Airplane Flight Manual

XA42

S/N:

_____

Registration:

_____

Document Number:

AFM-XA42-0040-002-A.01

Manufacturer:

XtremeAir GmbH

Harzstraße 2

Am Flughafen Cochstedt

39444 Hecklingen

Germany

This Manual includes the material required to be furnished to the pilot by EASA regulations and additional informations provided by the manufacturer and constitutes the EASA approved Flight Manual.

This Flight Manual is EASA approved under Approval Number A.507

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EASA certification manager

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TABLE OF CONTENTS

INTRODUCTION

This Airplane Flight Manual contains 9 chapters, and includes the material required to be known by the pilot according to EASA CS-23.

It also contains supplementary data supplied by XtremeAir GmbH.

NOTES

This Airplane Flight Manual applies only to the aircraft whose nationality and registration marks are noted on the title page.

This Airplane Flight Manual is only valid in connection with the latest approved revision.

It is the responsibility of the pilot to be familiar with the contents of this Airplane Flight Manual including revisions and any relevant supplements.

Pages of this Airplane Flight Manual must not be exchanged and no alterations of or additions to the approved contents may be made without the XtremeAir GmbH/EASA approval.

The editor has the copyright of this Airplane Flight Manual and is responsible for edition of revisions/amendments and supplements.

Amendments, which affect the airworthiness of the aircraft will be announced in the mandatory Service Bulletins issued by the manufacturer XtremeAir GmbH coming along with the "Airworthiness Directive" (AD) publication issued by the EASA. The owner is responsible for incorporating prescribed amendments and should make notes about these on the records of amendments

Should this Airplane Flight Manual get lost, please inform

XtremeAir GmbH,

Harzstraße 2, Am Flughafen Cochstedt,

39444 Hecklingen, Germany.

Should this Airplane Flight Manual be found, kindly forward it to the civil aviation authority in the country the aircraft is registered.

WARNINGS, CAUTIONS AND NOTES

The following definitions apply to Warnings, Cautions, and Notes:

WARNING

Operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.

CAUTION

Operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

NOTE

Operating procedures, techniques, etc., which are considered essential to emphasize.

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1. GENERAL

1.1 DESCRIPTION

The XA42 is a two-seat, high performance acrobatic tailwheel airplane.

The structure is manufactured from carbon/honeycomb sandwich.

1.2 SPECIFICATION OF CATEGORY

The aircraft is certified in the Utility and Acrobatic category according to EASA CS-23.

