**(1) DISASSEMBLY**

- (a) Deflate the tube (12).
- (b) Break the tire bead loose from the wheel.
- (c) Remove the wheel half nuts (5) and bolts (6).
- (d) Pull the wheel hubs (8) apart being careful with the valve stem.
- (e) Remove the spacer (1), grease retainer (2), inner spacer (3) and bearing (4) from each hub.

**(2) INSPECTION**

- (a) Wipe the tire and the tube with a dry cloth. If the tire or the tube is spotted with grease, oil or other deposits, wash in a solution of soap and water. Rinse with clean water and dry with a clean cloth.
- (b) Visually inspect the tire inside and out for cuts, uneven or excessive wear, and penetration by foreign objects. Replace if the tire is in poor condition.
- (c) Visually inspect the inner tube for wear, cuts or cracks taking a close look at the valve stem base. Replace if the tube is in poor condition.
- (d) The tire should be removed when the tread is worn to the base of a groove. Tires that are worn through the top fabric layer can only remain in service long enough to return to a maintenance base to be replaced.
- (e) Clean all metal parts (including the bearings) in a cleaning solution. Dry all parts with compressed air.
- (f) Inspect the bearing and races for wear or damage. Replace if necessary.

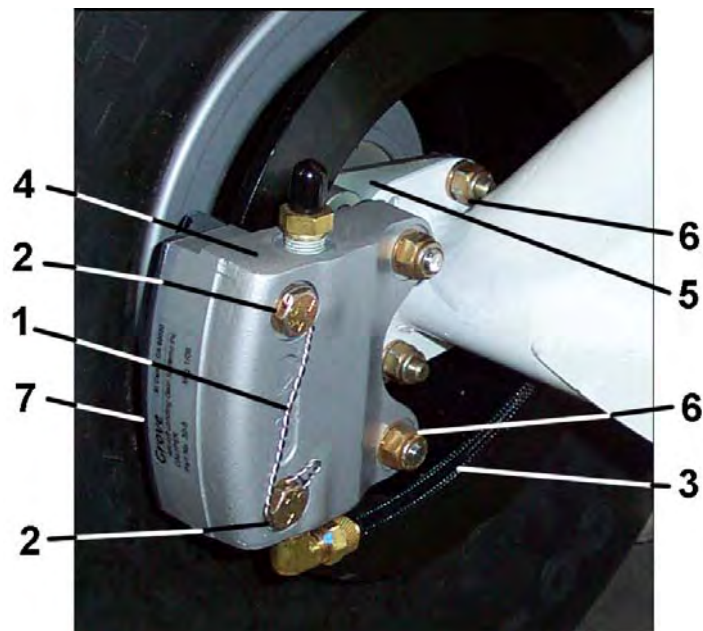
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**(3) REASSEMBLY OF TAIL WHEEL**

- (a) Insert the wheel hubs (8) with the gasket (9) in between into the tire and tube assembly. Make certain the gasket (9) is properly aligned with tube valve and hub bolt holes.
- (b) Insert 4 bolts and engage with 4 nuts. Torque to 80-100 in-lbs.
- (c) Inflate the tire to 38 psi.
- (d) Pack the bearings with grease (MIL-G-81322E).
- (e) Insert a bearing (4), inner spacer (3), grease retainer (2) and spacer (1) into the each wheel hub.
- (f) To install on the airplane see Section 5.4.1.6.4.(6).(j).

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**3 BRAKE CALIPERS**



1 - Safety Wire	2 - Bolts	3 - Brake Line
4 - Caliper	5 - Backing Plate	6 - Anchor Lugs
7 - Brake Back Plates		

**Figure 6.3.8.3 Brake Calipers**

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**(1) REMOVAL**

- (a) Cut the safety wire (1) and remove the brake back plate bolts (2).
- (b) Disconnect the brake line (3) from the caliper (4).
- (c) Separate the caliper (4) from backing plate (5).

**(2) INSPECTION**

- (a) Inspect the brake linings for loose rivets, cracks and uneven wear.
- (b) The minimum lining thickness is 0.100 inches.
- (c) Inspect the calipers for leaks and excessive corrosion.
- (d) If leaks are present at the pistons, overhaul the caliper.
- (e) Inspect the brake backing plate for cracks or excessive wear.
- (f) Replace the parts if their condition so dictates.

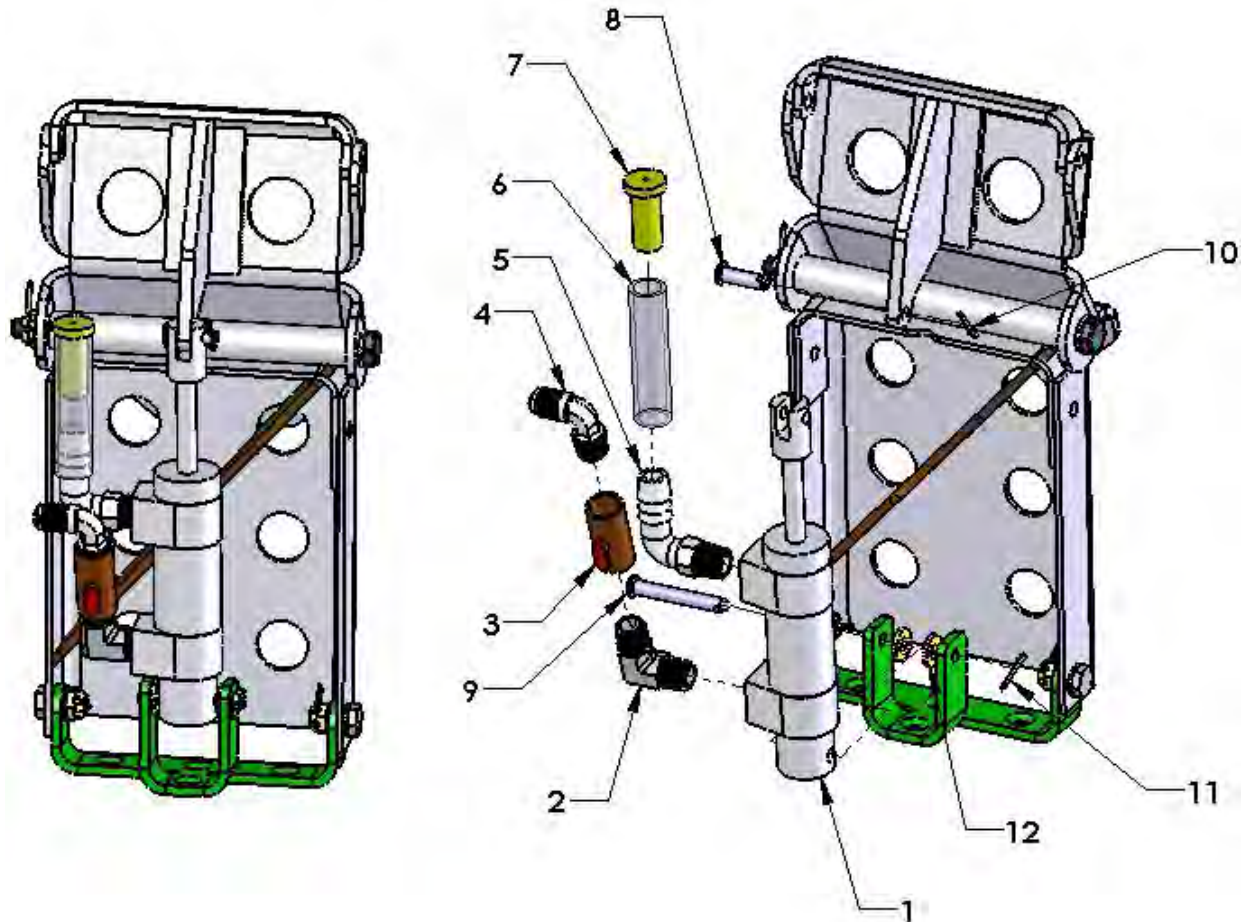
**(3) INSTALLATION**

- (a) Position the brake pressure plate on the caliper so the linings are facing the disc.
- (b) Insert the caliper anchor lugs (6) into the backing plate (5) holes.
- (c) Connect the brake line (3) and tighten. Make sure the wheel turns freely.
- (d) Position the brake back plates (7), insert the bolts (2), and torque to 65-75 in/lbs.
- (e) Safety (1) bolts (2) with 0.032 safety wire.
- (f) Make sure the wheel turns freely.



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**4 MASTER CYLINDER AND PARKING BRAKE VALVE**



**Figure 6.3.8.4 Brake Master Cylinder and Parking Brake Valve**

1 – Master Cylinder	2 – 90° Male Elbow	3 – Ball Valve
4 – 90° Brass Poly-Flow Fitting	5 – Nylon 90° Tube Fitting	6 – Brake Reservoir
7 – Reservoir Plug	8 – MS20392-2C17 Clevis Pin	9 – MS20392-2C39 Clevis Pin
10 – AN380-2-2 Cotter Pin	11 – AN380-2-2 Cotter Pin	12 – AN960-10 Washer

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**(1) REMOVAL**

- (a) Drain hydraulic fluid from system.
- (b) Disconnect brake line from 90° Brass Poly-Flow Fitting (4).
- (c) Remove Cotter Pins (10) (11) from Clevis Pins (8) (9).
- (d) Remove Clevis Pins (8) (9) and AN960-10 Washers (12).
- (e) Remove Master Cylinder (1) and attached components.

**(2) INSPECTION**

- (a) Inspect Master Cylinder (1) for signs of leaks, cracks, or any other damage.
- (b) Inspect Brake Reservoir (6) for signs of leaks, cracks, or any other damage.
- (c) Inspect all fittings (2) (3) (4) (5) for signs of leaks, cracks, or any other damage.

**(3) INSTALLATION (See Figure 6.3.8.4)**

- (a) Ensure center to center distance of bottom hole to upper hole on Master Cylinder (1) is 5.125". Adjust distance as required by twisting nut on Master Cylinder arm.
- (b) Ensure Master Cylinder lock nut is tight.
- (c) Locate Master Cylinder (1) on rudder pedal as shown in Figure 6.3.8.4.
- (d) Insert Clevis Pin (9) thru rudder pedal, AN960-10 Washers (12), and bottom of Master Cylinder (1).
- (e) Insert Clevis Pin (8) thru rudder pedal and top of Master Cylinder (1) arm.
- (f) Secure both clevis pins (8) (9) with Cotter Pins (10) (11).
- (g) Connect brake line to 90° Brass Poly-Flow Fitting (4).
- (h) Fill brake system with MIL-H-5606 hydraulic fluid. Bleed system carefully ensuring no air is left in the brake lines. Top off Brake Reservoir (6) making sure that it is a minimum of  $\frac{3}{4}$  full.

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## **5 MAINTENANCE**

No repairs or alterations - as outlined in ASTM Section 8 or in this manual - are authorized at this time for the CC11.

If any repairs or alteration tasks should be required to be performed before the release of this section of the manual, it shall be accomplished using approved engineering data that will be provided by Cub Crafters' Engineering Department.

To obtain such data and approvals please contact:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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**6.3.9 ENGINE MOUNT**

**(1) INSPECTION**

See inspection forms in Appendix 6.A to perform periodic inspection tasks.

**(2) REPAIR**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

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**6.3.10. ENGINE**

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# CUB CRAFTERS, INC. CC11-100 MAINTENANCE MANUAL

## 1 TROUBLESHOOTING

This section is prepared to help the owners / operators diagnose the probable causes and determine appropriate corrective actions. For additional information on more specific trouble shooting procedures, refer to Teledyne-Continental's Operator's Manual and their Maintenance and Overhaul Manual.

**WARNING**  
**DO NOT ATTEMPT TO USE THIS MANUAL AS A GUIDE FOR PERFORMING REPAIR OR OVERHAUL OF THE ENGINE. THE ENGINE OVERHAUL MANUAL MUST BE CONSULTED FOR SUCH OPERATIONS.**

PROBLEM	PROBABLE CAUSE	REMEDY	Reference in this manual
Engine does not start	Insufficient fuel.	Fill tank.	6.2.3
	Fuel does not reach carburetor.	Clean tank vents, blowout supply line, replace shut-off valve, repair pump, and clean filter.	6.3.15 7*NOTE
	Carburetor float valve stuck shut.	Remove carburetor and repair.	7*NOTE
	Carburetor screen or jets plugged.	Remove and clean.	6.3.15
	Insufficient priming (weak explosions).	Repeat starting procedure with more priming.	
	Excess priming (puffs of black smoke).	Clear cylinders by turning propeller several revolutions, with ignition switch "OFF", and throttle wide open.	
	Engine hot (vapor lock in fuel system).	Disconnect fuel line at carburetor and purge system.	6.3.15
	Low battery charge	Recharge battery.	6.3.17
	Cold oil.	Turn propeller by hand several revolutions to break loose congealed oil.	
	Incorrect starter adjustment.	Readjust shift lever screw.	7*NOTE
	Spark plugs fouled.	Remove and clean. Check gaps.	6.3.18
	Spark plug cables defective.	Replace defective parts.	7*NOTE
	Magneto breaker points burned or fouled.	Remove oil from breaker. Replace defective condenser.	7*NOTE
	Magnetos incorrectly timed internally or to engine.	Check and correct timing to overhaul if internal engine.	7*NOTE
Irregular idling	Incorrect idle mixture adjustment.	Correct carburetor adjustment.	6.3.15
	Carburetor idle air bleed plugged.	Disassemble, as required, and clean.	7*NOTE
	Spark plugs fouled.	Remove and clean.	6.3.18
Irregular idling	Leak in air induction system.	Tighten loose joints. Replace damaged parts.	7*NOTE



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<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>	<b>Reference in this manual</b>
Rough running	Propeller out of balance.	Remove and inspect.	6.3.16
	Engine mount bolts loose.	Tighten.	5.2.5
	Defective spark plug cables.	Test for break-down at high voltage.	
	Cracked magneto distributor block.	Overhaul magneto. Check for very fine cracks in block.	8*NOTE
	Worn cam lobe.	Overhaul engine.	8*NOTE
	Defective valve lifter.	Remove and test hydraulic unit. Replace if worn.	7*NOTE
	Scored valve stems.	Replace valves and guides.	7*NOTE
	Warped valves.	Replace. Grind seats.	7*NOTE
	Detonation.	Use specified fuel. Keep cylinder head temperature below specified maximum.	
Poor acceleration	Engine not warm enough.	Continue warm-up.	
	Defective throttle control.	Check for binding, kinks, slipping, worn parts.	
	Plugged air filter.	Remove and clean filter.	6.3.12
	Idling mixture too lean.	Readjust.	6.3.15
	Idling jet plugged.	Clean carburetor.	6.3.15
	Water in fuel.	Drain sediment trap.	6.3.15
	Leak in air induction system.	Check all joints and throttle shaft bearings.	6.3.12
Low power	Defective ignition cable.	Test for high voltage leaks. Replace parts.	TBD
	Scored valve stems.	Replace valves and guides.	7*NOTE
	Warped valves.	Replace valves. Grind seats.	7*NOTE
	Defective magneto.	Overhaul magneto.	8*NOTE
	Throttle not fully open.	Readjust linkage.	6.3.12
	Carburetor air heat valve not closing fully.	Remove filter, inspect valve. Straighten plate.	7*NOTE
	Propeller blades warped.	Inspect pitch. Replace.	
	Ice forming on carburetor throttle valve.	Apply full carburetor air heat.	
	Air filter plugged.	Remove and clean.	6.3.12
	Fuel flow restricted.	Inspect tank vents. Inspect shutoff valve. Clean strainer. Clean carburetor screen. Blow out fuel supply line.	6.3.15
	Worn cylinders, pistons and/or piston rings.	Overhaul engine.	8*NOTE

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<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>	<b>Reference in this manual</b>
Low oil pressure	Low oil supply.	Replenish.	
	Low oil viscosity.	Drain sump. Refill with correct grade.	6.2.3
	Plugged oil screen.	Remove and clean.	6.3.10
	Dirt on oil pressure relief valve seat.	Clean plunger and seat. Replace dirty oil.	6.2.3
	Oil pressure relief valve seat worn.	Overhaul engine. Refinish valve seat.	8*NOTE
	Oil pressure relief valve plunger sticking.	Remove cap and plunger. Clean parts.	7*NOTE
	Oil pump suction tube screen plugged.	Remove sump. Clean screen.	7*NOTE
	Engine bearings worn.	Overhaul engine.	8*NOTE
	Oil pressure gauge defective.	Test gauge, and replace or repair.	7*NOTE
	Internal oil leak.	Overhaul engine.	8*NOTE
	Cracked crankcase cover casting, defective oil pump, leaking suction tube.	Overhaul engine. Replace damaged parts.	8*NOTE
High oil temperature	Low oil supply.	Replenish.	
	Dirty or diluted oil.	Drain sump, and fill with fresh oil of proper grade.	6.2.3
	Prolonged ground operation at high speed.	Avoid prolonged running on the ground.	
	Excessive rate of climb.	Avoid low air speed.	
	Lean fuel-air mixture.	Refer to Teledyne-Continental's overhaul manual.	7*NOTE

**NOTE:**

\*NOTE – Refer to Chapter 7 or 8 for more details.

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## **2 SERVICING – OIL SYSTEM**

The oil system is an integral part of the engine, except for the cooler that is mounted on the left side of the firewall.

Refer to the latest revision of Teledyne-Continental Motors Service Information Letter SIL99-2B to determine the frequency of oil changes and screen inspections.

The optional oil filter is a K&N HP1008.

### **2.1. CHANGING ENGINE OIL AND FILTER**

- (a) Warm engine
- (b) Remove the upper and lower engine cowlings. (Refer to Chapter 6.3.15)
- (c) Place a suitable drain pan under the oil drain.
- (d) Open the oil drain. Allow the oil to completely drain out.
- (e) Replace oil filter (if installed) and safety wire. (See Figure 6.3.10.1)



**Figure 6.3.10.1 Spin-On Oil Filter**

- (f) Close the oil drain making sure it is sealed.
- (g) Fill the engine with an approved oil (4-6 quarts).
- (h) Verify oil quantity with dipstick and secure dipstick.
- (i) Install engine cowling. (Refer to Chapter 6.3.15)
- (j) Start the engine in accordance with Pilot's Operating Handbook procedures and monitor the engine oil pressure gauge for proper oil pressure. Allow

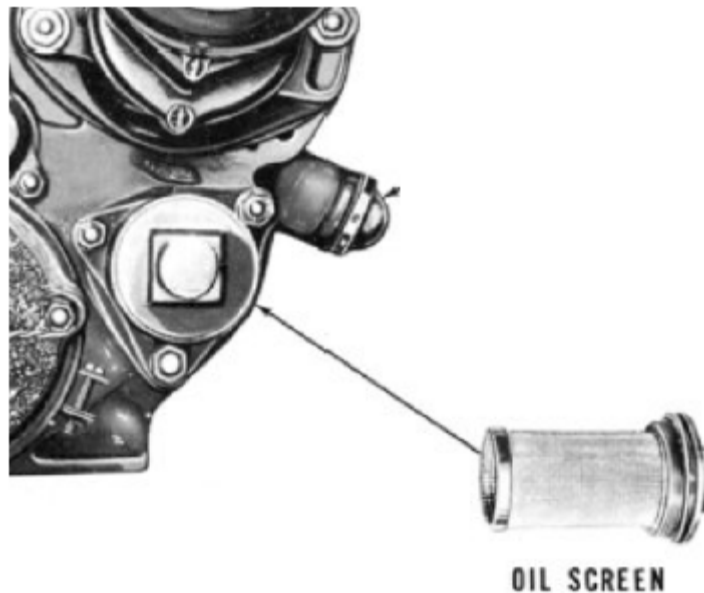
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the engine to idle for a few minutes and shutdown the engine in accordance with POH procedures.

**CAUTION**  
**If the oil pressure does not rise in 30 seconds, stop the engine and determine the trouble.**

- (k) Visually check inside of cowling for any obvious leaks and correct them as necessary.

## **2.2. OIL SCREEN**



1 - Gasket

2 - Oil Screen

**Figure 6.3.10.2 Oil Pressure Screen**

### **(1) REMOVAL**

**NOTE:**  
If a spin on oil filter is installed, the oil screen should be desoldered and removed.

- (a) Drain the oil (Refer to Section 6.3.10.2.1)
- (b) Place a rag below the screen and on top of the muffler shroud to catch the oil.
- (c) Remove the bolts that secure the oil screen housing.

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**CAUTION**

**Do not damage the temperature probe wire while separating the screen housing from the accessory case.**

(d) Drain the oil from the housing and remove the screen.

(2) INSPECTION

(a) Inspect the screen (2) and inside the housing (3) for foreign particles.

**CAUTION**

**If examination of the pressure screen indicates abnormal metal content, additional service may be required to determine the source and possible need for corrective maintenance**

(b) Remove the old gasket (1) and make sure the housing and case surfaces are clean.

