

SCHEIBE FLUGZEUGBAU GMBH  
August-Pfaltz-Str.23

D - 8060 Dachau  
Tel. (08131) 72083 und 72084



## Instructions For Continued Airworthiness

# SF 34

### Sailplane

This Manual is FAA approved for U.S. registered gliders, and is required by FAA Type Certificate Data Sheet No. ~~G 48 E 4~~

Registration:.....Factory Serial No.: 5117..

Owner:

Published September 1983

Approval of translation has been done by best knowledge and judgement - in any case the original text in German language is authoritative.

1.1. Log of revisions

Revision No.	Pages affected	Description	FCAA approval signature	Date

Pages included:

- 1
- 1a
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 11a
- 12
- 13
- 13a
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 29a

I	<u>Contents</u>	page
	Log of revisions	1,1a
I	Contents	2,2a
II	Description of the systems	3
1	Controls	3,4
2	Drawing of Fuselage controls	5
3	Drawing of Rudder controls	6
4	Drawing of Aileron and divebrake controls	7
5	Instrument tubes and connections	8
6	Radio	9
7	Oxygen system and barograph mount	9
III	Rigging data	10
IV	Rigging and derigging, miscellaneous	11
1	Rigging	11,12
2	De-rigging	12
3	Trailing	12,13
4	Parking	13
5	Cleaning and servicing	13
V	Maintenance	14
1	Maintenance of glider	14
2	Maintenance of Landing gear and brake	15
VI	Weight and moments of the control surfaces	16
VII	Checks	17
1	Daily checks	17
2	Checks in Specific cases	17
3	Regular service	17,18
VIII	Lubrications	19,20
IX	General care	21
X	Airworthiness limitations	22
1	Annual inspection checklist	23,24 25,26
2	Inspection procedure for increase of service time	27,28
3	Components with a limited life time	29,30



## II Description of the systems

### II.1 Controls

Earthing wires interconnect the sticks, rudder pedals, dive brake drive and nose and C.G. coupling. If you work on the above mentioned components make sure that the earthing wires are intact and connected properly.

#### Elevator control

The elevator control is a push-pull control. Both sticks are connected to a push rod beneath the seats. The push rod runs inside the torsion rod of the aileron control and terminates just short of the main wheel. There the control mechanism is diverted so that it passes left of the main wheel from where the long push rod which runs all the way through the fuselage operates the lever which drives the elevator. If the rudder is detached you can pull out the push rod from behind. Access to the front elevator control is provided behind the backrests and by the cutouts in the seats.

The elevator control stops are located on the torsion rod. To adjust them, remove the front stick sack and adjust the setscrews and their lock nuts.

#### Aileron control

Both sticks are connected with a torsion rod beneath the seats. The push rod of the elevator control runs inside the torsion rod which terminates just short of the main wheel where it drives a push rod upwards up to wing level. A short torsion rod with a lever drives the long push rods in the wings. The push rods in the wings in turn operate the ailerons via the differential levers and short driving push rods.

Access to that part of the aileron control which is located in the fuselage behind the back-rests is provided by the cutouts in the seats and the hand-hole in the baggage compartment. The part which is in the wings can be reached through hand-holes near the aileron drive.

The stops for the aileron control are located on the side of the front stick. To adjust them, remove the stick sack and adjust the setscrews and their lock nuts.

#### Rudder control

Pedals operate the rudder via control cables. You can adjust the pedals of both the front and rear seats. Turnbuckles couple the control cables of the front pedals with the ones of the rear pedals. The Coupling can be checked and adjusted next to the backrest of the rear seat (tilt forwards if necessary). Springs which are fitted to each pedal provide the cable tension.

The rudder control stops are located on the bottom rudder pedestal and can be adjusted with setscrew and lock nut.

