| | Speed | IAS | Remarks |
|---|---|---|---|
| $V_A$ | **Manoeuvering speed** | 215 km/h,<br>116 kts, 134 mph | Do not make full or abrupt control movement above this speed, because under certain conditions the sail-plane may be overstressed by full control movement. |
| $V_{FE}$ | Maximum **Flap Extended speeds** (different for relevant flap settings) | WK 1 = 285 km/h,<br>154 kts, 177 mph<br>WK 2 = 285 km/h,<br>154 kts, 177 mph<br>WK A = 215 km/h,<br>116 kts, 134 mph<br>WK 3a & WK 3b = 200 km/h,<br>108 kts, 124 mph<br>WK 4 = 180 km/h,<br>97 kts, 112 mph<br>WK 5 = 180 km/h,<br>97 kts, 112 mph<br>WK L = 150 km/h,<br>81 kts, 93 mph | Do not exceed these speeds with the given flap setting "WK" |
| $V_W$ | Max. **winch-launching speed** | 130 km/h,<br>70 kts, 81 mph | Do not exceed this speed during winch- or autotow launching |
| $V_T$ | Maximum **aero-towing speed** | 170 km/h,<br>92 kts, 106 mph | Do not exceed this speed during aerotowing. |

## 2.3 Airspeed Indicator Markings

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

| Marking | (IAS) value or range [km/h] | Significance |
|---|---|---|
| White arc | 92,5 - 200 km/h, 50 - 108kts, 57.5 -124mph | Positive Flap Operating Range |
| WK L | 150 km/h, 81 kts, 93 mph | Maximum speed in flap setting for landing |
| WK 5 / 4 | 180 km/h, 97 kts, 112 mph | Maximum speed in flap settings 5 & 4 |
| WK 3 ***)** | 200 km/h, 108 kts,124 mph | Maximum speed in flap settings 3a & 3b |
| WK A | 215 km/h, 116 kts,134 mph | Maximum speed in flap setting A |
| Green arc | 100 - 215 km/h, 54 - 116 kts 62 - 134 mph | Normal Operating Range |
| Yellow arc | 215 - 285 km/h, 116 - 154 kts, 134 - 177 mph | Manoeuvres must be conducted with caution and only in smooth air. |
| Red line | 285 km/h, 154 kts,177 mph | Maximum speed for all operations. |
| Yellow triangle | 100 km/h, 54 kts, 62 mph | Approach speed at maximum weight **without** water ballast. |

***)** The speed limit indicated on the airspeed indicator as for flap setting 3 is valid for both flap settings 3a and 3b.
As there is no room on the dial of the ASI for both flap settings only setting 3 is indicated.

5. Check full and free operation of all controls through full deflections. Hold controls firmly while loads are applied to control surfaces. A competent person should assist you when doing this check.

6. Check ventilation opening and optional Pitot tube in fuselage nose.

7. Check inflation and condition of tires:
   Main wheel: 2.3 bar ± 0.2 bar (33 psi ± 3 psi)
   Tail wheel: 2.5 bar ± 0.1 bar (36 psi ± 2 psi)

8. Check condition and operation of tow hook(s). Release operating freely? Release checks done?

9. Check wheel brake for operation and fluid leaks. With airbrakes fully extended, the brake pressure from the main brake cylinder should be felt through spoiler handle.

10. If installed, check connections to wing and fuselage water ballast tank ventilation lines (not applicable for integrated water ballast tanks!).

11. Check battery voltage to be > 12 V.

12. Check both upper and lower wing surfaces for damage and water ballast openings for dirt.
    For integrated wing water ballast tanks only: Check ventilation port at the wing tip to be clean as well as the cover on the upper outer wing surface for proper seating watertight taping!
    Are the Winglets undamaged, safetied and taped?

13. Ailerons and flaps:
    Check condition and full and free movement (control-surface clearances). Check external linkage fairings for clearance.
    Friction areas of the elastic control gap covers must be carefully cleaned!

14. Airbrakes:
Check condition and control connections. Check both airbrakes have good over-centre locks. Check both airbrake boxes for loose objects, stones, water etc.
The seat areas of the airbrake cover plates must be carefully cleaned!

15. Check fuselage, especially underside, for damage and water ballast exit for dirt if applicable.
Check ventilation ports of the water ballast system at the top of the fuselage for dirt and/or free flow .

16. Check that static pressure ports in the fuselage tail boom are unobstructed.

17. Check that rudder, horizontal tail, and elevator are correctly fitted and for damage or excessive play. Check that tail bolt is tight and locked.

18. Check probe in fin:
Is probe properly seated and tight ?

19. Check water-ballast system for leaks after it is filled.

In flap setting 2 the lower wing surface contour is flush and the low drag laminary boundary layer can pass the well faired hinge line until it is intentionally tripped into a turbulent layer which attaches to the surface of the trailing edge.

For flap setting 3a (+5°) operational experience as well as following wind tunnel tests have verified a favourable speed range for this flap setting, see also page 5.9.
Flap setting 3b (+12°) the upper wing surface contour is flush and aerodynamically at an optimum. Therefore low drag is achieved for slow level flight at best L/D.
For slow ridge soaring as well as when surfing a mild wave flap setting 3b is also recommended. Only in turns at the edges of the lift area flap setting 4 is used for turns, setting 5 in very steep turns only.