(3) INSTALLATION

(a) Assemble the screen in the housing and assemble the gasket and the housing on mounting pad.

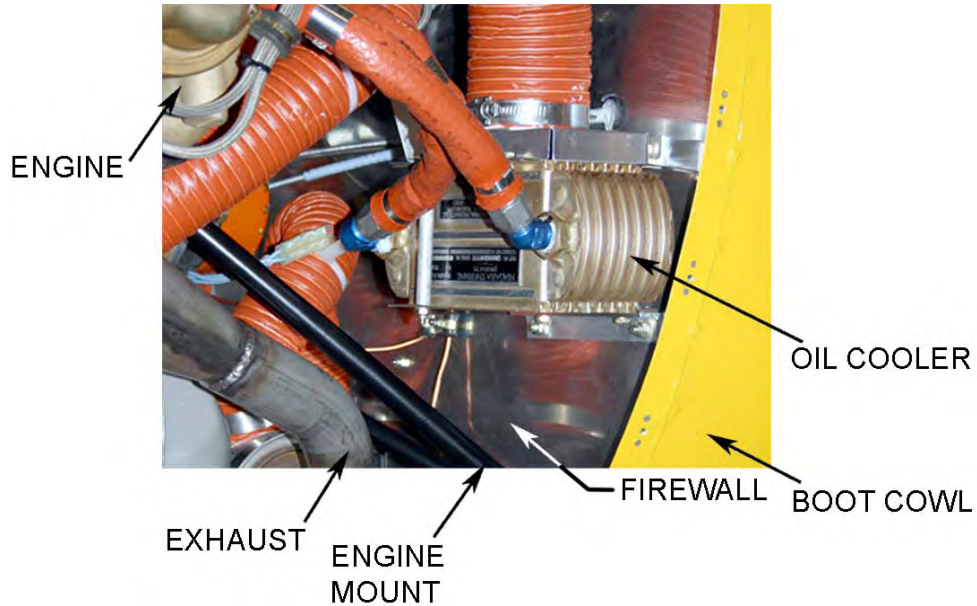
(b) Ensure that the gasket is properly oriented.

(c) Using new lock washers, secure the housing with bolts and torque in accordance with Teledyne-Continental's operator's manual and overhaul manual.

(d) Remove the rag and clean all excess oil from the engine, firewall and muffler.

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**2.3. OIL COOLER**



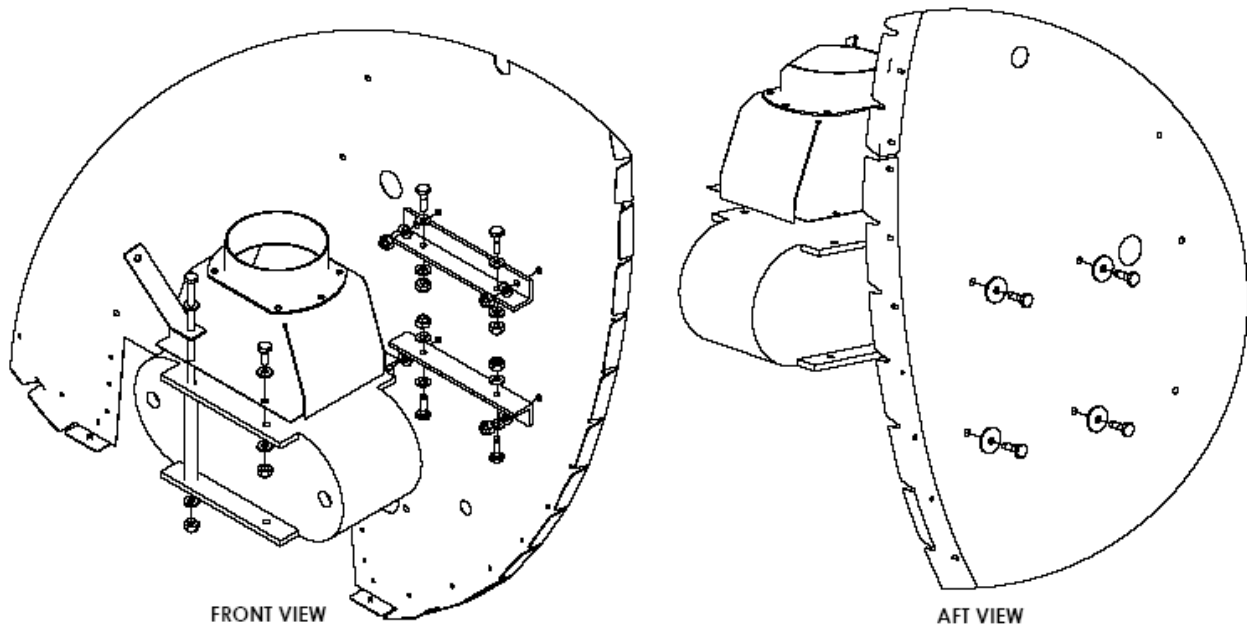
**Figure 6.3.10.3 Oil Cooler Installation**

**(1) REMOVAL**

- (a) Disconnect the hose fittings from the elbows that go into the oil cooler. Use a backup wrench on the elbow fittings to prevent damage to the oil cooler.
- (b) Loosen the hose clamp and remove the air duct.
- (c) Remove the through-bolt that hold the brace and carefully remove the oil cooler.
- (d) Disconnect the hoses from the oil cooler elbows.
- (e) Remove the elbows from the oil cooler.

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**(2) INSTALLATION**



**Figure 6.3.10.4 Oil Cooler**

Refer to Figure 6.3.10

- (a) Apply thread sealant (EZ TURN Lubricant) to all but the most inner pipe thread on each elbow but not on the flare fitting threads. Screw the elbows into the oil cooler. Be very careful to start the threads properly and tighten with the elbow pointing the proper direction.
- (b) Position the oil cooler and install the through-bolt with a washer through the long spacer tubes between the oil cooler webs.
- (c) Position the brace and secure each bolt with a washer and nut
- (d) Torque the bolts/nuts.
- (e) Attach the oil hose to the elbow on the oil cooler and tighten the fitting while holding the elbow with a wrench.

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### **3 ENGINE MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**



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**6.3.11                      ENGINE CONTROLS**

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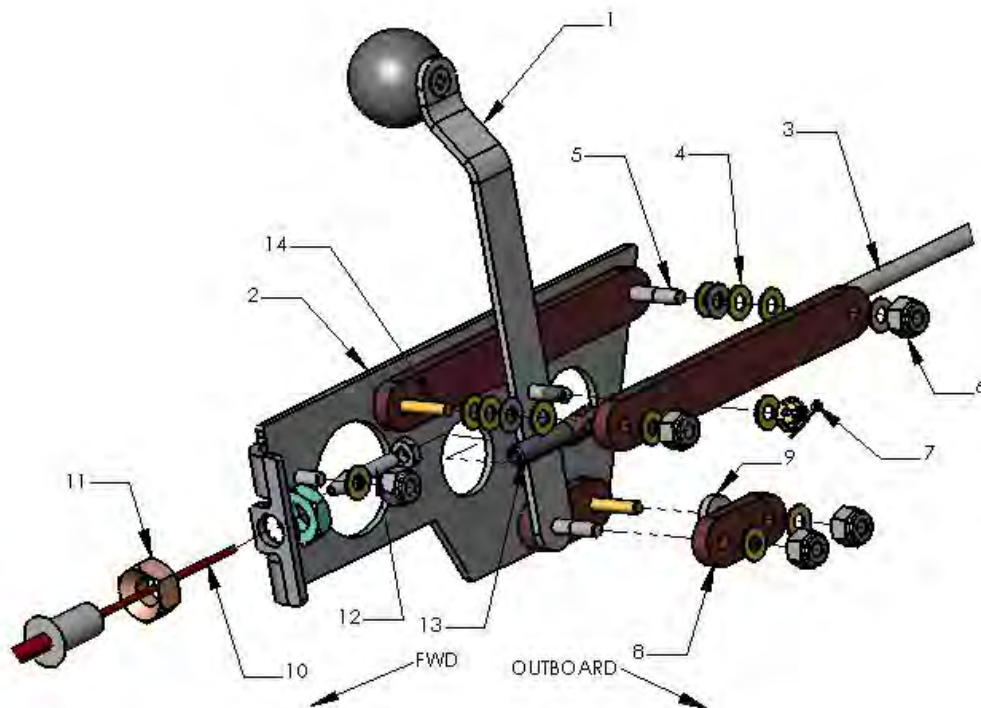
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## 1. GENERAL

Each crewmember is provided with a throttle lever on the left side of the cockpit. The air-to-fuel mixture is adjusted manually with a red control knob located on the left side of the instrument panel. Pulling the mixture control all the way back operates a cut-off valve on the carburetor that stops the supply of fuel to the engine.

## 2. MAINTENANCE

### 2.1 PIN VICE GRIP THROTTLE CABLE



1 – Throttle Lever	2 – Throttle Lever Plate	3 – Throttle Linkage Rod
4 – Washers	5 – AN525 Screws	6 – Nylon Lock Nut
7 – Cotter Pin	8 – Phenolic Spacer	9 – Bushing
10 – Throttle Cable	11 – Cable Nut	12 – Pin Vice Wire Grip
13 – MS35812-1 (Clevis)	14 – MS24693 (Counter Sunk Screw)	

**Figure 6.3.11.1 Pin Vice Throttle Installation (Forward Throttle Shown)**

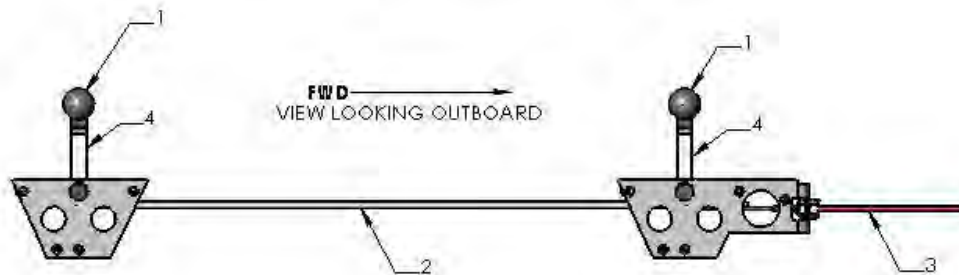
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**(1) LEVER ATTACHMENT**

Refer to Figure 6.3.11.1

- (a) Each lever is installed onto a bolt that is mounted to the throttle lever plate (2) as shown.
- (b) Each control has spacers (8) which are secured with a AN525 screw (5), washers (4), a bushing (9), and nylon lock nuts (6).
- (c) The connecting rod (3) is secured to the throttle levers with a AN525 screw (5), washers (4), castle nut, and cotter pin (7).
- (d) The throttle cable end is secured to the front throttle lever with a pin vice wire grip (12), MS35812-1 clevis (13), AN525 screw (5) washers (4), castle nut, and cotter pin (7).

**(2) LEVER INTERCONNECT LINKAGE**



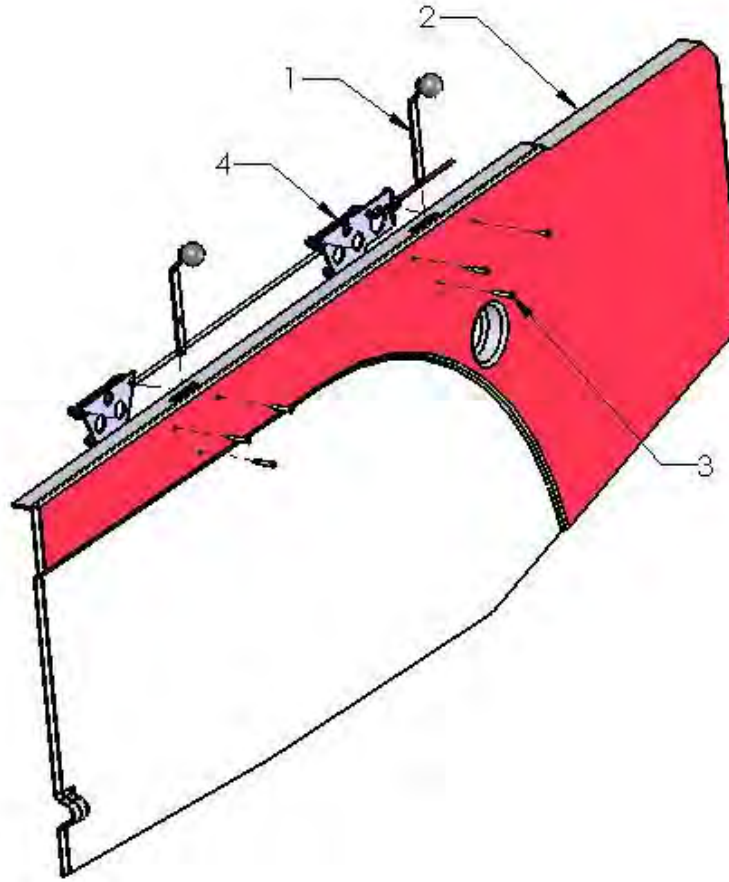
1 – Throttle Knob	2 – Connecting Rod
3 – Throttle Cable	4 – Throttle Lever

**Figure 6.3.11.2 Throttle Interconnect Linkage**

(View from the cockpit, looking outboard)

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**(3) ATTACHMENT OF THROTTLE CABLE TO SIDE PANEL**



1 – Throttle Lever	2 – Side Panel	3 – AN525 Screw
4 – Throttle Plate		

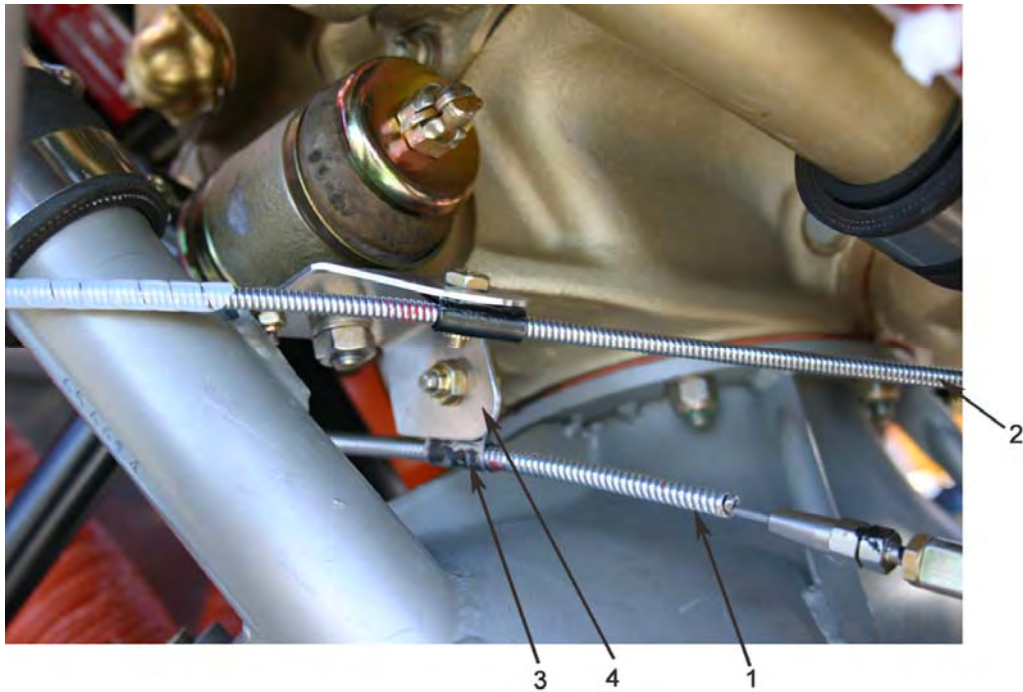
**Figure 6.3.11.3    Attachment of Throttle to Side Panel**

Refer to Figure 6.3.11.3

The throttle plates (4) are kept from moving by six AN525 screws (3) that are bolted thru the left hand composite side panel (2).

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**(4) MOTOR MOUNT THROTTLE CABLE ATTACHMENT**



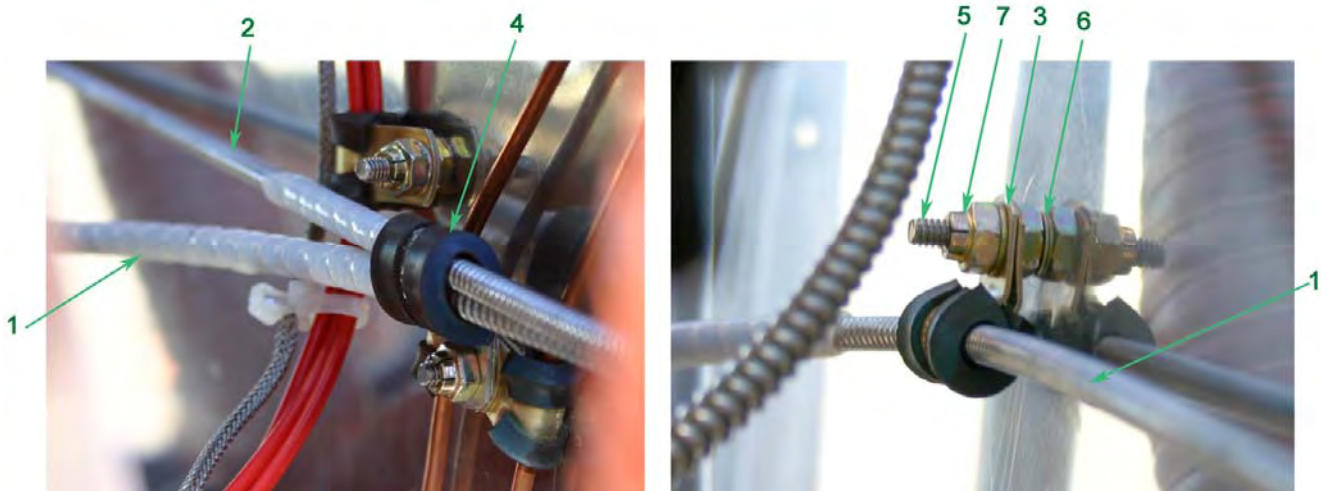
1 – Throttle Cable	2 – Mixture Cable
3 – Cable Clamp	4 – Mixture Bracket

**Figure 6.3.11.4 Attachment of Throttle Bracket to Engine Mount**

Refer to Figure 6.3.11.4

The throttle cable (1) is held in place to the mixture bracket (4) and secured with a cable clamp (3), bolt, washer and nut.

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1 – Throttle Cable	2 – Mixture Cable	3 – Clamp
4 – Clamp	5 – Bolt	6 – Washer
7 – Nut		

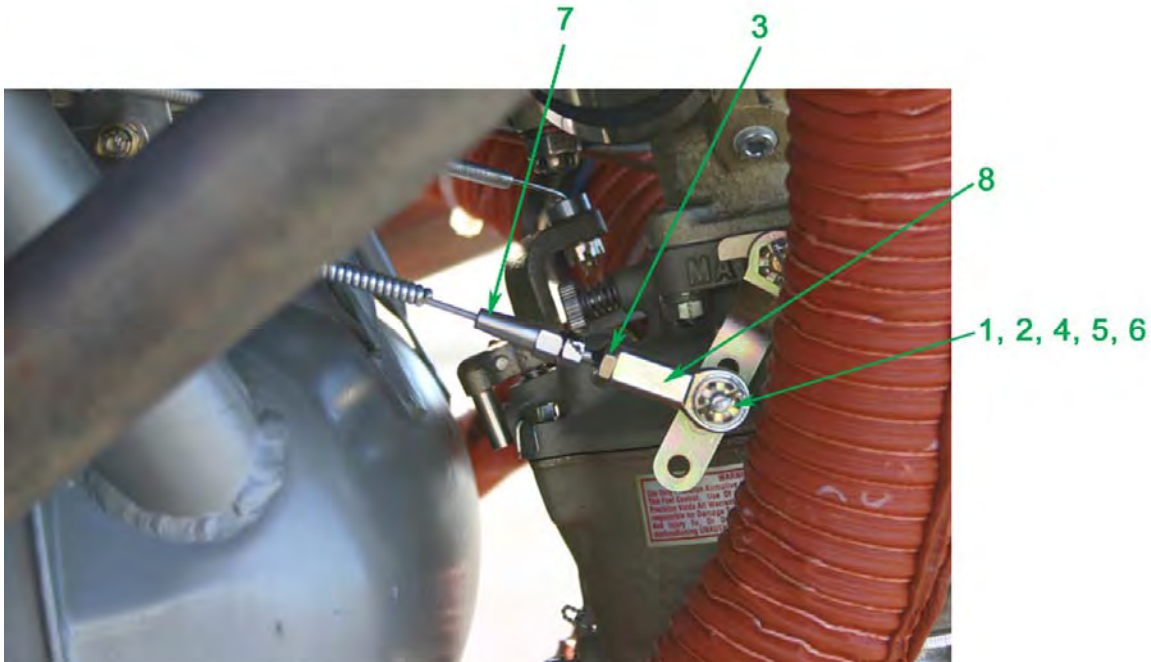
**Figure 6.3.11.5 Attachment of Throttle Cable to Firewall**

Refer to Figure 6.3.11.5

The throttle cable is held in place to the firewall with clamps secured with bolts, washers, and nuts.