#### Dive brake drive

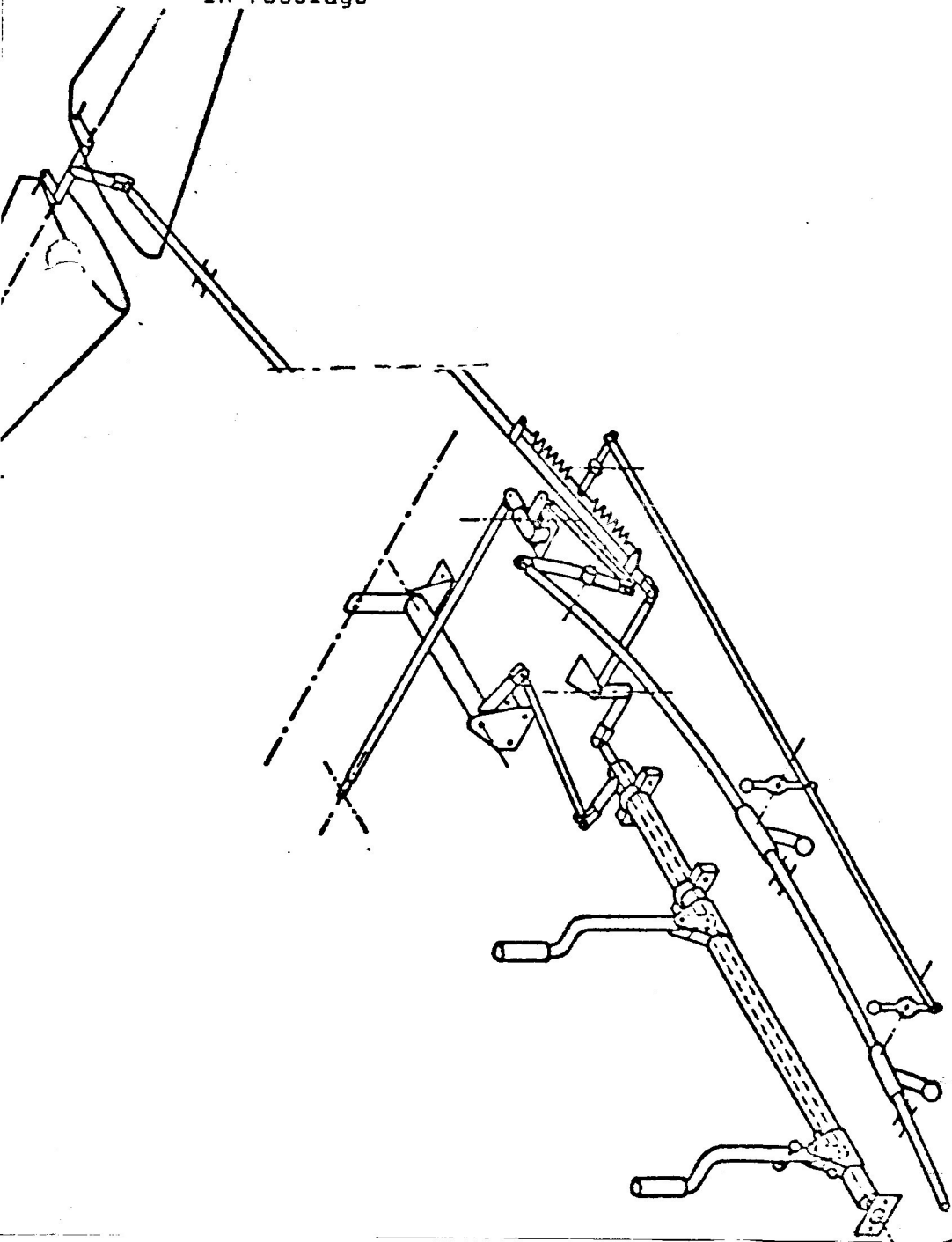
A push rod on port side provides the dive brake drive up to the front wing/fuselage suspension. There the drive mechanism is diverted, extended beneath the wing spar stubs and thereafter attached to each individual drive in the wings (push rods). The dive brake drive is locked at each wing root and can be adjusted with setscrew and locknut.

The dive brake lock must be equally adjusted at each wing. Adjust such that the unlocking force needed when operating one dive brake in the cockpit is approx. 10 deca-Newton.

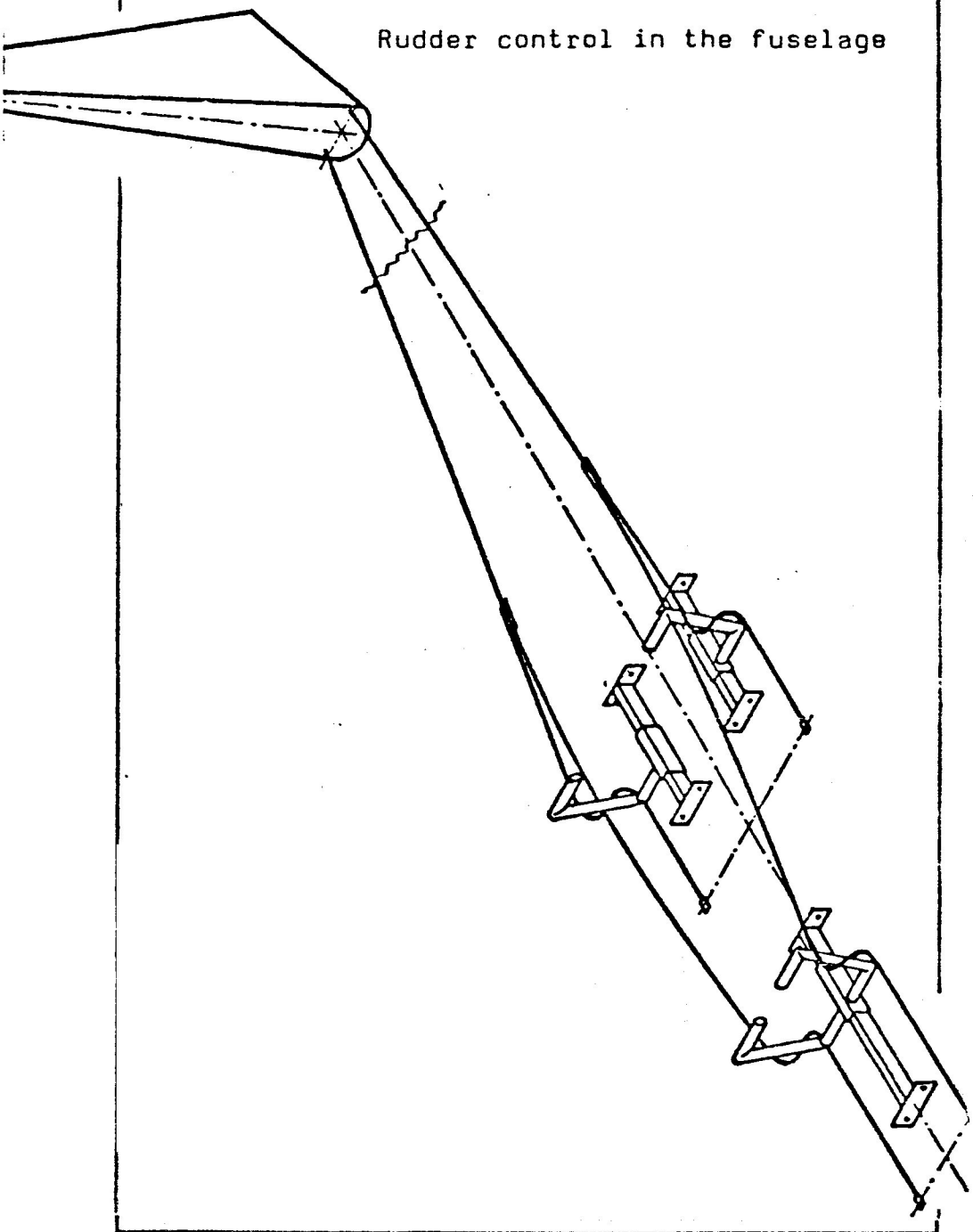
#### Trim

The elevator trim is spring operated. Fibre discs hold the trim levers in the desired setting by friction. If after long use the friction is no longer adequate you only have to tighten the stop nuts of the trim lever mounts a little.

