SCHEMPP-HIRTH FLUGZEUGBAU GMBH, KIRCHHEIM/TECK

F L I G H T M A N U A L

for

Sailplane

Model : Duo Discus

Serial-No. : 223

Registr.-No. : N369DD

Date of Issue : October 1993

FAA-approved for U.S. registered aircraft in accordance with FAR 21.29.

Pages as indicated by "LBA-app." are approved by

Signature

LUFTFAHRT BUNDESAMT — Authority

Stamp

Original date of approval

This sailplane is to be operated in compliance with information and limitations contained herein.

1.4 Descriptive data

The "Duo Discus" is a two-seat sailplane for advanced training and cross-country flying, constructed from glass and carbon fiber reinforced plastic (GFRP/CFRP), featuring a T-tail (with fixed horiz. stabilizer and elevator).

Wing

The wing is four-stage trapezoid in planform, consists of two main panels with tip extension (having a swept-back leading edge) and has double-panel "Schempp-Hirth" type airbrakes on the upper surface. Ailerons are internally driven.
The integral water ballast tanks have a total capacity of approx. 198 Liter (52.3 US Gal., 43.5 IMP Gal.).

The wing shells are a glass fiber/foam-sandwich construction with spar flanges of carbon fiber rovings and shear webs made as a GFRP/foam-sandwich.

Fuselage

The cockpit is comfortable and features two seats in tandem. The one-piece canopy hinges sideways and opens to the right. The fuselage is constructed as a pure glass fiber non-sandwich shell and is thus highly energy absorbing. While its aft section is stiffened by GFRP/foam-sandwich bulkheads and webs, the cockpit region is reinforced by a double skin on the sides, with integrated canopy coaming frame and seat pan mounting flanges. The main wheel is retractable and features a hydraulic disc brake; nose wheel and tail wheel (or skid) are fixed.

Horizontal tailplane

The horiz. tailplane consists of a fixed stabilizer with elevator. The stabilizer is a GFRP/foam-sandwich construction with CFRP-reinforcements, the elevator halves are a pure CFRP/GFRP shell.
The spring trim is gradually adjustable by a lever resting against a threaded rod.

Vertical tail

Fin and rudder are constructed as a GFRP/foam-sandwich. On request a water ballast trim tank with a capacity of 11 Liter (2.9 US Gal., 2.4 IMP Gal.) is provided in the fin.

