ALEXANDER SCHLEICHER
SEGELFLUGZEUGBAU
6416 POPPENHAUSEN/RHÖN

Flight and Operations Manual
for the Sailplane Type
„ASW 15"
February 1971
Edition for Gliders under U.S. registration.

This manual is always to be carried on board

It belongs to the Sailplane ASW 15

Serial Number: .....
Registration No.: .....
Owner : .....
.....
.....

Manufacturer : Alexander Schleicher
Segelflugzeugbau
6416
Poppenhausen/Rhön

The pages 1 to 15 of the Flight Manual are approved by the Federal Office of Civil Aeronautics of the Federal Republic of Germany (LBA). Approval of translation has been done by best knowledge and judgment.
In any case the original text in German language is authoritative.

Contents

Amendments to the Manual

No.	Title	Page	Date	Signature

1 Flight Manual

1.1 Preface

The ASW 15 is the first sailplane of the A. Schleicher Sailplane Co. which has been licensed according to the new "Airworthiness Requirements for Sailplanes" (LFS). As will be noticed in the subsequent data, the "LFS" result in higher clearance data than the old Airworthiness Requirements "BVS" .
The reason for these higher placards is the reduction of the safety factor (proportion of breaking load to permissible load) from the previous 2.0 to the new value of 1.5.
Several important deductions for the flight operation have to be made from this fact.
The listed speed limitations must not be exceeded at any time, since the safety margin to the breaking load has been significantly reduced. Even during flight test program the speed limitations are hardly exceeded.
One should consider further that while the sailplane is stressed to take a gust of -10 m/s (± 2000 feet/min) at 220 km/h (119 knots 135 mph) the pilot in such a case has to be able to withstand accelerations of approx, +6 G and -4 G without overcontrolling and thusly overstressing the aircraft.
Contrary to the old "BVS" requirements where the green range on the airspeed indicator was synonymous with the rough airspeed range, the green range of the ASW 15 airspeed indicator denotes the speed range where full control movements are permissible.

The yellow speed range only allows reduced control movements. They must become progressively smaller to 1/3 of the possible deflection at the rough air redline airspeed.

1.2 Operation Values and limitations

Speed limits:

Maximum speed	220 km/h, 119 knots, 137 mph.
Max. speed with full control deflections	150 km/h, 82 knots, 93 mph.
Max. speed in aero tow	150 km/h, 81 knots, 93 mph.
Auto and winch tow	110 km/h, 59 knots, 68 mph.

For this purpose the following colored calibration markings appear on the airspeed indicator:

- Red line at	220 km/h, 119 knots, 137 mph
- Green range between	70-150 km/h, 38-81 knots, 43-93 mph
- Yellow range between	150-220 km/h, 81-119 knots, 93-137 mph

Weights

Empty weight with minimum equipment and antenna	205 kg, 451 lbs.
Maximum all up weight	318 kg, 700 lbs.
Max. weight of non-lift producing members(fuselage, payload and tailplane)	198 kg, 437 lbs.

Weak link in tow line:

For winch and aero tow	max	500 kg, 1100 lbs

In Flight Center of Gravity

Datum point is the leading edge of the wingroot rib.
The horizontal reference line is the center-line of the fuselage tail cone or a 1000 : 50 wedge template leveled out on the top side of the fuselage aft portion (see the page "rigging data" of the appendix).

Center of Gravity range from 220 mm (8.67 inch) to 380 mm (14.9 inch) behind datum point.

Notes
The sailplane is suited for cloud flying when the required equipment is installed and semi aerobatics, including spins (see page 12).
Maximum permissible load factor is + 5.3,
Minimum permissible load factor is - 2.65.

Tall pilots can fly without the adjustable seatrest but they must use a stiff cushion that levels the edge of the towing hook fairing with the box of the wheel. Also tall pilots should use shoes with heels as low as possible.

1.3 Minimum Equipment

- Airspeed indicator with 30 to 250 km/h range (20 to 135 knots, 20 to 155 mph), marked in accordance with paragraph 1.2 (page 5).
- Lap and shoulder straps
- Parachute or back-cushion at least 8 cm thick (3 1/4 inches) when compressed.
- Altimeter

Additional minimum equipment for cloud flying:

- Turn and bank indicator
- Compass
- Variometer (on U.S. registered Sailplanes)
- Experiences to date have proven the pitot pressure system is adequate for cloud flying.

Flights under icing conditions are prohibited,
If the compass cannot be compensated in the instrument panel, it can be fitted in the Perspex canopy above the stick or on the right cockpit wall above the side pocket.

Instruments that weigh more than 1 kg (2.2 lbs) themselves should not only be fixed to the instrument panel by using 4 screws. They should be supported additional by a fitting aiming to one of the rubber blocks.

1.4 Load Schedule

Load in the pilot's seat (pilot and parachute).