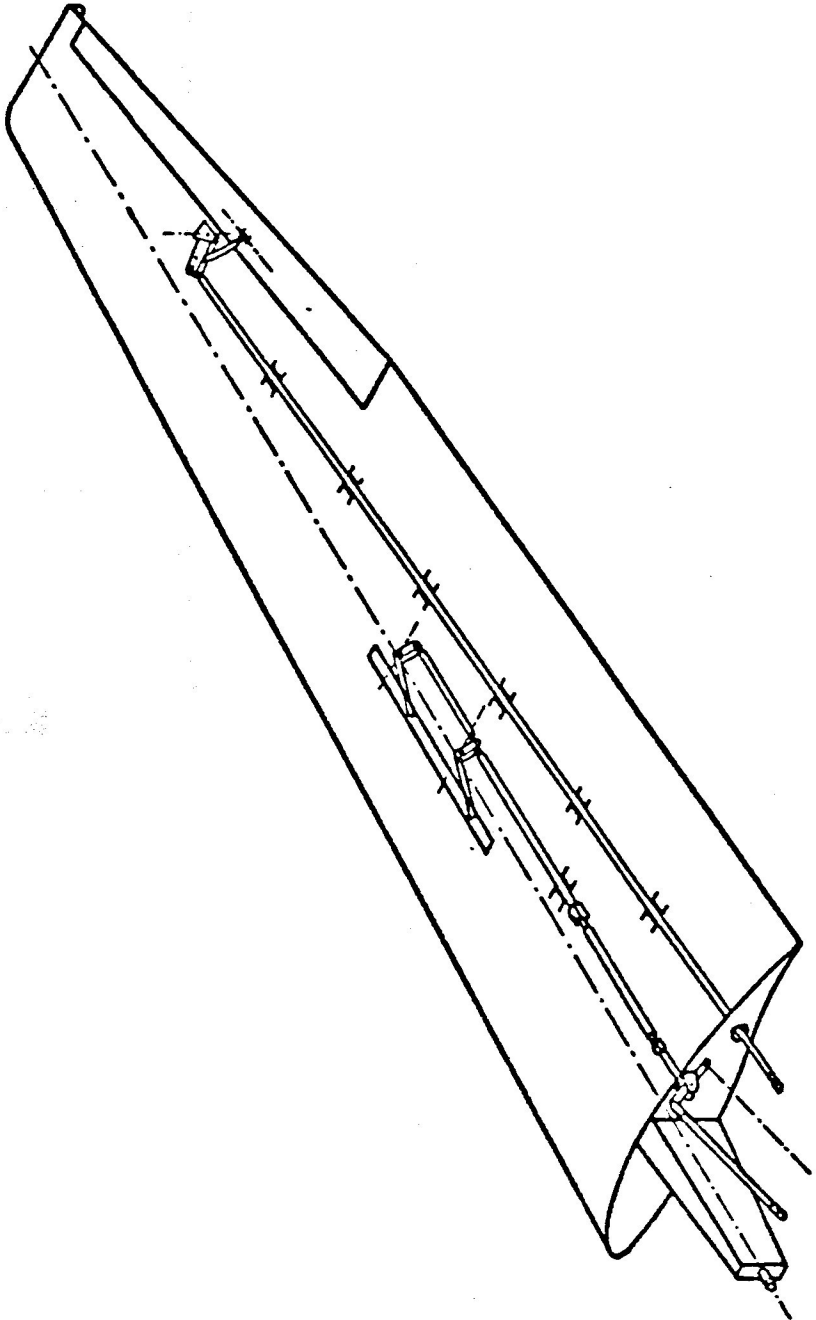
II.2 Elevator, aileron and dive brake control runs in fuselage



Rudder control in the fuselage



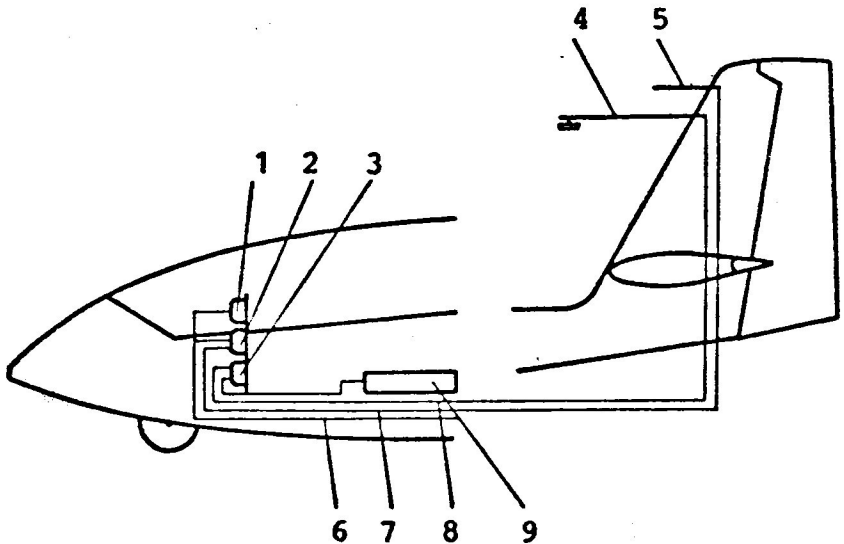
II.4 Aileron and dive brake control runs in wing



II.5 Instrument tubes and connections

Open or remove the canopy to gain access to the instruments on the front panel. Unscrew the rear instrument panel from the fuselage cross-strut for access thereto.

