ROSSI F

I-DIAU 1/2

FLIGHT MANUAL

Edition for Italy

For the sailplane type LS3-a

This Flight Manual should be carried in the sailplane at all times.

This Flight Manual is issued for the sailplane LS3-a

Registration Number: I-DIAU

Serial Number: 3411

Convalidato dal REGISTRO AERONAUTICO ITALIANO
ed allegato al Certificato di Navigabilità n. 1025/2
rilasciato in data 3-5-1987

Manufacturer: Rolladen Schneider Flugzeugbau GmbH
Mühlstrasse 1o, 6o73 Egelsbach, Germany

Owner:

IL CAPO SERVIZIO
CERTIFICAZIONE MATERIALE AERONAUTICO

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

Because of responsibility of information a change of ownership should be reported to the manufacturer immediately.

Pages 1.1 through 3.1o approved by Luftfahrt-Bundesamt

16. März 1383

Table of Contents

Structural Limits:

The LS3-a sailplane is designed to permit full control surface deflections or strong gusts or severe turbulence at speeds up to 190 km/h (103 kts, 118 mph).

At speeds between 190 km/h and 270 km/h (103-146 kts, 118-168 mph), yellow arc, the following conditions should be avoided not to exceed the design limit of the aircraft: severe turbulence, rapid movement of flaps and control surface deflections of more than one third of possible travel. Maneuvering loads, gust loads and loads due to control surface deflections should not be encountered simultaneously.

When divebrakes are deployed, maneuvering loads exceeding 3 G's and speeds greater than 190 km/h (103 kts, 118 mph), should be avoided because of possible additional loads due to turbulence.

Severe turbulence would include wave rotors, flying in cumulonimbus clouds, wind funnels and when crossing mountain ridges in strong winds.

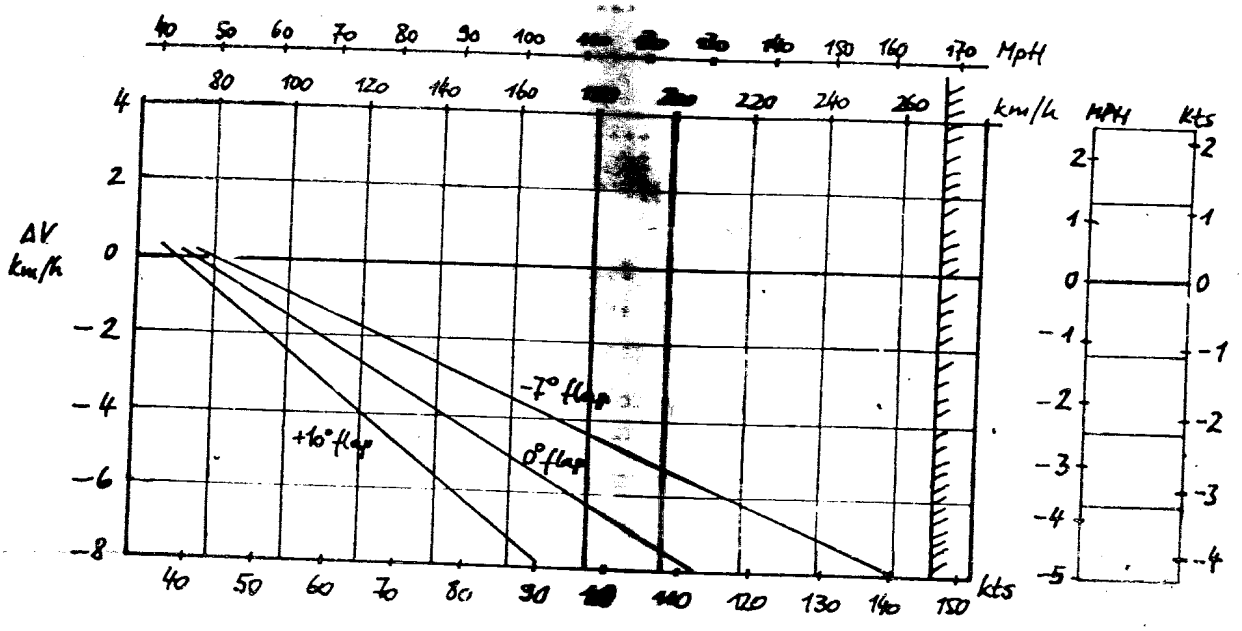
Airspeed Limits

	km/h	kts	mph
1. Never exceed (IAS) from sea level up to 3000 m	270	146	168
up to 6000 m	219	118	136
up to 10000 m	173	93	107
2. Maneuvering	190	103	118
3. Limit Speed in rough air	190	103	118
winch launch	130	70	81
aero tow	190	103	118
with flap position 2°	160	86	99
with flap position 1°	190	103	118
with flap position 0° and -7°	270	146	168

Note: Considering flying altitude the lower limit IAS is always autoritative.