EASA type certificate data sheet A.507

1.3 MANUFACTURER

XtremeAir GmbH

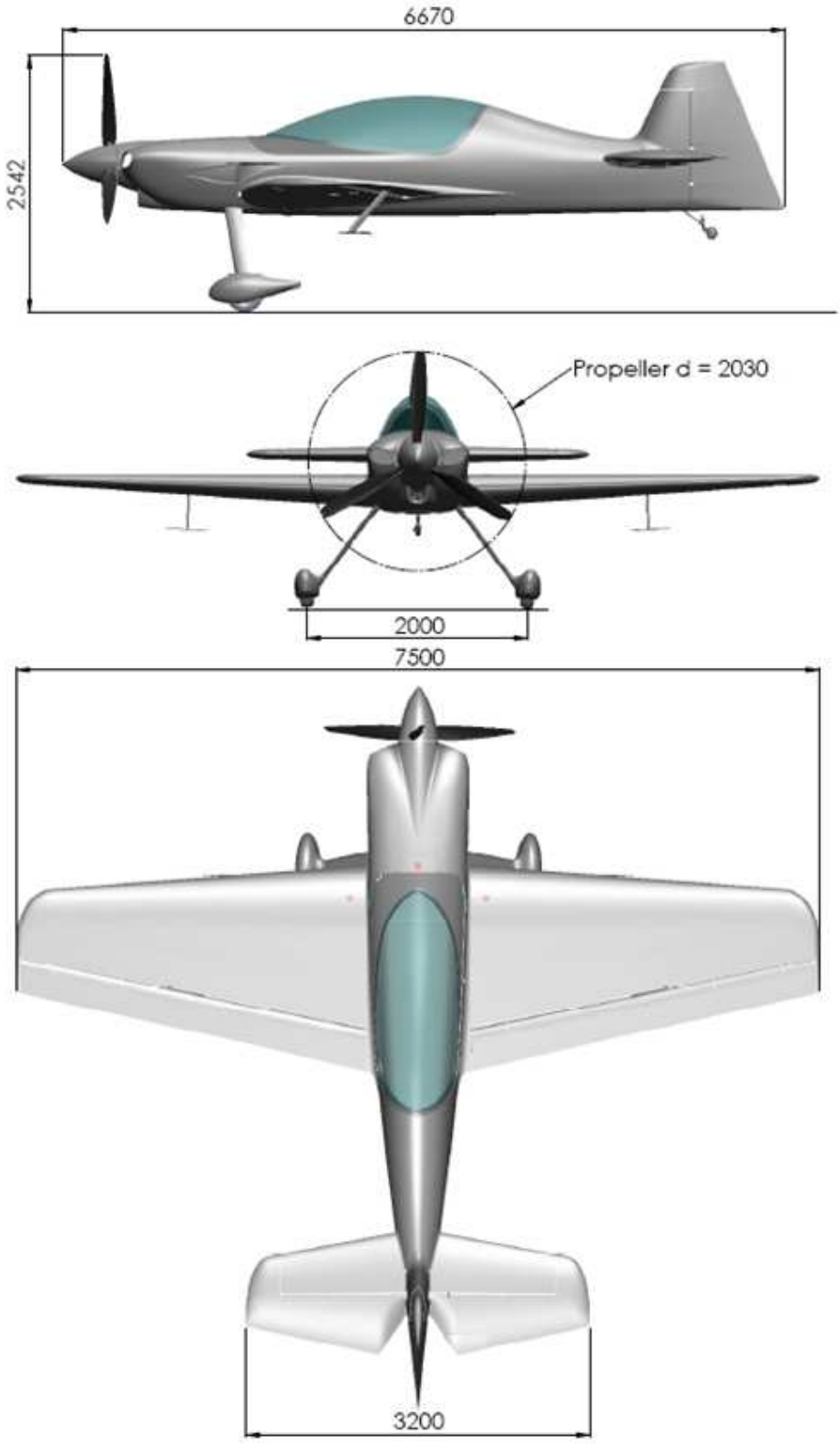
Harzstraße 2, Am Flughafen Cochstedt

39444 Hecklingen

Germany

1.4 TECHNICAL DATA

1.4.1 3 VIEW DRAWING



All dimensions in millimeters

1.4.2 MAIN DATA

Length overall	6670 mm
Height overall (ground attitude)	2542 mm
Span	7500 mm
Wheel base	4425 mm
Wheel track	2000 mm

1.4.3 WING

Wing plan form	Trapezoid
Wing span	7500 mm
Wing area	11.25 m²
Aspect ratio	5.00
Airfoil	PS-1-16 / Tip PS-1-09
Root chord	2060 mm
Tip chord	950 mm
MAC	1505 mm
Aileron span	3220 mm
Aileron area	1.26 m²
Aileron deflection	± 30 °

1.4.4 HORIZONTAL TAIL (INCLUDING ELEVATOR)

Plan form	Trapezoid
Span	2600 mm
Area	2.97 m²
Airfoil	DU86-MOD1

1.4.5 ELEVATOR

Span	3200 mm
Area	1.45 m²
Deflection	± 27 °

1.4.6 FLETTNER TAB

Span:	400 mm
Tip chord:	130 mm
Deflection:	± 30 °

1.4.7 VERTICAL TAIL (INCLUDING RUDDER)

Plan form:	Trapezoid
Height:	1100 mm
Area:	1.54 m²
Airfoil:	DU86-MOD1

1.4.8 RUDDER

Height:	1400 mm
Area:	0.82 m²
Deflection:	± 30 °

1.5 ENGINE

Manufacturer:		Lycoming Engines, Williamsport, PA 17701, USA
Type:		AEIO-580-B1A
Rated power:	Acrobatic:	235 kW / 315 hp @ 2700 rpm
Rated power:	Utility:	233 kW / 312 hp @ 2670 rpm

1.6 PROPELLER

Manufacturer:	MT-Propeller Entwicklung GmbH, 94348 Atting, Germany
Type:	MTV-9-B-C/C203-20d

1.7 EXHAUST SYSTEM

Manufacturer:	Gomolzig GmbH, Eisenwerkstraße 9, 58332 Schwelm, Germany
Type:	3 in 1 each side

1.8 FUEL

Fuel type:	Aviation Gasoline (Avgas) 100LL
	For alternative fuel grades see latest issue of Textron Lycoming S.I. No. 1070
	Minimum / Maximum 100/130 octane
Total fuel capacity:	275 l / 72.5 US gal
• Wing tanks:	2 x 105 l / 2 x 27.7 US gal
• Acro tank:	65 l / 17.1 US gal
Usable fuel capacity (Total):	273 l / 72.0 US gal
Usable fuel capacity (Acro):	64 l / 16.9 US gal

1.9 OIL

Maximum sump capacity: 15.15 l / 16 US qt

Minimum sump capacity: 8.52 l / 9 US qt

Average Ambient Air Temp.	Mil-L6082 grades	Mil-22851 ashless dispersant grades
All temperatures	---	SAE 15W50 or 20W50
> 27°C (80°F)	SAE 60	SAE 60
> 16°C (60°F)	SAE 50	SAE 40 or SAE 60
-1°C to 32°C (30°F to 90°F)	SAE 40	SAE 40
-18°C to 21°C (0°F to 70°F	SAE 30	SAE 30, SE 40 or 20W50
-18°C to 32°C (0°F to 90°F)	SAE 20W50	SAE 20W50 or SAE 15W50
< -12°C (10°F)	SAE 20	SAE 30 or 20W30

Single or multi-viscosity aviation grade oils see latest issue of Textron Lycoming S.I. No. 1014

1.10 SMOKE OIL

Smoke Oil type: Straight paraffin oil,
viscosity 30-50 cts at 20°C (68°F),
initial boiling point > 330°C (626°F)
For example: Fauth FC05, Texaco Canopus 13 or equivalent.

