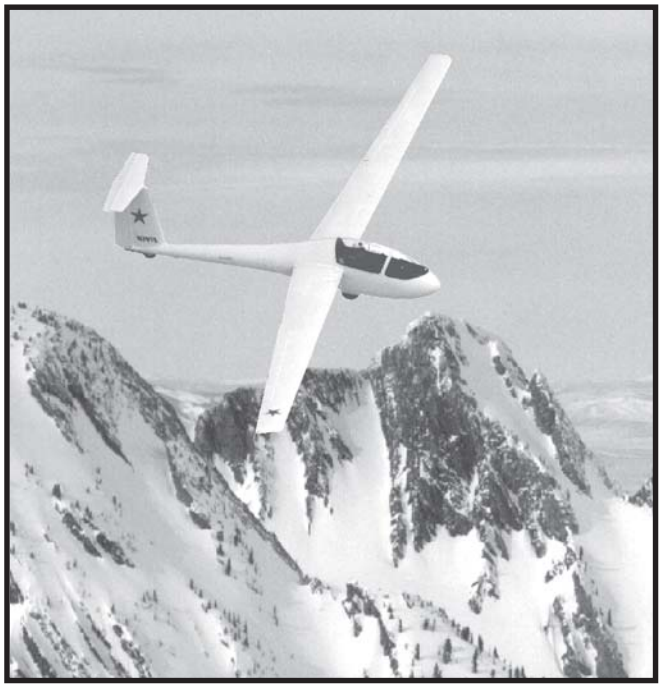
АвиаСтроитель

AviaStroitel of Moscow, Russia



Russia Sailplanes AC-4

Flight Manual
Maintenance Manual
Inspection Manual

For Russia Model AC-4C Revised 2-14-98
(contents applicable also to models A and B)

Russia Sailplanes, Inc.
121 East Olive Street
Bozeman, MT 59715
(406) 586-1560

Sailplane Type: _____
Serial Number: _____
Registration Number: _____
Date of Manufacture: _____

Warning:

Soaring is a high risk activity. Your safety and well being depend entirely upon the level of your training and your commitment to exercise your responsibilities as a licensed pilot.

DO NOT purchase or use this sailplane unless you fully agree to read, understand and follow all manufacturer's instructions, requirements, recommendations and limitations. If you do not understand the meaning of any statement contained in the documentation, do not operate the equipment until you have contacted the distributer and obtained a clear understanding of the unclear statement.

DO NOT purchase or use this sailplane unless you agree to read and understand all Federal Aviation Administration regulations concerning its use in any applicable airspace.

DO NOT perform any maneuver in this sailplane without receiving instruction and an endorsement from a Certified Flight Instructor/ Glider who is qualified to provide related instruction.

DO NOT allow anyone **else** to use this sailplane unless they have read, understood and accepted the terms, waiver, and disclaimer contained in your sales contract.

Insurance Liability:

In an effort to bring an affordable sailplane into the United States, Russia Sailplanes has incurred the high cost of importing limited numbers of aircraft for domestic use. "We" are essentially a one-man operation with very limited assets and little ability to pay any claim against us, and because of the expense of operations **we shall not carry any product liability insurance**.

We stress that **it is therefore imperative that ANY user of a Russia Sailplanes product be self-insured to the extent necessary to provide financial security in the event that the use or misuse of this product should result in damages, injury or death to the user.**

Warranty:

Russia Sailplanes offers a limited warranty covering the structure, glazing and general construction of the Aviastroitel AC-4 for a period of one (1) year from the date of delivery. This warranty is limited to the supply of replacement parts determined to be defective in manufacture, which determination shall be made solely by the manufacturer or its representatives. All warranty work shall be performed at Russia Sailplanes' facility or at a location mutually agreed upon by Russia Sailplanes and the owner. Custom installed equipment is covered by the manufacturer's warranty and no other warranties are extended or implied by Russia Sailplanes.

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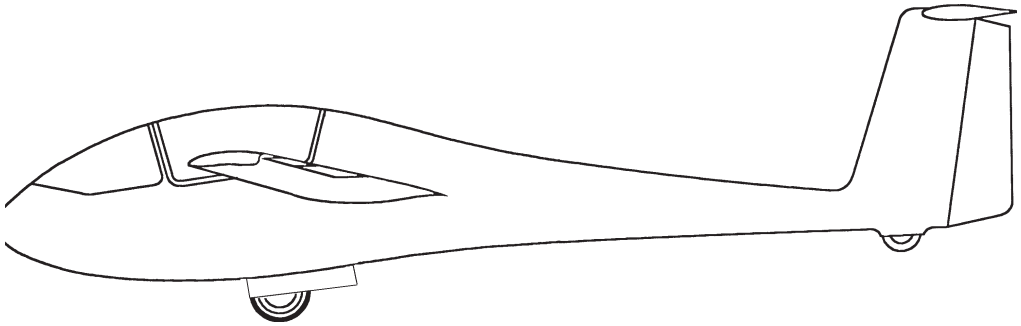
This manual was written in cooperation with Aviastroitel and every effort has been made to assure correct translation from the Russian documentation. Allowing for minor translation errors, this manual has been read and approved by the designer of the AC-4, Vladimir Fedorov.



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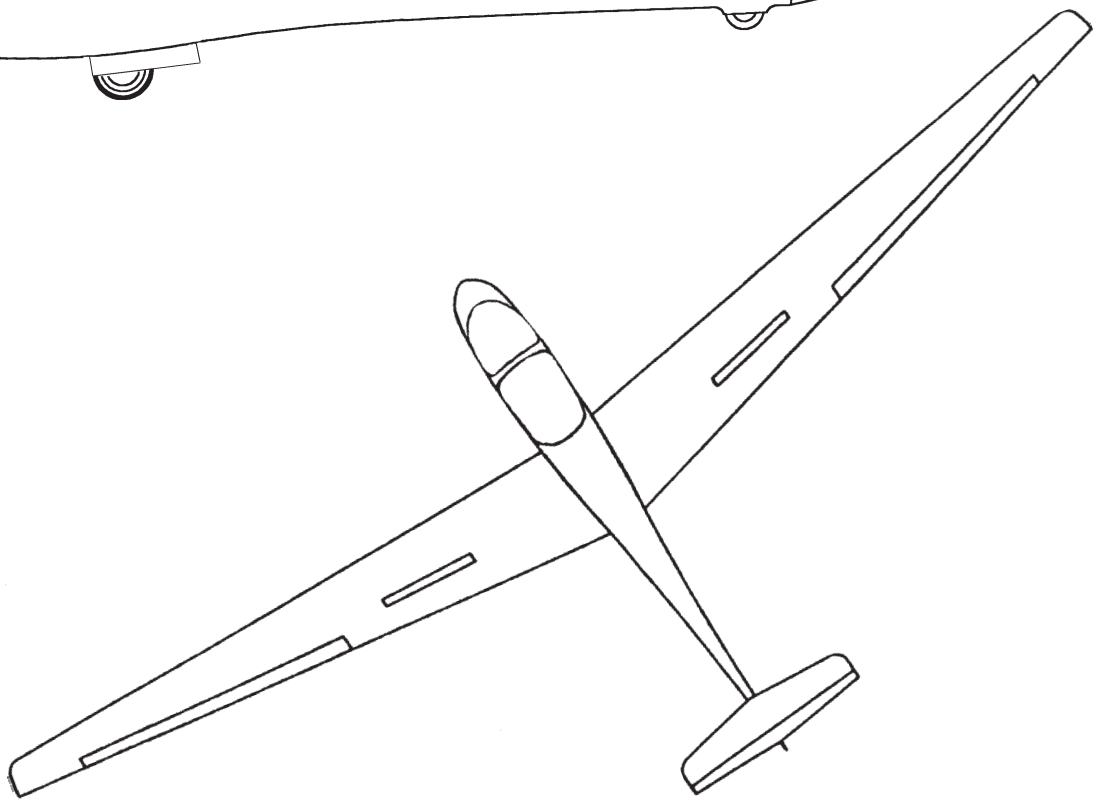

