

FLIGHT MANUAL

for Sailplane

Model: **D u o D i s c u s**

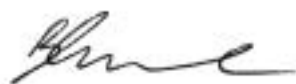
Type sales name: Duo Discus (x) (S/N 450, 469 and 473 and on
when in compliance with MB-No. 396-15)

Serial-No.:

Registr.-No.:

Date of issue: **O c t o b e r 1 9 9 3**

Pages as indicated by „LBA-app.“ are approved by



(Signature)

Luftfahrt-Bundesamt

(Authority)



(Stamp)

1 0. FEB. 2006

(Original date of approval)

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

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

0.1 Erfassung der Berichtigungen / Records of revisions

Lfd. Nr. der Berichtigung	Abschnitt	Seiten	Datum der Be- richtigung	Bezug	Datum der Anerkennung durch das LBA	Datum der Ein- arbeitung	Zeichen /Unter- schrift
Revision No.	Affected section	Affected page	Date of issue	Reference	Date of Approval by LBA	Date of Insertion	Signature
10	0 4	0.2.1 4.5.1.2	July 2005	<u>TM 396-11</u> F-Schlepp mit Motor- segler, wahlweise Werk-Nr. 1 bis 471 <u>TN 396-11</u> Aerotow with powered sailplane, optional S/N 1 through 471			
11	0 1 2 4 5 6 7	Deckblatt cover sheet 0.2.1 0.2.2 0.2.3 0.2.5 0.2.6 0.2.7 0.2.8 1.2 1.4.1 1.5 2.3 2.15 4.3.1 4.3.2 4.5.1.2 4.5.3.1 4.5.3.3 4.5.3.4 4.5.4 4.5.5 5.2.2 5.3.2.1 5.3.2.2 6.2.3 6.2.7 7.2.1 *) 7.2.4 7.2.7 *) 7.3.1*) 7.7 *) entfällt bei Werk-Nr. 469 not applicable for S/N 469	September 2005	<u>ÄB 396-15</u> Winglets, Hinterkanten- klappen (Werk-Nr. 469) und gefedertes Fahrwerk (Werk-Nr. 450 und ab Werk-Nr. 473) <u>MB 396-15</u> Winglets, trailing edge flap (S/N 469) and landing gear with shock absorber struts (S/N 450, 473 and on)			

MB: Modification Bulletin – Änderungsblatt
TN : Technical Note – Technische Mitteilung

0.2 Verzeichnis der Seiten / List of effective pages

Abschnitt	Seite	Ausgabe-Datum	Bezug
0	0.1.1		
	0.1.2		
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	0.2.2		
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	0.3.1		

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1	1.1.1 1.1.2 1.2 1.3 1.4.1 1.4.2 1.4.3 1.5	Oktober 1993 Oktober 1993 September 2005 Oktober 1993 September 2005 Oktober 1993 Oktober 1993 September 2005	MB 396-15 MB 396-15 MB 396-15

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2	2.1.1	Oktober 1993	TN 396-5/MB 396-10 MB 396-15
	2.1.2	Oktober 1993	
	LBA-ank. 2.2	Januar 2000	
	LBA-ank. 2.3	September 2005	
	LBA-ank. 2.4	Oktober 1993	
	LBA-ank. 2.5	Oktober 1993	
	LBA-ank. 2.6	Oktober 1993	
	LBA-ank. 2.7	Oktober 1993	
	LBA-ank. 2.8	Oktober 1993	
	LBA-ank. 2.9	Oktober 1993	
	LBA-ank. 2.10	Oktober 1993	
	LBA-ank. 2.11	Oktober 1993	
	LBA-ank. 2.12	Oktober 1993	
	LBA-ank. 2.13	Januar 2000	TN 396-5/MB 396-10 MB 396-15
	LBA-ank. 2.14	Oktober 1993	
	LBA-ank. 2.15	September 2005	