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**(5) THROTTLE CABLE TO CARBURETOR ARM ATTACHMENT**



1 – AN3 Bolt	2 – Castle Nut	3 – Nut
4 – Bushings	5 – Cotter Pin	6 – Washer
7 – Pin Vice Grip	8 – Bearing Rod End	

**Figure 6.3.11.6 Attachment of Throttle Cable to Carburetor Arm**

Refer to Figure 6.3.11.6

- (a) The throttle cable is secured to the carburetor arm with a bolt (1), through-bushings (4), a washer (6), a nut (2), and a cotter pin (5).
- (b) The throttle travel can be adjusted by screwing the bearing rod end. Be sure that the bearing rod end jam nut is retightened after making any adjustment.

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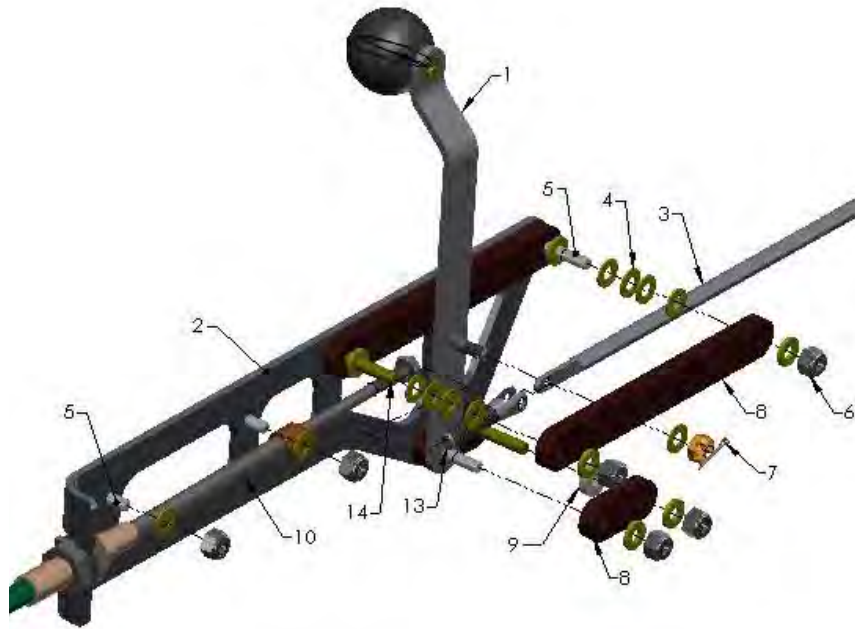
**(6) INSPECTION**

- (a) Ensure that the throttle arm at the carburetor contacts both stops at either extreme of its travel while the throttle levers in the cabin have positive clearance from the panel.
- (b) Move the throttle to either full open or full closed, inspect cable attachment at the carburetor. Repeat the same procedure with the full opposite throttle setting.
- (c) Control operation should be smooth. Lubricate the cable with LPS #2 if needed.
- (d) The throttle levers and cable should have enough friction so that the levers do not creep at full power while at the same time operating easily.



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**2.2 HEAVY DUTY THROTTLE CABLE**



1 – Throttle Lever	2 – Throttle Lever Plate	3 – Throttle Linkage Rod
4 – Washers	5 – AN525 Screws	6 – Nylon Lock Nut
7 – Cotter Pin	8 – Phenolic Spacer	9 – Bushing
10 – Throttle Cable	11 – Cable Nut	13 – MS35812-1 (Clevis)
14 – MS24693 (Counter Sunk Screw)		

**Figure 6.3.11.7 Throttle Installation (Forward Throttle Shown)**

**(1) LEVER ATTACHMENT**

Refer to Figure 6.3.11.7

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- (a) Each lever is installed onto a bolt that is mounted to the throttle lever plate (2) as shown.
- (b) Each control has spacers (8) which are secured with a AN525 screw (5), washers (4), a bushing (9), and nylon lock nuts (6).
- (c) The connecting rod (3) is secured to the throttle levers with a AN525 screw (5), washers (4), castle nut, and cotter pin (7).
- (d) The heavy duty throttle cable is secured to the clevis with an AN315 nut.

**(2) LEVER INTERCONNECT LINKAGE**



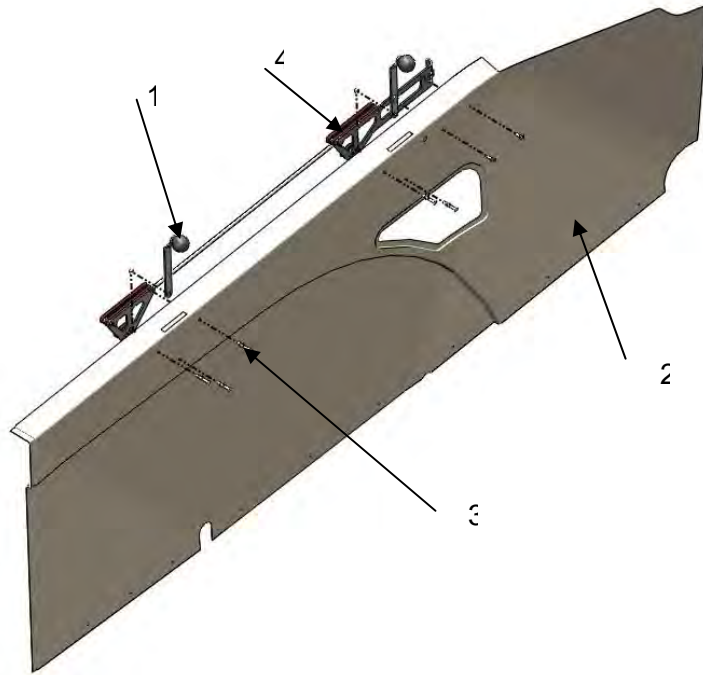
1 – Throttle Knob	2 – Connecting Rod
3 – Throttle Cable	4 – Throttle Lever

**Figure 6.3.11.8 Throttle Interconnect Linkage**

(View from the cockpit, looking outboard)

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(3) ATTACHMENT OF THROTTLE CABLE TO SIDE PANEL



1 – Throttle Lever	2 – Side Panel	3 – AN525 Screw
4 – Throttle Plate		

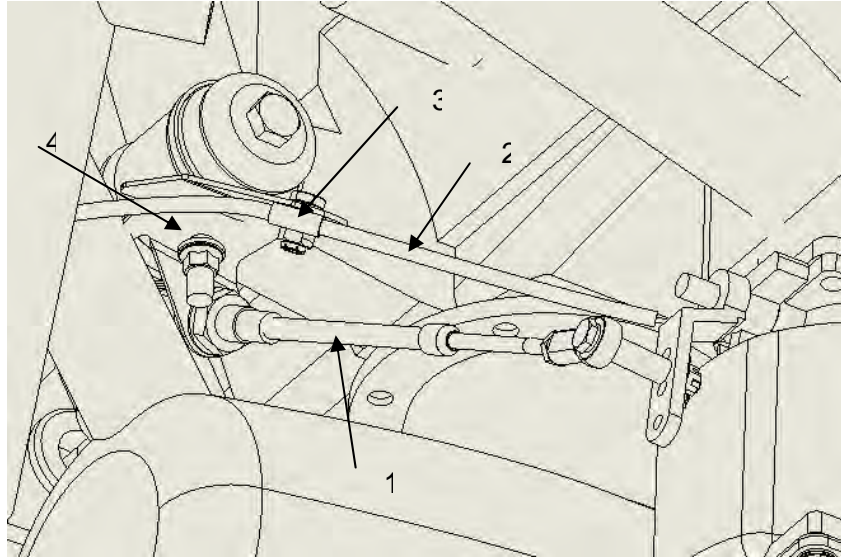
**Figure 6.3.11.9    Attachment of Throttle to Side Panel**

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Refer to Figure 6.3.11.9

The throttle plates (4) are kept from moving by seven AN525 screws (3) that are bolted through the left hand composite side panel (2).

**(4) MOTOR MOUNT THROTTLE CABLE ATTACHMENT**



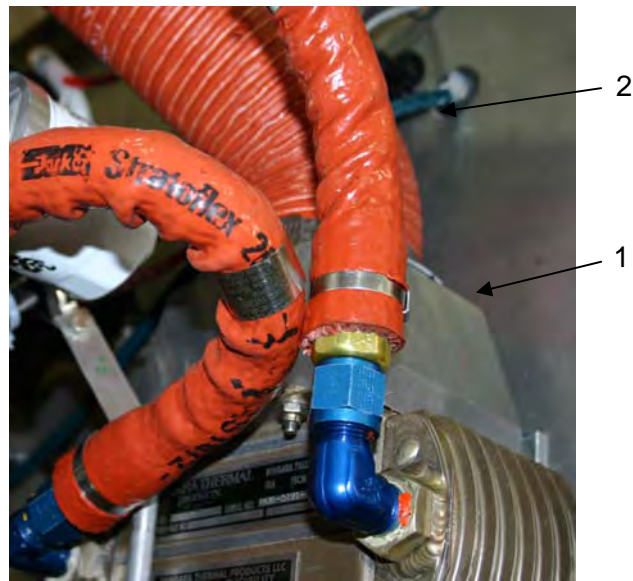
1 – Throttle Cable	2 – Mixture Cable
3 – Cable Clamp	4 – Mixture Bracket

**Figure 6.3.11.10 Attachment of Throttle to Mixture Bracket**

Refer to Figure 6.3.11.10

The throttle cable (1) is held in place to the mixture bracket (4) with the jam nut. The mixture cable (2) is held in place with the cable clamp (3), bolt, washer and nut.

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1 - Firewall	2 - Throttle Cable
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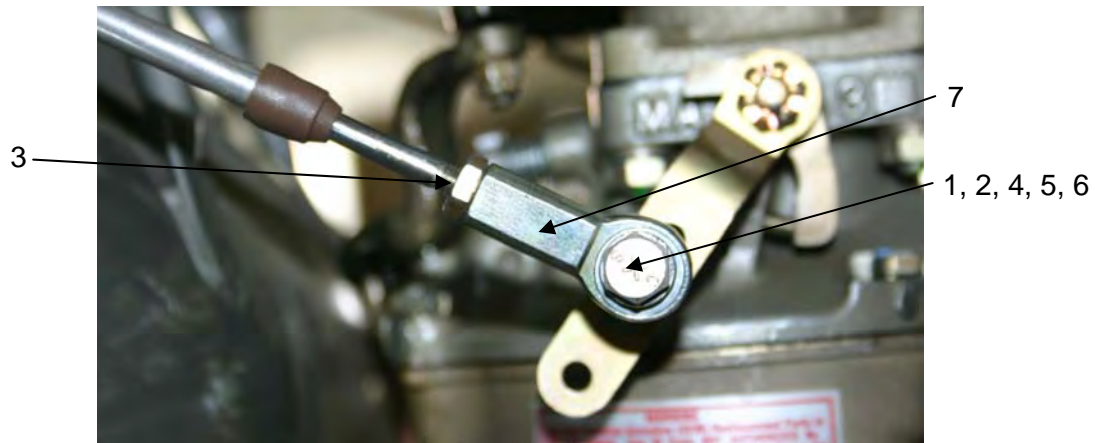
**Figure 6.3.11.11 Routing of Throttle Cable through Firewall**

Refer to Figure 6.3.11.11

The heavy duty throttle cable is directly routed through a hole in the firewall to the mixture bracket. A bracket secures the throttle cable to the engine mount on the left hand side of the engine.

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**(5) THROTTLE CABLE TO CARBURETOR ARM ATTACHMENT**



1 – AN3 Bolt	2 – Castle Nut	3 – Nut
4 – Bushings	5 – Cotter Pin	6 – Washer
7 – Bearing Rod End		

**Figure 6.3.11.12 Attachment of Throttle Cable to Carburetor Arm**

Refer to Figure 6.3.11.12

- (a) The throttle cable is secured to the carburetor arm with a bolt (1), through-bushings (4), a washer (6), a castle nut (2), and a cotter pin (5).
- (b) The throttle travel can be adjusted by screwing the bearing rod end. Be sure that the bearing rod end jam nut is retightened after making any adjustment.

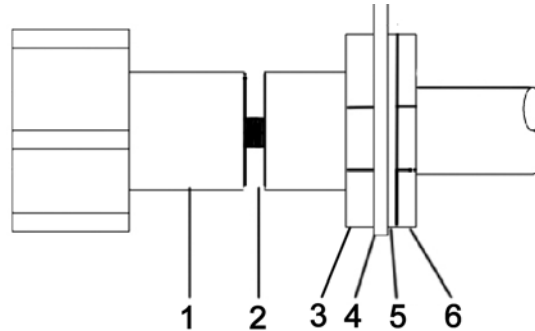
**(6) INSPECTION**

- (a) Ensure that the throttle arm at the carburetor contacts both stops at either extreme of its travel while the throttle levers in the cabin have positive clearance from the panel.
- (b) Move the throttle to either full open or full closed, inspect cable attachment at the carburetor. Repeat the same procedure with the full opposite throttle setting.
- (c) Control operation should be smooth. Lubricate the cable with LPS #2 if needed.
- (d) The throttle levers and cable should have enough friction so that the levers do not creep at full power while at the same time operating easily.

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## **2.3 MIXTURE**

### **(1) MIXTURE CONTROL CABLE TO PANEL ATTACHMENT**



1 - Mixture Control Knob	2 - Cushion Space	3 - Panel Nut
4 - Instrument Panel	5 - Lock Washer	6 - Large Nut

**Figure 6.3.11.13 Mounting of the Mixture Control at the Instrument Panel**

Refer to Figure 6.3.11.13

- (a) The mixture control knob (1) is secured to the instrument panel (4) with a lock washer (5), and a nut (6).
- (b) The mixture knob (1) should have enough movement so that the carburetor mixture lever contacts the stops at both extents of its travel and there should not be more than  $\frac{1}{4}$ " cushion (2) between the knob (1) and the panel nut (3) in the full rich position.

### **(3) MOTOR MOUNT MIXTURE CABLE ATTACHMENT**

Refer to Figure 6.3.11.10

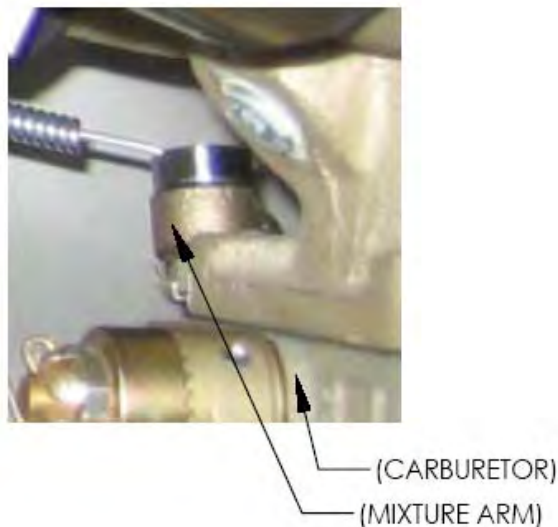
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- (a) The mixture cable is fastened to the mixture bracket clamp with a bolt, washers, and a nut.
- (b) The mixture bracket is secured to the engine mount with a bolt, a washer, and a nut.

The position of the cable housing in the mixture bracket clamp affects the travel of the knob in relation to the instrument panel. The travel can be adjusted by loosening the mixture bracket clamp holding the cable housing and sliding the cable housing in the clamp. Retighten the clamp and check travel.

- (c) Be sure the cable housing is held tightly in the clamp after making any adjustments.

**(3) MIXTURE CABLE TO CARBURETOR LEVER SWIVEL ATTACHMENT**



1- Cable Rod	2- Stud	3- Swivel
4- Mixture Lever	5- Washer	6- Short Castellated Nut
7- Cotter Pin		

**Figure 6.3.11.14 Attachment of Mixture Cable to Carburetor Swivel Arm**



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Refer to Figure 6.3.11.14

- (a) The control cable rod pivots the mixture control lever on the carburetor. The rod is held tight by the mixture swivel fitting.
- (b) Adjusting the cable rod length at the swivel fitting affects the travel of the mixture control lever. There should be enough travel in the lever that it reaches the stops on either extreme of its travel.
- (c) The swivel nut should be tightened enough to hold the cable rod firmly but not enough to shear it or strip the threads.

**(4) INSPECTION**

- (a) Ensure that the mixture lever at the carburetor contacts both stops at either extreme of its travel. At the same time, there should be no more than ¼" cushion between the knob and the panel nut in the full rich position.
- (b) Inspect to be sure the cable attach swivel does not have excessive play and the cable is held tightly by the clamp.
- (c) Control operation should be smooth. Lubricate with LPS #2 if required.

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6.3.12 INDUCTION SYSTEM

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## **1 GENERAL**

The induction air for the engine enters through a filter on the lower side of the cowl. Alternatively, the pilot may use the carburetor heat control, which operates a butterfly valve that allows heated, unfiltered air to feed into the carburetor. The carburetor heat control is located on the instrument panel.

**CAUTION**  
**Ground operations with the carburetor heat control in the hot position must be limited because it allows air to bypass the filter.**

Should the air filter become obstructed, the carburetor air control provides an alternate manual means of supplying the engine with air for the induction system.

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**1.1. AIR FILTER**



**Figure 6.3.12.1 Air Filter**

**(1) REMOVAL**

- (a) Grasp the filter and pull it straight forward out of the air box.
- (b) If a new filter is required, contact Cub Crafters and seek replacement filter part number SC54108-001.

**(1) INSPECTION**

- (a) Inspect the foam filter for any damage, such as tears or large holes.
- (b) Clean the filter in a mild degreasing cleanser to remove dirt and other particles. Wring the excess from the element and allow it to dry.
- (c) Apply a filter oil, such as Castrol Foam Filter Oil or Amsoil High Tack Foam Filter Oil, to the element and work it into the cells throughout.

**(2) INSTALLATION**

- (a) Press the filter into the opening in the front of the air box and press the edges behind the flange all around.

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**1.2. CARBURETOR HEAT**



**Figure 6.3.12.2 Carburetor Heat Valve**

**(1) INSTALLATION OF CABLE TO VALVE ARM SWIVEL FITTING**

- (a) Insert the carburetor heat control cable end through the swivel fitting stud.
- (b) Insert the threaded end of the stud through the swivel fitting and through the carburetor heat valve arm.
- (c) Place the AN960-10 washer and AN310-3 castle nut on the stud and tighten it one half turn past finger tight.
- (d) Test the travel of the carburetor heat control knob in the cockpit and adjust the position of the cable within the fitting. When you are satisfied that the position is correct, tighten the castle nut, and install an AN380-2-2 cotter pin.