Flap settings 4 and 5 are purely for use while circling. Flap setting 4 is designed for centring into thermals and circling in turbulent lift.
Flap setting 5 should be selected when the conditions warrant tight and steady circling in the core of a thermal.

The best flap settings at various speeds depend very much on the wing loading. The effect of the all-up weight at any one time on the appropriate speeds for the various flap settings is shown in the diagram in Section 5.3.2.2 .

***NOTE:*** The table in section 5.3.2.2 is only valid forsteady level flight, but not for dynamic pull up or push over flight conditions.
To compensate for the elevated acceleration (g-load) in steady turns the airspeed must be increased by about 10% for 30° bank and by about 20% for 45° bank.

Because the flap setting directly influences the amount of lift generated over the whole of the wing, a sudden, jerky operation of the flaps will cause a sudden drop or climb; therefore, care should be exercised in this respect, especially when flying close to the ground or circling near other sailplanes.

### 4.5.5 Landing

Before landing, the water ballast must be jettisoned.
In an emergency (e.g., abandoned take-off), the structural strength will prove adequate for a landing at maximum all-up weight.

When final approach is flown in flap setting L with some nose-down attitude, remember to round out in time to allow a clean 2-point touch down.

Immediately before touching down, the air brake setting may be reduced so as to avoid touching down with the wheel brake too firmly applied.

During the ground run, the stick should be held fully back; this gives better directional stability in crosswinds and prevents the tail from lifting due to hard wheel braking.
The flaps may be left in the landing setting L, because the negative aileron deflection will provide adequate lateral control until the aircraft comes to a stop. If flap setting 5 was used for the landing, it is advisable to engage flap setting 1 after touch down. This will inhibit the sailplane from lifting off again and the aileron effectivity is improved, which will help in controlling the crosswind effect.
When parking the aircraft, engage flap setting 3 to save the plastic sealing strips over the control surface gaps from deformation.

When parking the sailplane flap setting 3b must be selected ! This is recommended in order to take load from the elastic control gap seals.

### 4.5.9 Aerobatics

**WARNING: Aerobatics** are only allowed **without** water ballast on board !

In accordance with JAR-22.3 some simple aerobatic manoeuvres may be permitted for the Utility Category, provided they are demonstrated by appropriate substantiation in the course of type approval tests.

For **Darlington-** and **Maughmer-Winglets** according to TN 4 **aerobatic manoeuvres** are approved in the meantime !

With central and forward C.G. positions the ASW 27 cannot be held in a spin. A steady spin is only possible with aft C.G. positions and is therefore not a suitable aerobatic manoeuvre.

For aerobatic flying an additional flap setting WK A (+10°) is installed so that the full speed range up to VA = 215 km/h (116 kt; 134 mph) can be utilised while still maintaining aerodynamic efficiency.
All approved manoeuvres can be safely executed well within the maximum g-load value of 5.3 g without the use of a g-meter. Installation of a g-meter will however improve the manoeuvring from an aerodynamic point of view.

**NOTE:** As the ASW 27 is a very high performance glider with rapid speed build up it is imperative that aerobatic manoeuvres are only performed by qualified pilots who have received proper training.

### 5.2.2 Stall Speeds

Stall speeds in km/h (kts, mph) Indicated Airspeed

| Flap Setting | All-Up Weight kg (lb) 300 kg (660 lb) | | | 355 kg (780 lb) | | | 400 kg (880 lb) | | | 500 kg (1102 lb) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | km/h | kts | mph | km/h | kts | mph | km/h | kts | mph | km/h | kts | mph |
| Flap 1 | 83 | 45 | 51 | 90 | 49 | 56 | 96 | 52 | 59 | 107 | 58 | 66 |
| Flap 2 | 78 | 42 | 49 | 85 | 46 | 53 | 90 | 49 | 56 | 101 | 54 | 63 |
| Flap 3b + a | 70 | 38 | 43 | 76 | 41 | 47 | 81 | 44 | 50 | 90 | 49 | 56 |
| Flap 4 | 67 | 36 | 42 | 73 | 39 | 45 | 77 | 42 | 48 | 87 | 47 | 54 |
| Flap 5 | 65 | 35 | 41 | 71 | 38 | 44 | 75 | 41 | 47 | 84 | 46 | 52 |
| Flap L | 65 | 35 | 41 | 71 | 38 | 44 | 75 | 41 | 47 | 84 | 46 | 52 |
| Flap L + airbrakes | 70 | 38 | 43 | 76 | 41 | 47 | 81 | 44 | 51 | 90 | 49 | 56 |