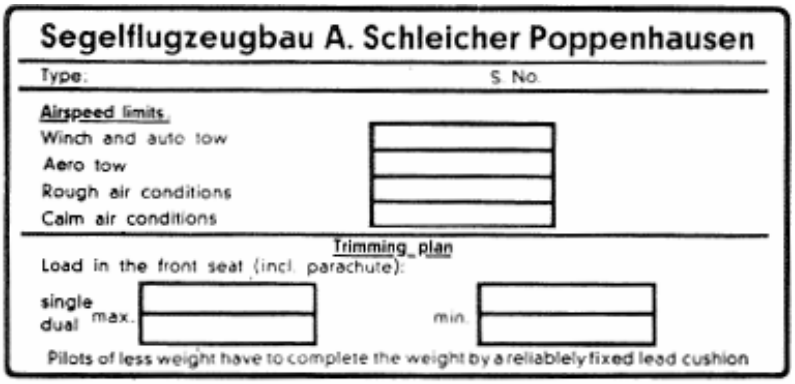
min.	65 kg, 143 lbs.
max.	110 kg, 242 lbs.

If no parachute is used a back-cushion of 8 cm (3.25 inch) minimum thickness when compressed is to be used.

If the load is below the minimum of 143 lbs., ballast in the seat area in form of lead or sandbags is required.
The loading of the baggage case has nearly no influence to the Center of Gravity position. It should not be loaded with more than 24 lbs.
Hard objects of more than 1 kg (2 lbs.) should be thoroughly fixed in the baggage department for safety reasons.

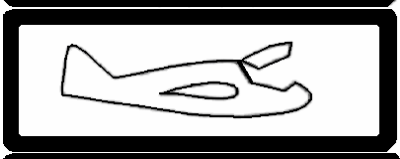
1.5 Operating Handles, Placards and Nomenclatures

Data Plate

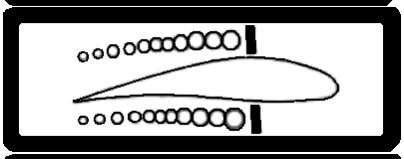


The fireproof type nameplate is part of the dive brake handle and trim escutcheon.

Tow release - yellow-knob on LH area next to the control stick

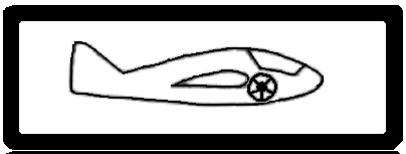


To jettison canopy - red handle pull above instrument panel.

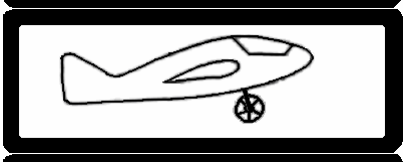


Dive brakes - blue handle on lower left sidewall.

Wheel brake - pull, dive brake handle on lower left side wall.



Landing gear up - black handle on the upper left side wall pulled.



Landing gear down - black handle pushed forward.

Trim nose heavy - green knob on LH arm rest area.

Trim tail heavy.

Rudder pedal adjustment : grey knob RH area next to control stick. To move pedals back: Take load off pedals and pull back; release control knob and put slight pressure on pedals to adjust them.
To move pedals forward: Pull knob and simultaneously push pedals forward; release control knob suddenly and lock in place by putting slight pressure on pedals.

Ventilation: light blue knob in upper RH area in instrument panel.

Anchoring point for parachute static line: Red ring on main bulkhead.

1.6 In-flight Informations

Instructions for rigging and derigging are given on page 15 and 16 of the operations manual.

Jettisoning of Canopy
Pull red handle back and push canopy upward.

Winch Launch
Maximum winch launch speed is 110 km/h (59 knots, 68 mph). Trim lever in the center to slight back position the sailplane will lift off by itself and will assume a moderate attitude. When safety height is reached, slight back-pressure can be applied.

Aero Tow
Maximum aerotow speed is 150 km/h (81 knots, 93 mph). Tested lengths for manila or nylon towropes are within the 20-60 m (70 to 200 feet) range. Towing is done from the Center of Gravity hock. To release pull yellow knob all the way back. Once the safety-altitude is reached, one can pull up the landing gear. Heavy pilots should try to keep the tail on the ground on take off run by pulling the stick.

Free Flight
The stalling speed in level flight depends on the all up weight and varies from 63 km/h (34 knots, 39 mph) at 270 kg (544 lbs.) to 66 km/h (36 knots, 41 mph) at 318 kg (700 lbs. The stalling speed increases in turns. The respective stalling speeds are 70 km/h (38 knots, 44 mph) at 30° and 75 km/h (40 knots, 47 mph) at 45° bank.

The best rate of sink is obtained at 70 km/h (38 knots, 44 mph) in level flight; the best L/D at 90 km/h (19 knots, 56 mph). The best circling speeds are 74-80 km/h (40-43 knots, 46-50 mph) for 30° bank and 80-85 km/h (43-46 knots, 50-53 mph) for 45 bank.

