CIRRUS

SCHEMPP-HIRTH

- STANDARD CIRRUS -

SCHEMPP-HIRTH K.G., KIRCHHEIM-TECK

Flight and Service Manual
for the Sailplane
- STANDARD CIRRUS -
Translation of the German Manual
Issue: November 1969

This manual should always be carried in the sailplane.

It belongs to the Sailplane
STANDARD CIRRUS

Registration Marks : N 33 LC

Serial Number : 35

Prüfer von Luftfahrtgerät LBA 1119 Klasse 5

Manufacturer : Schempp-Hirth K.G.
Kirchheim-Teck
W. Germany

Owner : Dr. Lewis C. Richmond, Jr.

Approved by the Luftfahrt-Bundesamt
March 16, 1970

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- STANDARD CIRRUS - - FLIGHT MANUAL -

Amendments

No.	Item	Page	Date

1. Operating data and limitations

Airspeed limits	km/h	m.p.h.	knots
Glide or dive	220	137	119
In rough air	220	137	119
Airplane tow	150	93	81
Auto-winch tow	120	75	65
Airbrakes extended	220	137	119

Weights

Empty weight appr. 200 kp, 441 lbs.

Maximum weight 330 kp, 728 lbs.

Max. weight of non-load-carrying structure incl. payload 220 kp, 485 lbs.

Approved for cloud flying and restricted acrobatic maneuvers YES

(See comments on pages 11, 12)

Category

Utility, High Performance according to the German Airworthiness Requirements (LFS).

C.G. range in flight

250 mm to 400 mm, 9.8 inches to 15.7 inches aft of datum

Datum : Wing leading edge at root rib

Leveling means: Slope of rear top edge of fuselage 100 to 5.1

Weak link in the tow cable

Maximum : 500 kp, 1100 lbs.

The following placards must be installed in full view of the pilot:

a) Maximum weight: 330 kg, 728 lbs.

Airspeed limits	km/h	m.p.h.	knots
Glide or dive	220	137	119
In rough air	220	137	119
Airplane tow	150	93	81
Auto-winch tow	120	75	65
Airbrakes ext.	220	137	119

b) Payload (pilot and parachute)

The maximum weight must not be exceeded.

Min. payload : 70 kg, 154 lbs.

Less weight must be equalized with ballast on the seat.

c) Cloud flying : Permitted only when the following instruments are installed:
(1) Airspeed indicator
(2) Altimeter
(3) Turn and bank
(4) Variometer (5) Compass

Night flying is prohibited

Acrobatic maneuvers are prohibited except when executed in accordance with the approved Flight Manual.

2. Flying operations

Winch launching

Max. tow speed: 120 km/h, 75 m.p.h., 65 knots.

The sailplane has one tow release hook for both, winch launching and airplane tow. It is mounted on the bottom of the fuselage, just in front of the lower cross bar of the welded steel tube frame.
Winch launchings are conducted without difficulty. After leaving the ground the sailplane goes into the climb with the control stick in neutral position.

At emergency conditions, i.e. at a break of the tow rope or at an excessive displacement of the glider, release the tow hook immediately.

Airplane tow

Max. tow speed: 150 km/h, 93 m.p.h., 81 knots.

The sailplane shows a normal behaviour during the ground run and the take-off.
The airspeed at unstick is about 70 km/h, 43 m.p.h., 38 knots.
When releasing the glider pull the release handle fully back. (Handle at the left-hand side of the control stick with yellow ball knob).
For aero-tow use only textile ropes of a length of 50 up to max. 100 meters, 55 up to max. 110 yards.

Adjustment of the rudder pedals

The adjustment device is operated by a Bowden cable with a plastic T-handle at the left-hand side of the control stick.

Pull the cable and move the pedals into the desired backward position. Give the pedals a slight forward push with the heels (not the tips) until the locking pin engages self-acting with a clear clicking noise.

Pull the cable slightly back to unlock the mechanism and push the pedals with the heels into the desired forward position and lock.

Parachute stowage recess

A shaped glass fiber support, serving as a stowage recess for back-type parachutes of a long size, is attached on to the rear part of the seat by means of four screws.
When using a short back-pack parachute it is advisable to take it off.

Canopy

The hinged, one-piece plexiglass hood is opened at the left-hand side of the cockpit. PULL BACK the red knob of the locking device (right under the canopy frame) and lift the canopy with the free hand. Take care that the cord which holds the opened canopy in place is attached.
The jettisoning device is mounted on the right-hand side of the cockpit, also right under the canopy frame. Open the canopy as described before, then push the red knob forward for jettisoning.

Operation of the retractable landing gear

The retractable landing gear is operated by a push rod with a handle at the right-hand side of the cockpit. The handle is pulled resp. pushed through a guide slot with two locking recesses. The handle is retained in the forward locking recess by a spring to avoid unintentional unlocking on the ground.

Handle in forward position : EXTENDED

Handle in backward position : RETRACTED

Retraction

Swing the handle out of the front locking recess, pull it back through the slot and push it into the rear locking recess.