- 1 Altimeter
- 2 Airspeed indicator
- 3 Variometer
- 4 Compensation nozzle
- 5 Pitot head
- 6 Static pressure
- 7 Total pressure
- 8 Nozzle (Total Energy)
- 9 Balance Chamber



### II.6 Radio

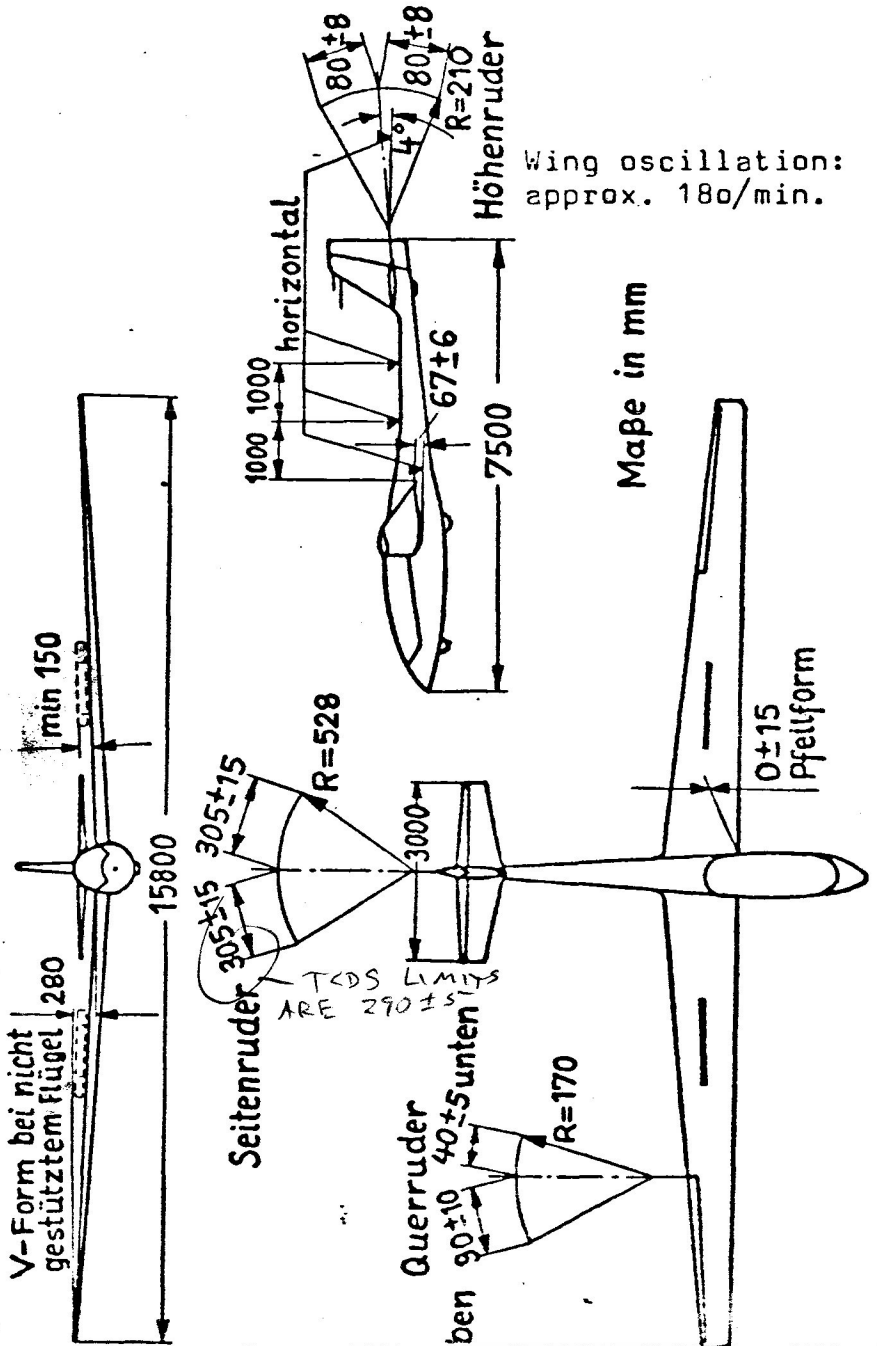
Radios measuring 146 x 47 mm (e.G. Becker COMM 2000 80 x 80 mm (e.G. Dittel FSG 40, Avionic Dittel ATR 720, Joillett ER50) or similar can be installed in the front instrument panel. The most suitable place for the speaker (audibility) is behind the rear instrument panel; another, not so suitable, is in the luggage compartment. Flexible microphones can be attached to the glass fibre reinforced plastic fairing on the starboard side. The aerial for aeronautical frequencies is installed inside the vertical fin. The battery should be installed in the baggage compartment. Notice that the max. allowable weight for baggage and any installations is 15kg. Red adhesive tape on the flat surface of the baggage compartment indicates the position of roving s. Do not damage the roving beams when installing additional equipment.