1. The speeds shown are valid for the aerodynamically clean sailplane.

2. With aft C.G., a stall warning in the form of horizontal-tail buffeting will commence about 7 % above stall speed.

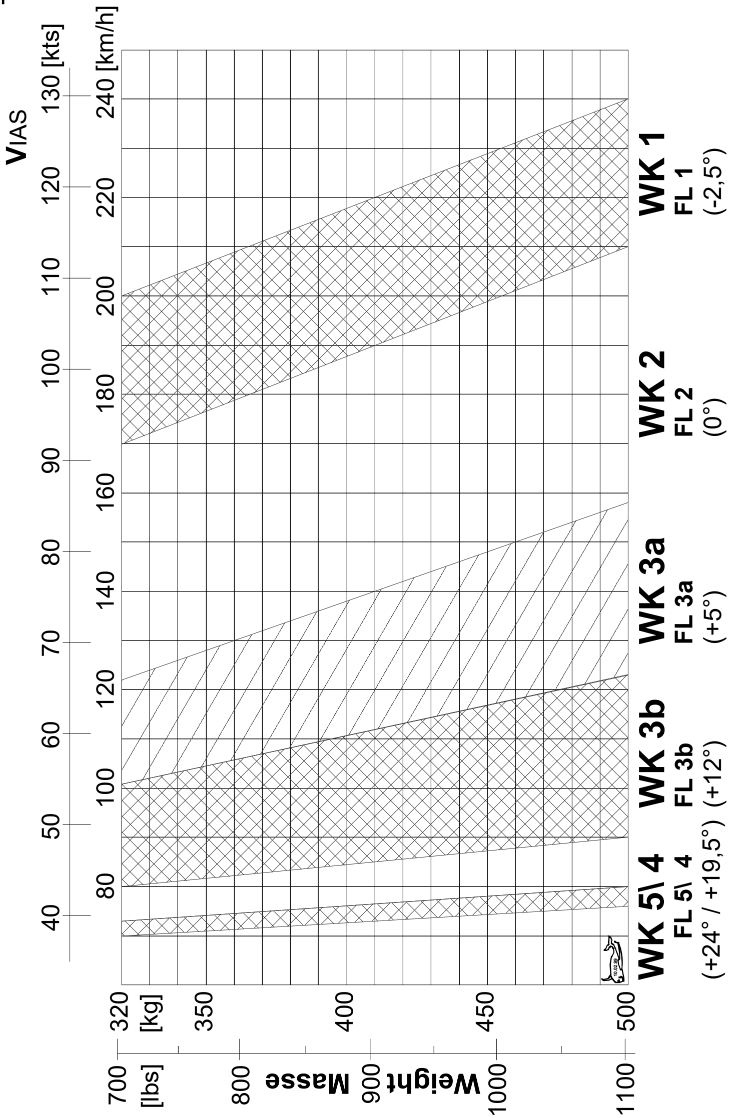
3. Extension of the airbrakes increases the stall speed in straight level flight by about 6 km/h (3.2 kts, 3.7 mph).

4. Lowering the landing gear does not affect the stalling speed.

**NOTE:** Intermediate values not given in the tables above must be interpolated !
See also diagram 5.2.2.1 .

### 5.3.2.2 Optimum-Performance Flap-Setting Ranges

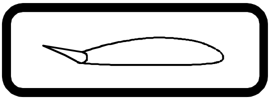
The following diagram was developed using the calculated level-flight polar.



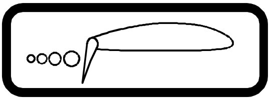
### 5.3.2.3 Trim drag, influence of c.g.-position on flight performance

In "Technical Soaring" Vol. 16, No. 1 (Jan. 1992) Cedric O. Vernon published an article on "Trim Drag".
He confirmed earlier papers on the subject and explained in detail that the horizontal tailplane must have nearly no lift (neither up nor down) to get the optimum performance of the sailplane.
It is obvious to every pilot that it cannot be optimum that the wing produces lift whereas the horizontal tail produces a great down load.
Also it is easy to understand that the wing with its high aspect ratio is much more efficient at producing lift at low induced drag than the horizontal tail with its compact planform.
So the lowest trim drag for a T-tail sailplane like the ASW 27 is given when nearly all lift is produced by the wing and only very little lift is produced by the horizontal tailplane.
Knowing these details the designer has adjusted the c.g.-range of the ASW 27 such that the calculated optima are covered.
For flap positions 1 and 2 forward c.g.-positions of x = 0,21 m and x = 0,22 m are optimum,
for flap position 3b x = 0,275 m is an optimum and
for circling flight positions 4 and 5 x = 0,29 m to x = 0,30 m are an optimum.
The optima however are quite flat and a compromise has to be found.
For "ridge running" in the eastern USA a forward c.g. is definitely optimum, whereas in very weak weather when circling in thermals dominates a rear c.g. is optimum.

Flap settings are selected by means of the black handle on the left cockpit wall.
Pivot the handle down to unlock so that it may be moved forwards or backwards.
The flap settings are marked 1, 2, A, 3a & 3b, 4, 5 and L above the position pointer.



Flap in high-speed flight setting.



Flap in landing setting.

**7.2.4 Trim**

The trim is only connected to the elevator-control circuit.

Normally the ASW 27 is trimmed to about 100 km/h (54kts or 62mph) IAS in flap setting 3b. To set the trim, simply press the trim-release button at the control stick when flying at the desired airspeed.

The ASW 27 is now trimmed over a wide speed range when the flaps are set to their optimum position.

For fine adjustment, the stick-mounted trim release button can be pressed at the desired speed.

A trim indicator is fitted along the left cockpit wall near the seat.

