

THE 1-34 & 1-34R SAILPLANE
FLIGHT - ERECTION - MAINTENANCE
MANUAL

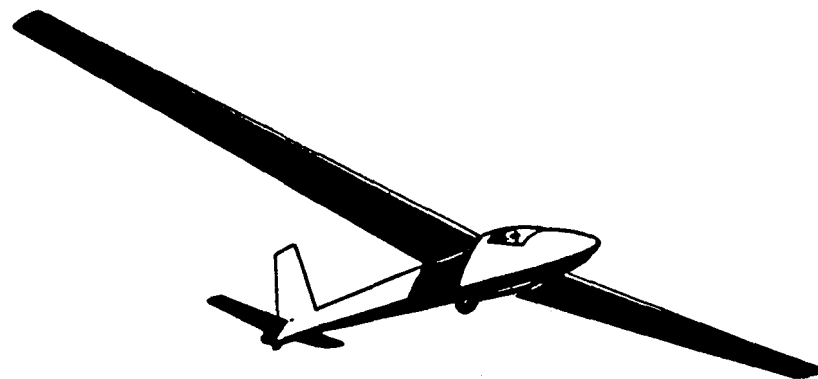


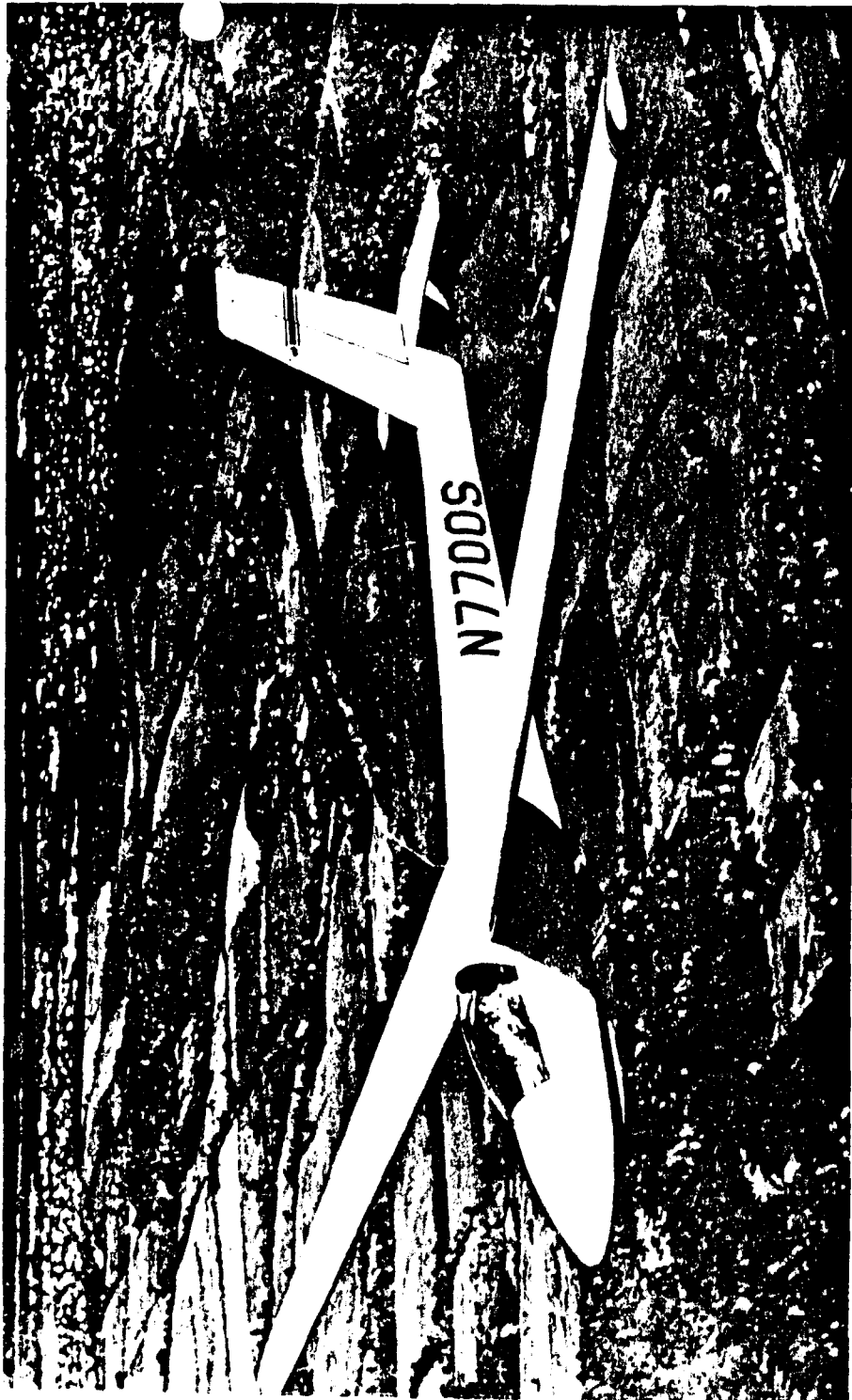
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GENERAL DESCRIPTION

MODEL SGS 1-34

The SGS 1-34 is a single place, high performance, all-metal sailplane of monocoque construction, built by Schweizer Aircraft Corp., Elmira, N. Y.

It was designed and built to meet the need and demand for a US Standard Class Sailplane. Its many safety features plus the excellent flying and handling characteristics serve to make it an ideal sailplane for the average soaring pilot; as well as for one with competition in mind.

Pilot fatigue, after long duration flights, has been virtually eliminated because of the semi-reclining adjustable seat, adjustable rudder pedals and adjustable headrest.

The rate of roll and controllability, while thermalling, is very good. The visibility out of the cockpit in all directions is excellent. The cockpit is roomy, with all the controls and instruments within easy reach. These features add up to more pilot comfort and better proficiency.

MODEL SGS 1-34R

The SGS 1-34R flight and handling characteristics, from lift-off to touch-down, are identical with those of the 1-34.

The 1-34R incorporates a manually-operated retractable main gear with doors. The retractable gear offers three advantages over the conventional gear. One, obviously that of resulting in a more aerodynamically clean aircraft. Second, the weight of the retraction mechanism is beneficial from a penetration standpoint. Furthermore, additional ground clearance is provided by the extended gear for those operating from uneven fields. The overall dimensions remain the same except for the ground height, which is slightly increased on the 1-34R. In this connection, the gear for the 1-34 has a one inch up and down ground adjustment through the use of alternate axle holes in the gear plates and brake torque arm.

Overall Dimensions

Other Characteristics

		<u>1-34</u>	<u>1-34R</u>
Length	25 ft. 5 in.	16	16
Span (15 meters)	49 ft. 2 in.	570 lbs.	595 lbs.
Height	7 ft. 6 in.	270 lbs.	245 lbs.
Wing Area	151 sq.ft.	840 lbs.	840 lbs.

PERFORMANCE DATA

SGS 1-34

SGS 1-34R

Calculated L/D	33 at 55 mph	34 at 55.5 mph
Mtn. Sink	2.4 fps @ 49 mph	2.2 fps @ 46 mph
Placard (red line) Speed:	800# GW 840# GW	800# GW 840# GW
dive brakes closed	135 mph 132 mph	135 mph 132 mph
dive brakes open	142 mph 132 mph	142 mph 132 mph
Stall Speed	36 - 38 mph	36 - 38 mph

Opening the Canopy:

Access to the cockpit is gained normally from the left hand side of the ship. The small window panel in the lower section of the canopy is pushed slightly inward, then aft. Reach across the cockpit to the ring on the latch handle, rotate the latch by pulling the handle ring inboard and aft. The canopy is unlatched when the handle is at right angles to the longeron. To latch the canopy after tie-down, reverse the above procedure.

FLIGHT CONTROLS:

1. Control Stick:
The single bent control stick is conventional for aileron and elevator control.
- 2a. Rudder Pedals:
Rudder pedals are conventional with a five position adjustment. Ease of adjustment is provided for by a levered lock-pin arrangement and a spring assisted pedal retraction.
- b. Rudder Pedal Adjustment Lever:
Located between the bottom of the rudder pedals. To adjust, depress lever with either heel and relax pressure on rudder pedals. The spring will retract the pedals to the full aft position. Push pedals forward to desired position and allow lever to lock in place by removing heel.
3. Trim Control (longitudinal):
The cockpit control is a lever with a knurled lock-knob located on the right hand side of the cockpit. The lock-knob must be turned counter-clockwise to unlock and clockwise to lock.