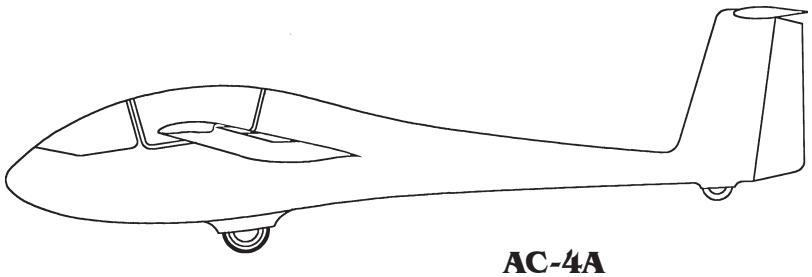

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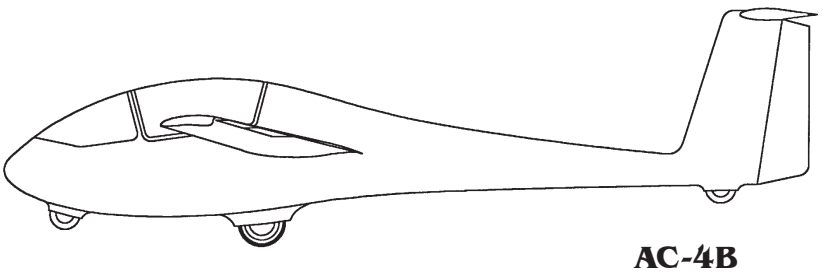


АС-4В

АвиаСтроитель

AS+ model AC-4 by AviaStroitel of Moscow, Russia

1. DETAILED DESCRIPTION OF THE AC-4

1.1 GENERAL

The AC-4 “Russia” is a fiberglass T-tail Sailplane built by Aviastroitel of Moscow, Russia. It is a lightweight airframe constructed of advanced composite materials vacuum bonded in female molds; the fuselage and all flight and control surfaces are of fiberglass-epoxy resin/ foam sandwich panels. All parts of the aircraft are heat cured at 70 degrees Celsius for 16 hours prior to assembly. The design employs a forward swept 12.6 meter wing with upper-surface Schempp-Hirth divebrakes and completely automatic control connections. The forward swept wing allows a full 5” CG range without installation of ballast. The safety-designed cockpit includes both rudder pedal adjustment and fully adjustable seat back. The AC-4 was designed to meet JAR-22 standards, but is presently certified only in Britain (1997) and Canada (2000); the Russia is licensed as Experimental in the United States.

1.2 WING

The tapered, high-aspect (20.6) wing utilizes a high-load, Wortmann FX60-157 laminar airfoil design. It offers a wing loading at typical flying weight of 6.66 lb/ sq.ft. and a 90 degree roll rate of 3.5 seconds. American tests have shown a production quality level of just .004” of waviness across the airfoil, ensuring performance in each example equal to that of the factory test ship. The tapered spars fit through corresponding boxes in the fuselage, extending through the fuselage and into the root rib of the opposite wing. The 80 pound wing panels are anchored with a single spar pin using an integral cam which pulls the wing assembly together; aileron and divebrake control circuits mate automatically when the wings are installed.

1.3 LANDING GEAR

The original A model is a taildragger configuration with a fixed main gear ahead of the center of gravity. The B model has the main gear moved behind the center of gravity and employs a nose wheel for takeoff and rollout. The C model has a retractable main wheel. The tubeless 310mm balloon tire does an adequate job of shock absorption, and the 110mm tailwheel provides arrow-straight tracking on rollout; the tailwheel is identical in all models, providing identical landing procedures. The main wheel in all models utilizes sealed bearings and houses a cable actuated drum brake.

1.4 COCKPIT

Beginning with serial number 029, all models of the AC-4 share identical cockpit dimensions. The wide shoulder with ample knee and head room will easily accomodate pilots of 6 feet or more; all models include rudder pedal adjustment and fully adjustable seat back. The two piece canopy affords the pilot a full “five to seven o’clock” view; the forward windscreen is fixed while the aft portion of the canopy hinges to the right, and emergency canopy jettison is easily accomplished by pulling two red release handles on the canopy bottom rail. The recessed instrument panel has ample space for all standard instrumentation, as well as various custom configurations with an extra variometer or other flight instruments. A four-point harness is standard, as is a TE system and a long-range VHF radio antenna located in the vertical tail. Standardization toward the C model with allowance for retrofit of the **BRS** ballistic parachute has resulted in diminished baggage area, however the space aft of the pilot’s seat can be customized to accept an oxygen system, battery, and barograph when installed with proper weight and balance precautions.

1.5 PHYSICAL DESCRIPTION AND FLIGHT CHARACTERISTICS

AC-4 SPECIFICATIONS:

Empty weight	313 lbs. (individual weights vary)
Max Gross	605 lbs. (serial numbers 034 onward)
Max Payload	290 lbs.
Load Factors	+5.3/ -2.6
Wing Loading	6.66 lbs. typical (7.3 at max gross weight)
Wing Area	82.9 sq. ft.
Aspect Ratio	20.6
Rated Aerotow Load	1200 lbs.

DIMENSIONS:

Span	41.3 ft.
Length	17.2 ft.
Height	4.3 ft.

PERFORMANCE SPEEDS AND CRITICAL SINK RATES:

WEIGHT	440LBS	550 LBS	600 LBS
STALL	34.5	39	41
MIN SINK(fpm) @ SPEED(kts)	130 37	145 41.5	152 43
MAX L/D (kts) SINK RATE(fpm)	45 150	50 170	52.5 180
SINK @ 70 kts	340	290	280

Max L/D	33:1 35:1 with performance package
Red Line (Vne)	119 kts (137 mph)
Maneuvering (Va)	84 kts (97 mph)
Max Entry Speed	97 kts (112 mph) *Loop, Lazy Eight, Chandelle, Stall Turn
Approach Speed	55 kts (63 mph) plus wind considerations

2. MARKINGS AND PLACARDS

2.1 COCKPIT CONTROLS: COLORS AND PLACEMENT

a) **EGRESS**: Red handle on the port side canopy bottom rail rotates aft to disengage the canopy latch; canopy opens to the right. Make sure that handle is full forward and latch is secure before take off.

b) **EMERGENCY JETTISON**: Red handle on starboard side canopy bottom rail rotates aft to disengage both canopy hinges; to jettison the canopy, pull both red handles aft simultaneously, lift and release.

c) **TOW RELEASE**: Yellow tow release T handle is on the floor to the left of control stick.

d) **TRIM**: Green knob on port side floor controls aircraft pitch trim.

e) **AIR BRAKES**: Blue handle on port side cockpit wall controls airbrakes: unlock and slide aft to deploy airbrakes as needed, move full forward and down to lock.

f) **WHEEL BRAKE**: actuated by bicycle style lever located on control stick.

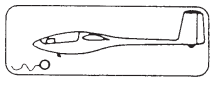
g) **RUDDER PEDAL ADJUSTMENT** is affected by pulling pedal adjustment cable handle (S/N 001- 011) or lifting rudder adjustment bar (S/N 012 and later) and moving the pedals in or out to desired detent.

h) **CABIN VENTILATION**: slide instrument panel vent cover aft to open; forward to close.

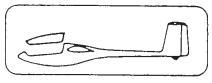
i) **LANDING GEAR LOCK** : White knob below air brake handle; pull to disengage.

j) **LANDING GEAR** : White handle on port side cockpit wall controls spring-actuated landing gear deployment/ retraction: unlock and slide forward to retract; unlock and slide aft to deploy.