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4	4.1.1	Okt. 1993	
	4.1.2	Okt. 1993	
	LBA-ank. 4.2.1	Okt. 1993	
	LBA-ank. 4.2.2	Juni 2001	MB 396-3
	LBA-ank. 4.2.3	Okt. 1993	
	LBA-ank. 4.3.1	September 2005	MB 396-15
	LBA-ank. 4.3.2	September 2005	MB 396-15
	LBA-ank. 4.3.3	Febr. 1996	TM 396-3 / MB 396-7
	LBA-ank. 4.3.4	Febr. 1996	TM 396-3 / MB 396-7
	LBA-ank. 4.4	Okt. 1993	
	LBA-ank. 4.5.1.1	Jan. 2000	TM 396-5 / MB 396-10
	LBA-ank. 4.5.1.2	September 2005	MB 306-15
	LBA-ank. 4.5.1.3	Okt. 1993	
	LBA-ank. 4.5.1.4	Okt. 1993	
	LBA-ank. 4.5.2	Okt. 1993	
	LBA-ank. 4.5.3.1	September 2005	FAA, MB 396-15
	LBA-ank. 4.5.3.2	Okt. 1993	
	LBA-ank. 4.5.3.3	September 2005	MB 396-15
	LBA-ank. 4.5.3.4	September 2005	MB 396-15
	LBA-ank. 4.5.4	September 2005	MB 396-15
	LBA-ank. 4.5.5	September 2005	MB 396-15
	LBA-ank. 4.5.6.1	Okt. 1993	
	LBA-ank. 4.5.6.2	Okt. 1993	
	LBA-ank. 4.5.6.3	Okt. 1993	
	LBA-ank. 4.5.6.4	Okt. 1993	
	LBA-ank. 4.5.6.5	Okt. 1993	
	LBA-ank. 4.5.7.1	Okt. 1993	
	LBA-ank. 4.5.7.2	Okt. 1993	
	LBA-ank. 4.5.8	Okt. 1993	
	LBA-ank. 4.5.9	Okt. 1993	

Duo Discus

FLUGHANDBUCH / FLIGHT MANUAL0.2 Verzeichnis der Seiten / List of effective pages

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5	5.1.1 5.1.2 LBA-ank. 5.2.1 LBA-ank. 5.2.2 LBA-ank. 5.2.3 LBA-ank. 5.2.4 LBA-ank. 5.3.1 LBA-ank. 5.3.2.1 LBA-ank. 5.3.2.2	Okt. 1993 Okt. 1993 Febr. 1996 September 2005 Okt. 1993 Okt. 1993 Okt. 1993 September 2005 September 2005	TM 396-3 / MB 396-7 MB 396-15 MB 396-15 MB 396-15

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1	6.1.1	Oktober 1993	MB 396-15
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	6.2.1	Oktober 1993	
	6.2.2	Oktober 1993	
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	6.2.5	Oktober 1993	
	6.2.6	Oktober 1993	
	6.2.7	September 2005	
	6.2.8	Oktober 1993	

1.2 Certification basis

This sailplane, model designation

„Duo Discus“

has been approved by the Luftfahrt-Bundesamt (LBA) in compliance with “JAR”, Part 22 effective on October 28, 1995 (Change 5 of the English Original Issue).

The LBA Type Certificate is No. **EASA.A.025** and was issued primarily under Data Sheet No. 396 on

21.03.1994

Category of Airworthiness: UTILITY

1.4 Descriptive data

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

Wing

The wing is four-stage trapezoid in planform, consists of two main panels with tip extension with winglets (having a swept-back leading edge) and features double-panel „Schempp-Hirth“ type airbrakes on the upper surface and connected to a trailing edge flap. Ailerons are internally driven. The integral water ballast tanks have a total capacity of approx. 198 Liters (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 with shock absorber struts 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.