POSITION ERROR OF AIRSPEED SYSTEM

$V_{Cal} = V_I + \Delta V$ (Nose pitot, forward fuselage side static)



Colour Marking on Airspeed Indicator

Green Range	85-190 km/h Within this speed **range it is not** possible to overload the sailplane by **"severe turbulence" and** the necessary maximum control surface deflections **to maintain** the desired attitude.
Yellow Range	190-270 km/h Within this speed range **severe** turbulence, control surface deflections of more **than 1/3** of possible travel or rapid movement of flaps may exceed **the design** limit and should be avoided. Manoeuvering loads, **gust loads** and loads due to control surface deflections should not **be encountered** simultaneously.
Red Line	270 km/h Never exceed up to 3000 **m above** MSL flying altitude. For higher altitudes see page 1.2 .
White Range	94-190 km/h 94 km/h is minimum speed **in** straight and level flight, at maximum **weight** (472 kg) and 20° **flap** position and dive brakes fully deployed. **160 km/h is maximum permissible** speed with 20° flap position, **190 km/h is maximum permissible** speed with 10° flap position.
Yellow **Triangle**	**90 km/h** Recommended approach to landing speed without water ballast.

Weights:

Gross Weight ..... 472 kg (1041 lbs)

Maximum Weight of Non-lift Producing Parts ..... 230 kg (507 lbs)

Empty Weight ..... around 250 kg (551 lbs)

Maximum Water Ballast ..... see pages 1.7 and 1.8

Maximum Cockpit Load

Pilot and Parachute ..... 110 kg (242 lbs)

Cockpit load may be limited by weight of non-lift producing parts, see entry on page 1.6

Minimum Cockpit Load

Pilot and Parachute, no trim ballast, normally 70 kg (154 lbs)

Pilot, Parachute and 3 trim weights, normally .. 55 kg (121 lbs)

Note: Each 2.45 kg trim weight corresponds to 5 kg (11 lbs) of cockpit load.

The sailplane can be trimmed for a different Minimum Cockpit Load. See Maintenance Manual pages 2.2 and 11.1 .

For Minimum Cockpit Load see entry on page 1.6 and on placards.

Position of C.G. in Flight (without water ballast)

Maximum allowable:

Forward C.G. position ..... 250 mm aft of DP.

Rearward C.G. position ..... 400 mm aft of DP.

Datum Point (DP): Leading edge of wing at root, when under side of fuselage boom placed horizontal.

Cockpit Load (Pilot and Parachute)

Entry with each annual inspection and when changing equipment. Should be calculated in accordance with guide in Maintenance Manual.

Empty Weight	Maximum Permissible Load	Minimum Permissible Load	Fixed Ballast fore	Fixed Ballast aft	Date	Inspector

Water Ballast Limitations Maximum Capacity 150 liters (150 kg = 330 lbs)

Pilot and Parachute kg	Empty Weight (kg)										
	240	245	250	255	260	265	270	275	280	285	290
60	150	150	150	150	150	147	142	137	132	127	122
65	150	150	150	150	147	142	137	132	127	122	117
70	150	150	150	147	142	137	132	127	122	117	112
75	150	150	147	142	137	132	127	122	117	112	107
80	150	147	142	137	132	127	122	117	112	107	102
85	147	142	137	132	127	122	117	112	107	102	97
90	142	137	132	127	122	117	112	107	102	97	92
95	137	132	127	122	117	112	107	102	97	92	87
100	132	127	122	117	112	107	102	97	92	87	82
105	127	122	117	112	107	102	97	92	87	82	77
110	122	117	112	107	102	97	92	87	82	77	72

Example: At an empty weight of 250 kg and a pilot and parachute weight of 95 kg, maximum permissible water ballast is 127 kg.

See page 1.6a for limitations in lbs.

