ALEXANDER SCHLEICHER GMBH & CO., SEGELFLUGZEUGBAU
D-36161 POPPENHAUSEN/WASSERKUPPE

FLIGHT MANUAL

FOR POWERED SAILPLANE

ASH 26 E

Model Variant	:	ASH 26 E
Works Serial No.	:	
Date of Issue	:	JULY 95

Pages identified "LBA-App." are approved by the German Federal Civil Aviation Authority (LBA) as shown below:

.... (Signature)

Anerkannt vom
Luftfahrt-Bundesamt
.... (Authority)

.... (Stamp)

28. Juli 1995
.... (Original Date of Approval)

This powered sailplane is to be operated only in compliance with the operating instructions and limitations contained herein.

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

SECTION 0

0.1 Record of Revisions

Operators Responsibility

It is the responsibility of the operator to ensure that this manual is maintained to a current status.

Revision Incorporation

On receipt of revisions insert new pages as detailed in the corresponding Technical Note or AD, enter to the Record of Revisions the revision number and date, insertion date, then sign the Record.

Any revision of the present manual, except actual weighing data, must be recorded in the following table "Record of Revisions" (pages 0.2/0.3) and in case of LBA-approved Sections endorsed by the LBA.

Identification of Revisions

The new or revised content of pages will be indicated by a black vertical line in the left margin, adjacent to the relevant text, and the "Rev.No. and Date" will be shown in the box at the bottom left of the page.

Record of Revision

Rev. No.	Section & Pages Affected	Revision Date	Approval	LBA-Approved on Date	Date of Insertion of the pages	Ref./ Signature
TM 1	0.2 0.4 thru 0.6 2.1 2.2 2.4 2.11 2.12 3.8 4.1 4.9 4.11 bis 4.34 5.9 7.35	31.10.96		12.11.96	14.11.96	/st
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TM 7	1.5 1.6 4.2 4.3 4.4 4.5 4.6 4.25 8.4	09.04.99		21.05.99	25.05.99	/st

Record of Revision

Rev. No.	Section & Pages Affected	Revision Date	Approval	LBA-Approved on Date	Date of Insertion of the pages	Ref./ Signature
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TM 12	0.2 – 0.4 1.4 2.7	07.05.03		24.02.04	01.03.04	mm
TM 15	4.8	08.01.08		29.01.08	31.01.08	mm

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0.3 Table of Contents

SECTION 1

1.1 Introduction

This Flight Manual has been compiled in order to give pilots and instructors all the information they need for operating the ASH 26 E powered sailplane safely and appropriately, and for getting the full benefit from the performance it offers. This Manual includes all data required to be available to the pilot as laid down in the Design Standards JAR-22. In addition, we have provided a number of data and notes on operation which, our experience as manufacturers suggests, may be of use to the pilot.

1.2 Type Certification Basis

This powered sailplane of the type designation ASH 26 E is type approved by the German Federal Civil Aviation Authority (LBA) in accordance with the Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes JAR-22 incl. amendments up to June 27, 1989 and supplementary Amendments 22/90/1, 22/91/1 and 22/92/1. The Joint Airworthiness Requirements so updated correspond with the more recent Change 4 of the original edition in English dated 7th May, 1987.

The Type Approval Certificate issued uses the Data Sheet No. 883, under Airworthiness Category "U". U stands for Utility and refers to sailplanes and powered sailplanes used in normal gliding activities.

The noise emission measurements were carried out in accordance with the currently valid "Noise Abatement Requirements for Aircraft" (German: Lärmschutzforderungen für Luftfahrzeuge [LSL]), and in accordance with ICAO, Annex 16, Chapter 10. The measurements established a noise level of 62.4 dB(A).

1.3 Special Annotations (Warnings, Cautions and Notes

Passages in this manual which are of special importance for flight safety or handling have been emphasized by being prefixed by one of the following annotations:-

"WARNING" means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

"CAUTION" means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

"NOTE" draws the attention on any special item not directly related to safety, but which is important or unusual.

1.4 Description and Technical Data

The ASH 26 is a high performance single-seater sailplane designed for a future 18 Meter Class of the FAI. Its high performance potential makes the ASH 26 suitable for record breaking and competition flying.
Not least, its pleasant flying characteristics make the ASH 26 suitable for use in performance-orientated clubs.
The installation of the compact power-plant, a single rotor engine, type AE50R, increases the operational range of this sailplane. It allows the flight to be extended to different kinds of terrain - so long as they offer outlanding possibilities - and their meteorological conditions, which would be out of reach of a pure sailplane.

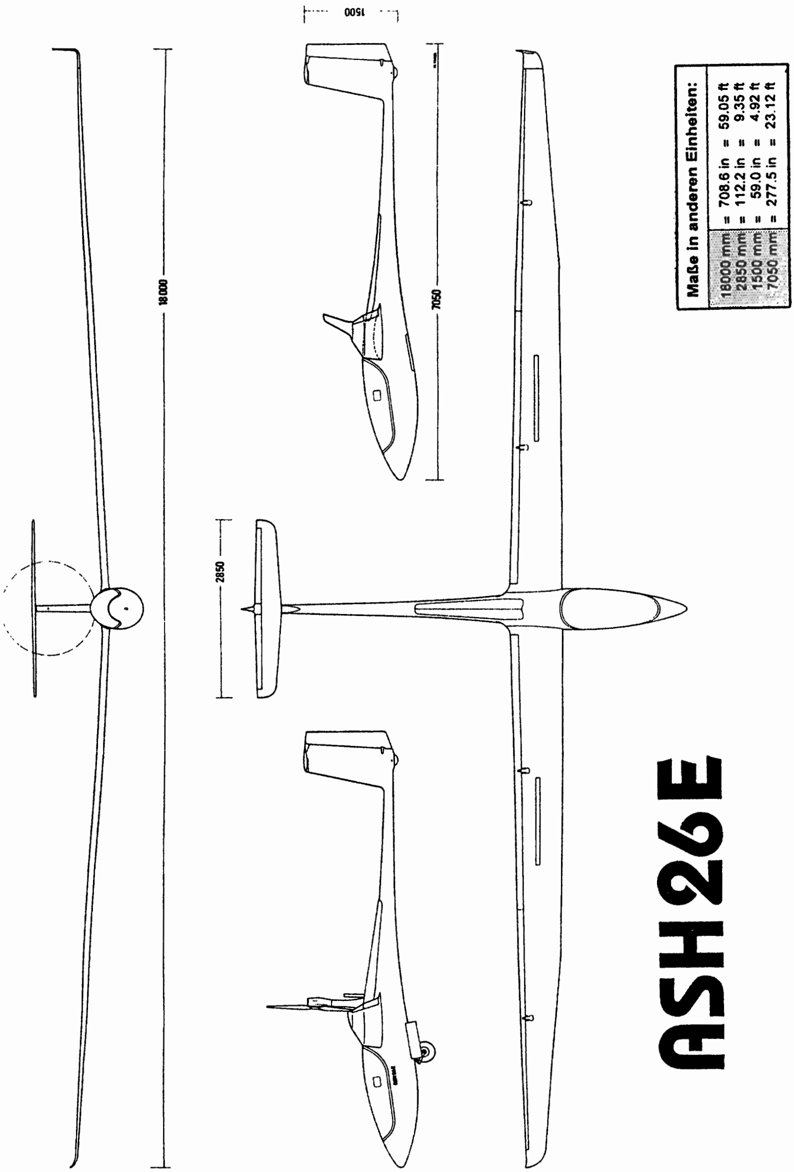
The ASH 26 E is a shoulder wing sailplane with damped T-tail and sprung, retractable landing gear with hydraulic disc brake. The wing is equipped with trailing edge flaps extending over the full span, to allow a choice of optimum wing camber in relation to drag throughout the speed range. With landing flap selected the deflection of these flaps will generate high drag combined with good control which, together with the airbrake paddles on the upper wing side, permits very short landing approaches.
The engine and the exhaust silencer of this new designed power-plant are fitted stationary in the fuselage. Only the rigid twin-bladed propeller of this self-launching sailplane is extended electrically. The power-plant has an extremely low noise and vibration level and is fitted behind the wing in the fuselage. The 37 kW engine provides excellent rates of climb even at maximum all-up weight.

By the issue of the Technical Note 7 the use of winglets has been certified. A wing separation joint at 8.7 meter was incorporated in order to enable the fitting of these detachable winglets sitting on an approx. 30 cm short wing piece.
The previous short wing tip is available as another option and can also be fitted at this separation joint.

Technical Data:

Span	18.00 m	(59.06 ft)
Fuselage length	7.05 m	(23.13 ft)
Height (Fin and Tail Wheel)	1.50 m	(4.92 ft)
Max. all-up mass	525 kg	(1157.62 lb)
Wing chord:		
(mean aerodynamic)	0.688 m	(2.26 ft)
Wing area	11.68 m^2	(125.72 sqft)
Wing loading:		
- minimum	36 kg/m^2	(7.37 lb/sqft)
- maximum	45 kg m^2	(9.22 lb/sqft)

1.5 Three-View Drawing Fig.1.5-1



SECTION 2

2.1 Introduction

This Section contains operating limitations, instrument markings and cockpit placards required for the safe operation of the powered sailplane ASH 26 E and its systems, installations, and equipment provided as factory-standard.

The operating limitations included in this Section and in Section 9 are LBA-approved.

2.2 Air Speed

Air speed limitations and their operational significance are shown below:-

	SPEED	IAS km/h and (kts)	REMARKS
v_{NE}	Never exceed speed	270 (146)	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection.

v_{NE} must be reduced for altitudes above 10000 feet in accordance with the placard shown in section 4.5.8.
For US registered aircraft this v_{NE} placard has to be affixed next to the ASI.

v_{RA}	Rough air speed	184 (99)	Do not exceed this speed except in smooth air, and then only with caution. Examples of rough air are lee-wave rotor, thunderclouds etc.
v_A	Maneuvering speed	184 (99)	Do not make full or abrupt control movement above this speed, because under certain conditions the sailplane may be overstressed by full control movement.

V_{FE}	Max. Flap Extended Speed (if applicable give different flap setting)	**WK 1 = 270 km/h (= 146 kts)** **WK 2 = 270 km/h (=146 kts)** **WK W = 270 km/h (= 146 kts)** **WK 3 = 270 km/h (= 146 kts)** **WK 4 = 160 km/h (= 86 kts)** **WK L = 140 km/h (= 76 kts)** **WK = Flap**	Do not exceed these speeds with the given flap settings.
V_W	Max. winch launching speed	**130 km/h (70 kts)**	Do not exceed this speed during winch or autotow launching
V_T	Max. aerotowing speed	**150 km/h (81 kts)**	Do not exceed this speed during aerotow

	Max. speed propeller extended	184 (99)	Do not exceed this speed with power-plant idling.
v_{LO}	Max. landing gear operating speed	184 (99)	Do not extend or retract the landing gear above this speed.
$v_{PO\,max}$	Max. speed for extending & retracting propeller	120 (65)	Do not extend or retract the propeller beyond the speed range given here.
$v_{PO\,min}$	Min. speed for extending & retracting propeller	90 (49)	

2.3 A.S.I. Markings

The following table shows the ASI markings and the meaning of the colors:

MARKING	(IAS) VALUE OR RANGE km/h and (kts)	SIGNIFICANCE
WHITE ARC	76 - 160 (41 - 86)	Positive Flap Operating Range
GREEN ARC	87 - 184 (47 - 99)	Normal Operating Range (neutral flap setting)
YELLOW ARC	184 - 270 (99 - 146)	Maneuvers must be conducted with caution and only in smooth air.
RED LINE	270 (146)	Max. speed for all operations.
YELLOW TRIANGLE	90 (49)	Approach speed at max. weight without water ballast
BLUE LINE	95 (51)	Best rate-of-climb speed V_Y

2.4 Power-Plant

Engine Model:	AE50R	
Max. power,		
- take-off:	37 kW (5 minute limit)	7500 rpm
- continuous:	34.6 kW	6900 rpm
Max. take-off revs:		7500 rpm
Max. continuous revs:		6900 rpm
Max. overspeed revs (20 sec.)		7800 rpm
Max. coolant temperature:	107 °C	224 °F
Max. coolant temperature, take-off	90 °C	194 °F
Min. coolant temperature, take-off:	60 °C	140 °F
Max. rotor cooling air temp.:	125 °C	257 °F

Lubricant: Total loss oil lubrication at ratio 1:60 approx.

Transmission: Toothed belt transmission with 1 : 2.78 reduction ratio.

The installation of the following propeller is type-approved:
Manufacturer: Alexander Schleicher GmbH & Co.
Propeller: AS 2 F1-1 /R 153 – 92 – N1

2.5 Power-Plant Control Unit Markings

The following table shows the markings of the digital ILEC engine control unit and the meaning of the colors employed.

Permanent Display:

RPM Indication (4 digits) [rpm]	**Green Diode** Normal Operating Range 1800 to 6900	**Yellow Diode** Caution Range 6900 to 7500	**Red Diode** Max. Limit, blinking at 7500 plus
Fuel quantity (2 digits) in liters		0 to 16	

Display reading when pressing the white button:
Press one time:

Liquid Coolant Temperature (3 digits)	--- °C

Press two times:

Internal Cooling Air Temperature (3 digits)	--- °C

Press three times:

Engine Battery Voltage (4 digits)	XX,X [Volts]

2.6 Masses (Weights)

Max. Take-Off Mass:		
-with water ballast	525 kg	(1158 lb)
-without water ballast but with fuel in the wing tank	525 kg	(1158 lb)
Max. Landing Mass:	525 kg	(1158 lb)
Max. mass of all non-lifting parts	344 kg	(758 lb)
Max. mass in baggage compartment:	15 kg	(33 lb)

2.7 Center of Gravity

The limits of the C.G. range are as follows:

forward limit	0.29 m	(0.95 ft) aft of BP
aft limit	0.41 m	(1.35 ft) aft of BP

"BP" (German: **B**ezugs**p**unkt) stands in this context for "Reference Datum" which is identical with the wing leading edge at the wing root rib.
Examples of calculating C.G. positions are given in Section 6 of the ASH 26 E Maintenance Manual.

2.8 Approved Maneuvers

This powered sailplane is approved for normal sailplane and powered sailplane operation (Airworthiness Category "Utility").

2.9 Maneuvering Load Factors

Maximum maneuvering load factors:

- max. positive load factor	+ 5.3
- max. negative load factor	- 2.65
at an air speed of:	184 km/h (99 kts)

At increasing air speeds, these values will be reduced to:

- max. positive load factor	+ 4
- max. negative load factor	- 1.5
at an air speed of:	270 km/h (146 kts).

Max. maneuvering load factor with

- airbrakes extended:	+ 3.5 up to 270 km/h (146 kts)
- flaps in landing setting:	+ 4.0 up to 140 km/h (75.5 kts)

2.10 Flight Crew

Pilots weighing less than 70 kg = 154.5 lb (incl. parachute) must use additional trim ballast weight. Please refer to the Mass and Balance Form in Section 6 and the description of trim ballast plates in Section 7.
In addition the minimum seat load is shown in the Operating Limitations Placard affixed on the right cockpit wall (DATA and LOADING PLACARD).

2.11 Types of Operation

Flights may be carried out in daylight, in accordance with VFR.

2.12 Fuel

Only fuel **WITHOUT** two-stroke oil must be refilled.

Capacity of the fuel tanks:

	Ltrs	US Gal.
Fuselage tank:	16.0	4.23
Each wing tank (if fitted):	15.0	3.97
Total fuel capacity, incl. fuselage tank:	46.0	12.15
Max. fuel quantity usable in flight, incl. fuselage tank:	45.3	11.97
Non-usable fuel:	0.7	0.18

Approved Octane Rating:	not less than 94 RON/ROZ (research o.r.)
Approved fuel grades:	**preferably AVGAS 100LL**

Fuel grades like Car Super, Euro-Super, and Super-plus are also permissible.
In the U.S. the "US 94 Octane Rating" complies with the minimum relative octane number required by the engine manufacturer.
The Maintenance Instruction "Fuel" as appendix to the Maintenance Manual must be regarded. For further data refer to the Engine Manual AE50R.

Engine oil: Preferably Silkolene Comp 2 Pre-mix.
However, Castrol Aviation A545 or Spectro Oils of America "Golden Spectro" can also be used.

2.13 Minimum Equipment

Minimum Equipment consists of:

- 1 x ASI indicating up to 300 km/h = 162 kts
- 1 x Altimeter
- 1 x 4-part seat harness (symmetrical)
- 1 x Magnetic Compass
- 1 x ILEC engine control unit
- 1 x rear view mirror
- 1 x parachute or back cushion

For flights beyond the environs of the airfield at which the flight originates an aircraft radio is mandatory (for Germany). In addition, headphones should be worn when the engine is running.
Approved equipment is listed in the Maintenance Manual in Section 12.1.

2.14 Aerotow, winch- and autotow-launching

The maximum launch speeds are:

for aerotow	150 km/h (80,9 kts)
for winch- and autotow-launch	130 km/h (70,1 kts)

For all launching methods a weak link of 675 to 825 daN must be used in the launch cable or tow rope.

For aerotow, the tow rope must be not less than 40 m (135 feet) in length.

2.15 Operating Limitations Placard

This placard is fixed at the left cockpit side wall and contains the most important Mass and Speed Limitations.

Segelflugzeugbau A. Schleicher GmbH & Co. Poppenhausen

Model: ASH 26 E Serial No.:

DATA and LOADING PLACARD

Empty Mass:	kg	lb
Max. Flight Mass:	525 kg	1158 lb
Min. Seat Load	kg	lb
Max. Seat Load	kg	lb

Max. Permissible Speeds:

Calm Air	146.6 kts	270 km/h
Winch Launch W/L	70.1 kts	130 km/h
Aerotow A/T	80.9 kts	150 km/h TM3
Extending Landing Gear	99.2 kts	184 km/h
as Maneuvering Speed	99.2 kts	184 km/h

With Power-Plant running:

to extend/retract propeller	48.5 - 64.7 kts	90-120 km/h
Propeller extended	99.2 kts	184 km/h

Weak Link for Aerotow & Winch Launch: 675 bis 825 daN

Tire Pressure Main Wheel:	2.9 to 3.2 bar	(42 to 46 psi)
Tail Wheel:	2.4 to 2.6 bar	(34 to 37 psi)

Reduced minimum cockpit load <u>without</u> trim ballast in the fin:
see flight manual - Page 6.4

Reduced minimum cockpit load
with power-plant dismantled
see flight manual - Page 6.4

Reduced minimum cockpit load <u>without</u>
barograph in the engine compartment:
see flight manual - Page 6.4

Reduced minimum cockpit load by fitting removable trim ballast in front of the pedal assembly: see Section 7.13.