Extension

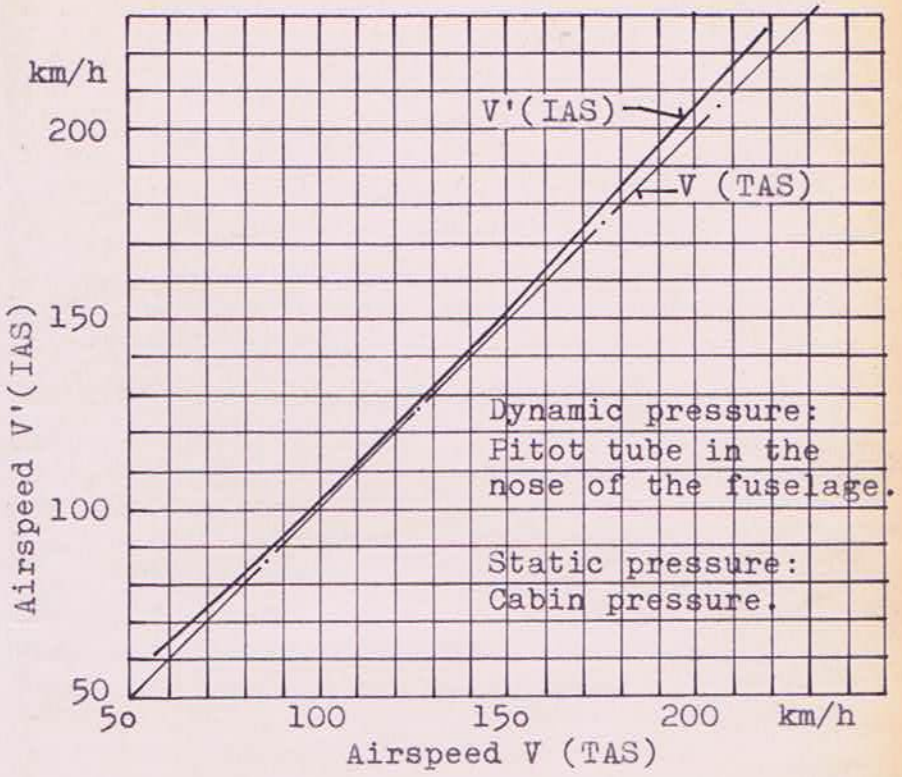
Swing the handle out of the rear locking recess, push it forward through the slot and into the front locking recess.

Caution

Do not operate the handle when the landing wheel is in ground contact.

Due to the separate mounting of the tow release hook (see page 4) the landing gear can be retracted during the tow.

Calibration of the Airspeed Indicator



V(TAS) km/h	V'(IAS) km/h	V(TAS) MPH	V'(IAS) MPH	V(TAS) knots	V'(IAS) knots
60	66	40	43.5	40	42
80	83	50	52	50	51
100	102	60	61	60	61
120	122	70	71	70	71
140	142.5	80	81.5	80	81.5
160	163.5	90	92	90	92
180	184.7	100	102	100	102
200	206	110	113	110	112.5
		120	124	120	122.5
		130	134	130	132.5

F r e e f l i g h t

Performances

(at a gross weight of 290 kp, 640 lbs.)

Stall speed	62 km/h, 38 m.p.h., 33 knots
Min. sink	0.57 m/sec., 1.87 ft./sec. (112 FT/MIN) at 70 km/h, 43 m.p.h., 38 knots
Max. L/D	38 at 85 km/h, 53 m.p.h., 46 knots

Longitudinal trim

The spring-type trimming device at the left-hand side of the cockpit (green ball knob) has a number of locking recesses and can be adjusted into the desired position.

With the C.G. in a medium position the glider can be trimmed for steady flight at speeds of 65 km/h to 170 km/h, 40 m.p.h. to 105 m.p.h., 35 knots to 92 knots.

Circling flight

The increase of stick forces during circling flight is clearly noticeable. Opposite aileron is necessary only in turns with greater bank. The rudder is very effective and must be held almost in neutral position during circling flight.
The glider takes about 3.5 seconds to roll from a 45° banked turn through an angle of 90°.

Stalling characteristic

Depending on the wing loading, stall warning occurs at speeds of 70 to 65 km/h, 43 to 40 m.p.h., 37 to 35 knots by a slight buffeting of the horizontal tail plane.
In the approach to the stall the aileron

control force becomes very small. The glider can be held in the stall by pulling the control stick gently to the limit of its backward travel. When pulling the stick sharply back the control is lost by nose dropping. The glider is building up speed immediately.
At a stall from turning flight the glider pitches down by the hanging wing gaining speed.
The bank however is still under control.

Behaviour at high speeds

In flights at high speeds all controls are effective and function normally. Excessive control movements however should be avoided.
The control surfaces do not show any tendency to flutter.
The airbrakes can be operated at all speeds up to the maximum permitted speed; normal forces are required.
In a flight with an inclination of the flight path of 45° the terminal velocity is about 200 km/h, 124 m.p.h., 108 knots, airbrakes and landing gear extended.

Approach and landing

The approach is normally conducted at a speed of about 80 km/h, 50 m.p.h., 43 knots.
The airbrakes function with ease and smoothness and are very effective.
Sideslip can be used as a landing aid without difficulty in control, also with airbrakes extended.
The sailplane touches down on the main wheel and the tail skid simultaneously.
The wheel brake, operated by a handle on the stick, is a drum brake and works very well.

Emergencies

The sailplane can be held in a stalling position with fully pulled stick and necessary rudder control.
Applying full rudder in a stall with the control stick pulled back brings the glider into a spin.

Safe recovery from the spin is effected by the STANDARD METHOD, which is defined as:

a) apply opposite rudder (i.e. against the direction of the spin);

b) pause;

c) ease the control stick forward until rotation ceases and the glider becomes unstalled;

d) take the rudder into neutral position and allow the glider to dive out.

The approximate loss of hight in one complete turn is about 70 meters, 230 feet.

After having initiated action for recovery the sailplane speeds up very fast, therefore be cautious to dive out gently and promptly.

In rain, snow or at icing the aerodynamic qualities of the sailplane are reduced and caution should be taken in landing.
Increase the landing speed at least about 10 km/h, 6 m.p.h., 5 knots.

Cloud flying

This sailplane has sufficient strength qualities for cloud flying. Nevertheless observe the following instructions:

a) Do avoid extreme airspeeds in any case. Make it a rule to extend the airbrakes already at speeds of about 150 km/h, 93 m.p.h., 81 knots.

b) Cloud flying is permitted only when the following approved instruments are installed:
Airspeed indicator, Altimeter, Turn and Bank, Variometer, Compass.

An artificial horizon, an accelerometer, and a clock are recommended.

c) Take care to follow the official regulations about cloud flying.

Acrobatic maneuvers

The STANDARD CIRRUS is certificated for the following acrobatic maneuvers:

Inside loops, stall turns, tight turns, spins.

Due to the high wing loading the following speeds must be observed for the initiation of the maneuvers:

Inside loops	180 km/h,	112 m.p.h.,	97 knots
Stall turns	180 km/h,	112 m.p.h.,	97 knots
Tight turns	120 km/h,	75 m.p.h.,	65 knots

The sailplane enters into a spin from a sharp stall applying full rudder. The control stick should be pulled during the spin.