Total Smoke Oil capacity: 28 l / 7.4 US gal

1.11 LOADING

	Utility Category	Acrobatic Category
Wing Loading kg / m^{-2}	84.4	75.5
Power – Weight Ratio kg / hp^{-1}	3.01	2.69

1.12 TERMINOLOGY

Air Speeds

CAS	Calibrated air speed (CAS = TAS in standard atmospheric conditions at sea level)
IAS	Indicated air speed
KIAS	Indicated air speed in knots
TAS	True air speed (same as CAS compensated for altitude, temperature and density)
V_A	Maneuvering speed
V_{NE}	Never exceed speed
V_{NO}	Maximum structural cruising speed
V_S	Stalling speed / minimum steady flight speed
V_X	Best angle-of-climb speed
V_Y	Best rate-of-climb speed

Meteorological Terminology

ISA	International standard atmospheric condition
OAT	Outside air temperature

Secondary Terminology

fpm	Feet per minute
ft	Feet (1 ft = 304.8 mm)
in	Inch (1 in = 25.4 mm)
m	Meter
l	Liter
US gal	US (liquid) gallon (1 US gal = 3.79 Liter)
US quartt	US (liquid) quart (1 US qt = 0.946 Liter)
hp	Horse power (English)
h	Hour
kts	Knots (nautical miles per hour)
km/h	Kilometer per hour
lbs	English pound (1 lbs = 0.4536 kg)
MP	Manifold pressure
NM	Nautical mile (1 nm = 1.852 km)
rpm	Revolutions per minute
CG	Center of gravity
Arm	Is the horizontal distance from reference datum
Moment	Is the product of the weight of an item multiplied by its arm
SL	Sea level

1.13 CONERVERSION TABLE

kts	km/h	km/h	kts	ft	m	m	ft	nm	km	km	nm
50	93	90	49	500	152	250	820	10	19	10	5
55	102	100	54	1000	305	375	1230	20	37	20	11
60	111	110	59	1500	457	500	1640	30	56	30	16
65	120	120	65	2000	610	625	2051	40	74	40	22
70	130	130	70	2500	762	750	2461	50	93	50	27
75	139	140	76	3000	914	875	2871	60	111	60	32
80	148	150	81	3500	1067	1000	3281	70	130	70	38
85	157	160	86	4000	1219	1125	3691	80	148	80	43
90	167	170	92	4500	1372	1250	4101	90	167	90	49
95	176	180	97	5000	1524	1375	4511	100	185	100	54
100	185	190	103	5500	1676	1500	4921	110	204	110	59
105	194	200	108	6000	1829	1625	5331	120	222	120	65
110	204	210	113	6500	1981	1750	5741	130	241	130	70
115	213	220	119	7000	2134	1875	6152	140	259	140	76
120	222	230	124	7500	2286	2000	6562	150	278	150	81
125	232	240	130	8000	2438	2125	6972	160	296	160	86
130	241	250	135	8500	2591	2250	7382	170	315	170	92
135	250	260	140	9000	2743	2375	7792	180	333	180	97
140	259	270	146	9500	2896	2500	8202	190	352	190	103
145	269	280	151	10000	3048	2625	8612	200	370	200	108
150	278	290	157	10500	3200	2750	9022	220	407	250	135
155	287	300	162	11000	3353	2875	9432	240	444	300	162
160	296	310	167	11500	3505	3000	9843	260	482	350	189
165	306	320	173	12000	3658	3125	10253	280	519	400	216
170	315	330	178	12500	3810	3250	10663	300	556	450	243
175	324	340	184	13000	3962	3375	11073	320	593	500	270
180	333	350	189	13500	4115	3500	11483	340	630	550	297
185	343	360	194	14000	4267	3625	11893	360	667	600	324
190	352	370	200	14500	4420	3750	12303	380	704	650	351
195	361	380	205	15000	4572	3875	12713	400	741	700	378
200	370	390	211	15500	4724	4000	13123	420	778	750	405
205	380	400	216	16000	4877	4125	13533	440	815	800	432
210	389	410	221	16500	5029	4250	13944	460	852	850	459
215	398	420	227	17000	5182	4375	14354	480	889	900	486
220	407	430	232	17500	5334	4500	14764	500	926	950	513
225	417	440	238	18000	5486	4625	15174	520	963	1000	540
230	426	450	243	18500	5639	4750	15584	540	1000	1050	567
235	435	460	248	19000	5791	4875	15994	560	1037	1100	594

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2. LIMITATIONS

2.1 GENERAL

This chapter includes limitations for operation of the aircraft, the engine, the standard systems and the standard equipment. Also it gives information on the instrument markings and basic placards. The limitations in this chapter have been approved by the EASA. Observance of these operating limitations is required by national aviation regulations.