The baggage compartment load must not exceed 15 kg = 33 lb.

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

SECTION 3

3.1 Introduction

This Section contains Check Lists, summarising procedures recommended in the case of emergencies, in the form of brief headings.
This is followed by a more detailed description.

EMERGENCY PROCEDURES

(1) To Jettison Canopy

- If applicable, shut the power-plant
- Pull both red jettison handles all the way back
- Push canopy UP by the handles

(2) Bailing Out

- Ignition: OFF!
- Engage the propeller stop
- Push instrument panel UP
- Release safety harness
- Roll over cockpit side
- Push off strongly
- Watch wing & tailplane!
- Pull parachute

(3) **Spinning**

- (When power plant running: set throttle to IDLE)
- Apply opposite rudder and at the same time,
- relax back pressure on stick until rotation stops,
- centralise rudder and immediately pull out gently from dive.

(4) **Fire**

- Fuel valve: SHUT! (aft position)
- Full throttle until engine stops
- Ignition: OFF!
- Retract the propeller if possible
- Power-plant main switch: OFF!
- Land as quickly as possible
- Extinguish fire.

3.2 Jettisoning Canopy

If, during propeller-extended flight, jettisoning the canopy is unavoidable, the (running) propeller must at first be moved into a position which is less dangerous for the pilot.
To do this switch off the ignition and engage the propeller stop.
Do not wait until the propeller stops rotating but retract the propeller immediately; any position from half-retracted on would seem sufficient. This position should prevent the canopy from being destroyed by the propeller and, thereby, pieces of the canopy from hurting the pilot.

After this procedure - or in the soaring configuration -:

Pull the canopy-jettison handles (red handles mounted left and right on the canopy frame) and push canopy up and backwards!

CAUTION: Push up the canopy by the jettison handles. Do not push up the canopy by your hands direct above the head as this would cause the jettison back-up pin (Röger-hook substitute) to disengage first and become ineffective.

Using your knee or shin press shortly the instrument carrier above its dead point until it hinges upwards by itself.

In a vertical dive, the air loads on the canopy may be high. With some yaw, however, low pressure builds over the canopy. Therefore, apply some rudder in this case!

3.3 Bailing Out

If bailing out becomes inevitable, first the canopy is jettisoned, and only then should the seat harness be released.

- Push instrument panel UP (if this was not yet done in the course of jettisoning the canopy).
- Get up or simply roll over cockpit side.
- When jumping, push yourself away from the aircraft as strongly as possible.
  Try to avoid contact with wing leading edge, tail plane, or propeller !

3.4 Stall Recovery

In straight or circling flight, relaxing of back pressure on the stick will always lead to recovery.
Due to its aerodynamic qualities the ASH 26 E will immediately re-gain flying speed.

3.5 Spin Recovery

Intentional spinning is NOT permitted. The procedure hereafter describes how to terminate unintended spinning.

(1) Apply opposite rudder (i.e: in the direction opposite to the rotation of the spin), and at the same time
(2) move stick gently forward until rotation stops;
(3) centralise rudder and gently pull out of the dive.

CAUTION: When the propeller is extended, the engine must only be running at 'IDLE' in order to obviate the danger of over-revving in the course of spin recovery.

CAUTION: Furthermore, spin recovery will be achieved more quickly if flap deflection is reduced. It is advisable to reduce circling flap setting to neutral flap setting (Flap 3).
Spinning is not noticeably affected by extending the airbrake paddles,

but it will increase the height loss when pulling-out, and is therefore less advisable.

WARNING: Watch the V_{NE} for flaps in landing setting; see Section 2.2.
If a spin should inadvertently develop with this flap setting engaged, the flaps should immediately be reduced to neutral setting (Flap 3), and only then should recovery action be initiated.

3.6 Spiral Dive Recovery

Depending on the aileron deflection during spinning with forward C.G. positions, it will immediately or after a few turns develop a spiral dive, or a slipping turn similar to a spiral dive.
These conditions will both be terminated by:

(1) applying opposite rudder
(2) applying aileron opposite to bank.

3.7 Engine Failure

(1) Failure at Safe Altitude

- Fuel Valve: OPEN? (in most forward position?)
- Ignition: ON? (upward position?)
- Main Switch: ON? (ILEC responding?)
- Fuel: ??? (Fuselage tank contents?)

If the above points check out correctly, the fault cannot be rectified in flight, the propeller should be retracted and the ASH 26 E should from then on be operated as a pure sailplane.
Retract propeller in the normal manner in accordance with the check list.
If necessary, carry out a normal sailplane outlanding.
If the stoppage has been caused by lack of fuel in the fuselage tank, open the valve serving the wing fuel tanks, if fitted (see Section 7). After about 2 minutes, enough fuel will have flowed into the fuselage tank to allow the engine to be re-started in accordance with the checklist.

(2) Failure at Low Altitude

Check the points on the check list given in the previous para. The fuel from the wing tanks does not flow quickly enough that it would make sense to open the valve at this stage.

- Fuel Valve: SHUT! (Aft position)
- Ignition: OFF!
- Main Switch: OFF!
- Propeller Stop: ENGAGED! (bottom position)
- Leave the propeller extended.
- Initiate outlanding.

If the situation becomes so critical that a crash landing seems unavoidable because no landable terrain can be reached, the propeller stop should be engaged at a speed of about 90 km/h (49 kts) - even with the propeller still running. This will help to stop the propeller more quickly. Then the propeller must be retracted to a "halfway in" position minimum. This action not only improves the gliding performance (perhaps now a more suitable field can be reached), but also reduces the risk in case of a crash landing. In this case the main switch must not be turned off until the propeller has reached at least its partially retracted position.

(3) Heavy Vibrations of the Power-Plant

Comply with checklist. If no cause is found, shut down the engine and retract propeller in the normal manner. It is possible that the propeller has been damaged, causing an unbalance. Do not re-start the power-plant.

3.8 Fire

(1) Fire with propeller extended

A fire in the engine compartment is indicated by a red blinking diode in the instrument panel. Further details are given in Section 7.9

Comply with **Check List (4)** and land as quickly as possible. If possible, retract the propeller, as closing the engine doors will reduce the oxygen feed !
Smother fire with extinguisher or fire blanket (clothing).

(2) Fire with propeller retracted

The propeller remains retracted because of the reduction of oxygen supply.

- Fuel valve: SHUT!
- Power-plant Main Switch: OFF!
- Land as quickly as possible.
- Extinguish fire.

3.9 Other Emergencies

(1) Jammed Elevator Control System

If the flap control is jammed, the ASH 26 E is converted into an aircraft with fixed wing profile.
On the other hand, it will not always occur to the pilot in case of need that, with elevator control jammed, the flaps will still afford him some measure of pitch control for improving his position for bailing out or even perhaps obviating the need to do so.

(2) Emergency Landing with Retracted Landing Gear

Emergency landings with retracted landing gear are inadviseable in principle, as the capacity for energy absorption of the fuselage is many times less that that of the sprung landing gear. If the wheel cannot be lowered, the ASH 26 E should be touched down with landing flap (Flap L) selected, air brakes closed as far as possible, at a shallow angle and without stalling on to the ground.

(3) Groundloops

If the aircraft threatens to roll out beyond the intended landing area, the decision should be made not less than 40 m = 140 ft before reaching the end of the landing area to initiate a controlled ground loop.

- If possible, turn into wind !
- When putting down a wing, at the same time push the stick forward and apply opposite rudder !

(4) Emergency Landing on Water

A landing on water by a fiber composite sailplane with wheel retracted has been experimentally tried out.
The experience gained on that occasion suggests that the aircraft will not skim across the water, but that the whole cockpit area will be forced under the surface.
If the depth of the water is below 2 m = 6.5 ft, the pilot is in the greatest danger. Touching down on water is, therefore, recommended only with wheel down, and only as a very last resort.

(5) Flying with Defective Water Ballast Jettison System

When jettisoning water ballast in flight, it should be positively ensured that the water is draining from both wings. If this is not the case, it would cause asymmetric loads very quickly. Water ballast jettison should be stopped immediately, because a landing at a higher wing loading would be preferable to a landing with asymmetric ballast loading.

If a failure of the valves should cause asymmetric loading, the flight should be terminated with extreme care, maintaining an adequate margin above stalling speed as wing dropping and spinning with asymmetric ballast load are not permitted. Special care should be taken to avoid turning in the direction of the heavier wing.

(6) Strong Noise Development Due To Defective Exhaust Silencer

If the noise from the exhaust silencer is considerably increasing, a failure of the exhaust system must be taken into account. Because hot exhaust fumes may cause fire, the engine must be stopped immediately or after reaching a safety height respectively. Prior to the next flight the exhaust system must be inspected and if necessary repaired.

(7) Defective Airbrake Control Circuit

If sudden strong change of flight course happens, the pilot should immediately visually check that the airbrakes have extended on both wings as this asymmetry may be caused by an airbrake extended on one wing only. This problem could occur after a defect in the airbrake control circuit and cannot be compensated by rudder deflection.
If the airbrake has extended on one wing only, the other airbrake must immediately be extended so far that the aircraft will regain level flight and the airbrake lever must be hold in this position.

Depending on the flight height immediately initiate an outlanding.

(8) Throttle Cable Broken

If the throttle cable fails, a spring at the carburettor opens the throttle valve wide open and the engine is running a full throttle. Climb to a safe altitude, switch off the ignition, stop the propeller so that it can be retracted in the normal manner.

If no airfield or no landable terrain can be reached and further height gain is no more possible, you may prevent a further climb by using the airbrakes and possibly the flap landing setting. Then you may continue the flight in this configuration until you can reach an airfield. Prior to landing switch off the ignition and retract the propeller.

SECTION 4

4.1 Introduction

This Section contains Check Lists for the daily inspection and pre-flight checks. It also describes normal operating procedures. Normal operation procedures associated with the sailplane, if equipped with various ancillary systems and equipment not included as standard equipment, are described in Section 9.

4.2 Rigging and Derigging

Rigging
The ASH 26 E can be rigged without use of rigging aids by three people, or by two people if a fuselage cradle and wing trestle are used.

NOTE: Winglets must be attached only after the wing assembly is done.

1. Clean and lubricate all pins, bushings and control connections.
2. Support fuselage and keep upright. If the wheel is lowered, check that the landing gear is securely locked down.
3. Set flap lever to Flap Position 1 or 2.
4. Insert right wing spar fork into fuselage and watch the alignment of the automatic control linkage connectors. Hold the wing such that the wing-side levers of the automatic connectors will be guided into the angular funnel-type connectors at the fuselage. Only then a further assembly is possible.
   Now support the outer wing end with a trestle, if available.

NOTE: The wing trestle must not obstruct the movement of the aileron!

5. Insert left wing and watch again the alignment of the automatic control linkage connectors (see above point 4.). Then line up main rigging pin bushes. Insert and lock main pins. Only at this point - and not before - may the wing weight be relaxed. If the aircraft is still supported in a fuselage cradle, it is recommended that the landing gear should be extended at this stage, and rigging completed with the aircraft standing on its wheel.

   Only at this stage the winglets - if available - are rigged.

   NOTE: The correct and secure engagement of the winglets or of the short wing tip respectively must be checked.

6. After cleaning and lightly lubricating the elevator studs and sockets, the tailplane is pushed on to the fin from the front. Each half-·elevator must be guided into the elevator connectors. The elastic lip seal covering the elevator gap must be placed on top of the elevator control tongue. Now push the tailplane home until the hexagon socket head bolt at the leading edge will engage its thread. The bolt must be fully and firmly tightened; it is secured by means of a spring ball catch, whose ball must engage in the grooves on the side of the bolt head.

7. A considerable performance improvement can be achieved with little effort by taping all gaps between wing junctions with plastic self-adhesive tape (on the non moving parts only). The fin-tailplane junction should also be taped up. The canopy rim must not be taped over, so as not to impair bail-out.

It is recommended that areas to be taped up should be thoroughly waxed beforehand, so that the adhesive tape can afterwards be cleanly removed without lifting the paint finish.

8. If flexible fuel tanks are fitted in the wings, their fuel hoses should now (or, at the latest, after filling up) be connected to that from the fuselage tank. The end of this hose is located in the baggage compartment in front of the spar.

WARNING: If the wing tank vent is returned into the fuselage tank (optional modification), then in any case the vent tube must always be connected at the fuselage-to-wing separation joint already during the rigging. This applies even if the wing tanks are not used !

9. Now use the Check List (see the following para. 4.4) to carry out a pre-flight check. Under point 3. "Control surface clearances at trailing edge min. 1.5 mm = 1/16 in!" check that the wing control surfaces have that minimum clearance from each other and from the inboard and outboard wing cut-out edges. This clearance is necessary to ensure that these surfaces do not foul each other or the wing cut-out edges when deformed under load in flight.

De-rigging

To de-rig, proceed in the reverse order of rigging. We would add the following suggestions:

1. Drain all water ballast. Ensure that all the water has emptied out by putting down alternate wing tips several times. If fuel tanks are fitted in the wings, these must be emptied before transporting the aircraft.

2. If the tailplane is very firmly located in its rear seating, it will be more easily dismantled by two people alternately pushing it forwards by the tips.

NOTE: Winglets must be detached prior to de-rigging the wings.

3. Before de-rigging the wings from the fuselage, do not forget to disconnect the fuel hoses!

4.3 Daily Inspection

Before commencing flying operations, the aircraft must be thoroughly inspected and its controls checked; this also applies to aircraft kept in the hangar, as experience shows them to be vulnerable to hangar-packing damage and small animal.

a) Open canopy and check canopy jettison.

b) Main pins home and secured?

c) Check cockpit and control runs for loose objects or components.

d) Check condition and operation of tow release couplings! Release control operating freely? Do not forget release checks!

e) Check that the Pitot tube in the ventilation aperture of the fuselage nose is clean and unobstructed.

f) Check fuselage, especially underside, for damage.

g) Check inflation and condition of tires:
the values are given in the Data and Loading Placard which is affixed in the cockpit, and a copy of it is shown at the end of Section 2 of this manual.

h) Check both wing upper and under surface for damage.

i) Flaps including ailerons: check condition and free movement (clearances). Also the linkage fairings of control surfaces and wings must be checked for clearance.

j) Check correct assembly of winglets, or short wing tips respectively. Locking mechanism on wing underside securely engaged ?

k) Check that static ports in the fuselage tail boom are unobstructed.

l) Check that rudder, tailplane and elevator are correctly assembled, and for damage or excessive play.

m) Check proper condition of the turbulator tape at the horizontal tailplane.

n) Check the pressure ports in the fin: is the probe properly seated and tight??

o) The control connections of ailerons, elevator and air brakes can be verified only by checking the full, free and stress-free operation of all control linkages. Hold controls firmly at full deflection while loads are applied to control surfaces.

p) Airbrake paddles: check condition and positive connections. Do both sides have good over-center lock?

q) Check wheel brake for operation and leaks. With airbrake paddles fully extended the resilient brake pressure from the main brake (master) cylinder should be felt through the brake handle.

Daily Inspection of Extended Propeller

a) When extending the propeller pay attention to unusual noise and stiffness of operation.

b) The most important bolted connections can be checked from above through the open engine bay doors. With one exception only they are secured with standard stop nuts and therefore, are easy to check. Particular attention must be paid to both front engine mounting screws and to the screw connections of the extending toggle crank with jack head.

c) The rear engine mounting screw which is running through the engine oil tank is secured by locking wire. Check this locking wire for damage.

d) By pushing against the propeller assembly from the side and the front, check the rubber elements of the engine mounting. The power-plant should react flexible and should not immediately stop on the fuselage structure.

e) Check the toggle over dead center of the drive mechanism of the propeller assembly! Do both sides have good over-center lock?

f) Inspect the mounting of the exhaust silencer. The spring mountings can be checked by shaking the silencer.

g) Check mounting of radiator, and the radiator support plate for cracks.

h) Check operation of throttle and propeller stop mechanism.

i) Any kinks in Bowden cables or fuel lines and hoses? Elastic cords of the engine bay doors in good condition?

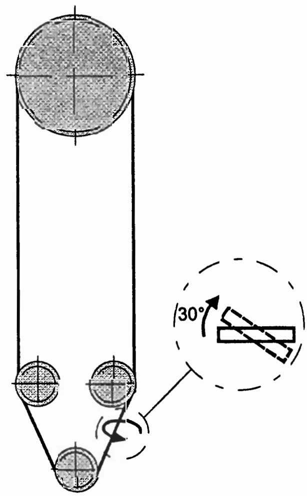
j) Inspect hoses (especially fuel and coolant hoses) and all components for signs of chafing.

k) Check carburettor and air filter for secure seating.

l) Check limit switch for electric jack for damage and secure seating - including its electric connectors.

m) Check the toothed belt for wear and correct pre-tension.

It should be possible to twist the belt just by 30° with normal hand force applied between the bottom belt pulley and one of the guide pulleys. This measuring method may be relatively imprecise, yet it may aid to recognise a considerably too low belt tension. Further notes on measuring and adjustment of belt tension are given in the Maintenance Manual, Section 2.



n) Turn the propeller through by hand one time (Ignition OFF?) and check for excessive friction.

Visual Inspection of the Propeller

a) Visual inspection of the propeller as per propeller manual.

b) Visual inspection of propeller mounting.

Tank System (fuel and oil)

a) Check that hose connections to the wing tanks are secure and tight.

b) Check visually fuselage tank through wheel well for damage due to impact from stones and for leaks.

c) Press drainer and release any condensation if present. Watch carefully that the drainer afterwards closes tightly again. The drainer is situated at the rear end of the left fuselage tank half.

d) Check fuel tank vent opening. This vent is fitted at the left-hand side of the fin above the tail wheel.

e) Check fuel contents for a safe take-off (min. 5 liters).

f) Check engine oil tank (between engine and exhaust silencer) for any signs of leakage. Level check! Sufficient oil usage ? (See also Section 7.10)
Always top up the oil tank to approx. 1 cm below the filler opening.