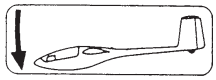
2.2 UNIVERSAL COCKPIT CONTROL SYMBOLS

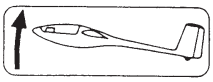


Tow Release

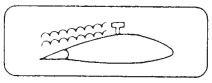


Canopy Jettison Release





Trim Control



Airbrakes

2.3 PLACARDS IN FULL VIEW OF PILOT:

a) an **EXPERIMENTAL** placard shall be placed on cockpit side wall opposite entrance.

b) **CRITICAL AIRSPEEDS**

Calm Air (Vne)	119 kts.
Turbulent Air (Vb)	87 kts.
Maneuvering (Va)	84 kts.
Aerotow (Vt)	87 kts.
Winch tow (Vw)	60 kts.
Airbrakes extended	97 kts.
Stall	37 kts.
Utility Weight Stall	41 kts.

(i) THIS SAILPLANE MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN MARKINGS, PLACARDS AND IN THE FLIGHT MANUAL .

(ii) WHEN OPERATING THIS SAILPLANE ABOVE THE 551 LB. GROSS RACING WEIGHT THE UTILITY CLASS LOAD FACTORS MUST BE ADHERED TO AT ALL TIMES.

c) **APPROVED AEROBATIC MANEUVERS, MAXIMUM ENTRY SPEEDS, LOAD FACTORS**

MANEUVER	MAXIMUM ENTRY SPEED		
Loop	180 km/h	112mph	97 kts
Lazy Eight	180 km/h	112 mph	97 kts
Chandelle	180 kp/h	112 mph	97 kts
Stall Turn	180 kp/h	112 mph	97 kts
Spin	Use Slow Deceleration		
Stall (Except Whip Stall)	Use Slow Deceleration		
Maximum Load Factors	+5.3	-2.6	
Utility Load Factors	+4.7	-2.6	

(i) ACCELEROMETER MUST BE INSTALLED WHEN ANY AEROBATIC MANEUVERS ARE PERFORMED.

(ii) NO SNAPPED FIGURES APPROVED.

d) **TAKEOFF CHECKLIST**:

-CONTROLS FREE	-TRIM FOR TAKE OFF
-BALLAST SECURED	-CANOPY LOCKED
-SEAT AND HARNESS SECURE	-AIRBRAKES RETRACTED
-INSTRUMENTS SET	

3. ASSEMBLY PROCEDURES

3.1 WING INSTALLATION

a) Unlock the divebrake handle in the cockpit to allow free movement of the divebrake control circuit.

b) With the fuselage level in the transportation dolly and with the aid of a helper, remove the left wing from its dolly and insert the spar into the carry through receiver. Keeping the spar in line with the receiver, push it through the fuselage until the drag pins and control linkages line up and the wing root is nearly flush with the fuselage. Insert the spar pin approximately 1" to prevent the left wing backing out (but not far enough to prevent insertion of the right wing) and support the wingtip on the wing stand or other suitable support.

c) Install the right wing in the same manner using gentle lifting, lowering and rocking movements to aid the spar stubs to engage the receivers in the opposite wing's root rib. Check to see that all control rods are free to engage their respective contact points. When both wing roots are inside 1/4" of the fuselage, insert the spar pin cam into the bushing of the rear (right) wing spar, then rotate the pin 180 degrees to pull the assembly tightly together and ease the pin fully into place. Align the rear hole in the pin with the safety bracket and insert and close the safety clip. Installation and connection of controls is complete.

3.2 HORIZONTAL TAIL INSTALLATION

The stabilizer clevis pin and safety clip should be stored in their receiver atop the vertical tail fin during transport of the disassembled glider; remove these and lightly lubricate the clevis pin. Place the horizontal tail assembly over the vertical fin from above, inserting the forward alignment pin while centering the clevis on the fin. Carefully lower the stabilizer into place until the clevis lines up with the mounting hole, then insert the pin through the assembly and secure with the safety clip. Installation and connection of the elevator is complete.

3.3 CONTROL CHECK

Although the controls connect automatically during assembly, proper function and freeplay of each control surface must be verified before attempting to fly the aircraft. Correct connection is guaranteed by a positive control check, wherein a helper holds each surface firmly while the controls are moved against the resistance in both directions of travel. Double check by holding the controls firm and moving the surfaces against the resistance. Finish by making sure the controls are free for their full range of movement.

This must be done for ailerons, divebrakes, elevator and rudder, even though the rudder assembly is not normally disconnected from its control linkage during transport. Make specific note of control surface freeplay and ease of movement and, if in doubt, consult the maintenance portion of this manual.

note: *If control surface freeplay exceeds acceptable limits do not attempt to fly the aircraft without proper system rigging by a certified technician. Excessive freeplay may cause loss of control, structural damage, or catastrophic failure of the control surface.*

3.4 INSTALLATION OF PERFORMANCE MODS

The aerodynamic wing root fairings are designed to increase performance approximately 5% across the entire flight envelope of the AC-4. This is accomplished by greatly reducing the turbulent airflow at the junction of the wing root and the fuselage. Loose or improperly fitted fairings will degrade the performance benefits you can expect from this modification.

Installation is accomplished by simply slipping the fairing over the leading edge of the wing at the root after the sailplane is assembled. Temporarily taping the trailing edge of the fairing with a small piece of tape will aid in careful positioning at the root, then tape both the fuselage and wing junctions. Taping the seams not only holds the fairing in place, but also smooths the transition between surfaces and covers small gaps that will create parasitic drag and decrease the effectiveness of the fairing. Finally, remove the temporary tape on the trailing edge and seal this seam as well.

It is permissible to leave the trailing edge taped and install the fairing by sliding it down the wing from the tip, but make certain both the fairing and the wing are clean and free of dust or scratches may occur. It is also permissible to semi-permanently mount the fairing to the wing root with double-stick tape, so that only the fuselage junctions need be taped before each flight.

3.5 SEALING FLIGHT SURFACES

With or without the special fairings, applying tape to the intersections of all surfaces will reduce drag and turbulence and thereby increase your sailplane's performance. This applies particularly to the wing root to fuselage junction, but also to the stabilizer to fin connection and all wheel fairings.

note: Do not attempt to tape the intersections of control surfaces, dive brake top plates or canopy. Do not place tape in any way that restricts the free operation of any sailplane system. Doing so may cause loss of control, structural damage or inability to escape in an emergency.

3.6 DISASSEMBLY

Roll the sailplane onto its dolly and brace the left wing with the wing stand so that the aircraft is level. Remove all tape that will interfere with disassembly. Follow the reverse of the procedures outlined above and stow the rigging pins either in their brackets or a clean, secure location in the aircraft.

SUPPLEMENT #1 TO THE FLIGHT MANUAL OF THE AC-4: WING ROOT FAIRINGS

The wing root fairings for the AC-4 have been designed by AviaStroitel to increase the performance of the basic glider by reducing the turbulent airflow at the wing root to fuselage juncture. Following successful experiments by the American test pilot Richard Johnson, Russia Sailplanes prevailed upon chief Moscow designer Vladimir Fedorov to create a lightweight, fiberglass fairing that can be easily installed by the pilot prior to flight.

This supplement is included here at the recommendation of the Montana Flight Standards District Office; persuant to FAR 14 CFR 21.93 and Notice 8130.27 your FSDO inspector should be notified of the purchase and use of the after market fairings on any glider **not originally equipped with them**. Compliance is the sole responsibility of the owner/ operator.