On the first few aircraft, the cockpit control is a T-handle located under the lower left side of the instrument panel. To unlock, turn T-handle counterclockwise. Pull to the desired trim position and lock by turning the handle firmly clockwise.

The trim system is of the bungee type which applies tension to the elevator cable to reduce the control stick back-pressure required while flying at slower airspeeds. Forward position for nose-down trim and aft positions for increasing amounts of nose-up trim, for either type of control.

4. Tow Release Control:
The release control is a knob located below center of the instrument panel. Pull the knob fully aft to actuate the tow hook release.
 5. Dive Brake Control:
The dive brakes are actuated by a lever located at the forward left hand side of the cockpit. Lever is pulled slightly inboard to unlock and aft to the desired degree of dive brake application. To close and lock dive brakes, push the lever forward until it snaps into the locked position. Forces required to open and close the dive brakes are light at low speeds, but will require more force to close as speed is increased.
 6. Main Wheel Brake:
The main wheel brake is a hydraulically actuated disc type and is applied by unlocking the dive brake lever and pulling to the full aft position. The wheel brake is actuated during the final few inches of the dive brake control lever travel. Extra pull force is needed to achieve wheel-braking action.
 7. Instrumentation:
An airspeed indicator, sensitive altimeter and magnetic compass are required. Additional instruments, up to a full panel, are optional at the owner's discretion.
 8. Static Line Drain:
Provision for draining of any accumulation of water from the airspeed static line is made by a spring-loaded valve located at the lower left hand side of center console. To open the drain valve, push forward on the handle pins and turn counter-clockwise approximately 1/4 turn. To close valve, turn handle pins 1/4 turn clockwise and release.
- Factory flight tests have shown that with this valve open in flight, air-speed readings are reduced slightly. Flight with this valve inadvertently in the open position is therefore not particularly hazardous, and, in an emergency, may be used as an alternate source of static pressure

9. Canopy Latch:
Located on right side center bottom canopy frame. Push down and forward to secure canopy. Reverse to unlatch - the handle is at right angle to the longeron in the unlatched position.
10. Cockpit Ventilation:
Located at top left side or right side of console. Adjust valve as desired.
11. Clear-vision Window Panel:
Located at left or right bottom side of canopy aft of center. To open, pull small knob inward and slide panel aft to ventilate and remove condensation from internal canopy surfaces.
12. Headrest Adjustment Lever:
Located at center of aft hatch forward bulkhead. To adjust, pull spring-loaded lever outboard and set headrest to desired position. Release lever to lock in place. Six positions are provided to complement the various seat-back positions.
13. Seat-back Adjustment Levers:
Located at top outboard sides of seat back. Depress both spring-loaded levers inboard and set seat-back to desired position in the adjustment racks. Release levers to lock into position.
14. Retractable Gear Control, I-34R:
The gear retraction/extension control has a slide-tube and cable arrangement with a knob handle, together with a squeeze-type finger lever latch, on the right side of the cockpit. For "Gear Down", the control knob is in the full forward position; for "Gear Up", the control is pulled to its full aft position. At both "Gear Up" and "Gear Down" positions, the control is locked by a pin (on the underside of the latch lever) engaging a hole in the inner slide tube. A "Gear Down" safety pin is provided (attached to a bead chain) for insertion through the slide tubes for additional protection against inadvertent gear retraction during ground-handling or tie down periods.

PREFLIGHT INSPECTION

CHECK ALL POINTS AS LISTED

Fuselage and Cockpit:

- a. Flight controls for free and normal movement.
- b. Rudder pedal adjustment.
- c. Seat and headrest adjustments.
- d. Release hook and linkage.

- e. Instruments, lines, pitot-static openings, static line drain.
- f. Canopy - hinges and latch, head clearance.
- g. Safety belt and shoulder harness.
- h. Wing pins - main spar. and aft carry-thru.
- i. Aileron control attachment, fuselage to wing.
- j. Tire condition and inflation (31 psi).
- k. Wheel brake operation.
- l. Nose skid attachment and condition.
- m. General condition exterior surfaces.
- n. Retractable gear safety pin removed - I-34R only.

Wing:

- a. Aileron hinge and pushrod connection.
- b. Dive brake and mechanism.
- c. General surface condition.

Empennage:

- a. Stabilizer attach, forward and aft.
- b. Elevator - hinges, pushrod attach.
- c. Rudder - hinges and fabric.
- d. Remove inspection plate - rudder and elevator control connections.
- e. Tail wheel.
- f. General condition surfaces and aft fuselage.

WEIGHT AND BALANCE. SGS 1-34

The weight and balance, furnished with each sailplane, should be the concern of each pilot, to familiarize himself with the various weights, and weight distribution limits shown. The "placard limits" plate attached to the instrument panel shows only the basic weight limitations as to maximum pilot weight to reach either (1) maximum gross weight, or forward CG limit, whichever is less; and (2) the minimum pilot weight to maintain the aft CG limit. However, because of variables in loading conditions, pilot-weight limits will also vary. For instance, the maximum pilot weight (for forward CG limit) with the seat back in the fully forward position, will sometimes calculate to be less than the weight necessary to obtain the maximum gross weight. See Weight and Balance Report for the aircraft. It should be understood that the heavier pilot will, in most cases, be tall enough to require that the seat-back be adjusted to a position other than the fully forward position. In such case, it is quite probable that the maximum gross weight figure is applicable, as each succeeding position (aft) of the seat back adjustment will allow a somewhat greater pilot weight and still remain within the forward limit. In any case, flight at, or near, the forward

CG limit condition is not as critical to controllability as is flight at the aft CG limit condition.

CAUTION: Upon entering the cockpit, the nose section should be pushed downward so that the nose skid rests on the ground. Should the pilot's own weight fail to keep the nose skid in contact with the ground, the C.G. condition must be rechecked, to assure that the aft C.G. limit is not exceeded, before flight is attempted. This indication of the C.G. applies to the fixed gear model only.

WEIGHT AND BALANCE. 1-34R

The Datum, MAC and C.G. limits are identical with those for the SGS 1-34.

The 1-34R maximum Gross Weight is 840 **lbs.** gross weight was also approved for the model SGS 1-34 and was made retroactive to include ships Serial No. 1 and up.

The main wheel on the 1-34R, as stated previously, extends farther below the fuselage than on the 1-34. The axle position is also moved forward approximately eleven inches. This has no effect on the weight and balance outcome - only the figures used in some computations.

AERO TOWING

Use normal aero tow procedures. The actual take-off should not be attempted until an IAS of 40 mph is reached. Due to the low angle of attack, a slower attempt of take-off will result in a series of tail bumps which will be severe if the terrain or runway is not smooth. The recommended aero tow speed is 55- 60 mph. Towing slower than an IAS of 50 mph is not recommended.

AUTO OR WINCH TOWING

Both the SGS 1-34 and SGS 1-34R have been flight-tested and approved for auto-winch towing at maximum gross weight. However, with the release hook so far forward of the CG, this manner of launch is something less than ideal. Therefore, not recommended for any pilot without proper instruction or equivalent experience.

Normal auto or winch tow procedures are used, however, as the tow hook is so far forward, the sailplane has a porpoising tendency when too much up-elevator is used for the climb. Should this occur, reduce back pressure on the stick until the porpoising stops. The maximum tow speed of 66 mph must be observed.

TAKE-OFF

The take-off characteristics for the 1-34R are different from the 1-34 because of the more forward location of the main landing gear. For this reason, a forward pressure on the stick is required to raise the tail off the ground to attain a level flying attitude for take-off.

SPINS

Spin entries, rotation and recoveries are all normal throughout the C.G. range. The following characteristics occur as the C.G. is moved rearward.

1. Entries will be more difficult.
2. Rotation will be slower and flatter.
3. Control movements for recoveries more pronounced.
4. Slower recovery, but will not exceed 3/8 - 1/2 turn at aft CG limit.
5. Slower indicated airspeed upon recovery.
6. Less loss of altitude per rotation.

AEROBATICS

The 1-34 is fully aerobatic, but due to the danger of easily exceeding the maximum placard speed from a poorly executed maneuver, it is highly recommended that pilots without aerobatic experience either not attempt aerobatics, or get instruction prior to engaging in such flight.