The action of recovery is initiated by easing the control stick forward and giving slight opposite rudder.
When diving out gently and promptly the speed must not be higher than 150 km/h, 93 m.p.h., 81 knots.
The loss of hight in one complete turn is about 70 meters, 230 feet.

The acrobatic maneuvers, as specified before, are to be executed by experienced pilots, who have an acrobatic flight license.

The permitted acrobatic maneuvers should not be executed in hights less than 400 meters, 1320 feet above ground, in order to have sufficient reserve in hight when failing the maneuver.
Spins should be recovered at least in that hight.

Other than the afore mentioned acrobatic maneuvers and maneuvers involving negative g are prohibited.

3. Minimum equipment

a) Airspeed indicator 250 km/h, 160 m.p.h.

Altimeter

Four-piece safety belt (seat belt and shoulder straps)

Back cushion or parachute

b) Operating instructions:

Flight and service manual

Placards indicating operating limits

4. Wing and tail setting Control surface movements

Angle of wing setting 1.5°
Reference line : fuselage center line

Angle of tail setting -1.5°
Reference line : wing chord at root rib

For control surface movements see page 16.

Pay attention to the tolerances if repair work is necessary.

The travel of the controls is limited by stops.

Rudder - Firm stops on the back side of the steel tube frame of fuselage.

Elevator
Aileron - Adjustable stops (setscrews) on the stick support.

Airbrakes - Front stop at the cockpit handle, rear stop on the steel tube frame of the fuselage.

5. Weight and C.G. range

After repair work, after having installed additional equipment, and after a new painting the empty weight C.G. is to be checked. If it should not be within the limits, equalizing weights must be added. If the limits of the empty weight C.G. are followed, it is certain that the C.G. in flight is also within the permitted range.

The following empty weight C.G. range aft of datum must be observed.

Datum: Wing leading edge at root rib

Leveling means: Slope of rear top edge of fuselage 100 to 5.1

E.weight kp	C.G.range mm	E.weight lbs.	C.G.range inches
200	630 - 694	441	24.80 - 27.32
205	621 - 686	452	24.44 - 27.00
210	612 - 680	463	24.09 - 26.77
215	603 - 673	474	23.74 - 26.49
220	595 - 667	485	23.42 - 26.25
225	572 - 661	496	22.51 - 26.02
230	550 - 655	507	21.65 - 25.78
235	529 - 650	518	20.82 - 25.59
240	509 - 645	529	20.03 - 25.39
245	489 - 640	540	19.25 - 25.19

C.G. range in flight (gross weight C.G.)
(aft of datum)

250 mm to 400 mm, 9.8 inches to 15.7 inches

6. Cockpit load

Permitted payload (pilot incl. parachute)

maximum : 110 kp, 242 lbs.

The maximum weight of 330 kp, 728 lbs. however must not be exceeded.

minimum : 70 kp, 154 lbs.

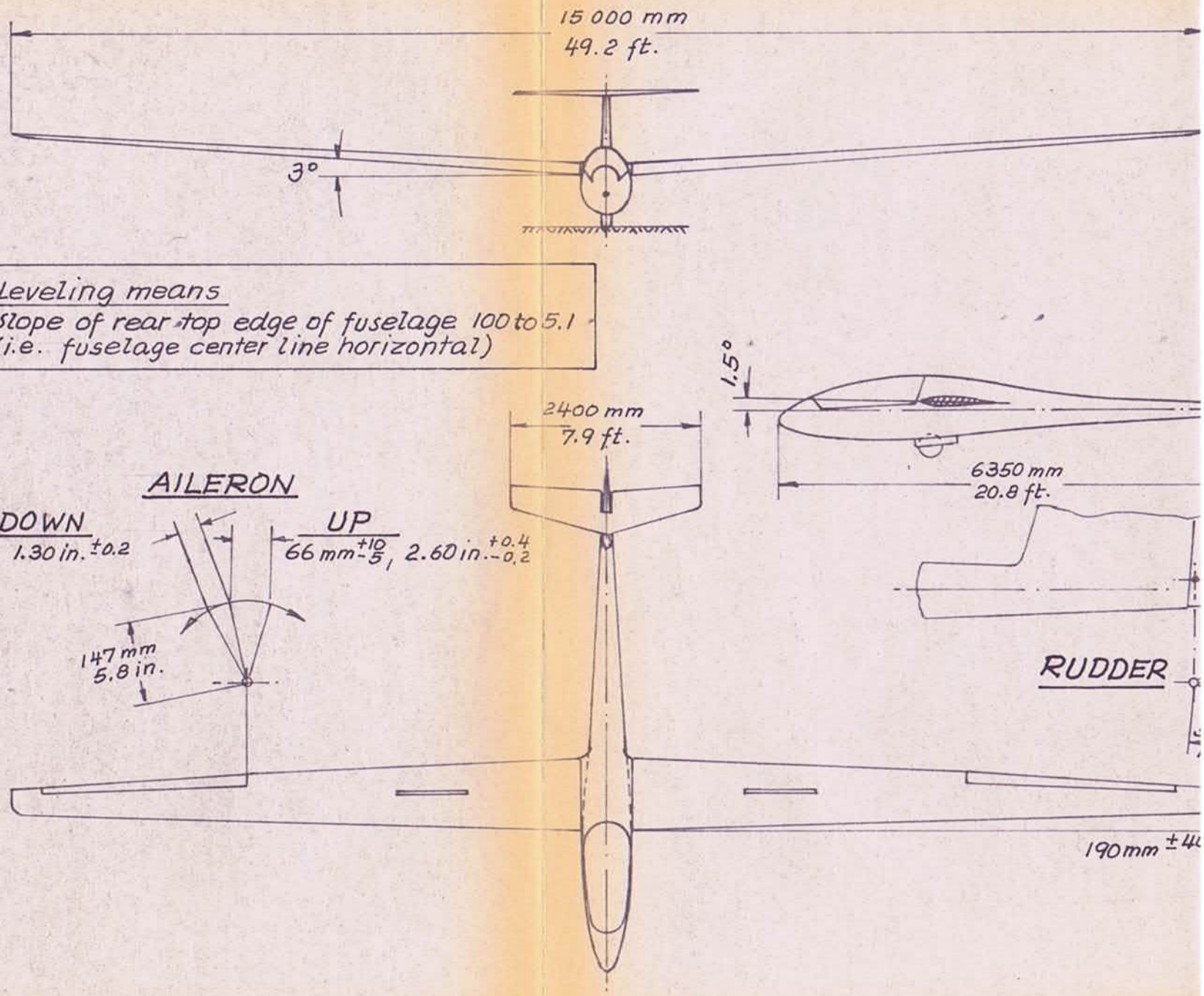
If the payload should be less than the minimum required, equalizing ballast (lead coushion) must be carried, safely attached on to the seat.