Dangerous Flight Attitudes
The ASW 15 has extremely harmless stalling characteristics. The stall warning occurs at 68-70 km/h (37-38 knots, 42-44 mph) and is indicated by large stick movement in the elevator. With the stick hard back, the aileron and rudder respond up to approximately half control movements in the normal sense.

Full rudder and aileron deflection during a stall will cause wing dropping. Only with the C. of G. near the maximum rearward position will it 1ead to a spin.

Wing dropping as well as spinning are terminated with the (German) standard procedure (opposite rudder and elevator neutral),

If no corrective measures are started, the sailplane will terminate the sideskid or spin by itself and will develop a spiral like sideslip. This sideslip can also be ended with opposite rudder.

If still no corrective measures are taken, then this sideslip will eventually change to a spiral dive with the typical buildup of high speeds.
Only with the C. of G. at the rear limit can the sailplane be put into a stationary spin, which would be finished by the "standard method"
(see above). Haiti drops, frost and icing deteriorate the surface and will cause a change in the flight characteristics. Under such conditions one should be extremely careful when landing and should use a sufficient safety margin in the airspeed.

Landing
Lower the landing gear in time , not later than at 100 m (300 feet) altitude. The approach should be made at about 90-100 km/h (49-54 knots. 50-62 mph). If possible have the sailplane trimmed out for this speed.
The glide path can be varied with the divebrakes within wide limits, moreover the sideslip is very effective.

Cloud Flying
The minimum equipment for cloud living is listed under paragraph 1.3. The installation of an artificial horizon and an accelerometer is recommended. Excessive speeds are to be avoided by all means when flying in cloud. A timely use of the dive brakes (about at 120 km/h, (65 knots, 75 mph) ensures not only a safe braking action but also a more stable flight attitude.

"Semi"-Aerobatics
Besides spinning the following aerobatics are approved:

Loops, Stall Turns, Lazy Eight, and Chandelle as well as combinations of these maneuvers are approved. Negative load factors are not certified.

Loop: A starting speed in the lowest point of about 160-180 km/h (86-98 knots, 100-112 mph) is recommended.

Stall Turn: A stall turn is also started with 160-180 km/h in level flight. At 70 km h (38 knots, 44 mph) or a bit earlier the turn is started by full application of the rudder. With some aileron to the outside of the turn one must avoid an inverted flight attitude.

Lazy Eight: This maneuver can be done up to 170 km/h (92 knots, 106 mph) in the crossing point.

Chandelle: This maneuver is started like a stall turn, however at 90 km/h (49 knots, 56 mph) and with full rudder and full contrary aileron deflections applied, the transition to the level flight must be started. Also the stick must be markably pushed.

1.7 Empty Weight Center of Gravity Limits

After repairs or installations of additional equipment have been made or after the sailplane has been repainted, special attention is to be given to the empty weight center of gravity, remaining within the permissible limits.

Datum point and reference line are the same as shown in paragraph 1.2.

A diagram on the empty weight center of gravity location range is found on page 27, If these limits are maintained, one can be assured that the in-flight C. of G. is within the allowable limits, provided the load limitations have been properly observed.

The in-flight C. of G. has a great effect on the flight characteristics; it is therefore essential that its limits are observed.

A C. of G. location aft of the rear limit is dangerous, since the stall and spin characteristics are adversely affected. Moreover the elevator becomes hypersensitive.

Excessive forward location of the C. of G. leads to a loss in the flight performance and no longer allows, flying in the maximum lift range, which is very important in tight circling.

Rigging data

The angles of attack and aerodynamic twist as well as the control deflections can be found on the rigging data sheet (page 23).

After a repair has been made, one must be sure that the tolerances have been held. The controls have the following positive stops:

Rudder: Two adjustable stops on the rear main bulkhead.

Aileron: Two adjustable clamps, which bottom out against the front main bulkhead. They can be reached by removing the floor of the baggage department and the towing hook fairing. The down deflection of the ailerons is controlled by two fixed stops inside the wings.

Elevator: Two fixed stops on the instrument panel bulkhead in the cockpit.

Dive brakes: Two fixed stops in the lever escutcheon.

1.8 Center Of Gravity at the Last Weighing

Signature of Examiner	
Payload in Cockpit (incl parachute) maximum	
minimum	
Empty Weight Center of Gravity	
Date of weight and balance	

2 Operations Manual

2.1 Rigging

All pins and fittings including the ball pip fittings are to be cleaned and lubricated. The right wing (2 prong spar end) is inserted from the side into the fuselage tunnel, then the left wing is inserted from the opposite side. Align the main fittings, push in the main pins and safety. Now the wing tips can be released.