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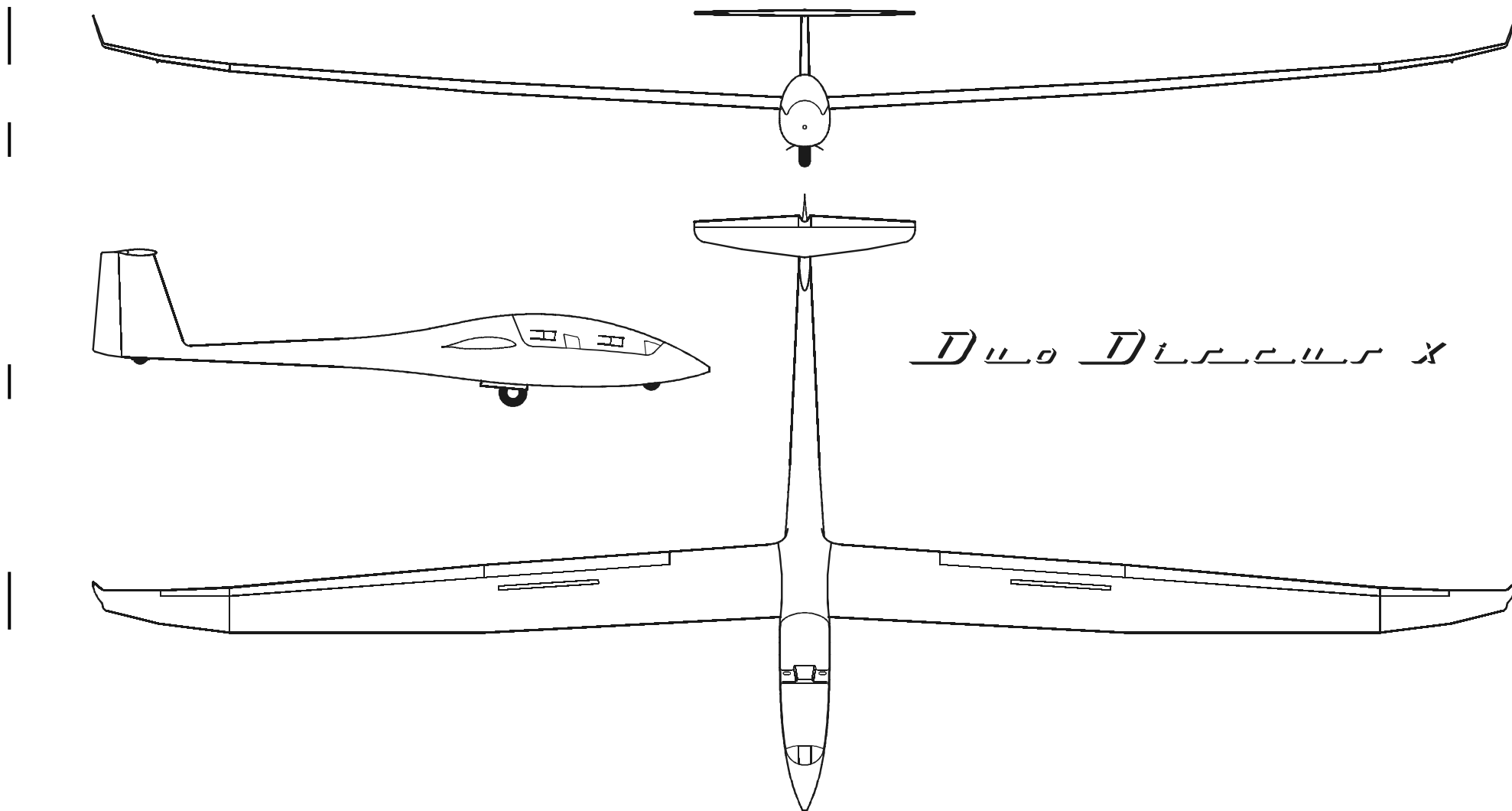
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Controls

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1.5 Three-side view



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	<u>Normal operating range</u> (lower limit is the speed $1.1V_{S1}$ 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	95 km/h 51 kt 59 mph	Approach speed at maximum mass without water ballast

2.15 Limitations placards

MAXIMUM PERMITTED ALL-UP MASS: 700 kg (1543 lb)				Max. permitted speed				
MAXIMUM PERMITTED SPEEDS (IAS): km/h kt mph				Altitude		V _{NE} (IAS)		
				[m]	[ft]	km/h	kt	mph
Never exceed speed	250	135	155	0-2000	0-6562	250	135	155
Rough air speed	180	97	112	3000	9843	241	130	150
Maneuvering speed	180	97	112	4000	13123	229	124	142
Aerotowing speed	180	97	112	5000	16404	217	117	135
Winch launching speed	150	81	93	6000	19685	205	111	127
Landing gear operating speed	180	97	112	7000	22966	194	105	121
				8000	26247	183	99	114
				9000	29528	172	93	107
				10000	32808	162	87	101

fin tank **not** installed

LOAD ON THE SEATS (crew incl. parachutes)				
SEAT LOAD	TWO PERSONS		ONE PERSON	
	min.	max.	min.	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	_____	_____
For seat loads below placarded minimum refer to Flight Manual, section 6.2				

fin tank installed

LOAD ON THE SEATS (crew incl. parachutes)				
SEAT LOAD	TWO PERSONS		ONE PERSON	
	min.	max.	min.	max.
front seat load	100* kg 221* lb (70*) kg (154*) lb	110* kg 243* lb	100* kg 221* 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.				