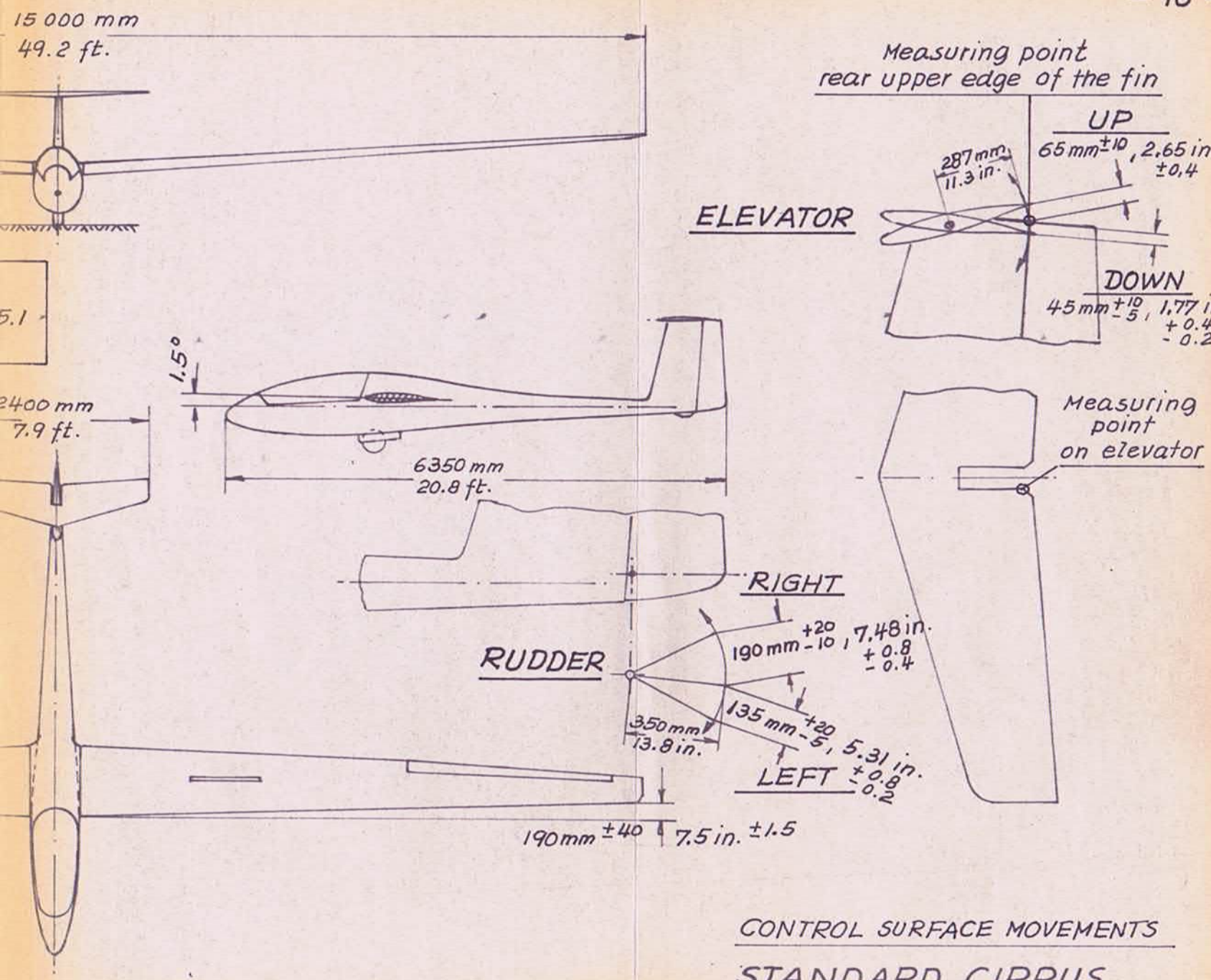
C.G. arm of the pilot incl. parachute

440 mm, 17.3 inches

ahead of datum (i.e. wing leading edge at root rib)

(Moment is negative)

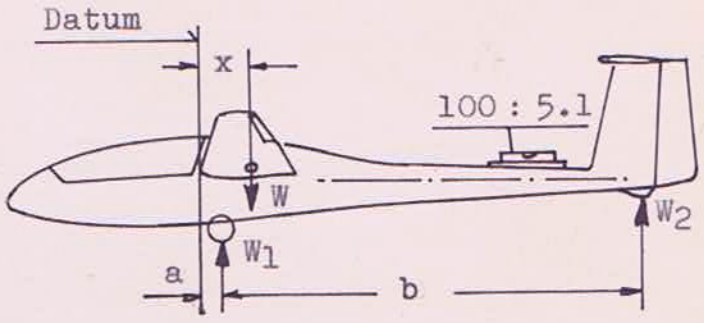

15 000 mm
49.2 ft.
3°
Leveling means
Slope of rear top edge of fuselage 100 to 5.1
(i.e. fuselage center line horizontal)
1.5°
2400 mm
7.9 ft.
6350 mm
20.8 ft.
AILERON
DOWN
33 mm ±5, 1.30 in. ±0.2
UP
66 mm +10 −5, 2.60 in. +0.4 −0.2
147 mm
5.8 in.
RUDDER
190 mm ±4



CONTROL SURFACE MOVEMENTS

STANDARD CIRRUS

Weight and Balance



Datum : Wing leading edge at root rib

Leveling means : Slope of rear top edge of fuselage 100 to 5.1

Weight at landing wheel W_1 = ...