This supplement has been approved by AviaStroitel 05-25-98

4. FLIGHT PROCEDURES

4.1 PREFLIGHT INSPECTION (MINIMUM REQUIREMENTS)

a) EXTERNAL
-main spar pin secured and safetied
-horizontal tail secure and safetied
-pitot and TE probe clear of obstruction
-control surfaces connected and functional
-main and auxiliary wheels properly inflated
-entire aircraft checked visually for damage or obstructions
-check all taped seams for tape security, including front windscreen, fuselage hatch, and all gap seals.

b) INTERNAL
-loading and ballast secured
-parachute secured
-seat and pedals adjusted
-harness secured
-canopy locked
-altimeter set
-airbrakes retracted
-trim set for takeoff
-controls free and correct

4.2 TAKEOFF PROCEDURES

a) AEROTOW
-trim neutral to one notch forward
-recommended speed 55-70 kts.
-maximum speed 87 knots

b) WINCH LAUNCH
-trim forward
-recommended speed 54-57 kts
-maximum speed 60 kts

4.3 FLIGHT PROCEDURES

note: Transition pilots must be aware that the light control forces of the AC-4 dictate caution during launch and aerotow to avoid overcorrection and Pilot Induced Oscillation. Early recognition of these errors will lead to a greater appreciation of the aircraft's responsiveness.

Warning: at speeds over 87 knots (100 mph, 160 km/h) full control movements are not acceptable. As the speed increases from Va to Vne the control forces will increase and control movements must be decreased to 1/3 of full deflection. Elevator inputs must be moderate at high speeds to avoid excessive G loads.

(FLIGHT PROCEDURES CONTINUED)

a) **performance speeds and critical sink rates** (from section 1.5)

WEIGHT	440 LBS	550 LBS	600 LBS
STALL (kts)	34.5	39	41
MIN SINK(kts)	37	41.5	43
SINK RATE (fpm)	130	145	152
MAX L/D (kts)	45	50	52.5
SINK RATE (fpm)	150	170	180
SINK @ 70 kts	340	290	280

note:

Flight in the 600 lb. maximum weight range will involve higher critical speeds. Higher stall speed is a significant safety concern, and the higher sink rates in normal flight are required to achieve the high speed performance benefits of a fully ballasted sailplane.

note: The AC-4 will spin without any tendency to enter a flat spin at all approved center of gravity positions and approved weights. If a spin is performed as an aerobatic maneuver, an accelerometer is mandatory.

note: Spin recovery is as follows: apply full rudder deflection opposite to the spin to stop rotation, simultaneously easing the control stick forward. When rotation ceases, neutralize the rudder. When flight speed has been regained, you may recover from the dive, taking care not to exceed allowable speed or load factors.

warning: Airspeed indications may be erroneous from the onset of stall through the entire spin maneuver. However, airspeed indications **above** stall speed may indicate a spiral dive has been entered rather than a spin. If this should occur, the correct procedure is to relax back pressure on the stick and shallow the bank to less than 45 degrees. Then gradually increase back pressure while rolling the aircraft out of the turn and into straight and level flight. Care must be taken not to exceed allowable speed or load factors.

4.4 LANDING

-minimum safe approach speed..... 55 kts (calm air)
-airbrake as desired before touchdown; 1/4 to 1/2 divebrakes are recommended throughout final approach..
-full airbrakes can be applied after touchdown to shorten rollout
-apply wheel brake to control stopping point

note: Pilots new to the AC-4 should carry extra speed throughout the approach until the aircraft's divebrake effectiveness, dinstinctive sounds and visual reference angles become familiar.

note: At pattern speeds the AC-4C will fly slightly tail low and the tailwheel will normally touch first; if you are touching down on the main wheel your landing speeds are considerably higher than necessary.

note: Touchdown with airbrakes fully extended is **not recommended**.There will be little float in ground effect.

note: Aggressive application of the wheel brake may cause the nose of the AC-4C to contact the ground. Hard braking should be applied at higher speeds when this action can be countered by elevator forces; as control effectiveness subsides, brake application should be moderated to allow a normal rollout.

5. WEIGHT AND BALANCE

5.1 ALLOWABLE WEIGHTS (typical)

-Empty Weight	310 lbs.	** note exact weight of individual AC-4
-Maximum Gross Weight: Before s/n #034.....	551 lbs.	
-Maximum Gross Weight: s/n #034 onward.....	605 lbs.	
-Pilot Weight Range: Before #034.....	141 ... 242 lbs.	
-Pilot Weight Range: #034 onward.....	165 ...290 lbs.	**consult weight & balance sheet

Warning: When loading the aircraft outside the Pilot Weight Range listed in your specific weight and balance report you must re-ballast the aircraft accordingly and perform a new weight and balance to assure that you are still within the allowable C.G. limits.

5.2 C.G. LIMITS (ALL MODELS/ ALL CATEGORIES)

-forward C.G. (serial numbers 004- 027)	1.81 in. forward of datum (-1.81)
-aft C.G. (serial numbers 004- 027)	3.19 in. aft of datum (+3.19)
-forward C.G (serial numbers 029- onward)	**0.5 in. aft of datum (+.5)**
-aft C.G. (serial numbers 029- onward)	**5.5 in. aft of datum (+5.5)**

-datum: wing root leading edge
-leveling means: root chord is horizontal

5.3 NOTICES REGARDING THE AC-4 C.G.

(a) **Individual weight and balance calculations will provide the minimum and maximum pilot weights for particular serial number AC-4s.** Individual gliders may be ballasted as necessary to bring them into compliance with the allowable pilot weights specified in this manual. No person may remove these weights without supervision of a certified technician and proper notations in the aircraft logbook.

(b) Pilots at the light end of the allowable pilot weight range must take particular care in stowing equipment in the rear compartment and take responsibility to stay within the CG limits of the aircraft.

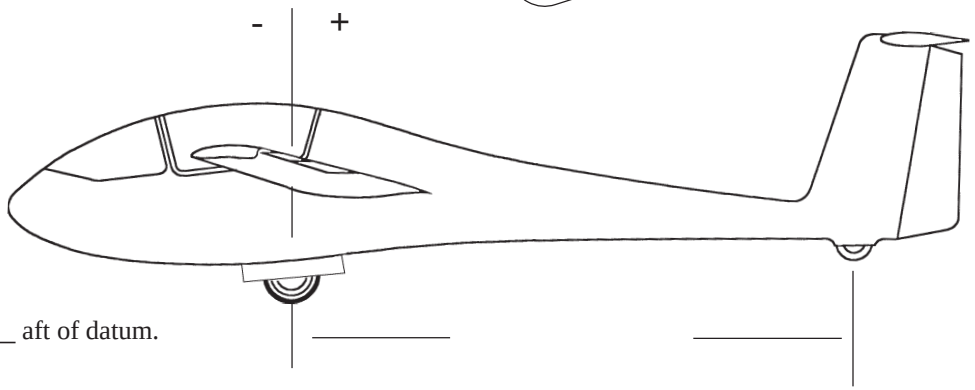
(c) If a battery or oxygen cylinder is mounted in the rear compartment care must be taken to add counter ballast as necessary to maintain proper CG allowances. Permanent installations must be documented in the aircraft logbook.

[INSERT WEIGHT AND BALANCE WITH EQUIPMENT LIST]

AC-4 FLIGHT MANUAL

5.4 WEIGHT AND BALANCE REPORT: SERIAL #__048__ N# __1809__

Datum: leading edge @ root . Root chord is horizontal



Front axle _____ aft of datum.

front scale: _____ lb. rear scale: _____lb.

1. Total empty weight _____. Max Gross __605__.
2. Computed Empty C.G. _____.
3. C.G. Limits: forward __+ .5"__; aft __+5.5"__.
4. Check of critical conditions:

a) most forward C.G. _____ . Maximum Pilot Weight _____ lbs.