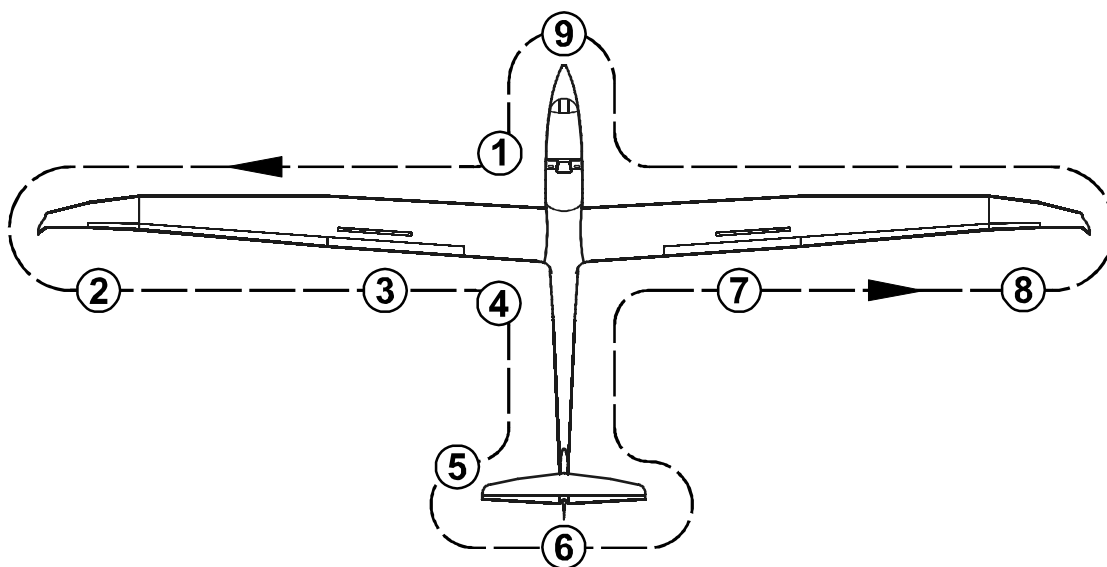
- *) As the actual minimum or maximum seat load of this aircraft (to which this manual refers) may differ from these typical weights, the placard in the cockpit must always show the actual values, which are also to be entered in the log chart - see section 6.2.

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.

- 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

- f) Check for the presence of foreign objects
 - g) (reserved)
 - h) (reserved)
 - i) Check tire pressure:
 - Nose wheel: 3.0 bar (43 psi)
 - Main wheel: 4.0 bar (57 psi)
 - j) 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)
- a) Check airbrakes for proper condition, fit and locking
 - b) Check the trailing edge flap for any unusual play by gently shaking the trailing edge.
 - c) With airbrakes locked the trailing edge flap must rest against the stop at the inner end of the trailing edge flap.
 - d) Extending the airbrakes must result in a simultaneous down deflection of the trailing edge flap.

When flown solo, the normal towing speed is in the region of 100 to 120 km/h (54-65 kt, 62-75 mph) and 130 to 140 km/h (70-76 kt, 81-87 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.

NOTE:

The minimum towing speeds are lower for aero tow with a powered sailplane:

- 95 km/h (51 kt, 59 mph) (when flown solo)
- 105 km/h (56 kt, 65 mph) (for two occupants with water ballast)

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	620 kg 1364 lb	700 kg 1543 lb
Speed	97 km/h 52 kt 60 mph	105 km/h 56 kt 65 mph
Reversal time	4.8 sec	4.4 sec

Note:

Flights in conditions conducive to lightning strikes must be avoided.

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 12 km/h (3 - 6 kt, 3 - 7 mph) above stalling speed 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 40 m (131 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. 60 m (197 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 100 km/h (54 kt, 62 mph) at maximum permitted all-up mass.

The yellow triangle on the ASI at the 95 km/h mark (51 kt, 59 mph) is the recommended approach speed for the maximum all-up mass without water ballast (670 kg / 1474 lb).

The airbrakes open smoothly.

The approach to the ground can be done slowly with airbrakes fully extended because no pancaking occur when flaring out - also when retracting the airbrakes.

Side slipping is also fine aid for landing. It is possible in a straight line with the rudder deflected up to about 90 % of its travel and results in a yaw angle of about 30° and a bank angle of about 10° to 15°. 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.
- Side slipping causes the ASI to read less.
- During side slip with water ballast some water escapes through the vent hole of the water tank filler cap of the lower wing. Prolonged slips with water ballast are therefore not recommended.

WARNING:

Both the performance and the aerodynamic characteristics of the "DUO DISCUS" are affected adversely by rain or ice on the wing.

Be cautious when landing!

Increase the approach speed 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.

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

5.2.2 Stall speeds

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

All-up weight (mass)	(kg)	624	700
approx.	(lb)	1373	1543
C/G position	(mm)	250	45
aft of datum	(in.)	9.84	1.77
Stall speed,			
airbrakes closed	(km/h)	55*	70*
	(kt)	29*	38*
	(mph)	34*	44*
airbrakes extended	(km/h)	55*	70*
	(kt)	29*	38*
	(mph)	34*	44*

* 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).

