MAINTENANCE MANUAL

for the powered sailplane STEMME S 10

Document No. A40-10-021

Date of Issue: October 1, 1990

Translation and conversion of technical data have been done by best knowledge and judgement.
In any case the original version in the German language is authoritative

Model: **STEMME S 10**	Serial number: **10-**
Type Certificate: EASA.A.054 (former LBA 846)	Registration:

Non-standard equipment or systems with effect to the contents of this manual, if installed, are entered in the table on page 1.

Druck-Info: Datei enthält 64 Seiten gesamt

Deviations from the Basic Maintenance Manual for the Type:

The aircraft specified below is fitted, in accordance with the entries in the list, with equipment or systems installed as an alternative to the equipment of the standard version. Resulting additional text has been included in the Maintenance Manual under the specified revision numbers; the text passages relating to the standard version have been crossed out. The necessary amendments to the text are described in further detail in the associated LBA approved Service Bulletins.

The procedure of amending the Manual in the case of installation of alternative equipment is described in further detail in the Service Bulletin A31-10-008 (see Annex B) as well as in Section 9.3.

The licensed inspector certifies by his signature that this Maintenance Manual complies with the data specified in the following and with the associated aircraft.

Valid for STEMME S10, serial no.:				
Affected Component	Am. No.	SB-Number	Date	Approval

0.1 Record of Amendments

Any amendment of the present manual must be recorded in the following table. Exempted are:

- Data relating to the installation of alternative equipment (page 1)
- Data relating to the installation of supplemental or additional equipment (page 51)
- Deletion of inapplicable text passages pursuant to the Service Bulletin A31-10-008.

The list of amendments on this page and the list of effective pages on the next page are assigned to the serial number. The indicated revision no. in the headline of these pages **does not change** with later entries in the lists.

Information as to which amendments **must** be included in the present Manual can be seen from the current "Record of Airworthiness Directives and Service Bulletins" (see Annex B, doc. no. A08-10-000).

The new or amended text of the latest amendment will be marked on the revised page by a black vertical line on the right hand margin. Any Amendment Numbers applied to the specific page and the date of the most recent amendment is indicated on the right hand side in the headline of each page. In text passages concerned by the installation of alternative equipment, the text for both versions is included in [ ]; the text not applicable to the serial number concerned must be crossed out. For further information please refer to Section 9.3 or to the Service Bulletin A31-10-008.

The inspector certifies by his signature at the same time the correct transfer of the information specific to the serial number (deletion of inapplicable text passages).

Am. No.	Affected Sections	removed Pages	included Pages	Amendment Date	Date of inclusion	Signature
1	0, 4	4, 21	4, 21	Aug. 15, 1991	Aug. 15, 1991	
2	0, 4	4, 21, 22	4, 21, 22	March 1, 1993	March 1, 1993	
3	0, 9, 10, 11, 12, 13	1, 2, 3, 5, 51, 53, 54, 55, 56	Title p., 1, 2, 3, 5, 51, 53 to 56, Cover p. Annex A, B, and C	July 1, 1993	July 1, 1993	
4	3, 12	14, 15, 47*, Fig. 3.3.2.a*, Fig. 3.6.b*	14, 15, 47*, Fig. 3.3.2.a*, Fig. 3.6.b*	May 26, 1993	May 26, 1993	
5	not issued					
6	3, 4, 10, 12	13, 25, 55, Fig. 3.2.b	13, 25, 55, Fig. 3.2.b	Feb. 10, 1994	Feb. 10, 1994	
7	3, 5, 12	4, 13, 14, 24 ⋯ 26, Fig. 3.2.a ⋯ g, Fig. 6.4.1.a	4, 13, 14, 24 ⋯ 26, Fig. 3.2.a ⋯ g, Fig. 6.4.1.a	Dec. 05, 1994	Dec. 05, 1994	
8	0, 5	2 ⋯ 5, 26 ⋯ 29	2 ⋯ 5, 26 ⋯ 29	Aug. 8, 1996	Aug. 8, 1996	
9	3, 5, 6, 7, 8	2...5, 19 ,27, 28, 33, 42, 44, 45, 48	2...5, 19 ,27, 28, 33, 42, 44, 45, 48	April 19, 1999	April 19, 1999	
10	0,4	2, 3, 21, 22,	2, 3, 21, 22-1, 22-2	March 16, 2005		
11	0, 3, 4, 5, 7,9	2..5, 18, 21, 22-1, 22-2, 27, 28, 29, 30, 36, 38, 51..54	2..5, 18, 21, 22-1, 22-2, 27, 28, 29, 30, 36, 38, 51...53, 54-1, 54-2	May 25, 2005		

** These pages may only be incorporated with the quoted amendment number if the alternative equipment item requiring the amendment is installed in the individual aircraft - please check the entries on page 1 for the corresponding SB. Amendment no. 4 is mandatory for U.S.A.*

Am. No.	Affected Sections	removed Pages	included Pages	Amendment Date	Date of inclusion	Signature
12	0, 4, 7, 12	Titel, 2 ,3, 21, 22-1, 22-2, 38, fig. 6.3.a,	Titel, 2-1, 2-2 , 3, 21, 22-1, 22-2, 38, fig. 6.3.a-1, fig. 6.3.a-2	Nov. 30, 2007		
13	0, 4	2 ,3, 21, 22-1, 22-2	2 ,3, 21, 22-1, 22-2	Nov. 24, 2008		
14	0, 4	2-2, 3, 21, 22-1, 22-2	2-2, 3, 21, 22-1, 22-2	Feb. 24, 2010		
15	0, 5	2-2, 3, 23-29	2-2, 3, 23-29	June 07, 2011		
16	0, 4	2-2, 3, 21, 22-1, 22-2	2-2, 3, 21, 22-1, 22-2	April 04, 2012		
17	0, 4	2-2, 3, 21, 22-1, 22-2	2-2, 3, 21, 22-1, 22-2	Aug. 13, 2012		
18	0, 4, 5	2-2, 3, 4, 5, 21, 22-1, 22-2, 23…30	2-2, 3, 4, 5, 21, 22, 23…30	Oct. 15, 2012		
19	0, 3, 7, 9	2-2, 3, 17, 40, 51, 52, 53, 54-1	2-2, 3, 17, 40-1, 40-2, 51, 52, 53, 54-1	Jan. 10, 2014		

0.2 List of effective pages

This record is valid only for the Serial No. specified on the title page. Any amendment is contained ex works that is effective for this Maintenance Manual at Aug. 08, 1996 (amendment status 08). Related to alternative equipment, only those amendments is provided for that correspond to the entries on page 1, amendments that are included later must be entered by hand.

Section	Page	Am. No.	Date
--	Title	12	Nov 30. 2007
--	1	3	July 1. 1993
0.1	2-1	12	Nov 30. 2007
0.1	2-2	19	Jan. 10, 2014
0.2	3	19	Jan. 10, 2014
0.3	4	18	Oct. 15, 2012
0.3	5	18	Oct. 15, 2012
res.	6		Oct 1. 1990
1	7		Oct 1. 1990
res.	8		Oct 1. 1990
2	9		Oct 1. 1990
2	10		Oct 1. 1990
res.	11		Oct 1. 1990
3.1	12		Oct 1. 1990
3.1/3.2	13	6, 7	Dec 05. 1994
3.3	14	4, 7	Dec 05. 1994
3.3	15	4	May 26. 1993
3.3	16		Oct 1. 1990
3.4	17	19	Jan. 10, 2014
3.5/3.6	18	11	May 25. 2005
3.7/3.8	19	9	April 19. 1999
res.	20		Oct 1. 1990
4	21	18	Oct. 15, 2012
4	22	18	Oct. 15, 2012
5.1/5.2/ 5.3	23	18	Oct. 15, 2012
5.3	24	18	Oct. 15, 2012
5.3	25	18	Oct. 15, 2012
5.3	26	18	Oct. 15, 2012
5.3	27	18	Oct. 15, 2012
5.3	28	18	Oct. 15, 2012

Section	Page	Am. No.	Date
5.3	29	18	Oct. 15, 2012
5.4	30	18	Oct. 15, 2012
6.1/6.3	31		Oct 1. 1990
6.4/6.5	32		Oct 1. 1990
6.6	33	9	April 19. 1999
res.	34		Oct 1. 1990
7.1/7.3	35		Oct 1. 1990
7.3	36	11	May 25. 2005
7.3	37		Oct 1. 1990
7.3/7.4	38	12	Nov 30. 2007
7.4	39		Oct 1. 1990
7.4	40-1	19	Jan. 10, 2014
7.4	40-2	19	Jan. 10, 2014
7.4/7.6	41		Oct 1. 1990
7.7/7.8	42	9	April 19. 1999
res.	43		Oct 1. 1990
8	44	9	April 19. 1999
8	45	9	April 19. 1999
8	46		Oct 1. 1990
8	47		Oct 1. 1990
8	48	9	Apr 19. 1999
8	49		Oct 1. 1990
res.	50		Oct 1. 1990
9.1	51	19	Jan. 10, 2014
9.2, 9.3	52	19	Jan. 10, 2014
9.3	53	19	Jan. 10, 2014
9.3	54-1	19	Jan. 10, 2014
9.3	54-2	11	May 25. 2005
10, 11	55	3, 6	Feb10. 1994
12	56	3	July 1. 1993

Figure to Section	Am. No.	Am. Date
2.a		Oct 1. 1990
3.2.a	7	Dec 05. 1994
3.2.b	7	Dec 05. 1994
3.2.c	7	Dec 05. 1994
3.2.d	7	Dec 05. 1994
3.2.e	7	Dec 05. 1994
3.2.f	7	Dec 05. 1994
3.2.g	7	Dec 05. 1994
3.3.a		Oct 1. 1990
3.3.2.a		Oct 1. 1990
3.4.1.a		Oct 1. 1990
3.5.a		Oct 1. 1990
3.6.a		Oct 1. 1990
3.6.b		Oct 1. 1990
3.6.c		Oct 1. 1990
3.6.d		Oct 1. 1990
3.6.e		Oct 1. 1990
6.3.a-1	12	Nov 30. 2007
6.3.a-2	12	Nov 30. 2007
6.3.b		Oct 1. 1990
6.4.1.a	7	Dec. 05. 1994
6.4.2.a		Oct 1. 1990
7.4.1.a		Oct 1. 1990

Annex A (Cover Page)	3	July 1. 1993
Annex B (Cover Page)	3	July 1. 1993
Annex C (Cover Page)	3	July 1. 1993

0.3 Contents

intentionally left blank

1. General Remarks on Maintenance

The holder of the powered glider STEMME S10 is obliged to ensure that, according to the specific national laws and regulations, the maintenance of the aircraft follows the instructions of this manual. Among others, there are

- controls,
- adjustments,
- exchange of fluids and lubricants,
- exchange of parts going to expire their service life,
- small repairs.

All maintenance work must be documented.

The manufacturer is to be notified immediately if the ownership changes and the message must be confirmed by the manufacturer, so that all information for continued airworthiness can be given to the holder.

For maintenance work the following documents must especially paid attention to:

1. This Maintenance Manual for the powered glider STEMME S10,
2. The "Flight Manual for the motorglider STEMME S10",
3. The "Operating and Maintenance Manual Limbach L2400 and Series",
4. Maintenance instructions for the "L'Hotellier" ball and swivel joints (in Appendix to this Maintenance Manual),
5. Manufacturer's documents referring to the equipment listed in the equipment list of the corresponding S/N.

The amount of maintenance work depends, irrespective of the periodic checks, on the utilisation of the aircraft, the climate, airfield conditions, storing facilities and other factors. E. g., in sandy environs it might be necessary to clean all filters before every commencement of operation; on the other hand in coastal or rainy regions it is important to take more care of the conservation of the aircraft. The instructions in this manual are valid under normal conditions and use.

Use only spare parts from the manufacturer or according to his requirements.

By faults which affect the airworthiness the manufacturer must be informed immediately.

The maintenance must be carried out by qualified personnel.

intentionally left blank

2. Brief Description and Technical Data

The STEMME S10 is a twin-seat high performance powered sailplane with an innovative propulsion concept and a high grade aerodynamic design. The wing is made of carbon fibre reinforced plastic, the fuselage is fabricated as a hybrid construction (carbon, aramide, glass) with an extremely rigid steel tube framework in the centre of force introduction. The seats are arranged side by side and equipped with dual controls.

The wing is attached to the fuselage behind the cockpit in the fuselage upper third. The wing consists of a one-part central wing equipped with flaps and Schempp-Hirth air brakes as well as two outboard wings with continuous ailerons.

The tail unit is designed as a T-tail.

The two-leg landing gear is electrically extended and retracted and is equipped with hydraulic disc brakes. The tail wheel is steered with the pedals.

The engine is located in the fuselage in a central steel tube framework near the aeroplane centre of gravity. The engine power is transmitted via a composite material shaft and a transmission gear to an articulated propeller in the fuselage nose. In soaring flight, the propeller is folded and covered by the slidable fuselage nose cone (propeller dome).

One fuel tank is located in each outboard area of the central wing.