Aerobatic Flight: Aerobatic manoeuvers including spins not approved

Structural Limitations in Flight:

At 19o km/h (1o3 kts, 118 mph) 5.3 G positive and 2.65 G negative.
At 27o km/h (146 kts, 168 mph) 4.o G positive and 1.5 G negative.

VFR-Flight: permitted

Cloud Flying: permitted, if aircraft is appropriately equipped (See Minimum Equipment)

Minimum Equipment: Normal Operation: 1. Airspeed Indicator, scale 5o-3oo km/h
2. Altimeter

In addition for Cloud Flying: 1. Turn and Bank Indicator
2. Variometer
3. Compass

Note: See also Chapter 12 of Maintenance Manual

Break Away Link in Tow Rope: For winch launch and aero tow max. 6oo kg (1323 lbs)

Sideslip

Sideslip speed range up to 19o km/h

During sideslip rudder control force decreases to almost zero force.

For a straight and steady sideslip 1oo % rudder and between 5o % and 75 % aileron deflection are necessary.

For forward C.G. positions and divebrakes deployed the created nose heavy moment is too much to be balanced by elevator deflection, thus the minimum possible speed increases and slip effectiveness decreases.

Degradation in airspeed system goes down to zero airspeed indication. Depending on airspeed indicator, negative values may be indicated (Fuselage nose pitot and forward side statics used).

Stalls

Before entering stall, light tail shudder can be noticed. The effectiveness of the ailerons is reduced by about 5o%, and the rate of sink increases considerably. The stall should be terminated through downward deflection of the elevator.

Spins

If a stall is exaggerated through further upward deflection of the elevator, depending on C.G. position, the aircraft may spin.
Termination of spin by pronounced deflection of rudder opposite to spin direction and careful pull out.
Altitude loss due to termination of spin is about 5o m (15o ft).

Limitation of High Speed Flight

If there are indications while flying under large cloudbank, or while flying in clouds, that the maximum permissible rough air speed will be exceeded, divebrakes should be deployed carefully before 19o km/h (1o3 kts, 118 mph) is reached. Divebrakes can also be deployed in emergencies up to a speed of 27o km/h (146 kts, 168 mph). However, in this case flaps should be in the -7° position. Only then they will dampen rapid opening of divebrakes after unlocking and subsequent uncomfortable negative accelerations.
Once deployed divebrakes can be retracted only at speeds below 22o km/h (119 kts, 137 mph). When divebrakes are deployed, for example, during descent after high altitude wave flights a speed of 19o km/h (1o3 kts, 118 mph) should not be exceeded because of possible severe turbulence.

Emergency Canopy Release

Pull red handle on right side of instrument panel to release forward canopy

Rain:

Raindrops will change the airfoil and will effect performance significantly. Therefore, the approach speed to a landing should be increased by at least 10 km/h (5 kts, 6 mph). To improve visibility canopy window should be opened when flying in rain.

Icing:

Water ballast should be drained when there is danger of freezing to avoid ice formation at the tail or one-sided frezzing of the water ballast. When there is danger of icing, control surfaces should be moved continuously. To improve visibility, canopy window should be opened.

Landing on Water:

Canopy should be jettisoned and parachute straps should be released on downwind leg. Touch down at lowest possible speed with landing gear retracted. During touchdown protect face with left arm. After touchdown release seatbelts and leave cockpit.

Assembly:

1. Clean and grease all pins and matching holes.
2. Divebrake handle in unlocked position, about 1o cm (4 in.) aft of locked position. Flap handle in zero degree position. Nain pins should be within reach.
3. Check if divebrakes are in locked position on wings. If they are, they should be unlocked with main pin handle.
4. Insert right spar end into fuselage until wing root pins are inserted.
5. Flap activators should be meshed into drive gear. Occasionally drive gear will have to be adjusted by hand.
6. Divebrake activators should be meshed with pins on fuselage, where fuselage pins may have to be adjusted through moving divebrake handle in the cockpit.
7. Right wing should now be pushed until flush with fuselage. Now connect left wing following the same procedure as with right wing, carefully observing the dihedral of the wings.

