4.5.4 Approach

Make the decision to land in good time and, despite the high performance, lower the wheel at not less than 150 m (~ 500 ft) agl.
For the remainder of the circuit, maintain about 90 – 100 km/h (49 – 54 kts). The yellow triangle on the ASI scale is valid for maximum weight without water ballast. In turbulence or strong headwind increase the approach speed.
Trim the glider to 90 – 100 km/h (49 – 54 kts).

The three-piece airbrakes are normally effective in controlling the glide angle.

Side slipping with the ASW 28-18 is very effective and may therefore also be used for controlling the glide angle.
The slip is initiated with airspeed between 90 km/h and 120 km/h IAS (49 to 65 kts) by gently applying aileron control and holding the flight path with the rudder. In a stationary side slip the ASI reading is not usable as it reads between 50 km/h (27 kts) and zero. The correct flying speed is checked by the pitch attitude. The upper edge of the instrument panel must not rise above a horizon position known from thermal flight attitude.
The amount of sideslip is controllable with the size of the control deflections. Associated negative rudder control force gradients and rudder lock can be easily overcome by moderate pedal forces or by easing the control stick into a more neutral position
With airbrakes already extended, the slip is more effective and can more easily be initiated.
If the slip is initiated at too high airspeed and with too dynamic control deflections, the glider may react with violent motions. Entry speed should therefore be max. 140 km/h / 76kts / 87mph
.

CAUTION: *Side slipping should be practiced from time to time at a safe height*

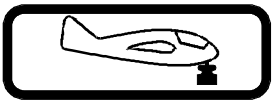
CAUTION: *With a partial but symmetric water ballast load side slipping is possible!*

WARNING: *When an asymmetric water ballast load is suspected or recognized,* ***emergency procedures*** *according to* ***Section 3*** *are applicable. Side slipping into the direction of the heavier wing must be avoided!*

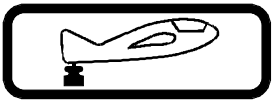
Trim

To set the trim, simply press the trim release lever at the control stick when flying at the desired air speed. A trim indicator is fitted at the left cockpit wall at the seat.

When trim is unlocked by pressing the stick mounted trim release lever, the trim can also be adjusted by sliding at the same time the trim indicator knob to a desired position.



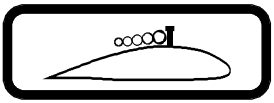
Trim nose heavy



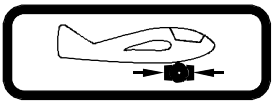
Trim tail heavy

7.4 Airbrake System

The airbrakes are operated by a blue handle mounted at the left cockpit wall.



Pull the blue handle to extend the airbrake paddles.



When the airbrake handle is pulled back to its fullest extent, it will also actuate the hydraulic disc brake of the main wheel.

The three-piece airbrakes extend on the upper wing surface only.

1.1 Introduction

This Maintenance Manual was produced because the safety and airworthiness of an aircraft depends on the careful maintenance of all its components. The airworthiness of the ASW 28-18E can only be assured, if the glider is maintained and operated according to the manuals. The maintenance and inspection requirements issued by the Civil Aviation Authority of the country, in which the aircraft is registered, must be observed.
Only for the English issue of this Manual, the units of measurement used are SI Metric (Systeme Internationale) with inch, lb, gallons, etc. shown in parenthesis. The decaNewton (daN) is frequently used for force representation as one daN is very close to equalling one kilogram weight force (kilopond or kp in older texts).

1.2 Description of the Sailplane

The ASW 28-18E is a single seat self-sustaining powered sailplane with T-tail unit, retractable sprung landing gear with hydraulic disc brake, and including a water ballast system. Automatic connections for elevator, aileron and airbrakes controls have been developed for this design. The three-piece airbrakes with spring loaded sealing caps extend on the top surface only. The power-plant consists of a two-cylinder two-stroke engine with lubrication mixture and a CRP-two-blade-propeller. The complete propulsion unit extends and retracts electrically.