Technical Data (general drawing figure 2.a)

Wing	
wing span	23.00 m
central wing span	9.90 m
wing area	18.74 m²
aspect ratio	28.22
dihedral angle	0.75°
sweep of central wing leading edge	0°
sweep of outboard wing leading edge up to the bend	0°
airfoil: laminar profile	HQ41/14.35
Air Brakes (two-storied Schempp-Hirth air brakes on wing upper side only)	
length	1.50 m
area	0.22 m²
maximum height above wing upper side	0.16 m
Wing Flaps	
span	4.39 m
area	0.75 m²
flap positions:	- 10° - 5° 0° + 5° + 10° (L) + 16°
Ailerons	
span	5.80 m
area	0.68 m²

Fuselage	
length	8.42 m
width	1.18 m
clear cockpit width	1.16 m
clear cockpit height	0.93 m
height at tail unit	1.75 m
Vertical Tail	
height	1.60 m
total area	1.51 m²
area of rudder	0.52 m²
airfoil	FX 71-L-150/35
Horizontal Tail	
span	3.10 m
total area	1.46 m²
area of elevator	0.36 m²
aspect ratio	0.62
airfoil	FX 71-L-150/25
Landing Gear	
2 main wheels (disc brake)	348 x 122
wheel track	1.15 m
tail wheel (steerable)	210 x 65
wheel base	5.46 m
Power-Plant	
engine	Limbach L 2400 EB 1.D
take-off power (3400 rpm)	69 kW
propeller	STEMME 10 AP-N
diameter	1.61 m
gear transmission ratio	i=1.18
Masses (see also figure 14.3.a)	
maximum allowable mass	850 kg
empty mass	640 kg
maximum mass of non-structural parts	570 kg
total useful load (occupants, fuel, baggage)	210 kg

mass of ballast: For pilot masses between 55 and 70 kg (including parachute), the defined ballast mass of 6 kg must be attached to the right-hand rudder pedal support.

For distribution of the useful load, please refer to the load and balance sheet in the Flight Manual.

The empty mass stated does not include any additional equipment. The total useful load will be reduced depending on the equipment.

In-flight Centre-of-Gravity Range aft of datum
(formed by the central wing leading edge, see figure 6.3.a) 254 to 420 mm

For further technical data, please refer to the Flight Manual.

intentionally left blank

3. Description of Assemblies

3.1 Cell, Primary and Secondary Structures

The **primary structure** includes:

- wing spars, root ribs, and wing spar boxes
- wing shells
- central fuselage framework
- tail boom and vertical stabiliser
- front portion of fuselage
- horizontal stabiliser
- fittings

The **secondary structure** includes

- control surfaces
- cowlings, cooling air system ducts, cockpit components

3.1.1 Wing

Sandwich shell made of carbon fibre reinforced plastic (CFP), CFP spars.

Consisting of three sections i.e. central wing with a span of 32.5 ft. (9.90 m) and two outboard wing sections with a length of 21.5 ft. (6.55 m) each.

Attachment to the fuselage by means of four sliding bolts, attachment central wing to outboard wings with one sliding bolt each.

Removable cowling to cover the wing/fuselage attachment. Beneath the cowling, free access to the wing attachment, control system joints and the "mixed" aileron/flap controls. Detachment of wing from the fuselage upwards.

Flaps over the total span of the central wing, ailerons over the total span of outboard wings. Articulation of flaps and ailerons on the lower side. Symmetrical and asymmetrical cross connection of flap and aileron controls.

Two-storied Schempp-Hirth air brakes on wing upper side.

Slots of flaps and ailerons sealed with elastic adhesive tape on wing upper side and with textile tape on lower side.

Boundary layer turbulator (adhesive point tape) on the wing lower side for defined flow transition (special equipment).

3.1.2 Fuselage and Cockpit

Modular construction of three assemblies bolted to each other: front section of fuselage (CFP-armada-glass construction), central fuselage framework with cowlings, tail boom (CFP construction).

The loads from the fuselage front section, wing, landing gear, power-plant and tail unit are introduced into the central fuselage framework.

Cockpit: Two seats arranged side by side. Console between the seats. Seat backs adjustable step by step, dual controls.

One-piece canopy hinged at the front and held in opened position by gas springs. Three locks each on the left and the right side to be operated by one locking lever on each side; "Röger"-hook on the rear/top. Emergency jettisoning: Open both locking levers and pull T-shaped handle for emergency opening (red, on the instrument panel). The canopy hinge opens and the canopy is lifted by means of a gas spring by approximately 4 in. (100 mm). The Röger hook must remain closed, since it is the axis of rotation until the canopy is jettisoned.

Cockpit ventilation via a nozzle in the instrument panel, canopy ventilation via openings in the canopy frame.

Instrument panel comprising three faces.

Two four-point harnesses with central locks.

Cockpit heating with power-plant waste heat (special equipment).

3.1.3 Tail Unit

Horizontal Tail

- T-arrangement.
- stabiliser as sandwich construction of CFP, elevator made of CFP.
- elevator slot sealed by elastic tape.

Vertical Tail

- Stabiliser as a sandwich construction of CFP.
- rudder as a sandwich construction of GFP, rudder slot sealed by elastic tape.
- integrated COM antenna in the rudder.

3.2 Control System

Longitudinal Control (figure 3.2.a)

Both control sticks are coupled by a connection tube. The control movements are transmitted via push-pull rods to the end of the tail boom and then straight up to the elevator fitting. In the tail boom, the push-pull rod is several times supported by linear motion ball bearings. The (adjustable) longitudinal control stops are in the middle of the connection tube beneath the right control system cover in the cockpit.

Longitudinal Trim (figure 3.2.a)

The powered sailplane is trimmed by means of a slidable spring system acting upon the connection tube of the longitudinal control in the cockpit.

Wing Flap Control System (figures 3.2.b and 3.2.c)

Both flap control levers are coupled by a connection tube. Control inputs are transmitted from this connection tube via push-pull rods to a "mixing shaft" in the central fuselage. From this "mixing shaft", the control inputs are transmitted via bell-crank levers, push-pull rods and quick-release joints to the control rods in the wing. The control rods in the wing are supported by means of linear motion ball bearings. Via bell-crank levers, the control movement is transmitted to the flap drive fittings.

On the flap input of the mixer, the flap control system is supported against the airframe structure by means of a gas spring so that the operation lever is nearly free of forces in each position corresponding to the respective airspeed. Due to the bi-directional viscous damping of the gas spring, impact loads are introduced into the structure and thus are held off the hand lever and the locking appliance. Flap positions are set in a notched plate that locks the control lever at the connection tube, located below the control gap cover in the cockpit.

Lateral Control (figures 3.2.d and 3.2.e)

The control sticks are cross-connected beneath the connection tube of the longitudinal control to a bell-crank lever in the centre. From the bell-crank lever, the control input is transmitted via push-pull rods to the "mixing shaft" in the central fuselage. Via this "mixing shaft", bell-crank levers, push-pull rods and quick-release joints, the control rods in the wing are moved. Both sides of the central wing contain a straight-through control rod supported by several linear motion ball bearings and equipped with a further quick-release joint at the attachment of the central wing to the outboard wings. From the push-pull rods in the outboard wing, the control movement is transmitted via two bell-crank levers to the drive fittings of the ailerons.

By means of the "mixing shaft", the ailerons are moved together with flap position changes and the flaps are moved together with aileron deflections. The percentage of co-movement depends on the position of the control surfaces. The lateral control stops (adjustment screws) are located in the cockpit beneath the covers of the control system well, on the elevator connection tube at the left and right side .

Operation of Air Brakes (figures 3.2.f and 3.2.g)

The hand-levers to operate the air brakes are coupled by means of a connection tube. Travel of the levers is transmitted via push-pull rods and bell-crank levers to a driving lever (elbow lever) in the centre fuselage, from which it is transmitted via push-pull rods and quick-release joints to push-pull rods in the wing, which then move the air brakes. The push-pull rods in the wing are supported by linear motion ball bearings.

The fully retracted position of the airbrakes is barred by over-centre-locking of the elbow lever. The locked position can be adjusted by a stop screw at the elbow lever. The fully extended position is determined by a fix rubber stop, which one end of the driving lever butts upon when this position is reached.

Directional Control

From the left and the right rudder pedal support, the control cables are led through the central fuselage to the tail boom entrance. At this point, the control cables of the left pedals and the right pedals meet to be directed further to the rudder driving lever. From the rudder driving lever, the tail wheel is steered via a spring connection. The directional control stops are mounted on the lower rudder support, the pertinent adjustment screws are located at the rudder on the drive fitting.

3.3 Power Plant (figure 3.3.a)

3.3.1 Engine

Type:	Limbach L 2400 EB1.AD[1]
Engine Description:	please refer to Flight Engine Operating and Maintenance Manual "Limbach L 2400 and Series"
Forward Engine Mount:	by means of a separate steel tube beam in vibration absorbing elements in the forward lateral framework junctions
Rear Engine Mount:	at the rear engine flange on top by means of two vibration absorbing elements on the upper transversal tube of the framework.

3.3.2 Fuel system

The powered sailplane is equipped with two independent fuel systems connected to each other only beyond the fuel pumps and each supplying fuel to both carburettors in parallel. Each system comprises a fuel shut-off valve, a water trap, a coarse filter and a fine filter. A backup system consists of two electrically driven fuel pumps, each piped in parallel to the respective main pump, both backup pumps switched with one common switch. General view: figures 3.3.2.a (piping) and 3.6.b (wiring).

[1] *Type designation changed: formerly L 2400 EB1.D. Ref. to Limbach Service Bulletin no. 17*

One fuel tank is installed in each outboard area of the central wing between spar and leading edge. The fuel tanks are made of a hybrid laminate. To ensure long-time resistance, the internal surfaces of the tanks are coated with a fuel-resistant protection film "Scotch Clad 776" (3M Company; MIL-D-1795-B).

The fuel is supplied from the tank through a pipe of relatively large cross section to the central wing root. At this point, a finger strainer combined with a flexible hose fitting is installed. From this flexible hose fitting, the fuel line - equipped with a fine filter - is conducted to the water separator. A flexible hose of 0.4 in. (10 mm) internal diameter leading to the drainer in the wheel well serves as a water trap. The fuel line is directed from the water separator via the associated shut-off valve to the fuel pumps. Beyond those, both systems are cross-connected and then piped on to the distribution line of the carburettors. The main pump of the left hand fuel system is mechanically driven from the engine (and located on it), the right hand system is provided with an electrically driven main pump.

The fuel tank vent is located close to the filler cap. From this point, an aluminium tube Ø 8 x 1 mm is installed over a length of 5.25 ft. (1.60 m) towards the fuselage and then back to the wing attachment point. The fuel tank vent discharges on the wing lower side at the attachment. The discharge opening is tapered by 45° towards flight direction (thus ramming intake).

3.3.3 Oil System

A thermostat-controlled oil cooler (switching point 176℉ / 80℃) is installed in the main oil flow of the engine. The oil cooler is located on the left side of the central fuselage framework. The connection to the fittings on the engine is realised by means of flexible hoses with metal reinforcement and a fire-resistant sheathing.

3.3.4 Cooling System

The engine is cooled by ram air. The air inlets are to the left and to the right side of the central fuselage cowlings. From these inlets, the cooling air flows directly to the cylinder heads. A minor portion of the cooling air is blown into the engine compartment through several openings. On the left side of the central fuselage cowling, the cooling air duct is continued to the oil cooler. The cooling air outlet is located in the lower cowling of the central fuselage. Both inlet flaps and the waste air flap are synchronously operated by means of bowden cables, which are directed into the cockpit and attached to a bell-crank lever in the left leg room (behind the cover). This bell-crank lever to close the flaps is actuated together with the propeller dome control. All three flaps are opened by means of springs attached to the flaps, when the propeller dome is opened and the bell-crank lever released.

3.3.5 Induction System

The screens of the engine induction system are mounted on the firewall. The air is supplied through air inlets at the upper end of the vertical stabiliser, through the tail boom and air inlets in the front and central areas of the fuselage. From the induction system screens, the air is supplied through a spiral hose duct to the carburettors.

3.3.6 Exhaust System

The arrangement of the exhaust system can be seen from the general view figure 3.3.a: The exhaust manifolds are directed beneath the engine with slight lateral displacement rearwards to a muffler. Drip pans are installed beneath the carburettors in order to collect possible fuel leakage and to divert leaking fuel around the exhaust manifold. The exhaust gases discharge from the muffler directly down through the lower engine cowling.

The whole exhaust system is made of corrosion resistant steel. It is attached exclusively to the engine.

3.3.7 Power-Plant Controls and Instruments

Power and choke are controlled via bowden cables led from the carburettors over the engine to the central console in the cockpit. Operation from the cockpit is realised by means of a lever with adjustable friction.

The cowl flaps are moved simultaneously with the lever for opening and closing the propeller dome.

The power-plant instruments are located on the right face of the instrument panel.

3.3.8 Fire Protection

To the front, upwards and rearwards, the engine including the exhaust system and the induction system (except for induction system screens) is separated by means of a fire-wall from the remaining parts of the powered sailplane. The firewall is made of corrosion resistant steel sheet of .01 in. (0,38 mm) thickness.

The engine compartment is enclosed at the sides and below by the engine cowlings. The internal surfaces of the cowlings are treated with a fire protection coating.

3.3.9 Engine Cowlings

The engine cowling is formed by the lateral and the lower parts of the central fuselage cowling. The cowlings are connected to each other and to the fuselage front section and to the tail boom by means of Camloc snap fasteners.