DIVE BRAKES

Dive brakes can be used for rapid loss of altitude at any time, including the normal landing procedure as described below.

The 1-34's dive brakes are extremely effective and will limit the aircraft's speed to approximately 142 mph in a vertical-attitude dive at full gross weight. They can be opened at any IAS up to 142 mph. To maintain a given IAS the nose must be lowered as the dive brakes are pulled open. The reverse is true when closing them.

SLIPPING THE AIRCRAFT

Slips can be executed normally, but with the effectiveness of the dive brakes it is unlikely that slipping should become necessary.

LANDING PROCEDURES

A. Normal Landing

Pattern It is standard practice to fly a normal traffic pattern. Allow extra airspeed as necessary depending on gust and wind conditions

Approach The approach should be made high with use of dive brakes as needed. They increase both sink and drag which, in turn, creates a steeper and more controllable glide path.

Touch Down Can be made with dive brakes fully open, partially open, or fully closed. However, the latter is not recommended except for practice or to stretch out a landing approach. The actual landing should be made at an IAS of 40 - 45 mph. Landing at a slower speed will result in a tail first landing.

On the I-34R the main wheel is located in a more forward position. For that reason forward pressure is used during the landing roll and stick movement increased as airspeed decreases, until elevator control becomes lost and the tail wheel contacts the ground.

Ground run after landing After touch-down, the aircraft should be literally flown to a stop. Care should be taken to keep the wings level and the track straight. When taxiing in a cross wind, keep the upwind wing low for best possible control.

Wheel brake May be used at any time, and to any extent, for as quick a stop as desired after touch down. The aircraft can be landed with the wheel brake fully on. This will not cause the sailplane to nose over, although an abrupt rotation will occur until the nose skid makes contact with the ground.

B. Landing, Dive-Brakes Inoperative - Emergency Procedure:

In the event that the dive brakes should become inoperative, in which case the wheel brake would probably be also inoperative, the correct landing procedure is:

1. Enter pattern at lower than normal altitude.
2. Fly pattern at a slow but safe speed (45 - 50 mph).
3. Slip as necessary at an indicated 45-50 mph until sailplane is 1/2 wing span from the ground.
4. Raise low wing as altitude decreases, but hold in full opposite rudder.

5. At 2 to 3 feet above ground, wings should be level and opposite rudder eased off to neutral position (straight and level flight).
6. From 2 to 3 feet force the sailplane gently but firmly to a flying touch-down.
7. Upon touch-down, immediately but slowly, push the stick full forward so that the skid will contact the ground and assist in braking to a stop.

It's rather difficult to land a high performance sailplane using the above procedure. Therefore, some practice landings of this type would be very beneficial for a future emergency. However, since an inoperative dive brake is considered to be a remote possibility, a pilot should not attempt to practice this emergency procedure until he has become thoroughly familiar with the normal flight and handling characteristics of the sailplane.

COLD WEATHER OPERATION OF THE I-34

Since the I-34 may be used in wave and winter flying, it is recommended that a low-temperature lubricant be used on all pivot points, bearing surfaces, and other moving parts. To do this, the pins and bolts should be removed and cleaned of any old grease or oil with a solvent. Apply low-temperature grease, such as Esso "Beacon #325", or equivalent, which meets low-temperature requirements of Spec. MIL-G-3276 (See QPL-3278).

DIVE BRAKE FREEZING:

Two types of freezing are possible with the dive brake system. The first is the actual freezing down of the dive brake doors and the second is the high friction of the dive brake control system due to the low temperature effect on lubricants.

Snow or ice on the top surface of the wing will usually be melted by the sun which results in a water film in the dive brake door recesses. In flight as the air cools with altitude, this water freezes the doors into the recesses so that they may not be opened. It is recommended that the doors and recesses be checked and dried off if flying in freezing weather is expected or intended.

The dive brake system should be cleaned and re-lubricated with low-temperature grease as previously stated.

ICE, FROST OR SNOW ON SAILPLANE:

Ice, frost or snow on a sailplane can be dangerous in that it greatly increases stalling speed. All ice, frost and snow should be removed from the sailplane prior to flight. This can most easily be done by cleaning off the excess and then letting the sun melt the rest. If heated hangars or blowers are available, they

1-34 and 1-34R FLIGHT ENVELOPE

can be used. Be sure surfaces are dry before attempting flight. Do not scrape ice, snow or frost from surface as this is likely to scratch the finish, or possibly gouge the skin.

CANOPY PROVISIONS:

Be sure that the bolts and nuts holding the plexiglass to the canopy frame are only snug so that plastic can move as it expands or contracts. It is recommended that clear-view panels be installed inside the canopy to provide a dead air space. Use of the ventilating window may not be practical at extremely low temperatures.

BATTERIES:

Dry and wet cell batteries lose voltage with low temperature. Insulation helps to reduce loss of voltage. Some of the newer types batteries have improved cold weather performance and should be considered.

WHEEL FREEZING:

When operating through slush or mud, it is possible that the wheel well may become filled during one or several take-offs and landings. Then during flight, if temperature drops sufficiently, slush may freeze and lock the wheel. There is no remedy for this except to avoid the slush and mud. The consequence for landing with a wheel locked is not severe - at most, a blown tire could result.

On the SGS 1-34R, the above conditions hold true, but with the additional possibility of the retraction mechanisms and doors becoming frozen in the "gear up" position. While this is undesirable a nearly normal landing can be made on the nose skid without necessarily damaging the sailplane. Allowances should be made to compensate for the absence of the wheel-brake in such an instance.

The graph on the following page (Fig. III) shows the basic Flight Envelope. The aircraft should be operated within the envelope limits at all times. Note the different maximum speeds allowable with or without use of the dive brakes. From points A to C and A to J abrupt maneuvers will not exceed the load factor indicated by this line. Above C (83 mph) the maneuver must be limited to avoid excessive load factors. The gust lines are based on the standard 24 ft/sec. gust. In case of extreme turbulence, such as found in wave conditions and clouds, gusts can be much higher and the aircraft should be operated as slowly as practicable, considering the fact that under turbulent conditions a safe margin above stalling speed should be maintained.

Keep in mind that while the load factors in the Flight Envelope carry a 50% margin of safety, these margins should not be used intentionally - they are for inadvertent conditions only. This is also generally true for over-speeding. A 20% increase in speed above the placard limit will use up the margin of safety. A wise pilot will never use greater speed, or pull more G's than the condition requires.

A word of caution on aerobatics. Sailplane aerobatics is a specialized field and requires instruction and experience to accomplish safely. As previously stated in this manual, it is all too easy to exceed flight limits in an improperly executed maneuver, and for that reason aerobatic flight is not recommended.

PERFORMANCE CURVES

To aid the serious pilot in becoming familiar with the various L/D vs. air-speed relationships, a graph of the calculated performance curves, at maximum gross weight, is provided for his information. See Figure IV.