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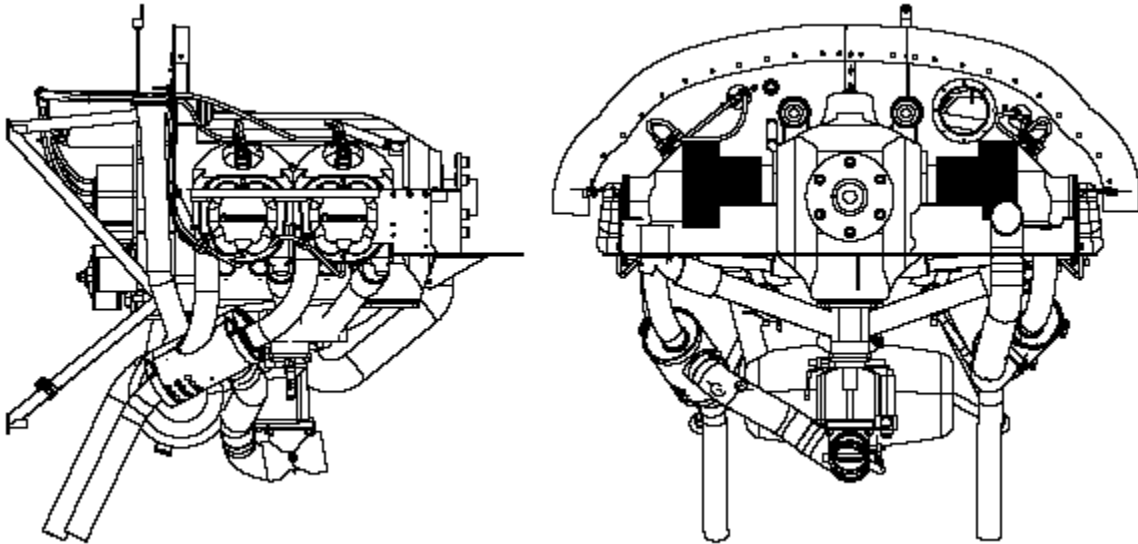
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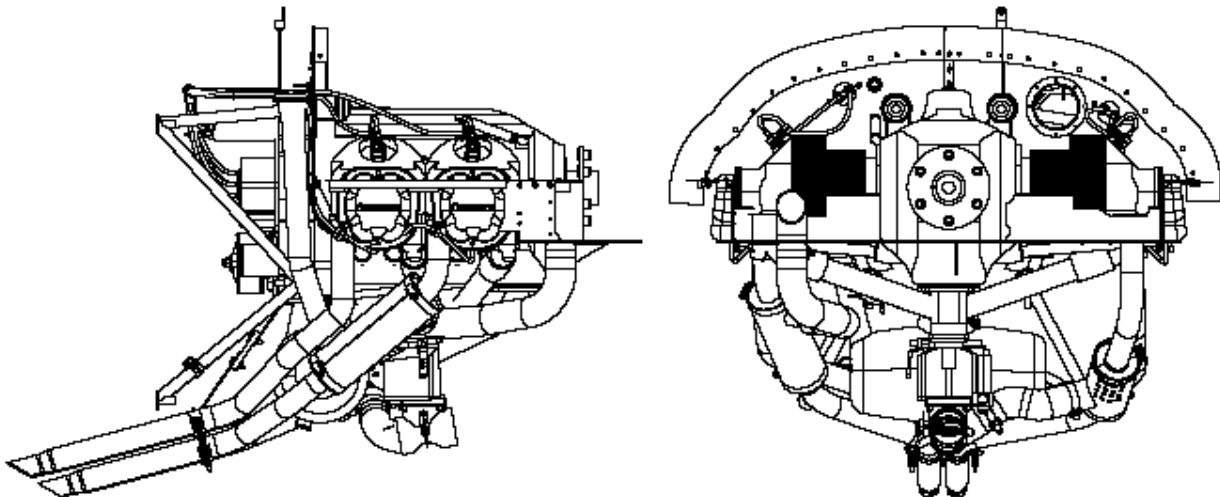
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## **1 GENERAL**

The exhaust system is one of two options, standard or performance exhaust. The standard exhaust consists of a two-into-one system. The performance exhaust is a four-into-four system. Shrouds mounted on the exhaust lines provide provision for both carburetor heat and cabin heat.



**Figure 6.3.13.1: Standard Exhaust System**



**Figure 6.3.13.2: Performance Exhaust System**



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**1.1. ENGINE EXHAUST**

**(1) REMOVAL**

- (a) Remove the cowl as described in section 6.3.14.
- (b) Disconnect all of the SCAT ducts from the heat shrouds by loosening the hose clamps.
- (c) Remove the forward induction elbow on each side of the engine. Do this by loosening the winged hose clamps and sliding the rubber couple inboard along the induction tube. Remove the nuts and washers holding the elbows to the engine. Set the elbows aside.
- (d) Remove the nuts that attach the exhaust flanges to the engine cylinders and lower the exhaust system away from the engine.

**(2) INSPECTION**

- (a) Inspect the components of the exhaust system for signs of cracking. Have any cracks repaired by an FAA-approved or Cub Crafters-approved repair facility. If the cracking is excessive, replace the exhaust system component(s).

**WARNING**

**CRACKS IN THE EXHAUST SYSTEM WILL ALLOW CARBON MONOXIDE TO BE PRESENT INSIDE THE COWL. THIS MAY TRAVEL THROUGH THE FIREWALL AND INTO THE COCKPIT. CARBON MONOXIDE MAY RESULT IN DEATH. NEVER OPERATE THE AIRCRAFT WITH ANY CRACKS IN THE EXHAUST SYSTEM.**

**(3) INSTALLATION**

- (a) Install the exhaust system in the reverse order that it was removed in. Replace the gaskets on both the exhaust flanges and on the induction elbows. Torque the nuts on the engine cylinders as specified in the Teledyne Continental overhaul manual.

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6.3.14 ENGINE COWL

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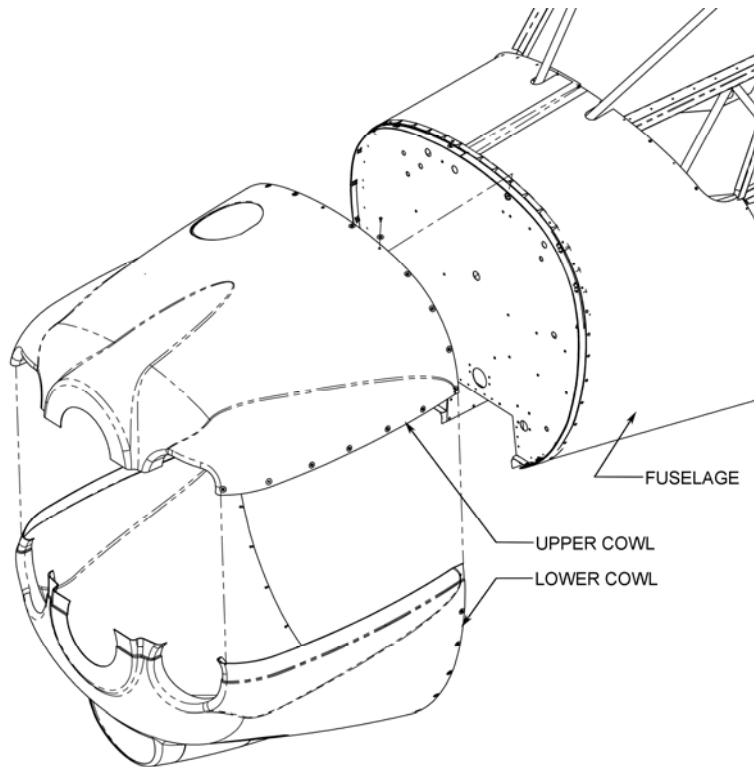
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## **1 GENERAL**

The engine cowl is made in two pieces and can be removed without the propeller having to come off. The upper and lower portions are made of composites using fire-resistant resins.

### **1.1. ENGINE COWL**

#### **(1) REMOVAL**



**Figure 6.3.14.1 Engine Cowl**

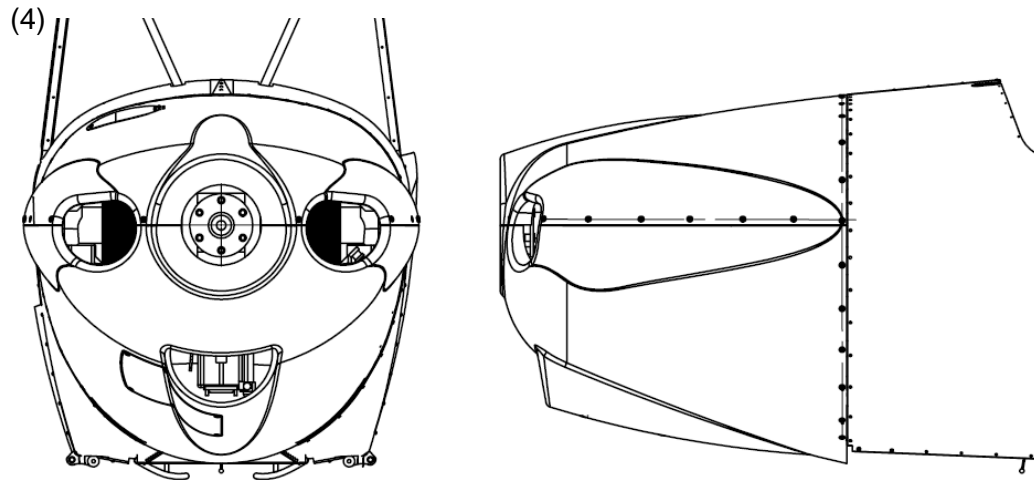
- (a) Remove the screws that hold the upper cowl to the lower cowl and the fuselage.
- (b) Carefully remove the upper cowl
- (c) Remove the screws that hold the lower cowl to the fuselage.
- (d) Disconnect the induction tubing.
- (e) Carefully remove the lower cowl.

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(2) INSPECTION

- (a) Inspect the cowl for loose rivets, wear points and cracking.

(3) INSTALLATION



**Figure 6.3.14.2 Engine Cowl Installation**

- (a) Carefully position the lower cowl in place.
- (b) Carefully position the lower cowl in place; secure the cowl to the fuselage with screws.
- (c) Carefully position the upper cowl in place; secure it to the lower cowl and to the fuselage with screws.
- (d) Make sure the baffle seal is properly formed against the cowling, baffle seal should face forward.
- (e) Double check to make sure all the hardware is tight.
- (f) Reinstall the induction tubing, ensure hose clamps are tight.
- (g) Verify that there is clearance between the cowl and prop spinner.

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**6.3.15      FUEL SYSTEMS**

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## **1     SERVICING**

### **(1) DRAINING FUEL**

The aircraft has two fuel drains, one under the fuselage and one on the fuel strainer, located on the engine firewall.

#### **CAUTION**

**Observe all precautions related to fuelling and de-fueling the aircraft. In particular, the following are highlighted:**

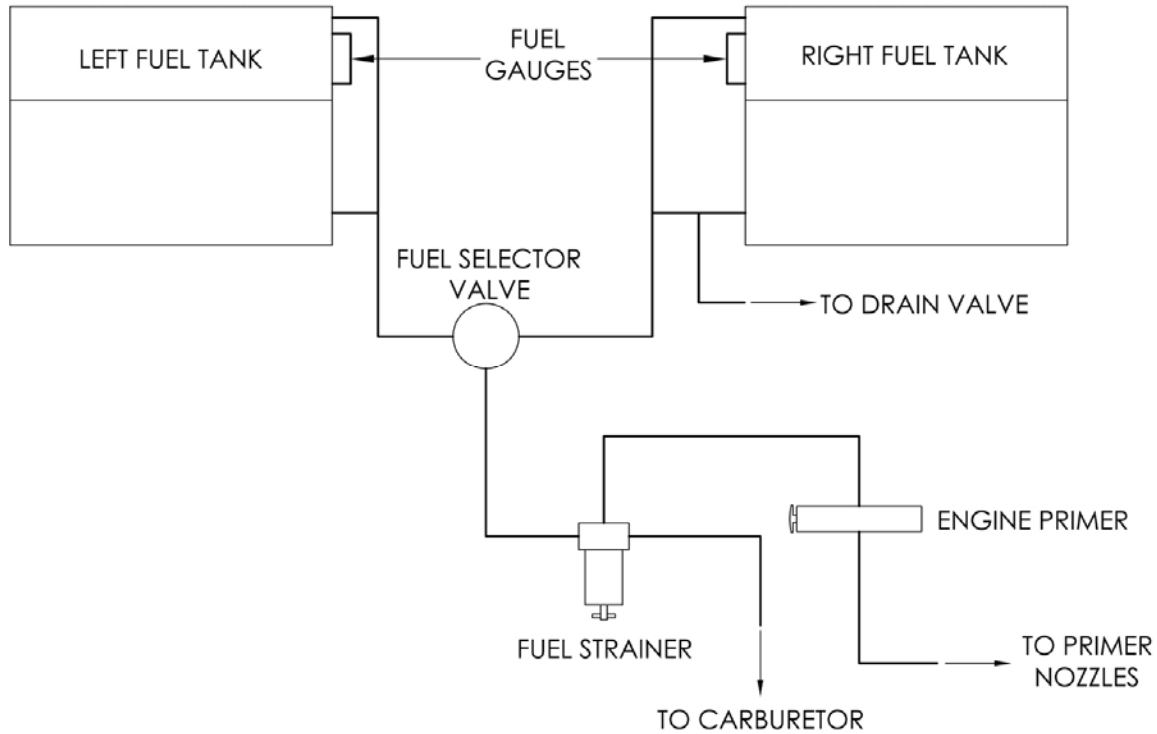
- **Connect grounding wire to one of the wing tie-downs and ground the aircraft to an earth ground.**
- **Do not operate any electrical equipment during the de-fueling operation.**
- **Operation of any electrical switch during the fueling operation is prohibited.**
- **Do not allow smoking or open flames within 100 feet (of the aircraft or fuel servicing vehicle are prohibited.**
- **Do not operate radios, electric system, or electronic equipment during the fueling or de-fueling operations.**
- **Do not drain fuel tanks within 100 feet of any electrical equipment capable of producing sparks.**
- **Have a suitable fire extinguisher available at all times**

- (a) Open the fuel strainer drain valve and allow fuel to drain into container.
- (b) If the fuel has been drained and then the aircraft has been re-fueled, the engine must be run on the ground for enough time to purge the system of air prior to flight



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**2 FUEL TANKS**



**Figure 6.3.15.1 Fuel System Schematic**

**(1) TROUBLESHOOTING**

PROBLEM	PROBABLE CAUSE	REMEDY
Filler Cap Leaks	Filler Cap Improperly Installed	Install Filler Cap Properly
	Seal Improperly Installed	Replace Fuel Cap Seal
	Deteriorated Seal	Replace Fuel Cap Seal
Leak in Fuel Line	Loose Connector(s)	Inspect and Tighten Connector(s)
	Chaffing	Replace Fuel Line
	Defective Thread	Replace Threaded Component

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(2) MAINTENANCE

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

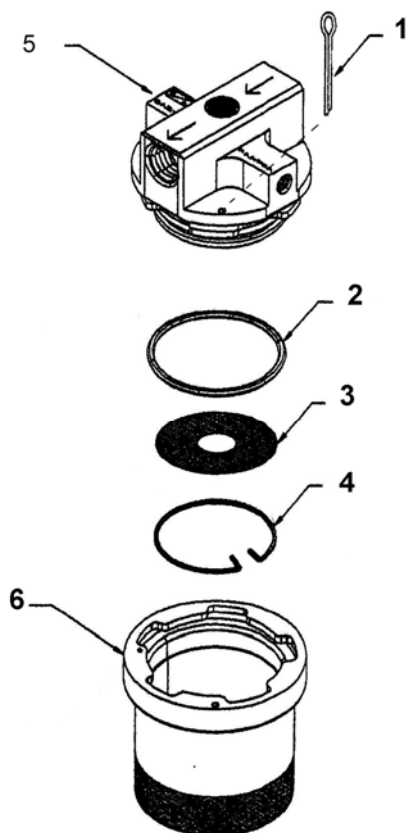
**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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**3 FUEL FILTERS**

**(1) FUEL STRAINER SERVICING**



- |                 |                  |             |
|-----------------|------------------|-------------|
| 1. – Cotter Pin | 2. – O-Ring      | 3. – Screen |
| 4. – Clip       | 5. – Top Support | 6. – Bowl   |

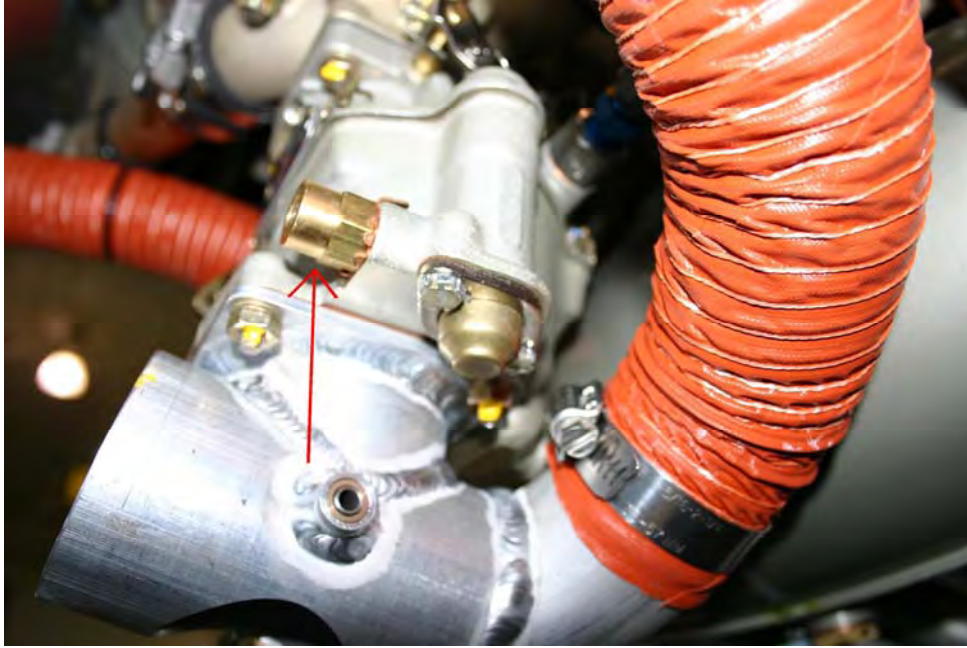
**Figure 6.3.15.2 Fuel Strainer Assembly**

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- (a) Turn fuel selector to "OFF" position.
- (b) Drain fuel from strainer.
- (c) Remove the cotter pin (1) that locks the bowl (6).
- (d) Place a metal container under the bowl to catch the residual fuel.
- (e) Twist bowl (6) to remove and empty the residual fuel.
- (f) Remove the wire snap ring (4) with your fingers and gently remove the screen (3).
- (g) Inspect and clean the screen (3).
- (h) Check the condition of the O-ring (2).
- (i) Carefully install the screen (3) and hold it in place with the wire snap ring (4).
- (j) Insert and twist the bowl (6) into position.
- (k) Install the safety cotter pin (1).
- (l) Turn on fuel and check for leaks.

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**(2) CARBURETOR INLET SCREEN SERVICING**

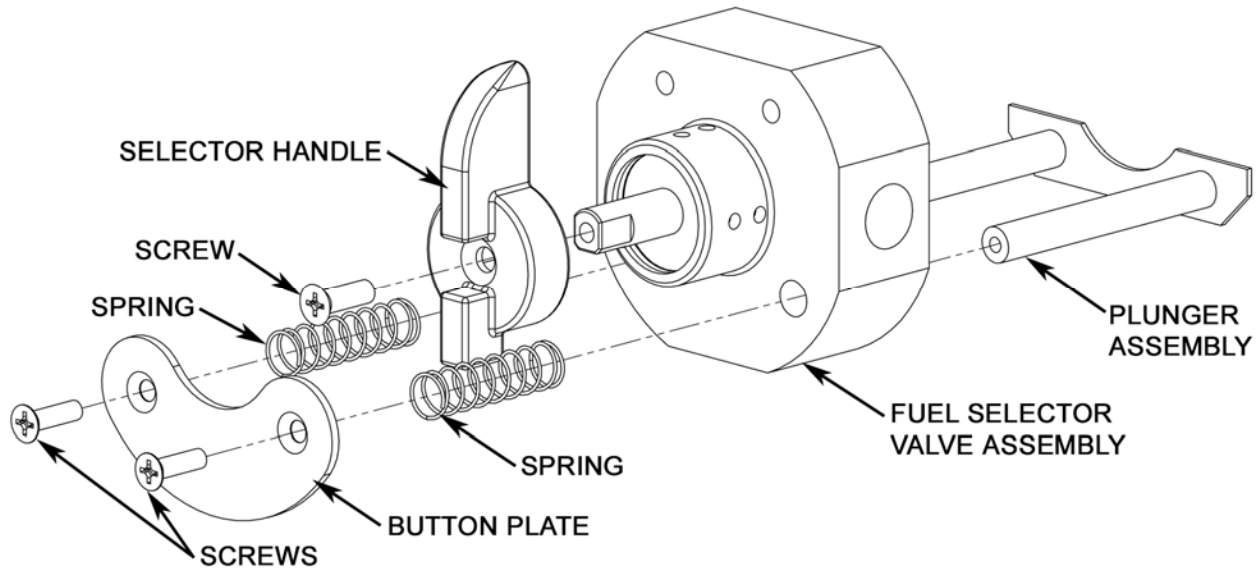


**Figure 6.3.15.3 Carburetor Inlet Screen**

- (a) Turn fuel selector to "OFF" position.
- (b) Remove the large hex plug in the left side of the float chamber.
- (c) Clean the screen and flush accumulations of dirt and water from the chamber.
- (d) Install the hex plug.

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**4 FUEL SELECTOR**

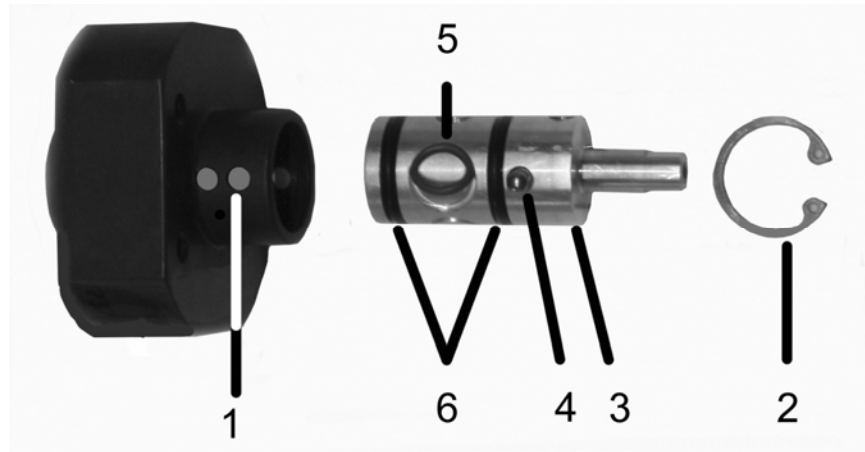


**Figure 6.3.15.4 Fuel Selector Assembly**

**(1) FUEL SELECTOR OVERHAUL**

- (a) Drain the fuel tanks through the drains located on the underside of the fuselage and fuel strainer.
- (b) Drain the remaining fuel out the fuel strainer drain.
- (c) Remove the selector handle and handle button plate with the springs by loosening the screws.
- (d) Put a rag under the valve to catch any residual fuel.