3.3.10 Propeller

The articulated propeller consists of a central part and two propeller blades hinged to this central part. The articulation axle is aligned so that the propeller blades are movable in the plane of rotation of the propeller. When the propeller is not running, the blades are folded inwards by means of springs.

When the engine is started, the blades unfold automatically by centrifugal force. Soft rubber stops protect the blades in case of probable overswing. Also during folding, the movement of the blades is cushioned by rubber stops.

The central part of the propeller is made of high strength aluminium. The propeller blades are made of carbon/aramide/glass laminate. The blade hinges are equipped with needle bearings.

Marking:

- complete propeller: 10 AP-N / XX / YYYY / ZZZZ
- propeller blade: 10 AP-NB / XX / YYYY / ZZZZ

X = date of amendment of drawing
Y = order number of production
Z = month and year of production

3.3.11 Drive train System

The drivetrain includes:

– Clutch on the engine side: a force transmitting clutch operated by direction and speed. In addition, the clutch has integrated positive elements to allow torsional and angular flexibility as well as longitudinal flexibility. Since the clutch transmits the torque by friction, it serves as an overload protection at the same time.

– Drive shaft made of carbon fibre reinforced composite material

– Flexible coupling on transmission gear side: flexible coupling with elastic angular and torsional flexibility. Lateral flexibility is eliminated by means of a centring bearing.

– Transmission unit: one-stage quintuple high performance V-belt transmission unit with maintenance-free sealed antifriction bearings. The belt pulleys are subjected to a special hard anodising process. The transmission unit is supported in the foremost fuselage frame by four mounts with non-linear characteristics for vibration absorption.

3.4 Landing Gear

3.4.1 Main Landing Gear (figure 3.4.1.a)

Left and right landing gear legs each supported by two sleeve bearings in the central fuselage framework, swivel axis in flight direction. Trailing arms hinged with sleeve bearings in the legs. Elastomere spring bars in the rear tube of the leg.

Retraction and extension with one electric spindle drive for each side.

Retraction: one after the other - first the left landing gear leg, then the right one together with the gear door, and then the left gear door.

Extension: first the left gear door, then the right landing gear leg including gear door, and then the left leg.

The Gear-down position is locked by means of over-centre locking of the operating arms.
Electric stop switches for "DOWN" position: on the associated operating arm.
Electric stop switches for "UP" position: at the front of the wheel well on the associated side.

Indication of "DOWN" position by one green LED (light emitting diode) each for the left and the right gear leg on the right face of the instrument panel. During extension and re-traction of the landing gear legs, the corresponding LED is blinking red. With the landing gear in the retracted position, the diodes extinguish and the position of the spindle drives is fixed by means of blocking brakes above the spindle drive motors. The brakes are locked by springs and released electrically during operation of the spindle drives.

The wheel well is covered by two landing gear doors; the right-hand door is coupled via a spring element directly to the right gear leg. The left-hand door is closed via a bowden cable which is operated also by the right landing gear during the last part of its track.

Electric landing gear warning: acoustic warning activated by switches on the air brakes control shaft beneath the left stick cover.

The disk brakes on the main L/G wheels are operated hydraulically. The main cylinder for both the left and right wheel is located on the LH control stick, on RH stick optional. The pressure line from the main brake cylinder to the brake callipers of the wheel brake in the center fuselage are designed as metal-shielded brake hoses. The brake fluid reservoir is located in the landing-gear bay, cabin rear wall.
The parking brake valve to set and to release the parking brake is located on the floor panel console in front of the LH control stick. The parking brake valve is operated by a lever respectively rotary handle. The brake action is simultaneously on both main wheels. Maximum brake pressure for the system layout is 115 bar / 1668 psi, maximum allowed system pressure is 200 bar / 2900 psi.

Only for hydromechanical Brake System:
The master cylinder for both the left and right wheel is located in the wheel well at the front wall (pressure line to the wheel cylinders by short metal tube, T-type distributor and metal-shielded brake hoses). The connection to the hand operating lever on the left stick (right stick optional) is made by a bowden cable, adjustable at the master cylinder. The hand lever can be locked in the operated position for use as a parking brake.

Main Landing Gear Emergency Extension

Mechanical emergency extension system: By operating two pulls, the connection of the electric landing gear spindle drive to the operating arm is successively released via bowden cables. The landing gear legs extend by gravity to the "DOWN" position. The operating arms are pressed into the locked position by means of spring clips. For operation, the proper sequence is to be adhered to: first the right gear leg, then the left gear leg. The right landing gear leg is equipped with a catch strap in order to prevent the legs from getting stuck in case of incorrect operation (i.e. left leg first).

3.4.2 Tail Wheel

Tail wheel steerable with the rudder pedals and connected to the rudder by springs.

3.5 Flight Instruments, Pressure System (figure 3.5.a)

Instruments: see Equipment List.

The pitot pressure, the static pressure and the total energy compensation are measured by means of a bar probe in the propeller dome. The ducts are directed to the instrument panel. The static pressure measured by the bar probe may not be used for the airspeed indicator!

In addition, static pressure is measured primarily for the airspeed indicating system on both sides of the tail boom. This duct is also directed to the instrument panel. All ducts are equipped with water traps/filters.

3.6 Electric System (figures 3.6.a to 3.6.e)

The electric system is supplied by a main battery and a generator. The main battery is installed behind the firewall.

All current circuits and electric instruments are protected by fuses or circuit breakers, respectively.

Master Switch: cuts all current sources from the main bus. In case of failure of the main current circuit, the avionics instruments are automatically switched over to the auxiliary battery (if installed).

Subordinate Switches:

Engine master switch: to switch "ON" / "OFF" all electric appliances of the power-plant (starter, instruments, etc.) connected to the main battery and the generator. Recommended switch position for soaring flight: "OFF", since otherwise current consumed.

Starter: push button for electric engine starter.

Ignition: to switch Ignition "ON" / "OFF".

Avionics: to switch "ON" / "OFF" all flight and navigation instruments electrically energised.

During operation of the starter, the avionics instruments are switched off or switched over to the auxiliary battery (if installed).

Landing gear switch:
- Upper position: RETRACT
- Lower position: LOWER
- Centre position: Circuit disconnected from electrical system.

ACL (optional): ON / OFF - only operative with engine master switch ON (Anti-Collision Light).

Position lights (optional): ON / OFF - only operative with engine master switch ON.

Auxiliary Battery (optional)

Location: left leg room or top of the fin, depending on trim requirements.

Utilisation: Supply of avionics especially during soaring flight in order to avoid inadvertent discharge of the main battery and to ensure sufficient capacity of the main battery for restarting the engine.

Switching: By switching over from the main to the auxiliary battery with the switch "AVIONIC SUPPLY".

Charging: By the generator or externally (maximum charging voltage 14.7 V)

3.7 Communication and Navigation Equipment

The VHF transmitter-receiver is a part of the minimum equipment. Furthermore, equipment approved for operation in powered sailplanes or not subject to approval may be installed. The mass limits and the centre-of-gravity range for equipment in the instrument board as well as the limits of current consumption are to be adhered to.

Locations of the antennas:

- The radio antenna is installed in the rudder.
- The VOR-antenna is installed on the cockpit floor (armada shell).
- The transponder antenna is installed in the tail boom.

3.8 Oxygen Equipment

One or maximum two oxygen system mountings (optional equipment) for one oxygen bottle each are installed in the upper baggage compartment. The mountings are suitable for oxygen bottles from various manufacturers, provided the diameter is within a minimum of 132 mm / 5.2 in. and approx. 140 mm / 5.5 in., and the total length including regulator is approx. 450 mm / 17.7 in. through a maximum of 520 mm / 20.5 in..

The certification of the powered glider does not include a certain oxygen system and fulfilment of the requirements must be demonstrated to the authority by the supplier or the facility, which modified the a/c (normally as a modification of a single a/c).

intenionally left blank

4. Airworthiness Limitations Section

The permissible operating times of all parts, components and assemblies assigned for installation - in series or optional - in the powered sailplane STEMME S10 and subject to service life limitations, are notified in the following list.

The referred IPC-Chapters refer to the Illustrated Parts Catalog for Type S10, STEMME Doc. no. A44-10-00, latest Revision.

Review of permissible operating times:

No.	Part/Assembly/ Equipment	Manufacturer, Type	Part No. (STEMME)	IPC Chapter	Permissible op. time by		Notes
					Overhaul (TBO)	Replacement	
1	Airframe (Composite structure)	STEMME	sundry	--	-	6000 h	
2	Propeller (fixed pitch)	STEMME	10AP-N	61-10	400 h		
3	Propeller lateral parts	STEMME	10AP-N01 10AP-N11	61-10		1000 h	
4	Reduction Gear (V- belts)	STEMME	10AG	72-10	400 h		
5	Gear suspension	STEMME	10AA	72-10	1000 h 12 years		
6	Flywheel clutch (2 flyweights)	STEMME	10AK	72-10	400 h		
7	Driveshaft	STEMME	10AS-07 10AS-W 10AS-F	72-10	800 h		
8	Rubber parts of the clutch	STEMME	10AK-43 10AK-48	72-10	-	12 years	
9	Flexible disk of the drive shaft system (Cardan Joints)	STEMME	10AS-09	72-10	-	12 years	
10	Fuel Hoses	STEMME	HZ-KSL010 HZ-KSL014 HZ-KSL031	28-20	-	5 years	
11	Lubrication hoses	STEMME	10AM-KÖ04 10AM-MO04	79-20	-	5 years	
12	Brake hoses	sundry	10FO-B06 / 10FO-B15	32-40	-	10 years	

Overhauls of STEMME components may only be performed in accordance with manufacturer approved data.
If the limitation is given in operating hours and in a calendar period (year), the first occurring case applies.

07 FEB 2013
EASA Approval: 10043570

NOTES:

5. Time Limits / Maintenance Checks

5.1 Life-Limited Components

For Life limited parts refer to the Airworthiness Limitations section of the manufacturer documentation (applicable Maintenance Manual, Service Bulletin etc.) for permissible service life limits prescribed by the respective manufacturer. These items must be entered in the form Review of Operating times.

5.2 Pre- Flight Checks

See Flight Manual.

5.3 Periodical Checks, Inspection Lists

The intervals for general maintenance tasks depend on operating conditions, climate, stowage, etc.

Notwithstanding the above mentioned conditions, however, at least the following periodical checks are to be performed:

Type 1a after the first 25 operating hours

– **Type 1b** after the first 50 operating hours and every further 50 operating hours

– **Type 2** after the first 100 operating hours and every further 100 operating hours

– **Type 3** annually

The items to be checked are given in the following "Inspection Lists for Periodical Checks".

In addition, special inspections which may be prescribed by the manufacturer or by the airworthiness authority are to be performed in accordance with the directives issued.

Unscheduled Maintenance for propeller assembly, engine drive section and reduction gear components:

An unscheduled overhaul or replacement additional to expiration of the stated time limit is necessary in each case of:

- Impact stop (possible ground touch of the propeller);
- Non- observance of the periodical inspections as they are fixed in the Maintenance Manual,

In case of damaging by ground contact, bird strike, stone strike or similar which require a „large repair“, the manufacturer decides which parts of the complete drive system are affected and if a repair may be practicable or if an overhaul or replacement has to be performed.

Check Lists for Periodical Inspections

Caution: Prior to any rigging tasks, please refer to chapter "Maintenance Instructions".