	Weight	Arm	Moment	
Aircraft Empty				
Pilot		-14.9		
Totals				

b) most rearward C.G. _____. Minimum Pilot Weight _____ lbs.

Aircraft Empty				
Pilot		-14.9		
Totals				

Calculations by: _____ date: _____

EQUIPMENT LIST

All Items Installed on the Aircraft at Time of Weighing Must be Listed Below

Aircraft Make: AS+ Model: AC-4 C Serial Number: _____.

Original Equipment: (All Items Included in Empty Weight Calculations)	Weight:	Arm:
1. altimeter #	1.35 lbs.	-37.2
3. airspeed #	.45 lbs.	-37.2
4. compass #	.55 lbs.	-37.2
5. variometer #	.95 lbs.	-37.2
6. radio #	2.0 lbs.	-37.2

Additional Equipment:		

Equipment List Verified by: _____

1. INTRODUCTION

1.1 SYSTEMS INTRODUCTION

a) WING- The AC-4 wing is swept forward at an angle of 4 degrees and has a dihedral of 3.5 degrees. The assembly is in two parts, left and right, which are removable for transport and storage; they are secured in place with a single, cam-actuated spar pin. Primary structural bending loads are carried in upper and lower spar caps, and torsional loads are carried in the "D" cell forward of the spar and in the structure of the skin itself. Ribs and webs are constructed of a fiberglass/ epoxy matrix over a plywood core, while flight and control surfaces are constructed of fiberglass/ epoxy- foam sandwich construction. Aileron and spoiler controls will connect automatically upon assembly. Correct aileron deflection is up 20/ down 17 degrees.

b) EMPENNAGE- The T-tail configuration is composed of 1) an integral vertical stabilizer molded with the fuselage halves containing a removable rudder assembly and mounting bracket for the horizontal tail; and 2) a separate tapered horizontal tail surface incorporating the elevator. The two elements are connected by a single safetied clevis pin and the elevator controls are connected automatically upon assembly. The correct tail surface deflection angles are: elevator up 27/ down 13 degrees; rudder 25 degrees left and right.

c) CONTROLS- Primary flight controls consist of a conventional three-axis system with the addition of simultaneously activated Schempp-Hirth style dive brakes. The ailerons and elevator are controlled by a conventional stick arrangement, and the divebrakes by a sliding handle on the port cockpit wall, moving hollow aluminum push-pull tubes. The aileron and divebrake acyuators comprise a unique, patented, closed loop system that is integral to the AviaStroitel automatic control connect system. The rudder is actuated by enclosed braided steel cables joined to adjustable rudder pedals. The elevator trim mechanism utilizes a torsion spring (after s/n 028) connected directly to the control stick; the stick position controlled by a handle on the port side cockpit floor.

d) LANDING GEAR - The main wheel comprises a tubeless tire mounted on a two part fiberglass wheel, sealed with a rubber "O" ring, and incorporating sealed and permanently lubricated bearings with steel brake drum. The brake is a standard, mechanical drum brake with cam-actuated shoes controlled by a cable attached to a bicycle-style handle on the control stick. The wheel and brake assembly are attached to the aircraft by means of a non-rotating axle passed through a fixed bracket.

The tail wheel is a fixed, two piece fiberglass hub with tube type tire. It is attached to the aircraft with an axle through internal brackets and turns on a pair of sealed bearings (after s/n 028).

e) PITOT- STATIC SYSTEM- Pitot and Total Energy probes are both mounted on the vertical tail; static ports are located on either side of the rear fuselage. TE probe is removable for storage. Plumbing for all instruments runs up the starboard side of the fuselage and exits the cockpit wall behind the instrument panel.

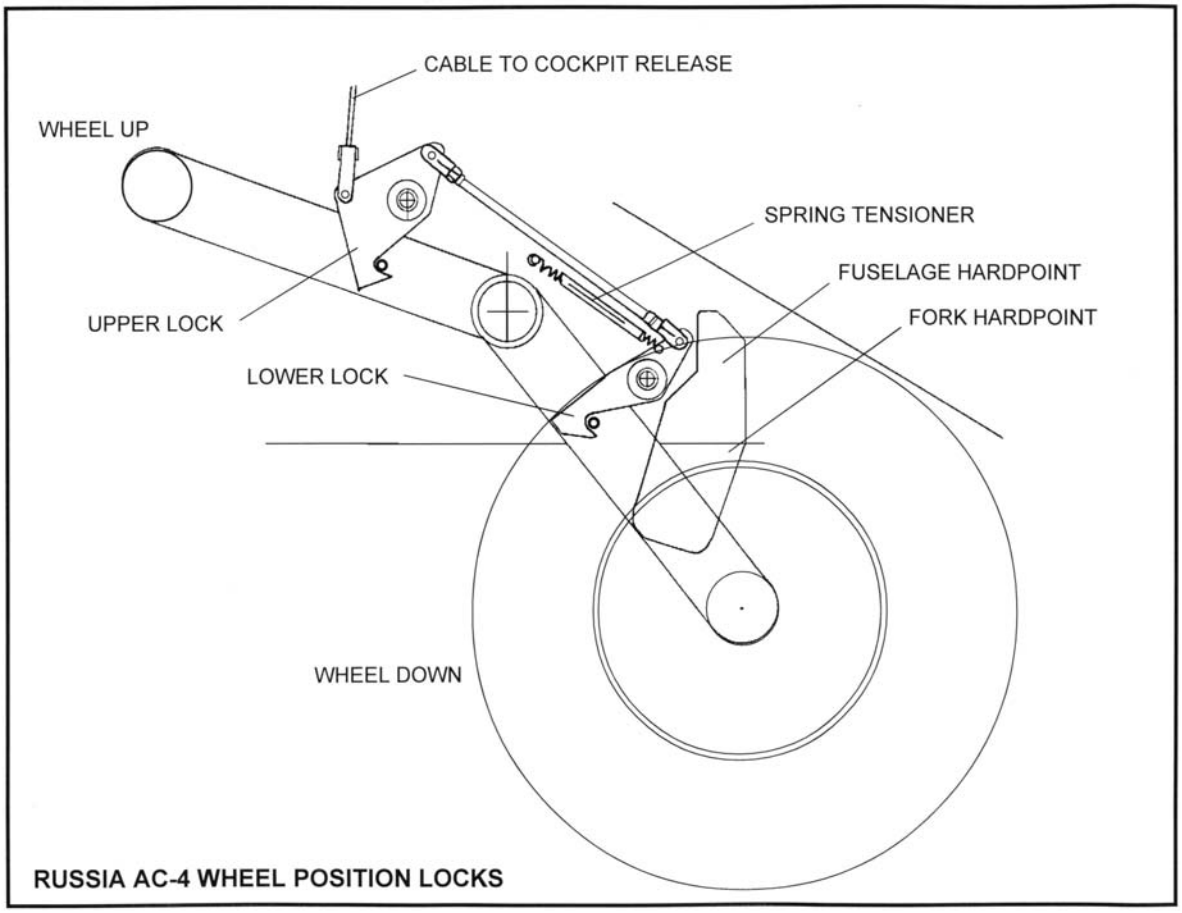
f) MINIMUM EQUIPMENT- Instruments required for operation the United States are: altimeter, airspeed indicator and compass. Standard equipment for the Russia Sailplanes AC-4 includes altimeter, airspeed indicator with painted speed ranges for the AC-4, standard compass, and total energy compensated electric/ audio variometer.

(SYSTEMS INTRODUCTION CONTINUED)

g) LANDING GEAR RETRACTION MECHANISM : The standard AC-4 wheel and brake system is mounted on a solid composite fork, allowing the assembly to be raised into an internal bay aft of the cockpit. This system includes a positive lock at both the fully deployed and fully retracted positions, and makes contact with fixed fuselage hardpoints when in landing configuration. The range of motion places the wheel well forward of its neutral position when the system is down and locked, making gear failure and collapse on landing virtually impossible. Additionally, landing loads are taken by the fuselage hardpoints and are not borne by the landing gear pivot points themselves, further protecting the gear from collapse.

