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.

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)

1.2.2 Fuselage

The fuselage shell construction employs hybrid materials technology. The mixture of glass, carbon and aramid fibers provides a light, rigid structure.
The additional stiffening - partly two-skin-structure - provided in the cockpit area and the specially shaped cockpit rim further increase pilot safety in the case of an accident.

The fin is made up from GRP/SRP hard foam sandwich so as not to impede signal transmission from the VHF radio aerial.

1.2.3 Tail Unit, Control Surfaces, and Flaps

The stabilizer of the horizontal (stabilizer-plus-elevator) T-tail unit is of CFRP/hard foam sandwich construction. Control surfaces and flaps are of SRP-/hard foam sandwich construction.

1.2.4 Power-plant

The compact power-plant, a single rotor engine type AE50R, is accommodated in the fuselage tail boom immediately behind the wing.
The engine and exhaust silencer of this new-technology power-plant are fitted stationary in the fuselage. Only the rigid two-bladed propeller of this self-launching powered sailplane is extended electrically. When the propeller is retracted the engine compartment is aerodynamically faired and covered by neatly fitting doors.
The power-plant has an extremely low noise and vibration level and the 37 kW engine provides excellent rates of climb even at maximum all-up weight.

1.3 Primary and Secondary Structures

Primary structures include:

- wing spars and root ribs
- wing shells
- fuselage tail boom from wing mounting area to fin
- fin and horizontal stabilizer
- all rigging fittings and control linkage parts
- engine mount bed and propeller support assy.

Secondary structures are:

- control surfaces and flaps
- fuselage in the cockpit area
- engine compartment doors.

1.4 Specifications

Wings

Span		18 m	(59.06 ft)
Wing area		11.68 m^2	(125.72 sqft)
Aspect Ratio		27.74	
Dihedral (control surface hinges)		3.0°	
Sweepback: (both inner wing tapers)		0.0°	
(outboard wing taper)		+3.0°	
Flap settings		-1°, 0°, +10°, +23°, + 38°	
Airfoil section:	Wing	DU 89-134/14 (13.4 % thickness)	
	Winglet, bottom	DU 98-125M1	
	Winglet, top	DU 98-100M1	
Winglet height (as of wing chord)		0.45 m	(1.48 ft)
Winglet area		0.0647 m^2	(0.70 sqft)
Winglet sweepback (leading edge)		30°	

Fuselage

Length	7.05 m	(23.13 ft)
Height (Fin and Tail Wheel)	1.51 m	(4.95 ft)
Cockpit width	0.66 m	(2.17 ft)
Cockpit height	0.877 m	(2.88 ft)

Vertical Tail

Height above tail boom top edge	1.25 m	(4.10 ft)
Surface area	1.064 m^2	(11.45 ft^2)

Airfoil Section DU 86-131/30 with 13.1 % thickness.

Rudder

Chord ratio	30 %	
Surface area	0.319 m^2	(3.43 ft^2)

Horizontal Tail

Span	2.85 m	(9.35 ft)
Surface area	0.988 m^2	(10.63 ft^2)
Aspect ratio	7.644	
Airfoil Section	DU 86-137/25 with 13.7 % thickness.	
or:	DU 92-131/25 with 13.1 % thickness.	

Elevator

Chord ratio	30 %	
Surface area	0.209 m^2	(2.25 ft^2)
or:	0.232 m^2	(2.50 ft^2)

Airbrake Paddles

(Schempp-Hirth type - on top surface only)

Length	1.40 m	(4.59 ft)
Surface area (both together)	≈ 0,18 m^2	(1.94 ft^2)
Height	≈ 0.10 m	(0.33 ft)

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 temp., take-off	90 °C	194 °F
Min.~ ~, take-off:	60 °C	140 °F
Max. rotor cooling air temp.:	125 °C	257 °F