Type and Subject of Inspection	Inspection Type			
	Type 1a	Type 1b	Type 2	Type 3
5.3.1 Wing				
1. Check surface for damage and cracks, look out for signs of hidden structural damage, check registration marks, renew if necessary.			X	X
2. Check drain and vent outlets.				X
3. At the wing root: inspect quick-release joints for function and proper sealing, check plug-in connector of fuel gauge.	X			X
4. Inspect fuel tank unit for: function of tank ventilation, proper sealing of filler caps, leakage of fuel into the tank compartment of the wing.	X		X	X
5. Inspect wing fittings, grease slightly, check play, check locks of wing attachment bolts	X		X	X
6. Check wing flap and aileron bearings for correct play, function and corrosion, clearances of the components between each other and spanwise clearance between the components and the wing 3 ± 0.5 mm. Check upper and lower gap sealings.				X
7. Check all control rods and bearings in the area of the wing-to-central-fuselage attachment; check quik release joints - is a spring cotter fastened unloosable to the connector?	X		X	X
8. Check and maintain the L´Hotellier quik release joints of the aileron push-pull rods at the inner-to-outer wing attachements, according to the manufacturer instructions (ref. to Appendix A). Is a spring cotter fastened unloosable to the connector	X		X	X
9. Remove fairings on the flap and aileron link rods and inspect the bellcrank levers and the other parts of the flap and aileron drive systems in the wing for tight fit of all screw joints, cracks, deformation and other defects. Use an endoscope or an inspection mirror.			X	X
10. Examine all control rods in the terminal swaging area for embrittlement or crack initiation (axial and peripherical direction), check fork terminals for cracks, particulary the fork terminals where the root turns into the webs.			X	X
11. Inspect air brakes for correct retracted position and ease of operation, check screw joints for tight fit.			X	X
5.3.2 Fuselage Front Section				
1. Inspect surface for damage and cracks, look out for signs of hidden structural damage; check especially fuselage lower surface for damage caused by stone strike.			X	X
2. Check static pressure ports.		X	X	X
3. Propeller dome lock: check for proper function, particularly safe locking during engine operation. Only with the lever fully engaged, the switch installed in the locking system completes the starter circuit.	X	X	X	X
4. Check condition of propeller dome push tube; play perpendicular to the flight direction must be less than 3 mm (at the dome tip)			X	X

Type and Subject of Inspection	Inspection Type			
	Type 1a	Type 1b	Type 2	Type 3
5.3.3 Cockpit				
1. Inspect the canopy for damage and proper functioning of the locking mechanism. Grease in case of stiff operation.	X		X	X
2. Emergency jettisoning system: functional check. The compressed gas spring must have a minimum strength of 150 N.				X
3. Check lateral gas springs for proper function: canopy must remain in the opened position.				X
4. Inspect safety harnesses and their points of attachment.				X
5. Check stops, smooth movement and neutral position of the control sticks. Check all controls for ease of operation, including flap, air brake and trim controls. If there is any jamming or chafing within the range of operation, trace and eliminate the reason. Counterforce at the flap lever in "L"-position must be 28 ± 6 lbf (125 ± 25 N), damping must be perceivable in both directions.	X		X	X
6. Remove control system coverings to the left and to the right, check for foreign objects. Check bearings for proper condition and all joints for tight fit. Inspect rods and bellcrank levers for cracks, deformation an other defects.	X			X
7. Examine all control rods in the terminal swaging area for embrittlement or crack initiation (axial and peripherical direction), check fork terminals for cracks, particulary the fork terminals where the root turns into the webs.			X	X
8. Inspect condition and attachment of instruments, switches, circuit breakers, fuses and wiring.	X	X	X	X
9. Flexible hoses of ventilation, heating and instruments: Check condition and installation.	X			X
10. Inspect and if necessary replace moisture/dust filters in the instrument hose system.				X
11. Inspect rudder pedals and cables, check adjustment device.	X		X	X
12. Seats: check condition, attachment and adjustment device.	X		X	X
13. If installed in the cockpit: check condition of battery(ies), their terminals, and installation				X
14. Functional check of propeller brake and propeller positioning	X		X	X
5.3.4 Centre Section of Fuselage				
1. Inspect central fuselage framework for damage, corrosion, and chafe marks.				X
2. Check condition of framework/ tailboom attachment points and tight fit of screw joints.				X
3. Check condition of lower attachment points framework to front fuselage section and tight fit of screw joints.				X
4. Inspect all control rods and levers in the central fuselage for tight fit of all joints, proper condition of the bearings, and for defects such as cracks or deformation. Check rudder cable guides for proper condition and tight fit.	X		X	X
5. Check flap relief gas spring for proper condition and tight fit at the hinge points.			X	X
6. Check condition, fit and locks of cowlings and coverings.	X		X	X

Type and Subject of Inspection	Inspection Type			
	Type 1a	Type 1b	Type 2	Type 3
5.3.5 Tail Boom				
1. Inspect surface for damage and cracks, look out for signs of hidden structural damage, check lower surface for damage caused by stone strike, check registration marks and renew if necessary, check drain outlets.			X	X
2. Check static pressure ports and flexible hoses from the tail boom via the central fuselage to the cockpit		X	X	X
3. Inspect bellcrank lever of the elevator control system in the base of the fin by means of an endoscope introduced through the two inspection holes for tight fit of all bolt connections, proper condition of the bearings, and for cracks, deformation and other damages.				X
4. Examine push pull rods in the terminal swaging area for embrittlement or crack initiation (axial and peripherical direction), check fork terminals for cracks, particulary the fork terminals where the root turns into the webs.			X	X
5. Check connection of rudder control cables at the tail boom entrance for improper condition.	X			X
5.3.6 Empennage				
1. Check vertical stabiliser (**VS**) and rudder surface for damage and cracks, look out for signs of hidden structural damage, check nationality and registration marks (renew if necessary), check drain outlets			X	X
2. Inspect rudder supports for firm attachment, check especially the lower support for cracks and deformation. Check play of the hinges. Check split pin lock.	X		X	X
3. Inspect connection of the antenna cable (rudder, bottom)				X
4. Check rudder cables and their attachment	X		X	X
5. Check rudder stops, especially for unobstructed rudder deflection in case the tail wheel is blocked.	X		X	
6. Check horizontal stabiliser (**HS**) front fitting for sufficient spring tension and ease of operation of the lock bolt. Inspect for fatigue cracks and corrosion.	X		X	X
7. Inspect HS rear fitting for wear of pins/bushings, fatigue cracks (especially in the vicinity of welding and cut-outs in the fixing plates), axial and radial clearance, corrosion.	X		X	X
8. Check tight fit of all bolt connections of both HS fittings.	X			X
9. Check HS fittings for slackness after attaching the HS.	X			X
10. Check bolt connection of elevator push-pull rod to rear HS fitting.	X		X	X
11. Inspect HS and elevator for damage and cracks, look out for signs of hidden structural damage. Check drain outlets.			X	X
12. Check deflection of rudder and elevator (for Control Surface adjustment data, see Section 12 Alignment Record)				X

Type and Subject of Inspection	Inspection Type			
	Type 1a	Type 1b	Type 2	Type 3

5.3.7 Powerplant - except Propeller and Drivetrain System

The hours given in this list are engine operating hours.

Caution: In excess of the inspections listed below, the instructions of the engine manufacturer given in the Engine Operating and Maintenance Manual are mandatory. LIMBACH prescribes an additional periodical engine check after every 25 operating hours.

1. Inspect engine supports and rubber mounts.			X	X
2. Check fuel lines and fittings for leak tightness (fuel leakage)	X		X	X
3. Check conditions of fuel lines (in particular cracks in the outer surface)		X	X	X
4. Check function of the electric fuel pumps.			X	X
5. Replace fine filters, clean coarse filters (inserted in the tank fitting at the wing root; open clamp on wing side and remove finger strainer)			X	X
6. Inspect oil lines between engine and oil cooler including fittings. Check sealing lips on the cowling for proper sealing.	X		X	X
7. Check function of air inlet flaps and air outlet flap for free movement (no jamming?) and full opening angle. Sealing lips on the cooling air duct in the cowling must be in contact with the cooling air box on the engine.	X	X	X	X
8. Inspect flexible ducts between air filters and carburettors, check for tight fit.	X		X	X
9. Check the exhaust system for sealing, cracks and correct attachment.	X		X	X
10. Throttle/choke control: make sure that the extreme positions in the carburettors are achieved. Check attachment of bowden cables and sleeves. Check condition of the return springs on the carburettors.	X		X	X
11. Check powerplant instruments for improper functioning.	X		X	X
12. Check fire wall steel sheets for improper condition and looseness.	X		X	X

5.3.8 Propeller

The hours given in this list are engine operating hours.

1. Visual inspection of the central part for cracks, corrosion and other damage. Check all parts for tight fit, check rubber stops for damage	X	X	X	X
2. Check pre-load force of blade folding spring: With the central part horizontal, the lower blade must still slightly be pulled against the rubber stop. Check play of blade tips in flight direction: not more than a total of 4 mm.	X	X	X	X
3. Visual inspection of the propeller blades for damage, such as cracks, gaps in the glued seam and surface damage. Check erosion protective tape on the leading edges for poor condition, repair or renew it if necessary.	X	X	X	X
4. Check tightening torque of the attachment screws propeller to transmission gear: 30 Nm. Refit safety lock wire.	X		X	X

5.3.9 Drivetrain System

The hours given in this list are engine operating hours.

1. Clutch on engine side: check for tight fit on engine flange, check thickness of clutch linings: min. 2 mm.	X		X	X
2. Check function of clutch: turn the propeller by hand: smooth movement in the normal running direction, more roughly to the opposite).	X		X	X
3. Inspect torsionally flexible couplings (rubber elements) for tight fit, embrittlement and cracks in the rubber	X		X	X
4. Check the splined sliding joint for tight fit (hub on clutch, 3 bolts) Observe section 6.5.	X		X	X

Type and Subject of Inspection	Inspection Type			
	Type 1a	Type 1b	Type 2	Type 3
5. Propeller brake: check thickness of brake band lining - min. .06 in./1.5 mm. Check actuation mechanism for smooth operation.			X	X
6. Check condition and tension of V-belts: Press-in depth 3.7 mm at a press-down force of 50 N on each belt, applied half-way between the axes. Adjust if necessary, then fit new safety lock wire.	X	X	X	X
7. Check tight fit and securing of the gearbox suspension at the front spar, and for proper condition - rubber material must be free of embrittlement or cracks.	X		X	X
8. Check transmission gear bearings for running noise and lubricant leakage (turn the propeller by hand).	X		X	X

5.3.10 Main Landing Gear

1. Inspect the main landing gear legs and trailing arms for deformations and possible cracks as an result of overloads	X	X	X	X
2. Check the linear actuators for external damages	X		X	X
3. Inspect the screw joint of the complete landing gear	X		X	X
4. Check condition of main landing gear tires, creep markings. Tire pressure: [45 - 48 p.s.i. (3.1 - 3.3 bar)] [5s] [36 – 39 p.s.i. (2.5 - 2.7 bar), if optional wide tires installed] [5a]	X	X	X	X
5. Functional check of trailing arm link suspension.	X			X
6. Wheel bearings: check for ease of operation and slackness.	X		X	X
7. Inspect brake master and wheel cylinders. Check brake hoses and pipes for proper guidance, chafe marks and leakage.	X		X	X
8. Inspect brake discs and brake linings (min. .06 in./1.5 mm).			X	X
9. Check brake fluid level (replace fluid once in two years).	X		X	X
10. Check efficiency of brakes.	X	X	X	X
11. Clean and regrease hinges of landing gear doors.			X	X
12. Check function of landing gear (support aircraft on trestles): limit switches, fit of gear doors, bowden cables for emergency release and the release mechanism on the brace strut, for improper operation and poor condition.	X		X	X
13. Inspect the operating mechanism of the LH landing gear door, including bowden cable, for improper operation and poor condition.	X		X	X
14. Check landing gear position indicator and warning system	X	X	X	X
15. Functional check of landing gear Emergency Let Down				X

5.3.11 Tail Wheel

1. Check tail wheel unit for ease of operation and slackness.	X			X
2. Check condition of tire, check pressure (2.8 ± 0.2 bar) and creep marking.	X	X	X	X
3. Inspect wheel fork, including journal bearing.	X		X	X
4. Check spring coupling between tail wheel and rudder	X		X	X

5.3.12 Flight Instruments and Static Pressure System

1. Check condition and function - if applicable service life limits - of the flight control instruments (see Equipment List)				X
2. Check adjustment of the stall warning system (every second Type 3 inspection)				X

Type and Subject of Inspection	Inspection Type			
	Type 1a	Type 1b	Type 2	Type 3
5.3.13 Electrical System				
1. Inspect wiring and conduits for improper routing, insecure mounting and obvious defects, electrical components for tightness of fit and poor condition.				X
2. Inspect the main battery for poor condition (check drop in voltage during starter operation). For battery maintenance refer to manufacturer instructions.				X
5.3.14 Radio and Navigation Equipment				
1. Inspect radio and navigation equipment (refer to the Equipment List) for poor condition, improper operation and, if applicable, service life limits.				X
2. Check each antenna installed				X
5.3.15 Oxygen System				
1. Inspect oxygen system, if installed, including mounting. Observe Maintenance Instructions of the Manufacturer (Annex A).				X
5.3.16 Completition works				
1. After end of maintenance on the drive train system – Engine check run	X	X	X	X

5.4 Special Inspections

5.4.1 Inspection following an Impact Landing or a Wing Tip Landing

Following an impact landing or a wing tip landing, the aircraft is to be subjected to a comprehensive inspection. The inspection may be carried out by a knowledgeable person or - in case of doubt concerning the extent of damage - by an inspector holding appropriate rating. The inspection program is to be requested from the manufacturer.

5.4.2 Inspection following an Impact to the rotating Propeller

Following an inpact to the rotating propeller (caused by touching the ground or obstacles), the propulsion system is to be subjected to a comprehensive inspection. It may be performed by a licensed and appropriately rated inspector. The inspection program is to be requested from the manufacturer.

6. Maintenance Instructions, Tolerances, Adjustment Data for the Aircraft

6.1 General Information

-

6.2 Ground Towing, Supporting Points, and Lifting of Aircraft

Ground towing of the aircraft by automobile may be made only in flight direction, since the tail wheel runs in a castering fork the lateral deflection of which is limited to 30° in both directions.

For ground towing, two ropes of textile material of at least 33 ft. (10 m) each are needed. They are to be attached to the front struts of the main landing gear at the lowest possible points (mind the brake system tubes!). The cockpit is to be manned with an instructed person. The aircraft is to be towed at walking pace.

For manouevring on the ground, the manufacturer offers a tail wheel dolly. In exceptional cases, the aircraft may be pushed backwards over a short distance without a tail wheel dolly, if the rudder is directed.

The supporting points to lift the whole aircraft are situated on the wing lower sides under the wing spar at a distance of approximately 3.3 ft. (1 m) from the fuselage (the position of the wing spar is to be determined by slight tapping). Supported at the tail wheel, the fuselage rear end is to be lifted by approximately 1.6 ft. (0.5 m).