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- |                               |                   |                    |
|-------------------------------|-------------------|--------------------|
| 1. – Detent Holes             | 2. – Snap Ring    | 3. – Barrel        |
| 4. – Detent Balls and Springs | 5. – Small O-Ring | 6. – Large O-Rings |

**Figure 6.3.15.5 Fuel Selector Detail**

Refer to Figure 6.3.15.5

- (e) Rotate the shaft so the detent balls (4) are between the detent holes (1).
- (f) Remove the snap ring (2) holding the handle barrel (3) in the housing.
- (g) Carefully pull the barrel (3) out of the housing with your fingers positioned to catch each set of balls and springs (4).
- (h) Remove the small O-ring (5) and the large O-rings (6) then clean the barrel.
- (i) Inspect for wear and grooves.
- (j) Replace the small O-ring (5) and the large O-rings (6) with new and lube on installation.
- (k) Insert the barrel (3) part way in the housing.
- (l) One set at a time, insert a spring with a ball (4) on each end and push the barrel the rest of the way in.
- (m) Secure with the snap ring (2).
- (n) Check the operation for positive detent and smooth turning.
- (o) Remove the rag.
- (p) Reattach the cover, and the handle stop plate with the springs and the handle.
- (q) Check and make sure the handle stop is working properly.

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## **5 MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**



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**6.3.16      PROPELLERS**

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**1 GENERAL**

**(1) TROUBLESHOOTING**

If the propeller-engine combination feels rough in flight;

- (a) Check that the mounting face of the propeller is tight against the engine flange and check the blade track.
- (b) Verify that the attaching bolts have reached their required torque and have not bottomed out of the threads.
- (c) Remove the propeller, rotate it 180 degrees on the engine crankshaft flange, and re-install. Again, check the blade track.
- (d) If roughness or vibration is still present, dynamic propeller balancing may be required.

**(2) REMOVAL**

- (a) Be certain that magneto switch is off, and that both magnetos are grounded.
- (b) Remove the spinner dome.
- (c) Mark the aft bulkhead propeller and spinner with tape, so they are reinstalled in the same orientation.
- (d) Remove safety wire on propeller mounting bolts.
- (e) Remove the spinner.
- (f) Remove the propeller bolts.
- (g) Remove the propeller from the flange. A slight rocking may be necessary to remove the propeller. Be careful during the removal; if the propeller is tight on the flange it is possible to tear out the back of the hub around the center bore and bolt hole counterbores.
- (h) Assistance may be needed to hold the propeller and spinner backing plate.

**(3) PROPELLER INSPECTION**

- (a) Examine the propeller blades for corrosion, cracks, nicks, or dents beyond the permissible limits. These limits will be found in the propeller manufacturer's service manuals. If the propeller is unserviceable, replace it with a new one and return the damaged propeller to the factory. Remove the spinner.

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- (b) Inspect the attaching bolts for worn or damaged threads and heads. Replace damaged bolts with new ones.
- (c) Inspect the spinner bulkheads for cracks or broken brackets. Replace if any damage is noted.
- (d) Be certain that the ignition switch is off and that both magnetos are grounded.
- (e) Inspect for bruises, scars, or other damage to wood and blade leading edge protection. Assume that your propeller is un-airworthy after any kind of impact until qualified personnel have inspected it.
- (f) All wood and metal tipping repairs must be made at the factory or by an approved propeller repair station.

**NOTE**

The saw slots in metal tipping are designed to crack across after several hours of use. This prevents cracks from occurring at other locations.

- (g) Check propeller balance whenever there is evidence of roughness on operation.
- (h) If your propeller begins to show any of the following damage, it should be retired from service:
  - Cracks in hub bore, bolt holes or counter bores,
  - A deep cut across the wood grain,
  - A long, wide, or deep crack parallel to the grain,
  - A separated lamination,
  - Oversize or elongated hub bore or bolt holes,
  - An appreciable warp (discovered by inspection or through rough operation),
  - More than 1" of the tips broken or an appreciable portion of wood missing or,
  - Obvious damage or wear beyond economical repair.

**(4) HUB INSPECTION**

- (a) Remove propeller in accordance with previous instructions.
- (b) Clean both propeller hub faces using light-grit Scotch-Brite pad and denatured alcohol. It should be possible to remove most of any fretting marks and darkened areas.
- (c) Inspect the propeller's rear hub face for cracks and/or elongation of the bolt holes and/or counterbores where the engine flange drive bushings are inserted.

**Cracks**

If cracks are evident on the hub face, take a razor blade and very gently try to insert the corner of the blade. Most cracks will be paint cracks only, however, if

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the tip of the razor easily goes into the crack more than 1/16-inch then the propeller must be returned to the factory for closer inspection.

**Bolt Hole/Counterbore Elongation**

The bolt holes and counterbores will naturally elongate since the wood will shrink and expand differently with and against the grain. When inspecting the counterbores, look for a ridge at .38-.75" deep in from the mounting hub face that would indicate that the flange drive bushings were hitting against the side. If any bolt hole elongation or ridge height inside the counterbore is more than 1/32", then the propeller **MUST** be returned to the manufacturer for closer inspection, and the attaching bolts **MUST** be replaced.

- (d) Inspect the spinner aft bulkhead and engine flange for fretting. If the fretting is severe and cannot be dressed out with emery cloth then the parts must be replaced.
- (e) Clean the flange face for reinstallation.

**(5) INSTALLATION**

The following instructions are a general guide. Defer to propeller manufacturers detailed instructions as required.

- (a) Thoroughly clean the surfaces of the crankshaft flange and pilot stub, the rear/mounting face of the propeller, and the pilot bore. Carefully examine each surface and especially examine the end of the crankshaft pilot stub. Even minor nicks or burrs must be smoothed.
- (b) MAKE SURE the propeller attaching bolts and the threads in the drive bushings or retaining nuts are clean and dry.
- (c) Be certain that the magneto switches are off and both magnetos are grounded.
- (d) Place the spinner backing plate on the crankshaft flange ensuring the prop blade orientation is correct.
- (e) Position the propeller in the correct orientation. Tighten the bolts snug.
- (f) BE SURE the spinner backing plate is positioned properly on the flange bushings before you torque the bolts.
- (g) Apply torque in several increments, working diagonally across the bolt circle until reaching proper torque.

**CAUTION:**

**Over-tightening propeller attaching bolts cause the wood of the hub to crush, breaking its seal, and slightly reducing drive-torque.**

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<b>McCauley Metal Propeller</b>	<b>Sensenich Wood Propeller</b>	<b>Sensenich Composite Propeller</b>	<b>Catto Propellers Wood/Composite</b>
300-360 in-lbs	175-225 in-lbs	340-360 in-lbs	360 in-lbs

- (h) Check to make sure the propeller track is within 1/8-inch.
- (i) Install 0.041-inch diameter stainless steel safety wire in the propeller bolt heads locking bolt heads together in a tightening moment. It is recommended that bolts be wired in pairs, twisting the wire between the bolt heads.

## **(6) REMOVAL**

- (a) Be certain that magneto switch is off, and that both magnetos are grounded. Remove the spinner dome.
- (b) Mark the aft bulkhead propeller and spinner with tape, so they are reinstalled in the same orientation.
- (c) Remove safety wire on propeller mounting bolts.
- (d) Remove the spinner.
- (e) Remove the propeller bolts.
- (f) Remove the propeller from the flange. A slight rocking may be necessary to remove the propeller. Be careful during the removal; if the propeller is tight on the flange it is possible to tear out the back of the hub around the center bore and bolt hole counterbores.
- (g) Assistance may be needed to hold the propeller and spinner backing plate.

## **2 WOOD PROPELLER**

### **(1) PROPELLER MAINTENANCE (BOLT TORQUE)**

The main factor that leads to the loss of propeller bolt torque is the variation of the wood hub thickness. The hub thickness will vary with wood moisture content changes and temperature changes. Even though your propeller has been sealed and/or painted, changes in wood moisture content can occur and can significantly change the thickness of the hub. A one percent (1%) change in the moisture content of a propeller (increase / decrease) will cause a 0.010" change in hub thickness.

As the required compression for a typical wood propeller is 0.021", almost half of the required hub compression would be lost with such a change. Moisture content changes are not immediate and can span several weeks or months, depending on many factors such as temperature, humidity, and operating schedules. Operating temperature changes have similar effects but are not as severe.

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For these reasons, it is important to follow the maintenance schedule below:

- (a) **After First Flight** – After the first flight, recheck the bolt torque. Refer to Bolt Torque Check Procedure and Table 6.3.16.1.
- (b) **After First 25 Hours** – After the first 25 hours, recheck the propeller bolt torque. Refer to Bolt Torque Check Procedure and Table 6.3.16.1.
- (c) **Every 50 Hours** – After the first 25-hour recheck, it is **Mandatory** that the propeller bolt torque be rechecked every 50 hours. Refer to Bolt Torque Check Procedure and Table 6.3.16.1.
- (d) **Environment Changes** - Should the operating environment change significantly in temperature and/or humidity for a long period of time, the propeller bolt torque must be rechecked.
- (e) When the propeller is not in use, place the propeller in a horizontal position and if it is exposed to weather, cover it with a waterproof cover.
- (f) Do not use the propeller as a tow-bar to move your aircraft.
- (g) Protect your propeller from moisture and UV exposure by waxing with an automotive type paste at least once a year. Keep the tip drain holes in metal tipping clear.
- (h) Avoid running the engine up in areas containing loose stones and gravel.
- (i) Finish loss off the leading edge is a normal wear item, and is dependent on the amount of operation in rain and grit.
- (j) Touch up worn finish areas and scratches with spar varnish. Return the propeller to the factory or approved repair station for total worn areas larger than 4x4" or scratches deeper than 1/32". Inspect frequently for bruises, scars, or other damage to wood and blade leading edge protection. Damage to the wood or leading edge that is 1/16" deep or less without breaking the finish is acceptable.

**(2) BOLT TORQUE CHECK PROCEDURE:**

- (a) Be certain that magneto switch is off, and that both magnetos are grounded. Remove the spinner dome.
- (b) Remove safety wire on propeller mounting bolts.
- (c) With a calibrated torque wrench, check bolt torque by applying the torque in a tightening direction until the bolt begins to turn. Check the torque limits and actions given in Table 6.3.16.1.

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**CAUTION**

Improper torque values will be obtained by measuring the breaking torque in a loosening direction. The torque should be checked in a tightening direction and adjusted as needed.

Actual Torque	Required Action
Below 117 in-lbs	Remove Propeller Inspect hub for damage
Between 117-175 in-lbs	Adjust Torque as per Installation
Between 175-225 in-lbs	No further action required
Above 225 in-lbs	Loosen bolts and re-torque as per Installation

**Table 6.3.16.1 Torque Values and Actions**

### **3 MAINTENANCE**

No major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

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**6.3.17      ELECTRICAL POWER SYSTEMS**

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**1 GENERAL**

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To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

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## **2 TROUBLESHOOTING**

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
No Operation	Engine speed too low	Check for output at higher speed
	Blown fuse(s)	Replace fuse(s)
	Bad Wire Connections	Replace bad connectors
	Shear coupling broken	Replace shear coupling
	Regulator Faulty	Replace regulator
	Alternator Faulty	Overhaul or replace alternator
Low Voltage	Engine speed too low	Increase engine speed
	Very Low Battery	Charge battery
	Bad battery (shorted cell)	Replace battery
	Load exceeds alternator output	Decrease load or increase engine RPM
High Voltage	Bad battery (open)	Check connections and/or replace battery
	Bad regulator	Replace Regulator

Refer to Figure 5.4.14.1, Figure 6.3.17.4, and use a high-impedance (preferably digital) volt/ohmmeter (DVM) to make the following checks.

**WARNING**  
**THE ENGINE SHOULD NOT BE RUNNING AND THE MAGNETOS SHOULD BE OFF!**

- (a) Turn all switches off. Use the lowest resistance scale on the DVM. Check the resistance between the battery negative (-) terminal and both pin - of the regulator and the engine case. Measurements over 0.5 Ohm in either cause should be investigated. If this is the case, check the engine ground strap, battery ground strap, and regulator ground wire for loose or contaminated connections, broken conductors or bad crimp joints. If these measurements are less than 0.5 Ohm, any of these three points may be used as reference (-) for the following measurements.
- (b) Turn on the master switch. Measure the voltage on the battery bus and on pin + of the regulator. The voltages should be equal, within 0.2 volts. A difference of more than 0.2 volts may be caused by a bad breaker.
- (c) Intermittent problems are the hardest to find. Bring small test wires into the cockpit from two or three of the points mentioned above to allow them to be monitored with the DVM while running the electrical systems. Double check all screw terminals for security. Try a 5 pound pull test on all crimp joints and make sure that the terminals are crimped on the wire, not the insulation.

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**3 STARTER**

**(1) GENERAL**

The starter is a 12 Volt High-Torque starter with a built in electro-mechanical pinion to actuate the gear.



**Figure 6.3.17.1 Starter**

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**(2) TROUBLESHOOTING**

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Starter turns engine slowly when cold	Weak battery	<ul style="list-style-type: none"><li>- Charge battery</li><li>- Test</li><li>- Replace, if necessary</li></ul>
Starter turns engine slowly when hot	Bad connection, cable, or solenoid	<ul style="list-style-type: none"><li>- Clean connections and/or</li><li>- replace faulty component</li></ul>
When starter engages, it makes a loud grinding noise	Starter damaged by engine kicking back	<ul style="list-style-type: none"><li>- Correct the ignition problem</li><li>- Repair or replace starter</li></ul>
When the starter is engaged, there is a click and the engine does not turn	Voltage not getting to starter Starter solenoid defective	<ul style="list-style-type: none"><li>- Replace starter solenoid</li></ul>
Starter drive gear stays engaged for some length of time after the start button released	Stuck starter solenoid	<ul style="list-style-type: none"><li>- Replace faulty starter solenoid</li><li>- Replace or repair starter</li></ul>

**(3) REMOVAL**

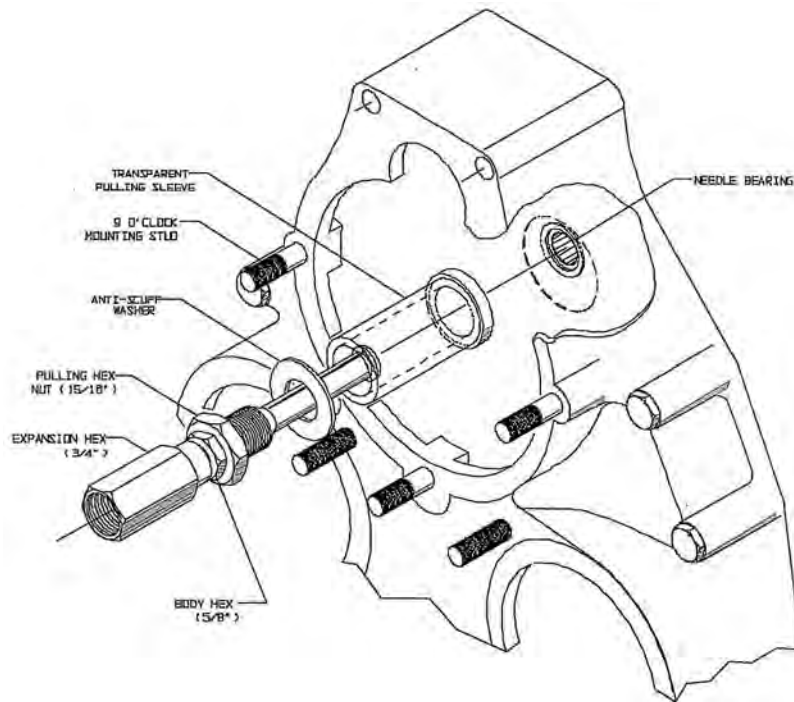
- (a) Disconnect the power cable.
- (b) Unbolt the starter attachment bolts and nuts.
- (c) Retain all existing attach hardware except top bolts which will be replaced.
- (d) Remove starter from engine.

**CAUTION:**

**The following step removes a pinion shaft support bearing which is pressed into the crankcase. The bearing may fall apart during extraction. Take care to insure that bearing needles do not drop into the accessory case**

- (e) Remove needle bearing, if present. Refer to Figure 6.3.17.2
- (f) Clean gasket surface on accessory case starter mounting pad.
- (g) Thoroughly clean the bearing bore

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**Figure 6.3.17.2: Needle Bearing Removal**

**(4) INSPECTION**

- (a) Visually inspect the teeth of the starter gear and starter's housing for damage.

**(5) INSTALLATION**

- (a) Before installing new starter, five 5/16" cap-head bolts must be removed from the new starter. These bolts are useful during assembly and shipping but must be removed before installation. The two 6-32 cap-head screws will clear the accessory case and **SHOULD NOT** be removed.
- (b) Install the starter using new gasket (352179).
- (c) Secure the starter using the original hardware except for top bolts (S813-5C28). Replace flat washers (AN960-516L) and lock washers (MS35337-45). Use new terminal cover nipple (MS25171-2S) on wire.
- (d) Torque the bolts and nuts.

**CAUTION**  
**Do not over torque the nut on the copper stud.**

- (e) Attach the power cable using the nut and new lock washer. Torque the nut.

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## **2 ALTERNATOR**

### **(1) GENERAL**

The alternator is manufactured by B&C Specialty Products. It is a model BC433-H, gear-driven, 30 ampere, externally regulated alternator.



**Figure 6.3.17.3 Alternator**

### **(2) REMOVAL**

- (a) Disconnect the wires
- (b) Remove the mounting bolts.

### **(3) INSPECTION**

Inspect the alternator for general condition. Broken wires or damaged connectors may be corrected in the field. All other repairs must be carried out by qualified personnel as described in Section 6.1 of this manual.

### **(4) INSTALLATION**

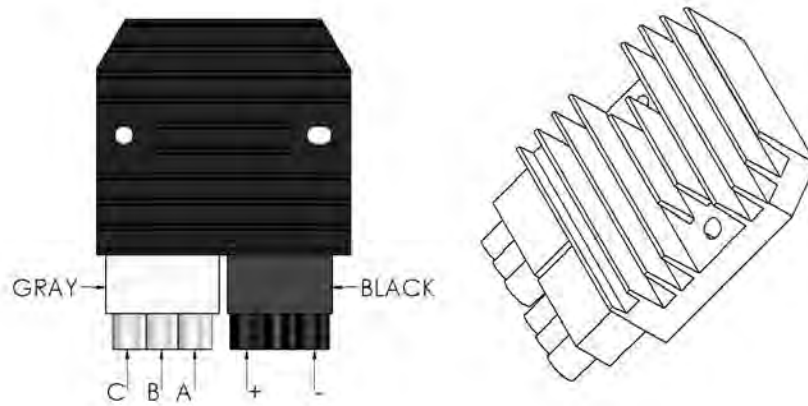
- (c) Locate the alternator in place.
- (d) Secure the alternator with the mounting bolts; torque the bolts.
- (e) Attach the alternator wires.

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### **3 REGULATOR**

#### **(1) GENERAL**

The regulator is a B&C Specialty Products 3-phase Permanent Magnetic Regulator.



**Figure 6.3.17.4 Voltage Regulator**

#### **(2) REMOVAL**

- (a) Disconnect the electrical connectors.
- (b) Unscrew the attaching hardware and remove the regulator.

#### **(3) INSTALLATION**

- (c) Secure regulator to the firewall.
- (d) Reconnect the color coded connectors.



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## **4 BATTERY**

The battery is a 12 Volt lead acid battery. It is sealed and does not require electrolyte replenishment. Inspect every 100 hours for physical condition and cleanliness.

### **(1) REMOVAL**

- (a) Remove the pins from each side of pilot's seat base.
- (b) Slide the seat fully forward and tilt the seat forward.
- (c) Disconnect the battery cable and remove the battery.

### **(2) INSPECTION**

- (a) Inspect the battery and terminals for condition and corrosion.
- (b) Clean as required.
- (c) If necessary, charge the battery in accordance with the following instructions.

### **(3) CHARGING**

**NOTE**

Charging should be conducted in an environment between 70° F and 90° F (20°C and 30°C). The battery capacity may vary if charged outside of this recommended temperature range.

**NOTE**

If battery becomes very hot to touch, cease charging and allow battery to cool down.