Connect ailerons and dive brakes and double check the connection by trying to pull the push pull rods away from the ball fittings.

Insert left elevator half with the tube into the fitting in the rudder fin. Pull back the safety catch on the second elevator half and push over torsion tube. Release safety catch on trailing edge and push it all the way in if needed.

Please note: The top side of the elevator has a convex surface, whereas the underside has a concave rear portion (under camber).
The taping of the wing-fuselage junction with a plastic tape brings a lot of performance for very little effort (1-2 points on the L/D).
Do not tape the canopy gap, otherwise any emergency exit is jeopardized. It is recommended to wax the taping area prior to taping, so that tape can later be removed without pulling the lacquer finish off.

2.2 Checking

After rigging and prior to the first flight every day: Make sure that all assembly connections have been made properly and are safetied.

Check for foreign matter in the cockpit, check the controls for ease of operations.

It is advisable to inspect the entire aircraft from time to time. Many a bolt without safety and many a damaged area has been noticed this way. Especially with a newly developed aircraft such detail is important despite the fact that the aircraft has been designed and built with care .

2.3 Derigging

Derigging is done in the inverted sequence as the rigging.

2.4 Road Transport

The Schleicher Co. can supply drawings for a light weight trailer. It is important that the wings are sitting in well fitting saddles or are supported at the spar roots **near the wing root rib**.

Good attachment points for fuselage are tailskid, wheel, wing attachment pins and under the instrument panel bulkhead.

If the ASW 15 is transported on an open trailer, one can waterproof it to a certain extent by taping up aileron gaps, dive brakes, canopy and pitot head as well as the static vents.

Since we are dealing with a sailplane, however, which depends for its performance on the quality of its surfaces the purchase of a light, waterproof cover or better yet an enclosed light colored trailer is a good investment. It is important to keep the closed trailer well ventilated in order to avoid high temperatures and high relative humidity.

2.5 Upkeep and Maintenance

Moisture is an enemy of fiberglass. Always take great care that no water remains in some corners. The upper dive brake boxes are not vented in the interest of performance. They have to be kept dry with the aid of a sponge. If there is a suspicion that water has got into a component, one should store them in a dry room and turn them over daily. Do not under estimate the amount of condensation water that can get inside an airplane. That is why hangars and trailers should be well ventilated (remove instruments before longer storage periods).

Excessive sun radiation is harmful for the finish; for this reason the sailplane should not be exposed to sunlight any more than necessary.

The maintenance of finish with a good cleaning and polishing compound (silicon free if possible) prolongs the life of the lacquer and improves the surface, an important factor for good performance. The advantages of a fiber-glass aircraft can only be utilized if the surfaces are smooth and free from imperfections, especially in the area of the wing and control leading edges as well as fuselage nose.

It is not too important to have a light luster, but to remove all irregularities, such as dust particles, mud splashes, insects, etc.

The Perspex canopy is best cleaned with a recommended Perspex cleaner, in an emergency soap and water will do. Use a soft cloth.

After landing on wet, muddy ground or in dusty fields the landing gear must be cleaned. To do this one removes the loft half of the baggage department floor in order to get good access with a vacuum cleaner and to facilitate a thorough cleaning job.

The tire pressure should be between 2.6 - 2.8 atü (37-40 psi).

The skidplate on the tailskid should be protected against excessive wear by welding several stellite beads on to it.

The rubber tailskid has been designed in such a manner that it will shear off under strong side loads. It can be glued back on or repaired with contact cement. It is important to cover the gap from rubber skid to fuselage in order to prevent any peeling and catching of long grass.

The tow coupling is especially exposed to soil and dirt and requires frequent cleaning and oiling. For that the fiber glass fairing aft of the seat pan has to be removed.

Lubrication of the Bearings
Most ball bearings are, however possible, covered and therefore will normally require no special care for a longer period of time. The felt or Teflon guides of the push pull rods do not need any special care either with the exception of the tow guides in the right lower bulkhead area which can be soiled up by the landing gear and must therefore periodically be checked.

The rudder and remaining hinge bearings must be dismantled at the annual inspection and relubricated. Excessive friction in the aileron is usually due to dryness of the hinges.

The Pitot and Static Pressure Ports on a sailplane transported on an open trailer must be sealed off by taping.

The Safety Harness is to be constantly checked for tears and corrosion spots.

2.6 Overhaul

The tow coupling must be removed after every 2000 launches or every 2 year's at the latest and sent in to the manufacturer for reconditioning. The rudder cables are to be renewed as soon as any wear spots are noticed.

2.7 Repairs

Smaller repairs on fiberglass components can be made by the owner in accordance with the guidelines as set forth in the Repair Manual for the ASW 12 and ASW 15.

All major repairs and overhauls are to be performed by the manufacturer. In case of doubt information and advice can be obtained from the Schleicher Factory.