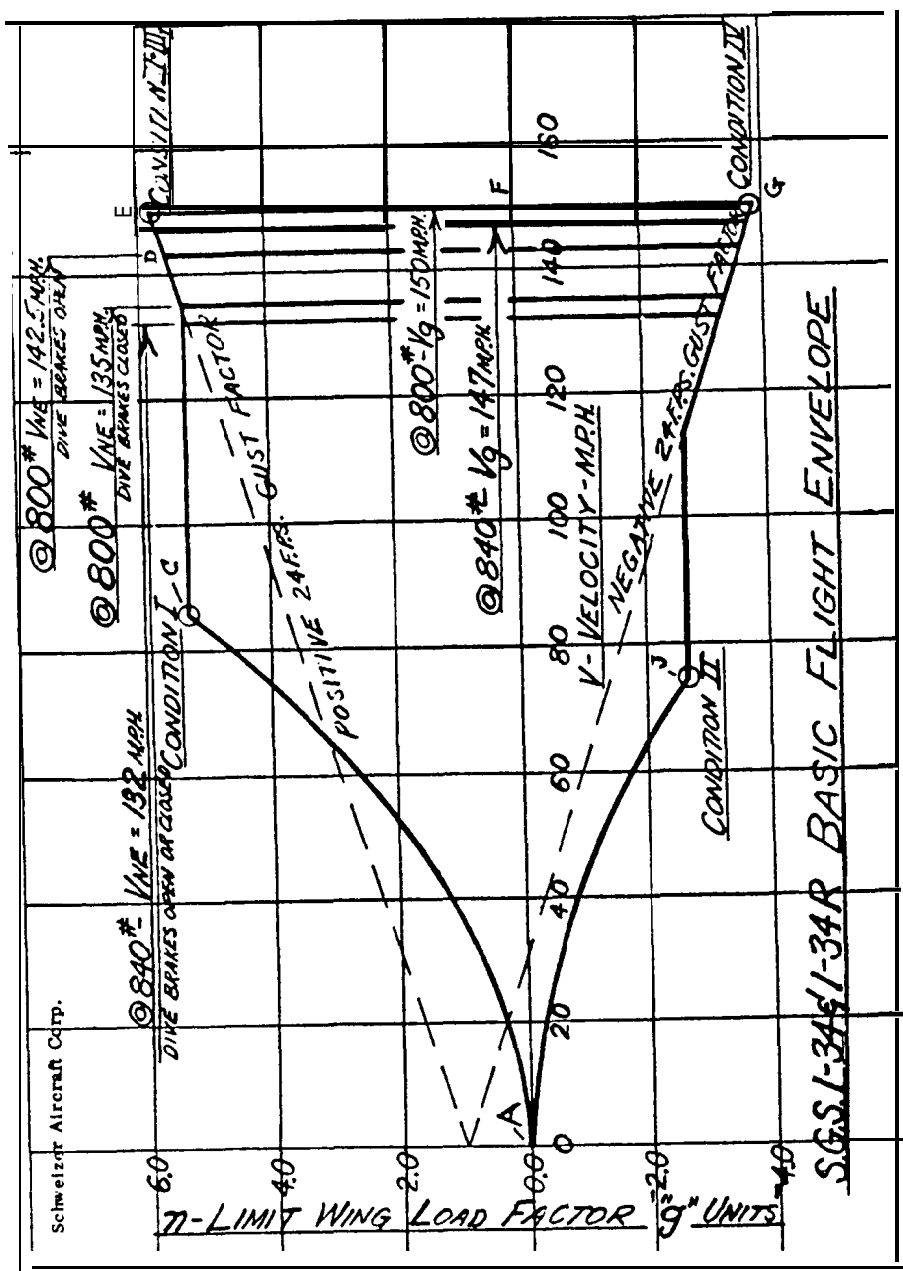
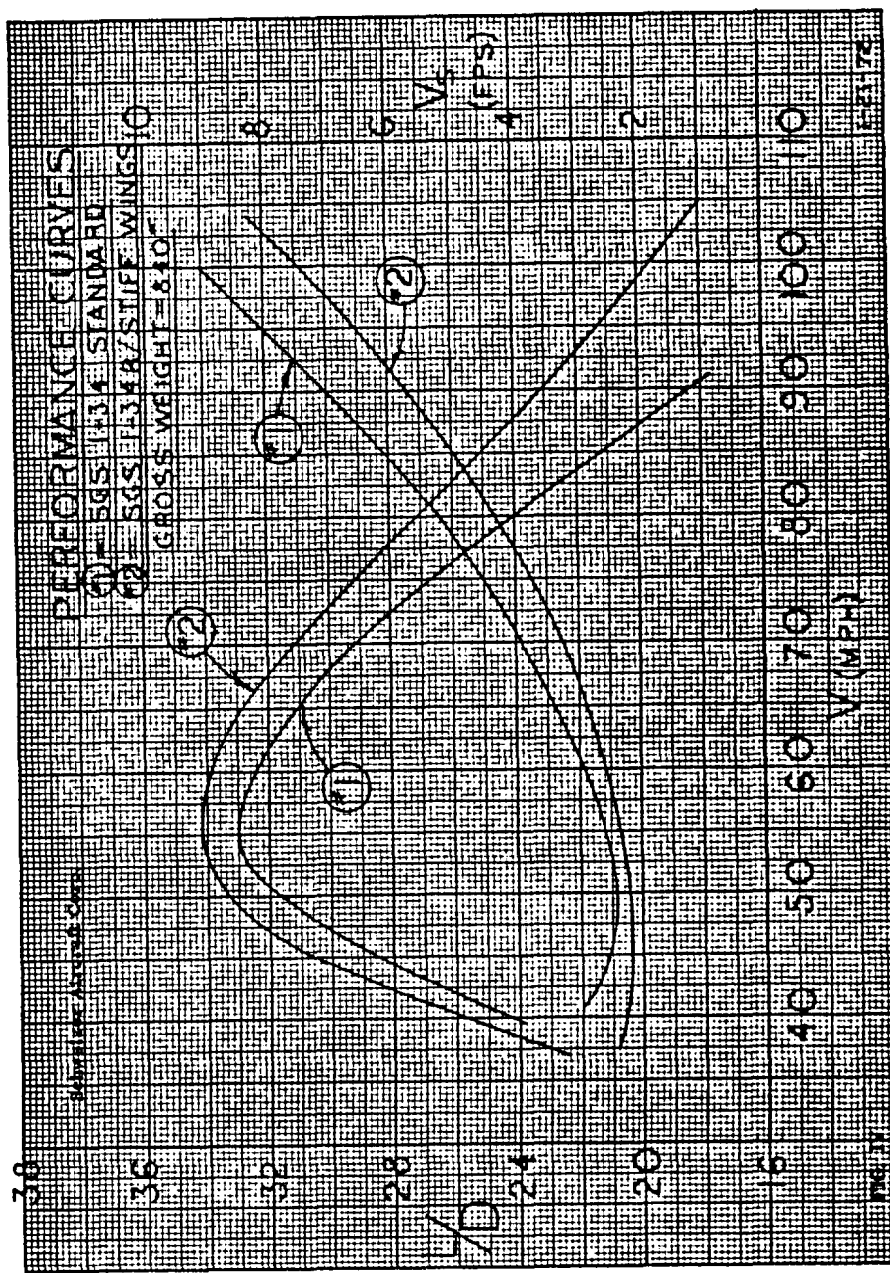


Fig. III



SCHWEIZER AIRCRAFT CORP.
Elmira, New York 14902

Form F-116
1-70
Rev. 1-72

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SECTION TWO

ERECTION AND MAINTENANCE INSTRUCTIONS

MODELS SGS 1-34 & 1-34R

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SGS I-34.- FINAL ASSEMBLY HARDWARE LIST

The following lists of assembly hardware are for a convenient reference.

Wings to Fuselage Attach:

- (2) 34430B-1 Pin - Main, Wing
- (2) 34901B-1 Main Safety Pin
- (2) AN393-25 Clevis Pin
- (6) No. LSP-1, Comm'l. Safety Pin
- (2) 34237D-1 Pin-Rear Carry-Thru
(Captive in Fuse.)
- (2) 34239D-3 Pin - Main Spar (Captive In Fuse.)

Stabilizer to Elevator Attach (Ref.)::

- (2) AN3-11 Bolt (L/R)
- (2) AN310-3 Nut
- (2) AN960-10 Washer
- (2) AN380-2-2 Cotter Pin

Stabilizer to Fuselage Attach:

- (2) 34902A Bolt, Stab. Attach
- (2) AN310-5 Nut
- (2) AN380-2-2 Cotter Pin
- (2) AN960-516 Washer

Fln to Fuselage Attach (Ref.)::

- (1) AN4-7A Bolt (Fwd.)
- (5) AN960-416 Washer
- (4) AN 4-5A Bolt (Rear)
- (4) AN365-428 Nut

Alleron to Push Rod Attach (Ref.)::

- (1) AN3-11 Bolt (L/R)
- (1) AN960-10 Washer
- (1) AN310-3 Nut
- (1) AN380-2-2 Cotter Pin

Rudder to Fin Attach (Ref.)::

- (3) AN3-11 Bolt
- (3) AN960-10 Washer
- (3) AN310-3 Nut
- (3) AN380-2-2 Cotter Pin

Aileron to Wing Attach (Ref.)::

- (2) 34505B-5 Hinge Pin (L/R)
- (2) 34505B-7 Hinge Pin (L/R)

Rudder to Horn Attach (Ref. :):

- (1) AN4-20 Bolt
- (1) AN960-416 Washer
- (1) AN310-4 Nut
- (1) AN380-2-2 Cotter Pin

Tall Cone to Fuselage (Ref.)::

- (12) AN509-8R-8 Screw

NOTE: Items marked "(Ref.)" are not normally disassembled for routine handling and tralling.