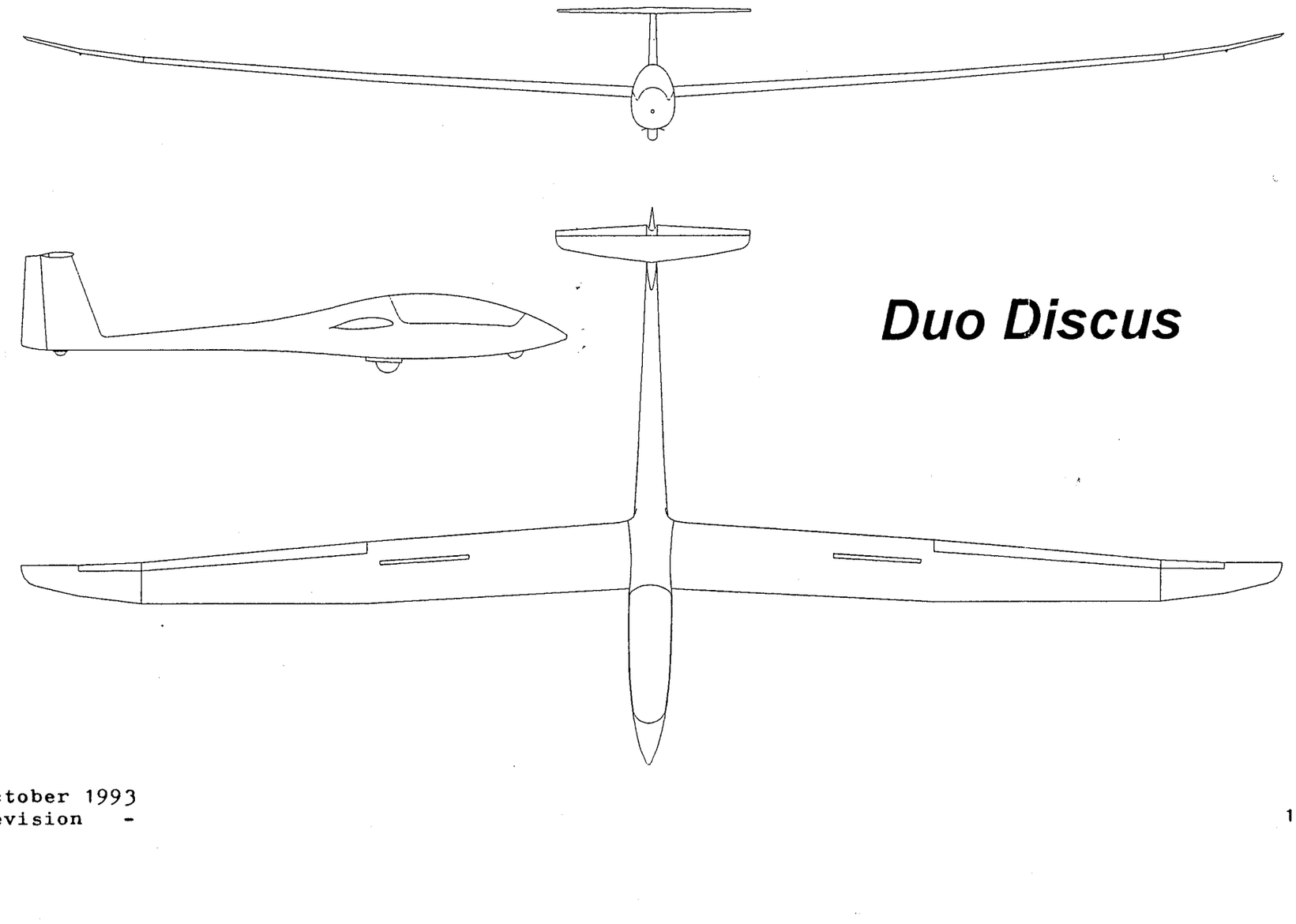
Controls

All controls are automatically hooked up when the sailplane is rigged.

TECHNICAL DATA

Wing	Span	20.00 m	65.62 ft
	Area	16.40 m^2	176.53 ft^2
	Aspect ratio	24.4	
	MAC	0.875 m	2.87 ft
Fuselage	Length	8.62 m	28.28 ft
	Width	0.71 m	2.33 ft
	Height	1.00 m	3.28 ft
Mass	Empty mass approx.	420 kg	926 lb
	Maximum all-up mass	700 kg	1543 lb
	Wing loading	29.9 - 42.7 kg/m^2	6.1 - 8.7 lb/ft^2

1.5 Three-side view



2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

SPEED		(IAS)	REMARKS
V_{NE}	Never exceed speed in calm air	250 km/h 135 kt 155 mph	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection.
V_{RA}	Rough air speed	180 km/h 97 kt 112 mph	Do not exceed this speed except in smooth air, and then only with caution. Rough air is met in lee-wave rotors, thunderclouds etc.
V_A	Maneuvering speed	180 km/h 97 kt 112 mph	Do not make full or abrupt control movements above this speed as the aircraft structure might get overstressed.
V_T	Maximum speed on aerotow	150 km/h 81 kt 93 mph	Do not exceed this speed during an aerotow.
V_W	Maximum winch launch speed	150 km/h 81 kt 93 mph	Do not exceed this speed during a winch launch.
V_{LO}	Maximum landing gear operating speed	180 km/h 97 kt 112 mph	Do not extend or retract landing gear above this speed.

2.3 Airspeed indicator markings

Airspeed indicator markings and their colour code significance are shown below:

MARKING	VALUE OR RANGE (IAS)	SIGNIFICANCE
Green arc	90 - 180 km/h 49 - 97 kt 56 - 112 mph	Normal operating range (Lower limit is the speed 1.1 V_{S1} at maximum mass and c/g in most forward position. Upper limit is the max. permissible speed in rough air).
Yellow arc	180 - 250 km/h 97 - 135 kt 112 - 155 mph	Maneuvers must be conducted with caution and operating in rough air is not permitted.
Red line at	250 km/h 135 kt 155 mph	Maximum speed for all operations.
Yellow triangle at	100 km/h 54 kt 62 mph	Approach speed at maximum mass without water ballast.

2.6 Weights (masses)

Maximum permitted take-off mass	:	700 kg (1543 lb)
Maximum permitted landing mass	:	700 kg (1543 lb)
Maximum permitted take-off and landing mass without water ballast	:	660 kg (1455 lb)
Maximum permitted mass of all non-lifting parts	:	440 kg (970 lb)
Maximum permitted mass in baggage compartment	:	--- ---

2.7 Center of gravity

Center of gravity in flight

Sailplane attitude:		Tail jacked up such that a wedge-shaped block, 100 : 4.5, placed on the rear top fuselage, is horizontal along its upper edge.
Datum	:	Wing leading edge at root rib
Maximum forward c/g position	:	45 mm (1.77 in.) aft of datum plane
Maximum rearward c/g position	:	250 mm (9.84 in.) aft of datum plane

It is extremely important that the maximum rearward c/g position is not exceeded.