For an aircraft of this quality and value, an open trailer, even with tarpaulin, cannot be recommended. Only an enclosed trailer of composite or metal construction, may be considered suitable. The trailer should have light-colored surfaces and be wellventilated both while moving and while stationary so as to avoid high internal temperatures or humidity.

**NOTE:** Road transport with water ballast on board is **not** permitted!

In order to protect the cover plates of the air brakes from damage, those must be closed and locked by use of a special tool, (AS-No. 270.05.0002)!

**WARNING:** Under **no** circumstances should the elevator actuator on top of the vertical fin be loaded or fixed in any way, even by soft foam cushions.
When designing or adapting the trailer, free movement and side clearance for the elevator actuator must be provided.

When, for example, a foam block applied some load to the elevator actuator, which, in turn, restricted its free movement, fatigue cracks were found after long road transports. **Remedy is urgently needed!**

The following sketch shows, how a foam-rubber block must be trimmed and glued in position. It is also important to have a strap over the fuselage tail boom near the fin, which is connected to the trailer floor. In any case, it is necessary to guarantee the free movement of the elevator actuator. This must be so even if the stick is pulled fully back and the elevator is fully deflected upward.

The water bags may now be carefully drawn out from the apertures in the root ribs; please pay attention that there is a plastic tube (about 2.5 m = 8.2 ft long) inside the bag, running from the valve to the constriction of the water bag. Lay the bags out on a clean surface. Untie the long nylon fixing cords from the bags and leave them inside the wing.
Valves of integrated water ballast tanks can be removed for maintenance in the same way as described for soft water ballast bags, see also Fig. 2.4 - 1 .

Removing the fuselage water tank:

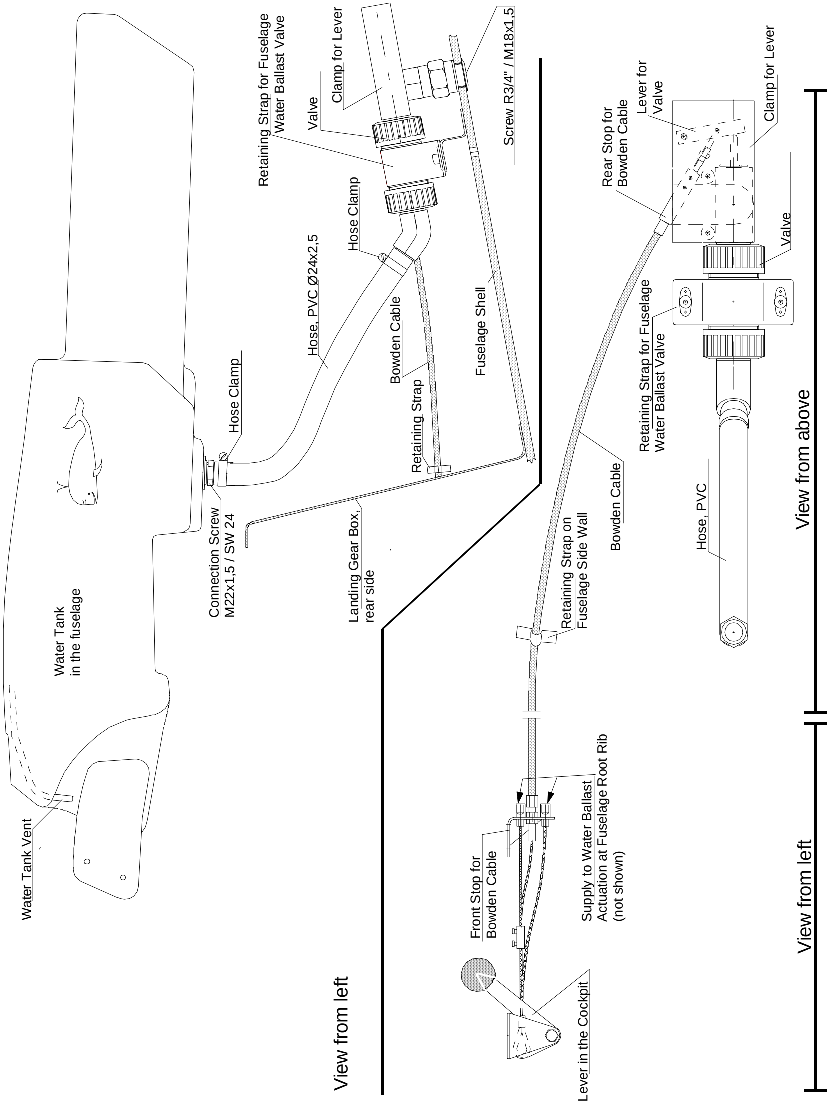
Remove the hose clamp on the lower tank surface. Then remove drain fitting (spanner 24 mm) from the tank. Remove four bolts (spanner 10 mm) at the rear canopy frame. Pull the tank carefully forward and out. Put the drain fitting back to the drain hose and safety with the hose clamp so that the drain hose cannot drop into the control gear below and jam it, see also Fig. 2.4 - 5 or 2.4 - 9 .
Install baggage compartment above/rear of the spar.

**WARNING:** When the fuselage water tank is removed the baggage compartment floor above and behind the wing main spar **must** be installed, so that no loose items can get from the cockpit or the baggage compartment in front of the spar into the area full of control gear behind and below the spar.