Weight at tail skid W_2 = ...

Empty weight W = ...499.6..

Distance a = ...

Distance b = ...

Empty weight C.G. position

$$x = \frac{W_2 \cdot b}{W} + a = \frac{\qquad\qquad}{\qquad\qquad} +$$

x = ...25.1/16".. aft of datum

A s s e m b l y

The sailplane can be assembled by two persons, when a wing support is used. Generally the rigging will be done by three persons in the following manner.

Wings - Clean and lubricate the wing attachment bolts and also the corresponding bearings on the fuselage.

Put the left wing (fork-type spar root) into the fuselage until the nose and rear attachment bolts are entirely inserted into their bearings on the fuselage.
Insert the main bolt into the front bushing of the fork (about 4 cm, 1.5 inches deep).
Put the right wing (tongue-type spar root) into the fuselage. The nose and rear attachment bolts should just gear a little into their bearings on the fuselage. Move the fuselage slightly back and forth (laterally) until the bolts on the fork end are in line with their bearings on the root rib of the right wing. Push the wing fully into the fuselage, moving it again slightly back and forth.
Push the main bolt completely through the spar bushings (the top edge of the tongue should be about 6 to 8 mm, 1/4" to 5/16" lower than the top edge of the fork. Attach the bolt handle onto the provided fitting on the fuselage shell and safety with the cowling pin.
The control connections of the ailerons and airbrakes are to be made in the back of the spar root. It is advisable to get familiar with the ball-spring safety couplings of the push rods before doing the wing assembly.
Connect the aileron push rods first with the

right hand, holding the control stick in neutral position with the left hand.
Then connect the push rods of the airbrakes in the same way.

Horizontal tail plane

(See sketch on page 20)

It is advisable to mount the tail plane by one person only.
Lock the trim in a front position first.
Put the tail plane onto the top of the vertical tail plane with the nose about 45° down. Keep it in this position, holding it with the left hand.
Insert the hook of the push rod (4) between the ball bearings of fitting (3) and push it forward.
Drop the trailing edge of the tail plane until the lower end of the T-fitting (1) is sitting on the locking bolt (8).
Push the locking handle (9) forward, using a bar of about 8 to 10 mm, 3/8" dia. The plane drops when moving it slightly forward.
Insert the two short pins on fitting(1) into their bushings on fitting (6) by rocking the plane gently back and forth. The plane drops again about 5 mm, 3/16".
Pull the locking handle (9) fully back, where it is held in place by two separately acting springs.

After assembly

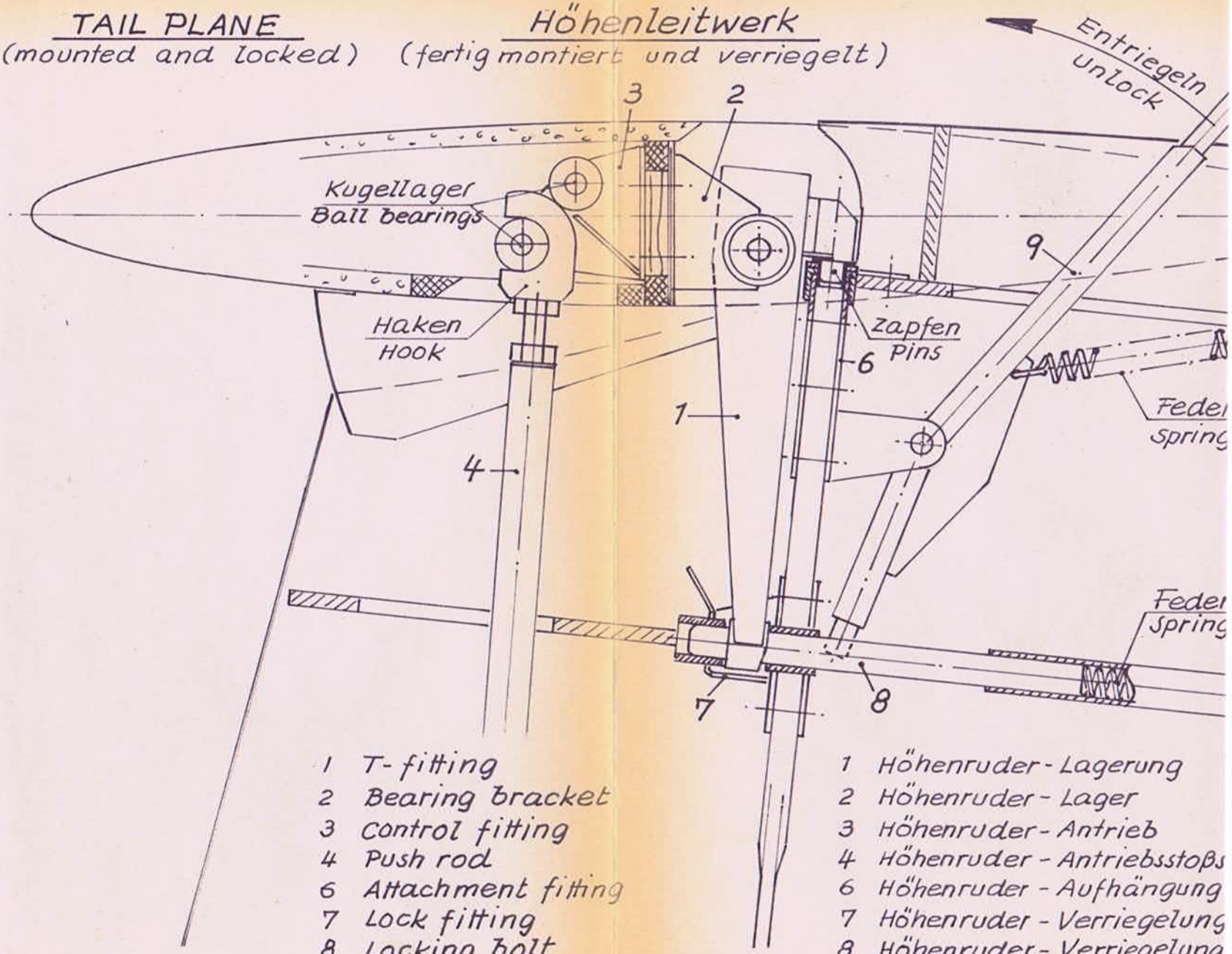
Check the function of the control surfaces.