This requirement is met when the minimum front seat load is observed.

The minimum front seat load is given in the loading table and is shown by a placard in the cockpit.

A lower front seat load must be compensated by ballast - see section 6.2 "Weight and Balance Record / Permitted Payload Range".

2.8 Approved maneuvers

The sailplane model "Duo Discus" is certified in category

U T I L I T Y

for normal sailplanes.

WARNING:

Aerobatic maneuvers such as

- Spins
- Lazy Eights, Chandelles, Stall Turns, Steep Turns
- Positive Loops

and

- Cloud Flying

are not permitted.

2.9 Maneuvering load factors

The following maneuvering load factors must not be exceeded when the sailplane is pulled up:

a) With airbrakes locked and at V_A = 180 km/h, 97 kt, 112 mph

$n = + 5.3$

$n = - 2.65$

With airbrakes locked and at V_{NE} = 250 km/h, 135 kt, 155 mph

$n = + 4.0$

$n = - 1.5$

b) With airbrakes extended, the maximum maneuvering load factor is

$n = + 3.5$ at V_{NE}

2.15 Limitation placards

MAXIMUM PERMITTED ALL-UP MASS: 700 kg (1543 lb)			
MAXIMUM PERMITTED SPEEDS (IAS): km/h		**kt**	**mph**
Never exceed speed	250	135	155
Rough air speed	180	97	112
Maneuvering speed	180	97	112
Aerotowing speed	150	81	93
Winch launching speed	150	81	93
Landing gear operating speed	180	97	112

fin tank n o t installed

LOAD ON THE SEATS (crew incl. parachutes)				
SEAT LOAD	TWO PERSONS min.	TWO PERSONS max.	ONE PERSON min.	ONE PERSON max.
front seat load	70* kg 154* lb	110* kg 243* lb	70* kg 154* lb	110* kg 243* lb
rear seat load	at choice	110* kg 243* lb	———	———

Loads of less than the above minimum must be raised by using trim ballast - see instructions given in section 6.2 of the Flight Manual.

fin tank installed

LOAD ON THE SEATS (crew incl. parachutes)				
SEAT LOAD	TWO PERSONS min.	TWO PERSONS max.	ONE PERSON min.	ONE PERSON max.
front seat load	100* kg 220* lb (70*) kg (154*) lb	110* kg 243* lb	100* kg 220* lb (70*) kg (154*) lb	110* kg 243* lb
rear seat load	at choice	110* kg 243* lb	———	———

Loads of less than the above minimum must be raised by using trim ballast - see instructions given in section 6.2 of the Flight Manual. The value shown in parenthesis may be used after having thoroughly checked the ballast quantity in the fin tank and the appropriate loading chart.

* As the actual minimum or maximum load on the seats of this "Duo Discus" (to which this manual refers) may differ from these typical weights, the placards in the cockpit must always show the actual weights, which are also to be entered in the log chart - see page 6.2.3.

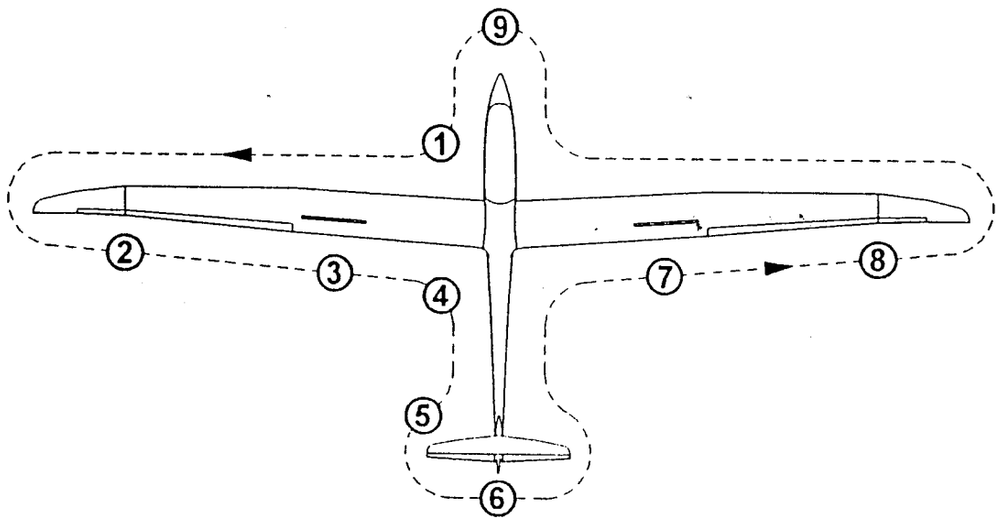
WEAK LINK FOR TOWING	
for Aerotow and Winch launch: max. 910 daN (2006 lb)	
TIRE PRESSURE	
Nose wheel :	3.0 bar (43 psi)
Main wheel :	4.0 bar (57 psi)
Tail wheel : (if installed)	3.0 bar (43 psi)