The wing is to be supported over an area of at least 8 in. x 12 in. (200 x 300 mm) (the longer side in wing span direction). A plywood sheet of 2 in. (50 mm) thickness with a felt layer of .6 to .8 in. (15 to 20 mm) thickness or something adequate is to be used. The support under the plywood sheet center must be flexible so that the wing rests evenly upon the plywood sheet.

The stands must be capable of reliably carriing the aircraft mass and be sufficiently stable. The slabs to support the wing must be non-skid.

Warning: Ensure that the wing stands are evenly lifted and correctly positioned, since otherwise the wing shell and spar will be deformed or even destroyed.

Letting down of the aircraft must also be done evenly; during both lifting and letting down, the profile chord shall always remain in a nearly horizontal position.

The fuselage with the wing removed may be supported as follows:

– either in a felt-lined, fitted rigid tray of a width of 40 in. (1 m) and a length of 16 in. (.4 m). directly in front of the landing gear doors

– or remove the front wing attachment bolts and replace them by round bars of St 37 (soft steel) or something similar, Ø .78 ±.004 in. (19.8 ± 0.1mm), length 12 in. (300 mm). The bars are to be pushed in by 6 in. (150 mm) and to be locked against displacement. By means of these bars, the fuselage may be suspended or supported.

6.3 Determination of the Empty Mass and Corresponding Center of Gravity; Information on Mass Limits

In the following paragraphs, the determination of single masses, of mass limits and of the empty mass and corresponding center of gravity is described. Please refer to the "Mass and Balance" Sheet, fig. 6.3.a, and the table "Empty Masses and Allowable Center of Gravity Positions as a Function of Empty Masses" fig. 6.3.b.

The Equipment List required for weighing is always part of the latest valid inspection records.

Especially after repairs, after installation of additional equipment and after painting works, make sure that the empty weight and corresponding center of gravity remain within the allowable range. If this cannot be determined by analysis, the aircraft is to be weighed.

If necessary, the aircraft is to be trimmed by fixed ballast on the transmission gear frame or behind the tail wheel so that the center of gravity corresponding to the empty mass is within the allowable range.

If equipment in the instrument panel has been replaced, the correction of the empty mass and corresponding center of gravity is to be based on the lever arm in front of the reference plane. Check if the center of gravity position is still within the allowable range.

6.4 Control System

6.4.1 Deflection of Control Surfaces, Control System Friction, and Pilot Forces

Measurement procedures and design values are listed in the Alignment Report. Pattern see fig. 6.4.1.a.

6.4.2 Masses and Moments of the Control Surfaces

After repair and new painting of the control surfaces, it is to be checked whether the masses and taildown moments are still within the allowable tolerances. In case the tolerances are exceeded, the manufacturer is to be contacted.

The allowable masses and moments of the control surfaces are stated in fig. 6.4.2.a "Masses and Moments of Control Surfaces". The sheet also contains the procedures to determine the moments.

6.4.3 Slackness of Control System Bearings

For each control surface, a maximum slackness between the cockpit control and control surface is permitted. It is determined at the same measurement points where the control system alignment data are checked (please refer to fig. 6.4.1.a). During this check, the cockpit controls are to be locked.

	allowable slackness
ailerons	0.1 in. (2.5 mm)
wing flaps	0.1 in. (2.5 mm)
elevator	0.1 in. (2.5 mm)

6.5 Lubrication Chart

Lubricants:

For slide bearings steel-on-steel and anti-friction bearings, use lubricants and oils on an MoS_2 basis. For bearings containing brass, bronze or copper components, only MoS_2-free lubricants and oils shall be used.

Bearings of the Control System and Control Surfaces:

The control system bearings in the fuselage and in the wing are provided with permanent greasing and do not require any service for a long time.

The control surface hinges (except the rudder hinge) are coated and normally lubrication is not required, unless under aggressive environmental conditions, the bolts show first signs of corrosion (in this case use MoS_2-free lubricant).

The rudder hinges are to be lubricated depending on the degree to which they are exposed to contamination (especially the lower hinge).

Connection of the propeller shaft to the Clutch on the Engine Side (splined sliding joint):

CIBA drive shaft: Grease (MoS_2-free) during special inspections.

Other models: The surface of the splined joint is protected by a coating on delivery and is thus maintenance-free. Do not grease!

Canopy Lock:

Always keep well-greased (MoS_2-free lubricant, since rod bearing within the canopy frame is made of brass).

6.6 Tightening Moments for Screw Joints

These data apply to standard screw joints. Differing data, however, given for the assemblies, e.g. propeller and engine, are to be adhered to in any case.

	Tightening Moment	
Thread	[Nm]	[ftlb]
M4	1.8	13.4
M5	3.6	26.5
M6	6.4	47.2
M8	16	118
M10	32	236
M12	57	420
M14	92	680

intentionally left blank

7. Maintenance Instructions, Tolerances, Adjustment Data for Assemblies / Equipment

7.1 Airframe

7.1.1 Wing

Clearance of Wing / Fuselage Attachments:

axial: maximum of 0.016 in. (0.4 mm)
radial: maximum of 0.006 in. (0.15 mm)

Clearance of Inner-to-Outer-Wing Attachments:

- front and rear bolts, axial:	maximum of 0.012 in. (0.3 mm) each
- front and rear bolts, radial:	maximum of 0.008 in. (0.2 mm) each
- main bolt, radial:	maximum of 0.006 in. (0.15 mm) in the bearings of spar boxes and spar stubs
- spar stub bolts:	axial: maximum of 0.08 in. (2 mm)
	radial: maximum of 0.008 in. (0.2 mm)

In case of wear, the bolts can be replaced (they are provided with a thread). Upon replacement secure with Loctite type 638.

7.1.2 Fuselage and Cockpit

Test of canopy emergency jettisoning system: In flight configuration, carry out jettisoning procedure in accordance with the instructions in the Flight Manual. The canopy is to be checked smoothly by two assistants standing in front of the aircraft (to the left and to the right).

Up to S/N 19 the reinstallation of the canopy is to be performed by means of a special tool to facilitate the compression of the gas spring in the canopy hinge.

For later S/N the installation procedure is the following: compress the gas spring by hand and jam it underneath the rim of the hole. Fit the canopy and initialize the spring by pushing it towards the hole by means of a pin through the little hole on the right side of the spring housing.

Warning: If the gas spring is not initialized as described before, the canopy will not open when jettisoning is released during flight.

7.1.3 Tail Units

-

7.2 Control System

Position of stops of the control systems : see description under 3.2

Adjustment data: see fig. 6.4.1.

7.3 Powerplant

7.3.1 Engine

Maintenance of the engine in accordance with the instructions of the Operating and Maintenance Manual for Flight Engines "Limbach L 2400 and Versions".

Adjustment of the carburetors: For access from the top, remove cover in the upper fire wall.

Access to the fuel pump: Remove cover in the upper fire wall.

Access to the mounting attachment of accessories (generator, magneto): remove lateral and lower engine cowlings.

Removal of Engine:

- disconnect battery
- remove front and rear fire wall sheets
- remove V-supports of the frame below the engine
- loosen clutch on engine side and push it forward on the sliding joint (attention: do not loose bushes of screw joints).
- remove muffler
- disconnect electrical wirings, fuel hoses above the firewall, bowden cables, oil hoses on the engine and air induction hoses
- support the engine. Then loosen front engine mount at the attachment to the frame, loosen rear engine support (attention: mark the distance bushes left/right for reinstallation)
- lower down engine

Installation of Engine:

- In the opposite order as removal

7.3.2 Fuel System

Check all fuellines in the fuel system for tight fit and leak tightness. Check the fuel lines for conditions. A indication for high wear and the necessary replacement are cracks in the outer surface.

For replacement of the fuel hoses after expiration of the allowable time in service, remove or lift the upper parts of the fire wall.

7.3.3 Oil System

Warning: When tightening the screw joints of the oil hose fittings, "retain" the oil tubes to avoid twisting and thus shutting off of the flexible hoses in the fireresistant casing.

When removing the oil cooler, mark its original position.

For reinstallation of the oil cooler, check fitting with the sealing lips of the cooling air ducts.

7.3.4 Cooling System

The bowden cables to operate the cowl flaps are adjusted behind the covering of the left leg room. The opened position is limited by fix stops at the flaps. The opening force exerted by the springs attached to the flaps must be 1.8 to 3.4 lbf. (8 - 15 N) for the air inlet flaps and 4.5 to 6.7 lbf. (20 to 30 N) for the air outlet flap with the flaps pressed shut.

In the closed position, the lower air outlet flap is pulled against a stop leaving a gap of about .4 in. (10 mm). With the flap in the opened position, the bowden cable has no tension. The bowden cable can be adjusted behind the covering of the left leg room or above the flap.

7.3.5 Induction System

Cleaning of the filters:
Refer to the Operating and Maintenance Manual for Limbach Flight Engine.

7.3.6 Controls/Instruments

The bowden cables for power and choke setting can be adjusted on the carburettors and/or at the attachments to the power and choke control levers in the cockpit.

The power plant instruments do not require maintenance. Summary: see Equipment List.

Zero calibration of the cylinder head temperature indicator is based on 20℃ (temperature of the refer ence point, i.e. the soldered joints connecting the lines from the instrument to the thermocouples inside the fuselage).

7.3.7 Fire Protection

Retouching of damaged coating: Remove damaged area down to the laminate, apply three layers of fire protection paint and cover with clear varnish.

7.3.8 Engine Cowlings

Sealings on air ducts must be in close contact with the engine and oil cooler respectively. Replace them in case of embrittlement.

7.3.9 Propeller

Tolerances:

- Track of propeller joints (blade suspension) with reference to the position "upper left transmission gear mounting": maximum difference of 0.012 in. (0.3 mm) between both joints.
- Track of propeller blade tips: maximum difference of 0.12 in. (3 mm) between the blades.
- Play of blade tips in flight direction: maximum of 0.16 in. (4 mm) total.
- Unbalance: Basic Balancing by the manufacturer. Precission balancing by a knowledgeable person by adjusting the compensation masses at the blade root by a maximum of 1.13 dr. (2 g).

Removal of the propeller:

- Removal of the propeller dome: lift off left and right leg room covering in the cockpit. Loosen clamping screw on the stay tube of the propeller dome, pull out locking screw, remove static pressure hoses, withdraw propeller dome to the front.
- Loosen fastening screws, remove propeller.

Installation of the propeller:

- Clean and degrease the propeller and the transmission gear flange with an appropriate solvent. The torque is transmitted by friction fit, therefore, the surfaces must be even, clean and free from grease.
- Inspect threaded bushes in the transmission gear flange for visible damage.
- Tighten the fastening screws by means of a torque wrench in two steps:
  1st step: tightening torque: 74 lbft. (10 Nm);
  2nd step: tightening torque: 220 lbft. (30 Nm).
  Afterwards, lock 3 screws at a time with a safety wire.
- Check the tolerances.

7.3.10 Drivetrain System

Adjustment of the Belts on the Transmission Gear:

Loosen the clamping screw on the left lower side of the transmission gear. Adjust the belt tension (per belt) by means of the setting screw on the left transmission gear side to 0.15 in. (3.7 mm) press-down depth halfway between the axes exerting a press-down force of 11.2 lbf. (50 N). Tighten the clamping screws.

Insufficient belt tension is indicated by slipping together with "squeaking" at full power or when the power lever is pushed forward suddenly.

Removal:

The propeller shaft can be removed together with transmission gear and the propeller in one step:

- Remove the propeller dome: lift off left and right leg room coverings in the cockpit, Loosen clamping screw on the stay tube of the propeller dome, pull out locking screw, disconnect flexible hoses, disconnect the antenna connection to transponder/GPS, withdraw the dome to the front.
- Disconnect the control cable of the propeller brake on the transmission gear.
- Loosen four fastening screws on the transmission gear supports, loosen balancing spring on top of the transmission gear.
- Pull out transmission gear with propeller shaft.
- The engine side clutch remains on the engine. Removal by loosening of the attachment screws on the engine flange.

Installation:

In the opposite order as removal. Attention: Clean and regrease splined sliding joint.

7.4 Landing Gear

7.4.1 Main Landing Gear

Check the main landing gear legs and the trailing arms for deformations and possible cracks as an result of overloads.

Adjustment Data: see fig. 3.4.1.a

Functional Check:

Support the aircraft (clearance between the main wheels and the ground must be approximately 1.6 in. / 40 mm), remove upper cowling of the central fuselage.