ERECTION PROCEDURES

To facilitate disassembly for trailering and reassembly at the launch site, the I-34 is so designed that this may be accomplished easily and **quickly**.

Unloading from Trailer:

A. Unloading Preparations:

1. Release trailer from towing vehicle.
2. Place tow-bar end on ground and block up the aft end with a saw horse, jack or other convenient means.

B. Wing Removal:

1. Unfasten wing tip tie down.
2. Loosen and remove bolt that fastens the spar butt to the trailer.
3. Place one person at the wing tip, holding the wing by its leading and trailing edges.
4. Place one person at the root end, lifting by the wing leading edge.
5. Both men lift the wing simultaneously, high enough to clear the trailer.
6. When the wing is clear of the trailer, carry to its relative position near the point of assembly and place flat on the ground.
7. Remove the opposite wing with the same procedure outlined above.

C. Horizontal Stabilizer:

1. Remove wing-nuts from frame and swing the holding straps down out of the way.
2. Remove stabilizers from traller and carry to position.

D. Fuselage Removal:

1. Remove canopy and set aside in a safe place.
2. Remove the blocking means from under the rear of the trallsr, reverse the tilt of the trailer so that the aft end rests on the ground and place the blocking under the forward end.

3. Remove the bolt attaching the tail wheel bracket to the trailer.
4. Remove supports from fuselage attach points at rear carry-thru; at the same time make sure that the fuselage is supported manually.
5. With one person guiding the tail wheel, and one on each side of the fuselage at the cockpit, lift fuselage out of the wheel chocks and carefully back the fuselage off the aft end of the trailer.

SAILPLANE ASSEMBLY

A. Wing to Fuselage Assembly:

Before attaching the wing to the fuselage, check to insure that no dirt is clinging to the spar butt or between the fuselage carry-thru plates. A soft cloth may be used to wipe the surfaces clean. The main wing pin holes, the holes in the yoke fitting on each side of the fuselage and the rear carry-thru fitting should also be checked for cleanliness. It is recommended that a step-by-step procedure be followed to avoid trouble. A light film of grease applied to the inside surfaces of the right hand yoke fitting, also on the wing spar in the area of contact, may be beneficial in sliding the wing into position.

1. Support the fuselage in a normal upright position with the canopy and wing fairing removed.
2. Wings should be conveniently located on the ground, or on racks, on their respective sides of the fuselage. Assembly hardware should also be placed near its point of use. The dive brake control lever in the cockpit must be in its forward position and locked in order for the dive brake slip-fittings to engage automatically.
3. Check to make sure that the four captive (3/8" dia.) L-shaped pins (2 for the rear carry-thru and one each upper side of the fuselage at the U-shaped yoke fitting), are completely disengaged by pulling the pins forward against the pin stops.
4. The right hand wing is to be installed first, as it has a wing alignment pin installed on the underside of the spar butt. Have one person level the fuselage standing on the right hand side of fuselage. Two men pick up the wing, one at the tip and one at the root. The leading edge of the wing is handed to the man supporting the fuselage and the man carrying the wing root moves to support the trailing edge.
5. The spar butt is raised to clear the fuselage wing attach yoke fitting and wing alignment pin on the lower side of the spar butt. Lower wing into the yoke fitting and have tip man push wing inboard to

engage wing alignment pin in its receiver block together with the rear carry-thru fitting. Extreme care must be exercised at this point so that the man guiding the rear carry-thru fitting into position does not have his fingers caught between the sharp wing skin and the fuselage.

6. After engagement of rear fitting and wing alignment pin, rock wing slightly and insert 3/8" rear carry-thru pin and safety each by turning the L-shaped handle portion to the vertical position, lower the hinged-plate over the end of the handle and install a type AN416-1 safety pin through the hole provided in the handle end.
7. Next, insert the forward L-shaped wing attach pin at the yoke fitting under the spar. Push the pin aft, through the main spar and the aft leg of the yoke fitting, until stopped by the roll pin bumping against the forward leg of the yoke fitting. Safety the wing pin by installing a type AN416-1 safety pin through the wing pin just aft of the forward guide bracket.
8. The right hand wing tip should now be held, or supported, in a nearly level position, while the three persons install the opposite wing in a similar manner to that outlined above.
9. Install the two main wing pins P/N 34430B-1. A slight rocking at the wing tip will aid in inserting each pin as will the convenient handle, Safety both main pins using the P/N 34901B-1 large safety pins; the two aileron pushrods are attached to the aileron idler horn by engaging the quick-disconnect pins (captive in the idler horn), and are then safetied with (2) AN416-1 safety pins.
10. Check operation of dive brake doors and aileron control system to insure freedom of movement.

B. Horizontal Tail Surfaces to Fuselage:

Before placing stabilizer on the fuselage torque tube, check to make sure that the torque tube is free of dirt or grit. A soft cloth should be used to wipe the surfaces clean.

NOTE: The stabilizers and elevators are essentially symmetrical and are capable of being installed on opposite sides of the fuselage. However, the lower surface of each stabilizer can be identified by a rectangular notch in the aft inboard corner of the skin.

1. Place stabilizer on torque tube, align the stabilizer with forward line-up hole and the elevator with the elevator-drive-assembly pins. Push further inboard until the (vertical) attach hole in the stabilizer aligns with that in torque tube. Insert P/N 34902A-1 collared attach bolt, add AN960-516 washer, AN310-6 nut and (1) AN380-2-3 cotter pin.
2. Repeat the above procedure for opposite hand.
3. Check operation of the elevator control system for freedom of movement.

C. Control Surfaces, Travel:

1. In the event that the rigging of the control surfaces has been disturbed, the travel of the moveable surfaces must be rechecked to assure that they are within their respective specified tolerances. Specified travel of the various surfaces are shown below. In case protractor-type measuring devices are unavailable for making this check, the chordal dimensions, min. and max. from neutral, are listed immediately following the callout in degrees.

Aileron: 30-1/2° to 33-1/2° UP --- 4.96" to 5.43" at inboard end
10° to 13° DOWN ----- 1.64" to 2.14" at inboard end

Dive Brake: Upper 87° to 97° --- 9.64" to 10.48" at inboard end
Lower 68° to 78° --- 7.27" to 8.18" to inboard end

Elevator: 26° to 31° UP --- 5.34" to 5.90" at intersection of trailing edge and root rib
24° to 27° DOWN --- 4.58" to 5.16" at intersection of trailing edge and root rib.

R Rudder: 30° to 33° L&R --- 8.18" to 8.98" at bottom of trailing edge

2. Aileron control stops are located on the under-floor bulkhead and contact the horn on the control stick torque tube just above the cable attach points.

Elevator control stops are located beneath the control stick torque tube, immediately forward and aft of the control stick.

Rudder control stops are bolts, placed vertically through brackets in the aft fuselage, which restrict rotation of the rudder horn.

D. Wing Fairing and Canopy:

1. To install the fiberglass top wing fairing carefully align the slots formed by the joggled strips on the aft end of the canopy over the metal lip protruding forward from the aft fuselage. Push the fairing aft until the studs on the fuselage line up with the respective hole in the attach angle inside each forward corner of the fairing. Push the canopy down over the studs. When properly seated, insert the two type AN415-2 pins thru the hole provided in each stud. Secure the ball-type latches, one each side, connecting the upper and lower sections of the bulkhead at the forward end of the fairing.
2. Canopy installation is accomplished by placing the canopy in position over the double studs on the hinges located on the top of the left hand cockpit longeron. Lower the canopy, guiding the studs through the holes in the canopy frame. Insert the looped-end pins, P/N 34227R-15, along the top side of the canopy frame member, through the holes provided in the double-studs at each hinge. The canopy restraint cord is tied to the pin (AN395-32) located in the aft canopy bow, about six inches to the right of canopy center line. The S-hook on the opposite end of the restrainer cord is then hooked into the eyebolt, attached to the bulkhead in the aft, right rear corner of the cockpit. Position the latch handle directly inboard and close canopy.

To lock the canopy from outside the sailplane, push inboard and aft on the small sliding vent window located in the lower left hand side of the canopy glass. Reach across cockpit and rotate latch handle forward until seating of the latch pin into detent is felt. Reverse the above procedure to open canopy from outside the aircraft.