Note:

Further placards are shown in the Maintenance Manual

4.3 Daily inspection

The importance of inspecting the sailplane after rigging and before commencing the day's flying cannot be over-emphasized, as accidents often occur when these daily inspections are neglected or carried out carelessly.



When walking around the "Duo Discus", check all surfaces for paint cracks, dents and unevenness.

In case of doubt, ask an expert for his advice.

(1) a) Open canopy

b) Check that the main wing pin is properly secured

c) Make a visual check of all accessible control circuits in the cockpit

d) Check for full and free movements of the control elements

e) Check for the presence of foreign objects

f) (reserved)

g) (reserved)

h) Check tire pressure:

Nose wheel: 3.0 bar (43 psi)

Main wheel: 4.0 bar (57 psi)

i) Check tow release mechanism(s) for proper condition and function

(2) a) Check upper and lower wing surface for damage

b) Clean and grease water ballast dump valves (if necessary)

c) Check wing tip extensions for proper connection (locking pin must be flush with upper wing surface)

d) Check that the ailerons are in good condition and operate freely. Check for any unusual play by gently shaking the trailing edge. Check hinges for damage

(3) Check airbrakes for proper condition, fit and locking

(4) a) Check fuselage for damage, especially on its lower side

b) Check that the Static pressure ports for the ASI on the tail boom (1.02 m/3.35 ft forward of the base of the fin) and below the fuselage-to-wing fillet are clear

(5) a) Check condition of tail skid or wheel.
If the latter is installed, check tire pressure:

3.0 bar (43 psi)

b) Should a total energy compensation probe be used, mount it and check the line (when blowing gently into the probe, variometer(s) connected should read "climb")

c) (reserved)

d) Check that the Pitot pressure head is clear. Gently blowing into the head should produce a reading on the airspeed indicator

Should a water ballast fin tank be installed (option):

e) Check that the fin tank spill holes are clear

f) Check water ballast level in fin tank (in case of doubt, discharge ballast)

g) Check that the dump hole for the fin tank in the tail wheel fairing is clear

(6) a) Check horizontal tailplane for proper attachment and locking

b) Check elevator and rudder for free movement

c) Check trailing edge of elevator and rudder for damage

d) Check elevator and rudder for any unusual play by gently shaking the trailing edge

(7) See (3)

(8) See (2)

(9) Reserved

After heavy landings or after the "Duo Discus" has been subjected to excessive loads, the resonant wing vibration frequency should be checked (its value to be extracted from the last inspection report for this serial number).

Check the entire sailplane thoroughly for surface cracks and other damage. For this purpose it should be de-rigged.

If damage is discovered (e.g. surface cracks in the fuselage tail boom or tailplane, or if delamination is found at the wing roots or at the bearings in the root ribs), then the sailplane must be grounded until the damage has been repaired by a qualified person.

4.4 Pre-flight inspection

CHECK LIST BEFORE TAKE-OFF

- Water ballast in fin tank ? (if installed)
- Loading charts checked ?
- Parachute securely fastened ?
- Safety harness secured and tight ?
- Seat back, head rest and pedals in comfortable position ?
- All controls and instruments accessible ?
- Airbrakes checked and locked ?
- All control surfaces checked with assistant for full and free movement in correct sense ?
- Elevator trim correctly set ?
- Canopy closed and locked ?

4.5 Normal operating procedures and recommended speeds

4.5.1 Methods of launching

Aerotow

ONLY PERMISSIBLE WITH NOSE TOW RELEASE IN PLACE

Maximum permitted towing speed:

V_T = 150 km/h (81 kt, 93 mph)

For aerotow only the nose tow release must be used - hemp and nylon ropes of between 30 and 40 m length (98-131 ft) were tested.