Checking procedure:

- Inspect screw joints (torque paint);
- check wheels for smooth turning;
- joint heads of the operating arms may not be jammed;
- the articulations of the spindles and the operating arms must have play;
- installation of the landing gear emergency release system without kinks/collisions;
- landing gear stop switches on the operating arms: check for halfway position and proper functioning, inspect wiring / connection;

- retraction of left landing gear leg:
  Check if the landing gear contacts surrounding components,
  Brake tube must have regular bends, may not jam.
  Stop switch adjustment: 0.08 to 0.2 in. (2 - 5 mm) clearance between the landing gear leg and the shaft housing.
  Joint heads of the operating arm may not be jammed
  Articulation between the spindle and the operating arm may not jam;
- extension of left landing gear leg: check if the operating arm returns to its correct over-center-locked position, if necessary adjust the switch.
- retraction of right landing gear leg:
  (separated from the left side - for this purpose, actuate left stop switch "retracted")
  Check if the leg contacts surrounding components.
  Brake tube must have regular bends, may not jam.
  Stop switch must be positioned halfway on the landing gear leg.
  Joint heads of the operating arm may not be jammed.
  Articulation between the spindle and the operating arm may not jam.
- extension of right landing gear leg: check for correctly over-center-locked position of the operating arm.
- retraction of both landing gear legs:
  Collision check.
  Align stop switch on the right landing gear leg for a clearance of 0.08 to 0.12 in. (2 - 3 mm) between both gear legs;
- check of landing gear doors:
  Smooth operation of gear doors
  Fit of gear doors.
  Clearance between gear doors and wheels 0.4 to 0.6 in. (10 - 15 mm).
- retract landing gear with the upper cowling of the central fuselage mounted:
  Check clearance between the drive spindles and the cowling; the bowden cables of the emergency release system may not be buckled or get stuck;
- endurance test: retract and extend the landing gear ten times (at intervals of 2 minutes) with intermediate checks each time:
  - inspect supports of switches
  - inspect switches (attachment), damage
  - listen to spindle motor noise
  - if necessary, adjust brake bands
  - look out for chafe spots on the brake tubes
  - check for stress-strain loads acting on the wirings.

Functional Check of EMERGENCY LET DOWN: (fig. 7.4.1.a)

- support the aircraft;
- actuate the EMERGENCY-UNDERCARRIAGE handles. Actuating force is 22.5 to 45 lbf. (100 - 200 N). The landing gear legs must remain in the extended position (function of spring clips on the operating arms);
- remounting of the operating arm joints to the spindles: landing gear switch "DOWN", move the spindles by means of the stop switches on the operating arms, until their relative position to the articulations is correct.
- introduce latch lever and shift it into the operating position, introduce release elbow lever, lock with spring element. Afterwards perform a functional check: retract and extend the landing gear once.

Tires

The tires are to be replaced at the latest, when the profiles are worn thin. Pay attention to the slip marks rim/tire. Apply Loctite (metal glue) to the attachment screws on the wheel axles.

Refilling and Ventilation of Hydraulic Brake System (TOST Brake System)

- Refill with brake fluid DOT 4.
- Install transparent flexible hose and drain bottle at the three venting ports of the parking brake valve and at the left and right brake calliper
- Open the venting valve of the parking brake valve.
- Refill brake fluid by plastic injection nozzle to the brake fluid reservoir in landing gear bay (use sealed adapter) until the brake fluid passing through the transparent flexible hose at the parking brake valve is free of bubbles. If required release/remove RH brake lever and slightly swing with upside down attitude.
- Close venting valve at the parking brake valve.
- Open venting valve at the LH brake calliper.
- With continuous refilling of brake fluid to the brake fluid reservoir as required pump the brake fluid through the hydraulic brake system by operation of the RH brake lever until the brake fluid passing through the transparent flexible hose at the venting valve of the LH brake calliper is free of bubbles. If required release/remove LH brake lever and slightly swing in upside down attitude.
- Close venting valve at the LH brake calliper.
- Open venting valve at the RH brake calliper.
- With continuous refilling of brake fluid to the brake fluid reservoir as required pump the brake fluid through the hydraulic brake system by operation of the RH brake lever until the brake fluid passing through the transparent flexible hose at the venting valve of the RH brake calliper is free of bubbles.
- Close venting valve at the RH brake calliper.
- Operate LH and RH brake lever for inspection.
  => A clear pressure point has to identifiable during operation! Otherwise repeat ventilation procedure!
- Reinstall brake lever (if applicable).
- Remove transparent flexible hose and check final brake fluid level at brake fluid reservoir.
- Perform functional check of brake system with pre-flight check according Flight Manual, Ch. 4

Adjustment and Ventilation of the Wheel Brake System (Hydromechanical Brake System):

The brakes (actuating lever on the control stick) can be adjusted via bowden cable ends above the brake master cylinder (in the wheel well).

If the break efficiency remains poor, the hydraulic system should be bled:

– Prior to venting, the brake fluid tank should be filled completely (use brake fluid DOT4).

– Attach a transparent hose (D_i = .24 in./6 mm) on the nipple of the vent screw on the wheel brake jaws. The other end of the hose is to be directed into a glass container filled with brake fluid to such a level that the hose end dips into the fluid.

– Then actuate the brakes and at the same time briefly open and close the vent screw by means of a spanner (width .4 in./10 mm). During this phase, brake fluid and air will escape. This procedure is to be repeated until only brake fluid escapes. The procedure is to be repeated until only break fluid escapes. The procedure is to be performed on both wheels. Make sure that the brake fluid level does not fall below the minimum level mark of the fluid tank.

The same procedure is to be applied for replacement of the brake fluid.

Replacement of Brake Linings

The wheel brake jaws are provided with brake linings to the right and to the left side of the brake disc.

For replacement of the brake linings, the brake jaws can be removed after loosening of both 1/4" screws.

Warning: Do not actuate the brake now. The pads with the riveted brake lining can now be replaced by new ones.

The linings must be replaced at the latest shortly before the attachment rivets are exposed.

Removal and Installation of Landing Gear Legs

- Loosen all attachments to the frame.
- Remove locking screws in front of the main bearings.
- Push the bearing bolts out to the front and to the rear, respectively.

Installation is carried out in the reverse order.

7.4.2 Tail Wheel

After removal of the wheel fork: Do not grease the upper bearing. Friction is intended in order to prevent tail wheel flutter.

For tire replacement, watch out for the slip mark. The tyre wears down within a relatively short time, since during manoeuvring on the ground, the high inertia moment of the wing span of 75.5 ft. (23 m) counteracts the steering force.

7.5 Flight Instruments and Static Pressure System

Maintenance of the flight instruments in accordance with the instructions given by the manufacturer concerned (see Equipment List).

Calibration of the Stall Warning System:

Functional check on the ground:
shunt the pneumatic push button, which releases the stall warning at approximately 33 kts (60 km/h, connect the device to + 12 V on the main bus). Turn the adjustment screw on the panel (placarded with "stall warning") until the acoustic warning is actuated.

In-flight calibration: Fly with a center of gravity position in the rear range with a total mass of 1874 lbs. (850 kg).

Configuration for the calibration:
Wing flap position L, landing gear and air brakes retracted, engine running at 3000 rpm, horizontal flight, not above 3300 ft. (1000 m) MSL. Fly at a speed of 45 kts (83 km/h). Turn adjustment screw until the acoustic warning is actuated. Recheck several times.

Second check item:
Wing flap position 0°, the warning must operate at 47 ± 1.5 kts (87 ± 3 km/h).

Maintenance of the Static Pressure System: (see fig. 3.5.a)

Inspect and clean the pressure ports: bar probe on the propeller dome, the opening for the stall warning positioned below and two openings in the tail boom (to the left and to the right) 8.83 ft. (2.69 m) rear of the wing leading edge.

Flexible hoses and fine filter plugs are to be replaced in case of contamination, embrittlement or cracks. If moisture has accumulated in the flexible hoses, they are to be removed and can be reused after they have been dried completely.

7.6 Electrical System

Regulator voltage: maximum of 14.7 V

Voltage drop of a charged battery as new at approximately 15°C during starter operation: 2 V.

7.7 Radio and Navigation Equipment

Maintenance in accordance with the instructions by the manufacturer (see Equipment List, in this case, service records).

7.8 Oxygen Equipment

Oxygen System Mounting:

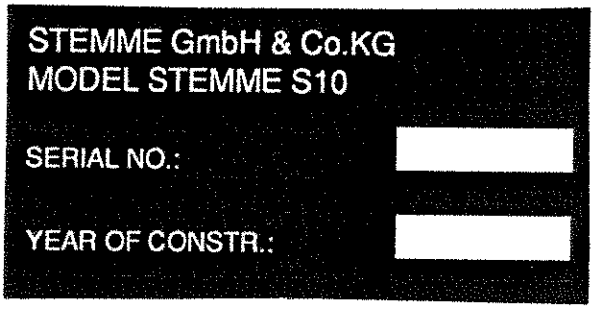
Check the oxygen system mounting, if installed as optional equipment, for condition and tight fit of components.

Oxygen System:

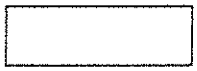
Perform maintenance on the oxygen system in accordance with the instructions of the manufacturer (see Annex A).

intentionally left blank

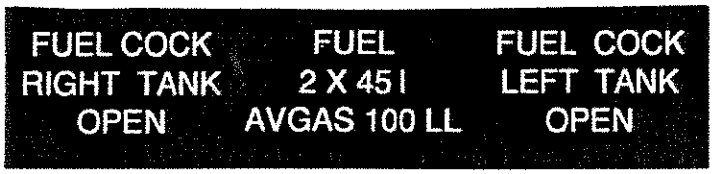
8. List of cockpit placards and their position



On right rear cockpit wall



Instrument panel near radio (provided for Reg. No.)



[

]^{9a}

(if optional 60 l fuel tanks installed)

on center console in the back

On T-grip in the back

STEMME GMBH & CO. KG
MODEL STEMME S10 SERIAL NO: [redacted]
YEAR OF CONSTRUCTION: [redacted]

MAXIMUM SPEED	V_{NE}	145 kts
MANOEUVRING SPEED	V_{A}	97 kts
ROUGH AIR SPEED	V_{RD}	97 kts
MAX. LANDING GEAR OPERATING SPEED	V_{LD}	76 kts
EMPTY WEIGHT		[redacted] kg
MAX. WEIGHT		850 kg

MIN. SEAT LOADING 70 kg, OTHERWISE BALLAST
MAX. LOAD (BOTH SEATS TOGETHER) [redacted] kg
[TYRE INFLATION PRESS.- MAIN WHEEL 45 psi][s]
TYRE INFLATION PRESS.- TAIL WHEEL 36 psi

INSPECTION AFTER RIGGING
1. WING PINS SECURED
2. ALL CONTROLS CONNECTED AND SECURED
3. FUEL LINES CONNECTED
4. FUEL INDICATORS CONNECTED
5. NO DIRT IN FUEL LINES

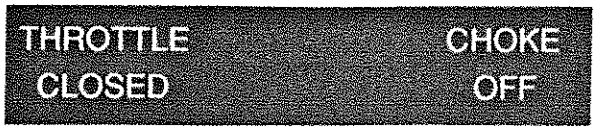
PREFLIGHT CHECK
1. PRESSURE PROBE MOUNTED
2. PARACHUTE FASTENED
4. SEAT BELTS FASTENED
3. ALTIMETER SET
5. CONTROL FUNCTIONS CHECKED
6. AIRBRAKES CLOSED AND LOCKED
7. FLAPS IN +5 POSITION
8. SUFFICIENT AMOUNT OF FUEL
9. FUEL COCKS OPEN
10. CANOPY CLOSED AND LOCKED

EMERGENCY LANDING GEAR OPERTION
PULL HANDLES (BEHIND ABOVE) SEQUENCE 1-2

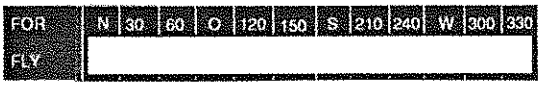
[36 p.s.i][9a]

(main landing gear tire pressure if optional wide tires installed)