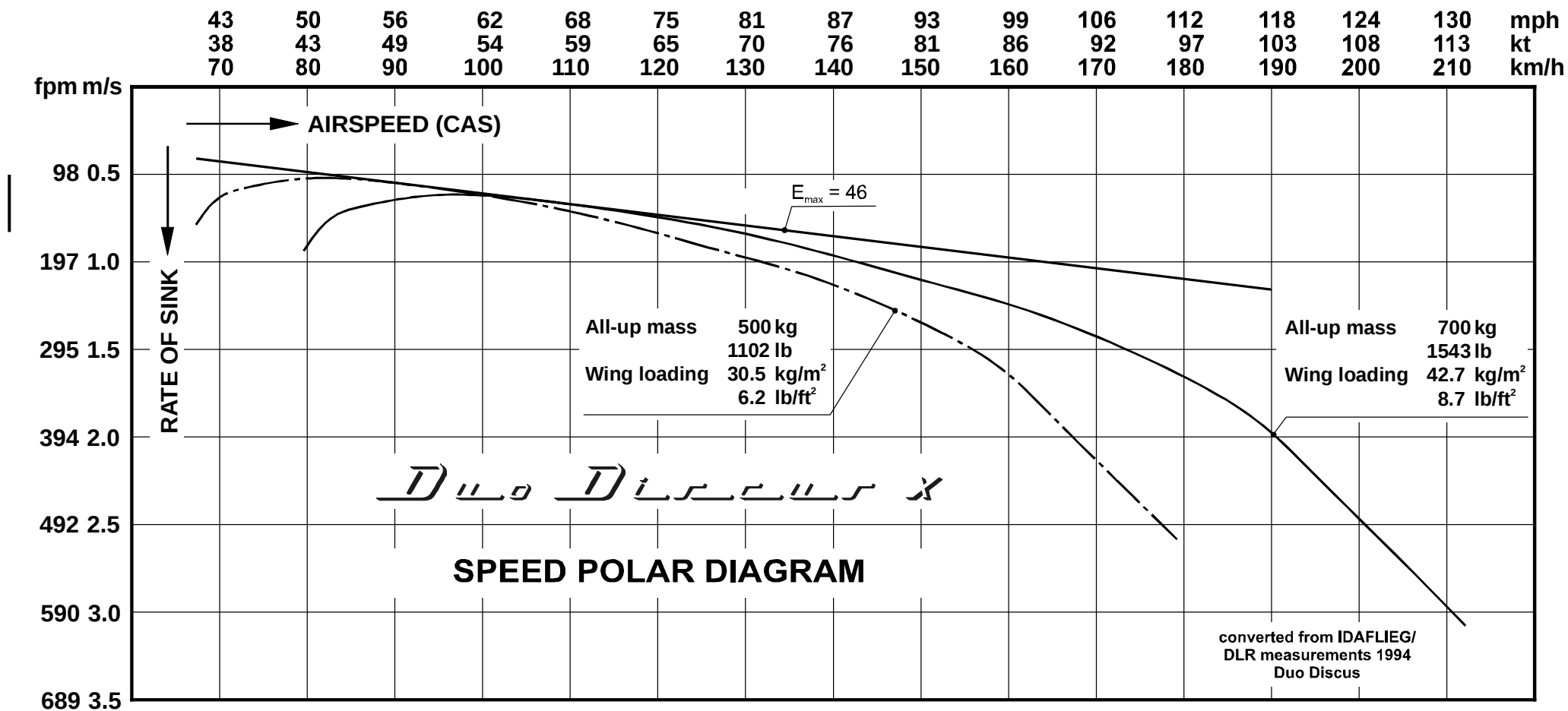
5.3.2 Flight polar

All values shown below refer to MSL (0 m)

Values converted from Idaflieg/DLR measurements 1994.

All-up mass	609 1343	kg lb
Wing loading	37.1 7.6	kg/m ² lb/ft ²
Minimum rate of sink	0.56 110	m/s fpm
Best L/D	46 - 47	
at a speed of	100 - 103 54 - 56 62 - 54	km/h kt mph

For a speed polar diagram refer to page 5.3.2.2.