## Testing the Valves

The valves are commercially available products of the GF factory modified by inserting a stainless steel spring to close the valve.
According to **Maintenance Instruction** "Water Ballast Valves" and as shown in Fig. 2.4-1 the valve is opened for cleaning by unscrewing the union nut; inspect sealing ring, ball and spring and replace if necessary.
If the valve has a leak at its actuation rod, replace the groove sealing ring.

**Fig. 2.4 - 9 Water Ballast System in the Fuselage**
Optional version with 35 ltr. fuselage water tank and valve, version 2



## 3. Rigging Angles and Deflections of Control Surfaces

| Wing Incidence | |
|---|---|
| + 1,35° | to horizontal tailplane chord |
| - 2,35° | to fuselage tail boom axis |

| Horizontal Tailplane Incidence | |
|---|---|
| - 1,35° | to wing chord |
| - 3,7° | to fuselage tail boom axis |

The tailboom axis is level when a wedge 1000 in 54 = 3.1° is put level on the rear part of the fuselage tailcone.

| | MPE ***)** | Deflection | Tolerance |
|---|---|---|---|
| Rudder | 280 mm | ± 150 mm<br>± 31°<br>left and right | ± 10 mm<br>± 2° |
| Elevator | 72 mm | ± 20 mm<br>± 20° | ± 2 mm<br>± 2° |

***) MPE** = **M**ess**P**unkt**E**ntfernung zur Drehachse
= Distance from Measuring Point to Pivot Axis

## Maximum Permissible Control Surface Play

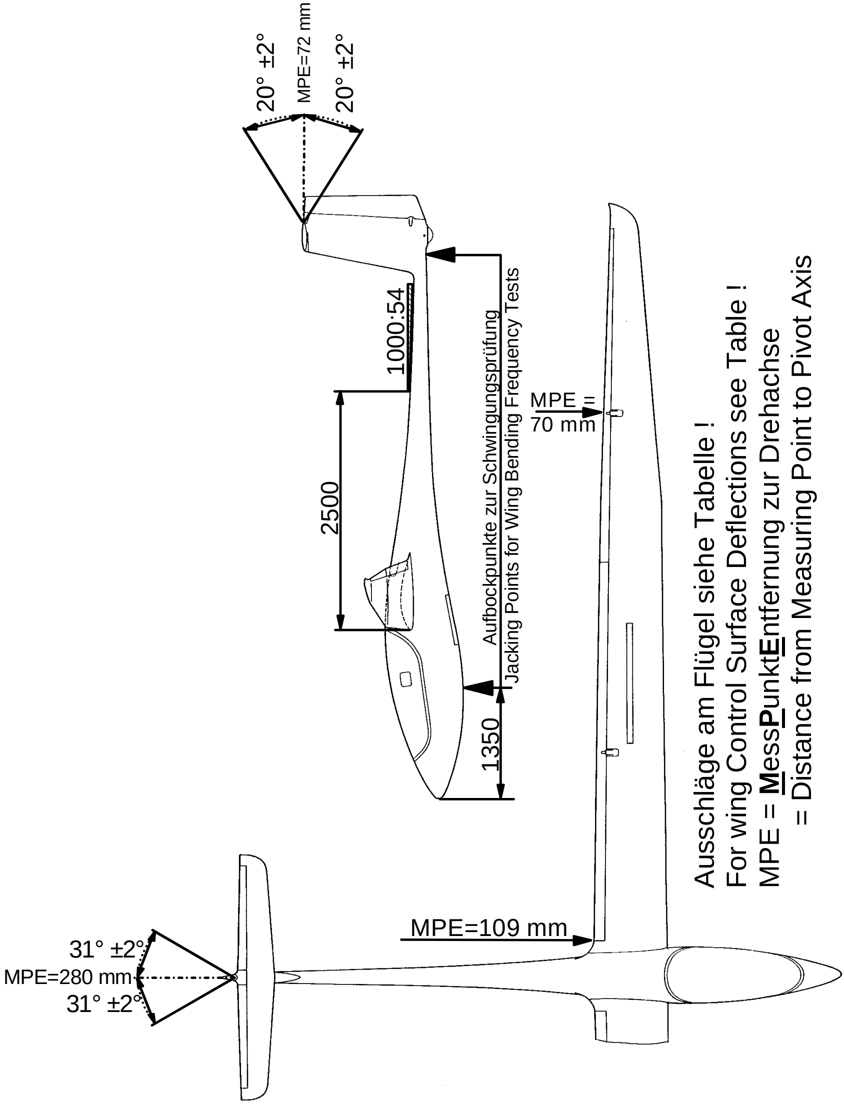
The maximum permissible tolerance of control surface play may be measured from the same measuring points used for measuring control surface deflections. The cockpit controls should be immobilised for this purpose.

| | MPE *) mm / in. | Max. permissible Play mm / in. |
|---|---|---|
| Rudder | 280 / 11.02 | 3,5 **) / 0.14 **) |
| Elevator | 72 / 2.83 | 2,0 / 0.08 |
| Aileron | 70 / 2.76 | 1,5 / 0.06 |
| Flap | 109 / 4.29 | 2,0 / 0.08 |

***)** **MPE** = **M**ess**P**unkt**E**ntfernung zur Drehachse
= Distance from Measuring Point to Pivot Axis

****)** When the actuating crank at the rudder is screwed on tightly, play in the cable-actuated rudder circuit with pedal springs is normally not measurable !