Deployment is accomplished by releasing the lock with the white knob on the port cockpit side wall. Gravity begins the deployment as the wheel swings out of the wheel well, opening the spring-loaded doors; the gear actuator handle below the lock release will slide slightly aft unassisted, and very little force is required to manually complete its throw into the locked position. The lock automatically engages as the system's hardpoints meet with an audible click; the cockpit handle is fully aft and can be released to fold against the cockpit wall.

Retraction is accomplished by again releasing the lock. Retraction begins with the help of a powerful return spring which pulls the wheel assembly down past the neutral position and up into the wheel well; again the cockpit actuator handle will slide slightly forward unassisted, and little effort is required to complete its throw into the locked position. When the lock engages with an audible click, the actuator handle will be in the full forward position and can be released to fold against the cockpit wall.



RUSSIA AC-4 WHEEL POSITION LOCKS

2. FLIGHT CONTROL SYSTEMS

2.1 FLIGHT CONTROL SYSTEM INSPECTION AND LUBRICATION

a) All bearings located in the flight control push-pull tube circuit for the aileron, elevator and divebrake controls are “rod end” style, and require lubrication with a non-drying, Teflon based lubricant (Tri-Flow). Use sparingly and wipe off excess lubricant. Bearings exceeding wear limits or not operating satisfactorily should be replaced. These should be checked and lubricated at the annual condition inspection.

b) Control surface hinge bushings should be lubricated with non-drying lubricant every 100 flight hours.

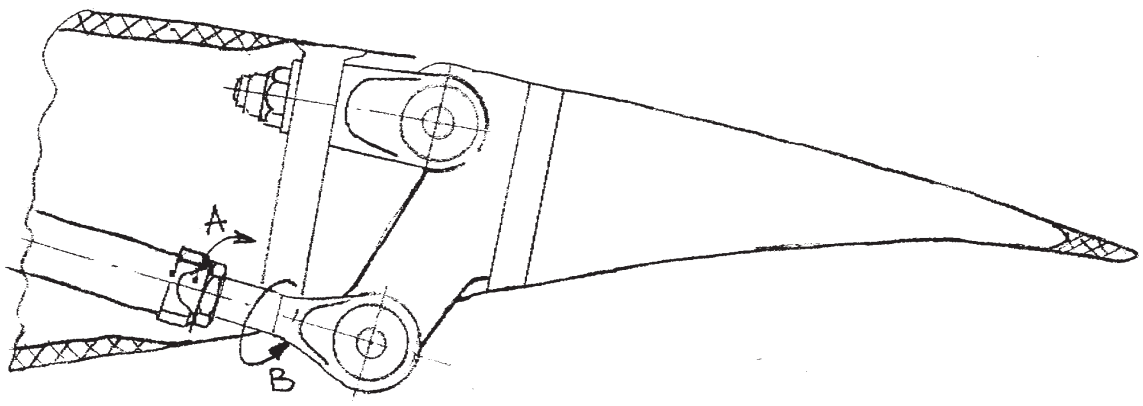
c) The rudder pedal adjustment mechanism and pedal bushings should be cleaned and lubricated every 100 flight hours.

2.2 FLIGHT CONTROL SYSTEM ADJUSTMENTS

a) To prevent binding as the wings flex under load, a spring system keeps tension on the aileron control cicircuit. There is a slight amount of circuit freeplay evident in control stick freeplay of 1/5” side to side. Excessive aileron freeplay can contribute to flutter at high speeds, which could cause loss of control, structural damage, or even catastrophic failure of one or more control surfaces. Adjustment of freeplay is easily accomplished by adjusting the length of the cross-fuselage element in the aileron circuit.

Warning: ***if aileron freeplay exceeds allowable limits, do not attempt to fly the aircraft without proper system rigging by a certified technician.***

b) Aileron set angles can be easily adjusted, if necessary, by the following procedure: Remove access panel at aileron mid-span. Loosen the set nut (A) and increase or decrease the length of the aileron control rod (B) by screwing it in or out of the threaded tube end. Tighten the set nut to lock in the new setting. Replace the access panel. Check to make sure that the aileron deflection angles are correct and adjust using the stops at the control stick base.



c) The dive brakes are deployed simultaneously by a system of pushrods and bell cranks mounted to hard points on the fiberglass structures and retract into boxes within the wing. If the dive brake cover plates do not close tightly against the wing skin and provide a flush fit, the aerodynamic performance will deteriorate significantly. Adjustment of the pushrod clevis at the desired surface to be rigged allows for individual fit of the cover plate; after making any adjustment, recheck the fit of the opposite cover plate.

d) The elevator controls are connected automatically upon installation of the horizontal tail and correct system freeplay is set by the factory. There should be very little looseness in the elevator circuit. If a positive control check reveals freeplay greater than 1/6” in the elevator, the system must be checked and adjusted.

note: Elevator freeplay can occasionally be traced to wear between the two halves of the main elevator bell crank. This can be corrected with a shim placed between the upper and lower portions of the split bell crank.

Warning: ***excessive elevator freeplay may cause loss of control, structural damage or catastrophic failure; do not attempt to fly the aircraft without proper control system rigging by a certified technician.***

e) The rudder control is a cable system actuated by right and left rudder pedals. The single cable is of fixed length and should not need adjustment. The cable originates at the locking plate on the rudder itself, travels through plastic tubing to the rudder pedal assembly in the cockpit, then threads through the S-tubes of the rudder pedal adjustment system and returns through tubing to the locking plate.

Any slippage over time can be corrected by simply loosening the locking plate, pulling the cable circuit taut and tightening the locking plate, taking care that the rudder pedals and the rudder itself are in a neutral position.

Springs attached to each rudder pedal support the pedals vertically and should be examined at each annual condition inspection for correct installation, security and condition and replaced if necessary.

Rudder cables should be inspected for wear throughout the travel of the rudder pedal assembly.

3. LANDING GEAR AND BRAKE SYSTEM

3.1 MAIN WHEEL MAINTENANCE AND LUBRICATION

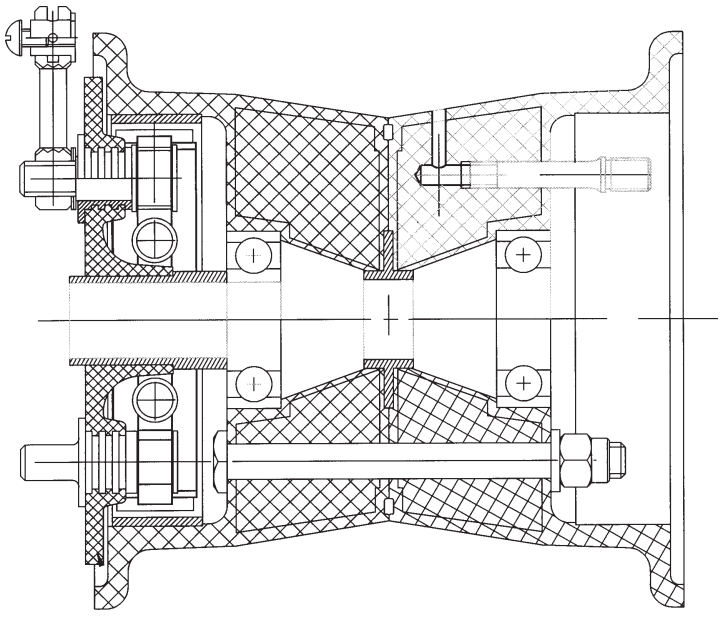
a) Russia Sailplanes AC-4s utilise a fiberglass main wheel that incorporates a standard international press bearing #6203 2RS1. This bearing does not require lubrication.

b) All AC-4 main wheels use a tubeless 310 X 135mm tire of Russian manufacture for which the proper tire pressure is 25 psi. Maintaining correct tire pressure will considerably extend the life of the tire, as landing loads on an under-inflated tire will break down the sidewall.