WEIGHT AND BALANCE LOG SHEET (loading chart) FOR S/N

Date of weighing:				
Empty mass [kg]				
Equipment list dated				
Empty mass c/g position aft of datum				
Max. useful load [kg] in fuselage				
Load [kg] on the seats (crew including parachute):				
Front seat load when flown solo:	max.	110	110	110
with two occupants:	max.			
Rear seat load with two occupants:	max.			
Water ballast fin tank installed (YES / NO)				
Front seat load regardless of load on rear seat, with				
a) Fin tank NOT installed	min.			
b) Fin tank installed	min.*			
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 of 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.

Waterballast in (optional fin tank) ctd.:**IMPORTANT NOTE**

When determining the useful load in the fuselage the quantity of waterballast in the fin must **not** be taken in account because of flight mechanic reasons.

In order to avoid that the maximum permitted all-up weight (mass) is exceeded, the ballast in the fin tank must also be taken into account when determining the maximum allowable ballast quantity for the wing tanks.

Example:

Assumed ballast load in wing tanks: 40 kg/Liters
(88 lb/10.6 US Gal)

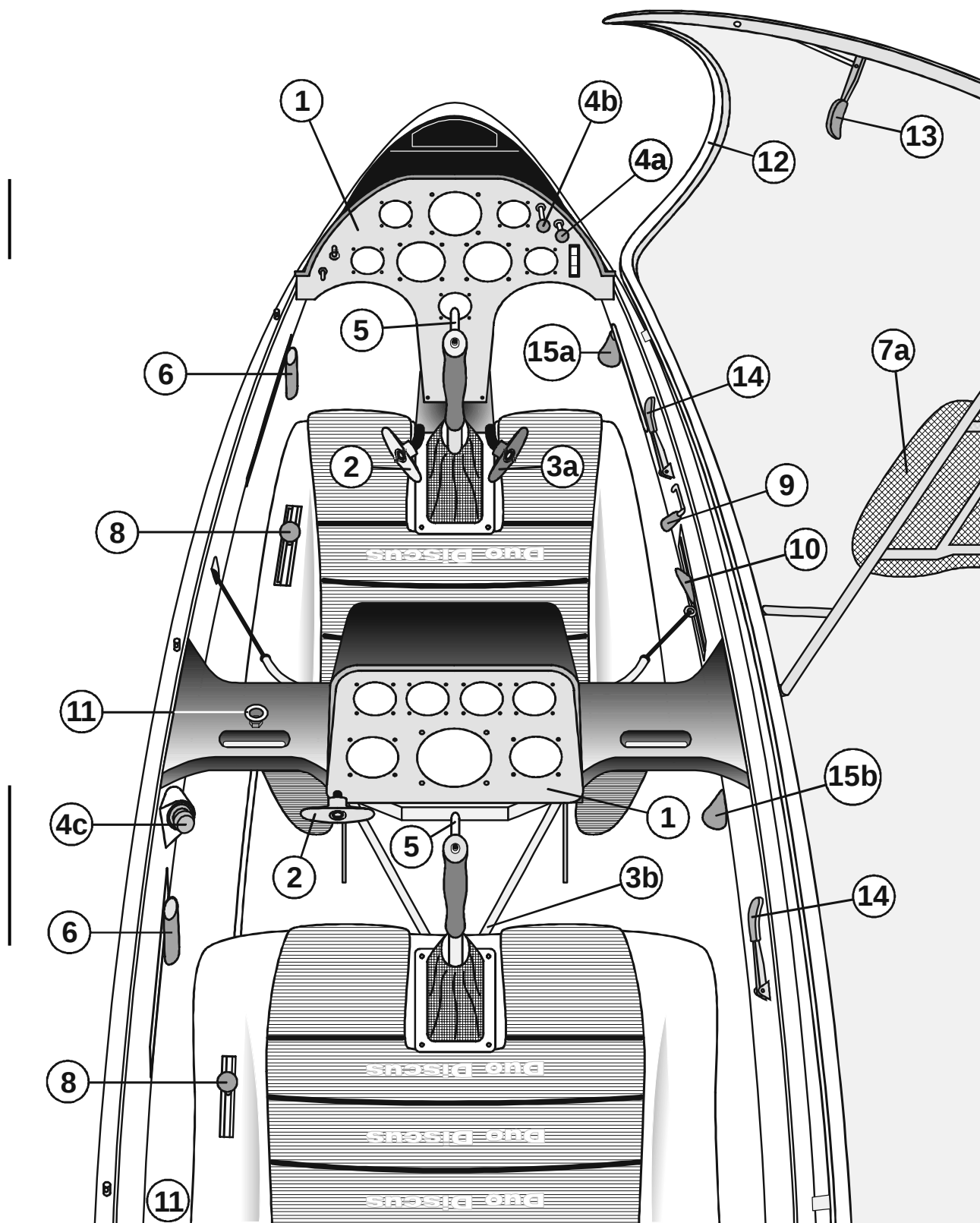
Assumed load on aft seat: 75 kg (165 lb)