NOTE

In case of an XA42 is equipped with specific options additional information required for safe operation will be contained in chapter 9.

Instrument markings and placards are provided for the acrobatic category only; for utility category refer to corresponding limitations.

This aircraft is certified under Type Certification Data Sheet EASA.A.507.

Any exceedance of given limitations has to be reported by the pilot so that necessary inspection or maintenance procedures according to the maintenance manual can be performed.

2.2 AIRSPEED (IAS)

Never exceed speed:	V_{NE}	225 kts
Maximum structural cruising speed:	V_{NO}	185 kts
Maneuvering speed:	V_A	174 kts
Maximum operating maneuvering speed	Vo	174 KIAS

2.3 CROSSWIND COMPONENT

The maximum demonstrated crosswind component for take-off and landing is 25 kts / 47 km/h.

2.4 ENGINE

Engine type is Lycoming AEIO-580-B1A with a rated power of 235 kW / 315 hp @ 2700 rpm.

2.4.1 FUEL

Minimum grade aviation gasoline:	100LL (for alternate fuel grades see latest revisions of Lycoming S.I. No. 1070P)
Total fuel capacity:	275 l / 72.5 US gal
Usable fuel capacity:	273 l / 72.0 US gal

WARNING

For acrobatic flights the wing tanks must be empty.

Total fuel capacity - Acro:	65 l / 17.1 US gal
Usable fuel capacity - Acro:	64 l / 16.9 US gal

2.4.2 ENGINE LIMITATIONS

RPM	• Max. takeoff:	Acrobatic	2700 rpm
		Utility	2670 rpm
	• Max. continuous:		2500 rpm
Oil temperature	• Normal operation:		38 - 117 °C / 100 - 245 °F
	• Maximum:		118 °C / 245 °F
Oil quantity	• Maximum sump quantity:		15.15 l / 16 US qt
	• Minimum sump quantity:		8.52 l / 9 US qt
Oil pressure	• Minimum idling:		1.7 bar / 25 psi
	• Normal:		3.8 – 6.5 bar / 55 - 95 psi
	• Starting, warm-up, taxi and takeoff:		7.9 bar / 115 psi

CAUTION

It is normal for the oil pressure to "flicker" from 10 to 30 psi when going from upright to inverted flight. During knife edge flights and zero-G flights oil pressure may drop and the oil system may not scavenge resulting in engine failure or damage if flight is prolonged. Knife edge and zero-G flight should not exceed 10 seconds.

WARNING

If oil pressure drops to 0 (psi) / 0 (kPa) the propeller pitch changes automatically to coarse (high) pitch with a corresponding decrease in RPM. Apply positive g loads to avoid engine stoppage.

Fuel pressure (Inlet to fuel injector)	• Maximum:	4.48 bar / 65 psi
	• Minimum:	2.00 bar / 29 psi
	• Minimum idle:	0.83 bar / 12 psi
Cylinder head temperature	• Maximum:	240 °C / 465 °F

2.5 PROPELLER

MT-Propeller MTV-9-B-C/C203-20d, 3-blade hydraulic constant speed

RPM limits	Max. takeoff:	Acrobatic	2700 rpm
		Utility	2670 rpm
		Max. continuous:	2500 rpm

2.6 WEIGHT LIMITS

Maximum empty weight	• Utility:	670 kg / 1477 lbs
	• Acro:	670 kg / 1477 lbs
Maximum take-off weight	• Utility:	999 kg / 2200 lbs
	• Acro:	850 kg / 1874 lbs
Maximum landing weight	• Utility:	999 kg / 2200 lbs
	• Acro:	850 kg / 1874 lbs

2.7 WEIGHT AND CENTER OF GRAVITY ENVELOPE

Reference planes for CG calculations:	• vertical:	firewall
	• horizontal:	straight part of cockpit frame

2.7.1 UTILITY FLIGHT

Maximum takeoff weight	Forward CG	Rear CG
999 kg / 2200 lbs	550 mm / 21,65 in / 25 %	700 mm / 27.55 in / 33 %

2.7.2 ACROBATIC FLIGHT

Maximum takeoff weight	Forward CG	Rear CG
850 kg / 1874 lbs	550 mm / 21,65 in / 25 %	700 mm / 27.55 in / 33 %

2.8 BAGGAGE

Maximum allowable baggage is 10 kg / 22 lbs securely stowed
in the baggage compartment behind the pilot´s seat

2.9 ACROBATIC MANEUVERS

2.8.1 UTILITY FLIGHT

All acrobatic maneuvers are prohibited except the following:

- Stall
- Chandelle
- Lazy eight
- Steep turns

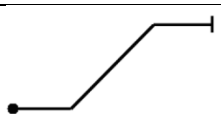
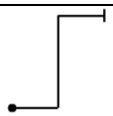
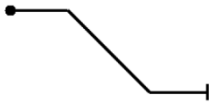
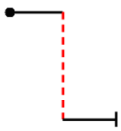
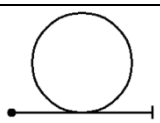
2.8.2 ACROBATIC FLIGHT

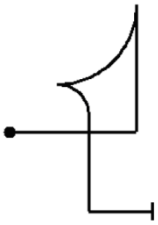
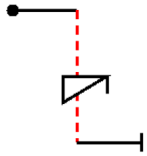
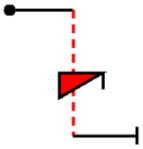
The airplane is certified in the acrobatic category and capable of unlimited acrobatics.