Prior to take-off set elevator trim as follows:

- Rearward c/g positions : Lever forward to first third of its travel
- Other c/g positions : Lever to the middle of its travel

As the tow rope tightens, apply the wheel brake gently (by actuating the stick-mounted lever) to prevent the "Duo Discus" from overrunning the rope.

In crosswind conditions the aileron control should be held towards the downwind wing, i.e. in winds from the left the stick should be displaced to the right. This is to counteract the lift increase on the right wing generated by the tug's prop wake, which the crosswind forces to drift to the right.

For intermediate to forward c/g positions the elevator should be neutral for the ground run; in the case of rearward c/g positions it is recommended that down elevator is applied until the tail lifts.

After lift-off the elevator trim can be set for a minimum in control stick loads.

When flown solo, the normal towing speed is in the region of 100 to 120 km/h (54-65 kt, 62-75 mph) and 120 to 140 km/h (65-76 kt, 75-87 mph) for two occupants flying with water ballast.

Only small control surface deflections are necessary to keep station behind the tug.

In gusty conditions or when flying into the propeller slip stream of a powerful tug, correspondingly greater control stick movements are required.

The undercarriage may be retracted during the tow; this is not, however, recommended at low altitude, as changing hands on the stick could easily cause the "Duo Discus" to lose station behind the tug.

When releasing the tow rope, pull the yellow T-shaped handle fully several times and turn only when definitely clear of the rope.

4.5.3 Flight

The "Duo Discus" has pleasant flight characteristics and can be flown effortlessly at all speeds, loading conditions (with or without water ballast), configurations and c/g positions.

With a mid-point c/g position the maximum speed range covered by the elevator trim is from about 70 km/h (38 kt, 43 mph) to about 200 km/h (108 kt, 124 mph).

Flying characteristics are pleasant and the controls are well harmonized. Turn reversal from + 45° to - 45° is effected without any noticeable skidding. Ailerons and rudder may be used to the limits of their travel.

All-up mass	513 kg 1131 lb	700 kg 1543 lb
Speed	99 km/h 53 kt 62 mph	113 km/h 61 kt 70 mph
Reversal time	4.6 sec	4.6 sec

Note:

Flights in conditions conducive to lightning strikes must be avoided.

High speed flying

At high speeds up to V_{NE} = 250 km/h (135 kt, 155 mph) the "Duo Discus" is easily controllable.

Full deflections of control surfaces may only be applied up to V_A = 180 km/h (97 kt, 112 mph).

At V_{NE} = 250 km/h (135 kt, 155 mph) only one third (1/3) of the full deflection range is permissible. Avoid especially sudden elevator control movements.

In strong turbulence, i.e. in wave rotors, thunderclouds, visible whirlwinds or when crossing mountain ridges, the speed in rough air V_{RA} = 180 km/h (97 kt, 112 mph) must not be exceeded.

With the c/g at an aft position, the control stick movement from the point of stall to maximum permissible speed is relatively small, though the change in speed will be noticed through a perceptible change in control stick loads.

The airbrakes may be extended up to V_{NE} = 250 km/h (135 kt, 155 mph). However, they should only be used at such high speeds in emergency or if the maximum permitted speeds are being exceeded inadvertently.

When extending the airbrakes suddenly, the deceleration forces are noticeable.

> WARNING:
>
> Consequently it is wise to check in advance that the harness is tight and that the control stick is not inadvertently thrown forwards when the airbrakes are extended. There should be no loose objects in the cockpit.

It should also be noted that in a dive with the airbrakes extended, the "Duo Discus" should be pulled out less abruptly than with retracted brakes (see section 2.9 "Maneuvering load factors").

A dive with the airbrakes fully extended is limited to an angle to the horizon of 30° at maximum permitted all-up mass at a speed of 250 km/h (135 kt, 155 mph).

Low speed flying and stall behaviour

In order to become familiar with the "Duo Discus" it is recommended to explore its low speed and stall characteristics at a safe height. This should be done whilst flying straight ahead and also whilst in a 45° banked turn.

Wings level stall

A stall warning usually occurs 5 to 7 km/h (3-4 kt, 3-4 mph) above stalling speed (CAS) and begins with vibration in the controls.
If the stick is pulled further back, this effect becomes more pronounced, the ailerons get spongy and the sailplane sometimes tends to slight pitching motions (speed increases again and will then drop to stalling speed).

On reaching a stalled condition - depending on the c/g position - a distinct drop of the ASI reading is observed, which then often oscillates because of turbulent air influencing the fin-mounted Pitot tube. With the c/g in rearward positions, the "Duo Discus" may slowly drop a wing, but usually it can be held level.

A normal flight attitude is regained by easing the control stick firmly forward and - if necessary - applying opposite rudder and aileron.