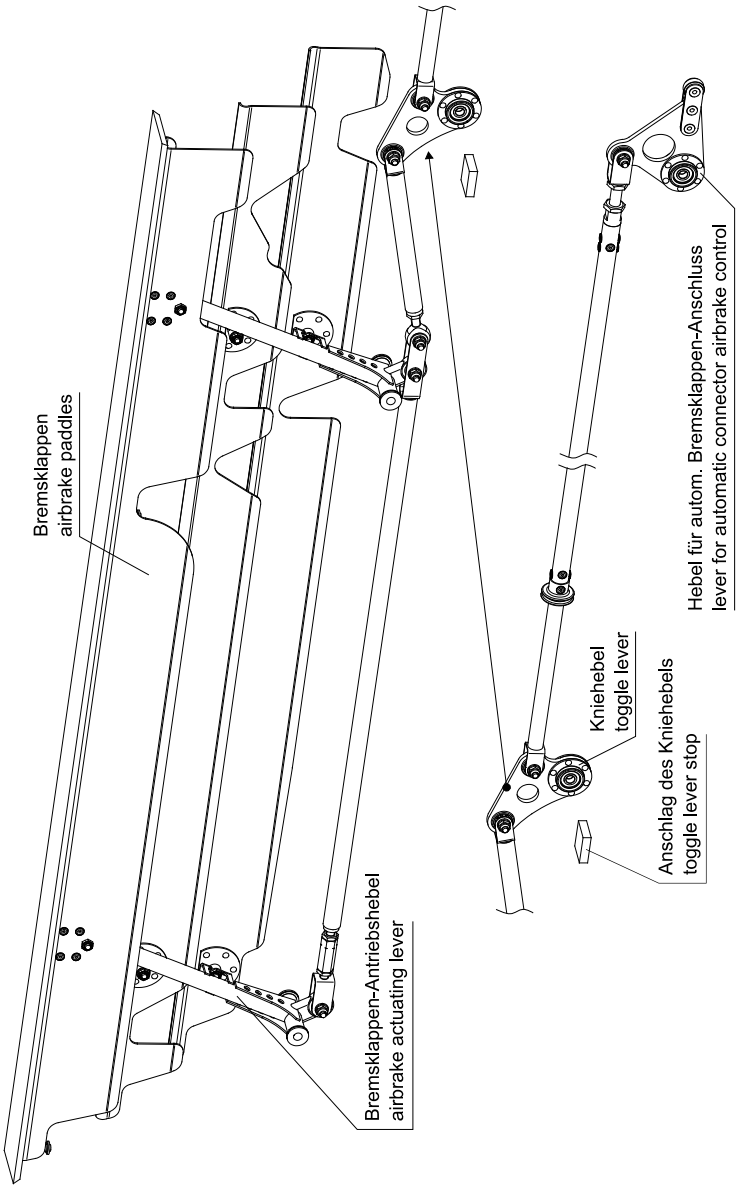
1.2.1 Wings

The 2-part wing is of GRP/CRP hard foam sandwich construction. The I-section spar consists of carbon fibre caps with GRP/hard foam web. The wings are assembled in the fuselage by means of a tongue-and-fork joint and two cylindrical main pins.

The ASW 28-18E has detachable winglets. Their tongue spar stub fits into an appropriate slit at the wing tip. A small spring cumbering bolt secures the winglet.

Fuselage		
Length	6.585 m	(21.6 ft)
Height at T-tail incl. tail wheel	1.3 m	(4.27 ft)
Cockpit width (inside)	0.64 m	(2.1 ft)
Cockpit height	0.8 m	(2.62 ft)
Vertical Tail		
Height above tail boom top edge	1.2 m	(3.94 ft)
Surface area	1.0 m²	(10.76 ft²)
Airfoil Section	DU 86-131/30	
Rudder		
Surface area	0.3 m²	(3.23 ft²)
Horizontal Tail		
Span	2.85 m	(9.35 ft)
Surface area	1.0 m²	
Aspect ratio	8.22	
Airfoil Section	DU 92-131/25	
Elevator		
Surface area	0.22 m²	
Airbrake Blades (Schempp-Hirth-type, top surface only)		
Length	1.10 m	(3.61 ft)
Surface area (both together)	0.36 m²	(3.88 ft²)
Height above wing top surface (approx.)	0.200 m	(0.66 ft)
Aileron		
Span	3.0 m	(9.84 ft)
Surface area (each)	0.267 m²	(2.87 ft²)