Fig. 3.0-1
Control Surface Deflections and Jacking Points for
Wing Bending Frequency Tests



Instruments

The flight monitoring instruments are not normally subject to service life limitations. As a general rule, the makers' instructions should be complied with.

Oxygen Installation

Oxygen systems and oxygen supply must comply with JAR 22.1441 and 22.1449 !
For oxygen systems fitted, the relevant section of the appertaining Inspection Release Certificate states the overhaul time limit. Over and beyond this, the oxygen bottles must be re-inspected by a technical inspection institute (every five years in Germany) in accordance with pressure vessel regulations.

Safety Harness

For the safety harness installed the life time limitation according to the appropriate maintenance instructions given by the harness manufacturer apply.

6. For the safety harness system time limit see the instructions given by the harness manufacturer with the individual harness system.

For details applying to 2. through 6. see chapter 4.2 of this manual.

From the noise produced one can learn whether the structure is still well bonded or de-laminated.
The white gelcoat on the outside surfaces of the FRP is intentionally made not too tough so that it acts as a crack indicator. Aged gelcoats get however so brittle that they may crack without over-stress of the FRP below.
When transparent fibreglass gets "blind" or "white" areas caused by crackling of the resin matrix it must be repaired. It can also be assumed that carbon fibres in the affected area are completely destroyed too. This is so, as the tolerable elongations of the carbon fibres are smaller than those of glass fibres. This means that over-stressed glass fibre laminate indicates strongly that carbon fibres below are broken.

**Inspection program**

At regular intervals - in intense operational use **100-hour intervals** are recommended - but **at the latest in the course of the annual C of A inspection,** the following inspections must be carried out:

1. The whole aircraft must be examined for cracks in the surface finish, holes and buckles, which must be attended to if necessary.

2. The aircraft must be examined for foreign bodies, for which purpose the seat pan must be removed.

3. Are all fittings in a satisfactory condition ?
   No play, cracks, scratches or corrosion ?

4. Are all other metal parts free from corrosion ?
   If necessary, re-paint. For this job a zinc-chromate based primer should be used.

**Inspection and Pressure Test**
**when PU - water bags are installed:**

In addition to the annual inspection as described in Section 2.4, the water bags must be tested for leaks and porosity every **two** years as follows:
Dismantle the water bags and make a pressure check with air. After reaching the test pressure of 0.2 bar (2.90 psi) and after a temperature & pressure balance time of 2 min. the pressure drop after another 5 minutes must not be greater than 1 %.

23 One Trim plate equals a pilot mass of 2,5 kg (5.5 lbs.) ASW 27

This is only affixed when nose trim discs can be installed.

24 L LANDUNG nur im Endteil LANDING for final only | THERMIK THERMALLING 5 4 | 3b ACRO 3a SCHNELLFLUG FAST 2 1 ASW 27

25

| VNE Speed Limit for high altitude ASW 27 | |
|---|---|
| Altitude msl.(m) | VNE IAS (km/h) |
| < 3.000 | 280 |
| < 5.000 | 247 |
| < 7.000 | 221 |
| < 9.000 | 197 |
| < 11.000 | 172 |
| < 12.000 | 159 |

| VNE Speed Limit for high altitude ASW 27 | |
|---|---|
| Altitude msl. (ft) | VNE IAS (kts) |
| < 10.000 | 151 |
| < 16.500 | 133 |
| < 23.000 | 119 |
| < 29.500 | 106 |
| < 36.000 | 93 |
| < 40.000 | 85 |

| VNE Speed Limit for high altitude ASW 27 | |
|---|---|
| Altitude msl.(ft) | VNE IAS (mph) |
| < 10.000 | 174 |
| < 16.500 | 154 |
| < 23.000 | 137 |
| < 29.500 | 122 |
| < 36.000 | 107 |
| < 40.000 | 99 |

26 Baggage compartment load **max. 15 kg** (33 lbs.)

This placard is affixed to the rear cockpit wall between the shoulder straps.