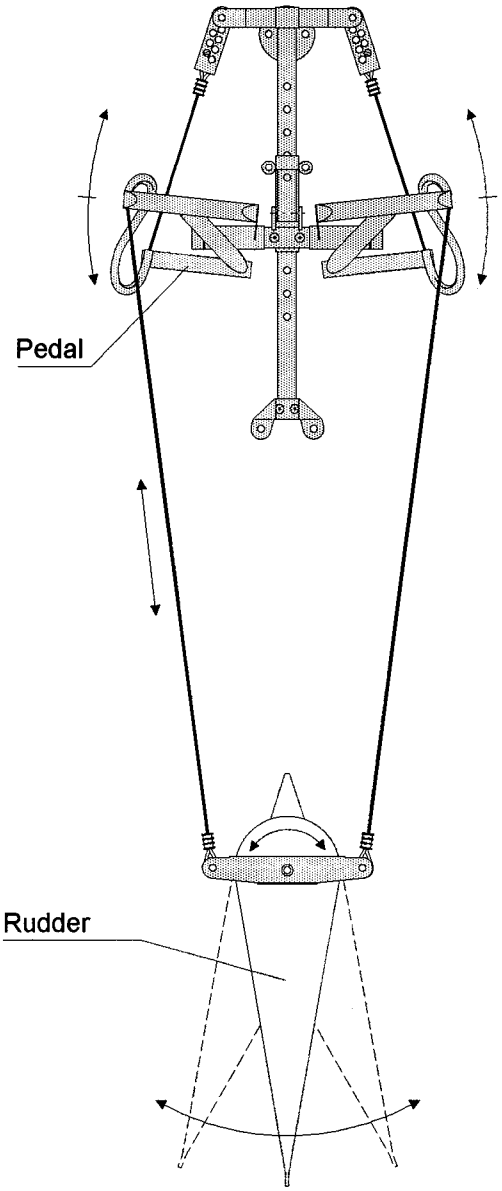
Lubricant: Total loss oil lubrication at ratio 1:60 approx.

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

Fig. 2.2 - 6 Rudder Control System



2.3. Power-Plant

2.3.1 Description of the Components

Power-plant components are marked in the following paras by a number in brackets. The Figures 2.3-1 through 2.3-10 hereafter use the same numbering for these parts.

2.3.1.1 Power-Plant Design

The power-plant is mounted to the airframe at three rubber suspended points - marked **[1]** + **[2]** - by means of an engine mount bed. An electric spindle **[3]** which is integrated into the left side of the engine mount bed, serves to extend and retract the propeller assembly **[5]** via a toggle crank design **[4]**. This process is assisted by a gas strut which engages at the right side to the toggle crank design. When the propeller is extended the drive belt is tightened at the same time (reduction gear 1:3).

The power-plant consists of a single rotor, Wankeltype rotary engine, with liquid-cooled housing, forced air cooled rotor, alternator **[17]**, electric starter **[7]** and electronic dual spark battery ignition. The precise engine designation of the makers is:

AE50R.

The engine is described in details in the engine manual.

The exhaust system **[8]**, too, is fitted stationary inside the fuselage.

When the propeller is retracted, the engine compartment is

- **Fuel system:**
Two electric fuel pumps provide the fuel supply; they are fitted in the fuselage in front of the fire bulkhead.
The fuel pressure at the carburettor inlet must meet the required tolerance; these values are given in the engine manual.

In order to be able to adjust the pump pressure independent of the pumps either a pressure reducer [48] or a throttle bypass line [49] is installed (see Fig.2.4-1).
The pumps are switched on at the same time when the ignition is ON (at the ILEC control unit).
The proper function of the fuel pumps can be checked when turning out either FUSE 1 or FUSE 2 of the pumps during an engine ground run. The RPM power of the engine should not alter by this action. If power loss is distinctly noticed, the corresponding pump must be replaced.

The electrically actuated primer valve [12] takes the fuel from the pressure side of the fuel system and injects it into the carburettor [13]. The primer works only if the fuel pumps work properly when the ignition is ON.

If problems with the carburettor mixture are experienced, you should consider also to check the primer valve for leaks. For this purpose the primer line [47] is disconnected from the carburettor (see Fig.2.3-9) and extended by a hose. With the ignition on (fuel pumps' running must be heard) it can be verified whether this valve is completely tight when NOT pressing the primer button in the cockpit.

In a second step it can also be tested if fuel flow through the valve is sufficient when pressing the Primer button.
If the primer valve is no longer completely tight, replace.

2.3.1.5 Ignition

The ignition system is described in the Engine Manual.
The ignition wiring diagram is contained in the wiring diagram Fig.2.8-3.

In this aircraft the components are installed as follows:

Ignition Circuit 1: Ignition trigger at the starter gear rim (flywheel), right top.
Left ignition box in front of the fire bulkhead.
Front HT coil
Front spark plug.

Ignition Circuit 2: Ignition trigger at the starter gear rim (flywheel), left bottom.
Right ignition box in front of the fire bulkhead.
Rear HT coil.
Rear spark plug.

If the ignition circuit test switch at the ILEC (see Flight Manual Section 7.9) is hold in setting 1, the circuit 2 is switched off and the engine is running only on the first circuit. Holding the switch in setting 2 will test the second circuit.