2.8 Notes for the Inspections

The upper dive brake boxes have no ventilation as they are completely sealed against the other structure.

After rain showers the boxes must therefore be dried with a sponge etc. For better sealing of the dive brake covering plates grease as used for accumulator maintenance has been found suitable.

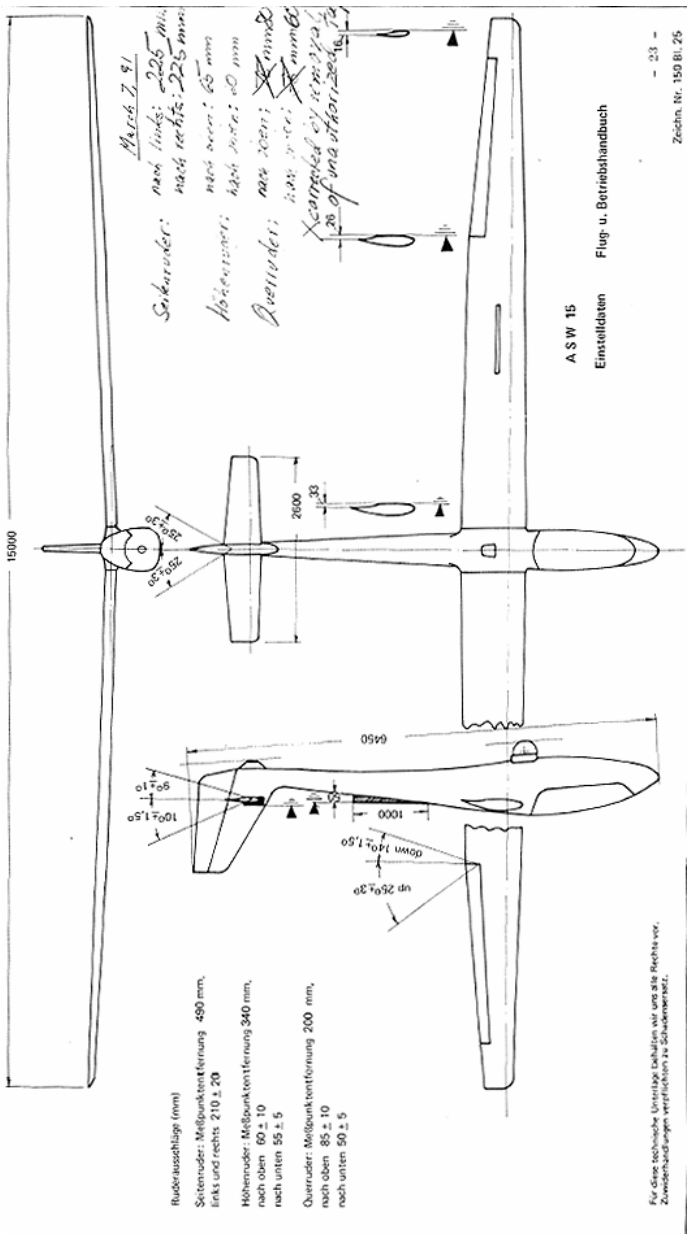
It is very important to check the proper locking of the dive brakes from time to time. Every brake has own dead point locking in every wing. Therefore one must check that left and right dive brake lock safely and in the same moment.

To check this one connect only one airbrake to the ball fitting in the fuselage and mark the dead point (locking point) on the dive brake lever escutcheon.

Do the same with other airbrake. Both dead points should not be more apart from each other than 5 mm (0,2 inch). Otherwise the mechanism must be adjusted (screws in the pipes behind the baggage department).

On the other hand there should be surplus forward range of the dive brake lever escutcheon about 5 mm (0,2 inch).