4.4 Pre-Flight Checks

The following Check List containing the most important points is affixed within easy view of the pilot.

Pre flight check

1. Horizontal tail bolt and assembly pins secured ?
2. Check control forces and freedom of control movements !
3. (Clearance of control surface gaps min. 1,5 mm as viewed from trailing edge) ?!
4. Automatic parachute static line connected ?
5. Check the C.G. !
6. Observe the mass and balance data !
7. Water tank outlets and ventilation openings free ?
8. Fuel contents checked ?
9. Wing fuel tanks (if installed) connected ?
10. Engine checked as per the manual?

Pre take-off check:

1. Fasten parachute ?
2. Fasten safety harness ?
3. Landing gear locked ?
4. Airbrakes locked ?
5. Trim set in take-off position ?
6. Flap set in take-off position ?
7. Altimeter correctly set ?
8. Tail dolly removed ?
9. Check the wind direction !
10. Close and lock the canopy !

4.5 Normal Operation and Recommended Speeds

4.5.1 Power-Plant Control and Self-Launch

Checklist, extending propeller and starting engine

- Fuel valve: OPEN
- Main switch: ON
- Power-plant main switch: ON (ILEC responding)
- Switch "Extend Propeller" engaged upwards?
- Green LED "Propeller extended" on?
- Propeller stop disengaged?
- Ignition: ON
- Check fuel pump (must be heard)!

Cold and warm start on the ground (not too cold)

- Nobody/nothing within the arc of the propeller?
- Move Throttle 1/4 to 1/3 towards "WIDE OPEN"
- Push PRIMER button for 2 to 3 seconds
- Push STARTER button max. 5 seconds
- If engine does not fire, press PRIMER and then STARTER again at 15 second intervals with increasing amounts of priming fuel.
- Check ignition circuits
- If engine fires shortly and seems to stall again, re-press PRIMER only for a second.
- Allow engine to warm through at 4000 RPM for 3 to 4 minutes.

Cold start (very cold, strongly cooled engine)

- Nobody/nothing within the arc of the propeller?
- Set Throttle to "IDLE"
- Push PRIMER button for 2 to 3 seconds
- Push STARTER button max. 5 seconds
- If engine does not fire, press PRIMER and then STARTER again at 15 second intervals with increasing amounts of priming fuel.
- If engine does not fire on the third trial, it may be "overflooded":
  - do not press PRIMER any more
  - set throttle 1/3 towards "WIDE OPEN"
  - shut fuel valve
  - press starter until engine fires
  - re-open fuel valve immediately.
- Check ignition circuits
- Allow engine to warm through at 4000 RPM for 3 to 4 minutes.

Cold and warm start in flight

- Air speed 90 to 110 km/h (49 to 60 kts).
- Move throttle 1/3 towards "Wide Open"
- Push PRIMER button for 2 to 3 seconds
- Push STARTER button max. 5 seconds
- If engine does not fire, press PRIMER and then STARTER again at 15 second intervals with increasing amounts of priming fuel.
- If engine fires shortly and seems to stall again, re-press PRIMER only for a short instant.
- If possible, allow engine to warm through
- Reduce airspeed and move throttle to Wide Open Throttle (WOT). (Watch rate of revolutions!)

Checklist stopping engine and retracting propeller

- Air Speed: 90-100 km/h (49-54 kts)
- Throttle: **IDLE** (bottom position). Wait until low RPM have stabilized.
- Ignition: **OFF**
- Let engine revs. die down.
- Engage propeller stop lever (bottom position). When engaging the stop the propeller must not stand direct above the stop block.
- Wait until propeller runs against the propeller stop block.
- Check vertical position of the propeller by means of the mirror.
- Hold down switch "RETRACT" and let propeller retract only so far that its tip can no longer be seen in the rear view mirror.
  Then after about 2 min. or when the maximum liquid coolant temperature has dropped by 2°C, press again "RETRACT" until the ILEC LED "Propeller retracted" lights.
- Fuel valve: **SHUT**
- Switch off Power-Plant Main Switch by pushing the red lever next to it.

Revolution Rates (RPM) and Speeds

Best climb at $\mathbf{V_y}$ = 95 km/h = 51 kts (blue line).
Cruising speed 135 km/h (73 kts) at 6900 rpm.
Maximum continuous revs: 6900 rpm.

The power-plant of the ASH 26 E gives the possibility to self-launch with good climbing performance, extending the operational range of a pure sailplane. It is advisable to familiarize oneself with the extending and starting procedures in the first instance within safe reach of an airfield, before attempting a cross country flight. The power-plant of a powered sailplane must not be regarded as a life insurance, ing unlandable areas. One should always be prepared for the possibility that the power-plant will fail to deliver the hoped-for propulsion. This may not necessarily be due to a technical shortcoming, but might be caused by nervous tension of the pilot (mistakes in carrying out starting procedure). The engine and its reliability should be regarded in the same light of a sailplane pilot's experience as that a thermal is not necessarily found when it is most urgently needed. The engines of powered sailplanes are not subject to quite such stringent production and test regulations as normal aviation engines, and therefore cannot be expected to be quite so reliable.

A minimum safe height for extending the propeller and starting the engine must be met. The criterium is that it must be possible to retract the propeller again and carry out a normal sailplane outlanding if the engine cannot be started. A valid value for this minimum safe height is about 300 meters (980 feet); however, this is depending also strongly on pilot ability and geographic factors.

(1) Extending the Power-Plant

Proceed as per checklist.
Do not extend the propeller at higher g-loads.
G-loads can increase, for instance while circling, to such an extent that the electric jack can only extend the propeller very slowly, or fails to do so fully.
Speeds for retracting and extending the propeller are given in Section 2.

(2) Starting the Engine

WARNING: A test run of the power-plant must <u>under no circumstances</u> be performed <u>without</u> the aircraft being completely rigged and safely chocked. Also a competent person must be securely strapped in the cockpit.

CAUTION: The local conditions for a safe take-off should be checked prior to take-off in accordance with the data given in Section 5 of this manual

Proceed in accordance with checklist.
If the engine fails to start, check it over as recommended in the Engine Manual.
It makes no sense to press the STARTER button for more than 5 seconds because the engine fires only if sufficient fuel has been primed. Therefore, after the 5 seconds first fuel should be primed again. If the engine still does not fire, this should be repeated again at 15 second intervals with increasing amounts of priming fuel.
If however, white smoke is observed to come out of the exhaust silencer already on the third trial and still no firing happened, then the engine is "overflooded". You must not prime any more fuel. Instead move throttle to 1/3 towards "WIDE OPEN", shut the fuel valve, and press STARTER until engine fires. Then immediately re-open the fuel valve.

Check ignition circuits. The RPM must not drop by

more than 200 RPM.
Allow engine to warm through at 4000 RPM for 3 to 4 minutes on ground; the coolant temperature should then be around 60 °C (140 °F). This way it will be ensured that the engine will smoothly accelerate to max. RPM.
With temperatures below -10 °C (14 °F) the engine should not be started because there is the danger with a very cold engine that the lubricant oil is too thick and thus the oil feed into the engine could be interrupted.

(3) Self-Launch

For a safe self-launch maximum engine revolutions should come up to at least 7000 rpm on the ground. With lower revolutions the pilot must face longer take-off distances than indicated in Section 5.2.3.

WARNING: If maximum revolutions reached on the ground are distinctly below 7000 rpm, the aircraft must not take off any longer. First the carburettor adjustment must be checked and again a test run of the power-plant on the ground must be done.

Experienced pilots should start their take-off run at the most negative flap setting 1. This flap setting affords excellent lateral control. At an indicated air speed of about 50 km/h = 27 kts the flap should be increased to Flap 4 (+23 °). For the remainder of the climb Flap 4 should be maintained.

For pilots without experience of flapped aircraft, we recommend setting Flap 4 both during take-off and throughout the climb.

For the acceleration run and actual lift-off, the following .....

For the acceleration run and actual lift-off, the following practises apply for different runway characteristics:

- **Concrete runways:**
Accelerate with "Wide Open" throttle in flap setting 2 and slightly push the stick until the tail wheel is unloaded. Up to a speed of about 50 km/h (27 kts) acceleration continues on the main wheel, then set flap 4 and at the same time gently pull the stick until the aircraft lifts off. After lift-off, climb to between 1 m and 2 m (3 and 6 ft) and accelerate then slowly to v_Y.
But in case of crosswind the procedure differs and the tailwheel is loaded by slightly pulling the stick in order to increase directional stability during the ground run.

- **Soft surface runways:**
Use flap setting 2 and by pulling the stick try to keep the tail wheel in contact with the ground until the aircraft lifts off. This is in order to reduce the load on the main wheel.
As early as possible change to flap 4 and at the same time gently pull the stick until the aircraft lifts off. After lift-off, climb to between 1 m and 2 m (3 and 6 ft) and accelerate then slowly to v_Y.

Maximum acceptable crosswind components are stated in Section 5.3.1.

(4) Climbing Flight

During climbing flight, the engine should be run at maximum 7500 rpm at v_Y = 95 km/h = 51 kts (blue line on ASI scale).

(5) Cruising Flight

This can be carried out in a saw-tooth pattern (climb followed by straight glide with propeller retracted), or in horizontal flight at 6900 rpm and an air speed of 135 km/h (73 kts). Monitor fuel reserves and open wing tank valve if appropriate.

CAUTION: The wing tank(s) valve will switch off automatically only if the tank selector switch is set to "AUTO" position. With manual position "ON" selected the valve will not close when the fuselage tank is full and fuel will be lost via the overflow vent! Therefore, the fuel level indicator must be monitored and the wing tank(s) valve closed in good time.

CAUTION: If wing fuel tank(s) are fitted, check that the oil supply is sufficient for the whole intended fuel contents. Monitor oil warning light!

A detailed description of the ILEC engine control unit is given under Section 7.9!

(6) Stopping the Power-Plant

CAUTION: To avoid damage to the propeller the procedures described hereafter must be met!

With normal outside air and engine temperatures the flight testing has shown that there is no need for ...

Only with very high engine and outside air temperatures it is actually necessary to do a longer cooling run which must then be done in fast level flight. The engine revs must be adjusted between 6600 and 6900 RPM at a speed of about 130 km/h (70 kts). Contrary to a cooling run with the engine idling, the cooling water pump and cooling air fan have still a sufficient function at these RPMs; as the throttle setting of about 50 % results in less combustion heat inside the engine, there is a good transport of the heat to the outside.
A longer cooling run at lower flight speeds and with the engine idling <u>must not</u> be done, because then the exhaust heats up strongly (the Venturi at the exhaust pipe does no longer supply sufficient cooling air through the Carbon fiber fairing of the exhaust).
Although the higher temperature of the exhaust silencer does not mean a problem per se for the structure of the fuselage, but if after this cooling run the propeller is at once completely retracted without waiting period, then the hot air from the exhaust may damage the propeller and impair its service life.

(7) Retracting the Propeller

Ony after the engine rpm's have almost completely died down and the propeller is only yet wind-milling the propeller stop block must be swivelled into the arc of the propeller.
Max. speed here is 120 km/h (65 kts).

In order to avoid damage to the propeller the pilot must not dispense with the progressive retraction of the propeller. This serves to better cool down the power-plant and the exhaust. Particularly with high outside air temperatures the pilot must not do without this.
In practical operation the following procedure has proven good:
After engine shut-off the liquid coolant temperature first increases a little, because the coolant is no longer circulated and the temperature sensor is fitted direct at the engine housing where it immediately indicates its temperature. As the degree of cooling down is indicated by this temperature, monitor this temperature and wait until the maximum value has dropped by about 2 °C. Only then the propeller may be completely retracted without any problems..

(8) Approach and Landing

Preferably carried out with propeller retracted.
If the electric power supply fails, it is possible to land with the propeller extended. Ignition and Power-Plant Main Switch must be OFF, the fuel valve CLOSED and the propeller stop lever ENGAGED.

If the propeller is still extended, the increased sink speed should be borne in mind. As a general guideline, a basic sink speed of about 1.5 m/sec (295.3 fpm), with propeller stationary and at flap setting 4 and 100 km/h, may be assumed. It may be possible to do without use of the air brakes during the landing, and a firmer round-out and hold-off will be needed.

4.5.2 Winch- and Autotow-launching

The C.G. tow release coupling must be used for winch launching and **Flap setting 3** (+10°) is recommended.

CAUTION: Because of its high positive deflection the flap setting 4 must not be used.

Trim should be set neutral to nose-heavy at any C.G. position. At this trim setting the ASH 26 E will assume a gentle climb attitude. With high-powered winches which tend to jerky accelerations, the trim should always be set nose-heavy. Above a minimum safe height the climb should be steepened by pulling the stick back.

A weak link of 675 to 825 daN must be incorporated in the launch cable.
Maximum acceptable crosswind component is 20 km/h = 10.8 kts.

NOTE: The wheel CANNOT be retracted during the launch.

CAUTION: Winch launching with water ballast is not recommended at less than 20 km/h = 10.8 kts headwind component. The winch driver must be informed of the total Take-Off Mass.

CAUTION: Before Take-Off, check seating position and that controls are within reach. The seating position, espe-

cially when using cushions, must preclude the possibility of sliding backwards during initial acceleration or steep climb.
The safe engagement of the adjustable back rest must also be checked.

WARNING: We expressly warn against attempting any launch by an under-powered winch in a tail wind!

4.5.3 Aero Tow

For aero tows only the nose tow release coupling must be used. This is a requirement of JAR 22.
The recommended flap setting for aero towing is **Flap 3.**
Trim should be set nose-heavy.
A tow rope of between 40 m and 60 m (135 ft and 197 ft) long, but not less than 40 m (135 ft) in length should be used.

Experienced pilots should start their take-off run at the most negative flap setting 1. This flap setting affords excellent lateral control. At an indicated air speed of about 50 km/h = 27 kts the flap should be increased to Flap 3 (+10 °) or, on short take-off runs or when carrying water ballast, to Flap 4 (+23 °). For the remainder of the tow, Flap 3 should be selected for reasons of trim loads.
For pilots without experience of flapped aircraft, we recommend setting Flap 3 both during take-off and throughout the aero tow.

For the actual lift-off, the following practise has proved satisfactory:

Try to keep the tail wheel in contact with the ground until the aircraft lifts off. This increases not only directional stability during the ground run, but helps the aircraft to lift off at the earliest possible moment.
After lift-off, climb to between 1 m and 2 m (3 and 6 ft) in order to avoid pitch oscillations caused by ground effect and slip stream turbulence from the tug.

NOTE: Inform tug pilot of minimum towing speed.

T/Off Mass	Recommended Towing Speed
430 kg (948 lb)	115 km/h (62 kts)
525 kg (1158 lb)	125 km/h (68 kts)

Maximum acceptable crosswind component: 20 km/h = 10.8 kts.

4.5.4 Free Flight

CAUTION: Flights in conditions conducive to lightning strikes must be avoided as aircraft certified under JAR 22 are not approved for such conditions.

Use of Flaps

Flap control allows improved adaptation of the aircraft to suit changing flight attitudes.
Flap settings 1, 2 and 3 are straight flight settings and are the best settings in high speed flight throughout overlapping speed ranges.

Flap setting 4 is purely for use while circling.
The optimum flap settings at various speeds depend very much on the wing loading. The effect of the take-off mass at any one time on the appropriate speeds for the various different flap settings is shown in the diagram in Section 5.3.4 (Optimum-Performance Flap-Setting Ranges).

As the flap setting will directly influence 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.

When circling, remember that the stalling speed will increase compared to that in straight flight at the same flap setting.
As a general guideline, you should expect the stalling speed to increase by 10 % at about 30° bank, and by 20 % at about 45° bank.

Low Speed Flight and Stalling Behaviour

The ASH 26 E behaves normally in slow and stalled flight. With all C.G. positions flow detachment at the fuselage and horizontal tail buffeting will give warning of an impending stall.

With all C.G. positions, about half of maximum aileron deflection can still be applied, with rudder centralised, to maintain the aircraft in straight stalled flight. It would, of course, be more appropriate to control the aircraft by means of rudder alone, and to leave the ailerons centered.

Violent applications of rudder or aileron would result in a spiral dive, spinning or side slipping, depending on C.G. position.

CAUTION: Height loss due to incipient spin from straight or circling flight depends largely on the all-up flight mass:
Height loss from straight flight after prompt recovery action

$$\approx 40\text{ m} = 132\text{ ft !}$$

Height loss from circling flight:

$$\text{up to } 150\text{ m} = 495\text{ ft !}$$

More specifically, the following would apply:

C.G.position	Flap	Rudder & Aileron Coordinated	Rudder & Aileron Crossed
rearmost	3 - 4	steady spin	steady spin
central	3 - 4	spin, leading to spiral dive	spin, leading to slipping turn
foremost	3 - 4	approx. half turn of spin, leading to spiral dive	slipping turn

See also Section 3.5 in this manual.

With winglets fitted the above specifications for spin behavior do not noticeably change.

Wing drop from circling flight is not noticeably more violent than from straight flight.
Height loss during one spin turn may come up to 150 m. For recovery from spinning up to 140 m will be required in the most unfavorable case.

4.5.5 Landing Approach

Make the decision to land in good time and, notwithstanding the high performance, select Flap 4 and lower the wheel at not less than 100 m = 300 ft above ground.
For the remainder of the circuit, maintain about 90 km/h [49 kts] (yellow triangle on ASI scale).
The aircraft should be trimmed to between 90 and 100 km/h [49 - 54 kts]. In turbulence, the approach speed should be appropriately increased.

CAUTION: Only when you are quite certain of being able to reach the boundary of the landing area in a straight approach should landing Flap L (+38°) be selected.

At air speeds above 100 km/h (54 kts) the control forces required to engage Flap L will noticeably increase. It is, therefore inadvisable to engage landing Flap L at more than 100 km/h. These high control forces are generated by the very positive camber of the flaps. These deflect downwards by 38°, whereas the outboard ailerons deflect to -6°. This marked wing wash-out greatly increases the natural sink of the aircraft, especially at air speeds between 120 and 130 km/h (65 and 70 kts).