Fig. 2.2.5-1 Airbrake Control System in the Wing



An aluminium alloy-connecting crank protrudes from each wing root. This has a roller on its extremity that engages in the funnel type connector in the fuselage thus providing automatic connection of the airbrakes when the wings are rigged to the fuselage in the wing. A short push rod leads direct to the toggle crank in the airbrake box that by over centre actuation locks the airbrakes closed. From this toggle crank, another short push rod joins to a longer push rod that connects both airbrake-actuating arms together. The three-piece airbrakes are mounted on these actuating arms (see Fig. 2.2.5-3).
Any play between the fuselage-side funnel-type connector and the wing-root-side connecting lever can be removed by means of the adjusting screw at the funnel-type connector.

2.3 Landing gear

2.3.1 Main Wheel

The sprung main wheel consists of a Cleveland rim (P/N 40 78B) with a Goodyear tire 5.00-5, 6pr TT and inner tube 5.00-5 TR67A.

The wheel is equipped with a hydraulic disc brake:-

Cleveland wheel brake cylinder	30-9
with Master Cylinder	10-20

The landing gear wheel fork is damped and sprung by a system of two shock absorber legs with polyurethane Cellasto-Spring elements MH 24-65 from Elastogran.

2.3.2 Tail Wheel or Tail Skid

In the series production standard the sailplane comes with a tail wheel:

Wheel hub	210 x 65 (Streifeneder or Tost "Moritz")
Tire with inner tube	210 x 65

Note on Brake Adjustment

To check adjustment with the aircraft rigged, measure the height of the upper edge of the airbrake blade cap above the wing top surface. The master brake cylinder must be adjusted in a way that with fully activated wheel brake the prescribed extension height of the airbrake according section 3 is reached.

Bleeding of the Brake Line

The brake system has been fitted in such a way that the connection between wheel brake cylinder to the master cylinder and the reservoir forms a consistently rising line. This allows the brake system to be bled without difficulty in the manner described below.

Changing or Replenishing Brake Fluid

WARNING: *Use only brake fluids based on mineral oils (see also section 2.3.3.)!*
Do not spill any fluid - the fluid is toxic!

In order to avoid the entry of air, the fluid is poured from the bottom upwards. A simple filling rig would require about 2 m (6.6 ft) of instrument hose with a funnel at the top end, filled with about 1/4 l (0.07 US gal.) of brake fluid. A bleeder screw is fitted to the base of the disc brake cylinder. Fit the bottom end of the hose on the bleeder screw, which should then be unscrewed to open it.

Hold the funnel as high as practicable to let the brake fluid stream in under pressure. It is essential to ensure that the brake fluid is free from bubbles to avoid including air in the system. To ensure this, there must always be enough fluid in the funnel. Continue filling until the reservoir contains about 2/3rd of capacity.

Then, tightly close the bleeder screw and remove the hose. Do not forget to replace the dust cap!

Check the brake system for leaks, action and effectiveness!

Rudder Deflection

	MPE. *	Deflection		Tolerance
Rudder	334 mm = 13,15 in.	right & left	± 180 mm ± 7.1 in. ± 31°	± 10 mm ± 0.39 in. ± 2°
Elevator	75 mm = 2,95 in.	up & down	± 26 mm ± 1.0 in. ± 20°	± 2,5 mm ± 0.1 in. ± 2°
Aileron	111 mm = 4.37 in.	up	- 43 mm -1.7 in. - 22,3°	± 5 mm ± 0.2 in. ± 2,6°
		down	+ 26 mm + 1.0 in. + 13,5°	± 3 mm ± 0.12 in. ± 1,6°
		neutral	+ 0 mm + 0°	± 1,5 mm ± 0.06 in. ± 0,8°
Airbrakes	upper edge cover over wing surface		200 mm 7.87 in.	± 5 mm ± 0.2 in.

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