The wing tanks and the baggage compartment must be empty for all acrobatic flights.

Inverted maneuvers are limited to a maximum time of 2 minutes.

The recommended basic maneuver entry speeds are listed below.

Maneuvers	Recommended entry speeds (IAS)		Symbol	Remarks
	Min. kts / km/h	Max. kts / km/h		
Horizontal line	V_S	225 / 417		
Aileron Roll	V_S	225 / 417		
45° climbing	80 / 148	225 / 417		
90° up	174 / 322	225 / 417		
45° diving	V_S	225 / 417		Reduce throttle
90° diving	V_S	225 / 417		Reduce throttle
Looping	100 / 185	225 / 417		
Stall turn	100 / 185	225 / 417		

Maneuvers	Recommended entry speeds (IAS)		Symbol	Remarks
	Min. kts / km/h	Max. kts / km/h		
Snap roll	80 / 148	174 / 322		
Tail slide	100 / 185	225 / 417		
Spin	V_S			
Inverted spin	V_S			
Knife edge	> 150 / 278			< 10 sec.
Inverted flight	> V_S	225 / 417		< 2 min.

CAUTION

Particular caution must be exercised when performing maneuvers at speeds above V_A = 174 KIAS / 322 km/h. Large or abrupt control inputs with elevator and rudder above this speed may impose unacceptably high loads which exceed the structural capability of the aircraft.

NOTE

Structure is designed for full and abrupt aileron input up to VNE.

For acrobatic maneuvers see chapter 4.

All maneuvers can be performed in upright and inverted flight attitude.

2.10 LOAD FACTORS

	Positive load factors	Negative load factors
Utility flight m_{TOW} = 999 kg / 2200 lbs	+ 4.4g	- 2g
Acrobatic flight m_{TOW} = 850 kg / 1874 lbs	+ 10g	- 10g

2.11 FLIGHT CREW LIMITS

The minimum crew is 1 pilot flying from the rear seat only.

The maximum is 2 persons in both categories, where the pilot in command is seated in the rear seat and the front seat occupant / passenger is seated in the front seat.

It is required to use a headset.

2.12 KINDS OF OPERATIONAL LIMITS

Flying is allowed under VFR day conditions only. Flight under icing conditions is prohibited.

Smoking is prohibited. Areas where the risk of lightning exist should be avoided.

The aircraft may be operated at OAT from -20 °C / -4 °F to +38 °C / +100 °F.

2.13 STRUCTURAL TEMPERATURE/COLOR LIMITATION

The structure is qualified up to 72 °C / 161 °F.

Flying with structural temperature above 72 °C / 161 °F is prohibited. To avoid high temperatures, paint colours have to comply with XtremeAir´s color specification for composite structure.

2.14 MAXIMUM OPERATING ALTITUDE

The certified maximum operating altitude is 15.000 ft / 4572 m MSL.

2.15 TYRE PRESSURE

The tyre pressure for the main landing gear is 3.0 bar / 43,5 psi.

The tail wheel is solid rubber.

2.16 SMOKE OIL

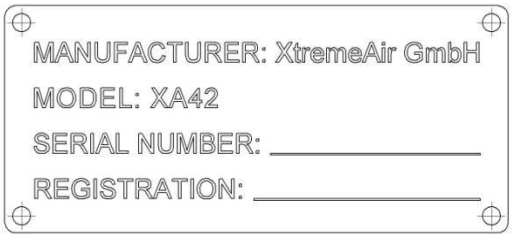
Straight paraffin oil, viscosity 30-50 cts at 20°C (68°F),

initial boiling point > 330°C (626°F)

For example: Fauth FC05, Texaco Canopus 13 or equivalent.