By changing pitch attitude (forward or back stick pressure) the glide angle can be further varied to a large degree.

In addition, glide path control can, of course, be exercised in the normal way by means of the airbrakes.

NOTES:

- In a strong headwind, use of landing flap setting L is NOT recommended, due to the danger of undershooting the landing area !
- If you are not familiar with the use of the flaps as a landing aid, you should initially only use Flap 4 for a landing into a headwind.

CAUTION: The danger of a sudden drop makes it inadviseable to reduce flap setting near the ground. This also applies to a reduction from landing flap L to Flap 4.
Such a reduction of landing flap when in danger of undershooting must only be employed above a safe height (at least 40 m = 131 ft), a safe speed (at least 95 km/h = 52 kts), and after practising the maneuver at greater heights.

4.5.6 Landing

Before landing, water ballast must be jettisoned.

In an emergency (eg: abandoned take-off), structural strength will prove adequate to a landing at maximum all-up flight mass.

In normal service, however, it is on principle recommended to jettison water ballast prior to landing in order to increase the safety reserves.

If approaching in a steep attitude with landing flap L selected, remember to round out in time to allow a clean 2-point touch-down.
Immediately before touching down, the airbrakes setting may be reduced a little so as to avoid touching down with wheel brake too firmly applied.

In a crosswind, landing flap setting L is advised as it will help in controlling the crosswind effect.
During the ground run the stick should be held fully back for better directional stability in crosswinds, and to prevent the tail from lifting due to hard application of the wheel brake.
The flaps may be left in landing setting, as the negative aileron deflection will provide adequate lateral control until the aircraft comes to a stop. If Flap 4 was used for the landing, it is advisable to engage Flap 1 after touch-down.

When parking the aircraft, engage Flap 3 in order to save the elastic sealing strips over the wing control surface gaps from wear.

4.5.7 Flying with Water Ballast

For normal European weather conditions, the wing loading of the ASH 26 E is already at its best even without additional water ballast.
If achieved lift is markedly greater than 2 m/s = 400 ft/min, wing loading can be increased up to about 45 kg/m^2 = 9.2 lb/sqft by use of water ballast.

NOTE: Remember that ballast load will increase the stalling speeds and take-off runs. Also the rates of climb are reduced (see the tables in Sections 5.3.3 and 5.3.4.)
Ensure that the condition of the air-field, the length of take-off run available and the power of the tug or winch permit a safe launch.

Filling of Water Ballast

The water ballast lever at the right cockpit wall behind the landing gear lever opens the valves.

Start by filling the tank of the wing with its tip on the ground. The design of the tank vents will allow the wing to vent best in this position. When the tank is full, the filler opening must be sealed by means of the stopper with marking tape supplied, because both the corresponding left and right valves must remain open during filling. This is an important LBA requirement to prevent inadvertent draining of only one tank.

Now the other wing tip is put down while its tank is filled. The valves should then be closed and the stopper with marking tape removed from the wing whose tank was filled first.
With wings level, carry out a balancing test to check that the ballast loads are even. Should one wing prove to be heavier, block the opening of the lighter wing briefly by hand or stopper while opening the valves until equilibrium is achieved.

WARNING: It is expressly prohibited to use pressurised water (mains, immersion pumps etc.) for filling ballast tanks due to possible damage to the wing structure!
It is recommended to fill from slightly elevated, <u>unpressurised</u> containers (on wing or car roof etc.). If water under pressure is used, it is essential to interpose an open intermediate vessel (funnel etc.), to ensure that the head-of-pressure cannot rise beyond 1.5 m = 4,9 ft.
For **self launch** a take-off weight of 525 kg (1158 lbs) is allowed and as the take-off distance depends so strongly on the all-up weight, the amount of water filled into the bags must really be carefully checked (use calibrated containers or a water meter). See also **Maintenance Manual** Section 12.2.

If the wings are filled to capacity, it can happen that the tanks slowly drain through the vents while the aircraft is parked. In this case we recommend that the wingtips should be supported level, but on no account to tape up the vents !

The maximum water ballast volume can be calculated as follows:-

Maximum all up Weight	525[kg] (1158 lbs)
less Empty Weight	xxx[kg] (xxx lbs)
less Cockpit Load (incl.Fuel)	xxx[kg] (xxx lbs)
= max. water ballast volume in [kg=litres] or lbs	

You will find a table with precise values in Section 6.2.

Jettisoning of Water Ballast.

To jettison water ballast the lever at the right cockpit wall is pulled forwards.
Attention must be paid to symmetric flight behaviour. If no change is noticed, it is certain that water is draining from both open valves constantly.

We distinguish between two types of circumstance in which ballast is normally released.

1. Gradual reduction of wing loading:
   The mean rate of drainage amounts to 0.5 l/sec (0.13 US Gal/sec), higher if tanks are full, less if they are nearly empty. After an appropriate lapse of time the valves should be closed.

2. Rapid ballast jettison:
   The full tanks will take about 5 1/2 min., ie: approx. 340 seconds, to drain. The first half of the ballast will drain in about 2 minutes, while the remainder will take about another 3 1/2 minutes.

Should the ballast fail to drain as intended, the valves should be closed immediately. Try again to achieve even drainage by operating the valves again or, if icing is suspected, after descending into warmer air.
If this fails after several attempts, the situation should be regarded as an emergency, and instructions in Section 3.9 should be followed.

4.5.8 High Altitude Flight

Flutter tests were carried out at about 2000 m msl (6562 ft). As the ASI under-reads at increasing altitude, but since flutter limits for light aircraft are determined by the true air speed, the following limitations apply to high altitude flights :

Maximum Speed VNE in high altitude	
Flight Height msl	V_{max} Indicated
0-3000 m (9843 ft)	270 km/h (146 kts)
< 5000 m (16404 ft)	230 " (124 ")
< 7000 m (22966 ft)	210 " (113 ")
< 9000 m (29528 ft)	185 " (100 ")
<11000 m (36089 ft)	165 " (89 ")
<13000 m (42651 ft)	140 " (76 ")

If above airspeed limits given as IAS are regarded the true air speed above 3000 m altitude will remain constant at 300 km/h = 162 kts. Therefore, in spite of a considerably lower airspeed reading, the actual speed achieved relative to the ground will be adequate for penetrating even against strong headwinds at greater altitudes.

WARNING: Avoid long flights at temperatures below -25°C (-13 °F), as the anti-freeze in the liquid coolant is only effective until such temperature.

WARNING: Cold engine oil becomes so thick that the lubrication feed can fail.

When the engine has been running and is retracted, our experience is that its normal operating temperature will cool down only slowly and makes a short-time engine operation in colder air still possible.

WARNING: A too cold liquid coolant becomes thick and may obstruct the radiator. This would lead in a very short time to increased engine operating temperature. The engine must then be switched off and the pilot must wait until the warm power-plant components have warmed up the radiator.

WARNING: Flights in icing conditions are not advised, especially if the aircraft is wet before climbing through icing level. Experience suggests that drops of moisture on the surface will be blown back, lodge in the control gaps, and there dry comparatively slowly.
This may cause the controls to become stiff to operate, or in extreme cases, jam them. A single climb through icing level (0°C) with a previously dry aircraft, on the other hand, is not likely to impair the use of the controls even if heavy icing-up of wing and tail unit leading edges occurs.
When carrying water ballast, avoid flying above icing level due to the danger of iced-up outlet valves, or in extreme cases bursting of wings due to ice formation.

4.5.9 Flight in Rain

Rain drops, frost and ice impair the aerodynamic qualities and also alter the flying behaviour.
Therefore the quoted minimum speeds for straight and circling flight should, in such conditions, be increased by some 10 km/h = 5.5 kts. Air speeds should not then be allowed to drop below these values.

Rain drops must be removed from a wet aircraft before take-off.
Do not fly into icing conditions with a wet aircraft. In this context, see also para 4.5.8 above.

SECTION 5

5.1 Introduction

This Section contains LBA-approved data relating to ASI indication errors and stall speeds, and also additional data and information which do not require approval.

The data in the charts and tables were established by means of test flights with a powered sailplane in good condition, and based on average pilot ability.

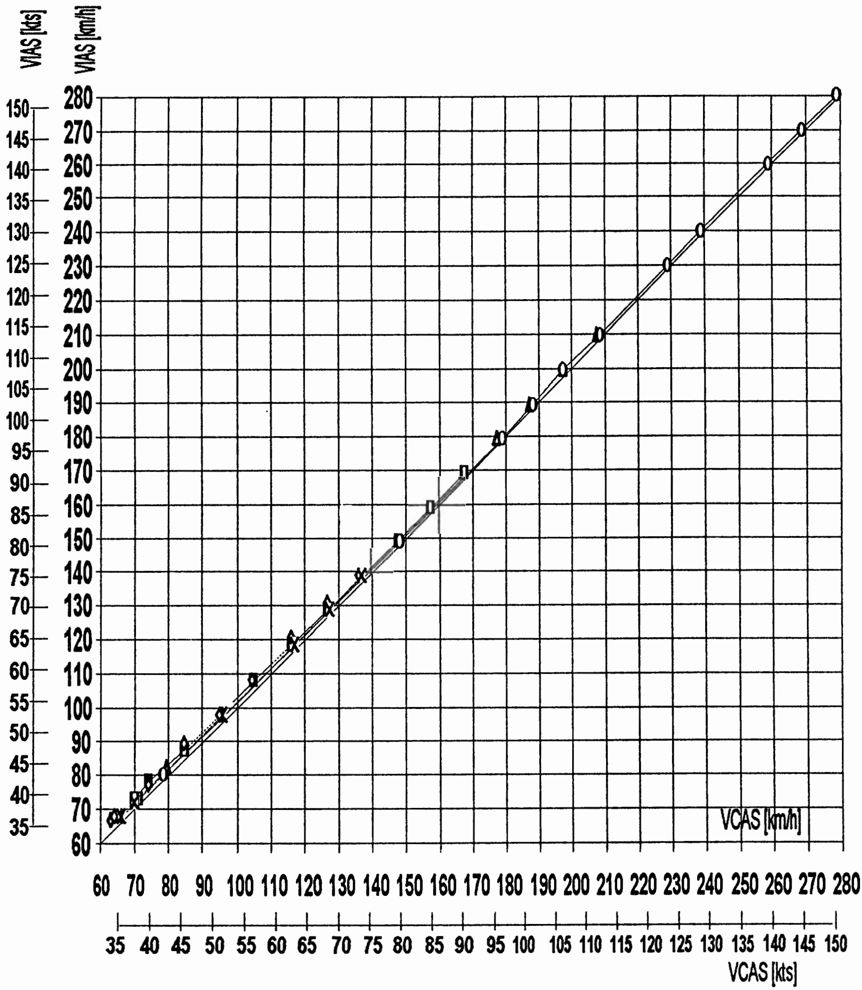
5.2 LBA-Approved Data

5.2.1 ASI Indication Errors

Below an indication of 120 km/h = 65 kts the ASI is subject to only show a minimal indication error. The deviations are within an over-indication of about 3 to 4 km/h = 1.5 to 2 kts, and so within the range of acceptable instrument error of a good ASI.
Upwards of an indication of 120 km/h the instrument error is negligible.

NOTE: The ASI must take its pitot pressure from the pitot tube in the fuselage nose, and static pressure from the static ports in the fuselage tail boom.

CAUTION: The following diagram only shows the position error of the ASH 26 E pressure system, however, does not include the ASI instrument error.



V_{IAS} = Indicated Air Speed

V_{CAS} = Calibrated Air Speed

5.2.2 Stall Speeds

Stall Speeds in km/h (kts) Indicated Air Speed :-

Flap Setting	Flight Mass 347 kg *) (765 lb)		420 kg (926 lb)		525 kg (1158 lb)	
	km/h	(kts)	km/h	(kts)	km/h	(kts)
Flap 1	77	(41.5)	85	(46)	95	(51)
Flap 2	76	(41)	83	(44.8)	93	(50)
Flap 3	65	(35.1)	72	(38.9)	80	(43)
Flap 4	62	(33.5)	68	(36.7)	77	(41.5)
Flap L	56	(30.2)	62	(33.5)	69	(37.2)
Flap L & Airbrakes	59	(31.8)	64	(34.5)	72	(38.9)

*: can be obtained only with power-plant dismantled!

1. The speeds indicated are valid for the aerodynamically clean aircraft.

2. With all C.G. positions, a stall warning in the form of horizontal tail buffeting will commence at about 5 % above stalling speed. When the propeller is extended, this will be masked by the turbulence caused by it.

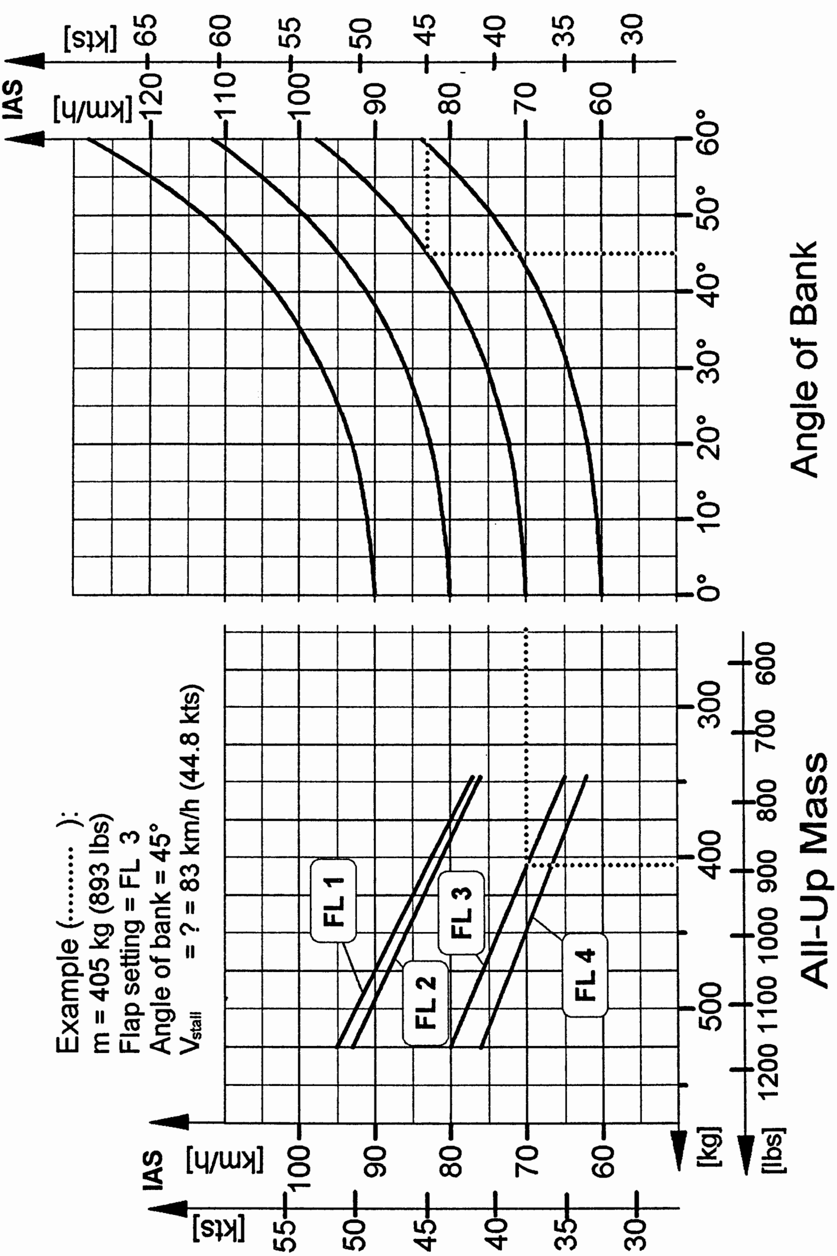
3. Extending the air brakes increases the stalling speed in level flight by about 6 kmh = 3.3 kts.

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

5. With maximum cockpit load and Flap 1 selected the height loss can be up to 60 m (197 ft) until stall is terminated.

6. Height loss from circling flight until recovery from stalled flight can be up to 150 m (493 ft).

Stalling Speed Diagrams



5.2.3. Take-Off Performance

The take-off performances given below are applicable to take-offs on hard and level grass runways and for the aircraft, propeller, and engine in good condition and for the following conditions:

Airfield elevation	0 msl	
Temperature	15°C	59°F
Air pressure	1013°hPa	29.92°in.merc.
Take-off mass (with water ballast)	525 kg	1158 lb
Speed to climb over 15°m (= 50°ft) obstacle (**V**$_{IAS}$):	95 km/h	(51 kts)*

* After safety altitude is reached, climb with **V**$_y$ = 95 km/h = 51 kts.

	GRASS RUNWAY:	HARD RUNWAY:
Take-off roll	195 m	160 m
	640 ft	525 ft
Take-off distance to 15°m (50°ft) height	305 m	270 m
	1001 ft	886 ft

The influence of air temperature and air pressure (airfield elevation) on take-off performance is given in the take-off charts. (See Section 5.2.3.1.)

CAUTION: In rain (wet wings) or with frost or ice on the leading edges, the aerodynamic quality of the aircraft is drastically reduced.
Take-off is prohibited!
First wing and tailplane must be cleaned !

- A tailwind as well as an uphill runway increases the take-off distances considerably. The possibility of abandoning the take-off must be considered. See also Section 4.5.1(3).

5.2.3.1 Take-off Charts

CAUTION: For other runway surface conditions such as wet grass, soft ground, high grass, wet snow, water spots, etc., which are not given in these charts, it is recommended to use the additional distance factors or percentages given in the AIP (Airport) Manual Volume 1 !

For pilots inexperienced in self-launch the following observation may be helpful for estimating a safe self-launch:
The flight testing of the ASH 26 E demonstrated that take-off and climb characteristics during self-launch are slightly better than for an aerotow behind a powerful 132 kW tug aircraft (eg: Robin DR 400). If therefore a safe aerotow may be expected, there will neither be any problems for the self-launch.

The following charts give values for various airfield elevations and temperatures.