Seal the small slots at the wing fillets and also the access hole for the locking handle on the top of the horizontal tail plane.

Unsealed wing fillets result in a reduction of performance, in tail buffeting and increase of speed at stalls.

TAIL PLANE
(mounted and locked)

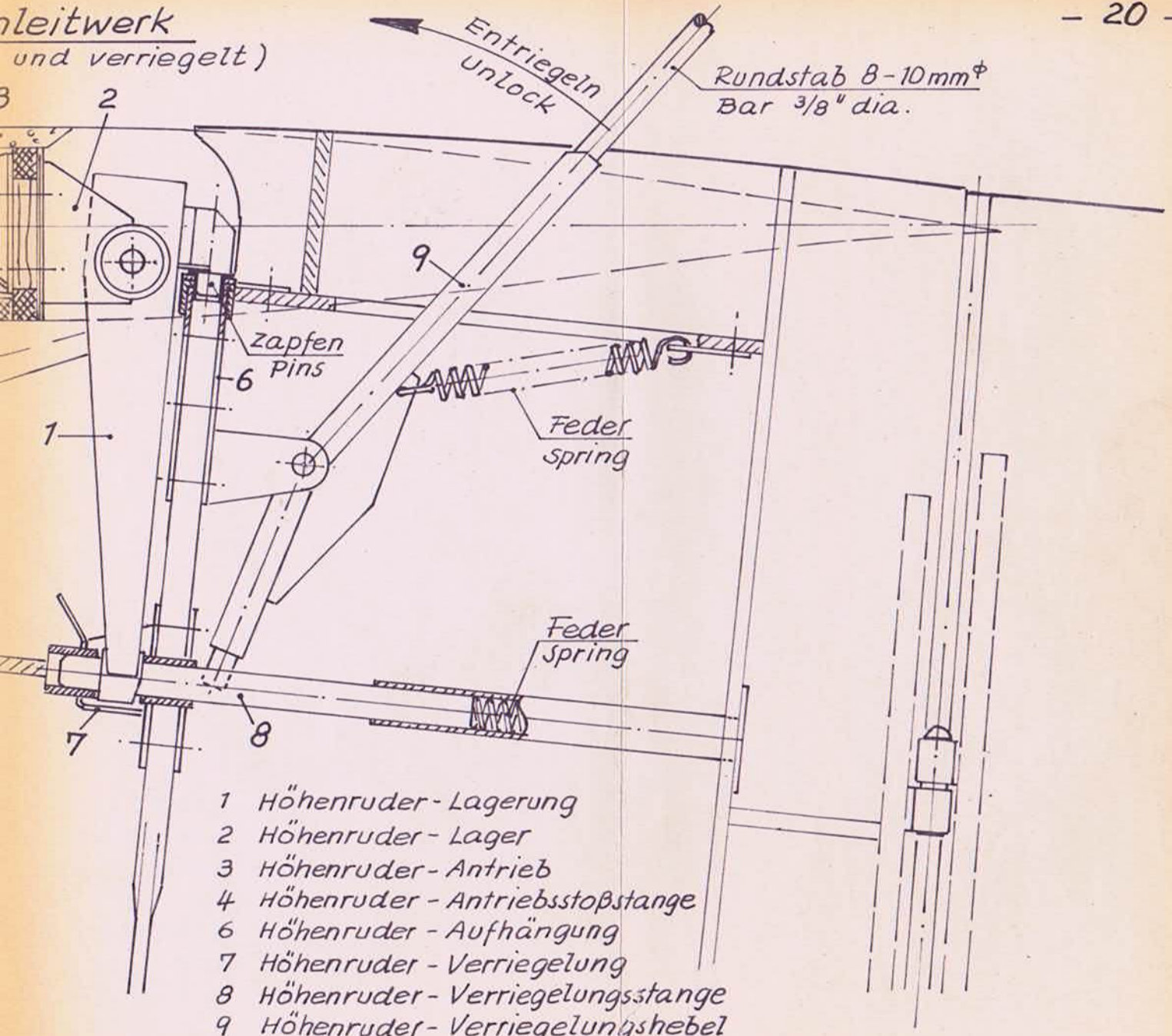
Höhenleitwerk
(fertig montiert und verriegelt)



1 T-fitting
2 Bearing bracket
3 Control fitting
4 Push rod
6 Attachment fitting
7 Lock fitting
8 Locking bolt
9 Locking handle

1 Höhenruder - Lagerung
2 Höhenruder - Lager
3 Höhenruder - Antrieb
4 Höhenruder - Antriebsstoßs
6 Höhenruder - Aufhängung
7 Höhenruder - Verriegelung
8 Höhenruder - Verriegelung
9 Höhenruder - Verriegelun

nleitwerk
und verriegelt)



1 Höhenruder - Lagerung
2 Höhenruder - Lager
3 Höhenruder - Antrieb
4 Höhenruder - Antriebsstoßstange
6 Höhenruder - Aufhängung
7 Höhenruder - Verriegelung
8 Höhenruder - Verriegelungsstange
9 Höhenruder - Verriegelungshebel

STANDARD CIRRUS

Check List

A) After Assembly

1. Is the handle of the main bolt attached to the provided fitting on the fuselage shell and secured by the safety cowling pin?

2. Are the aileron and airbrake push rods connected by their ball-spring safety couplings?

3. Are the wing fillet slots and the access hole on top of the horizontal tail plane sealed?

4. Does the tow release mechanism function properly?

5. Does the wheel brake function properly?

6. Is the tire pressure of the landing wheel checked? The pressure should be 2.5 atü or 36 psi.

B) Before the take-off

1. Check the function of the control surfaces. Do the controls reach the limit of their travels with sufficient ease and smoothness?