2.17 MARKINGS AND PLACARDS

2.17.1 AIRCRAFT IDENTITY PLACARD



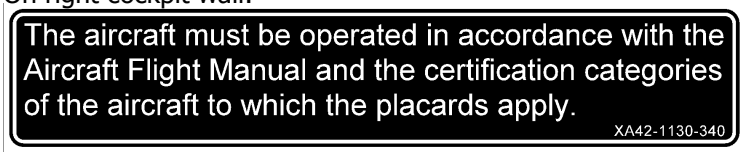
2.17.2 OPERATING PLACARDS

Callsign placard on the instrument panel (example only):

On right cockpit wall:

Near eyeball air vents

On right cockpit wall:



Below compass:

For	N	30	60	E	120	150
Steer						
For	S	210	240	W	300	330
Steer						

DATE VHF ON/OFF AIRPATH

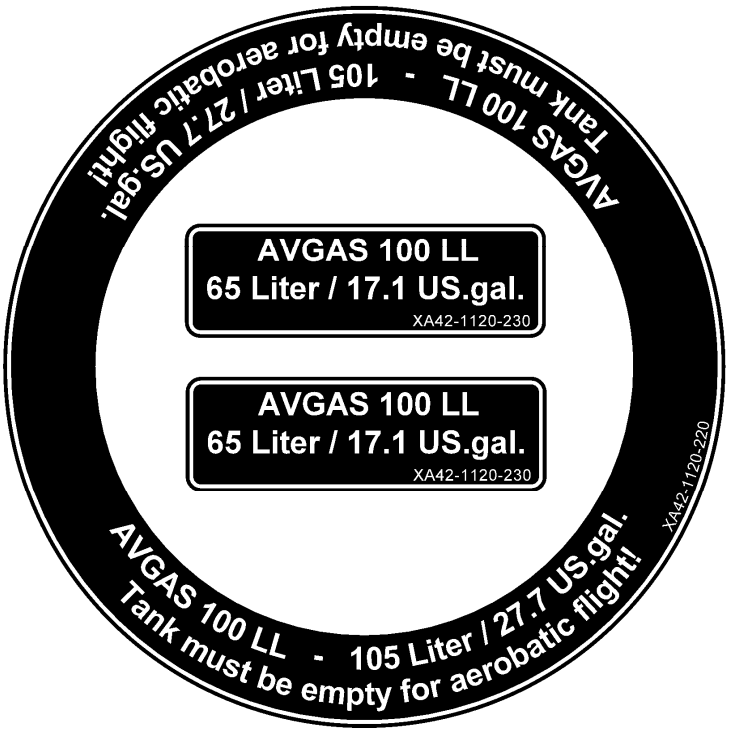
On right cockpit wall

Behind pilot seat and front instrument panel:

On instrument panel:

On fuel quantity indicator:

Near fuel filler caps:



On canopy frame, rh:

Near canopy locking lever inside front and back:

Outside:

On right cockpit wall:

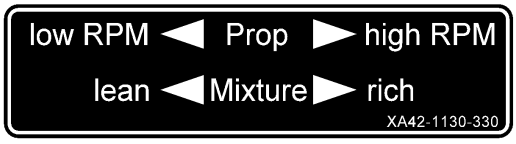
For aircraft with Airspeed indicators in knots

Approved aerobatic maneuvers and recommended entry speeds XA42-1130-230		
Maneuver	**Min. Entry Speed**	**Max. Entry Speed**
Loop	100 KIAS	225 KIAS
Stall Turn	100 KIAS	225 KIAS
Aileron Roll	80 KIAS	225 KIAS
Snap Roll	80 KIAS	174 KIAS
Tailslide	100 KIAS	225 KIAS
Knife Edge Flight	150 KIAS	225 KIAS
Inverted Flight	Stall	225 KIAS
Spin	Stall	-
Inverted Spin	Stall	-
1/4 Loop Up	100 KIAS	225 KIAS
Horizontal Line	Stall	225 KIAS
45° Climbing	80 KIAS	225 KIAS
90° Up	100 KIAS	225 KIAS
45° Diving	Stall	225 KIAS
90° Diving	Stall	225 KIAS

For aircraft with Airspeed indicators in km/h

Approved aerobatic maneuvers and recommended entry speeds XA42-1130-235		
Maneuver	**Min. Entry Speed**	**Max. Entry Speed**
Loop	185 km/h	417 km/h
Stall Turn	185 km/h	417 km/h
Aileron Roll	148 km/h	417 km/h
Snap Roll	148 km/h	322 km/h
Tailslide	185 km/h	417 km/h
Knife Edge Flight	278 km/h	417 km/h
Inverted Flight	Stall	417 km/h
Spin	Stall	-
Inverted Spin	Stall	-
1/4 Loop Up	185 km/h	417 km/h
Horizontal Line	Stall	417 km/h
45° Climbing	148 km/h	417 km/h
90° Up	185 km/h	417 km/h
45° Diving	Stall	417 km/h
90° Diving	Stall	417 km/h

On left rear cockpit wall:



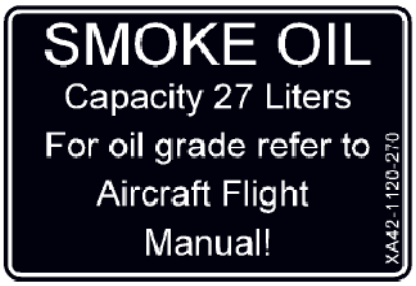
Under the Airspeed indicator:

On baggage compartment:

Near fuselage and Wing tank drains:

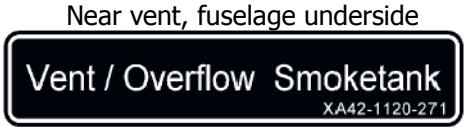
On oil inspection flap

Near smoke refill connector

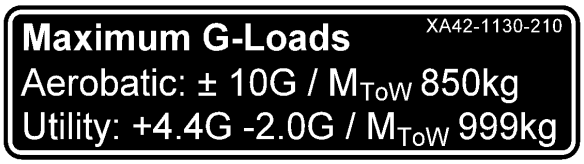


Left wheelpant, inner side:

Near vent, fuselage underside



near G-Meter



2.17.3 INSTRUMENT MARKINGS

Airspeed indicator

green arc	54 kts / 99 km/h to 185 kts / 342 km/h
yellow arc	185 kts / 342 km/h to 225 kts / 417 km/h
red line	225 kts / 417 km/h

Oil pressure indicator

red line	25 psi
yellow arc	25 psi to 55 psi
green arc	55 psi to 95 psi
yellow arc	95 psi to 115 psi
red line	115 psi

Oil temperature indicator

green arc	100 °F to 245 °F
red line	245 °F

Fuel pressure indicator

yellow arc	0 psi to 12 psi
green arc	12 psi to 65 psi
red line	65 psi

Manifold pressure indicator

green arc	11 in Hg to 32 in Hg

Cylinder head temperature indicator

Operating Range	200 °F to 465 °F

Starts to flicker when exceeding max. temperature

Tachometer

green arc	700 rpm to 2500 rpm
yellow arc	2500 rpm to 2700 rpm
red line	2700 rpm

G-Meter

Acrobatic:	MToW 850 kg	$\pm$ 10g
Utility:	MToW 999 kg	+4,4g, -2,0g

2.18 KINDS OF OPERATION EQUIPMENT LIST

The aircraft may be operated under VFR day conditions when the appropriate equipment is installed and operable. If icing conditions occur flying is prohibited.

To meet certification standards, the following equipment and systems must be installed and operable:

	Utility	Acrobatic	
		1 seat	2 seats
Communication			
1. Transceiver - VFH	O	O	O
2. Emergency Locator Transmitter*	M	M	M
Electrical Power			
1. Battery	M	M	M
2. Alternator	O	O	O
3. Amperemeter	O	O	O
Flight Control System			
1. Elevator trim control	M	M	M
Fuel			
1. Boost pump	M	M	M
2. Fuel quantity indicator	M	M	M
3. Manifold pressure	M	M	M
4. Fuel flow indicator	O	O	O
5. Fuel pressure	M	M	M
Light			
1. Anti collision light *	M	M	M
Navigation			
1. Altimeter	M	M	M
2. Airspeed indicator	M	M	M
3. Magnetic direction indicator	M	M	M
4. OAT indicator	O	O	O
5. Vertical speed indicator	O	O	O
6. Turn and bank indicator	O	O	O
7. Artificial horizon	O	O	O
8. Directional gyro	O	O	O
9. Transponder	O	O	O
Engine Control			
1. RPM indicator	M	M	M
2. Exhaust gas temperature indicator	O	O	O
3. Cylinder head temperature indicator	O	O	O
Oil			
1. Oil temperature indicator	M		M
2. Oil pressure indicator	M	M	M

(continued)	**Utility**	**Acrobatic**	
		1 seat	**2 seats**
Flight Crew Equipment			
1. Parachute	M	M	M
3. Seat belt	M	M	M
5. Headset	M	M	M

O = Optional

M = Mandatory

The asterisks (*) used in the above list requires a detailed observation of the national aviation requirements. For airplanes that are registered in the United States, the FAR Part 91 "General Operating and Flight Rules" prescribes each occupant to wear an approved parachute when performing acrobatic maneuvers.

XtremeAir GmbH highly recommends wearing an approved parachute during all flights.

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3. EMERGENCY PROCEDURES

3.1 INTRODUCTION

3.1.1 GENERAL

This section contains the checklist and procedures coping with emergencies that may occur.

This checklist must be followed in emergencies to ensure maximum safety for the crew and/or aircraft.

The knowledge of these procedures will enable the aircrew to better cope with an emergency. The steps should be performed in the listed sequence. However the procedures do not restrict the aircrew from taking any additional action necessary to deal with the emergency.

3.1.2 GENERAL BEHAVIOR IN EMERGENCY SITUATIONS

In any emergency situation, contact should be established with a ground station as soon as possible after completing the initial corrective action. Include position, altitude, heading, speed, nature of the emergency and pilot's intentions in the first transmission. There after the ground station should be kept informed of the progress of the flight and of any changes or developments in the emergency. Three basic rules apply to most emergencies and should be observed by the pilot:

1. Maintain aircraft control
2. Analyze the situation and initiate proper action
3. Land as soon as possible/as soon as practical

The meaning of "as soon as possible" and "as soon as practical" as used in this section is as follows:

Land AS SOON AS POSSIBLE (ASAP)

Emergency conditions are urgent and require an immediate landing at the nearest suitable airfield, considering also other factors, such as weather conditions and aircraft mass.