S_R = Take-off roll
S = Take-off distance to 15 m (50 ft) height

Take-Off Mass 525 kg (1158 lbs)

Pressure Altitude m	msl ft	Temperature °C	°F	S_R Take-off roll distance Hard surface m	ft	Grass m	ft	S Take-off dist. to 50 ft height Hard surface m	ft	Grass m	ft
0	0	-15	5	119	391	145	476	201	659	227	745
0	0	+0	32	139	455	169	554	234	767	264	867
0	0	+15	59	160	525	195	640	270	886	305	1001
0	0	+30	86	183	601	223	733	309	1014	349	1146
500	1640	-15	5	140	459	170	559	236	774	266	874
500	1640	+0	32	163	534	198	650	274	900	310	1017
500	1640	+15	59	188	615	229	750	317	1039	358	1173
500	1640	+30	86	215	704	262	858	362	1189	409	1343
1000	3281	-15	5	164	539	200	657	277	909	313	1027
1000	3281	+0	32	191	627	233	764	322	1057	364	1194
1000	3281	+15	59	220	722	268	880	372	1219	420	1377
1000	3281	+30	86	252	826	307	1007	425	1394	480	1575
1500	4921	-15	5	193	634	236	773	326	1070	368	1209
1500	4921	+0	32	225	737	274	898	379	1243	428	1404
1500	4921	+15	59	259	849	315	1034	437	1432	493	1618
1500	4921	+30	86	296	970	360	1183	499	1638	564	1850
2000	6562	-15	5	228	747	277	910	384	1260	434	1424
2000	6562	+0	32	264	867	322	1057	446	1464	504	1653
2000	6562	+15	59	304	999	371	1217	514	1685	580	1904
2000	6562	+30	86	348	1141	424	1391	587	1926	663	2176
2500	8202	-15	5	269	881	327	1074	453	1487	512	1679
2500	8202	+0	32	312	1022	380	1246	526	1725	594	1949
2500	8202	+15	59	359	1177	437	1434	605	1986	684	2243
2500	8202	+30	86	410	1344	499	1638	691	2268	781	2562
3000	9843	-15	5	317	1040	387	1268	535	1756	605	1983
3000	9843	+0	32	368	1207	448	1471	621	2037	701	2301
3000	9843	+15	59	423	1388	516	1692	714	2343	807	2647
3000	9843	+30	86	483	1585	589	1932	815	2675	921	3022

5.2.4 Flight Performance with Engine Running

Climb Rate:
At msl and normal atmosphere the ASH 26 E climbs at a rate of 3.4 m/s (669.3 ft/min) at the best climb speed $\mathbf{V_y}$ = 95 km/h (51 kts) and at a maximum take off mass of 525 kg (1158 lb).

Cruise:
Cruise speed is $\mathbf{V_H}$ = 135 km/h (73 kts) at 6900 RPM.

Range:
With a full fuselage fuel tank the engine running time is about 1 hour when climbing three times in a saw tooth flight to approx. 3000 m (9843 ft). The climb is done each time for five minutes at 7000 RPM and then with throttle back to 6900 RPM. Climb speed is $\mathbf{V_y}$ = 95 km/h (51 kts). During this hour a distance of about 95 km will be flown and a theoretical flight height in saw tooth flight of 8600 m (28.215 ft) is gained.

If this height is glided at the best L/D, another 430 km (267 miles) adds to the 95 km (59 miles). The maximum range is then 525 Km (326 miles) under the following conditions:

Climb rate 3.2 m/s (629.93 ft/min) at 7500 RPM,
medium flight height 500 m (1.640 ft)

Climb rate 2.1 m/s (413.4 ft/min) at 6900 RPM,
medium flight height 1500 m (4.921 ft)

in each case with standard temperature, max. take-off mass and with a fuel usage of 16.0 l/h (4.23 US Gal/h); i.e. 15 minutes at 7500 RPM and 45 minutes at 6900 RPM.

The carburettor adjustment, the fuel type and the aerodynamic condition of the aircraft may have a considerable influence on these results. Therefore, these examples should serve as a guidance only.

If fuel tanks are fitted in the wings, the fuel capacity is increased by each 15 liters (3.96 US Gal) per tank.

In cruise flight at $\mathbf{V_H}$ = 135 km/h (73 kts) and at 6900 RPM with a resulting fuel usage of 9.7 liters/h a flight time of approx. 98 minutes is reached when using 16 liters out of a full fuselage tank. This gives a range of 220 km (137 miles). Fuel for engine warm-up and taxying is not taken into consideration here.
Then there is no height gain which can be used for glide.

5.3 Additional Information

5.3.1 Demonstrated Crosswind Components

Self Launch	20 km/h	= 10.8 kts
Winch Launch	20 km/h	= 10.8 kts
Aero tow	20 km/h	= 10.8 kts
Landing	25 km/h	= 13.5 kts.

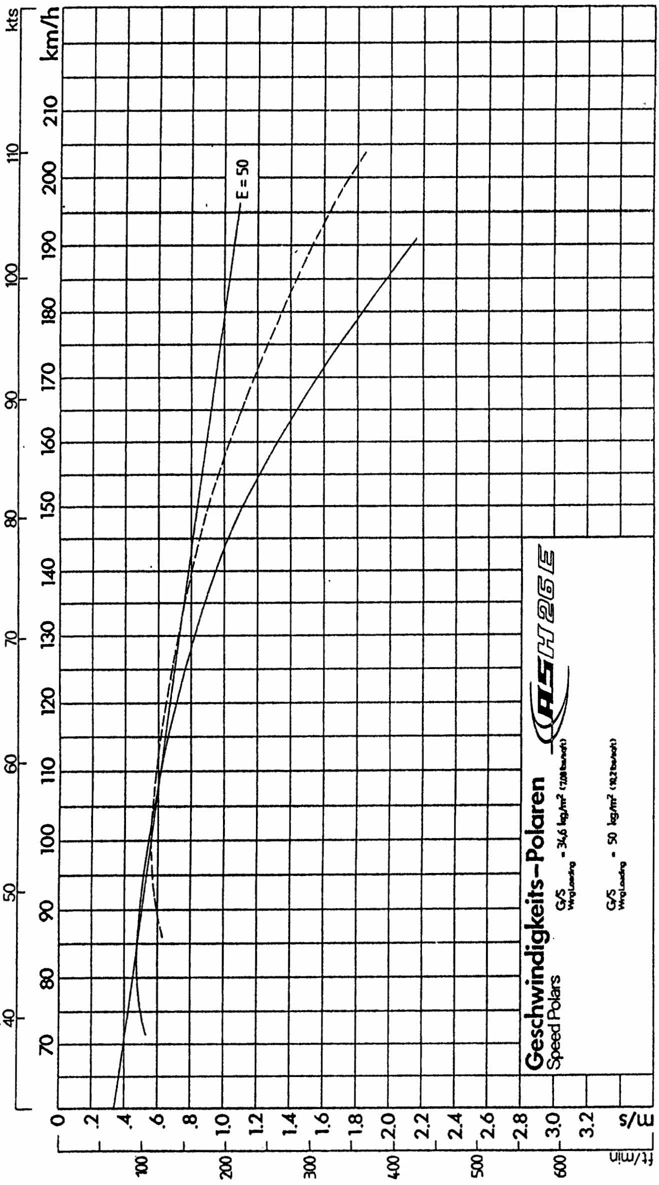
5.3.2 Noise Emission

The noise emission measurements were carried out in accordance with ICAO, Annex 16, Chapter 10, currently effective.

Measurement	Measured Value	Limit Value
Chapter 10	62.4 dB(A)	68.44 dB(A)

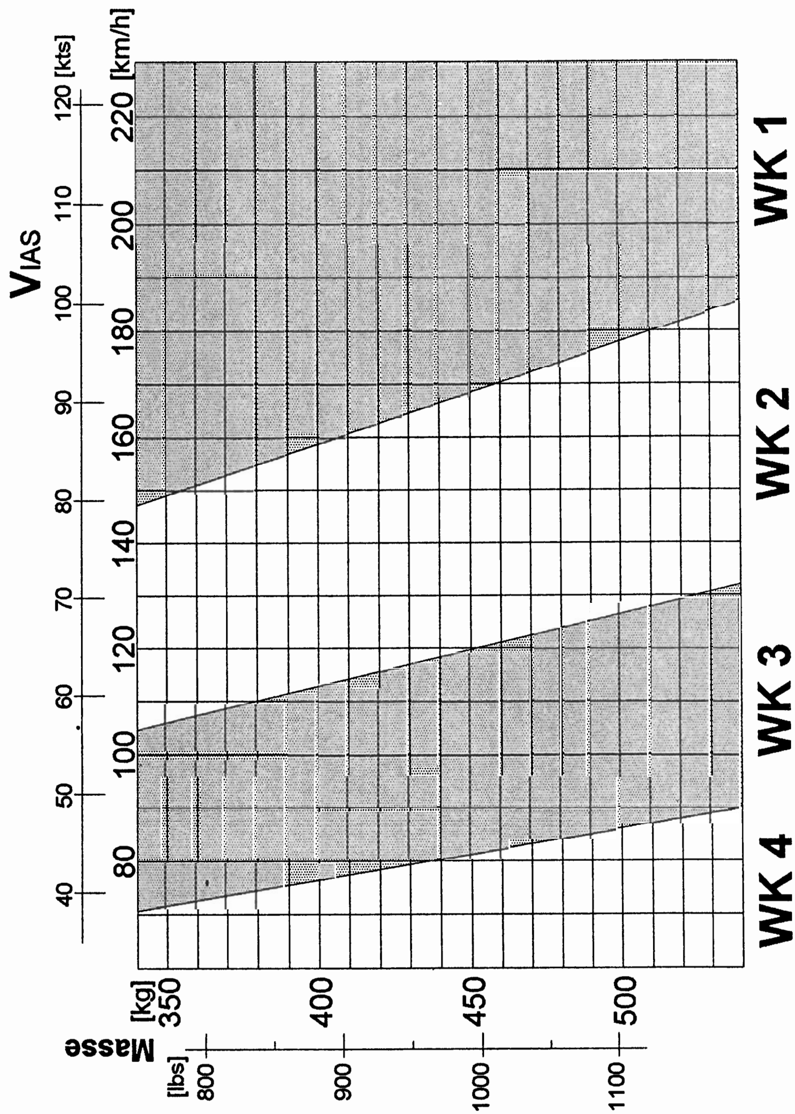
5.3.3 Flight Polars

Calculated Polar:



5.3.4 Optimum-Performance Flap-Setting Ranges

The diagram shown below is derived from the speed polars. ('WK' in the diagram means Flap Setting.)



SECTION 6

6.1 Introduction

This Section describes the limits of load distribution, inside which the ASH 26 E can be safely operated. The data given here apply only to the individual aircraft the serial number of which is specified on the title page of this manual.

Weighing procedure and calculation of permissible C.G. limits, and a list of equipment which must be included in the weighing, are shown in the **Maintenance Manual,** Section 6.

6.2 Mass and Balance Form

The Mass and Balance Form on Page 6.4 in this manual gives the maximum and minimum load in the pilot's seat, and any additional load still permissible for the baggage compartment and the fuselage fuel tank.

These mass and balance data must be calculated in accordance with the currently valid weighing record. The data and diagrams needed for establishing these are to be found in the **Maintenance Manual,** Section 6.

The **Mass and Balance Form** contained herein is valid only for the aircraft bearing the serial number (S.No.) shown on the title page of this manual.

If pilot mass is even less than the minimum stated in the Mass and Balance Form, this can be rectified by means of trim ballast weights fitted in front of the pedal assembly. See also Section 7.13.

Heavy pilots often like to ballast their aircraft for optimum performance to suit their individual weight. A housing is provided for this purpose in the upper part of the fin where any trim ballast, for instance in the form of a battery, may be fitted. If any trim ballast is mounted in the fin, the minimum cockpit load will of course be increased ! This increased minimum cockpit load must then be shown in the DATA and LOADING PLACARD in the cockpit. The lower permissible cockpit load without trim ballast in the fin will be shown only on **page 6.4 of this Flight Manual.**
In the cockpit, an additional placard is to be affixed:

REDUCED MINIMUM COCKPIT LOAD WITHOUT TRIM BALLAST IN THE FIN: SEE FLIGHT MANUAL - PAGE 6.4 !

See also Section 7.13.

The box in the rear of the engine compartment is prepared for a Winter barograph (engine vibration recording type). As this instrument is installed so far behind the C.G. it must be observed in any case for C.G. determination when installed!
An additional placard must be affixed in the cockpit:

REDUCED MINIMUM COCKPIT LOAD WITHOUT BAROGRAPH IN THE ENGINE COMPARTMENT: SEE FLIGHT MANUAL - PAGE 6.4 !

See also Section 7.13.

Mass and Balance Form

applicable to S.No.: ______

Date	Empty Mass [kg]	Empty Mass C.G. Position mm aft of BP	Permissible Pilot Mass with water [kg] min.	Permissible Pilot Mass with water [kg] max.	Permissible Pilot Mass without water [kg] min.	Permissible Pilot Mass without water [kg] max.	Max. Load in baggage compartment or fuel tank [kg]	Certified by stamp/signature

A) Maximum Permissible Loading with Water Ballast for Aero-tow and Winch Launch (table in kg):

Powered Sailplane

Empty Mass [kg]	Pilot mass + Parachute + Fuel (in fuselage tank) + Baggage in [kg] 70	80	90	100	110	120	130	140
350	105	95	85	75	65	55	45	35
360	95	85	75	65	55	45	35	XXX
370	85	75	65	55	45	35	XXX	XXX
380	75	65	55	45	35	XXX	XXX	XXX
390	65	55	45	35	XXX	XXX	XXX	XXX
400	55	45	35	XXX	XXX	XXX	XXX	XXX
410	45	35	XXX	XXX	XXX	XXX	XXX	XXX

XXX: These combinations are precluded as they would cause the maximum permissible mass of non-lifting parts to be exceeded!

Sailplane or Powered Sailplane with <u>POWER-PLANT DISMANTLED</u>

Empty Mass [kg]	Pilot mass + Parachute + Fuel (in fuselage tank) + Baggage in [kg] 60	70	80	90	100	110	120	130
260	full	full	full	full	full	155	145	135
270	full	full	full	full	155	145	135	125
280	full	full	full	155	145	135	125	115
290	full	full	155	145	135	125	115	105
300	full	155	145	135	125	115	105	95
310	155	145	135	125	115	105	95	85
320	145	135	125	115	105	95	85	75

Water ballast loads in excess of 60 liters can be achieved only if four water bags have been fitted (as an optional extra).

B) Maximum Permissible Loading with Water Ballast for Aero-tow and Winch Launch (table in lbs):

Powered Sailplane

Empty Mass [lbs]	Pilot mass + Parachute + Fuel (in fuselage tank) + Baggage in [lbs] 154	176	198	220	243	265	287	309
772	231	209	187	165	143	121	99	77
794	209	187	165	143	121	99	77	XXX
816	187	165	143	121	99	77	XXX	XXX
838	165	143	121	99	77	XXX	XXX	XXX
860	143	121	99	77	XXX	XXX	XXX	XXX
882	121	99	77	XXX	XXX	XXX	XXX	XXX
904	99	77	XXX	XXX	XXX	XXX	XXX	XXX

XXX: These combinations are precluded as they would cause the maximum permissible mass of non-lifting parts to be exceeded!

Sailplane or Powered Sailplane with <u>POWER-PLANT DISMANTLED</u>

Empty Mass [lbs]	Pilot mass + Parachute + Fuel (in fuselage tank) + Baggage in [lbs] 131	154	176	198	220	243	265	287
573	full	full	full	full	full	342	320	298
595	full	full	full	full	342	320	298	276
617	full	full	full	342	320	298	276	254
639	full	full	342	320	298	276	254	231
661	full	342	320	298	276	254	231	209
683	342	320	298	276	254	231	209	187
705	320	298	276	254	231	209	187	165

Water ballast loads in excess of 60 liters can be achieved only if four water bags have been fitted (as an optional extra).

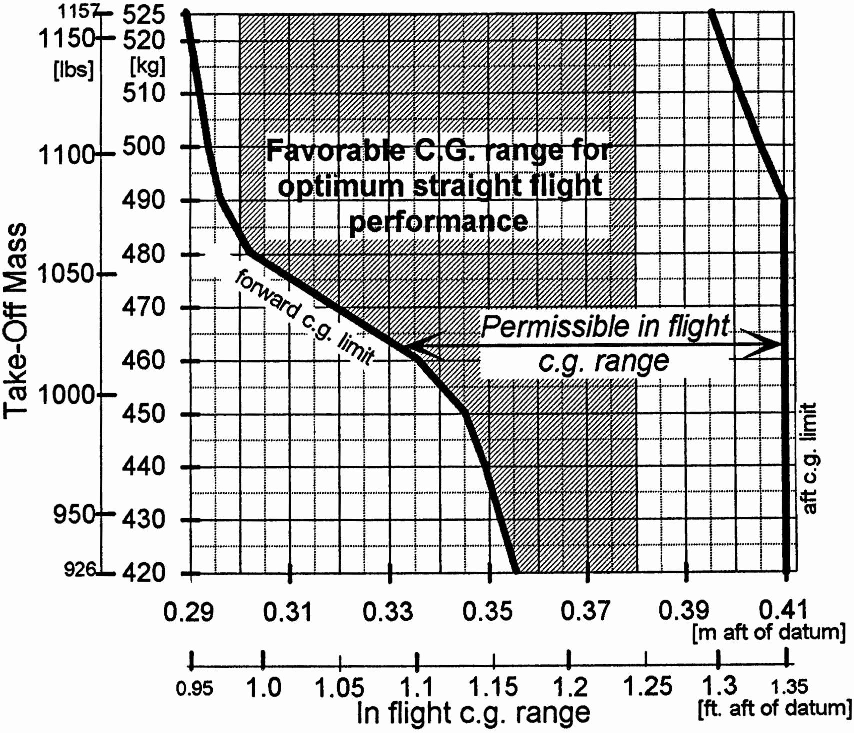
Two water ballast bags fitted in the wing have a combined capacity of 60 liters = 15.9 US Gal.