The wingroot to fuselage connection must be checked at least on the annual inspection for play or looseness between the fuselage wingroot pins and the wingroot holes. Play in the connection results in a clac-clac noise when the rudder is deflected and can induce awful tailplane oscillations at high speeds.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Flug- u. Betriebshandbuch
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6450
1000
Ruderausschläge (mm)
Seitenruder: Meßpunktentfernung 490 mm,
links und rechts 210 ± 20
Höhenruder: Meßpunktentfernung 340 mm,
nach oben 60 ± 10
nach unten 55 ± 5
Querruder: Meßpunktentfernung 200 mm,
nach oben 85 ± 10
nach unten 50 ± 5
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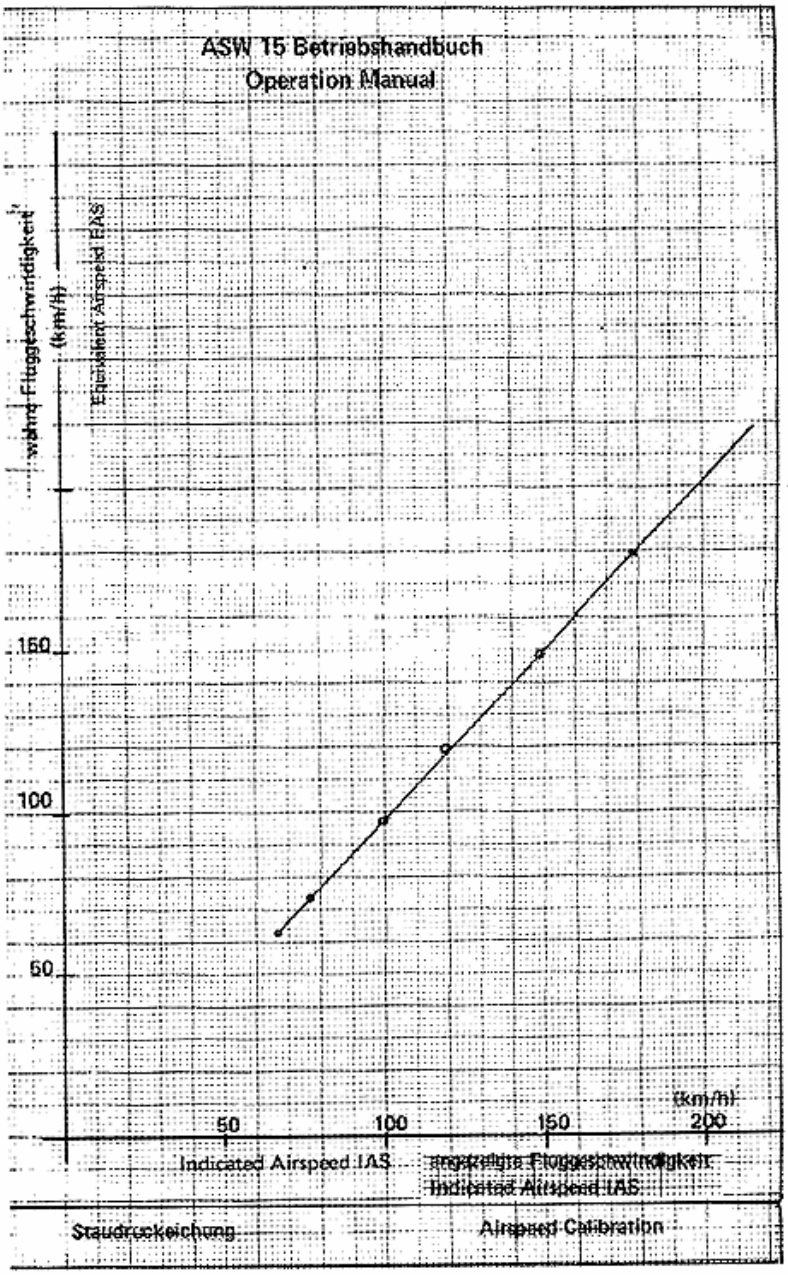
ASW 15 Betriebshandbuch
Operation Manual
wahre Fluggeschwindigkeit (km/h)
Äquivalent Airspeed EAS
150
100
50
50
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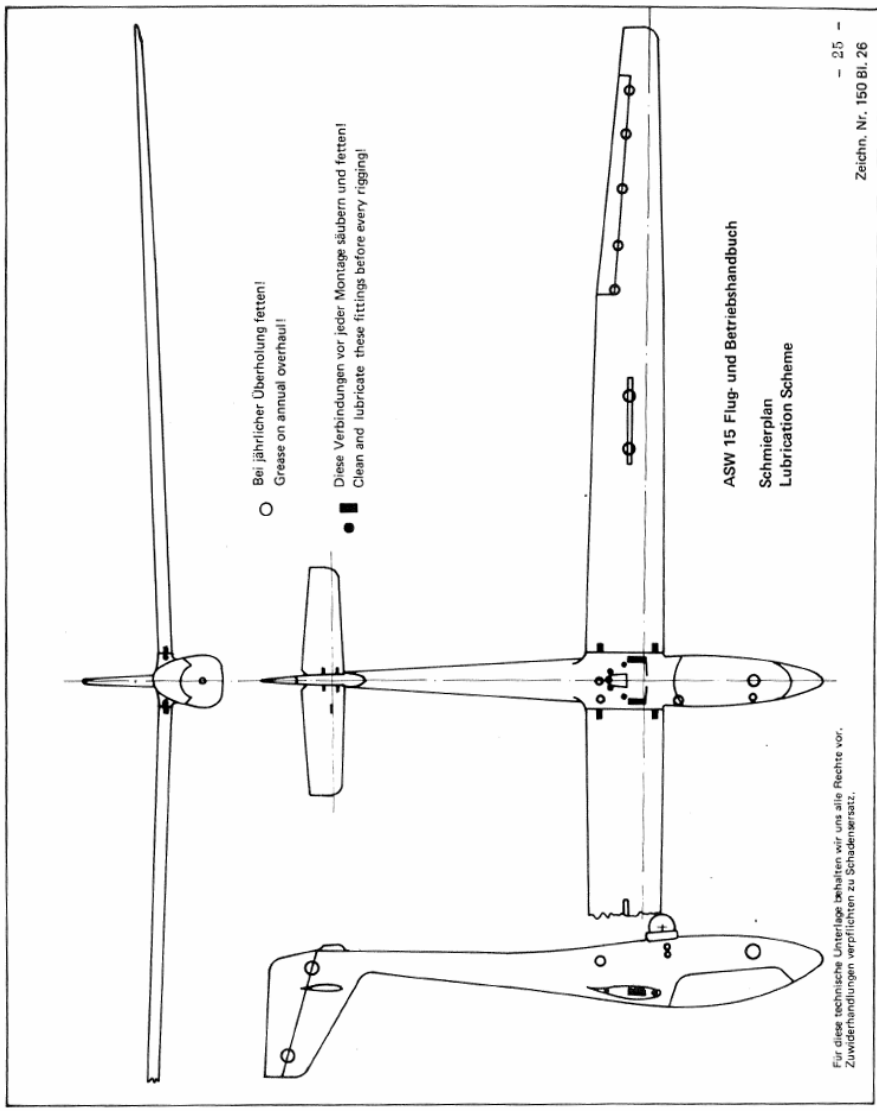
(km/h)
Indicated Airspeed IAS
angezeigte Fluggeschwindigkeit
Indicated Airspeed IAS
Staudruckeichung
Airspeed Calibration