3.2 MAIN WHEEL REMOVAL AND DISASSEMBLY

a) To remove the wheel, support the fuselage with a suitable dolly or lay it on its side with suitable padding. Rotate the gear to full extension and prop open the doors. Detach the brake cable. Serial numbers after #037 utilize a pair of flat spanner nuts set in putty to secure the axle. Light tapping with a hammer on a pin wrench will break the seal and allow removal of the nuts, the axle, and the wheel assembly.

b) If it is necessary to completely disassemble the wheel, release all tire pressure and remove the valve from the valve stem. The fiberglass wheel is made in two halves. Remove the bolts on the hub and separate the elements, being careful not to stress or gouge the surfaces or damage the “O” ring. Inspect and replace any damaged part, and/ or relubricate the seals as necessary and reassemble the wheel. Torque the bolts to not more than 30 inch-pounds, using a cross pattern to ensure even pressure. Replace the air valve and carefully reinflate the tire.



RUSSIA MAIN WHEEL CROSS SECTION

3.3 BRAKE ASSEMBLY INSPECTION AND LUBRICATION:

a) The brake mechanism is a separate assembly within the wheel hub. It is a standard mechanical drum brake activated by the brake cable, which pulls the brake lever, which in turn operates a cam which spreads the brake shoes apart, creating friction against the drum ring inside the wheel. To completely free the brake assembly for inspection, loosen the set screw on the actuator arm clamp and pull free of the cable.

note: *Do not use petroleum based products to clean brake parts; do not allow lubricants to contact the brake shoes. Use brake cleaner or alcohol based solvents only*.

b) Clean the brake assembly and visually inspect the brake lining and drum:

**check brake for: wear, galling, separation of lining, worn or broken springs, damaged shoe frame.

**check drum for: uneven wear, galling, glazing, pitting (rust), drum band security within the wheel.

c) Refer damage to a certified technician; if replacing parts, use only original equipment replacement parts or approved substitute; if the assembly is satisfactory, lubricate according to diagram and replace.

3.4 MODEL C GEAR RETRACTION MECHANISM:

a) from the cockpit: check to see that both the gear retract handle and the gear lock cable clamp are tight and secure; check operation of the gear lock and travel of the gear retract handle. No further inspection is required.

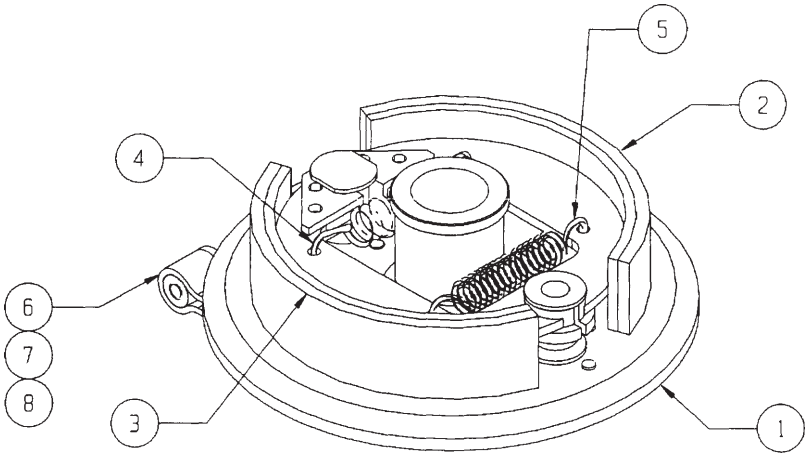
b) from the aft compartment: check security of return spring and gear lock cable fitting; check chain and sprockets for debris, clean and lubricate as necessary. Check that all moving parts are clean and lubricated; check that all bolts are tight. No adjustment is possible from this station.

c) from the wheel well: check freedom of travel throughout the deployment and retraction of the wheel, check operation of upper and lower locks. The lock cable is of fixed length and cannot be adjusted; however, the operation of the upper and lower locks can be fine tuned by adjusting the length of the connecting rod between them.

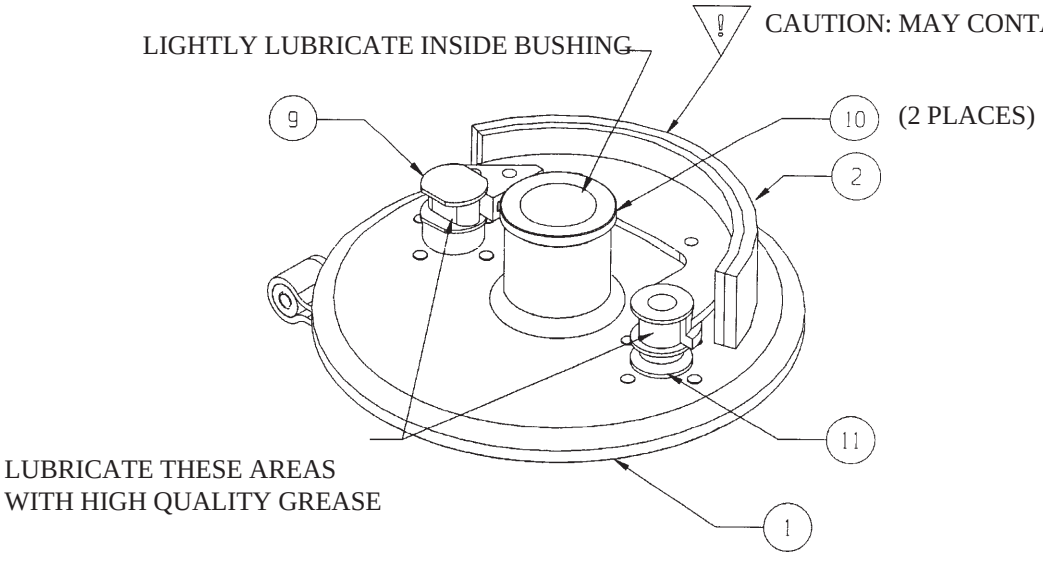
3.5 TAILWHEEL:

The AC-4 tailwheel is a two-piece fiberglass wheel with sealed bearings and a 47 X 110 mm tube type tire for which the correct inflation pressure is 15 to 20 psi.

AC-4 MAINTENANCE MANUAL: BRAKE ASSEMBLY AND LUBRICATION DIAGRAMS



1. MOUNTING PLATE
2. RIGHT BRAKE SHOE
3. LEFT BRAKE SHOE
4, 5. TENSION SPRINGS
6. BRAKE ACTUATOR ARM
7. CLEVIS & CLAMP
8. CLAMP
9. SPINDLE
10. BRAKE BUSHINGS (2)
11. SPACER



[INSERT GEAR RETRACTION SYSTEM DRAWINGS WHEN AVAILABLE]

1. ANNUAL CONDITION INSPECTION

note: A checklist of inspection items must be used and a written record of all discrepancies must be provided to the sailplane owner along with a proper entry in the aircraft logbook by a certified technician testifying to the airworthiness of the aircraft.

1.1 PREPARATION FOR INSPECTION- REMOVE THE FOLLOWING:

(a) Canopy

(b) Control Column Inspection Panel

(c) Cockpit Cushions

(d) Aft Fuselage Inspection Panel

(e) All Eight Wing Inspection Panels

(f) Horizontal Tail Assembly

1.2 FUSELAGE

[ ] Inspect skin for deterioration, distortion, evidence of failure or delamination, split seams, and defective or insecure attachment of fittings.