2.3.1.6 Cooling Systems

Liquid cooling system:
The largest part of the heat is rejected via the liquid cooling system, the radiator [14] of which is pivoted into the air stream when the propeller is extended. The system is filled with a

2.3.1.9 Adjustment of the Carburettor

The carburettor is adjusted as described in the engine manual.

Fig.2.3-9 shows the following details:

[44] Low-speed screw at carburettor
[45] High-speed screw at carburettor
[46] Idle stop
[47] Connector for primer line

For setting the carburettor it is essential to watch that coolant temperature must be above 54 °C.
Idle revolution rate shall be 2900 RPM ± 100 RPM. To achieve this, the idle stop screw at the idle stop [46] is adjusted.

If during adjustment work the carburettor needle throttle response differs distinctly from the values given in the engine manual, check also the fuel pressure at the carburettor inlet. The permissible pressure values are given in the engine manual.

If the problem cannot be solved by the correct fuel pressure, the opening and closing pressure of the carburettor diaphragm valve as well as the condition of the valve itself should be checked by an appropriately licensed person.

Opening pressure	= 0.72 to 0.78 bar (= 10.44 to 11.31 psi)
Closing pressure	not below 0.45 bar (6.53 psi) measured at the dry carburettor.

2.3.2 Propeller Type and Mounting

The approved propeller types are detailed in the Flight Manual of the ASH 26 E in Section 2.4

Fitting and dismantling the propeller is done in accordance with the instructions given in the operations and maintenance manual of the propeller.
The propeller bolts must be secured by stop nuts. Once loosened, always renew these nuts.

2.3.3 Temporary Storage of the Power-Plant

If the aircraft is not operated for a protracted period, observe the storage instructions in the engine manual.

Storage up to 30 days:
No special treatment is necessary for this period.

Storage over 30 up to 90 days:
Proceed as detailed in the engine manual.

The following exceptions / deviations apply:

- The engine is not dismantled.

- The air intake filter **[20]** is removed and the throttle is moved to Wide Open Setting. Connect an oil can to a thin silicone tube which is inserted into the ram pipe **[21]** as far as on a length of 520 mm. Then 2 cc engine oil are injected directly into the engine through this tube.

Now proceed as prescribed in the engine manual, injecting the oil - as described before - through the carburettor.

- The air intake filter **[20]** is not re-assembled, the air intake is sealed by a plastic foil and rubber band. The same sealing is done at the ram pipe end of the exhaust.
- When the propeller has been retracted, verify the timing belt for even loops in its fold-area. Where necessary, support the belt loop by a hard foam rubber or similar material at the inside of the loop.

Storage over 90 days:

The same treatment as described before is done and in addition the following:

- The fuselage tank must be emptied through the drainer and the engine should use up completely any fuel remaining in the lines and in the carburettor.
  Do NOT close the tank vent in the fin!
  On this occasion test the drainer for leaks and where necessary screw it out and clean.
- The outside of the engine needs no special protection as described in the engine manual on the condition that the engine compartment doors are airtight sealed by tape, in dry air.

  In regions with very humid climate in addition dry salt - as sold for caravan need may be put into the barograph support box in the engine compartment.

Returning to service from storage

Proceed in accordance with the engine manual. The following actions must be done in addition or differently from what is described in the engine manual.

- Open manually the engine compartment doors and check the belt loops in the fold-area for kinks. This is advised as a precaution, as no experience is so far available with storage time longer than 6 months.

- Air intake and exhaust are re-opened and the air intake filter re-assembled. If the engine has been stored for more than six months, than the engine inside requires oiling as described under para "Storage over 30 up to 90 days".

- The spark plugs which were left screwed in, need not be removed, if the engine starts after a few tries.

- Carry out a full engine ground run according to the instructions in the engine manual and record the results in the form contained in the engine manual.

2.3.4 Dismantling and Re-Assembling the Power-Plant

The following paras describe how to dismantle and re-fit the power-plant. This may become necessary for maintenance, repair or weight reduction or compliance with competition rules. The only component groups left in the fuselage are the fuel system, and all cockpit engine controls.

Safety harness

The safety harness has a maximum service life of 12 years as of the date of manufacture which is entered in the corresponding "JAA Form One" (airworthiness release tag). As a general rule, the makers' instructions should be complied with.

Oxygen System

Oxygen systems and oxygen supply must comply with JAR 22.1441 and 22.1449 !
For oxygen systems fitted, the relevant TBO is stated in the appertaining "airworthiness release tag" issued by the makers. Over and beyond this, the oxygen bottles must be re-inspected by a technical inspection institute every five years in accordance with pressure vessel regulations.