**NOTE**

Voltage reading should be a minimum of 12.8-13.0 volts after charging. If the voltage reading using voltmeter is not 12.8 volts or more, repeat charging cycle.

- (a) The battery may be charged using a 12 volt, 1 ampere battery charger.
- (b) Charging time using a 1 amp charger is 4.5 hours; charging rate will vary depending on the type of charger used. If a trickle or taper charger is used, charging time may be longer.

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State of Charge	Voltage Reading on Voltmeter (Volts)
100%	13.0
75%	12.8
50%	12.5
25%	12.2
0%	12.0 or less

**Table 6.3.17.1 Battery Voltage Reading using a Voltmeter**

**(4) INSTALLATION**

- (a) Place the battery in the mounting space.
- (b) Connect the positive lead.
- (c) Connect the ground lead.
- (d) Reinstall the pilot's seat by securing with the pins.

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**6.3.18      POWERPLANT - IGNITION**

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**1                    SPARK PLUGS**

**(1) REMOVAL**

- (a) Unscrew all the spark plug caps.
- (b) Unscrew all the spark plugs.

**(2) INSPECTION**

- (a) Inspect the firing end of the spark plugs for any foreign material lodged between electrodes or around the insulator that could be conductive. Clean as needed.
- (b) Check the electrode gap. It should be between 0.016 and 0.021 ins. Re-set if necessary.
- (c) Check connector for any abnormalities and clean if needed.

**(3) INSTALLATION**

- (a) Apply a small amount of Spark Plug Thread Lubricant (Refer to Section 6.2.3) to the threaded area of each spark plug at the firing end. Using a new gasket, install the plugs and torque to 300-360 in/lbs.
- (b) Connect the spark plug caps and torque.

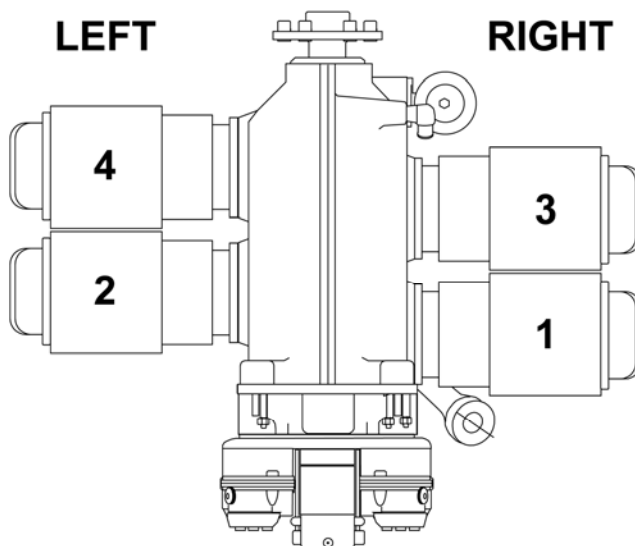
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## **2            MAGNETOS**

The ignition system on the O-200 engine uses two magnetos that generate electricity, which is distributed via a distributor block to the ignition cables. The ignition cables deliver the energy generated by the magnetos to the spark plugs via shielded conductors. The spark plugs then carry the energy from the ignition cables into the combustion chamber where the spark ignites the air/fuel mixture.

Dual ignition systems are provided with cables from the right magneto connected to the upper plugs and cables from the left magneto connected to the lower plugs.

Both magnetos incorporate impulse couplings which delay rotation of the magneto during the engine starts. The function of the impulse coupling is to hold back the magneto rotor just before the breaker opening position while the drive gear continues its rotation, thereby retarding the spark. The second function of the impulse coupling is to release the rotor at approximately T.D.C., allowing the coupling to spin the rotor rapidly through its neutral position, opening the breaker and producing a hot spark at cranking speed. The impulse couplings disengage after the engine starts. Because both magnetos have impulse couplings, the engine should be started with both magnetos on.



**Figure 6.3.18.1: Engine Firing Order (Seen from above)**

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(1) REMOVAL

**WARNING**  
**PRIOR TO REMOVING THE MAGNETOS, MAKE SURE THE FUEL MIXTURE IS**  
**IN IDLE CUTOFF POSITION THE AND THE MAGNETOS ARE TURNED OFF**

- (a) Remove spark plug cable terminals from the plugs.
- (b) Detach spark plug cable brackets from the case studs.
- (c) Cable outlet plates may be detached by unscrewing the screws which attach each plate to the magneto.
- (d) Pull the plate and grommet carefully from its position.
- (e) Remove two nuts retaining each magneto, and withdraw it to the rear.

(2) INSPECTION

Inspect the magnetos in accordance with the Teledyne-Continental Operator's manual.

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**(3) INSTALLATION**

- (a) Turn the engine crankshaft in the direction of engine rotation until No.1 cylinder is in its correct firing position on the compression stroke. See Table 6.3.18.1.

Right Magneto Fires Upper Plugs (°B.T.C.)	28°
Left Magneto Fires Lower Plugs (°B.T.C.)	28°

**Table 6.3.18.1: Ignition Timing**

- (b) Insert the magneto with the distributor rotor in position to fire No.1 ignition cable (after tripping the impulse mechanism).
- (c) Remove the timing key after installing the magneto on the engine.
- (d) Some Model O-200 engines are equipped with non-adjustable Model 4001 Slick Magnetos. Remove the bottom vent plug and "Spark Out" the magneto. This magneto cannot be overhauled and the breaker assembly, coil and capacitor are non-replaceable. Exchange magnetos are available through your Continental Distributor, or contact:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
[support@cubcrafters.com](mailto:support@cubcrafters.com)

- (e) To "Spark Out" the magneto, hold the lead with T1 or B1 on the spark plug nut 1/8" to 1/4" away from the magneto frame, and turn the impulse coupling or gear one (1) click at a time until a strong spark jumps between the wire and the magneto frame.

**NOTE**

Use care to hold the magneto firmly so the coupling will not move beyond the point where it trips and the spark occurs.

- (f) Reverse the operation approximately 25° until the white line appears in the center of the hole. Hold the rotor with the index finger so the white line is in the center of the hole and install the magneto on the engine.

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6.3.19 ELECTRICAL

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## **1 GENERAL**

This chapter contains information for troubleshooting, removal, installation and adjustments of the interior and exterior lighting systems used on the airplane.

Exterior lighting is optional. Options are incandescent navigation lights, incandescent navigation lights with anti-collision lights, or lightweight LED Navigation with anti-collision lights. There is one landing/taxi light on the leading edge of the left wing. The flight instruments are unlit but glass panel and/or GPS units are integrally lighted. There is a map light located on the upper right panel in the cockpit.

**WARNING:**

**ALWAYS DISCONNECT THE POWER SUPPLY PRIOR TO SERVICING ANY PORTION OF THE ELECTRICAL SYSTEM. ENSURE THAT THE MAIN POWER SWITCH IS IN THE OFF POSITION; THEN REMOVE THE NEGATIVE BATTERY CABLE FOLLOWED BY THE POSITIVE BATTERY CABLE.**

**CAUTION:**

**Always wear clean cotton gloves when working with light bulbs. Never allow the glass portion of the light bulb to come into contact with exposed skin. Oils from the exposed skin will cause premature bulb failure.**

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## **2 LANDING AND TAXI LIGHTS**

The landing/taxi light consists of one PAR 36 type lamp mounted in the left wing leading edge. The light is covered with a Plexiglas lens the same shape of the leading edge. A breaker switch on the instrument panel turns on the light.

### **(1) REMOVAL**

- (a) Remove the lens
- (b) Remove 4 screws and the lamp.
- (c) Disconnect wiring.

### **(2) INSTALLATION**

- (a) Attach wiring.
- (b) Reposition front mounting plate and secure with 4 screws.
- (c) Reattach the lens being very careful not to crack the Plexiglas.

## **3 INCANDESCENT LIGHTING SYSTEM**

### **(1) TROUBLESHOOTING**

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Bulb does not light up	Bulb burnt out	Replace bulb
	Circuit breaker tripped	Reset circuit breaker
	Loose wiring	Check wiring to bulb

### **(2) NAVIGATION LIGHTS**

#### **(1) GENERAL**

The colors of the navigation lights conform to standard aeronautical practice. The left wing navigation light is red, the right wing navigation light is green and the tail navigation light is white. A breaker switch on the instrument panel turns on all three lights.

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(2) REMOVAL

- (a) Wing tip - Remove the light shield lens and unscrew the bulb. Be careful not to drop the glass lens or the gasket.
- (b) Tail - Remove the lens retainer and lens and unscrew the bulb. Be careful not to drop the glass lens or the gasket.

(3) INSTALLATION

- (a) Wing tip - Insert the bulb and reinstall the lens and the shield.
- (b) Tail - Insert a bulb and reinstall the lens and the lens retainer.

(3) Anti-Collision Lights

(1) GENERAL

The anti collision lights are integral to Navigational lighting system. A breaker switch on the instrument panel turns it on.

(2) REMOVAL

- (a) Refer to Navigational light section

(3) INSTALLATION

- (a) Refer to Navigational light section

## **4 LIGHTWEIGHT LED NAVIGATION LIGHTS AND ANTI-COLLISION**

(1) GENERAL

The LED navigation and anti-collision lights are integrated into single solid units. Two breaker switches on the instrument panel turn them on. The NAV lights switch controls the Navigation Lights and the STROBE switch controls the anti-collision lights. The NAV lights must be on for the strobes to activate.

The LED navigation and anti-collision lights are manufactured by Aveo Engineering. Aveo Engineering offers a free replacement warranty for the lifetime of the aircraft to which it is installed and registered. This coverage includes all failures except aircraft crashes.

## **5 CABIN LIGHTING**

The map light is mounted on the right hand interior wing root panel. It is run by its own 4 IEC LR4 alkaline coin cell batteries. The life time is rated for 130 hours.

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6.3.20       STALL WARNING SYSTEM

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**1. GENERAL**

The stall warning system is electrically powered and is made up of a horn and an actuating switch. The horn is mounted in the left wing root panel and the switch is on the leading edge of the left wing. As the stall condition progresses, the air stream lifts the switch vane, closing the circuit and activating the horn.

**2. STALL WARNING SWITCH ADJUSTMENT**

The stall horn should be activated at a speed that is no less than 6 MPH prior to the stall occurring in any configuration. On the other hand, the stall warning should not come on so often that it becomes a nuisance.



**Figure 6.3.20.1: Stall Warning Vane**

Refer to Figure 6.3.20.1

- (a) Loosen the screws and slide the switch up or down. (Down will cause the horn to activate earlier and up will have the horn activate later.)
- (b) Tighten the screws in the desired position.
- (c) See Figure 5.4.7.1 Electrical Systems Schematic for system details.

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**6.3.21        HOSES AND LINES**

For replacement hoses, please contact:

**Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903**

**Tel: 509-248-9491**

**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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**6.3.22      LEVELING**

**(1) GENERAL**

Have a set of calibrated weighing scales available. The range should be 1000 lbs for each main and 250 lbs for the tail. Zero the scales or record the tare, as appropriate.

**(2) PREPARATION**

- (a) Place the aircraft in a hangar with the doors closed where the wind will not affect the aircraft.
- (b) Place the aircraft approximately in a flight level attitude by supporting the tail wheel on a bench.

**(3) LONGITUDINAL LEVELING**

Place a spirit level on the open door edge as shown in Figure 6.3.22.1. Lower or raise the tail until the aircraft is level. If necessary, this may be accomplished by letting air out of the tires.



**Figure 6.3.22.1: Leveling the Aircraft Longitudinally**

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**(4) LATERAL LEVELING**

Place the level on the upper forward cross tube located in the cabin just behind the windshield, as shown in Figure 6.3.22.2. Center the bubble to level the aircraft laterally.



**Figure 6.3.22.2: Leveling the Aircraft Laterally**

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**6.3.23      WEIGHING**

**(1) GENERAL**

This section describes the methods for determining the empty weight of the aircraft and the position of its center of gravity relative to the datum.

Weight and balance limits are placed on aircraft for two reasons:

- First, the structure was designed to carry a certain weight;
- Second, the operating weight of the aircraft and the position of the center of gravity affect performance, stability, and control characteristics, particularly in stall and spin recovery.

The aircraft will only attain the performance and exhibit the handling characteristics used for certification if it is flown when the weight and the center of gravity are within the approved range.

Prior to leaving the factory, the aircraft was weighed and the C.G. location was computed. You will find this information in paragraph 6.4 of the Pilot's Operating Handbook and Aircraft Flight Manual. If it should become necessary to re-weigh the aircraft, follow the procedures given in this section.

**(2) PREPARATION**

- (a) Clean the aircraft to remove excess dirt and grease.
- (b) Remove the fuel from the aircraft. This may be accomplished by opening the fuel drains until all remaining fuel is drained.
- (c) Check that the oil is full.
- (d) Position the pilot's seat in the mid position.
- (e) Zero the scales or record the tare, as appropriate.

**(3) WEIGHING THE AIRCRAFT**

- (a) Place the aircraft on calibrated scales. The range of the scales should be 1000 lb. for each main wheel and 250 lb. for the tail wheel.
- (b) Level the aircraft (Refer to Section 6.3.22)
- (c) Record the weight of the main wheels and the tail wheel in Table 6.3.23.1 or 6.3.23.2 depending upon the type of landing gear installed on the aircraft.

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Line Number	Position	Recorded Weight	Tare	Actual Weight	Arm	Moment
1	Left Main Wheel				62.50 in.	
2	Right Main Wheel				62.50 in.	
3	Tail Wheel				261.90 in.	
	<b>TOTAL WEIGHT</b> (Weight in Lines 1+2+3)				<b>TOTAL MOMENT</b> (Moment in Lines 1+2+3)	

**Table 6.3.23.1: Standard Landing Gear Weighing Form**

Line Number	Position	Recorded Weight	Tare	Actual Weight	Arm	Moment
1	Left Main Wheel				59.50 in.	
2	Right Main Wheel				59.50 in.	
3	Tail Wheel				261.90 in.	
	<b>TOTAL WEIGHT</b> (Weight in Lines 1+2+3)				<b>TOTAL MOMENT</b> (Moment in Lines 1+2+3)	

**Table 6.3.23.2: 3X3 Landing Gear Weighing Form**

(d) Compute the empty weight of the aircraft and position of center of gravity.

EMPTY WEIGHT OF AIRCRAFT = TOTAL WEIGHT (Lines 1+2+3)

= \_\_\_\_\_ lb.

POSITION OF CENTER OF GRAVITY = TOTAL MOMENT ÷ TOTAL WEIGHT

= \_\_\_\_\_ ÷ \_\_\_\_\_

= \_\_\_\_\_

(e) Record new empty weight and position of center of gravity in Section 6 of the Pilot's Operating Handbook and Aircraft Flight Manual.

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6.3.24 PARKING AND MOORING

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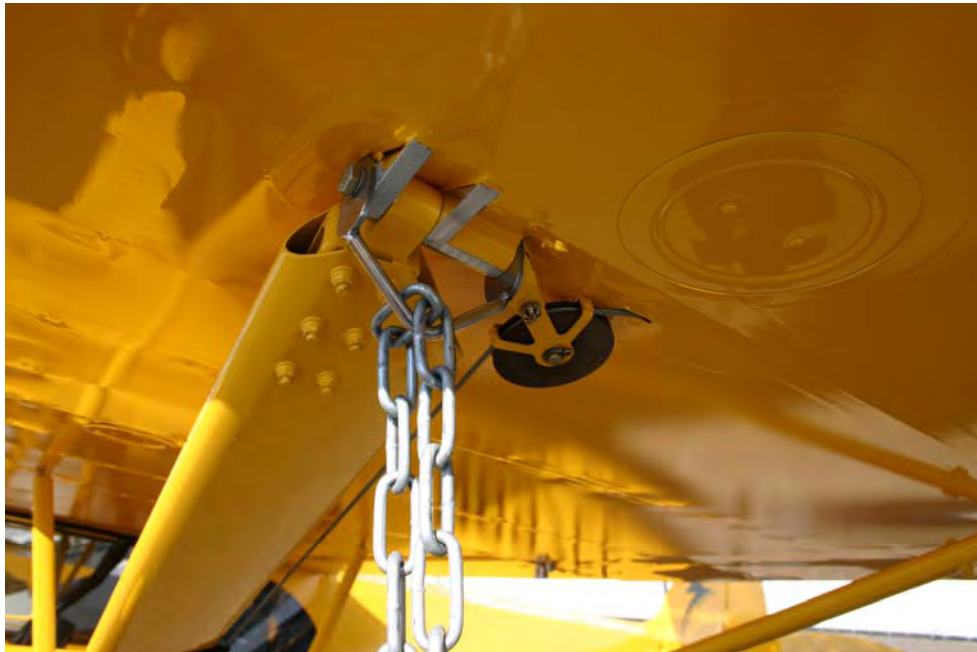
## **1 PARKING**

- (a) Position the airplane on level surface, headed into wind.
- (b) Set the parking brakes. The parking brake valves are located on the forward portion of the passenger rudder pedals. To engage, press both brake pedals and turn the brake valve to the horizontal position.
- (c) A good practice is to position the propeller in an angled or horizontal position when parked.
- (d) Chock the main gear wheels.
- (e) In gusty or stormy weather, moor the airplane.
- (f) When the aircraft is to be parked for an extended time, it should be moved frequently to prevent corrosion in the wheel bearings and getting flat spots on the tires.

## **2 MOORING**

- (a) Position the airplane on level surface and headed into the wind.
- (b) Set the parking brakes. The parking brake valves are located on the forward portion of the passenger rudder pedals. To engage, press both brake pedals and turn the brake valve to the horizontal position.
- (c) A good practice is to position the propeller in an angled or horizontal position.
- (d) Chock the main gear wheels.
- (e) Tie mooring lines. (Figure 6.3.24.1) There are two tie-down rings underneath each wing next to the forward lift strut. The tail should be tied down by wrapping chain/rope (at least once) around the tail wheel head. In severe weather, use multiple lines. During gusty or high wind conditions, mooring lines may require periodic tightening to prevent excessive movement of airplane. Use a secure knot such as a bowline knot to ensure security.

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**Figure 6.3.24.1: Wing Tie Down**



**Figure 6.3.24.2: Tailwheel Tie Down**

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## **STORAGE**

### **3.1. GENERAL**

The procedures outlined in this section must be followed if it is expected that the aircraft will remain inactive for longer than 30 days.

### **3.2. MAINTENANCE PRACTICES**

#### **(1) TEMPORARY STORAGE - 30 to 90 Days**

- (a) Park and moor the airplane.
- (b) Apply engine preservation. In extremely cold weather, it is advisable to drain the oil sump immediately after stopping for a long period and to warm the oil to 100°F before refilling the sump. To prevent excessive cooling of the oil sump and excessively high oil viscosity in cold weather, the sump may be covered with an oil-proof lagging. Refer to the latest edition of Manufacture's Service Letter.
- (c) Fill the fuel tanks completely. Check for water accumulating each week.
- (d) Wipe the tires with dry cloth, and treat them with tire protector spray. Mark the tire positions and date with chalk. Turn the wheels and check air pressure regularly.
- (e) Remove the battery (Refer to Chapter 6.3.14) and ELT battery (Refer to Chapter 5.4.14) and store in accordance with standard practices. Clean the battery compartment and the battery cable terminals to neutralize any battery acid that may be present.
- (f) Lubricate according to lubrication schedule. (Refer to Chapter 6.2.3)
- (g) Clean the propeller to remove dirt, oil, and bug accumulation. A good practice is to position the propeller in an angled or horizontal position.
- (h) Clean and cover the instruments and panel. Observe any additional precautions recommended by the various manufacturers of the avionics and the instruments.
- (i) Clean and install protective covers on the seats.



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(2) INDEFINITE STORAGE

**CAUTION**

**Do not set the parking brake as brake seizing can result.**

- (a) Park and moor the airplane.
- (b) Apply engine preservation. Refer to the latest edition of manufacturer's service letter.
- (c) Drain the fuel tanks. (Refer to Chapter 6.3.12)
- (d) Clean the brake assemblies. The wheels should be turned three to four revolutions per 30 days to prevent corrosion. Touch up all spots where paint has been chipped from the wheels. Wipe the tires with dry cloth, and treat with tire protector spray. Turn the wheels. Mark the tire position and date with chalk. Check the air pressure periodically and inflate the tires as necessary. (Refer to Chapter 6.2.3)

**NOTE**

It is advisable to use unserviceable tires for prolonged storage.

- (e) Remove the battery (Refer to Chapter 6.3.14) and the ELT batteries (Refer to Chapter 5.4.14) and store in accordance with standard practices (Refer to Chapter 6.3.14). Clean the battery compartment and the battery cable terminals to neutralize any battery acid that may be present.
- (f) Lubricate according to lubrication schedule. (Refer to Chapter 6.2.3)
- (g) Clean the propeller to remove dirt, oil, and bug accumulation. Coat the blades with preservative oil and wrap with moisture proof material. A good practice is to position the propeller in an angled or horizontal position.
- (h) Clean and cover the instruments and the panel. Take any additional precautions according to the manufacturer.
- (i) Clean and install protective covers on the seats
- (j) Remove all loose equipment and store.
- (k) Clean and install covers over windshield and windows.