27 S.No.

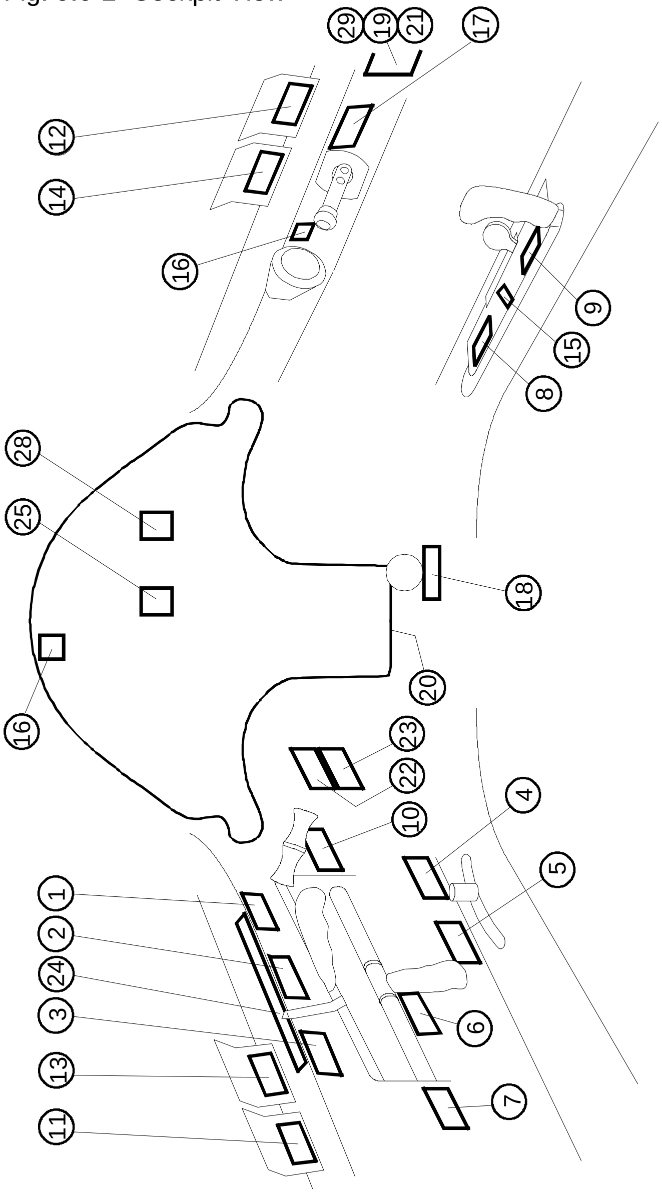
This placard is affixed to every component.

28

| Deviations-Table | | | |
|---|---|---|---|
| Heat-ing | Devi-ation | Heat-ing | Devi-ation |
| 0 | | 180 | |
| 30 | | 210 | |
| 60 | | 240 | |
| 90 | | 270 | |
| 120 | | 300 | |
| 150 | | 330 | |
| Date: | | | |

This table must be affixed next to the compass.

Fig. 9.0-2 Cockpit View



## 12.2 Special Tools

a) Socket wrench for hexagon socket head screws, 6 DIN 911-12.9 (Allen Key), and
b) Rigging plate AS P/N 99.000.4657
(both for rigging the tailplane)

c) Filling nozzle AS P/N 99.336.0022, and
d) Stopper plug AS P/N 99.000.8861
(both for filling the water bags)

e) Locking tool for air brakes AS-P/N 270.05.0002

Special tool not supplied:

f) Calliper Face Spanner - e.g: Gedore No.44/7"
(for water ballast valve assembly).

## 12.3 Supply Sources for Special Tools

The special tools b) through e) can only be obtained through Messrs. Alexander Schleicher.

The Allen key a) and the calliper face spanner f) are available from all good tool shops, but can also be obtained through Messrs. Alexander Schleicher.

## 12.6 Maintenance Instructions

The following Maintenance Instructions are established from time to time as required, in accordance with experience accumulated in operating the sailplane ASW 27. The Maintenance Manual is to be supplemented in case of new issues of Maintenance Instructions.

The general "**Maintenance Instruction ALL FRP GLIDER MODELS dated June 19, 1986**" describes the removing of play between the sockets (= bushings) and bolts (= pins) of the wing-to-fuselage transition.

The general Maintenance Instruction "**PAINT CRACKS**" dated June 26, 1989, describes how to inspect, preserve, and repair the paint surface.

The **Maintenance Instruction C** for the ASW 24 (dated April 26, 1990), which is also applicable to the ASW 27, describes how to repair the landing gear box.

The general Maintenance Instruction **"WATER BALLAST VALVES"**, Issue I, dated July 25, 1994 describes maintenance procedures for the valve itself.

The **Maintenance Instruction A** for the ASW 27 (dated January 20, 1997) describes how to apply or replace the elastic plastic fairing strips for the control surface gaps.

The **Maintenance Instruction B, Issue 2** for the ASW 27 (dated May 04, 1999) describes how to adjust the water ballast actuation system in the fuselage.

The **Maintenance Instruction C** for the ASW 27 (dated April 07, 1997) describes how to repair of the fuselage by scarf joints.

**Subject:** Adjustment of the water ballast actuation inside the fuselage

**Serial number applicability:** All ASW 27

**Reason:** In case that the water ballast valves in the wings drain uneven or do not open fully, their actuation may be checked and adjusted according to the following instructions.
Badly adjusted actuation systems may be the cause that the rocker switch in the fuselage runs over the actuating push rod during rigging and so the valve inside the wing cannot open.
In order to facilitate adjustment, the new version 2 uses the adjusting means at the rocker switch fitted at the fuselage-side root rib (and no longer at the front counter bearing of the Bowden cable, at the right under the seat pan support surface - previous version 1).

**Action:** Version 1:
As shown in Fig. 1, the correct adjustment of the valve actuation can be checked easily.
The adjustment of the actuation system is done by turning in or out the adjusting screw at the front Bowden cable counter bearing (see Fig. 2.
If the adjustment at the threaded bolt is not sufficient, the Bowden cable itself can be adjusted in length at the screw clamp (see Fig. 2.) Note that the cable is soft soldered into that clamp!