Assembly continued:

8. Insertion of main pins is possible only when all activators except aileron connectors have coupled properly.
9. Connect aileron system with ball snap joints. Check connection by trying to pull connectors off balls. You may secure connectors using safety pins after connection and test. Must
10. Install horizontal tail and secure with safety nut against tapered bolts using a suitable coin until red marking on mounting bracket is invisible.
11. Install Braunschweig tube, battery, barograph and automatic parachute.
12. Tape upper and lower wing fuselage connection, and access hole on upper side of elevator.
13. Fill water ballast tanks and check proper dumping.

Disassembly:

Reverse assembly sequence, except before removing main pins unlock dive brakes and disconnect aileron connectors.

Pre-flight Checks:

1. Check water drain holes and check for leaks in water ballast tanks.
2. Check static ports, pitot and Braunschweig tube for clogging.
3. Check air pressure in wheel.
4. Check wheel brake effectiveness.
5. Check tow release.
6. Check emergency canopy release.
7. Check weight and balance, especially minimum and maximum useful load as well as trim weights.
8. Check instruments including radio.
9. Adjust backrest, headrest and rudder pedals.
10. Check papers.
11. Before take off carry out check in accordance with check list on right side of cockpit.

Winch Launch:

Backrest and headrest should be secured to avoid pilot's sliding backwards during acceleration and steep climb.
Flaps at 0° position, set to 10° position after transition arc.
Trim slightly forward. Trim position mark at the trim setting indicator should be just before reference mark.
Ask winch operator to avoid brisk acceleration. The higher the starting acceleration, the higher is the pitch up tendency.
When the tow rope tightens, use wheel brake to avoid rolling over tow rope.

Pronounced forward stick pressure is required in transition arc.

Minimum launch speed without water ballast ..... 90 km/h (49 kts, 56 mph)
with water ballast ..... 100 km/h (54 kts, 62 mph)

ero Tow:

rim slightly forward. Trim position mark at the trim setting indicator should be st before reference mark.

laps should be kept at 0° until aileron effectiveness. Then flaps should be set at C for lower tow speeds or stay at 0°.

ditional aileron effectiveness during initial take off roll may be achieved by loying divebrakes. Retract divebrakes before leaving ground.

tow rope tightens, use wheel brake to avoid rolling over tow rope.

tow speed without water ballast ..... 100 km/h (54 kts, 62 mph)
with water ballast ..... 120 km/h (65 kts, 75 mph)

ssible Towrope Length: 30 - 80 m (100 - 260 ft)

nose or C.G. release can be used. While using the C.G. release the landing r not be retracted during tow.

Flight:

Speed is between 65 to 70 km/h (35-38 kts, 4o-44 mph) without water ballast, with full water ballast 75 to 80 km/h (41-43 kts, 47-5o mph) in straight and level flight.

When flying with empty water tanks, leave dump valves in open position to avoid pressure built up inside tanks at altitude.

ling: Flaps +10°, stick pressure should be trimmed to zero.

Glide Angle: between 90 and 100 km/h (49-54 kts, 56-62 mph) at flap position 0° or -5°.

Speed Flight up to 190 km/h (103 kts, 118 mph): Flaps should be between 0° and -7°, depending on desired speed. Once the aircraft is trimmed for thermaling no additional trim adjustment is required for high speed flight. Any stick forces can be removed by adjusting the flap position. This results in correct flap positions for all speeds.

Speed Flight 190 to 270 km/h (1o3-146 kts, 118-168 mph): Flap position -7°. Stick forces should be reduced to zero through trim adjustment.

ding

ring approach flaps should always be in +2o° position. It is recommended to dump water ballast before landing.

pproach speed not below 9o km/h (49 kts, 56 mph) without water ballast and dive brakes deployed.

ivebrakes allow control of glide angle within wide limits. When dive brakes are deployed, stall speed increases approximately 1o km/h (5kts, 6mph).

ipping is not necessary to control glide path. For sideslip see also page 1.11

ring pull out before touch down you should deploy divebrakes only one third of travel to avoid stalling and landing in front of desired touch down area.

High Altitude Flights:

Increasing altitude yields higher true airspeed than indicated airspeed. This does not influence loads on the structure, which means that colour markings on airspeed indicator are valid unless limited by red lines.

However, as flutter limitation depends on true airspeed, this should never be beyond 27o km/h (146 kts, 168 mph).

Using table on page 1.2, maximum permissible airspeeds depending on altitude, the pilot is able to avoid flying faster than true airspeed of 27o km/h (146 kts, 168 mph).