According to the diagrams on page 6.2.8 the following loads in the fin tank are permissible (fill only full Liters):

For ballast in wing tank : m_{FT} = 1 kg/Liter
(2.2 lb/0.26 US Gal)

For load on aft seat : Δm_{FT} = 6 kg/Liters
(13.2 lb/1.58 US Gal)

Total ballast in fin tank : $m_{FT} + \Delta m_{FT}$ = 7 kg/Liters
(15.5 lb/1.85 US Gal)

7.2 Cockpit description

(4) Ventilation

Small black knob on the front instrument panel on the left.

Pull to close ventilator
Push to open ventilator

Additionally the clear vision panels or the airscoop in the panels may be opened for ventilation.

(5) Wheel brake

A wheel brake handle is mounted on either control stick. Additionally the wheel brake will be actuated by extending the airbrakes fully.

(6) Airbrake levers

Levers (with blue marking), projecting downwards, below the inner skin on the left.

Forward position: Airbrakes closed and locked

Pulled back about 55 mm (2.2 in.): Airbrakes unlocked

Pulled fully back: Airbrakes fully extended and trailing edge flap deflected, wheel brake actuated.

(7) Head rests

a) Front seat: Head rest (vertically adjustable) on canopy transverse frame

b) Rear seat (not illustrated):
Mounting rail on upper fuselage skin. Head rest is gradually and horizontally adjustable:
Depress locking tap, slide head rest in desired position and let locking tap engage into nearest recess.

(4) Ventilation

- a) Small black knob on the front instrument panel on the right:
(Ventilation air quantity)

Pull to open ventilator nozzle
Push to close ventilator nozzle

- b) Small black knob on the front instrument panel on the right:
(Adjustment of the ventilation air stream direction)

Pull to steeper the air stream
Push to flatten the air stream

- c) Adjustable bull-eye-type ventilator on the starboard aft cockpit side:

Turned clockwise: Ventilator open
Turned anti-clockwise: Ventilator closed

Additionally the clear vision panels or the air scoop in the panels may be opened for ventilation.

(5) Wheel brake

A wheel brake handle is mounted on either control stick.

(6) Airbrake levers

Levers (with blue marking), projecting downwards, below the inner skin on the left.

Forward position: Airbrakes closed and locked

Pulled back about 55 mm (2.2 in.): Airbrakes unlocked

Pulled fully back: Airbrakes fully extended and trailing edge flap deflected

(7) Head rests

- a) Front seat: Head rest (vertically adjustable) on canopy transverse frame

- b) Rear seat (not illustrated):

Mounting rail on upper fuselage skin. Head rest is gradually and horizontally adjustable:
Depress locking tap, slide head rest in desired position and let locking tap engage into nearest recess.

(4) Ventilation

- a) Small black knob on the front instrument panel on the right:
(Ventilation air quantity)

Pull to open ventilator nozzle
Push to close ventilator nozzle

- b) Small black knob on the front instrument panel on the right:
(Adjustment of the ventilation air stream direction)

Pull to steeper the air stream
Push to flatten the air stream

- c) Adjustable bull-eye-type ventilator on the starboard aft cockpit side:

Turned clockwise: Ventilator open
Turned anti-clockwise: Ventilator closed

Additionally the clear vision panels or the air scoop in the panels may be opened for ventilation.

(5) Control stick with wheel brake

A wheel brake handle is mounted on either control stick.

Aft, removable control stick

To dismount the aft control stick unscrews and removes the wing bolt, push the stick down in the stick cage and disconnect the brake cable. Loosen the electrical coupling and remove the stick. Mounting of the stick has to be carried out in inverse order.

(6) Airbrake levers

Levers (with blue marking), projecting downwards, below the inner skin on the left.

Forward position: Airbrakes closed and locked

Pulled back about 55 mm (2.2 in.): Airbrakes unlocked

Pulled fully back: Airbrakes fully extended and trailing edge flap deflected

(7) Head rests

- a) Front seat: Head rest (vertically adjustable) on canopy transverse frame

- b) Rear seat (not illustrated):
Mounting rail on upper fuselage skin. Head rest is gradually and horizontally adjustable:
Depress locking tap, slide head rest in desired position and let locking tap engage into nearest recess.

(14) Canopy release

Black lever (for front and rear seat) on the inner skin on the right.