### II.7 Oxygen system and barograph mount

The oxygen cylinder and the barograph should be mounted on to the flat surface of the baggage compartment. Notice that the max. allowable weight for baggage and any installations is 15 kg. Red adhesive tape on the flat surface of the baggage compartment indicates the position of rowings . Do not damage the roving beams when installing additional equipment.

III. Rigging data

All the measurements are to be taken with the straight section of the rear fuselage kept horizontal.





IV. Rigging and de-rigging, miscellaneousLubrication

Lubricate all connecting links before rigging (if they are dirty clean them beforehand):

1. One main bolt on each wing spar stub.
2. One safety borehole in each wing spar stub and one locking bolt.
3. Three bearings in each of the wing root ribs.
4. The four bolts on the fuselage to which the wings are attached.
5. Four bearings on each side of the horizontal tail unit.
6. Three bearings and one spar tube at the fuselage rear section on each side of the horizontal tail unit.
7. Two aileron and two dive brake connections on the fuselage and wing side.
8. Two canopy hinges (i.e. the canopy emergency jettisoning mechanism).

Four people can rig the SF 34 without the help of any rigging aids. Remove the canopy before rigging and keep the fuselage horizontal throughout. The use of a fuselage pedestal or the assembly stand of a trailer is recommended.

IV.1 1. Wings

Insert both spar stubs into the fuselage in any order. To avoid the right wing's dive brake control getting under the torsion rod of the aileron drive during insertion of the spar stubs, reach through the hand-hole and lift the torsion rod up by hand. Align both wing connecting bolts with the bolt guidance in the wing roots by moving the wingtips up or down. After that, telescope both wings by slightly moving them back and forth. The locking bolts can easily be inserted if the wing is balanced. Secure the wing with a locking pin.

2. Aileron and dive brake connections

Connect the push-rods of the ailerons and dive brakes (four altogether) with the criving levers, secure them and check whether they hold by pulling

with approx. 5 deca-N. Then install the hand-hole cover in the baggage compartment by locking it with the spring lock.

### 3. Horizontal tail unit

Before assembly pull out the locking bolts at the front of the empennage with a threaded bolt of size No.6 and lock them in this position with a quarter of a turn.

Then slip both sides of the horizontal tail unit on to the spar tubes and insert the driving bolts of the fuselage into the guidance linings of the elevator. After that un~~lock~~ the locking bolts at the front of the empennage. Subsequently push carefully with the palm of your hand against the edges of the tail fins until the locking bolts have disappeared into the frontside of the empennage; the locking bolts have to be pushed in if necessary.

Besides taping the wing/fuselage and empennage/fuselage connections we recommend that the locking bolts in both sides of the horizontal tail unit are taped as well. Wax all the parts which are to be taped well, so that the adhesive tape can be removed without causing damage to the laquer.

### 4. Canopy

Fix the canopy on to the fuselage by pulling the quick release jettison handle backwards. Reach through the direct vision window and move the emergency jettisoning mechanism (canopy hinge) forwards to the stop. Subsequently hook in the canopy locking wire.

Before commencing the day's flying, inspect the aircraft according to the instructions given in section IV.1 of the flight manual.

#### IV.2 De-rigging

For de-rigging reverse the procedure which you adopted for rigging. It does not matter which wing is taken off first.

#### IV.3 Trailering

For trailering we recommend an enclosed trailer. All parts should have a soft support. Also make sure that they cannot get out of their place:

### 1. Fuselage

The fuselage rests on the nose and main wheel, or if the trailer is of the monocoque type, before the main wheel. The monocoque must be at least 400 mm long. The wing suspension bolts can be used for holding down the fuselage. Make sure the skid cannot move sideways.

### 2. Wings

The inside support for the spar stubs must be at least 200mm long (starting from the wing root rib). Alternatively you may support the leading edge with a seat which adjusts to the airfoil profile and which must be at least 400mm long and 500mm high. Outside support beginning approx. 5m behind the wing root rib. Profile shaped support at least 300mm long and 350mm high.

### 3. Horizontal tail unit

Lay both sides of the horizontal tail unit flat on the floor and hold them down with string or put them into profile shaped seats and place them vertically on to the empennage leading edge.

All contact surfaces have to be felt or rubber padded. The manufacturer can provide sectional drawings for making your own fuselage, wing and empennage seats.

## IV.4 Parking

Close the canopy when parking the glider. Tiedown ropes can be attached to the wing tip skids.

If you park the glider in a de-rigged state, jack up the wings at the right distances as described in section II.3 for the trailer, If you do not use profile shaped pedestals (only for temporary storage) you have to provide for a padded leading edge seat of at least 600mm.

If you want to store the glider in an enclosed space for a longer period allow for adequate ventilation.

IV.5 Cleaning and servicing

The glider has a weather-resisting ployester lac finish. However, if at all possible keep the glider dry and free from moisture.

## V. Maintenance

### V.1 Maintenance of the glider

The entire surface of the glider is coated with weather resistant white polyester gelcoat.

The greatest care should be taken in maintaining the fibre glass surface of the glider. Luke warm water should be used to wash off dust, grease, dead flies and other dirty marks. More resistant dirt should be removed by using a mild cleaning agent. Only special silicon-free preparations should be used in maintaining the painted surfaces. (1 Z-Spezialreiniger - D2, Fa. W. Sauer and Co., 5060 Bensberg or Reinigungspolish Fa. Lesonal).

Although very resistant the glider should be protected as much as possible against rain and dampness. Water that has seeped in should be dealt with by storing the glider in a dry place, frequently turning over the dismantled parts.

The most effective way to clean the canopy is to use a special perspex cleaner but if necessary luke warm water can be used. A soft, clean cloth or chamois-leather should be employed to wipe the canopy down. Never rub perspex with anything-dry.