2. Are the airbrakes operating properly? Make sure to lock the airbrakes after the check.

3. Is the landing gear handle locked in its front (wheel extended) position?

4. Is the plexiglass canopy properly closed and locked ?
   The red ball knob at the left-hand side must be in its front, the red ball knob at right-hand side in its rear position.

5. Is the rescue parachute properly connected?

6. Are the safety belts put on and secured?

7. Is the altimeter adjusted for the equivalent altitude or for NN?

8. Is the radio frequency adjusted for the airfield and/or for the air traffic control?

C) <u>After Take-off</u>

1. Is the landing gear retracted and its handle locked in the rear position? (The wheel can be retracted during the tow).

2. Check the trim.

Maintenance

Take good care of the surface finish. Remove all contaminations as dust, grass seeds, insects etc. using warm water and a soft sponge. Add soft cleaning lotion if necessary. Use no polish which might attack the paint. Smooth all scratches carefully using a resin filler.
Though the sailplane is not much affected, protect it from moisture.

Never try to clean the plexiglass hood with a dry cloth. Use special plexiglass polish after cleaning with warm water and a soft clean chamois.

Check the safety belts frequently for cuts and stains; the metal parts for rust.

The tow hook, mounted on the bottom of the fuselage right in front of the lower cross bar of the welded steel tube frame, is much exposed to dirt and must be checked quite often for damages. Keep it clean and lubricated.
It is easy to take off the tow hook for inspection or repair. Remove the seat, disconnect the cable, and unscrew the two attachment bolts.
In case of belly landings the tow hook is protected by two angular fittings which are bolted on to the attachment brackets of the hook. If these fittings show an abrasion up to the heads of the attachment bolts, they must be replaced.

The inflation pressure of the landing wheel should be 2.5 atü, 36 psi.

The landing wheel has a drum brake which is operated by a handle on the control stick. Its Bowden cable can be adjusted as usual by a setscrew on the drum lock bracket.
To take the landing wheel off for inspection, cleaning, and lubrication disconnect the cable from the brake lever and the lock bracket.
Remove the cotter pin and the castle nut on one side of the wheel axle and pull out the axle. Take off the wheel by pulling it slightly back in order to disengage the drum lock fitting from its guide pin on the front landing gear strut.
Take care that no washers and bushings get lost.
Clean and lubricate all parts.

Lubricate the bearings at least once a year, except for the bearings and bolts of the wing and tail plane attachments, which must be cleaned and lubricated before every assembly.

If there is any larger repair work to be done, ask the manufacturer or his representative for advice.

If a new painting should be made, take care that the surfaces exposed to sunlight are painted white.

Ground handling

A tail dolly should be used for better ground handling. Never pull the glider at the wing tips, especially when handling without tail dolly, in order to avoid premature wear of the spacers on the wing attachment bolts due to high stresses.

Backlash of the attachments

All attachments of a glider are wearing more or less with time. In the following the permitted tolerances and the provisions of repair are stated.

Wings

Tangential backlash (movement forth and back) can occur, due to the wear of the washers which are pressed onto the wing attachment bolts. If the wing tip can be moved about 30 mm, 1-3/16", additional washers of 0.3 up to 0.5 mm, about 1/16" thickness and with an inner diameter of 13.95 mm, 0.55" should be pressed onto the bolts until the backlash is eliminated.

Ailerons

Flight tests have shown that a backlash of 3 mm, 1/8", measured at the inner rib end with aileron in neutral position is allowable. If the tolerance is exceeded ask the manufacturer for instructions.

Elevator

a) Tangential and vertical backlash, due to the wear of the bronze bushings of the fitting (6), see page 20, must not exceed 8 mm, 5/16" at the tips. Excessively worn bushings must be replaced.

b) Backlash of controls. It must not exceed 8 mm, 5/16", measured at the maximum chord. If greater backlash should be observed, try to locate it. If the hook of the control rod (4) should be worn it can be replaced. Contact the manufacturer.

Rudder

Due to the continuous control system no backlash of the rudder control occurs.

It may be possible that the adjustment of one setting screw must be different from the other. This is the case if there is still a backlash existing though the locking mechanism has a very tight fit.
The setting screws then must be adjusted by steps until both locking hooks (B) are catching the axle (C) with the same tight fit. *Applies to S/N 573, 586, 593, 595, 597 to 599, 601 and following.*

Rudder

Due to the continuous control cables no backlash of the rudder control occurs.

Adjustment of the air brakes

If the top of the air brakes should open at high speeds, check at first the wings for excessive tangential backlash and eliminate it if necessary. Adjust the air brake control rods thereafter.

Before the air brakes are fully retracted the spring-loaded top of both brakes must have the same distance to the upper wing surface to warrant an equal spring load acting on the top. If an adjustment of the distance to the wing surface should be necessary, turn the control rod connector of one wing about one rotation - turning in means extending the brake. If one rotation of the connector is changing the length of the rod too much, keep the connector in its original position and turn the tube using a pipe wrench until the correct distance to the wing surface is attained.

Adjust then the force required to lock the air brakes, i.e. to tighten their seating by equally changing the length of the control tubes of both wings, equally shortening

means a decrease and equally lengthening an increase of the locking force.

The locking force is correct if a pilot's effort of 15 kp to 20 kp is required to close the brakes, while the operating rod in the cockpit should overtravel the center lock about 10 mm. A shortening of the cockpit rod means a greater travel over the center lock.

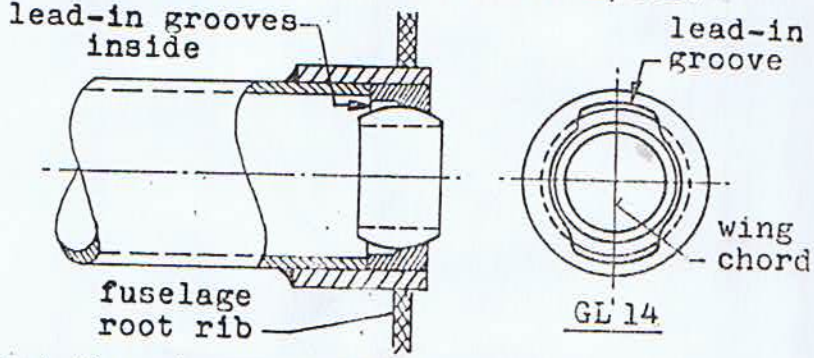
Never adjust the air brakes too tight by which in course of time a damage of the tube connector catches and the balls may occur.