GENERAL MAINTENANCE

The all-metal construction, rudder **fabric** covering excepted, **serves to minimize** maintenance required for **normal operation**.

LEVELING:

1. Lateral - using adjustable supports under the wing tips, level the aircraft and check with a spirit level along the upper edge of the bulkhead aft of the rear.
2. Longitudinal - raise the tail of the sailplane, place support under the tail wheel and check with a spirit level at the rivet line along the side longeron, aft of the wing **trailing** edge.

LUBRICATION:

The pulleys in the various control systems are equipped with sealed anti-friction bearings and, under normal operating conditions, are considered to be permanently lubricated. This also applies to the square slide-tube for rudder pedal adjustment, the main wheel bearings, and the aileron push-tube guide rollers inside the wing.

A good grade of engine lubricating oil (SAE #30) may be used on pivot points throughout the control systems. However, under dry and dusty conditions, it is desirable to use a dry-type lubrication such as a silicone, or solid-film spray or stick lubricant to prevent retention of grit or dirt around the bearing.

The Lubrication Charts (Figs. I, II and III), indicate the points requiring lubrication and the type of lubricant to be used. The maximum interval for complete lubrication is at annual inspections.

FABRIC COVERING:

1. The rudder is the only surface on the aircraft which is fabric covered. The covering is a synthetic fabric, "Ceconite No. 103", manufactured and sold by Ceconite, Inc. 4677 Worth Street, Los Angeles, Calif. 90063. A Ceconite Process Procedure Manual No. 101 may be procured from them for guidance in maintenance and repair of this fabric. See front of aircraft logbook for finishes applied.
2. FAA Manual No. AC43.13-1, Chapter 3, also contains guidance information for fabric testing and repairs.

LUBRICATION CHART

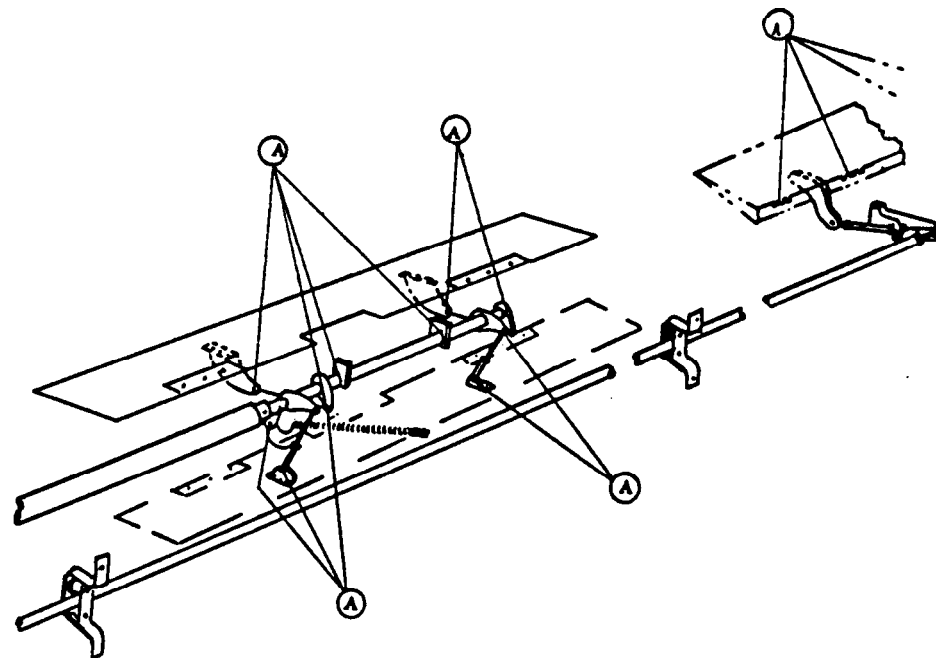
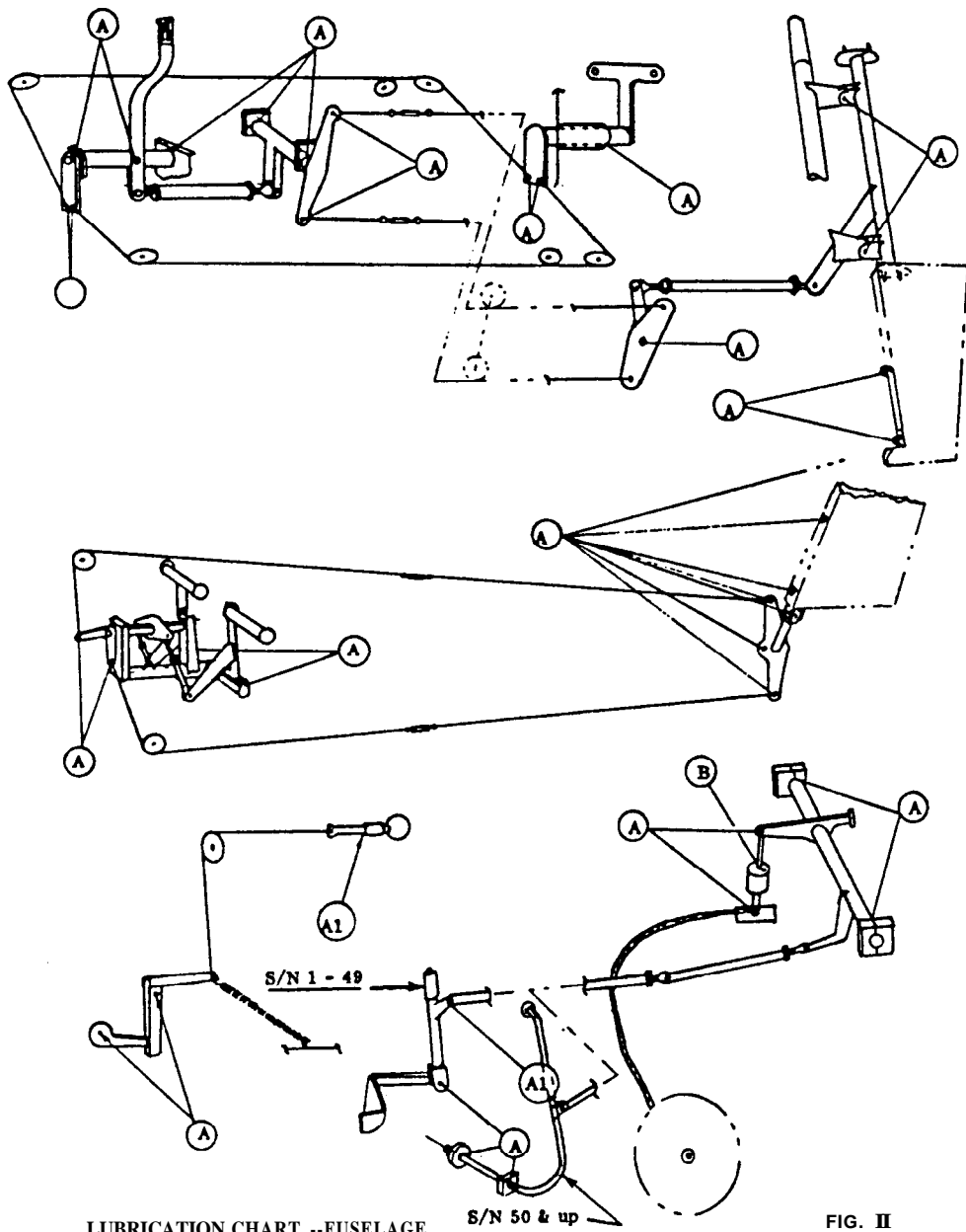


FIG. 1

KEY TO LUBRICATION:

- A** Lubricating Oil (SAE #30)
- B** Silicone or Solid-Film Spray (alt.)
- C** Hydraulic Fluid (MIL-H-5606 or equiv.)