Bei jährlicher Überholung fetten!
Grease on annual overhaul!
Diese Verbindungen vor jeder Montage säubern und fetten!
Clean and lubricate these fittings before every rigging!
ASW 15 Flug- und Betriebshandbuch
Schmierplan
Lubrication Scheme
- 25 -
Zeichn. Nr. 150 Bl. 26
Für diese technische Unterlage behalten wir uns alle Rechte vor.
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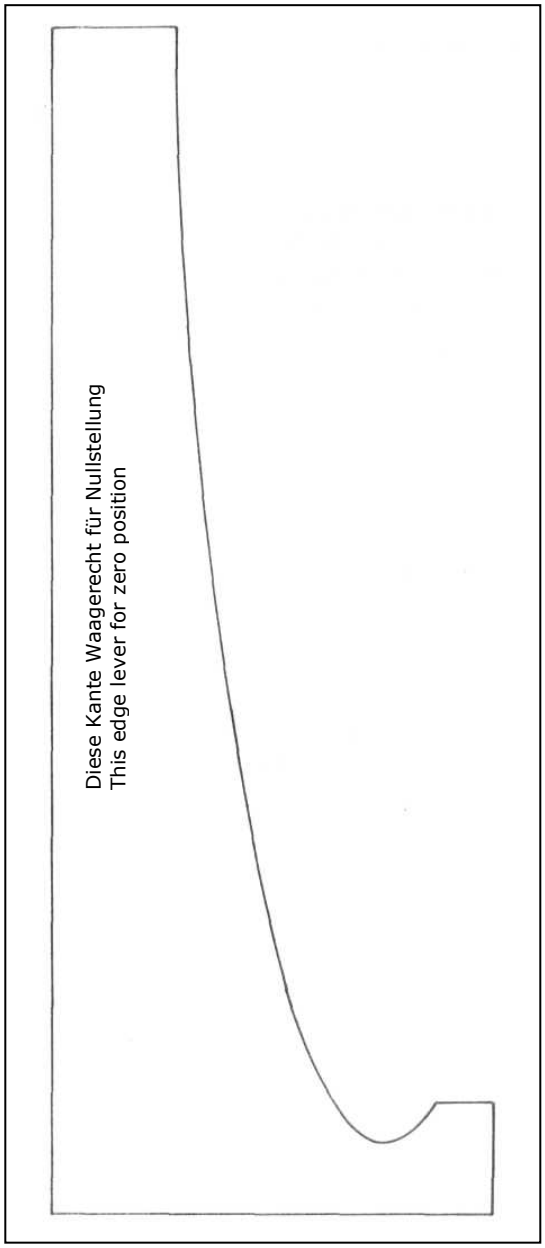

Schablone zur Err
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Anlegen auf die O
Wurzelrippe. M=