The loss of height from the beginning of the stall until regaining a normal level flight attitude is up to 30 m (98 ft).

In the case of forward c/g positions and stick fully pulled back, the sailplane just continues to fly in a mushed condition without the nose or a wing dropping.

Normal flying attitude is regained by easing the stick forward.

Turning flight stalls

When stalled during a coordinated 45° banked turn, the "Duo Discus" - with the control stick pulled fully back - just continues to fly in a stalled condition. There is no uncontrollable tendency to enter a spin. The transition into a normal flight attitude is conducted by an appropriate use of the controls.

The loss of height from the beginning of the stall until regaining a normal level flight attitude is approx. 20 to 30 m (66-98 ft).

Influence of water ballast

Apart from higher stall speeds - caused by the higher mass in flight - water ballast in the wing tanks has no aggravating influence on the stall characteristics.

With water ballast in the fin tank, stall characteristics are like those found for aft c/g positions.

4.5.4 Approach

Normal approach speed with airbrakes fully extended and wheel down is 90 km/h (49 kt, 56 mph) without water ballast and flown solo, or 105 km/h (57 kt, 65 mph) at maximum permitted all-up mass.

The yellow triangle on the ASI at the 100 km/h mark (54 kt, 62 mph) is the recommended approach speed for the maximum all-up mass without water ballast (660 kg/1455 lb).

In the above configurations the L/D is approximately 6.7 : 1.

The airbrakes open smoothly and are an effective landing aid.

Side slipping is also a fine aid for landing. It is possible in a straight line with the rudder deflected up to 85 % of its travel and results in a yaw angle of about 40° and a bank angle of about 25 to 30°. The control force reversal perceptible is low.

To return to level flight, normal opposite controls are required.

Caution:

With rudder fully deflected, side slips in a straight flight path are not possible - the sailplane will slowly turn in the direction of the displaced rudder.

> WARNING:
>
> Both the performance and the aerodynamic characteristics of the "Duo Discus" are affected adversely by heavy rain or ice on the wing. Be cautious when landing!
> Increase the approach speed by at least 5 to 10 km/h (3-5 kt, 3-6 mph).

4.5.5 Landing

For off-field landings the undercarriage should always be extended, as the protection of the crew is much better, especially from vertical impacts on landing.

Main wheel and tail wheel should touch down simultaneously.

To avoid a long ground run, make sure that the sailplane touches down at minimum speed.
A touch-down at a speed of 90 km/h (49 kt, 56 mph) instead of 70 km/h (38 kt, 43 mph) means that the kinetic energy to be dissipated by braking is increased by a factor of 1.65 and therefore the ground run is lengthened considerably.

The hydraulic main wheel disc brake is actuated via the airbrake linkage with airbrakes almost fully extended.

As the effectiveness of the wheel brake is good, the landing run is considerably shortened (the elevator control should be kept fully back).

5.2 LBA-approved data

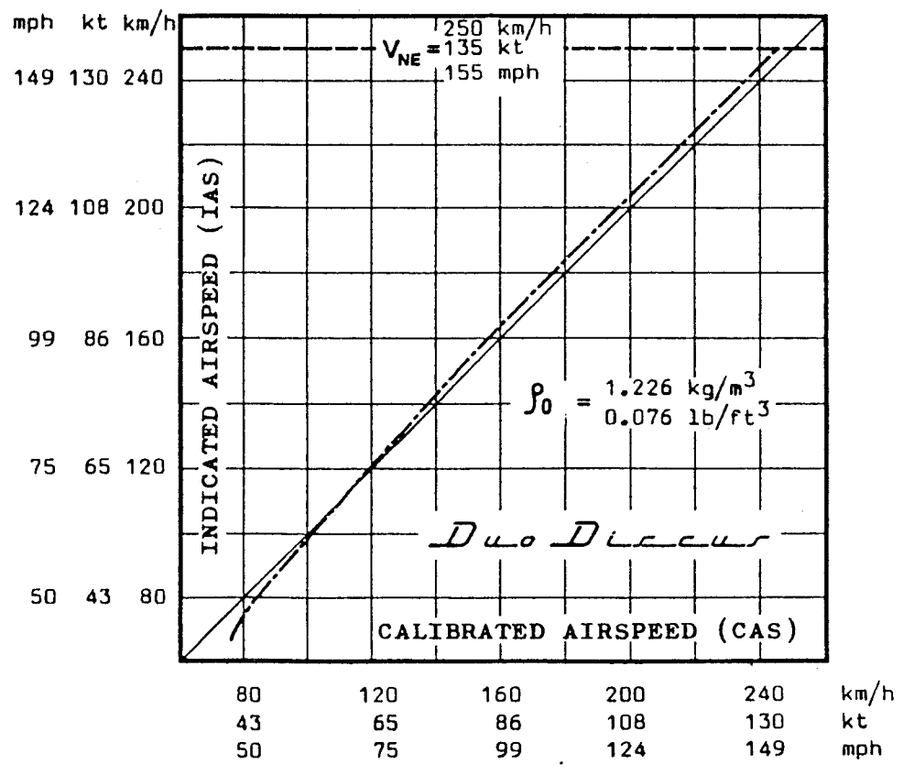
5.2.1 Airspeed indicator system calibration