[ ] Inspect control systems and components for improper installation, security of attach points, apparent defects or unsatisfactory operation.

1.3 COCKPIT GROUP

[ ] General inspection for cleanliness and loose items that might foul the controls.

[ ] Inspect seat pan for distortion, deterioration or evidence of failure, and security of attached equipment.

[ ] Inspect safety harness for condition and apparent defects.

[ ] Inspect seat back for correct operation.

[ ] Inspect windscreen and canopy for scratches, deterioration, cracks, or bonding delamination from frame.

[ ] Check for free and correct operation of the canopy latch and canopy jettison mechanisms.

[ ] Inspect instruments for condition, proper installation and operation (where practicable).

[ ] Inspect flight controls for proper installation , operation and condition.

[ ] Inspect rudder control cables for proper tension and routing, also for wear or fraying.

[ ] Inspect tow release mechanism for secure installation, free and correct operation, freeplay and friction in the release assembly; also for unacceptable wear to the hook assembly. Test the mechanism using the correct tow ring with a line under tension.

[ ] Inspect battery or battery pack for proper installation and indications of damage or leakage.

[ ] Inspect oxygen system (if applicable) for proper installation, proper operation, and date of last hydrostatic test for the oxygen cylinder.

1.4 LANDING GEAR GROUP

[ ] Inspect all moving parts for condition and security of attachment.

[ ] Inspect wheels for cracks, defects, and condition of bearings.

[ ] Inspect tires for wear, apparent damage, weathering and correct inflation pressures.

[ ] Inspect wheel brake for proper installation, adjustment, and acceptable wear of brake lining and drum.

1.5 WING GROUP

[ ] Inspect all components for condition and security, including hinge bushings and rod-end bushings.

[ ] Inspect skins for deterioration, distortion or other evidence of failure.

[ ] Inspect internal structure where visible for delamination, cracks or distortion.

*** Install wings onto fuselage.

[ ] Check control surfaces for freedom of movement, alignment, freeplay and security.

[ ] Check controls for freedom of movement, freeplay and security.

[ ] Check aileron freeplay for compliance with specified freeplay limits.

[ ] Inspect divebrakes for proper fit, freedom of movement and security.

1.6 EMPENNAGE GROUP

[ ] Inspect fixed surfaces for deterioration, distortion, or other evidence of failure.

[ ] Check condition and security of fittings, operation of control connections.

[ ] Inspect control surfaces for damage or apparent defects, secure attachment and correct travel.

[ ] Check rudder upper attach pin for proper installation and security.

[ ] Inspect horizontal stabilizer automatic connect for alignment, wear and proper fit.

*** Install horizontal tail

[ ] Check control mechanism for freedom of movement, alignment and security.

[ ] Check elevator control system for compliance with specified freeplay limits.

1.7 MISCELLANEOUS ITEMS

[ ] Inspect ballast weights (if installed) for secure installation.

[ ] Check all miscellaneous items not otherwise covered in this manual for loose screws or other fasteners, loose wire connections, missing safety clips or cotter pins, dirty or unlubricated mechanical connections, and and list any items that may require special attention by the pilot between inspections.

*** Reinstall all inspection panels and fairings.

[ ] Make proper entry in the aircraft logbook.

2. 100 HOUR MAINTENANCE ITEMS:
It is recommended that at 100 hour intervals the following items be performed.

2.1 WINGS

a) Remove the ailerons in order to clean and lubricate the outer pivot pins and bushings.

b) Inspect the aileron center plates for any elongation of the hinge bolt holes; this would indicate that the hinge pin has not been properly tightened during annual condition inspections. Deformation of the hinge holes requires that the plates be replaced.

2.2 EMPANNAGE

a) Remove the elevator in order to clean and lubricate the outer pivot pins and bushings.

b) Inspect the elevator center plates for any elongation of the hinge bolt holes; this would indicate that the hinge pin has not been properly tightened during annual condition inspections. Deformation of the hinge holes requires that the plates be replaced.

c) Remove the rudder in order to clean and lubricate upper and lower pivot points. It is not necessary to detach the rudder cables for this maintenance. With the rudder removed it is also easier to visually inspect and lubricate the lower elevator bell crank assembly.

2.3 OTHER

a) Remove the tow hook assembly for close inspection, cleaning and lubrication. **There is no rebuild cycle** or requirement for the AviaStroitel towhook, however careful inspection for general cleanliness, wear, proper operation, and adequate lubrication is required at this interval.

3. SPECIAL INSPECTIONS

3.1 HARD LANDING INSPECTION

[ ] Inspect main wheel for damage, freedom of movement and correct tire pressure.

[ ] Check brake operation and effectiveness.

[ ] Inspect tailwheel and tailwheel attach points for distortion or damage; check tire inflation pressure.

[ ] Inspect fuselage skin around trailing edge of wing root for distortion or other indication of delamination.

[ ] Inspect wingtips for evidence of ground strike damage.

[ ] Inspect seatback attach structure for structural security.

[ ] Inspect instrument panel attach structure for distortion or damage.

3.2 SEVERE TURBULENCE INSPECTION**

** A severe turbulence/ stress inspection is required if the aircraft was flown through turbulence at speeds above maneuvering speed or is suspected of exceeding structural limits established by the flight envelope.

[ ] Inspect upper and lower wing skins for distortion, delamination or buckling.

[ ] Perform a tap test with a metal disk or coin along the spar caps from root to outboard of the aileron on both upper and lower wing surfaces; a dull, hollow sound instead of a sharp click indicates that the area is damaged and possibly unairworthy. This condition must be repaired by a certified technician before flight.

[ ] Inspect spar stubs for cracks, distortion or delamination, especially at attach pin bushings.

[ ] Inspect fuselage skin around trailing edge of wing root for distortion or other evidence of delamination.

[ ] Inspect empennage skin surfaces at empannage root.

[ ] Inspect empennage skin at attachment areas for looseness of fittings, distortion or delamination.

[ ] Inspect all items secured to the composite laminate structure for security of attachment.

3.3 PREFLIGHT INSPECTION: EXTERIOR

[ ] Inspect nose for damage, ventilator clear, yawstring free, towhook secure and operational.

[ ] Check wheel and tire for proper inflation, general condition, brake operation.

[ ] Inspect underside of fuselage for obvious damage.

[ ] Inspect right wing for signs of damage, check aileron freedom and freeplay, check spoilers for fit.

[ ] Check fuselage skin for signs of stress or damage as inspection continues, check static ports clear.

[ ] Inspect empennage for general condition, pitot and TE probe clear, elevator attach pin secure and safety clipped, check freedom and freeplay of elevator and rudder, check tailwheel condition and proper inflation.

[ ] Inspect left wing for signs of damage, check aileron freedom and freeplay, check spoilers for fit.

[ ] Inspect closed canopy for fit and security.

3.4 PREFLIGHT INSPECTION: INTERIOR

[ ] Operating Handbook or Operating Limitations Placard aboard

[ ] Airworthiness Certificate

[ ] Aircraft Registration

[ ] Aircraft Flight Logbook

[ ] Current Weight and Balance

[ ] Cockpit free of loose or unnecessary items

[ ] Canopy clean and both latch and emergency release functioning properly

[ ] Battery and/ or ballast properly secured

[ ] Seatbelt and shoulder harness secure and operational and in good condition

[ ] Oxygen PRICE check (pressure, regulator, indicator, connections, emergency)

[ ] Barograph wound, sealed, secured and ready for operation (also remember to start operation)

[ ] Flight controls free and clear, positive control check complete

[ ] Spoilers operational, correct, down and locked, positive control check complete

[ ] Trim set for takeoff

[ ] Instruments set and checked