Version 2:
As shown in Fig. 1, the correct adjustment of the valve actuation can be checked easily.
The adjustment of the actuation system is done at the rocker switch by turning in or out the lock nut at the threaded connector of the Bowden cable (see Fig. 3).

**Material:** Any required parts can be ordered from Alexander Schleicher GmbH & Co.,
Tel.: +49 (0)6658-890 or -8929, FAX +49 (0)6658-8940,
or e-mail: info@alexander-schleicher.de

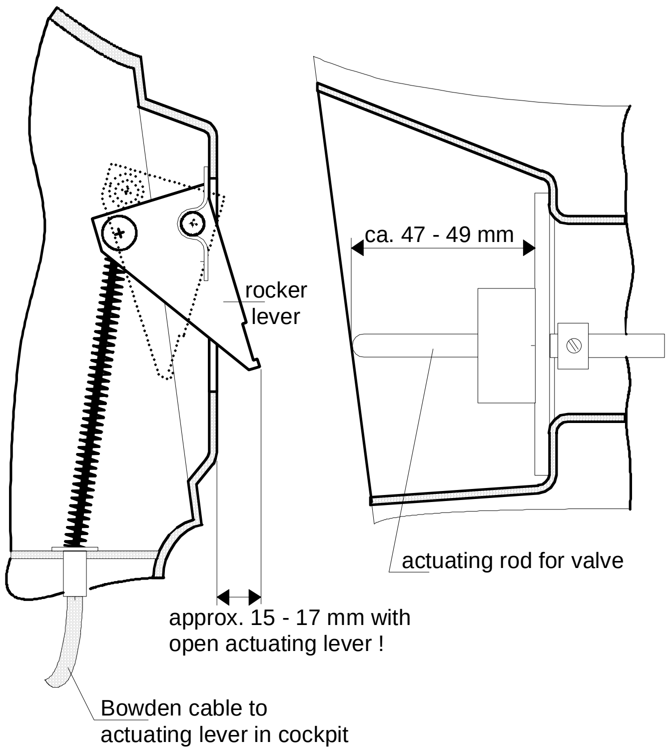
**Notes:** The action can be accomplished by a competent person.

Poppenhausen, May 4, 1999

**Alexander Schleicher**
GmbH & Co.

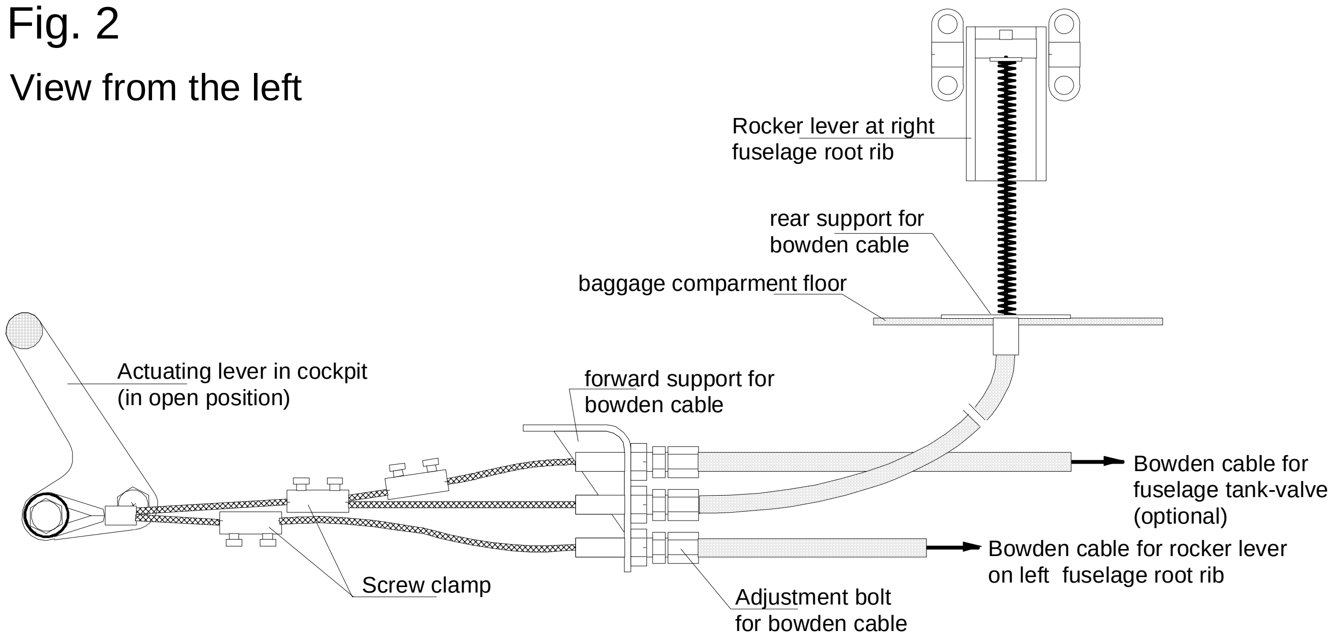
i.A.
(Lutz-Werner Jumtow)

# Fig. 1




# Fig. 2

View from the left



# Fig. 3

## View from the left