Errors in indicated airspeed (IAS) caused by Pitot/ Static pressure errors may be read off from the calibration chart shown below.

PITOT pressure source: Fin

STATIC pressure ports: Fuselage tail boom, approx. 1.02 m (40.16 in.) forward of the base of the fin and 0.18 m (7.09 in.) below fuselage/wing fillet

All airspeeds shown in this manual are indicated airspeeds (IAS) as registered by the airspeed indicator.



5.2.2 Stall speeds

The following stall speeds (IAS) were determined in straight and level flight:

All-up mass approx.	kg lb	499 1100	700 1543
C/G position aft of datum	mm in.	250 9.84	45 1.77
Stall speed, airbrakes closed	km/h kt mph	35 - 45* 19 - 24* 22 - 28*	58 - 60* 31 - 32* 36 - 37*
airbrakes extended	km/h kt mph	40 - 45* 22 - 24* 25 - 28*	62 - 66* 33 - 36* 39 - 41*

* At minimum speed the ASI reading is heavily oscillating because of turbulent air influencing the pitot tube in the fin

The loss of height from the beginning of the stall until regaining a normal level flight attitude is up to 30 m (98 ft).

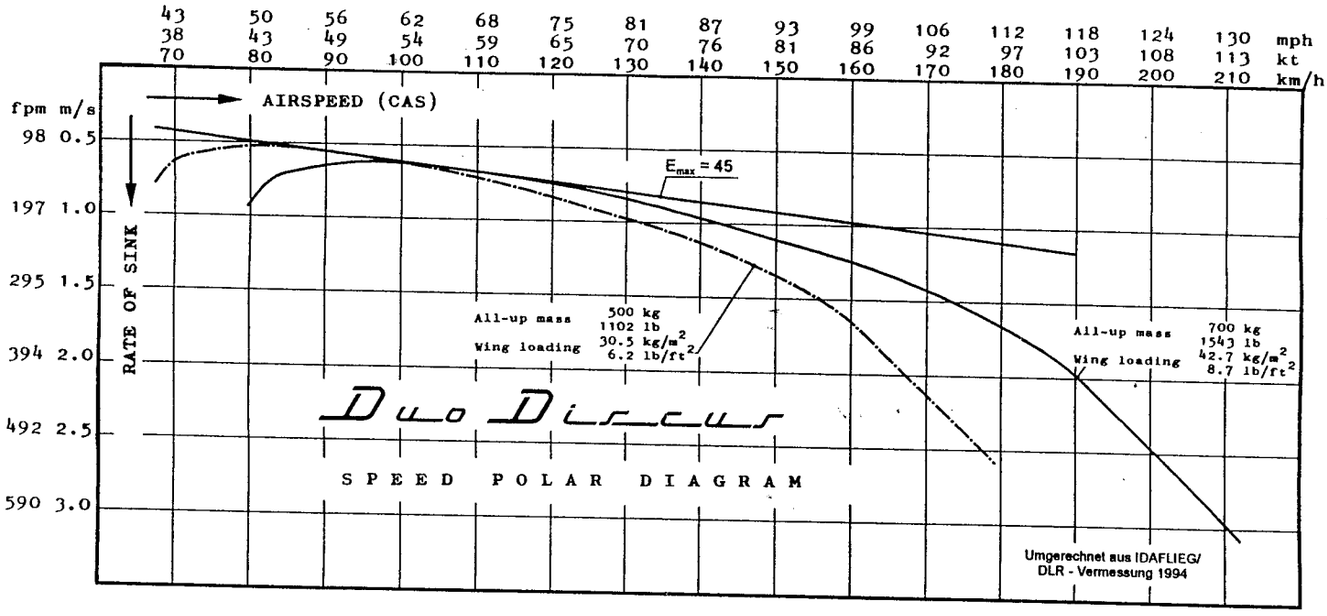
5.3.2 Flight polar

All values shown below refer to MSL

All-up mass	609 kg 1343 lb
Wing loading	37.1 kg/m^2 7.6 lb/ft^2
Minimum rate of sink	0.58 m/s 114 fpm
Best L/D	45
at a speed of	100 - 103 km/h 54 - 56 kt 62 - 64 mph

Above values are extracted from a DLR/ Idaflieg measurement in 1994.