Replacement of the ball bearings for wing attachment bolts on the Fuselage

Four ball bearings for the front and rear wing attachment bolts are installed on the fuselage steel tube frame protruding the fuselage root ribs. These bearings are to be checked for cracks after heavy landings.

If a replacement of the bearings should be necessary the repair is to be made as follows:

Turn the inner ball about 90° across and hammer the bearing out of its seat from the opposite side using a bar of about 12 to 14 mm diameter. Insert a new bearing (GL 14) taking care that the ball lead-in grooves are pointing to the inside in order to avoid the falling out of the ball.*Peen over or punch the outer bearing race at three spots.



Mount the wings and check the clearance of the wing attachments. If the backlash is exceeding the permitted tolerance, i.e. if the movement at the tips is exceeding 30 mm, follow the instructions on page 25.

*Insert the bearings with the lead-in grooves in the direction of the wing chord.

Weights and hinge moments of the control surfaces

After repair or a new painting the weight and hinge moment of the control surfaces must not exceed the following values:

Control surface	max. Mass [kg]	max. Hinge moment [m.daN]
Rudder	5.0	No. 1 to 531 0.175 No. 532 ... 0.120
Elevator	7.1	0.143
Aileron	2.1	0.096

If these values are exceeded a mass balance must be installed in front of the hinge axis.

If the installation of additional mass balance on the aileron should be necessary ask the manufacturer for instructions.

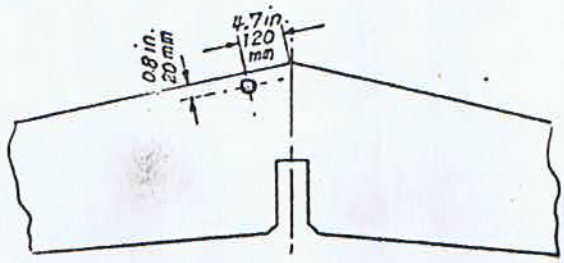
Mass balance on the rudder

Parallel to the already installed round bar a square or round bar of the required weight is to be glued onto the inside of the nose strip and covered with a glass cloth layer.

additional mass balance

Mass balance on the elevator

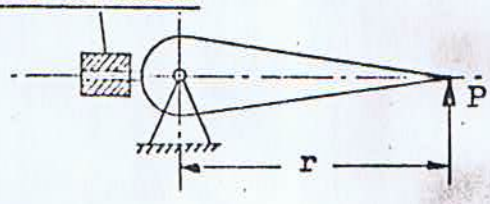
Drill a 20 mm (13/16") dia hole into the lower surface, glue in with Epoxy resin granulated lead mixed with microballoons. Let dry and close the hole following the repair instructions (see appendix).



The hinge moments must be determined on the disassembled control surfaces.

$$M = P \cdot r$$

Mass balance



The control surface should be supported at its hinge axis.

The force P is to be measured by means of a letter or spring balance.

After the installation of an additional mass balance the control surface movements are to be checked for their inlimited travel.

Prescribed periodic maintenance

Rudder control cables

After every 200 flight hours and at every annual inspection the rudder control cables are to be checked in the area of the S-shaped tubular guide on the pedals with pedals in the front and aft position.

The control cables should be replaced if injured, worn or corroded. A wear of single outer strands up to 25 % is permissible.

If a replacement of the cables should be necessary cables 3.2 mm (1/8") LN 9374 made of zinked carbon steel strands are to be used.

The thimble eye-splices are made with Nicopress Oval Sleeves No. 18-3-M or No. 28-3-M using a tool No. 51-M-850 and following the special instructions for making and checking the sleeves.

Ball joints

After every 500 flying hours the ball joints on the air brake drive lever in the fuselage are to be replaced by new ball joints MS 961 - 150 - 150.

Towing hook

Inspections are to be carried out in accord with the Operating and Maintenance Instructions for Special Towing Hooks "S 72 and SH 72", dated May 1975, LBA-approved.

Instruments

Follow the instructions of the respective manufacturers.

Suppliers

Cables, sleeves, main landing wheel.

Schempp-Hirth GmbH & Co KG
Krebenstrasse 25
7312 Kirchheim-Teck
West Germany

Nicopress sleeves and tools.

R. Lindemann
Osterrade 12
2050 Hamburg 80
West Germany

Towing hook.

TOST Flugzeuggerätebau
Thalkirchnerstr. 62
8000 München 2
West Germany

Sailplane "STANDARD CIRRUS"

Speed ring data

Speed ring km/h	Variometer m/sec.
70	0
80	0.4
90	0.8
100	1.25
110	1.75
120	2.3
130	2.9
140	3.6
150	4.3
160	5.1
170	5.9

Speed ring m.p.h.	Variometer ft./sec.	100 ft./min.
43	0	0
50	1.3	0.8
55	2.3	1.45
60	3.5	2.2
65	4.8	2.9
70	6.3	3.75
75	7.7	4.6
80	9.4	5.6
85	11.1	6.7
90	13.0	7.75
95	14.8	8.9
100	16.9	10.2
105	19.0	11.5
110	21.3	12.9

Repair Instructions for the STANDARD CIRRUS

The construction methods on the ST. CIRRUS are almost the same as on the big CIRRUS. Therefore repairs can be performed in the same way as described in the enclosed INSTRUCTIONS for the CIRRUS.

In the STANDARD CIRRUS we find the following different construction methods

1. Wing and horizontal tail plane

   Glass fiber-plastic foam sandwich construction, this means PVC rigid foam (8 mm, 5/16" thick) bonded on both sides with glass cloth.

2. Fixed vertical tail plane

   Front part up to the spar in a pure glass fiber-plastic layup,

   rear part in a sandwich construction using Styropor (4mm, 5/32" thick) as foam core.

3. Fuselage, ailerons, and rudder

   Pure glass fiber-plastic layup.

Should a fracture or damage occur to the sailplane, you should first inspect the damaged area to determine exactly the type of construction and to find the appropriate repair method.