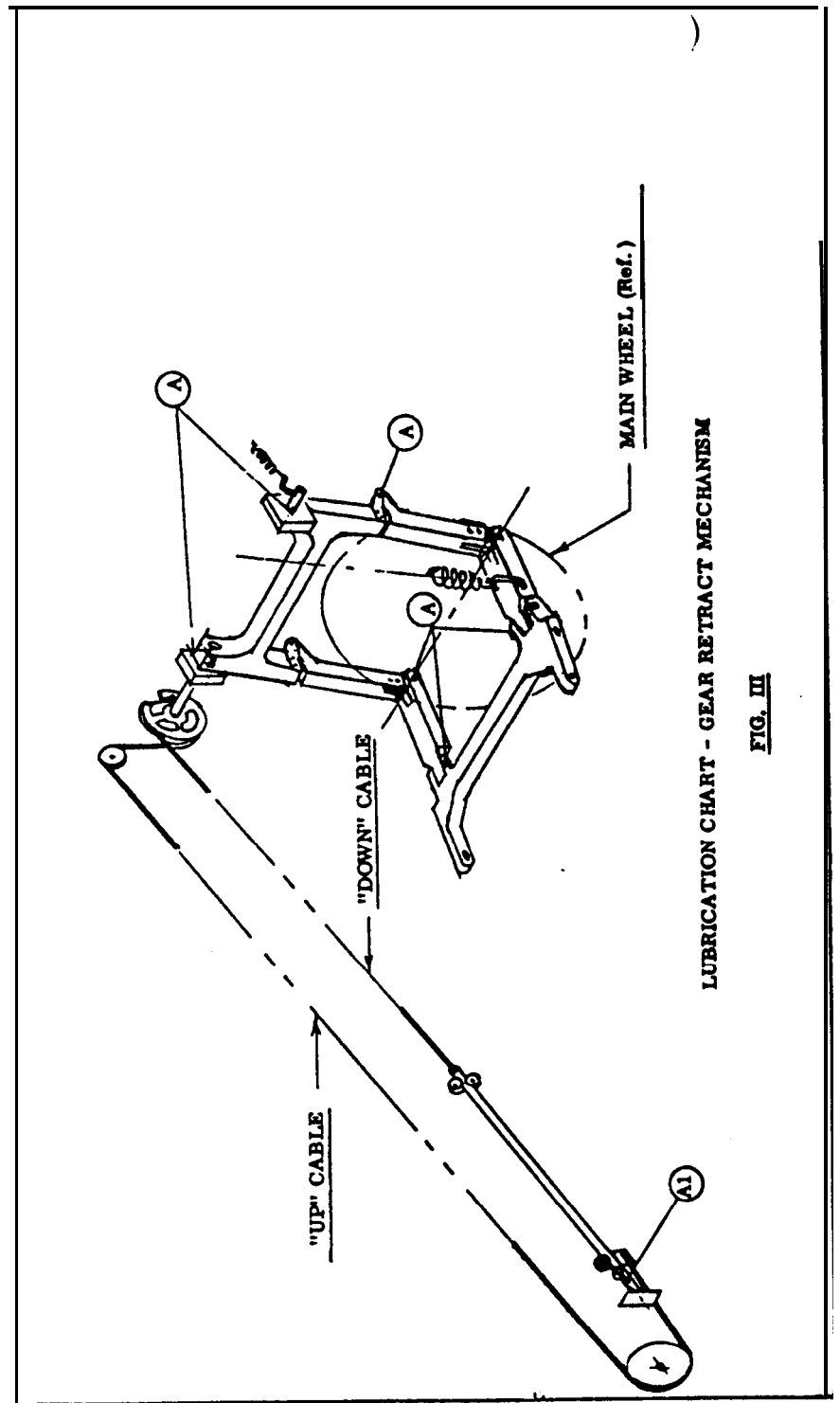


LUBRICATION CHART --FUSELAGE

S/N 50 & up

2-9

FIG. II



LUBRICATION CHART - GEAR RETRACT MECHANISM

FIG. III

2-10

FINISH:

1. The production aircraft are finished with acrylic lacquer. (Exceptions are ship serial numbers 7 and 8, which have enamel finish). Colors, manufacturer and manufacturer's numbers of the material applied is noted in the aircraft description section in the front of the individual aircraft logbook.

RIGGING:

1. The angle of incidence and dihedral angle are built into the wing and fuselage and are not adjustable in the field.
2. The aileron and elevator control system cables are rigged to a tension of 10 to 12 lbs. The tension should not be exceeded to prevent friction build-up in the system.
3. The rudder control cables are rigged to a tension of 10 to 14 lbs. This rigging tension is to be developed prior to attaching the rudder bungee link cables, from the captive pretensioned springs in the aft fuselage, to the bolt connection on the rudder cable turnbuckles.
4. Control cables should be rigged with the turnbuckle threads flush with the end of the barrel, although a maximum of three threads showing is permissible. Safety wiring of turnbuckles is done by the double-wrap method shown in Chapter 4 of FAA Manual AC43.13-1, or in Military Standard No. MS33591.
5. The dive-brake/wheel-brake linkage should be rigged so that there is no lost motion when the control handle is moved. Loosely rigged linkage may result in partial opening of the dive brakes even though the control lever is locked in the closed position. The wheel brake should be rigged to phase-in at the last segment of the brake lever travel. The wheel brake should be fully on at the point when the dive brake doors have reached maximum travel.
6. The spring attached to the aft end of the tow hook release arm should be tensioned to a point which requires a pull (aft) of 9 to 20 lbs., at the tow hook slot in the arm, to actuate the release arm and release the hook.
7. On the 1-34R, the main gear up-cable and down-cable should be rigged to equal tension so that the cables do not drag in fairleads. However, avoid excess tension which would cause friction build-up and consequent difficulty in operation of the control.

WHEEL AND BRAKE:

The main wheel is a split rim type, with roller bearing in each half. The tire is a 5.00 x 5 (aircraft) Type III, 4 ply rating and takes a 8.00 x 5 tube. Inflation should be maintained at 31 psi.

The main wheel brake is a Cleveland Aircraft Products Co. No. 30-S. It is a disc type, hydraulically operated by a cylinder. Scott Aviation. Part No. 44083, mounted in the aft fuselage section on the right hand side.

The brake system is serviced with hydraulic fluid (specification MIL-H-5808, or equivalent) by removing the filler head screw from the top plate on the master cylinder and filling through this Brewhole.

To bleed the brake system, remove the bleeder-valve cap on the brake assembly, opposite the line-attach point. Actuate the brake cylinder and, while pressure is maintained, crack the bleeder-valve screw to allow air to escape. Repeat this cycle, adding hydraulic fluid as necessary, until the air is exhausted. Check brakes for normal operation then tighten bleeder valve screw, replace bleeder-valve cap, also replace the screw in master cylinder filler-hole.

An "O" ring (type AN6290-4) is required in the master cylinder outlet and is inserted ahead of the (type AN815-4D) tube union fitting.

MAIN GEAR RETRACTION MECHANISM. 1-34R:

Retraction of the main gear is effected by the knee-action between the rear fork (upper) and the lower wheel support struts. The rear fork (upper) is bolted to trunnion shafts, the right hand shaft being also bolted to a sector assembly which, through a cable arrangement, rotates the upper rear fork forward and up together with the struts and forward fork. A large spring, mounted in a near-vertical in the forward left hand corner of the wheel well, compensates for most of the weight of the wheel and forks thereby reducing control actuation effort to a reasonable level. Adjustable stop-bolts, with jam nuts, are incorporated in both lower struts to facilitate adjustment, as needed, between the rear fork and struts when the gear is in the down position.

The gear doors are linked, with a turnbuckle, directly to the lower end of the wheel support struts. Adjustment for proper closed position is the only adjustment necessary.

The brake line is routed through grommets in the wheel well cover and care must be exercised in providing the correct lay of the line to prevent kinking of the line when the gear is in the up position.

Fig. III shows a schematic of the gear arrangement and lubrication requirements.

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PREFLIGHT INSPECTION

Refer to the Flight Procedures portion (section 1) of this manual for instructions relative to Preflight Inspection.

ANNUAL OR 100 HOUR INSPECTION

Federal Aviation Regulations require that 100 hour inspection be performed on aircraft which are used in commercial service. All aircraft, regardless of usage, are required to undergo an Annual Inspection in order to maintain the validity of the Certificate of Airworthiness. The form reproduced on Page 15 may be used as a guide for performing and recording these inspections. Useful and official information is listed in FAA Glider Data Sheet No. G3EA.