If the powered sailplane is operated with the power-plant dismantled additional water bags may be fitted in the place of the wing fuel bags (which are also optional extras). The maximum capacity with these four water bags is then approx. 150 l = 39.6 US Gal.

6.3 C.G. Envelopes

The in flight C.G. position has a strong influence on the flying qualities. Forward C.G. positions result in good longitudinal (pitch) stability, whereas rear C.G. positions make the aircraft very maneuverable in thermals, but "pitch sensitive" at high speeds.

The C.G. envelope on the next page shows the approved limits as well as a range of good performance. The C.G. position shift due to water ballast load have been included. This is to make sure that the ASH 26 E remains within the approved limits after the water ballast has been jettisoned.



If the empty mass C.G. diagram according to Section 6 of the **Maintenance Manual** and the Mass and Balance Form, Section 6.2 herein, are observed, the limits given by the above C.G. envelope are not exceeded!

6.4 Equipment List

The ASH 26 E Maintenance Manual includes an Equipment List which states the mass of equipment and their distance to the datum, i.e. Reference Point = BP (from German: "Bezugspunkt").

A list of equipment which must be included in the weighing, is shown under para "weighing procedure" in the Maintenance Manual, Section 6.

Any further additional equipment and data are listed in the weighing record of the aircraft, issued by the C. of A. inspector.

SECTION 7

7.1 Introduction

This Section contains a description of the powered sailplane, its systems and equipment with instructions for use. Details of various ancillary systems and equipment, not included as standard equipment, can furthermore be found in Section 9.

A detailed technical description with overall view drawings can be found in the Maintenance Manual, Section 2.

The principal purpose of this Section is to describe the controls in the cockpit, their layout and labels.

7.2 Airframe

The ASH 26 E wing is equipped with trailing edge flaps over the whole of its span. The inboard flap is defined as a **'camber changing flap'**. When landing flap setting is selected, this flap deflects downwards by some 38°. This flap is also actuated by the aileron control, however, it is deflecting less than the aileron.

The outer flap is called **'aileron'** as it is mainly actuated by the aileron control. In addition the aileron is also deflected in accordance with flap settings.
In landing flap setting, the aileron deflects upwards by about 6°. This helps to keep the ASH 26 E fully controllable during the landing run.

The wing is equipped with vortex generators on the lower surface for the purpose of boundary layer control. The air emitted control. The air emitted through the jet capillaries in the camber-changing flap and in the aileron is fed from the pitot tubes mounted - next to the control surface actuators - on the lower surface of flap and aileron.

7.3 Flight Controls, incl. Flaps and Trim

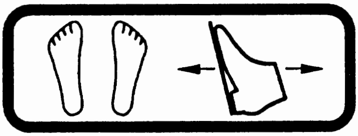
(1) Aileron and Elevator

Both these controls are operated by means of the control column. The stick is also fitted with the trim release lever for setting the trim, and with the radio transmit button.

(2) Rudder

The rudder pedal is adjustable to suit the length of the pilot's legs.

Pedal adjustment:
grey knob right hand side of stick

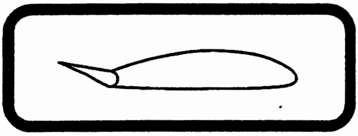


To move pedals aft:
relax foot pressure on pedals and pull them back by the knob. Then release knob and apply pressure to pedals to lock in position.

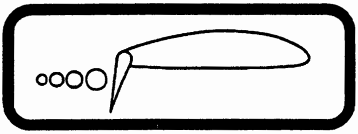
To move pedals forward:
pull knob and push pedals forward with your heels. Release knob and push again to lock in position.

(3) Flap Controls

Flap settings are selected by means of the black handle at the left cockpit wall. Pivot the handle down to unlock so that it may be moved forwards or backwards.
The flap positions are marked 1, 2, 3, 4, and L above the location notches.



Flap in speed flight setting

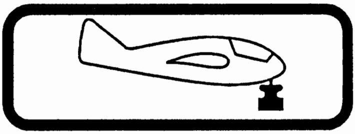


Flap in landing setting

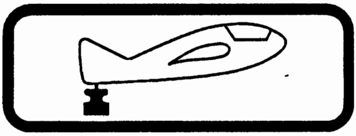
(4) Trim

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 next to the seat.

The trim can also be adjusted by sliding the trim indicator knob to a desired position, if it is first unlocked by pressing the stick mounted trim release lever.



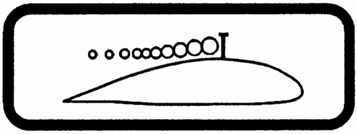
Trim nose heavy



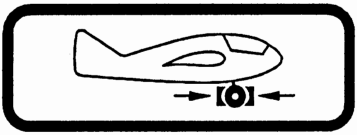
Trim tail heavy

7.4 Airbrake System

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



Pull the blue handle to extend the airbrake paddles.

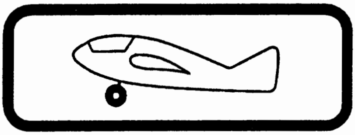


When the airbrake handle is pulled back to its fullest extent, it will also actuate the hydraulic disc brake of the main wheel.

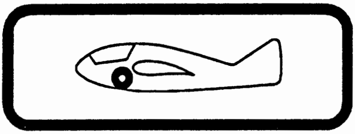
The airbrakes extend on the upper wing surface only.

7.5 Landing Gear System

The landing gear is extended and retracted, and locked at either position, by means of the black handled lever mounted at the right-hand cockpit wall.



Landing gear extended.
(lever forward)



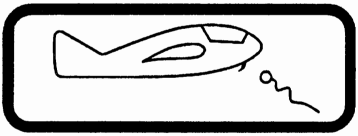
Landing gear retracted.
(lever aft)

Tire pressures:
The values are given in the Data and Loading Placard. This placard is affixed in the cockpit and a copy of it shown at the end of Section 2 of this manual.

7.6 Cockpit, Canopy, Safety Harness and Instrument Panel

(1) Tow Release Couplings

The two release couplings are released by a yellow handle on the top left cockpit wall.



Pull yellow handle!

Pulling the yellow handle will open both of the tow release couplings.
To allow the launch cable to be attached, pull the yellow handle back and then merely release it to allow the tow release coupling to snap shut and lock.

(2) Seat and Seating Positions

The seat including backrest and headrest has been designed in accordance with latest research results from TÜV Rheinland (German Technical Test Institute).
The pilot has achieved his best seating position when his upper thigh rests against the slope of the seatpan with his bottom in the curve beneath. The layout of the anchoring points of the lap belt towards the seat pan is such that a submarining below the lap belt will become unlikely when the pilot has gained the above seating position.
The seat is designed to allow even very tall pilots to sit comfortably. With the appropriate choice of parachute (for tall pilots we would recommend the use of thin parachute packs of the new type) any pilot size should reach a comfortable seating position.

Very short pilots will have to adjust their seating position by means of a stiff cushion (high energy absorbing foams are to be preferred) so that all controls are within comfortable reach and that they sit high enough to have a good view to the outside.
Short pilots have reached a sufficiently high seating position when the instrument panel does not obstruct their view to the front. The instrument panel has been designed such that the front canopy frame can be seen if the correct seating position has been taken.

It is very important for all pilot sizes to adjust the backrest appropriately and to lock it safely so that they are prevented from sliding back during initial take-off (winch launch) acceleration.
For the very same reason it must be ensured that additional cushions are sufficiently stiff.

Watch the correct engagement of the handle for the back rest adjustment!

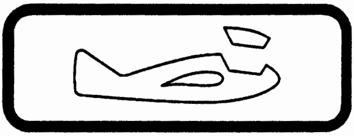
(3) Canopy

The canopy is locked by means of the two white lever handles fitted to the canopy frame at the right and left.

Push white levers forforward to lock the canopy!

To open the canopy, both white locking levers are pivoted to the rear and the canopy is then pushed up.

When the **red** levers mounted at either side of the canopy frame are operated, the canopy emergency jettison is actuated.



To jettison: pull both red levers and push canopy away upwards by means of these levers!

Operating the red jettison levers will automatically open the white locking levers, leaving the canopy resting loose on the cockpit rim.

Following investigations made by Prof.Röger, Technical University Aachen, it was realized that it is necessary to have a device which - in the case of an emergency jettisoning - will keep the rear end of the canopy still down so long until its front end has lifted enough to be blown off backwards. As we did not want to install unnecessary mechanism for providing such a rear fulcrum point, the ASH 26 E now uses a pin fitted into the canopy frame which engages - in a similar way as a push button - into a spring mounted into the fuselage-side canopy rim. See also Section 3.2.

NOTE: If possible, do not leave the aircraft parked or unattended with canopy open, because:

1. The canopy could be slammed shut by a gust of wind which might shatter the perspex.

2. At unfavorable elevations of the sun (from behind) the canopy could act as a lens concentrating the sun's rays, which might ignite cockpit instruments and equipment.

Operating the jettison levers allows the canopy to be removed for easy access when inspecting instruments.

(4) Safety Harness

The safety harness is anchored in such a way that it cannot jam the control runs underneath the seat pan.
The safety harness (shoulder straps, too) should be worn at all times, and should be fully tightened. Check every time that each individual strap is properly secured in the harness lock. The lock should also be tested from time to time to ensure that it can be satisfactorily released under load.

(5) Ventilation:

A ventilation flap is located at the front of the canopy frame.

It is operated by means of the small black knob on the instrument panel. Pull to open.

This flap also serves as a demister.

A further air outlet nozzle is fitted at the right cockpit wall to the right of the instrument panel, which is opened and closed by twisting the rim and the direction of which can also be adjusted.
This air outlet should be closed if the demisting function of the front ventilation flap needs to be made more effective.

(6) Instrument Panel:

For safety reasons, only a GRP panel made in accordance with the factory lamination plan may be used.
Instruments weighing more than 1 daN need further support, in addition to their fixing screws. This can be done by means of aluminum straps fixed to the instrument pod.
Instruments with operating controls must be fitted where they are within reach, when the pilot is strapped in.
Flight monitoring instruments, like ASI and altimeter, must be mounted within the pilots field of view.

7.7 Baggage Compartment

Hard objects must not be carried in the baggage compartment in front or on top of the spar without a suitably designed lashing or anchorage!
If, for instance, a barograph or battery is to be carried in this space, a mounting approved by the manufacturer must be used.

The baggage compartment load must not exceed 15 kg = 33 lb. This is placarded.

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

7.8 Water Ballast System

The water ballast system is not contained in the standard factory equipment and will be installed only if expressly ordered. Retrofitting is possible.
The water ballast valves in the wings are actuated mechanically. The actuating lever is fitted at the right cockpit wall behind the landing gear lever.

Move lever forward: the valves in both wings open at the same time.

In each wing two water ballast bags can be connected to each valve which provides suitable possibilities of better adjusting the ballast system to various tasks.

Normally the outer water bags are sufficient for the powered sailplane ASH 26 E to gain its maximum wing loading. So flexible wing fuel tanks can be installed instead of inner water bags.

If the ASH 26 E is operated with the power-plant removed, the maximum wing loading can only be obtained when fitting the inner water bags.

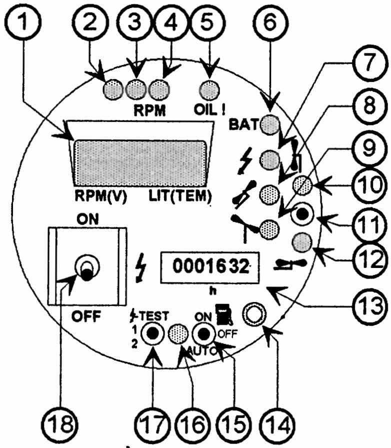
7.9 Power-Plant

The Propeller of the power-plant unit - when retracted - is accommodated in the engine bay in the fuselage behind the wing.
It is extended and retracted by means of an electric jack.

The following control elements are provided for the power-plant :

- the Control Console (beneath the instrument panel in front of the stick,
- the ILEC Control Unit (fitted in the instrument panel),
- the Power-Plant Main Switch (fitted in the instrument panel),
- the Fuel Valve (left to the seat pan)
- and the Rear-View Mirror for Propeller Positioning (on the instrument panel cover).
- and the Fire Warning Light (red blinking light diode in the instrument panel).

Fig.7.9-1 ILEC-Power-Plant Control Unit
Overall View



1 LC Display
2 Green Light Diode for green RPM Range
3 Yellow Light Diode for yellow RPM Range
4 Red Light Diode for Max. RPM
5 Yellow Light Diode: Engine Oil Warning
6 Red Light Diode: Generator Warning
7 Red Light Diode: Ignition Off while attempting to start
8 Red Light Diode: Propeller not entirely extended
9 Red Light Diode: Propeller not ready for retraction (only in function if a propeller sensor has been installed which is an optional extra)
10 Green Light Diode: Propeller entirely extended
11 Switch for extending/retracting propeller
12 Green Light Diode: Propeller entirely retracted
13 Engine Elapsed Time Indicator
14 Push-button for changing over LC Display
15 Selector switch for controlling fuel tank(s)
16 Yellow Light Diode: tank valve opened
17 Spring-return toggle switch for testing ignition circuits
18 Ignition Switch

Description of ILEC Engine Control Unit

The figures given in brackets refer to the numbering in the preceeding ILEC Overall View.

The basic mode LC Display [1] is indicating at the same time two values, i.e. RPM and Tank Contents (in liters). By pressing the white push-button [14] once, twice or three times the display mode is switched to read the coolant liquid temperature (in °C), the internal cooling air temperature (in °C), or the battery voltage respectively.

The light diodes [2], [3] and [4] indicate the green, yellow and red Revolution Range. When maximum RPM have been reached, the red diode lights up; additionally the RPM-reading in [1] starts blinking.

When the yellow diode [5] lights up, there is only a reserve for about 10 minutes left in the engine oil tank.

WARNING: If the engine is continued to be operated beyond these 10 minutes, the engine oil supply will break off.
The engine will suffer unrepairable damage and will fail in a short time.

The red diode [6] lights up when the voltage of the board circuit has dropped below 12.8 volts. This will be the case when the generator has failed. The ignition and all other power consumers will now discharge the battery. If the engine is stopped and the propeller retracted, this diode goes out.

WARNING: Depending on the battery charge you must face the possible failure of the ignition and hence the engine stoppage.

The toggle switch [11] is used to extend or retract the propeller. The upper position "Propeller Extended" is a detent-setting (the green LED [10] lights up). The switch remains engaged in the upper position with running power-plant.
The lower position "Propeller Retracted" has no detent-setting for safety reasons; it must be set and held down until the green diode [12] lights up.
In addition the engine bay doors slam audibly.

NOTE: With the Ignition **ON** [18] the propeller can be extended, but <u>not</u> retracted.

The elapsed-time indicator [13] starts recording the engine running time in hours and 1/100 hours when the number of revolutions are exceeding 2000 RPM.

The spring-return toggle switch [17] serves to test the two ignition circuits. e.g. pressing it to side 1 will interrupt circuit 2 and circuit 1 is then tested.
The revs must not drop by more than 200 RPM.

The switch [18] turns the ignition ON and OFF. When the ignition is ON, the function of the fuel pumps can be checked accoustically.

The diode [7] blinks red, when the STARTER button {5} in the Control Console (see following Figure 7.9-2) is pressed while the ignition is off.
On the other hand, this diode [7] will also be blinking, if it is attempted to retract the propeller with the ignition turned on.

The diode [8] blinks red when the propeller is not yet entirely extended while the ignition is turned on. The STARTER is now blocked.

If a propeller sensor is fitted (offered as an optional extra), the diode [9] blinks red when switch [11] is pressed downwards WHILE the propeller is NOT yet vertical, i.e. not ready for retraction. The propeller cannot be retracted.

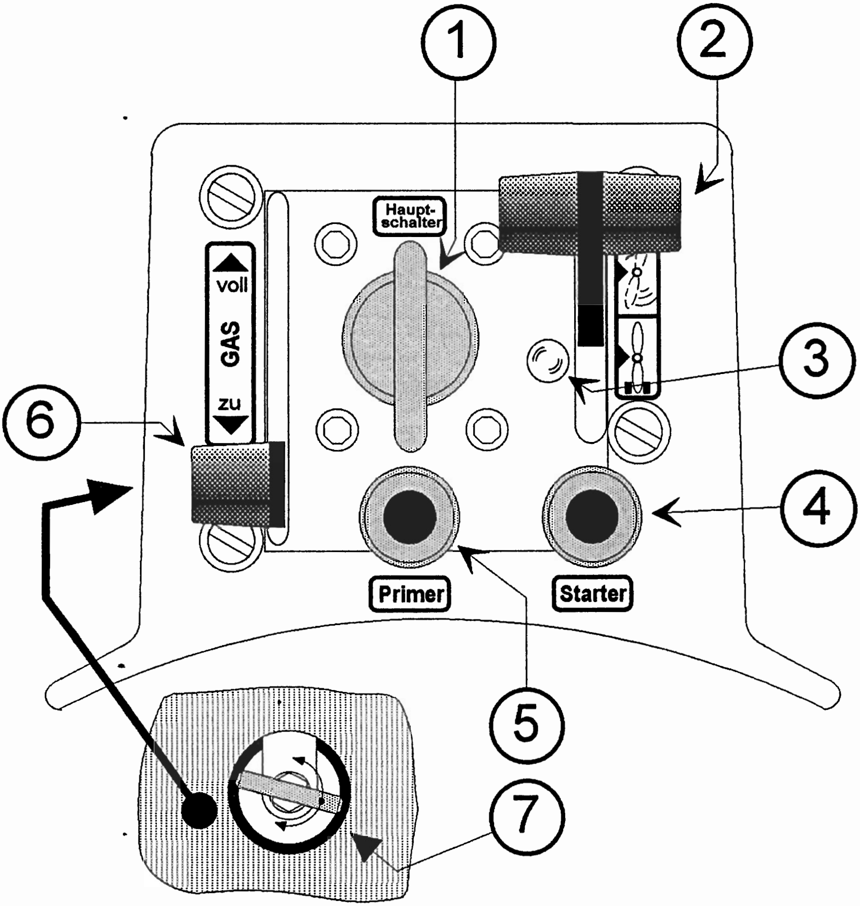
Selector switch [15] controls the tank system of the ASH 26 E. The flexible wing fuel tanks mentioned hereafter are not contained in the basic equipment and will be installed only if expressly ordered.
The upper position "ON" opens the magnetic valve for the flexible wing fuel tank(s), at the same time the yellow diode [16] lights up. The magnetic valve remains open, even if the fuselage tank is full. This position is intended to ensure that the wing fuel tanks will actually be entirely emptied. The lower position "AUTO" is switching on the automatic re-filling of the fuselage tank. When the fuel level in the fuselage tank gets lower than a certain number of liters, the magnetic valve is automatically opened, the diode [16] lights up and fuel is fed from the wing fuel tank(s). When the fuselage tank has been topped up, the magnetic

valve is automatically closed and the diode [16] goes out. When using the "AUTO" setting it is almost unlikely that fuel is lost by overflowing through the tank vent. A detailed description of the tank control system follows under Section 7.10.