For a speed polar diagram refer to page 5.3.2.2.


43 50 56 62 68 75 81 87 93 99 106 112 118 124 130 mph
38 43 49 54 59 65 70 76 81 86 92 97 103 108 113 kt
70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 km/h
fpm m/s
98 0.5
197 1.0
295 1.5
394 2.0
492 2.5
590 3.0
AIRSPEED (CAS)
RATE OF SINK
E_{max} = 45
All-up mass 500 kg 1102 lb
Wing loading 30.5 kg/m² 6.2 lb/ft²
All-up mass 700 kg 1543 lb
Wing loading 42.7 kg/m² 8.7 lb/ft²
Duo Discus
SPEED POLAR DIAGRAM
Umgerechnet aus IDAFLIEG/ DLR - Vermessung 1994

6.2 Weight and balance record / Permitted payload range

The following weight and balance log sheet (page 6.2.3) shows the maximum and minimum load on the seats. It is established with the aid of the last valid weighing report - the required data and diagrams are found in the "Duo Discus" Maintenance Manual.

The weight and balance log sheet is only applicable for this particular sailplane, the serial number of which is shown on the title page.

A front seat load of less than the required minimum is to be compensated by ballast - there are two methods:

1. By attaching ballast (lead or sand cushion) firmly to the lap belt mounting brackets.

   Optional trim ballast mounting provision(s)

2. a) By installing ballast (by means of lead plates) at the base of the front instrument panel (for further information refer to page 6.2.2)

   b) By attaching ballast (in addition to method 2 a) by means of lead plates to the front control stick mounting frame on the starboard side near the base of the instrument panel (for further information refer to page 6.2.2).

Altering the front seat load by trim ballast

Optional trim ballast mounting provision(s)

On request the "Duo Discus" is equipped with one or two mounting provisions for trim ballast, thus allowing a reduction of the placarded minimum front seat load (when flown solo) as shown in the table below.

a) Trim ballast mounting provision below front instrument panel:

This tray holds up to three (3) lead plates with a weight of 3.7 kg/8.2 lb each. Plates are made to fit only into this tray.

Lever arm of trim ballast plates:

2055 mm (6.74 ft) ahead of datum

b) Trim ballast mounting provision on front stick mounting frame on the starboard side:

This tray holds up to three (3) lead plates with a weight of 3.9 kg/8.6 lb each. Plates are made to fit only into this tray.

Lever arm of trim ballast plates:

1855 mm (6.09 ft) ahead of datum

WHEN FLOWN SOLO: Difference in seat load as compared with placarded front seat minimum:		Number of lead plates required:
up to 5 kg (11 lb) less	see a)	1
up to 10 kg (22 lb) less	see a)	2
up to 15 kg (33 lb) less	see a)	3
up to 20 kg (44 lb) less	see b)	4
up to 25 kg (55 lb) less	see b)	5
up to 30 kg (66 lb) less	see b)	6

WEIGHT AND BALANCE LOG SHEET (loading chart)

for Ser.No.:

Date of weighing				
Empty mass (kg)				
Equipment list dated				
Empty mass c/g position aft of datum (mm)				
Max. useful load (kg) in fuselage incl. ballast in fin tank				
Load (kg) on the seats (crew including parachutes):				
Maximum front seat load when flown solo	110	110	110	110
with two occupants				
Maximum rear seat load				
Water ballast fin tank installed (YES / NO)				
Minimum front seat load regardless of load on rear seat with				
a) Fin tank NOT installed				
b) Fin tank installed *)				
Inspector Signature Stamp				

Note:

*) 1. For safety reasons the value determined by weighing with an empty fin tank has been increased by 30 kg (66 lb) so as to allow for an unnoticed filled fin tank.

2. Adding the mass of 30 kg (66 lb) is not required, however, if the pilot either dumps all water ballast (prior to take-off) or does ensure that the ballast quantity in the fin tank is compensated by an appropriate load in the wing tanks and/or on the aft seat.

For the determination of the water ballast quantity permitted in the wing tanks refer to page 6.2.5.

For the determination of the water ballast quantity permitted in the fin tank refer to page 6.2.6 through 6.2.8.