Water bags

"Smiley" water bags have a preliminary service life of 6 years. Prior to the expiry of this time limit the customer should contact Messrs. SCHLEICHER and check whether it is possible to increase this service life by means of a special inspection program.

Power-Plant

Service life limits and maintenance intervals for the AE50R power-plant are specified in the engine manual, in its currently valid edition. Any inspection and maintenance work in view of the increase of service life must be performed and certified by the manufacturers, or by a licensed aircraft repair and maintenance establishment who has been authorized by the manufacturers and by the relevant civil aviation authority.

Propeller

According to the Technical Note no. 2 for AS-propellers the propeller type AS2F1 is subject to a service life limitation.

Fuel Lines

Fuel lines from Elastomers have a limited service life. According to German NOTAM (NFL II-39/76 and NFL II-96/78): "Permissible service limits are laid down generally in the Aviation Standard LN 9088 and in the respective U.S. publications." The fuel lines used as standard in the ASH 26 E have a maximum service life of five years.

Flexible Wing Fuel Tanks

The flexible fuel tanks are subject to a service life limitation. The service life is specified in the currently valid edition of the "Installation, Test & Inspection Instructions for flexible fuel tanks HFK T-LF.

CFRP Exhaust Fairing

Because of the extreme heat influence the CFRP exhaust fairing is subject to a service life limitation of 150 operating hours. Upon this time limit the fairing must be replaced by a fairing version with further improved heat resistance. This version is available from Schleicher as of November 1999.

5.3 Bolt Torque Settings Table

Table of maximum permissible torques for bolts in standard bolted connections.
These apply also to the bolted connections at the power plant unit but **NEITHER** to the engine AE50R itself, **NOR** to the groove nuts at the propeller shaft and engine drive shaft, **NOR** to the radial screws at the Centaflex-rubber coupling at the belt drive **NOR** to the six screws at the propeller!

Thread Size	daNm (mkp)
M4	0.18
M5	0.36
M6	0.64
M8	1.60
M10	3.20
M12	5.70
M14	9.20

Bolt Torque Settings for the groove nuts at the propeller shaft and at the engine drive shaft:

Groove Nuts	daNm (mkp)
M24*1,5 Propeller shaft	15,0
M38*1,0 Propeller shaft	12,0
M30*1,5 Engine drive shaft	12,0
M20*1,5 Engine crank shaft	12,0

Bolt Torque Settings for the radial screws at the Centaflex-rubber coupling at the belt drive:

Thread Size	daNm (mkp)
M10	5.00

Table of bolt torque settings of the engine AE50R:

see Engine Manual !

Table of bolt torque settings of the propeller:

see Propeller Manual **Section 7** !

12.2 Special Tools

a) Socket wrench for hexagon socket head screws, 6 DIN 911-12.9 (Allen Key), and

b) Rigging plate AS P/N 99.000.4657 (both for rigging the tailplane).

c) Filling nozzle AS P/N 99.336.0022, and

d) Stopper plug AS P/N 99.000.8861 (both for filling the water bags)

e) Unlocking tool for winglet and detachable short wing tip.

Special tool not supplied:

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

12.3 Supply Sources for Special Tools

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

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

The unlocking tool e) for example may also be made from a screwdriver which is cut obtuse.

12.4 List of Maintenance Documents for Fitted Equipment

- Currently valid edition of the Engine Manual in its currently valid edition.

- Currently valid edition of the Operating and Maintenance Manual for the propeller AS2F1, made by Messrs.SCHLEICHER, in its currently valid edition

- Operating Manual for Tow Release Coupling Series "Europa G 88" Safety Tow Release, issue February 1989, LBA approved.
  or:
- Operating Manual for the Tow Release Coupling,
  Series: Safety Tow Release "Europa G 72" and
  Safety Tow Release "Europa G 73", issue January 1989, LBA approved.

- Operating Manual for Tow Release Coupling Series Nose Tow Release Hook "E 85", issue March 1989, LBA approved.
  or:
- Operating Manual for Tow Release Coupling Series Nose Tow Release Hook "E 72" and "E 75", issue March 1989, LBA approved.

- WHEEL and BRAKE ASSEMBLIES CATALOGUE, Component Maintenance Manual, Appendix A, Fits and Clearances -
  A-1. Brake Lining Wear Limits
  A-2. Brake Disc Minimum Thickness,
  by Parker Hannifin Corporation, Avon, OH, USA.

- Installation, Test & Inspection Instructions for flexible fuel tanks Drawing No.12/89, by Messrs. HEIMANN, in the currently valid edition.