ILEC-Control Unit Indicating and Warning Ranges :

Subject	Range	WARNING Blinking	WARNING Honk
RPM	See Section 2.5		-
Coolant	40-150 °C	above 106 °C	above 106 °C
Internal Cooling Air	40-150 °C	above 128 °C	above 128 °C
Fuselage Tank	0-16 Liter	< 4 Liter	< 4 Liter
Wing tank(s) Fuel Valve	Valve opens when less than 4 l in fuselage tank and closes at 12 l. Only with [15] in AUTO setting		
Engine Hours Counter	above 2000 RPM		-
Oil Tank [5]	less than 132 cm^3	yellow LED lights up	-
Generator Warning [6]	less than 12.8 V battery voltage	red LED lights up	-

Fig. 7.9-2 Power-Plant Control Console



1	Main Switch: Avionic and power-plant
2	Propeller stop
3	Pin for engaging propeller stop
4	Starter
5	Primer
6	Throttle
7	Adjusting lever for throttle friction brake

Description of the power-plant control console:
The figures in braces refer to the numbering in the preceeding control console view.

The Main Switch {1} cuts out the battery from the circuit for power-plant and avionics.

When the propeller stop {2} is moved downwards and engaged behind the pin {3}, a stop block is pivoted into the arc of the propeller. A tab at the stop lever {2} obstructs the access to the STARTER button {4}.

The PRIMER button {5} opens an electromechanic valve and thereby injects fuel into the engine.
This serves as take-off assistance and makes a choke unnecessary.

CAUTION: The Primer is only effective when the ignition is ON and the fuel pump operating.

The Throttle {6} is set idle in the bottom position. The upper position is Wide Open Throttle.

Further power-plant controls in the cockpit:

Power-plant main switch:
This is an additional main switch for the power-plant electrical circuit and is fitted in the instrument panel. The Main Switch for the Power-Plant electric system is also an automatic circuit breaker. Pressing the black push-button switches on the power-plant circuit: the **ILEC** is illuminated. Next to the black push button of the main switch there is a red lever, which if pressed towards the push button will unlatch it and interrupt the circuit: **ILEC** must go out. If the electrical circuit of the power-plant is overloaded, the black push button will be automatically unlatched. The circuit breaker is re-set by pressing the black button.

Fuel valve:
The fuel valve is next to the seat pan at the left cockpit wall.

In the forward position the fuel valve is open. Rear position is shut.

CAUTION: Prior to attempting to start the engine the position of the fuel valve must be checked and where necessary moved to its foremost position.

Fire warning light:
A temperature sensor is fitted in the engine compartment which triggers the fire warning at a temperature above 140 °C. The fire warning is a red blinking diode in the instrument panel with the

with the following placard:

FIRE

If a fire warning is given, proceed as per Section 3 "Emergency Procedures" under para 3.8.

Rear view mirror for propeller setting:
This mirror is fitted at the right on the instrument panel cover within the pilot's view. By means of this mirror the vertical position of the propeller must be checked prior to retracting it.

7.10 Fuel and Oil Tank System

See also Fig.7.10-1 at the end of this Section.
The fuel system consists of a fuselage tank, mounted in the wheel well, with a fuel capacity for about a one-hour's operation.
As an optional extra the ASH 26 E may also be ordered with one or two fuel tank(s) fitted in the wing(s).

The fuel drainer is located at the rear end of the left fuselage tank and is easily accessible when the landing gear is down. The fuselage fuel tank vent is fitted at the left-hand side of the fin, above the tail wheel. The wing tank(s) is/are vented through the vent hole in the lower wing surface, near the wing root rib; else - if this option has been ordered - the wing tank vent is returned into the fuselage tank.

The tank of the total loss oil lubrication is fitted in the engine compartment between engine block and exhaust silencer and is accessible when the propeller is extended.

WARNING: The rotary engine uses a total loss oil lubrication. If no oil is refilled into the oil tank or if the oil supply gets interrupted, this will inevitably destroy the engine.

Avgas 100 LL or Car Super min.94 RON/ROZ	
Tankage:	
Fuselage	= 16 liters
if installed:	
wing fuel tank, right	= 15 liters
wing fuel tank, left	= 15 liters
non-usable	= 0.7 liters
CAUTION:	
check engine oil tank level!	

Engine Oil: ➡
Silkolene Comp 2 Pre-mix
Castrol Aviation A545 or
Spectro Oils of America
"Golden Spectro"
Top up with each refuelling!

Oil usage must be checked. The following values may be given as an indication (consumption is RPM sensitive):

a) 0.2 liters oil/h with an RPM of 6900.

b) or slightly more than 0.015 liters oil per liter fuel.

(1) Fuel Filling Systems

Filling of the fuel tanks in fuselage and wings must be carried out only either by means of the fuel refilling equipment available as optional extra or by means of a funnel with corresponding connecting hose and filter. The electric refueling equipment mainly comprises the fuel hose connectors, a fuel pump with electrical plug, a fuel filter and a hose which is inserted into a fuel container when filling-up. The electrical plug fits the socket mounted in the instrument panel for this purpose.

(2) Filling of Fuselage and Wing Fuel Tanks

The optional wing fuel tanks are connected to each other and to the fuselage tank by their filling hose couplings in the baggage compartment in front of the main spar. These couplings are fuel tight, even if they are disconnected one from the other with the tanks full.
To fill up, the adaptor of the tank to be filled is connected with the appropriate adaptor of the filling system **outside** the fuselage - the fuel hoses are long enough - and the electrical plug is inserted into the socket in the instrument panel.
For filling the fuel tank(s) it is recommended to use the electric refuelling system (optional extra). When all connections have been coupled up, the filling equipment is switched on by means of the plug switch.

WARNING: If the wing tank vent is returned into the fuselage tank (optional modification), then in any case the vent tube must always be connected at the fuselage-to-wing separation joint already during the rigging !

CAUTION: Filling of fuel may only be carried out either by means of the optional electric refueling pump system or by means of a funnel. More powerful pumps could burst the wing shell in the course of filling the wing tanks!
The fuel filter in the filling hose must not be removed.

The fuel hoses from the tanks must be connected with the re-fuelling system only **outside** the fuselage. This will prevent fuel dripping into the fuselage.

When filling the fuselage tank, monitor the fuel level indicator and switch off the electric filling system at the latest when 16 liters are indicated. When filling the fuselage tank via a funnel, the funnel must not be placed higher than the capacity reservoir mounted in the fuselage (see Fig.7.10-1). This will prevent the capacity reservoir from being filled inadvertently.

As the wing tanks are not equipped with a fuel gauge, it is advisable to fill from a container of a capacity approximately matching that of one wing tank, or on which the amount filled can be read off. As in the case of filling water ballast tanks, the respective wings are lowered in turn.
Fuselage and wing tank(s) **must not** be refilled **simultaneously.**

When fueling has been completed, the filling equipment is disconnected and the wing tanks are re-connected with the fuselage tank. Now verify in any case that the tank selector switch **[15]** at the ILEC control unit is re-set to position "**OFF**". If it remains in position "ON", fuel from the wing tank(s) would be fed into the fuselage tank and then overflow through the tank vent.

(3)Topping-Up of the Fuselage Tank in Flight

The engine is fed with fuel exclusively by the fuselage tank. The wing tanks merely serve to top up the fuselage tank. If, therefore, the fuselage tank is to be topped-up with fuel from the wing tanks in flight, the magnetic valve of the wing tanks must be opened at the ILEC control unit (switch **[15]** must be set to "ON" or "AUTO"; in position "AUTO" the yellow pilot light **[16]** is only illuminated if fuel contents in the fuselage tank is less than 4 liters).

WARNING: With the switch in position "**ON**" care should be taken to close the wing tanks again in good time in order to prevent the fuselage tank being overfilled, causing fuel to be lost by overflowing through the tank vent. Monitor fuel level indicator!

CAUTION: It is recommended to use the switch [15] only in setting "AUTO" because this makes it less likely that the fuselage tank will be overfilled. Anyhow, fuel level indicator must always be monitored !

(4) Draining Wing Fluel Tanks on the Ground

In order to drain the wing tanks on the ground, both flexible wing fuel tanks must be disconnected from the fuselage tank. Have a suitable container ready, and pull the hose with the appropriate connector off the fuel filling equipment. This hose is inserted into the container, and connected to the wing tank it is intended to drain.

7.11 Electrical System

Refer also to Fig.7.11-1 and 7.11-2 at the end of this Section.

(1) Soaring Flight Board Circuit

The electrical system is supplied by a 12V battery. A main switch {1} is installed in the power-plant control console which is turning on the board system. Each electrical applicance is protected by its own fuse.
There are different possible configurations to supply the electrical board system. Refer also to Fig.7.11-1.

(2) Power-Plant Current Supply

The power-plant circuit is fused through the **Power-Plant Main Switch.** Only the engine battery is being charged during powered flight.
It is depending on the charge of the engine battery whether the propeller can be extended or retracted.

7.12 Pitot and Static Pressure Systems

Refer also to Fig.7.12-1 at the end of this Section.

The pitot pressure for the ASI system is obtained from the pitot tube in the fuselage nose, static pressure from the static ports at either side of the fuselage tail boom.

For electrically compensated Variometer systems a pressure supply from the Prandtl-Tube mounted in the fin is more suitable. Ensure that this Prandtl probe is fully pushed home in its seating. The inner end of the probe should from time to time be lightly lubricated with Vaseline or a similar lubricant, in order to save the O-ring gaskets from wear.

7.13 Miscellaneous Equipment

(1) Removable Trim Ballast

On customer request, the ASH 26 E can be equipped such that trim ballast can be mounted in front of the pedals.
In this location, for example a 1 kg (2.2 lb) lead trim plate has the effect of a pilot mass of 3 kg (6.6 lb).
Thus, a pilot weighing 6.0 kg (13.2 lb) less than the minimum cockpit load must use 2 kg (4.4 lb) of lead trim ballast.

Prior to take-off check the weight of the trim plates and their secure fixing !

One trim plate equals a pilot mass of 3.0 kg (6.6 lbs)

(2) Trim Ballast (Battery) mounted in the fin

If trim ballast (e.g. a battery) is fitted in the fin, the minimum cockpit seat load will be more than 70 kg = 154 lbs (incl. parachute).
This <u>increased</u> minimum cockpit load must then be shown in the <u>DATA and LOADING PLACARD</u> affixed in the cockpit.
The possible <u>reduced</u> minimum cockpit load if no trim ballast is fitted, is <u>only</u> entered in the Mass and Balance Form on page 6.4 of this manual.

Further details covering the minimum cockpit load are provided in Sections 2.10 and 6 of this manual.

The foam buffer fitted over the trim ballast secures it above. This plastic foam pad must not be forgotten when changing or replacing trim ballast.
You should also ensure that there is adequate plastic foam seating under the trim ballast to protect it from hard knocks!

(3) Barograph

The box in the rear of the engine compartment is especially prepared to take up the Winter Barograph with a vibration recorder for engine operation. The location was deliberately selected as here the low engine vibration is easily measurable. An electric connection to this barograph type is not needed.

When such a barograph is installed in the rear of the engine compartment, the minimum seat load may be higher than 70 kg or 154 lbs (including the parachute). The necessarily increased minimum load will then be indicated on the DATA AND LOADING PLACARD in the cockpit.
The possible reduced minimum cockpit load without barograph installed is given only in the Mass and Balance Form in Section 6.2.

WARNING: The box in the engine compartment must only take up the engine vibration recording barograph made by Messrs.Winter. Other items must not be stored in this box!

Box for barograph must **not** be used as baggage compartment !

This placard is affixed to the clamping fixture of the barograph box.

(4) Oxygen

The seating for the oxygen bottle is provided as standard. It is the space above the spar. For the partition behind the spar various inserts are available which allow to take up different oxygen bottles. A 3-liter bottle of 100 mm diameter will be found the most suitable to fit in this space.

A suitable bottle fixing bracket is required, and is available as an optional accessory from SCHLEICHER.

When fitting the oxygen bottle, ensure that it is properly installed and securely anchored.

NOTE: Fitting of oxygen equipment causes only a minimal change in the empty mass C.G. position !

(5) Emergency Location Transmitter

The location least vulnerable to damage in case of accident is the area between the two drag spar pins at either side of the fuselage.
Therefore, the emergency location transmitter (ELT) should be fitted to the fuselage wall in the baggage compartment area, in an appropriate mounting.

An installation drawing cannot be provided by SCHLEICHER as too many different ELT's are on the market.

Since the whole of the air frame except for the fin and a small area above the baggage space contains CRP layers, and carbon fiber laminations screen the transmission radiation, the ELT aerial must be fitted in the baggage compartment at the top and must extend into the canopy area.
The instructions for the installation given by the ELT manufacturer must be regarded. The installation of an ELT must be approved by a licensed aviation inspector.

(6) Steerable Tailwheel

As an optional extra the ASH 26 E can be equipped alternatively with a steerable tail wheel instead of the conventional tail wheel and with removable wing tip wheels. This makes it possible to roll with the aircraft on the ground without the aid of a second person- eg: to the take-off point.

Prior to the assembly of the steerable tail wheel first the standard tail wheel including its box must be dismantled (loosen nut A/F 17, remove washer and axle bolt).
Now the connecting unit for the safety springs must be screwed onto the rudder in perfect alignment, with the retaining eyes pointing to the front. Then the white pressure plate of the steerable tail wheel assy is inserted into the support mounted at the front wall of the tail wheel housing and screwed on (two washers and two lock nuts M6). The bearing bushing of the steerable tail wheel assy must be aligned to fit the bore holes in the tail wheel housing so that the axle bolt can be re-fitted. Replace the washer //

and tighten nut A/F 13. If the above procedure cannot be accomplished with the safety springs hooked in, they may be unhooked at the wheel fork of the steerable tail wheel.
Finally the fairing is attached and taped on.

The parts of the steerable tail wheel mod have the same mass as the standard tail wheel. Therefore, the C.G. remains unchanged.
If the steerable tail wheel is dismantled in order to fly again with the standard tail wheel, the connecting unit for the safety springs at the rudder must also be removed!

If rubber skids are fitted at the wing tips these must be removed (two hexagonal socket head screws A/F 5 respectively) and replaced by the wing tip wheels. Pay attention to the correct mounting (left and right wheels are different).

NOTE: The original screws only must be used otherwise damage to the wing skin cannot be excluded.