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**(3) PREPARATION FOR SERVICE**

- (a) Engine preparation for service - Refer to the manufacturer's service letter.
- (b) Remove all covers, tapes and tags from airplane.
- (c) Reinstall the engine battery (Refer to Chapter 6.3.14) and the ELT batteries (Refer to Chapter 5.4.14).
- (d) Fill the fuel tanks (if applicable). Refer to Chapter 6.2.3.
- (e) Thoroughly clean and visually inspect the airplane. It is recommended to carry out at least a 100-hour inspection prior to flying the aircraft. (Refer to Chapter 5.3)

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**6.4 REPAIR OF STRUCTURE & COMPONENTS**

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## **1. GENERAL**

This section describes the process and method of repairing fabric and non-structural metal or composite components.

## **2 PATCHING OF HOLES IN FABRIC, METAL, OR COMPOSITE NON-STRUCTURAL COMPONENT**

### **2.1 Fabric Repairs**

#### **(1) APPROVED FABRIC REPAIR MATERIALS**

<b>Description</b>	<b>Supplier</b>
Methyl Ethyl Ketone (MEK)	Local Supplier
Poly-Fiber	Poly-Fiber Aircraft Coating
Poly-Tak	Poly-Fiber Aircraft Coating
Poly-Brush	Poly-Fiber Aircraft Coating
Poly-Spray	Poly-Fiber Aircraft Coating
Flat Rib Lace Cord	Poly-Fiber Aircraft Coating
LOCTITE Depend 330 Adhesive	Cub Crafters or Local Supplier

#### **(2) INSPECTION OF FABRIC**

The polyester fabric used is very durable and its longevity depends on maintaining the coating in good shape. Ultraviolet radiation (in other words, direct sunlight) is the main cause of deterioration of the fabric. The fabric is treated at the factory to protect it from this type of radiation.

The fabric covering meets the requirements of TSO C-15d/AMS which stipulates that the minimum breaking strength of the fabric should be at least 56 lbs. Testing fabric requires skill and experience and should only be performed by a qualified person who has experience in this matter.

The aircraft has been covered using a process that is proprietary to Cub Crafters. It is similar to the Poly-Fiber Aircraft coating process, more commonly referred to as the Stits method.

#### **(3) FABRIC REPAIRS**

The decision to repair damage on the fabric or whether to replace the covering on the part will depend upon the extent of the damage and should take into account the aesthetics of the repair. These repairs require the use of an iron to shrink the fabric. It is very important that only a good quality clothing iron be used.

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**WARNING**  
**GROUND THE STRUCTURE BEING IRONED, SANDED OR SPRAYED**  
**TO PREVENT STATIC ELECTRICITY FROM IGNITING VAPORS**

**(4) SIZE OF REPAIR AREA**

- If the length of the damaged area is 8 inches or more, the patch must overlap the old fabric by at least 2 inches. Repairs longer than 8 inches require at least a 2 inch wide finishing tape over the seams. These tapes should be centered over the seam of the patch.
- If the length of the damaged area is less than 8 inches in length, the patch must overlap the old fabric by at least 1 inch. Finishing tapes are not required over the glued seams unless the patch is on top of the wing.
- For small fabric repairs such as stick or stone damage, where the holes are  $\frac{1}{2}$  inch long or less, a patch of already doped and painted fabric with the edges pinked can be used. An overlap of at least  $\frac{1}{2}$  inch of patch material over  $\frac{1}{2}$  inch of old fabric on all sides is required and it must be secured with Loctite Depend 330 Adhesive or a suitable equivalent.
- Any stitching that is removed during repair must be replaced. Use the methods given in Chapter 6.3.4.

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**(5) PATCH REPAIR LESS THAN 8 INCHES**

- (a) Trim any ragged edges.
- (b) Lay an un-shrunk piece of material over the hole and trace the outline of the patch with a #2 pencil. Make sure to allow for enough overlap as explained earlier. Note that square or rectangular patches are preferable. Cut out the patch with pinking shears.
- (c) Mask off the area outside the patch leaving an extra half-inch or so of working room around the contour of the patch.
- (d) Peel the polyurethane paint off and clean all the coatings inside the masked area with MEK down to the bare fabric.
- (e) Glue the patch to the old fabric with Poly-Tak and allow it to dry.
- (f) With an iron set to 225°F, smooth the glued areas.
- (g) Heat-shrink the area of the patch over the hole with a 350°F iron. This acts as a shrinking panel to re-tighten the fabric in the area of the repair. Use a piece of cardboard as a shield to keep the iron off the glued areas, if needed.
- (h) Poly-Brush requires two applications. Each application consists of 2 coats.
  - The first coat should be brushed on to penetrate the fabric.
  - After the first coat has flashed off, apply the second coat by brushing or spraying on then allow it to dry.
  - If finishing tapes are needed, attach them with Poly-Brush.
  - Smooth the finish tapes with a hot iron.
  - Make a second application of Poly-Brush (2 coats) allowing it to flash off in between coats. The Poly-Brush may all be brushed on if it is a small patch or sprayed if it is larger or in a high visibility area.
- (i) Make 2 applications of Poly-Spray.
- (j) For the first application;
  - Blow and tack off the covering to be sure it is as dust free as possible.
  - Spray or brush the first coat of Poly-Spray. Allow to dry for approximately 15 minutes
  - Spray or brush the second coat of Poly-Spray and make sure it is dry before sanding.
- (k) For the second application;

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- Smooth any edges, which may be sticking up, using a small hot iron.
  - Smooth tape and doubler edges using dry 320 grit sandpaper to remove surface dust bumps.
  - Blow and tack off the covering to be sure it is as dust free as possible.
  - Spray or brush the third coat of Poly-Spray and let dry for approximately 15 minutes.
  - Spray or brush the fourth coat of Poly-Spray and let dry completely before sanding.
- (l) Paint to match original paint

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**(6) PATCH REPAIR MORE THAN 8 INCHES**

- (a) For large fabric repairs such as a wing tip, start at the last good rib, or at a convenient location close to the damaged area, removing the old finish tapes.
- (b) Cut the rib laces.
- (c) Clean off all the coatings with MEK down to the fabric so that there is at least a 2 inch overlap over the rib.
- (d) Glue a whole new piece of fabric to cover the wingtip with a 2 inch overlap over the rib area.
- (e) Heat shrink.
- (f) Apply the first application of Poly-Brush as described previously.
- (g) Secure the fabric to the rib, in the same manner it was previously, by rib stitching or with broad-head pop rivets. For rib stitching see the instructions at the end of the Section.
- (h) Apply tapes as described previously.
- (i) Apply the second application of Poly-Brush as described previously.
- (j) Then apply Poly-Spray as described previously.
- (k) Paint to match original paint.

**(7) STITCHING**

A modified seine knot will be used for stitching and the knots and stitches will be hidden under the fabric. The following text and sketches describe how this is accomplished.

Tie the first loop with a square knot as illustrated in Step 1 (Figure 6.4.1) and secure the knot with a half hitch on each side after the lacing is pulled tight around the rib (Step 2 Figure 6.4.1). Then route the needle under the fabric and out through the next lace location, then back down through the wing as illustrated in Steps 3 and 4 (Figure 6.4.1). Tie a modified seine knot as illustrated in Steps 5 through 11 (See Figure 6.4.2 and Figure 6.4.3).

- (a) Rotate each lace loop to place the knot at the side of the rib cap to reduce the protrusion and aerodynamic interference before moving to the next lace location, then route the cord under the fabric to the next lace location as illustrated in Step 3 and 4 (Figure 6.4.1). Cut the cord end off leaving a minimum of 1/4-inch stub pulled inside. Lacing tension should be uniform.
- (b) Repeated pulling of long lengths of lacing cord may remove wax coating from the cord and cause fraying. Convenient lengths of rib lacing cord may be used to

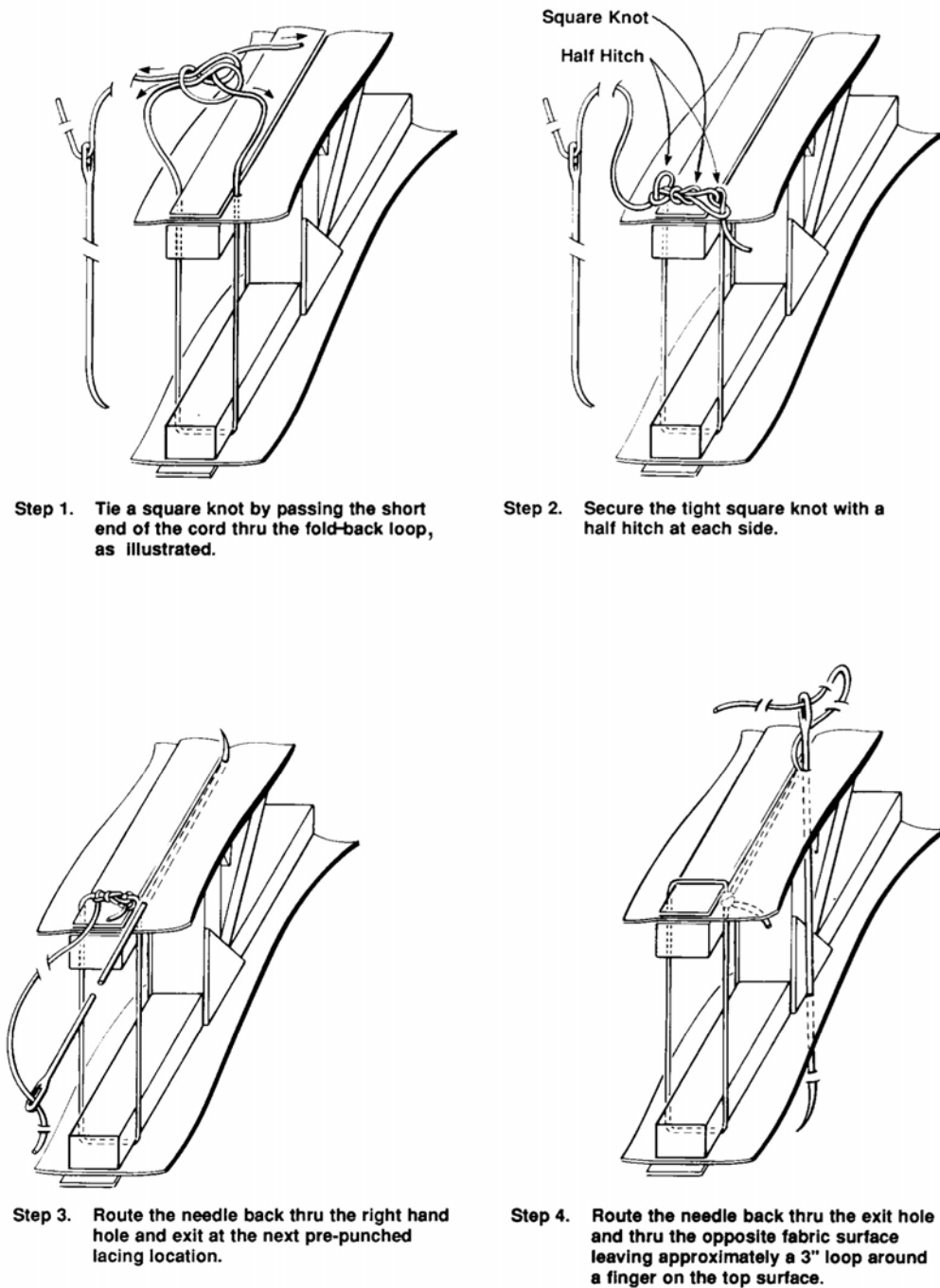


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lace long or thick ribs. Tie off the end of each length with a half hitch as illustrated in Step 10 and 11 (See Figure 6.4.3), or if needed, separate lengths of lacing cord may be joined by using the splice knot illustrated in Figure 6.4.4.

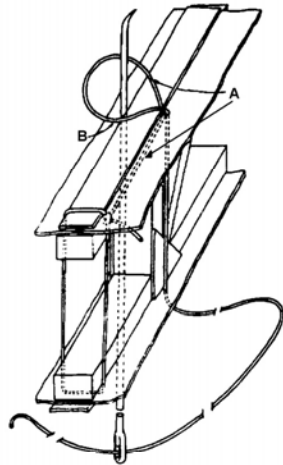
- (c) Lacing is installed through other components, where applicable, in the same manner as a wing. Single, wide space lace attachments, usually used on empennage surfaces, are tied with a square knot and half hitch on each side, the same as a starting wing rib lace illustrated in Steps 1 and 2 (Figure 6.4.1). The lace may be rotated to place the knot under the fabric before cutting the cord.

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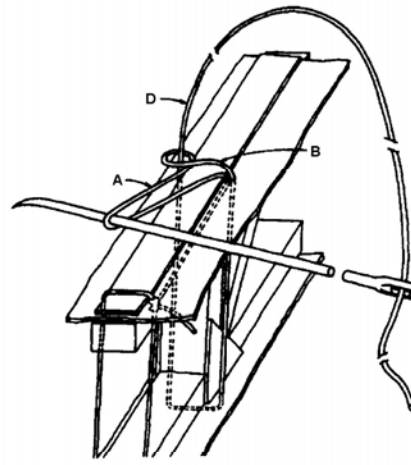


**Figure 6.4.1 - Rib Stitching, Steps 1 to 4**

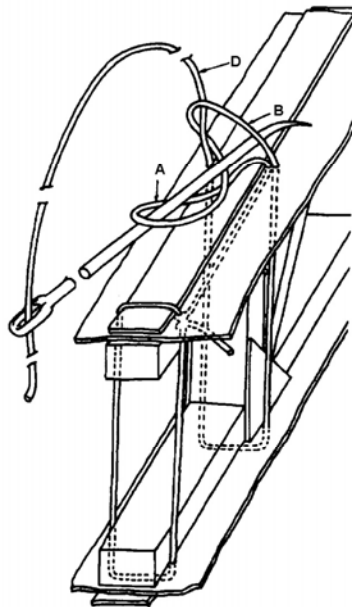
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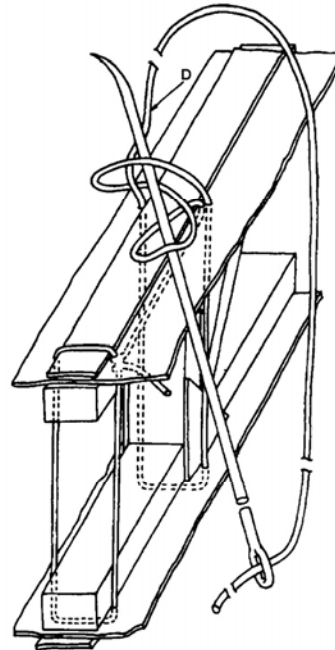
Step 5. As the needle is returned thru the top surface on the opposite side of the rib cap the loop is rotated to position cord section "A" to the forward side of the needle, then the needle is pulled thru.



Step 6. The needle tip is routed under cord section "B" to hook and pull cord section "A" aft.



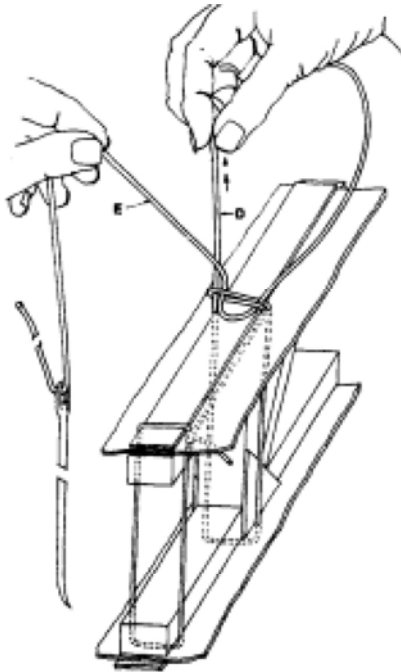
Step 7. The needle tip is then routed over the top of cord section "A" and under cord section "B."



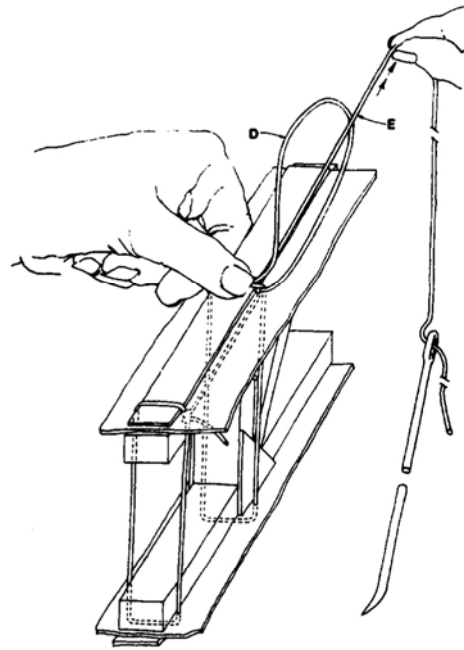
Step 8. The needle tip is then routed over cord section "D" and passed thru the lacing while holding cord section "D" perpendicular to the surface to avoid cord entanglement.

**Figure 6.4.2 - Rib Stitching, Steps 5 to 8**

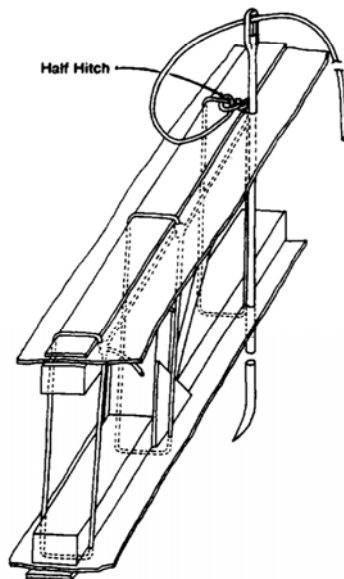
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Step 9. Pull cord section "D" perpendicular to the fabric surface to remove all slack in the cord back to the last rib lacing knot while working the loose knot to the right side. Do not pull cord section "E."



Step 10. After all slack is removed by pulling cord section "D," switch hands and place a thumbnail on the loose knot formed on the right-hand side, then secure the knot by pulling firmly perpendicular to the fabric surface on cord section "E."

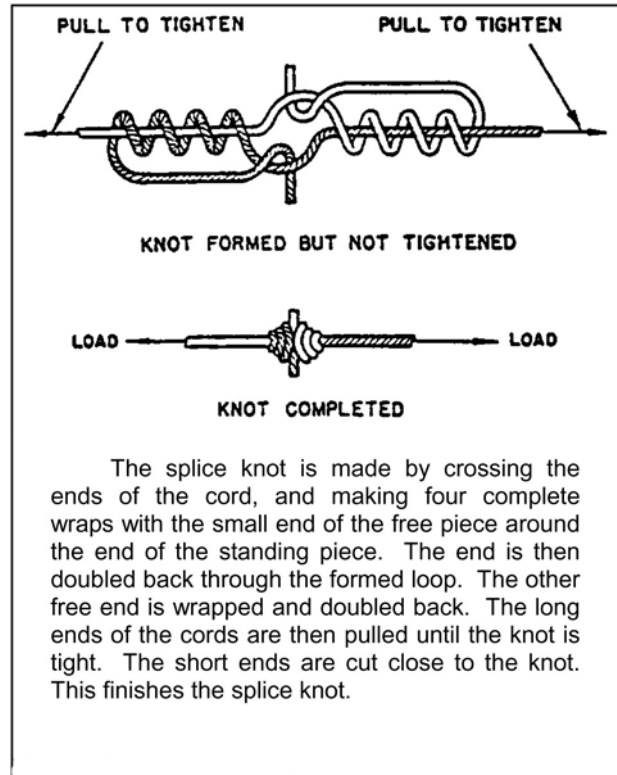


Step 11. After completing all lacing in the same sequence, the end is secured with a half hitch after the modified seine knot. The knot is pulled to the inside by routing the needle thru the wing before cutting the cord to leave the end inside.

**Figure 6.4.3 - Rib Stitching, Steps 9 to 11**

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The splice knot is made by crossing the ends of the cord, and making four complete wraps with the small end of the free piece around the end of the standing piece. The end is then doubled back through the formed loop. The other free end is wrapped and doubled back. The long ends of the cords are then pulled until the knot is tight. The short ends are cut close to the knot. This finishes the splice knot.



**Figure 6.4.4 - Splice Knot**

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### **3 NON-STRUCTURAL SHEET METAL REPAIRS**

#### **3.1 Level of Certification**

Non-structural sheet metal repairs are to be accomplished by: a certificated LSA Repairman; Maintenance Rated and FAA certified LSA Pilot /Owner; or a suitably qualified and experienced FAA certified A&P Mechanic.