Template for zero
the elevator
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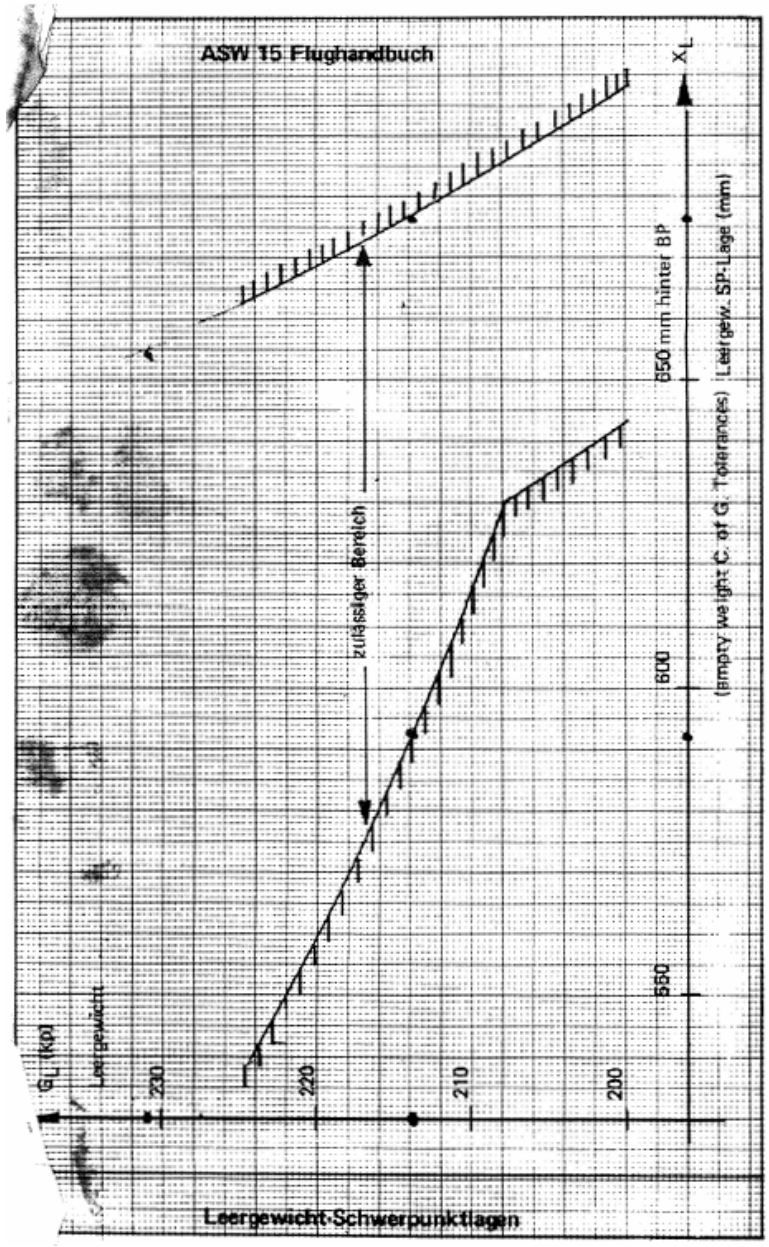
ASW 15 Flughandbuch
X_L
550 mm hinter BP
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230
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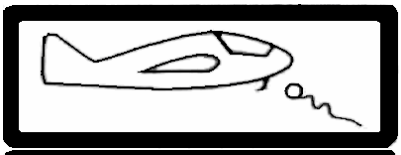
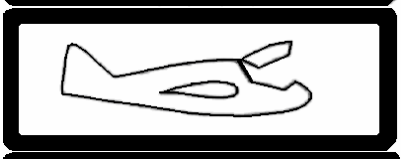
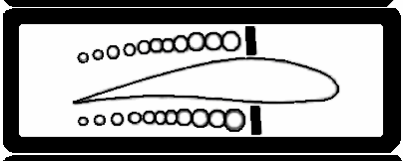


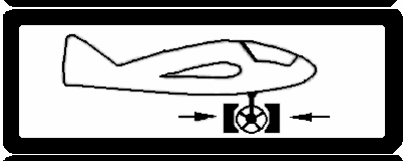
Tow release - yellow-knob or LH area next to the control stick



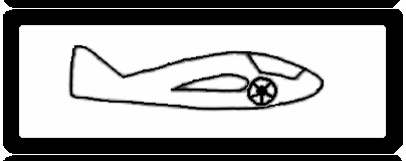
To jettison canopy - red handle pull above instrument panel.



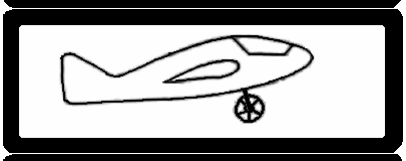
Dive brakes - blue handle on lower left sidewall.



Wheel brake - pull, dive brake handle on lower left side wall.

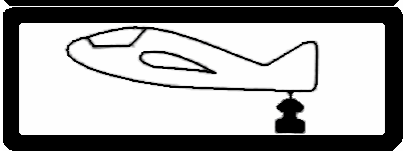


Landing gear up - black handle on the upper left side wall pulled.



Landing gear down - black handle pushed forward.

Trim nose heavy - green knob on LH arm rest area.



Trim tail heavy - green knob on LH arm rest area..