Fig. 7.10 - 1 Fuel System

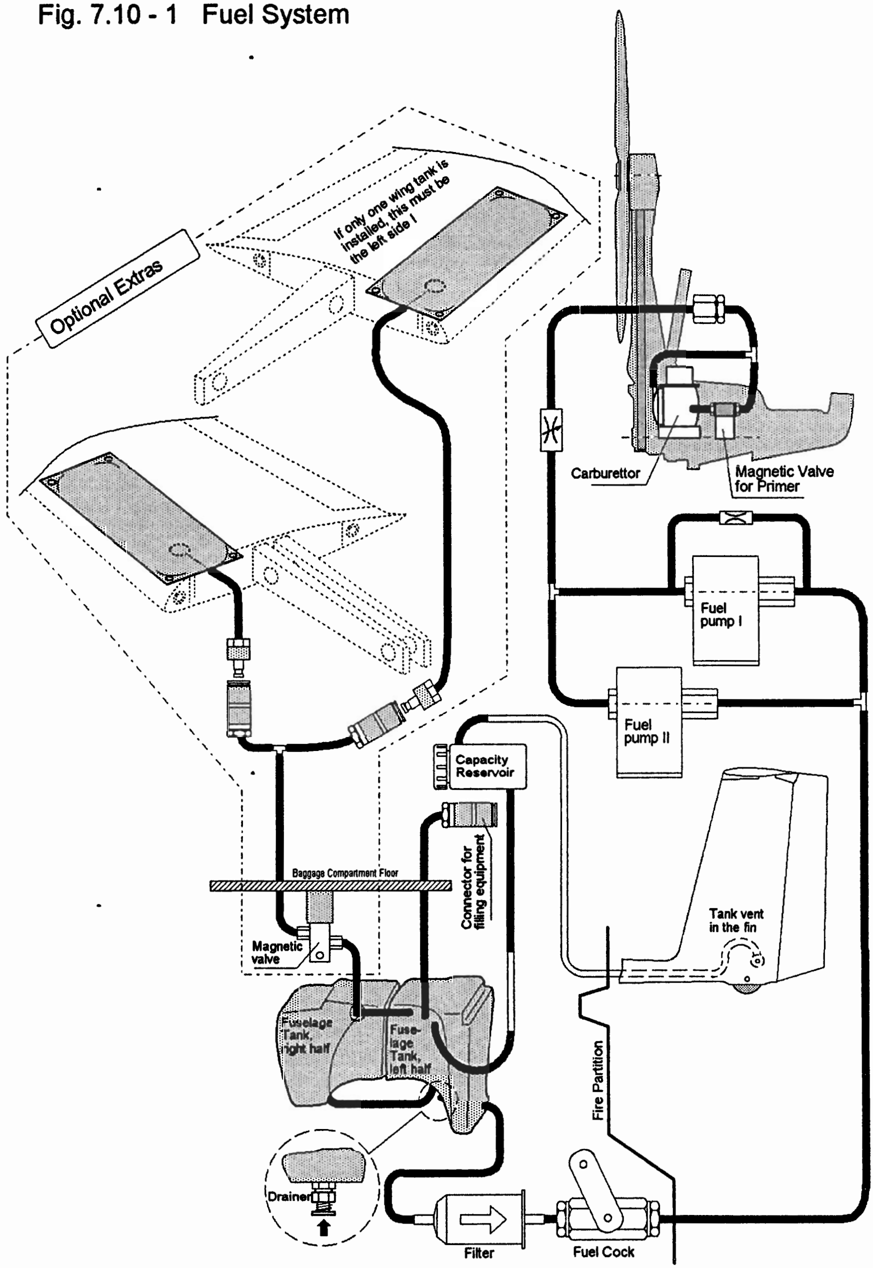


Fig. 7.11 - 1 Board Circuit

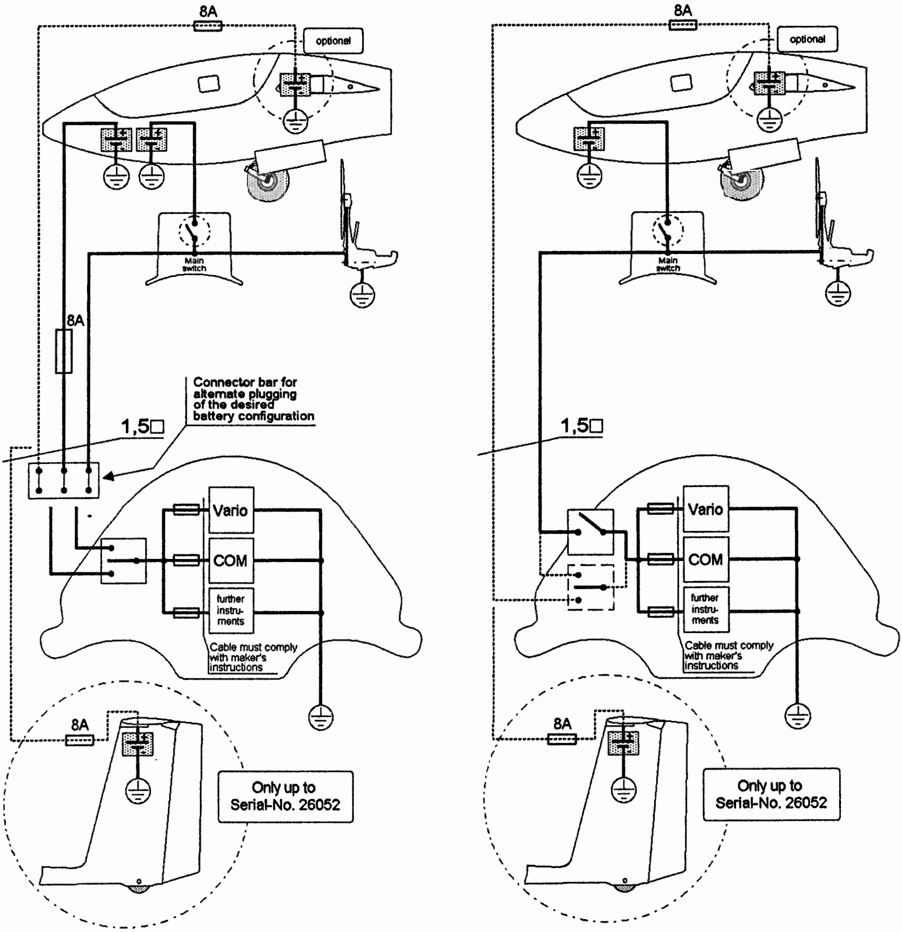


Fig. 7.11-2 Engine Electric Circuit

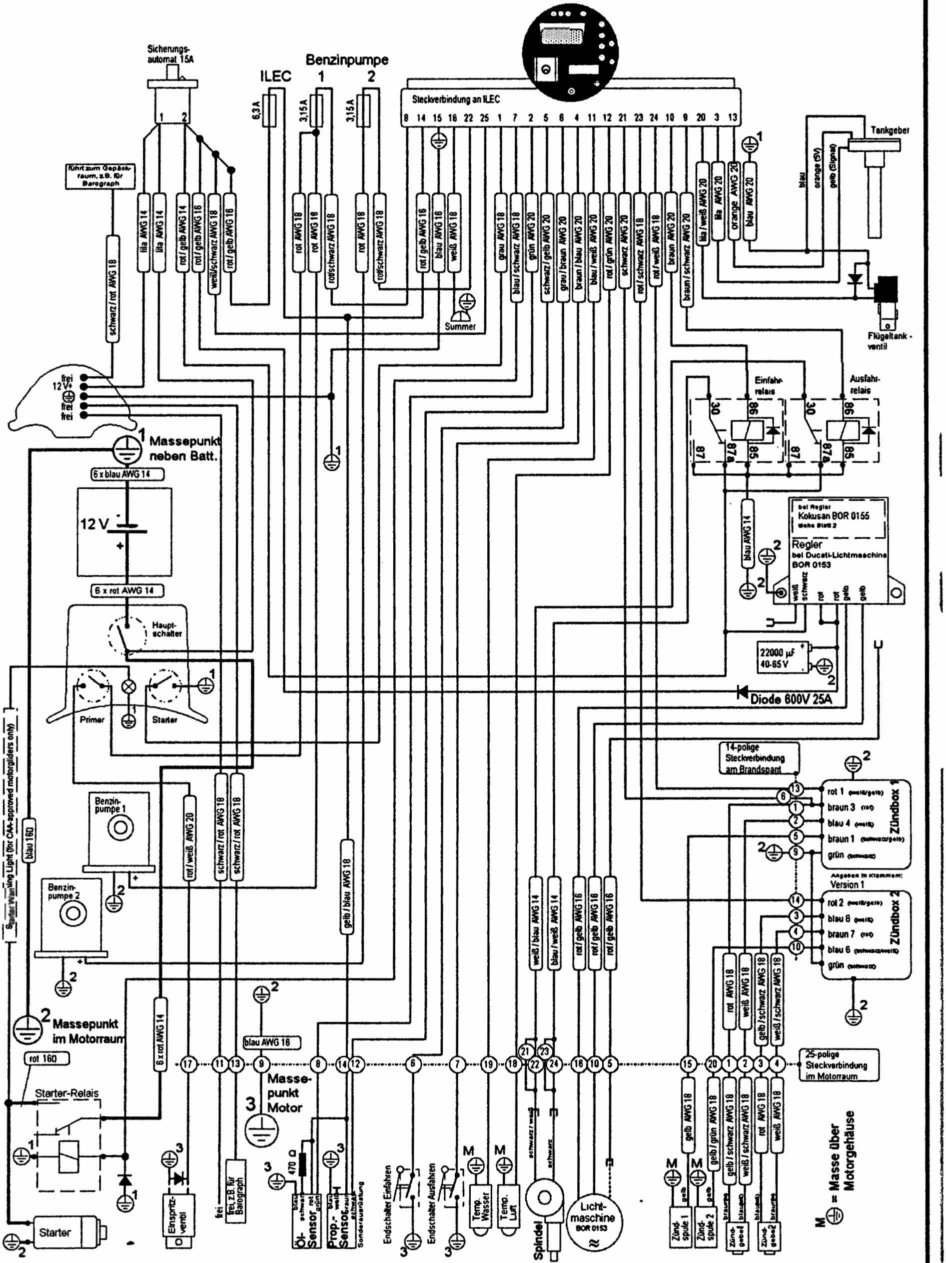
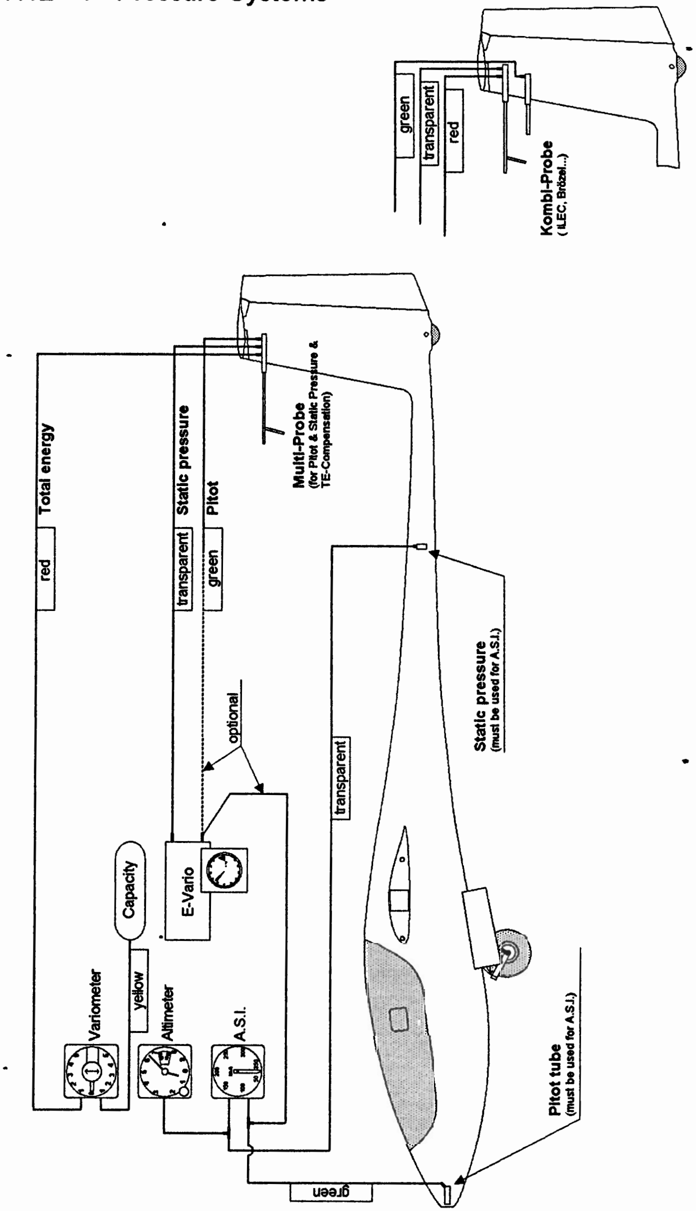


Fig. 7.12 - 1   Pressure Systems



SECTION 8

8.1 Introduction

This Section contains manufacturer`s recommended procedures for proper ground handling and servicing of the aircraft. It also identifies certain inspection and maintenance requirements which must be followed if the aircraft is to retain that new-plane performance and dependability.

It is wise to follow a planned schedule of lubrication and preventive maintenance based on climatic and flying conditions encountered.

8.2 Powered Sailplane Inspection Periods

A C. of A. inspection should be carried out annually.

Further details can be found in the ASH 26 E **Maintenance Manual**, Sections 4 and 7, and in the separate Engine and Propeller Maintenance Manuals.

8.3 Powered Sailplane Alterations or Repairs

Regarding repairs and alterations, please see the ASH 26 E Maintenance Manual, Sections 10 and 11.

It is important that the Aviation Authority concerned should be advised before carrying out any intended alteration of the aircraft which is not officially approved. This would ensure that the airworthiness of the aircraft is not invalidated.

8.4 Ground Handling / Road Transport

(1) Parking

The ASH 26 E is equipped with plastic sealing tape at all control surface gaps as serial standard. When parking the aircraft principally all control surfaces must be set to neutral !

In the open:
Parking of the aircraft in the open can be recommended only if forseeable weather conditions remain suitable. It should be seriously considered whether the secure picketing, covering, and cleaning of the aircraft before the next flight may not demand more effort than de-rigging and re-rigging would have done.
For tying-down the wings, cradles (perhaps from the trailer) should be used which ensure that the ailerons cannot be stressed by the picketing ropes.

NOTE: Parking in the open without protection against weather or light will reduce the life of the gelcoat surface finish. Even after only a few weeks without intensive care the polyester paint finish can become brittle and develop cracks.

CAUTION: The anti-freeze of the engine coolant liquid should be checked before the beginning of the cold season.
If there is no sufficient anti-freeze in the coolant, the engine will be destroyed by deep temperatures.

In the hangar:
If the aircraft is parked in the hangar for protracted periods, it is recommended to cover only the perspex canopy with a dust cover, as dust covers retain moisture in wet weather for long periods, which would impair the dimensional stability and even the strength of all fiber composite materials.
For this reason, protracted periods of parking with water ballast on board is also **inadmissible** !

When parking, carefully remove any remainders of provisions (chocolate, sweets &c), as experience shows this would attract small animal which could cause damage in and to the aircraft.

When tying down the aircraft winglets must be detached and replaced by assembly rods (trailer accessory).

(2) Road Transport

Messrs. Alexander Schleicher GmbH & Co. can supply dimensioned drawings of the ASH 26 E which will provide all the measurements needed for building a closed trailer. We can also supply the names and addresses of reputable trailer manufacturers.

Above all, it is important to ensure that the wings are supported in properly shaped and fitted wing cradles, or at the very least, that the spar ends are securely supported as close as possible to the root ribs.

Reinforced points of the fuselage are the main wheel (but watch the suspension springing !) and tail wheel; also possibly the drag spar pins (make up support seatings from plastic material like Nylon!), and under the fuselage the area between landing gear cutout and the lap strap anchoring points.

WARNING: In no case must the elevator actuator on the top of the vertical tailplane be loaded or fixed in any way, not even by soft foam cushions &c.
When designing or adapting the trailer, free movement and sideways clearance of the elevator actuator has to be regarded.

For an aircraft of this quality and value, an open trailer, even with tarpaulin, cannot be recommended. Only a closed trailer of plastic or metal construction, or with heavy tarpaulin cover, may be considered suitable, which in any case should have light coloured surfaces and be well ventilated also while stationary so as to avoid high internal temperatures or humidity.

Road transport with water ballast and / or fuel in the wing tanks is not permissible!

8.5 Cleaning and Care

Contrary to the false assumption that plastic materials are impervious to moisture and ultra-violet light we would state emphatically that even modern fiber composite powered sailplanes like the ASH 26 E do absolutely require care and maintenance !

(1) Moisture - Effects on the fiber composite structure and on the gelcoat surface finish

In the long run, moisture will also damage fiber composite structures, as it will penetrate into the expoxy resin base and cause it to swell, which will partially burst the tight cohesion of the plastic molecules.
In particular, a combination of high temperature and high humidity must be avoided ! (As eg: poorly ventilated trailer becoming damp inside, which is then heated by the sun).
Neither the best quality of paint protection on the surfaces, nor the plastic or rubber skins of the water ballast tanks can fundamentally prevent water vapour diffusion; they can only retard the process.
If water has entered the airframe and cannot be removed by means of sponge or chamois leather, the aircraft should be de-rigged and dried out, while periodically turning the affected part, in a room which should be as dry as possible, but not too hot.

(2) Sunlight - Effects on the gelcoat surface finish

Sunlight - especially its UV component - embrittles the white polyester gelcoat and the perspex canopy. The wax layer on the gelcoat will also oxydise and discolour more quickly if the aircraft is unnecessarily exposed to strong sunlight. There is no paint finish on the market as yet which is unrestrictedly suitable for fiber composite sailplanes, and which would approximate to the life span of the fiber composite aïrframe structure without maintenance.

(3) Care of Gelcoat Surface Finish

As the white polyester gelcoat is protected by a fairly durable wax layer, it will tolerate being washed down from time to time with cold water, with a little mild cleaning medium added.

CAUTION: The use of alcalic cleaning agents (e.g. "Meister Proper") may affect the paint surface and even penetrate as far as into the foam of the sandwich structure and damage it. In single cases the acrylic foam in the control surface sandwich structure was destroyed by the use of unsuitable cleaning agents.
Heavy dirt should therefore be removed using a cleaning polish.

In normal use, the wax coating need only be renewed annually with a rotary mop.
In moderate European conditions it will suffice if on two occasions a paint preservative is used in addition. In areas subject to long and stronger sun exposure this should be done more often.
For the care of the paint finish, only silicone-free preparations may be used !
(eg: 1 Z-Special Cleaner-D 2 by Messrs. W.Sauer & Co., D-51429 BERGISCH GLADBACH, or Cleaner Polish by Lesonal).

(6) Oil-Film and residual Oil Spots

The power-plant running develops a film of (semi-burnt) oil residues from the silencer. Prior to the normal cleaning of the paint surface this film should be removed with a soft and blotting out cloth.
Power-plant and engine compartment are cleaned in the same way where accessible.

(7) Fire Protection Coating of the Engine Compartment

The engine compartment is painted with a special fire protection paint, which is covered by a protective paint layer. The fire protection paint will develop a foam layer under heat which in turn should reduce the heat conductivity into the structure.
The fire protection paint <u>must be renewed</u> when foam blisters have developed after strong heat.
For refreshing the paint see -> the Maintenance Manual.

SECTION 9

9.1 Introduction

This Section contains additional information to facilitate safe and effective operation of the powered sailplane, if equipped with various ancillary systems and equipment not included as standard equipment.

9.2 List of Ancillary Equipment

- Oxygen system installation
- Re-fuelling system, fixed installed

9.3 Description of Ancillary Equipment

Oxygen system installation:

When flying at greater heights while using the oxygen installation, it should be borne in mind that any particular system may only be suitable for a limited altitude range.
The makers' instructions should be complied with.

Re-fuelling system, fixed installed

The components of the external re-fuelling system may also be installed fixed in the fuselage; this is offered as an optional extra.
Two versions are available:

1. Fuel pump behind barograph box in the fuselage

The fuel pump is located behind the barograph box. The fuel line runs (fire-protected behind the engine bay side wall) forwards to the baggage compartment. Here the re-fuelling system can be connected to the filling tube which is supplied as standard equipment item. The connecting coupling for the external intake tube with filter is located in the barograph box.

2. Fuel pump in front of fire bulkhead

The fuel pump is fitted in front of the fire bulkhead in the area of the control linkage system. The fuel line runs to the baggage compartment. Here the re-fuelling system can be connected to the filling tube which is supplied as standard equipment item. The connecting coupling for the external intake tube with filter is located at the rear shut-off wall of the landing gear compartment; it can be accessed from below though the landing gear box. There is a cover to protect the connecting coupling from dirt; and additionally it is closed by a dust plug.

The fuel pump is actuated via a switch in the instrument panel.
Re-fuelling the wing tanks is done by use of an adaptor (see also Fig.9.3-1 on the next page).