on centre console

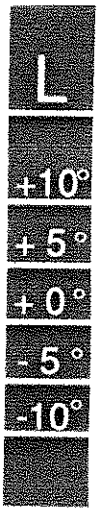


on centre console; infront and behind of the throttle and choke lever



on centre console

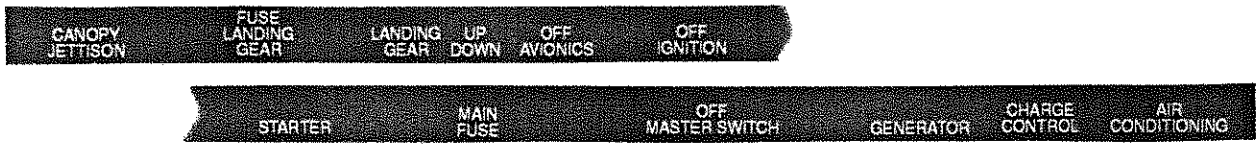
on left side of centre console



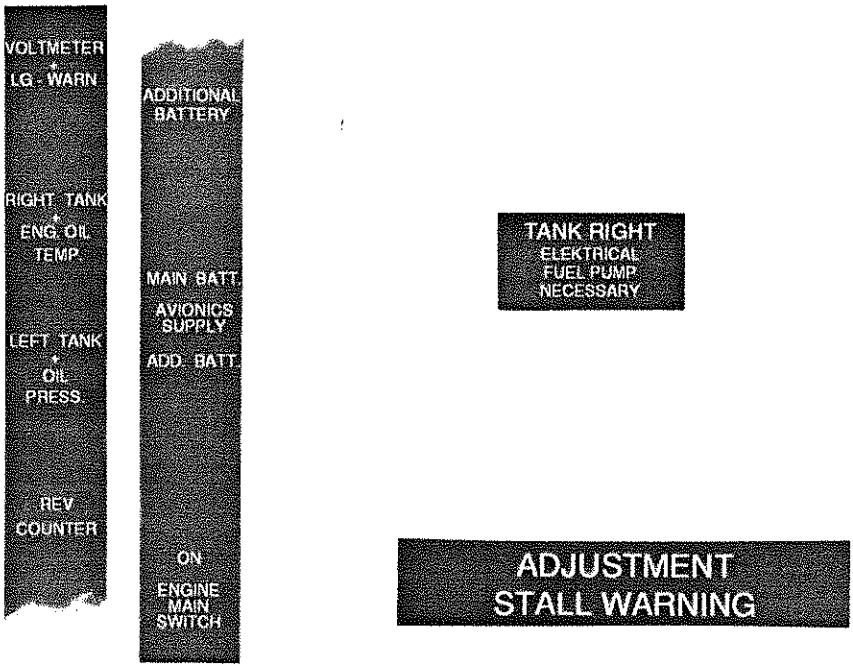
on the flap position indicator

on nose cone operating handle

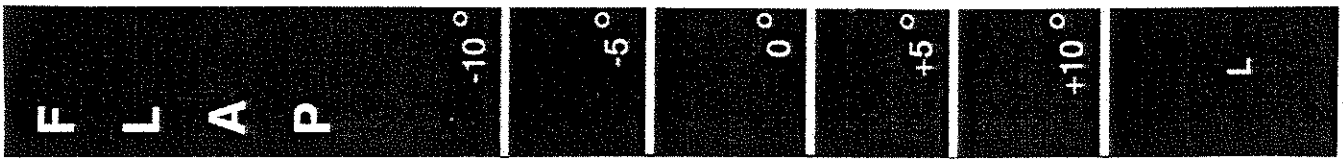
in the bottom centre part of panel



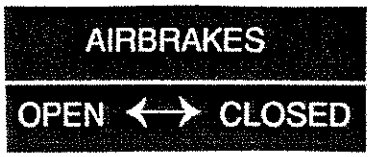
on centre face of panel



on right face of panel

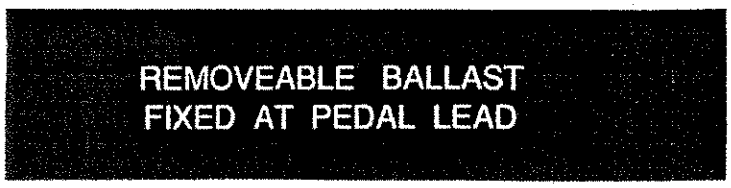


On control cover on right side next to flap lever



on side wall, left next to airbrake lever

on control cover next to T-grip (left and right)



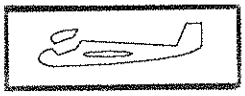
in the right footroom on the left side cover

next to lower baggage compartments on the left and right

[

]9a

on back wall over baggage compartment in the back



on red T-grip for canopy emergency jettison on instrument panel

on covers of canopy operating handles (left and right)

on fuel caps

on brake fluid container

on motor oil container

intentionally left blank

9. Equipment

9.1 Minimum Equipment List

Subject	Manufacturer	Type	TC No., Specification No.	Range
Airspeed Indicator	Winter	6FMS4	TS10.210/15	up to 300 km/h/ 180 mph / 160 kts
	Winter	6FMS5	TS10.210/16	
	Winter	7FMS4	TS10.210/19	
	Winter	7FMS5	TS10.210/20	
Altimeter	Winter	4FGH10	TS10.220/46	up to 10,000 m/ 30,000 ft
	Winter	4FGH20	TS10.220/47	
	Winter	4FGH40	TS10.220/48	up to 20,000 ft
	Winter	4HM6	TS10.220/44	up to 6,000 m
				up to 20,000 ft
	PZL	W-12S	FD-3/75	
Compass	Airpath	C2300	-	-
	PZL	B-13	FD19/77	-
	Ludolph	FK16	10.410/3	-
	Ludolph	FK5	10.410/1	-
	Hamilton	HI400	TSO C7c Type 1	-
	Presesion Aviation Inc.	PAI-700	TSO	
Stall Warning System	Westerboer	Speed Control	-	-
Revolution Counter	VDO	333.230/009/1	-	up to 4000 min^{-1}
Engine hour meter	Winter	FSZM	TS-GW 1510	-
	VDO	331.811/010/2	-	-
Oil pressure meter	VDO	350.271/031/7	-	up to 10 bar
Oil temp. meter	VDO	310.274/082/1	-	up to 150 °C
Fuel contents meter	VDO	301.271/036/1	-	$0 \dots {}^{4}/_{4}$
Cylinder head temperature meter	Limbach	170.215/001	-	up to 375 °C
Four-element straps	Gadringer	BaGu 5203 SchuGu 2700	40.070/32 40.071/05	
	Schroth	Automatic Shoulder belt, left Automatic Shoulder belt, right	SL/1-08-C702 (with stop) SR/1-08-C702 (with stop)	
Back-cushion	One per seat, compressed 2 in. (50 mm) thick (if no parachute, minimum 2 in. thick, is used)			

9.2 Supplementary Equipment

Depending on operational and environmental conditions, further equipment may be mandatory to supplementary to the minimum compulsory equipment. The supplementary equipment allowed to be installed in the Stemme S10 is listed in the following selection list.

At the moment, certification is only valid for daytime VFR flights. Flights from 30 min before sunrise and up to 30 min after sunset require lighting equipment, consisting of LH and RH navigation lights, tail position light and anti collision light.

VFR-Night flights are possible after accomplishment of the Stemme SB A31-10-072.

Subject	Manufacturer	Type	TC No., Specification No.	Range, Remarks
Lightning system				
ACL / Position Lights	Whelen / STEMME	various (standard, LED)		Contact manufacturer before installation of additional lighting equipment
Stern Light	Hella / STEMME	various		
Landing Light	Hella / STEMME	various		

9.3 Additional Equipment and Systems

Different equipment and systems may be installed in the powered glider S10, which are not part of the minimum or supplementary equipment and which normally are not series standard. Basically the cases “Alternative Equipment”, "Additional Equipment" and "Optional Systems" have to be distinguished and treated differently. For further information please refer to the Service Bulletin A31-10-008.

9.3.1 Alternative Equipment

Special attention is to be paid to the case of equipment and systems which are not installed in addition to but as an alternative to the standard version and thus have an influence on the standard text of the Maintenance Manual. Here the rule applies that associated information is added to the corresponding passage of the standard text, with the original text (if any) and the amended text appearing in square brackets each. A reference number following the closed bracket is identical with the current revision number, the letter following the reference number indicates whether the text passage applies to the standard version ("s") or to the alternative version ("a") (example: [‥]^{3a}).

All text passages in brackets which do not correspond to the aircraft's design configuration described on page 1 (standard version, if no entries) must be crossed out.

If this procedure cannot be applied (amendments to illustrations), the STEMME Company will keep ready "special versions" of the pages concerned identified with the corresponding SB number. In the case of an overall revision, all versions of a page will be newly issued; the version applicable to the aircraft concerned is to be inserted.

9.3.2 Additional Equipment

In addition to the minimum and supplementary equipment, installation of the following devices is allowed. A precondition is that the energy balance remains within certified limits and the certified weight of equipment in the instrument panel is not exceeded. Altogether 11 kg / 24 lbs instruments, including maximum 1 kg / 2.2 lbs of engine instruments, are certified.

Additionally a ground and flight test must be performed, showing electromagnetic compatibility (EMC). Changes of equipment may be performed by qualified personnel only. An inspector must confirm the correct installation by an entry in the a/c-logbook, the EMC-test flight, the keeping of the energy balance and the inclusion of the changes into the equipment list and the weight and balance report. The above-mentioned inspection and operation documents must be added to Annex C of this Maintenance Manual.

Subject	Manufacturer	Type	TC No., Specification No.	Range, Remarks
Compass	Bohli	46-MFK-1		
Mechanical Variometer	various	various		
VHF-COM	various	various		all approved TSO/ETSO equipment with 57 mm / 2 ¼ in standard ring cutout Contact TC holder before installation of any TSO/ETSO equipment with different size/design
Intercom	PS Engineering	PM 1000 II		and mechanical identical, all equipment, which is fix mountable to the instrument panel due to its own chassis or due to a suitable installation frame
	TELEX	Pro Com 4		
	Sigtronics	SPA-400	TSO	
	Flightcom	403-MC		
	Flightcom	ATC-2		
Transponder	various	various		all approved TSO/ETSO equipment with 57 mm / 2 ¼ in standard ring cutout or 159 mm / 6 ¼ in standard rectangle cutout Contact TC holder before installation of any TSO/ETSO equipment with different size/design
Encoder	various	various		all approved TSO/ETSO equipment
Emergency Transmitter (ELT)	various	various		all approved TSO/ETSO equipment
GPS & Moving Map	various	various		all equipment, which is fix mountable to the instrument panel due to its own chassis or due to a suitable installation frame
EFIS	Dynon Avionics	EFIS D-10 System		
	Garmin	G3X System		Contact TC holder before installation

Subject	Manufacturer	Type	TC No., Specification No.	Range, Remarks
Electronic Vario, Soaring Computer	various	various		all equipment, which is fix mountable to the instrument panel due to its own chassis or due to a suitable installation frame
Collision warning system	various	various		
VHF NAV (VOR)	various	various		all approved TSO/ETSO equipment with 57 mm / 2 ¼ in standard ring cutout Contact TC holder before installation of any TSO/ETSO equipment with different size/design
Horizon	various	various		all approved TSO/ETSO equipment, which is fix mountable to the instrument panel due to its own chassis or due to a suitable installation frame
Turn and Bank Indicator	various	various		
Directional Gyro	R.C.Allen	RCA15AK-2		
Fire Warning System	Stemme			Series equipment
Voltmeter/Ammeter	Filser	SR001		Series equipment

9.3.3 Optional Systems

Optional systems are not normally included in the Maintenance Manual. To each of these systems delivered by STEMME, a Service Bulletin approved by the LBA is assigned, providing the information necessary for correct installation and inspection (e. g. Serial No.'s, Documents, supplementary procedures). If installation requires additional instructions, an installation instruction is provided. If flight operation requires additional information, supplements to the Flight Manual are provided. Information required for maintained airworthiness are published as maintenance instructions, to be inserted in the Annex A of this Maintenance Manual and added to the list of maintenance instructions on the cover sheet of Annex A.

The document no. Of the Service Bulletin and relevant documents are always identical except for the prefix (A31- Service Bulletin, A34- Installation Instruction, A36- Flight Manual Supplement).

10. List of Special Tools

Torque wrench

Gauge for moment of ignition

Valve clearance gauge

Sparking plug wrench

chucking appliance for wing flap relief spring (P/N: 00SW-RMF)

11. List of Maintenance Documents for Parts being approved independently from the Aircraft

- Operating and Maintenance Manual **Limbach L 2400 and series,** flight engine for powered sailplanes and very light aircraft.

12. Figures referring to the previous Sections

The number of an illustration corresponds to the number of the section containing the first reference to the illustration. If several illustrations relate to one section, they are marked by .a, .b, etc.

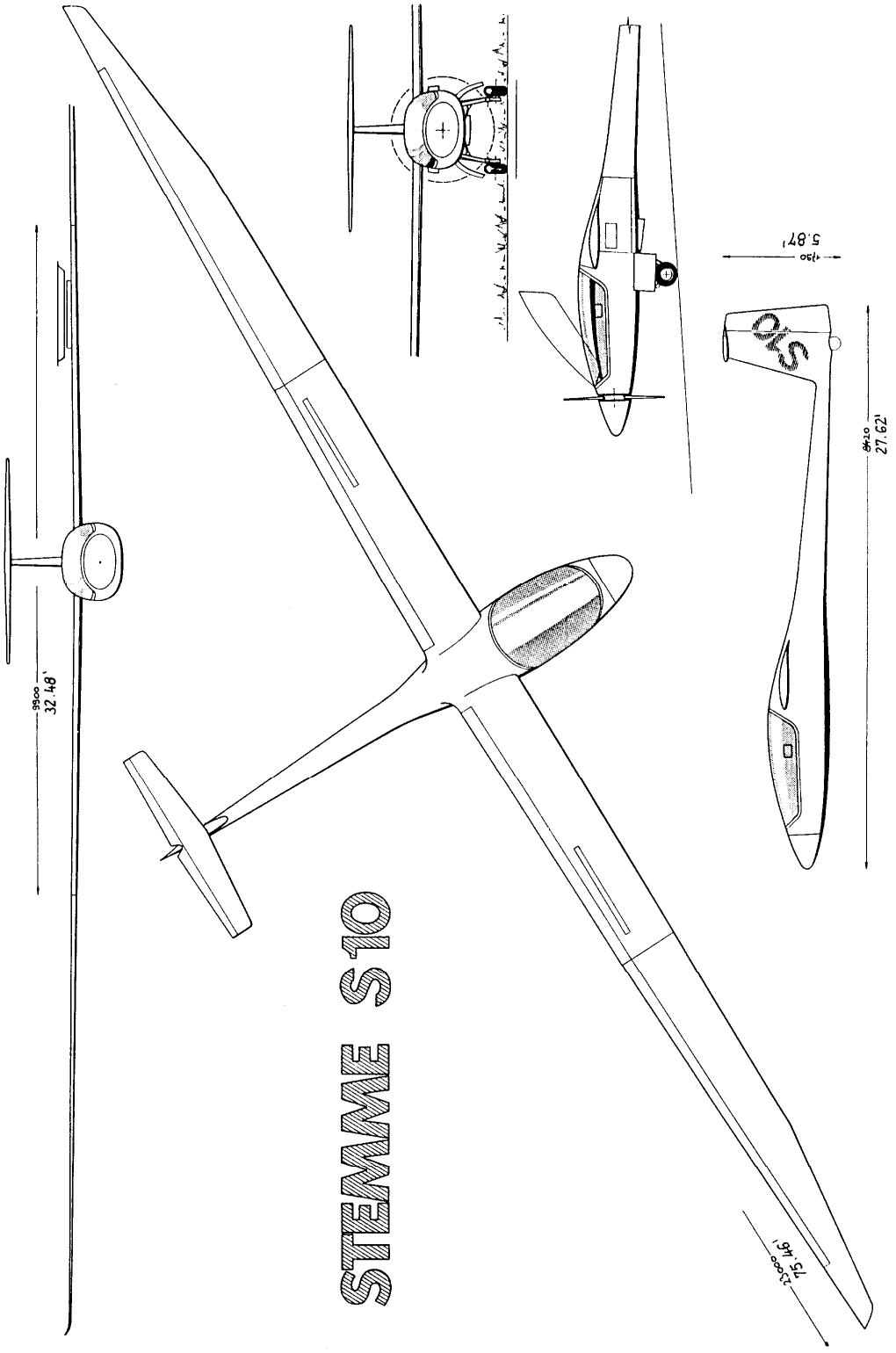


Fig. 2.a 3-View-Plan STEMME S10

Serial Number:	Registration:	Relevant Equipment List:	Order No.:
-	-		

☐ This Weight and Balance Report was drawn up without weighing. Any weighing data have been taken from the Weight and Balance Report dated _____ and if need be corrected according to point 4.2.