To remove the canopy, proceed as follows:

Swing back the canopy release lever (approx. 90°) and the canopy locking lever, disconnect restraining cable and lift off the canopy.

Undercarriage

(15a) Front and rear seat

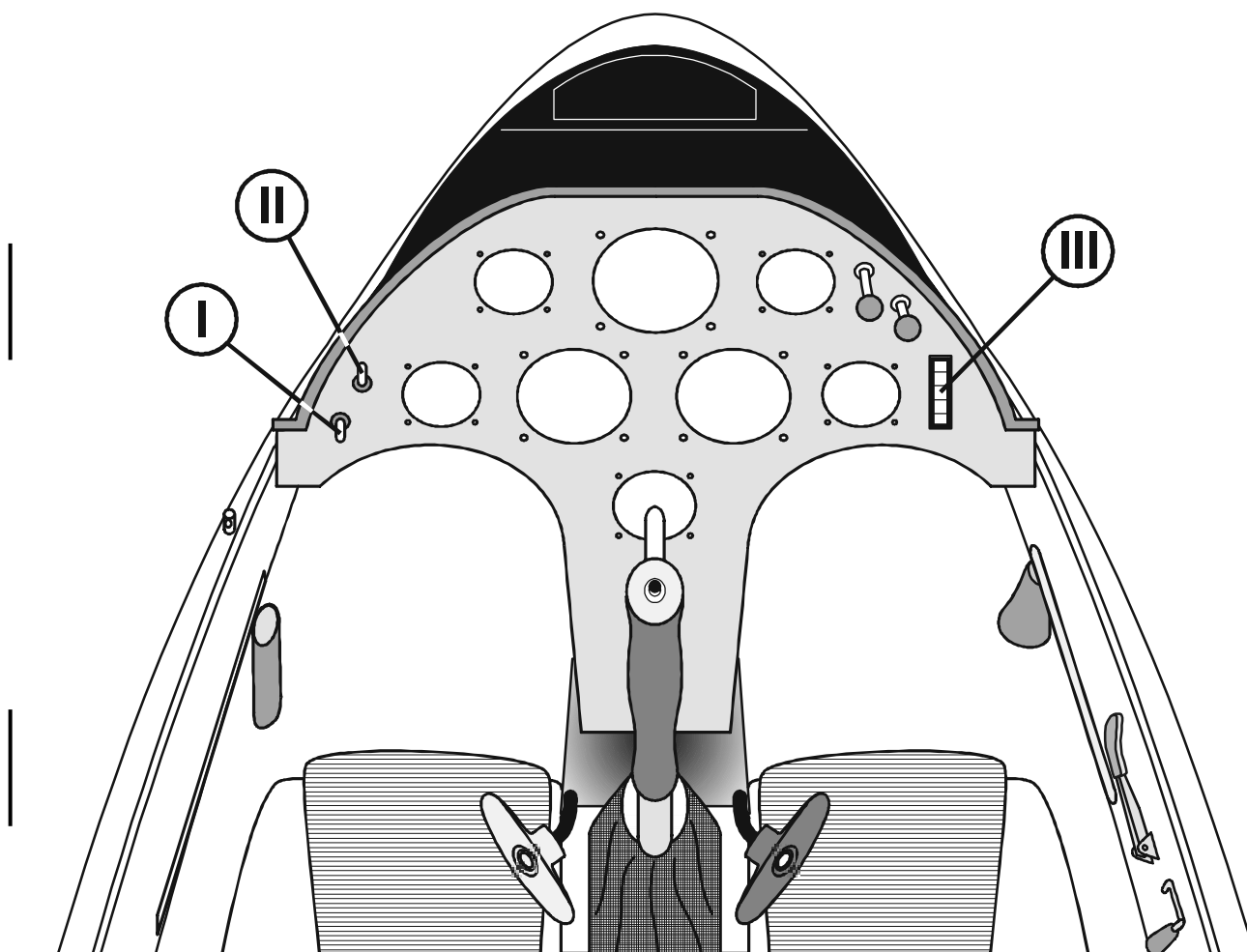
(15b)

Retracting : Disengage black handle below the inner skin on the right, pull it back and lock in rear recess

Extending: Disengage handle, push it forward and lock in front recess

7.3.1 Instrument panels

front panel:



For a description of components No. I through III refer to the following page 7.3.2. A description of the instrumentation and an illustration of the rear instrument panel is not deemed necessary.

7.7 Airbrake system

Schempp-Hirth type airbrakes are employed on the upper surface of the main wing panels which deflects simultaneously the trailing edge flap.

A schematic view of the airbrake system is given in the Maintenance Manual.