#### **3.2 Authorized Non-Structural Sheet Metal Repairs.**

Damage to non-structural sheet metal parts may be repaired using the techniques of FAA Aircraft Circular 43.13. Chapter 4, Section 4. At this time repairs to primary or secondary structures by others than Cub Crafters' are not authorized. Description, by Electronic photos or similar means, of damaged primary or secondary structures, or flight control surfaces structures, are to be forwarded to Cub Crafters, Inc. accompanied by a suggested repair scheme.

### **4 NON-STRUCTURAL COMPOSITE MATERIALS REPAIRS**

#### **4.1 Level of Certification**

Non-structural composite materials repairs are to be accomplished by: a certificated LSA Repairman; Maintenance Rated and FAA certified LSA Pilot /Owner; or a suitably qualified and experienced FAA certified A&P Mechanic.

#### **4.2 Authorized Non-Structural Composite Materials Repairs**

Damage to non-structural composite materials parts may be repaired using the techniques of FAA Aircraft Circular 43.13. Chapter 3, Section 1. At this time repairs to primary or secondary structures by others than Cub Crafters' are not authorized. Description, by photos or similar means, of damaged primary or secondary structures or flight control surfaces structures are to be forwarded to Cub Crafters, accompanied by a suggested repair scheme.

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**6.5     ALTERATIONS**

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6.5.1 .....COMPLIANCE WITH MANUFACTURER’S SERVICE DIRECTIVE

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**6.5.1            COMPLIANCE WITH MANUFACTURER'S SERVICE DIRECTIVE**

When service directives are issued, they will be in the form described in Chapter 11 of this manual. These will be issued to the owner/operators in the most current Cub Crafters database and will be in the form of safety alerts, service bulletins, and notifications.



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**APPENDIX A**

**Inspection Forms**

Scheduled Inspection Report			
<b>Make:</b> Sport Cub	<b>Model:</b> CC11-100	<b>Serial Number:</b>	<b>Registration:</b>
<b>Owner:</b>		<b>Date:</b>	
<b>Type of Inspection:</b>		<b>Hobbs/Tach Time:</b>	

Visual Pre-Inspection		Ref.	Interval		Initials
			100	Special	
1	Review compliance with current Federal Aviation Regulations, including visual inspection of: <ul style="list-style-type: none"> <li>- Aircraft Flight Manual</li> <li>- Aircraft Log Book</li> <li>- Registration Certificate</li> <li>- Weight and Balance Record</li> <li>- Aircraft Equipment List</li> <li>- FAA Airworthiness Directives</li> <li>- Cub Crafters' Service Documents</li> </ul>		X		
2	Visual Inspection of Aircraft				
3	Check Oil Quantity (6 Quarts)	6.2	X		
4	Operational Check	POH/AFM	X		
5	Perform walk-around to detect fluid leaks. <ul style="list-style-type: none"> <li>- Make a record of all malfunctions and discrepancies.</li> </ul>		X		

Engine Group		Ref.	Interval		Initials
			100	Special	
1	Engine:	Teledyne Continental Motors	Refer to Continental Engine Maintenance Manual and Overhaul Manual for all service instructions.		
2	Engine Cowl: <ul style="list-style-type: none"> <li>- Remove, clean and check for cracks distortion, loose, or missing fasteners.</li> </ul>	6.3.14	X		
3	Engine Oil: <ul style="list-style-type: none"> <li>- Drain.</li> </ul>	6.3.10		25 hours	

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Engine Group		Ref.	Interval		Initials
			100	Special	
4	Oil Screen - Visual inspection for foreign particles.	6.3.10		25 hours	
5	Oil Temperature Sender Unit: - Check for leaks and security.		X		
6	Oil Lines and Fittings: - Check for leaks, security, chafing, dents, and cracks.		X		
7	Oil Cooler: - Clean and check cooling fins for damage.		X		
8	Engine Oil: - Fill with 5 Quarts.	6.2.3		25 hours	
9	Spark Plugs - Visual inspection and re-gap as necessary.	Champion Aviation Technical Bulletin 99-2	X		
10	Check Differential Cylinder Compression:  Cylinder 1 _____ Cylinder 2 _____ Cylinder 3 _____ Cylinder 4 _____		X		
11	Cylinders: - Visual inspection for cracked or broken fins.		X		
12	Electrical wiring to engine and accessories: - Visual inspection and replace damaged wires and clamps. - Visual inspection of terminals for security and cleanliness.		X		
13	Ignition Harness and Insulators: - Visual inspection for high-tension leaks and continuity.		X		
14	Magnetos: - Check magneto to engine timing and adjust, if needed.	Teledyne- Continental Overhaul Manual	X		
15	Magnetos: - Inspect plug wires and P-lead for condition and security - Verify vent hole is clean and clear of obstructions	Teledyne- Continental Overhaul Manual	X		
16	Magnetos: - Remove and inspect IAW the latest version of the TCM Overhaul Manual	Teledyne- Continental Overhaul Manual		500 hour	

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Engine Group		Ref.	Interval		Initials
			100	Special	
17	Induction Air Filter: - Remove, inspect, and clean. - Replace at 500 hours, or when filter is more than 50% covered by foreign material.		X	500 hours, or 50% covered	
18	Carburetor: - Drain and clean inlet line fuel strainer.		X		
19	Induction Air Box: - Visual inspection condition.		X		
20	Intake Seals: - Visual inspection for leaks and clamps for tightness.		X		
21	Flexible Fuel and Primer Lines: - Visual inspection condition.		X		
22	Throttle, Mixture Controls: - Visual inspection for proper travel and operating condition.		X		
23	Exhaust Stacks, Connections, Gaskets, and Braces: - Visual inspection - Replace exhaust gaskets, as required.		X		
24	Performance Exhaust Bolts (AN3-35A) - Replace at 100 Hours or Condition Inspection, whichever comes first.		X	Condition Inspect.	
25	Muffler, Heat Exchanger, and Hoses: - Remove shroud - Visual inspection.			50 hours	
26	Oil Breather Tube: - Visual inspection for obstructions and security.		X		
27	Crankcase: - Visual inspection for cracks, leaks, and security of case bolts.		X		
28	Engine Mounts: - Visual inspection for cracks and distortion and security.		X		
27	Engine Baffles: - Visual inspection for damage and security.		X		
30	Rubber Engine Mount Bushings: - Visual inspection for deterioration.		X		
31	Firewall and Seals: - Visual inspection		X		
32	Cabin Heater Control: - Visual inspection.		X		
33	Alternator: - Visual inspection for condition, and security		X		

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Engine Group		Ref.	Interval		Initials
			100	Special	
34	Starter: - Visual inspection for condition and security.		X		
35	Engine Controls: - Check travel from stop to stop and lubricate.		X		
36	Engine Cowl: - Install, ensuring good clearance.		X		

Propeller Group – Metal		Ref.	Interval		Initials
			100	Special	
THIS INSPECTION SHEET IS APPLICABLE TO A METAL PROPELLER.					
1	Spinner and Bulkheads: - Visual inspection for damage and security.		X		
2	Propeller Blades: - Visual inspection for nicks and cracks.		X		
3	Spinner Mounting Brackets: - Visual inspection for damage and security.		X		
4	Propeller Mounting Bolts: - Visual inspection - Check torque, if safety wire is broken.		X		
Propeller Group - Wood					
THIS INSPECTION SHEET IS APPLICABLE TO A WOOD PROPELLER.					
1	Spinner and Back Plate: - Visual inspection for damage and security.			50 hours	
2	Propeller Hub and Blades: - Visual inspection for nicks and cracks			50 hours	
3	Propeller Mounting Bolts: - Torque verification after 1st flight, 25 hours, and every 50 hours thereafter or should the operating environment change.			1st FLT., 25 hours, 50 hours, environ.	

Cabin Group		Ref.	Interval		Initials
			100	Special	
1	Doors: - Visual inspection for damage, operation, and security.		X		
2	Door latches and hinges: - Visual inspection and lubricate.		X		
3	Cabin Windows and Windshield: - Clean and visual inspection for cracking, crazing, and general condition.		X		

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Cabin Group		Ref.	Interval		Initials
			100	Special	
4	Upholstery: - Visual inspection for tears and fraying.		X		
5	Seat Belts, Inertia Reel, and Harnesses: - Visual inspection.		X		
6	Seats: - Pilot (Front): Visual inspection and verify T- Handle security. - Passenger (Rear): Verify top strap routing and security. Verify Seat Crossbar security.		X		
7	ELT (if applicable): - Installation and condition of battery and antenna.	ACK E-01 or Artex ME-406 Installation & Operation Manual	X		
8	Battery and Cables: - Visual inspection.		X		
9	Control Bushings, Cables, and Pulleys (including control stick and torque tube): - Visual inspection and lubricate bearing surfaces only. - Check for loose rivets, slop in control sticks, etc.	SB00015	X		
10	Elevator Trim: - Visual inspection of complete System - Operational check.		X		
11	Fuel Lines and Gauges: - Visual inspection for leaks, chaffing, obstruction, security, general condition.		X		
12	Flap Lever: - Operational Check - Visual inspection of ratchet and latch through the range of operation - Lubricate Shaft.		X		
13	Rudder Pedals: - Operational Check and lubricate.		X		
14	Throttle: - Verify freedom of movement and ensure it contacts engine stops.		X		
15	Mixture: - Verify freedom of movement and ensure it contacts engine stops.		X		
16	Carburetor Heat Control: - Verify freedom of movement and ensure full travel.		X		

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Cabin Group		Ref.	Interval		Initials
			100	Special	
17	Cabin Heater: - Verify freedom of movement and ensure full travel.		X		
18	Placards and Instrument Markings: - Visual inspection for conformity, security, and condition.		X		
19	Instrument Panel: - Visual inspection for security of lines and wiring.		X		
20	Pitot System: - Visual inspection of lines for leaks and chaffing		X		
21	Strobe, Landing, and Navigation Lights: - Visual inspection for condition and security - Operational inspection.		X		
22	Stall Warning: - Operational inspection.		X		
23	Altimeter: - Visual and functional inspection for condition and calibration			24 mos	
24	Transponder (if applicable): - Visual and functional inspection for condition and calibration			24 mos	
25	Antennas: - Visual inspection for condition and security.		X		
26	Brake Cylinders and Parking Valves: - Operational and visual inspections for leaks - Fill up with fluid, as required.		X		
27	Fire Extinguisher (if applicable): - Visual inspection of extinguisher and mounting bracket - Visual inspection of safety seal		X		

Fuselage and Empennage Group		Ref.	Interval		Initials
			100	Special	
1	Fabric and Finish: - Visual inspection for cracks and deterioration.		X		
2	Fuel Lines: - Visual inspection for security and damage.		X		
3	Fuselage Frame Tubing, Longerons, and Stringers: - Visual inspection for damage and corrosion.		X		

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Fuselage and Empennage Group		Ref.	Interval		Initials
			100	Special	
4	Rudder, Elevator and Stabilizer Trim Cables, Turnbuckles, Guides, and Pulleys: - Inspect for tension, safety, wear, damage, corrosion, and operation.		X		
5	Stabilizer Yoke and Screw: - Visual inspection for end play, security, and excessive wear.		X		
6	Rudder, Stabilizer, and Elevator Structures: - Visual inspection for damage.		X		
7	Rudder Hinge Pins and Bushings: - Visual inspection for excess wear, and corrosion.		X		
8	Elevator Hinge Pins and Bushings: - Visual inspection for excess wear, and corrosion.		X		
9	Stabilizer Brace Wires: - Visual inspection for corrosion, tightness, and safety.		X		
10	Lubricate per Chapter 6.2		X		

Wing Group		Ref.	Interval		Initials
			100	Special	
1	Fabric and Finish: - Visual inspection for cracks and deterioration.		X		
2	Aileron, Flap, and Wing Structure: - Visual inspection for damage.		X		
3	Fuel Tanks, Caps, and Lines: - Visual inspection for damage, leaks and deterioration.		X		
4	Wing Attachment Bolts: - Visual inspection for security.		X		
5	Lift and Jury Struts: - Visual inspection for security.		X		
6	Lift Strut Forks: - Visual inspection for damage and security.		X		
7	Aileron and Flap Cables, Turnbuckles, Guides, and Pulleys: - Visual inspection for safety, damage, corrosion, and operation.		X		
8	Ailerons Attachments and Brackets: - Visual inspection for tightness and damage.		X		
9	Aileron Hinge Pins and Blocks: - Visual inspection for excess wear and corrosion.		X		

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Wing Group		Ref.	Interval		Initials
			100	Special	
10	Flap Attachments and Brackets: - Visual inspection for tightness and damage.		X		
11	Flap Crossbar, Control Rod, Spring Pins, and Blocks: - Visual inspection		X		
12	Lubricate per Chapter 6.2		X		

Landing Gear Group		Ref.	Interval		Initials
			100	Special	
1	Fabric and Finish: - Visual inspection for cracks and deterioration.		X		
2	Jack Airplane.		X		
3	Gear, Cabane, and Shock Strut Bolts and Nuts: - Visual inspection for safety.		X		
4	Shock Absorber and Shock Cords: - Visual inspection for broken bands, threads, and weakness.		X		
5	Tires: - Visual inspection for cuts, uneven or excessive wear and slippage.		X		
6	Wheels: - Remove, clean, check, and repack bearings.		X		
7	Main Wheel Tire Pressure: - Check pressure.		X		
8	Brake Lining and Disks: - Visual inspection for excessive wear.		X		
9	Brake Lines: - Visual inspection for chafing and security.		X		
10	Tailwheel Attachments: - Visual inspection for tightness and safety.		X		
11	Tailwheel Fork: - Visual inspection for looseness on bracket.		X		
12	Tailwheel tire: - Visual inspection for cuts and uneven or excessive wear.		X		
13	Tailwheel: - Remove, clean, and visually inspect for damage and corrosion - Functionally check tail wheel swivel lock - Repack bearings (if applicable).		X		



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14	Tailwheel Tire Pressure (applicable to the optional tailwheel only): - Verify pressure.		X		
15	Lubricate per Chapter 6.2		X		

Return To Service		Ref.	Interval		Initials
			100	Special	
1	Install engine cowling.		X		
2	Install fuselage and empennage access panels.				
3	Install wing access panels.				
4	Verify oil level is 6 quarts.				
5	Perform engine run-up in accordance with operational / functional check: - After completing, perform a walk around to detect fluid leaks or other discrepancies.		X		
6	Verify all Cub Crafters' Service Letters, Bulletins, and Instructions are complied with.		X		
7	Verify the aircraft's documentation is in order: - Airworthiness Certificate - Registration - Pilot's Operating Handbook and Aircraft Flight Manual - Weight and Balance - Equipment List		X		

Operational/Functional Inspection Report		Initials	Notes
1	Flight Controls: - Check controls operate in the correct direction - Ensure movement through full range of travel without binding and there is no excessive friction.		
2	Flaps: - Lower flaps to the first, second and third notches - Ensure the notches hold, both upward and downward.		
3	Elevator Trim Controls: - Ensure it operates through full range of travel without binding.		
4	Engine Controls: - Ensure movement through full range of travel without binding or cable wear.		
5	Altimeter: - Must indicate within 50 feet of field elevation when set to correct barometric pressure.		
6	Vertical Speed Indicator (VSI): - Must indicate zero.		

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Operational/Functional Inspection Report		Initials	Notes
7	Battery Master Switch: <ul style="list-style-type: none"> <li>- Switch on</li> <li>- Verify voltage</li> <li>- Flag on turn coordinator should disappear.</li> </ul>		
8	Start engine using procedure in Pilot's Operating Handbook, Section 4.		
9	Set 1700 RPM: <ul style="list-style-type: none"> <li>- Perform magneto check</li> <li>- Drop not to exceed 150 RPM or 75 RPM differential between magnetos</li> <li>- No engine roughness.</li> </ul>		
10	Pull Carburetor Heat Knob: <ul style="list-style-type: none"> <li>- Engine RPM should show a slight drop.</li> </ul>		
11	Apply a Load to the Electrical System (e.g. switch on landing lights): <ul style="list-style-type: none"> <li>- Observe that voltage remains constant and amperage increases when load is applied (if ammeter installed).</li> </ul>		
13	Check the radio for proper Nav and Com operation.		
14	Check the transponder for proper operation.		
15	Verify proper ELT operation.		
16	Set throttle to idle: <ul style="list-style-type: none"> <li>- Engine should idle between 500 and 750 RPM.</li> </ul>		
17	Set 1000 RPM.		
18	Turn engine off by slowly pulling mixture control. <p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">An increase in RPM prior to the control reaching idle cut-off position indicates proper air fuel mixture.</p>		

# **CHAPTER**

# **7**

# **HEAVY MAINTENANCE, REPAIRS, AND ALTERATIONS**

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7.2 ..... HEAVY MAINTENANCE TASKS

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**7.1. AUTHORIZATION TO PERFORM HEAVY MAINTENANCE, REPAIR, AND ALTERATIONS**

No heavy maintenance, major repair or alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

**7.2. HEAVY MAINTENANCE TASKS (Not Authorized at this Time)**

**7.2.1 Removal and Replacement of Components**

**7.2.2 Repair of Components or Aircraft Structure**

**7.2.3 Alterations of Components or Aircraft Structure**



**CHAPTER**

**8**

**OVERHAUL**

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**8.1. AUTHORIZATION TO PERFORM OVERHAULS**

No overhauls as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time. Overhauls can only be performed by Cub Crafters.

To obtain engineering approvals for any major repairs or alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

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**8.2. OVERHAUL MANUAL FOR LSA OR LSA COMPONENTS**

**8.3. COMPONENTS PLANNED FOR OVERHAUL**

**8.1.1 Engine**

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# **9**

# **MAJOR REPAIRS AND ALTERATIONS**

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**9.1. ALTERATIONS GENERAL**

No major alterations, as outlined in ASTM F2483, FAR 43, or in this manual are authorized at this time.

To obtain engineering approvals for any major alterations, please contact Cub Crafters at:

**Cub Crafters, Inc.**  
**1918 South 16<sup>th</sup> Avenue**  
**Yakima, WA. 98903**  
**Tel: 509-248-9491**  
**[support@cubcrafters.com](mailto:support@cubcrafters.com)**

**9.2. EVALUATION TO ASTM STANDARD WITH PRODUCTION ACCEPTANCE  
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**9.3. ALTERATION AFFIDAVIT**

**9.4. WRITTEN INSTRUCTIONS AND DIAGRAMS FOR CERTIFICATION**

**9.4.1 Ground and Flight Test Program for Verification of Safe  
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**9.5. OWNER INFORMATION ON ALTERATION DOCUMENTATION FOR  
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# **CHAPTER 10**

## **TASK-SPECIFIC TRAINING**

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**10.1 SPORT CUB SPECIFIC TRAINING – GENERAL**

**10.2 TYPE SPECIFIC TRAINING REQUIRED BY CUB CRAFTERS, INC.**

**10.1.2 Continental 0-200 Overhaul and Heavy Maintenance Course**

**10.2.2 EAA Sport Air Fabric Covering Course**

# **CHAPTER**

# **11**

## **SAFETY DIRECTIVES COMPLIANCE**

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### **11.1. SAFETY DIRECTIVES FOR CONTINUED AIRWORTHINESS**

In the event of an aircraft component failure, defect, or other discrepancy on this aircraft, contact Cub Crafters quality department via postal mail, e-mail, fax, or telephone. If the problem relates to safety of flight or is a significant service issue, use the form and procedures specified in section 5.2.11 of this manual to initiate corrective action.

Cub Crafters maintains an Operational Safety Monitoring System in accordance with ASTM F2295 through which all continued airworthiness issues are resolved.

### **11.2. TYPES OF SAFETY DIRECTIVES**

When corrective action has been determined to be warranted, Cub Crafters will issue a safety directive to all owner/operators within the current database. These directives will be classified in three different categories:

- SAFETY ALERT – The safety alert is a directive that relates to safety of flight and requires immediate action.
- SERVICE BULLETIN – A service bulletin is a directive which does not require immediate action, however compliance with the directive is strongly recommended.
- NOTIFICATION – A notification will not necessarily recommend any action but is provided as a method of disseminating information relating to the continued airworthiness of the aircraft.

### **11.3. MANDATORY SAFETY DIRECTIVES**

When a safety directive has been issued which requires mandatory action, it is the owner/operator's responsibility to ensure that the directive is fully complied with to allow the continued safe operation of the aircraft. Cub Crafters, Inc. assumes responsibility for problems arising from non-compliance with such directives.

### **11.4. OBTAINING LATEST SAFETY OF FLIGHT INFORMATION**

To ensure you have the latest safety of flight information, please contact:

Cub Crafters, Inc.  
1918 South 16<sup>th</sup> Avenue  
Yakima, WA. 98903-1212

Telephone: 509-248-9491

Email: [support@cubcrafters.com](mailto:support@cubcrafters.com)