Drawing Up Reason:
- ☐ Conformity Inspection
- ☐ Changes of Equipment _____
- ☐ Repair. Date of Findings Report: _____
- ☐ Other: _____

1. Preparation and Conditions

1.1 The fuselage weight must be determined including rudder, back rests with cushions or equivalent upholstery, seat cushions, canopy, standard tool kit in baggage compartment behind backrest, Logbook and Flight Manual. Replenish oil if necessary. Fixed ballast must be installed, loose ballast must be removed.

1.2 Wing weight must be determined with bolts and 3 l / 0.66 imp. gal. fuel (unusable volume).

1.3 Fixed supplementary equipment must be installed.

1.4 Points 1.2 through 1.4 must be observed if an overall weighing of the powered glider is performed. The canopy has to be closed during weighing.

1.5 If weight and moment arm of additionally installed or removed items is known exactly, the new CG may be determined numerically (see point 4.2)

2. Overview of Component Weights and Weight Limits

Component Weights from Separate Weighing	[kg] [lbs] ***	[kg] [lbs] ***
Central Wing		
Right Hand Outer Wing		
Left Hand Outer Wing		
Fuselage		
Horizontal Tail		
Component Weight Sum		
	Empty Weight*	LNT**

Weight Limits	[kg] [lbs] ***
Maximum All Up Weight (incl. Fuel)	850 (1874)
Maximum Weight of Non-Lifting Parts GNT_{max} (incl. Load in Cockpit)	570 (1257)
Of that: **Maximum Weight of Equipment** on Instrument Panel, without engine instruments	10 (22)
Maximum Load (Max AUW - Empty Weight)	
Max. Load in Cockpit (GNT_{max} - LNT**; maximum 202 kg / 445 lbs, of that max. 180 kg / 397 lbs in seats, max. 110 kg / 243 lbs in each seat and max. 22 kg / 48.5 lbs in baggage compartments) Cockpit load must be **at least 7 kg / 15,43 lbs less** than maximum load!	

* cross-check: compare with empty weight from 3.; Divergence of 2 kg / 4.4 lbs due to measure error is allowable.
** LNT: Empty weight of "Non Lifting Parts"
*** Units: cross out if not applicable

3. Determining of Empty Weight and Moment Arms

Weights and Moment Arms ***:		
forward RH	m_r	kg / lbs
forward LH	m_l	kg / lbs
Tail Wheel	m_s	kg / lbs
Σ=Empty Weight	m_e	kg / lbs
Moment Arm	a	mm / in.
Moment Arm	b	mm / in.

Datum level: Leading Edge of Central wing, vertical plane

Pitch: wedge 1000:84 (4°50') on tail cone, upper edge horizontal

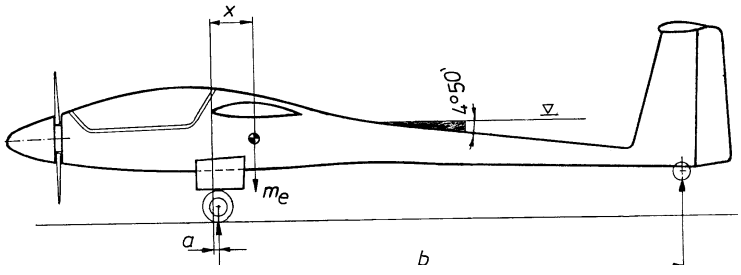


Fig. 6.3.a Mass and Balance Sheet (Pattern; the complete form can be obtained from the manufacturer)

4. Determining of Empty Weight Center of Gravity

4.1 After Weighing:

$$x_S = \frac{m_S \cdot b}{m_e} + a \quad \text{[mm / in.]***} \quad \Rightarrow x_S = \frac{\quad \cdot \quad}{\quad} + \quad = \_\_\_\_ \text{ [mm / in.]***}$$

4.2 After Changes, without Weighing:

Following changes have been made on the powered glider:

Install. / Removal	Item	Weight ($^+/_-$) m = [kg / lbs]***	Moment Arm ($^+/_-$) x = [mm / in.]***	Moment ($^+/_-$) M =[mm kg-/ in. lbs]***
	Sum m_{zus}=		*Sum M_{zus}=*	

NOTE: **Count weight installed positive, weights removed negative.**
Count moment arms aft of datum positive, in front of datum negative.

$$x_{S,neu} = \frac{m_{alt} \cdot x_{alt} + M_{zus}}{m_{neu}} \text{ [mm / in.]} \quad \Rightarrow x_{S,neu} = \frac{\quad \cdot \quad + \quad}{\quad} = \_\_\_\_ \text{ mm / in. }^{***}$$

5. Definition of Minimum Load Required

With Empty Weight determined:	kg / lbs***
and the empty weight CG aft of datum:	mm / in. ***
the Minimum Load Required is ****:	kg / lbs***

*** Units: cross out if not applicable

****According to Maintenance Manual, Section 6.3

Site, Date Stamp Sign Job Leader

Inspector Statement: All measured data are within the allowable ranges and correspond to the production and maintenance instructions of the type.

Site, Date Stamp Sign Inspector

Fig. 6.3.a Mass and Balance Sheet (Pattern; the complete form can be obtained from the manufacturer)

Empty Mass		Corresponding Range of Empty Mass C.G. (aft of datum)			
[kg]	[lb.]	foremost		rearmost	
		[mm]	[in.]	[mm]	[in.]
638	1406,5	515	20,28	526	20,71
640	1411	514	20,24	525	20,67
642	1415,4	513	20,20	525	20,67
644	1419,8	512	20,16	525	20,67
646	1424,2	511	20,12	524	20,63
648	1428,6	511	20,12	524	20,63
650	1433	509	20,04	524	20,63
652	1437,4	508	20,00	523	20,59
654	1441,8	507	19,96	523	20,59
656	1446,2	506	19,92	523	20,59
658	1450,6	504	19,84	522	20,55
660	1455,1	503	19,80	522	20,55
662	1459,5	502	19,76	522	20,55
664	1463,9	501	19,72	522	20,55
666	1468,3	499	19,65	521	20,51
668	1472,7	498	19,61	521	20,51
670	1477,1	497	19,57	521	20,51
672	1481,5	496	19,53	520	20,47
674	1485,9	495	19,49	520	20,47
676	1490,3	493	19,41	520	20,47
678	1494,7	492	19,37	519	20,43
680	1499,1	491	19,33	519	20,43
682	1503,6	490	19,29	519	20,43
684	1508	489	19,25	519	20,43
686	1512,4	487	19,17	518	20,39
688	1516,8	486	19,13	518	20,39

If the measured empty mass is between two values of the above table, please take for

- "foremost" the next greater value
- "rearmost" the next smaller value

of the C.G. range limits.

Definition of datum and empty mass see fig. 6.3.a (weighing record).

Fig. 6.3.b
Permissible Empty Mass C.G. Range depending on Empty Mass

Note: In the following tables the rated values with their permissible tolerances are figuring in the left cells. Please enter the measured value in the respective right cell.

Control Surface Deflections:

All positive values (+) indicate the max. positive control surface deflection (downwards), negative values indicate the max. negative deflection (upwards).

Elevator:	Measuring point: inner end rib of the elevator. Distance to hinge axis: 140 mm			
	- 48 $^{+2}/_{-5}$ mm	[mm]	+ 48 $^{+5}/_{-2}$ mm	[mm]
Trim:	With the trim lever in neutral position, the elevator deflection (pos. or neg.) shall not exceed ± 5 mm (same measuring point as above).			[mm]
Rudder:	Measuring point: lower rear corner of the rudder's trailing edge. Distance to hinge axis: 420 mm			
	left: +220 ± 15 mm	[mm]	right: -220 ± 15 mm	[mm]

Wing Flaps and Ailerons:

Flap lever position	Stick position	Measuring points: aileron: inner end rib of the control suface. Distance to hinge axis: 163 mm wing flap: inner end rib of the control suface.Distance to hinge axis: 175 mm							
		left ail. [mm]		left flap [mm]		right flap [mm]		right ail. [mm]	
- 10°	neutral			-31 ± 4		-31 ± 4			
- 5°	neutral			-15 ± 4		-15 ± 4			
0	left neutral right	-48 ± 4 0 ± 2 +27 ± 3		0 ± 2		0 ± 2		+27 ± 3 0 ± 2 -48 ± 4	
+ 5°	neutral			+15 ± 4		+15 ± 4			
+ 10°	neutral			+31 ± 4		+31 ± 4			
L (+16°)	neutral			+51 ± 4		+51 ± 4			

Control system friction:

Static friction is to be measured as follows: measuring point at the operating lever / control stick, mid of the grip; measure the force being reached when the system sets going - three times in both directions. The average of the higher values from each measurement is to be entered.

Elevator	5 ± 2 N	[N]
Aileron	15 $^{+5}/_{-8}$ N	[N]
Rudder (tailwheel off the ground)	25 $^{+5}/_{-8}$ N	[N]

Pilot Force required to unlock the Airbrakes:

Airbrake lock/unlock	150 + 50 N at 20°C	[N]	at [°C]
wing flap: counterforce in Pos. L	125 ± 25 N at 20°C	[N]	at [°C]
wing flap: damping perceptible in both directions when jerkily operated	□yes no		

□ □

Fig. 6.4.1.a

Alignment Record (Pattern; the complete form can be obtained from the manufacturer)

Annex A

- Supplemental Instructions for Maintenance and Care, Maintenance Instructions -

This Annex comprises:

- Manufacturer's maintenance documents for all instruments specified in the equipment list for the serial number indicated on the title page;
- "Minor repair to components of fibrous composite material" - a repair guide by the STEMME Company for the S10.
- "Information on service actions for UP Vorgelat T30 / UP Vorgelat T35" - a guide to the preventive care of aircraft surfaces by MGS-Scheuffler;
- Instructions for the maintenance of "L'Hotellier" ball and swivel joints;
- Maintenance instructions by STEMME as entered in the list below. This list must comprise at least those Maintenance Instructions relating to the additional equipment installed (refer to the record of accomplished SB's/AD's under Annex B).

Maintenance Instr. No.	Subject of the Maintenance Instruction	Date inserted

Annex B

- Service Bulletins, Airworthiness Directives -

This Annex comprises:

- The "List of Airworthiness Directives and Service Bulletins" issued by the manufacturer for the aircraft type STEMME S10 (document no. A31-10-000),
- The record of accomplished SB's / AD's for this serial number,
- All Service Bulletins already accomplished as well as those still to be accomplished.

Annex C
- Documents (Inspection and Operations Documents) -

This Annex comprises all original documents for the serial number indicated on the title page which may be of importance to maintenance and repair. Those documents are listed in the table below.

New documents which are to be added (e.g. new weight and balance record, revised equipment list or inspection certificates for instruments newly installed) are to be filed in this Annex. Documents which are no longer relevant should be kept in a separate file (service records).

Document	always	if any
Certificate of Production Inspection	X	
last Certificate of Inspection for Continued Airworthiness		X
latest records of production inspection or inspection for continued airworthiness	X	
Inspection Certificate - engine	X	
Inspection Certificate - propeller	X	
Inspection Certificate for any instruments installed according to the equipment list (except for engine instruments and other instruments not subject to certification)	X	
log sheets for engine, propeller, transmission gear, clutch		X
records of operating times	X	
current equipment list	X	
latest rigging report	X	
latest weight and balance record	X	
supplement sheet to the weight and balance record		X
report "control surface masses and hinge moments"	X	
latest report on compass compensation	X	
flight report related to the production inspection or to the last inspection for continuing airworthiness	X	
modifications to the individual aircraft ("major modification")		X
list of constructional deviations ("minor modifications")		X