The Safety harness should be regularly checked for damage and general wear. The metal parts of the harness should be frequently checked for corrosion.

Because of its position, the winch launch hook is susceptible to getting very grimy and muddy. It must therefore be frequently inspected for damage, cleaned and greased.

The cables and pulley for the nose and belly hooks should be checked for wear during the yearly inspection.

## V.2 Landing gear and brake

The SF 34 has a fixed nose wheel of size 260 x 85mm (air pressure of 2.5 bar), and a main wheel of size 5.00 x 5 in. (air pressure of 3.0 bar), with maintenance free gas-pressure suspension. The main wheel is suspended in an independent axle in the fuselage. Lubricate the two axle bearings with a grease gun every two months. Two lubrication nipples are provided for this purpose behind the backrest of the rear seat. Lubricate more frequently during heavy operations (flying school) or if you use a gliding site with a lot of dirt about.

The wheelbrake is operated by the dive brake control on the last part of its travel when it is pulled fully back; so do not attempt to touch down with the dive brakes pulled fully back.

Wear of the brake linings and pads respectively might necessitate readjustment of the wheelbrake. The setscrew and lock nut can be reached through the hand-hole in the baggage compartment. The brake linings of the drum brakes have to be at least 1.5 mm thick; the pads of disc brakes have to be at least 2 mm thick.

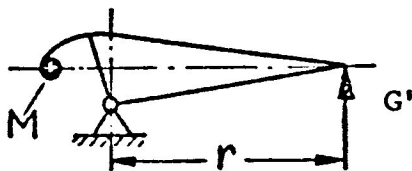
VI. Weights and moments of the control surfacesControl surface moment

After repairs or the application of a new finish the control surface weights and moments must be as follows:

	Moment	Weight
Elevator	5.10-6.72 kg.cm	1.15-1.51 kg
Rudder	16.72-21.28kg.cm	4.84-6.16 kg
Aileron	9.42-11.98kg.cm	1.38-2.52 kg

Remove the control surfaces and pivot them frictionless for measuring their moments  $M' = G' \times r$ . You can measure the mass  $G$  with, for example, a letter scale.

If the actual values exceed the ones above increase the mass balance weight. Contact the manufacturers before a repair or before changing the mass balance weight.



$M$  = mass balance

( 1kg= 2.2 lbs ; 1 kg cm = 0.0723 ft. lbs )



VII.1 Daily checks

Daily checks and checks before launch: See Flight Handbook IV 1 - 3

VII.2 Checks in specific cases

After a heavy landing:

Check the undercarriage, check the undercarriage mountings, check the spar and root rib for white patches in the glassfibre reinforced plastics (GFK). Check the wing fittings in the fuselage and the pins in the root rib.

After a Ground loop:

Check the undercarriage mounting, check the rudder controls.

Check the GFK tube at the base of the fin.

Check the wing fittings in the fuselage and the wing connection.

VII.3 Regular service

The following schedule of service should be carried out every 100 hours or at the annual inspection, whichever ever occurs first.

1. The entire glider should be checked for cracks, holes and bumps.
2. All fittings should be inspected for satisfactory condition (play scores and corrosion).
3. All metal parts should be examined for corrosion, cracks, deformation and if necessary reconditioned and freshly procted.
4. Check that there is no play in the wing and tail-plane to fuselage fittings.
5. The control linkages (Bearings, stops, fittings, hinges and control cables) should be inspected and replaced if there is evidence of bending or corrosion.

6. The controls including the brakes should be submitted to a functional test and the control deflections checked.
7. If the controls do not move free throughout their range, search for the cause and correct.
8. The wheels and brake should be checked to be in good condition.
9. The two hooks should be treated in accordance with their appropriate maintenance manual.
10. Check the pitot for the ASI is clear and that the tubing to all instruments is in good condition and free of leaks or kinks.
11. The condition and calibration of all instruments should be checked and any other equipment inspected.
12. Equipment and instruments should be checked against the equipment list.
13. The wing bending mode has to be established and checked with the figure stated at the approval report (Stückprüfbericht). The glider has to be supported at mainwheel and tail.
14. After repair or change of equipment, the weight table should be updated with the new empty weight and center of Gravity by weighing or calculation.

After extended storage check accordingly to regular service pos. 1 to 11 and inspect for evidence of rodents and birdness.