Example: Indicated airspeed of 219 km/h (118 kts, 136 mph) at 6000 m (19700 ft) altitude corresponds to 270 km/h (146 kts, 168 mph) true airspeed.

Trim System

Trim system uses a spring loaded clamping device for locking and springs for trimming. The trim lever is on the control stick, unwanted changes of trim are not possible.

Trim position can be changed with the control stick, when the trim lever is pulled, forward for nose down, rearward for nose up.

Trim setting indicator on the left cockpit side near the landing gear lever shows trim position relative to neutral reference mark.

Water Ballast:

Each tank holds about 75 liters (20 US-gallons). The maximum permissible load should be taken from the table on pages 1.7 or 1.8.

Filling of Water Tanks: **Open appropriate dump valve. Using connection hose, suck residual air from water bag. Subsequently, fill desired amount of water. Close valve. Repeat same procedure on other wing.**

Dumping of Water: **Open both valves simultaneously. Dumping of full tanks requires two to three minutes. Unequal dumping may be indicated when aircraft with free stick rolls around longitudinal axis. This necessitates early counteraction during landing roll.**

Note: Flights with water ballast when temperatures are below freezing should be made only if water is not dumped.

1. **The dump valve can freeze completely or partially, causing unequal dumpings.**
2. **The escaping water can lead to icing of the flap near the fuselage, and could block flap movements.**
3. **The escaping water could lead to substantial icing at the end of the fuselage, could block the rudder and could lead to excessive tail weight.**

GLASFASER ITALIANA S.R.L.

VALBREMBO

Rapporto di pesata per aliante

data: 15.02.89

Tipo: LS3 a

Nr.-Costr. 3410

I-DIAW

Dati Tecnici

1.Punto di riferim. Bordo d'attacco alare alla radice

2.Linea di rif.orizzontale Lato inferiore troncone coda orizzontale

Peso delle Parti	Kg.	P.n.P. Kg.
Ala destra	68.9	X
Ala sinistra	68.6	X
Fusoliera	105.2	105.2
Cappottina	8.9	8.9
Piano di coda	6.5	6.5
Timone		
Accessori		
Carico utile		109.4
Somma pesi parz.	258.1	230.0

Peso a vuoto..... 258.1 Kg.
in cab. 109.4

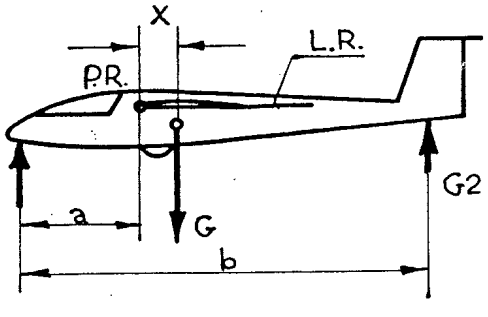
Carico utile consentito... Kg.
con acqua 213.9

Peso massimo consentito... 472.0 Kg.

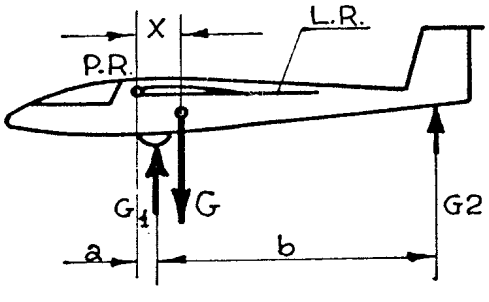
Peso **max.** parti non portanti..... 230.0 Kg.

Pesata e centraggio del peso a vuoto

Reazione	Lordo(KG)	Tara(Kg)	Netto(Kg)	Braccio (mm)
Avanti			228.3	a = 201 mm
Dietro			29.8	b = 4222 mm
			258.1	



$$\frac{G2 \cdot b}{G} - a = x$$



$$\frac{G2 \cdot b}{G} + a = x$$

X = 686 (mm.)

Il baricentro del peso a vuoto giace:

da 686 (mm) a 687 (mm) con 258 (Kg)

La posizione del Baricentro calcolata, giace nell'ambito permesso

Equipaggiamenti come dal lista datata 12.06.80

Rilievi: Peso min in cabina Kg. 50
max Kg. 109.4

IL PERITO
PASQUALE
ANGRISANI

(timbro)

IL CAPO CONTROLLO
Giampaolo Ghirlotti

(firma)