FORWARD FUSELAGE:

- a. Skins, damage, cracks, buckling.
- b. Canopy, plexiglass cracks or crazing, frame, hinges, latches, vent window.
- c. Upper wing fairing aft of canopy, for cracks or damage.
- d. Nose cap, pitot tube, static vents, ventilating-air tube.
- e. Seat, back and bottom adjustments.
- f. Control stick, torque tube, elevator push rod.
- g. Elevator bellcrank, fwd. operation, attach points.
- h. Elevator control cable system, tension, turnbuckles.
- i. Instrument panel and instruments, pitot/static lines.
- j. Radio and accessory console.
- k. Cabin ventilator, ducts, outlets.
- l. Rudder pedals, adjusting mechanism, return spring.
- m. Rudder control cable system, fairleads, tension, bungee, turnbuckles.
- n. Tow release control, cable, pulley, spring tension.
- o. Release arm, attachment, condition, spring tension.
- p. Release hook, attachment, condition, operation.
- q. Safety belt and shoulder harness, condition, attachment.
- r. Dive brake mechanism (fuse.). attachment, handle lock.
- s. Placards, instrument markings, legibility, currency.
- t. Lubrication of controls (See Lubrication Chart).
- u. Gear retraction control, locking lever, down lock pin, cable condition and attachment, operation. (I-34R ONLY)

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AFT FUSELAGE:

- a. Elevator cable runs, fairleads, guide pulleys, Sta. 161.
- b. Rudder cable runs, fairleads.
- c. Skins, damage, cracks, buckling.
- d. Stabilizer, condition, attachment.
- e. Elevator, condition, hinge bolts, safety.
- f. Elevator bellcrank, wear, security, pushrod and horn attach, safety.
- g. Fin, general condition, attachment forward and aft.
- h. Rudder, fabric, hinges wear and safety, air seal, balance weight attach.
- i. Rudder bellcrank, universal attach to rudder, wear, attachment, safety.

WINGS:

- a. Spar butt, main wing pin attach holes (.499/.501).
- b. Main wing pin, wear, damage, handle attach, safety.
- c. Main spar, captive pin, attachment, safety.
- d. Aft carry-thru, captive pin, attachment, safety.
- e. Aileron push rods, condition, attachment.
- f. Aileron bellcrank, condition, pivot bolt, safety.
- g. Ailerons, condition, balance weight attach, hinges, safety.
- h. Dive brake torque tube, condition, inboard engagement, outboard attach bolts.
- i. Dive brake mechanism, rod end attach, return spring attach.
- j. Dive brake doors, condition, rod end attach, hinges, safety.
- k. Wing skins, buckling, damage.
- l. Wing tip wheel (optional), condition, attachment.
- m. Lubrication of dive brake mechanism. (See Lubrication Chart)

LANDING GEAR:

- a. Nose skid and shoe, condition, attachment.
- b. Wheel, condition, bolts, bearing noise, axle attachment.
- c. Tire and tube, condition, inflation (31 psi).
- d. Brake, operation, cylinder, fluid level, line, grommet, puck and disc, torque arm attachment.
- e. Tail wheel and bracket, condition, attachment and safety.

I-34R ONLY:

- f. Gear retraction mechanism, wear, attachment, down-stops, safety.
- g. Gear door, condition, linkage adjust, attach, safety.

Model _____ S/N _____ Reg. No. N- _____ Work Order No. _____

Check the following for proper installation, tension, safety, wear, excessive free play, evidence of corrosion or other damage. Indicate airworth by checking () block. When unairworthy items are noted, leave appropriate block blank, until corrected.

NOTE: This form may be reproduced for used in the field.

FWD. FUSELAGE & COCKPIT:

- | | |
|------------------------------------|-------|
| a. Control stick & torque tube | _____ |
| b. Forward elevator bellcrank | _____ |
| c. Elevator cables and guides | _____ |
| d. Bungee control and cable | _____ |
| e. Release control and cable | _____ |
| f. Dive-brake control | _____ |
| g. Rudder pedals and springs | _____ |
| h. Rudder cables and guides | _____ |
| i. Instrument installations | _____ |
| j. Cabin ventilator | _____ |
| k. Canopy (glass and latches) | _____ |
| l. Safety Belt | _____ |
| m. Shoulder harness | _____ |
| n. Gear retraction control (I-34R) | _____ |

RIGHT WING:

- | | |
|-----------------------------------|-------|
| a. Main attach pin holes | _____ |
| b. Drag fittings and attach holes | _____ |
| c. Long ail. push rod and guides | _____ |
| d. Dive brake torque tube | _____ |
| e. Dive-brake well & contr. inst. | _____ |
| f. Aileron idler inst. | _____ |
| g. Aileron pushrod and horn | _____ |
| h. Aileron hinges | _____ |
| i. Wing tip | _____ |
| j. Exterior surface | _____ |
| k. Visible interior surfaces | _____ |
| l. Leading edge | _____ |

EMPENNAGE GROUP:

- | | |
|---------------------------------|-------|
| a. Stab. attach holes & pins | _____ |
| b. Elevator hinges | _____ |
| c. Elev. horn att. holes & pins | _____ |
| d. Elevator idler horn inst. | _____ |
| e. Elev. cables and guides | _____ |
| f. Fin attach points | _____ |
| g. Rudder hinges | _____ |
| h. Rudder cables & guides | _____ |
| i. Tail wheel & bracket | _____ |
| j. Tail fairing | _____ |
| k. Rudder covering - fabric | _____ |

AFT FUSELAGE:

- | | |
|----------------------------------|-------|
| a. Main wing attach holes | _____ |
| b. Forward carry-thru attach | _____ |
| c. Aftwing attach holes | _____ |
| d. Aft carry-thru attach | _____ |
| e. Aileron, transfer inst. | _____ |
| f. Dive-brake idler inst. | _____ |
| g. Brake inst. and cable | _____ |
| h. Elevator cables and guides | _____ |
| i. Rudder cables end guides | _____ |
| j. Inside skins | _____ |
| k. Wing fairing, aft of canopy | _____ |
| l. Gear retraction mech. (I-34R) | _____ |
| m. Gear doors (I-34R) | _____ |

LEFT WING:

- | | |
|------------------------------------|-------|
| a. Main attach pin holes | _____ |
| b. Drag fittings and attach holes | _____ |
| c. Long ail. push rod & guides | _____ |
| d. Dive brake torque tube | _____ |
| e. Dive-brake well & constr. inst. | _____ |
| f. Aileron idler inst. | _____ |
| g. Aileron pushrod and horn | _____ |
| h. Aileron hinges | _____ |
| i. Wing tip | _____ |
| j. Exterior surface | _____ |
| k. Visible interior surfaces | _____ |
| l. Leading Edge | _____ |

GENERAL EXTERIOR:

- | | |
|---------------------------------|-------|
| a. Tow hook inst. | _____ |
| b. Noseskid and shoe | _____ |
| c. Tire and inflation | _____ |
| d. Identification markings | _____ |
| e. Covering, fabric/metal skins | _____ |
| f. Pitot-static tubes/vents | _____ |

Aircraft Total Time _____ hrs.
 Prev. Ann. Insp. on _____ date,
 @ _____ hrs.

Mechanic's signature _____ Cert. No. _____ Date _____
 Insp. Auth. signature _____ Cert. No. _____ Date _____

By its very nature, a sailplane is susceptible to the effects of winds, More sailplanes are damaged on the ground by the wind than in accidents during flight. This is usually because of either leaving the ship unsecured, or from the me of inadequate tie-downs. Therefore, it is important that adequate tie downs be provided.

The following recommendations, based on experience. may be used as a guide.

1. Sheltered Area: Tall down, ropes (*) at wings and tail (**).
2. Unsheltered Area: Facing into prevailing wind. Rope at wings and tail and chain tie down to release hook.
3. Unsheltered- High Wind Hazard: Tail supported on padded stand. Rope to wings and two ropes to tail. Short chain (5/16" welded link), tie down to tow hook.
4. Flightline Tie Down: Short chain tie down to tow hook (tail in air). Water filled tire tubs on end of one wing.

NOTE:

- * Minimum size recommended ropes - 5/16" nylon, or 1/2" manila - renewed each season. (Knots can reduce rope strength by 50%).
- ** Ground anchor size and style will depend on soil composition and type of sailplane. In light sandy soils, anchor arm or chain longer and set deeper. A ground anchor should be able to withstand a vertical pull of at least 2,000#. Should not be located directly under tie downs.

Rudderlock - recommended if control locks are not used. Ailerons and elevator can be secured with seat belt around control stick.

Securing the spoilers or dive brakes "open" will decrease forces.