### VIII. Lubrication

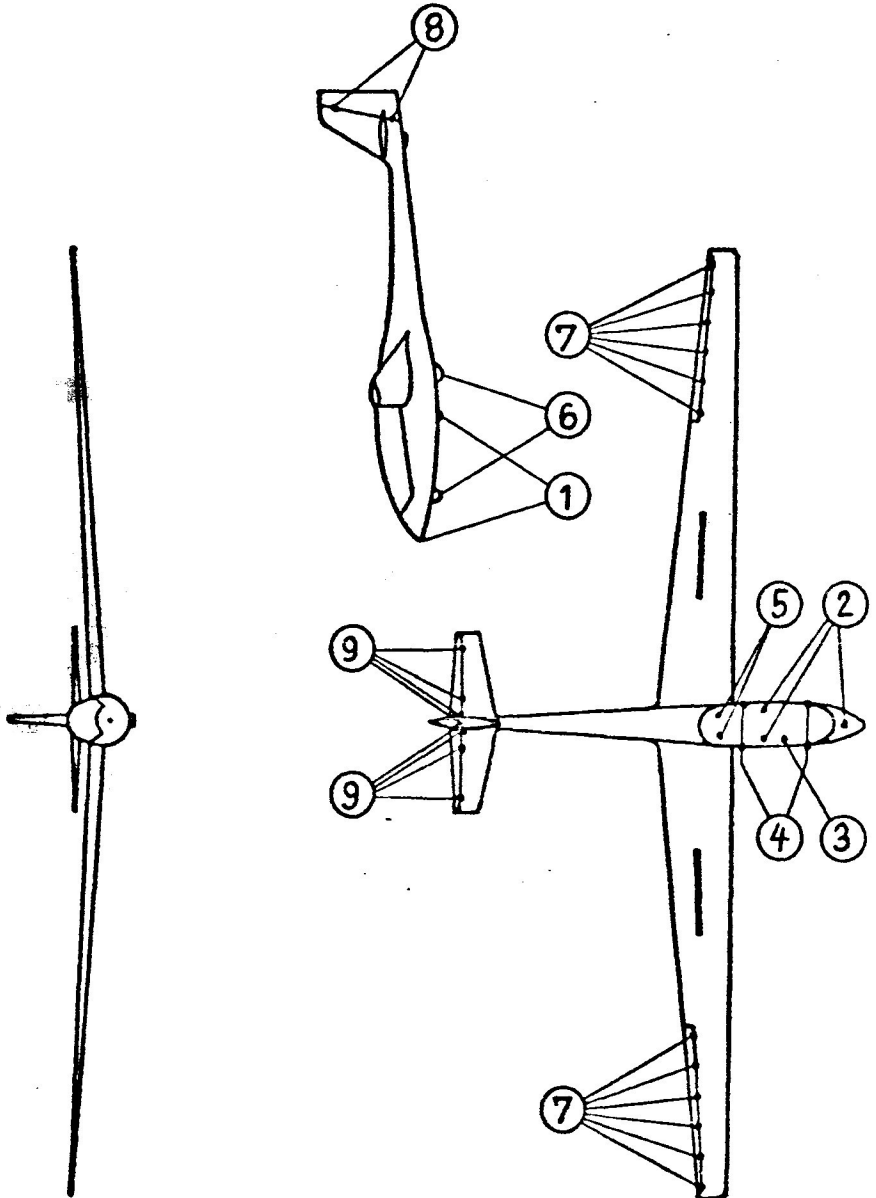
The installed ball bearings are of the pre-lubricated type (maintenance-free filled with lubricant). Neither do the installed pendulum ball bearings require any maintenance nor subsequent lubrication. Nevertheless, always keep a good check on the ball bearings (especially if you operate in tough climatic conditions such as wind-borne sand, air containing salt water, etc.) and clean and lubricate them if necessary.

Besides the lubrication of the landing gear axle (see previous section) and the lubrication during rigging (see section IV.1) carry out a lubrication every 100 flying hours or twice a year, whichever is the earlier.

1. Clean the nose and C of G releases and lubricate them with spray oil.
2. Lubricate the pedal adjustment mechanisms of both seats and oil the pedal bearings, cables and cable intake.
3. Lubricate the back-rest adjustment mechanisms and oil the cable and cable intake.
4. Lubricate the canopy bearings, its lock and emergency jettisoning mechanism.
5. Lubricate two bearings of the landing gear axle with a grease gun.
6. Clean the nose and main wheel if required or if they are dirty.  
Disassemble and lubricate the axle.
7. Lubricate six aileron bearings on each wing.
8. Oil two rudder bearings, two rudder drives and cables as far as they are accessible.
9. Oil three elevator bearings and one elevator drive on each side of the empennage.

Lubrication chart

For legend see page 19



## IX. General care

### Dampness

As far as possible the glider should be protected from dampness. All the metal parts of the glider, with the exception of the wing and tailplane fittings are protected against damp. However, this will not prevent corrosion during extended exposure to moisture. Following any flights in rain any water which has entered the glider should be dried up and the exterior surfaces dried with a chamois leather. Polished metal parts should be regreased. Beware of condensation.

### Sunlight

All structural parts of GFK glider should have white surfaces to avoid them heating up in sunlight.

### Protection of the Finish

The Gelcoat surface layer is very resistant and can therefore be cleaned using a mild detergent. Ingrained dirt such as grease and dead flies, are best removed with a SILICONE-FREE polish (1 Z Spezial-Reiniger or "Reinigungspolish", Fa. Lesonal, Stuttgart). Sticky tape used for sealing the wing and tailplane joints may be removed using thinners of Petrol (Beware thinners may remove the markings).

### Cleaning the Canopy

The canopy should only be cleaned using a soft clear cloth or sponge and a mild soap solution. It should be rinsed with clean water and dried with a chamois leather. "Plexipol" is a suitable polish. Never rub perspex with anything dry.

X. Airworthiness Limitations

This Airworthiness Limitations section is FAA approved for U.S. registered gliders in accordance with the provisions of 14 CFR section 21.29. In addition, this section is required by FAA Type Certificate Data Sheet No. \_\_\_\_\_ and it specifies maintenance required under 14 CFR sections 43.16 and 91.163 unless an alternative program has been FAA approved.

LBA approved on: 14. Nov. 1983.....



The following section specifies requirements for the instructions for continued airworthiness.

## FUSELAGE

Finish  
Shell  
Cracks in shell  
Drain holes  
Rudder bearings  
Bushes for wing root pins  
Stabilizer mounting  
Cockpits  
Seats  
Frames  
Canopy  
Canopy mechanism  
Canopy emergency release  
Canopy windows

Control stick  
Elevator drive  
Divebrake drive  
Aileron drive  
Aileron connectors  
Divebrake connectors  
Trim control

Pedals  
Pedal adjustment  
Steering cables  
Earth connections  
Cockpit ventilation  
Backrest adjustment



*Perin*  
14. Nov. 1963

XI. 1 Annual Inspection Checklist

WING

Finish

Shell

Cracks in shell

Root rib

Spar stub

Drain holes

Fittings at root rib

Aileron bearings

Aileron drive

Divebrake drive

TAILPLANE

Finish


Shell

Cracks in shell

Drain holes

Bushes for mounting

Elevator bearings

 *Perin*  
14. Nov 1963



Control surfaces (Aileron, Elevator, Rudder)

Finish

Shell

Rudder ventilation

Rudder drive

Bearings

Connecting means

LANDING GEAR (Mainwheel, Nosewheel)

Undercarriage and axle

Tires

Bearings and joints

Wheel brake system

EQUIPMENT

Minimum Instrumentation

Additional Instrumentation

Operating range

Limit marks

Oxygen bottles

Working of Instrumentation

Tubing

Total energy unit

Pitot system leakfree

Static system leakfree

T.E. system leakfree

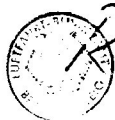
Electrical cables

Battery and fitting

Radio

Antenna

Compass deviation list



*Perin*  
14. Nov. 1953

Seat belt harness  
C.G. release  
Nose release  
Weight and balance plan  
Data placard  
Cockpit placards  
Placard with serial number  
Baggage compartment

#### ADJUSTMENT

Wings and horizontal tail  
Play at root ribs  
Zero setting of control surfaces  
Control surfaces deflections  
Dive brake deflection  
Wheel brake  
Trim control  
Nose release function  
C.G. release function  
Automatic C. G. release  
Aileron differentiation

Procedures and criteria for performing this inspection are contained in Section VII.3, page 17 of this manual.



14. Nov. 1963

## X.2 Inspection Procedure For Increase Of Service Time

### 1. General


The results of fatigue tests of wingspar sections have demonstrated recently that the service time of FRP gliders may be extended to 6000 hours, if for each individual glider (in addition to the obligatory annual inspections) the airworthiness is demonstrated according to a special multi-step inspection program particularly with regard to the service life.

### 2. Dates

When the glider has reached a service time of 3000 hours, an inspection must be done in accordance with the inspection program mentioned under point 3. If the results of this inspection are positive or if any defects found have been duly repaired, the service time of the glider is extended by another 1000 hours to a total of 4000 hours (first step).

The above inspection program must be repeated when the glider has reached a service time of 4000 hours. If the results of this inspection are positive or if any defects found have been duly repaired, the service time of the glider is extended to 5000 hours (second step).

When the glider has reached a service time of 5000 hours, the above inspection program again must be repeated. If the results of the inspection are still positive or if any defects found have been duly repaired, the service time may be extended to a total of 6000 hours (third step).

 *Reinhold*  
14. Nov. 1985

For a possible service time exceeding 6000 hours procedures will be evaluated in the future.

3. In each case the latest issue of the inspection program, which will be updated according to incoming inspection results, has to be ordered from the manufacturer.
4. The inspection must only be done by the manufacturer or by a licensed repair station or inspector.
5. The results of the inspections have to be recorded in an inspection test report wherein comments are required for each inspection instruction. If the inspections are done outside the manufacturer's facilities, a copy of the records must be sent to the manufacturer for his evaluation and information.
6. The annual inspection is not affected by this inspection program.



*Perin*  
14. Nov. 1963

X.3 1 Components with a limited life time

Oxygen system

Refer to the pertinent test certificate or applicable operating instructions of the installed oxygen system or parts thereof.

In addition to the above, in Germany oxygen cylinders have to be inspected by the Association for Technical Inspection, the time interval being dependent on the type of cylinder. At the time of writing the following time intervals apply:

Standard steel cylinders	every 5 years
steel cylinders made by Draeger in 1969 or later	every 6 years
light steel cylinders	every 3 years

Glider cable release

At the time of writing the factory installed cable releases have a time between inspections of 30 months from the time of installation, or 2000 hours of flight, whichever is the earlier.

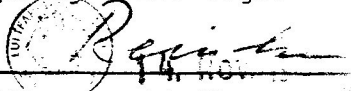
Comply with operating and maintenance instructions "E72" and "E75", May 1975 edition, for the nose cable release and operating and maintenance instructions "Europa G72" and "Europa G73", May 1975 edition, for the C of G cable release, for installation, maintenance and inspection.

V.2 Removal and installation of the tow release

Observe the previous section. Carefully inspect components and lubricate all moving parts and cables when changing the release. Do not forget the electrical wiring on re-installation.

Nose release

Removal:           remove canopy  
                      Adjust front pedal backwards  
                      remove the mastic cord of the vent  
                      shutter  
                      unscrew the ventilator shutter  
                      unscrew the coupling mount together  
                      the rudder

  
14. NOV. 1975

control cable mount and earthing wire,  
and pull it back  
as far as possible  
detach coupling from mount (four threaded studs size M6)

**Installation:** Proceed in reverse order from removal. In addition you will need four new poly-stop nuts of size M6 and strength 86 (release attachment). Four split pins (for securing the screws of the release mounting) and approx. 1m of mastic cord with a diameter of 10mm.

### C of G release

**Removal:** remove canopy  
tilt the backrest of the front seat forward  
unscrew the centre duct cover  
remove the stick sack of the rear seat  
loosen four connections size M6 and two size M8 on both sides of the release mounting  
remove release including side mounting and earthing wire

**Installation:** Proceed in reverse order from removal. You will need seven poly-stop nuts size M6 and two size M8, each of strength 86

### Placards and control markings

see page 10. and 11 in the flight manual



*Rein*  
14. Nov. 1983