Land AS SOON AS PRACTICAL

Emergency conditions are less urgent and in the aircrews judgment the flight may be safely continued to an airfield where more adequate facilities are available.

WARNING

Make only one attempt to restore an automatically disconnected power source or reset or replace an automatically disconnected circuit breaker that affects flight operations or safety. Each repetitive attempt to restore an automatically disconnected power source or the resetting of an automatically disconnected circuit breaker can result in progressively worse effects.

3.2 AIR SPEEDS FOR EMERGENCY OPERATION

Stall speed	54 KIAS / 100 km/h
Engine failure after takeoff	80 KIAS / 150 km/h
Best recommended gliding speed (glide angle 1:7)	
• Utility - 999 kg	80 KIAS / 150 km/h
• Acro - 850 kg	80 KIAS / 150 km/h
Precautionary landing with engine power	80 KIAS / 150 km/h
Landing without engine power	80 KIAS / 150 km/h
Maximum demonstrated cross wind component	25 kts / 47 km/h

3.3 OPERATIONAL CHECKLIST

3.3.1 ENGINE FAILURE DURING TAKEOFF

When sufficient runway left:

Normal	APPLY BRAKES

When insufficient runway is left:

Harsh	APPLY BRAKES
Mixture	PULL CUTOFF
Ignition	OFF
Master switch	OFF

3.3.2 ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

Push stick to maintain	80 kts
Mixture	PULL CUTOFF
Fuel selector switch	OFF
Ignition	OFF
Master switch	OFF
Straight ahead	LAND

3.3.3 ENGINE FAILURE DURING FLIGHT (RESTART ENGINE PROCESS)

Best glide speed	80 KIAS / 150 km/h
Fuel capacity of tank selected	CHECK
Select to fullest tank	SWITCH
Ignition BOTH	CHECK

(3.3.3 continued)

Engine restart in flight:

Propeller control Fine pitch	PUSH
Electric fuel pump	ON
Mixture	PUSH FULL RICH
Throttle 5 (mm) open	ADJUST
Starter (only if propeller is stopped!)	ENGAGE

3.3.4 OIL SYSTEM MALFUNCTION

Low oil pressure:

Changes in indication of oil temperature and oil pressure	OBSERVE
Power	REDUCE

When oil pressure drops below 25 psi engine must be stopped!

WARNING

If oil pressure drops to zero, Propeller goes to high pitch = low RPM = low drag!

High oil temperature:

Oil pressure	CHECK
When oil temperature rises and oil pressure sinks	REDUCE POWER
If possible	INCREASE airspeed.

3.3.5 ALTERNATOR FAILURE AND WIRE FIRE

Alternator failure:

Alternator switch	OFF
Before next flight	SOLVE PROBLEM

Wire fire:

Master switch	OFF
After fire extinguished	LAND ON NEAREST AIRFIELD
Fire keeps burning	LAND IMMEDIATELY

3.3.6 ENGINE MALFUNCTIONS

High cylinder head temperature:

Mixture	PUSH FULL RICH
Power	REDUCE
Flight with reduced power	CONTINUE

Sudden loss of power:

Mixture	PUSH FULL RICH
Electric fuel pump	ON
Fuel capacity of tank selected	CHECK
Select to fullest tank	SWITCH
Ignition BOTH	CHECK
Constant speed propeller	CHECK, if necessary PUSH Fine pitch

Malfunctions:

Power	REDUCE
Engine instruments	CHECK
Problem	ANALYSE
As soon as possible	LAND

3.4 FORCED LANDINGS

3.4.1 EMERGENCY LANDING WITHOUT ENGINE POWER

Glide with engine off:

Recommended glide speed	80 KIAS / 150 km/h
Propeller	PULL COARSE PITCH
Best glide ratio	E = 7

NOTE

Prop at fine pitch (pushed) reduces the glide ratio to	E = 5,5

WARNING

Loss of oil pressure puts the prop to coarse pitch, using the prop for glide ratio control is not possible when oil pressure is lost!

Suitable terrain	SELECT
Fuel selector switch	OFF
Mixture CUTOFF	CHECK
Master switch OFF	CHECK
Straps	TIGHTEN

Final and landing:

Approach speed	80 KIAS / 150 km/h
Glide angle with speed	CONTROL
After touchdown	APPLY BRAKES

3.4.2 PRECAUTIONARY LANDING WITH ENGINE POWER

Proceed like short field landing; additionally in short final MASTER SWITCH OFF.

3.5 FIRES

3.5.1 DURING START ON GROUND

Fuel selector switch	OFF
Throttle	FULL OPEN
Mixture	PULL CUTOFF
Master switch	OFF
After engine failure: Ignition	OFF
Aircraft	LEAVE IMMEDIATELY
Fire extinguishing	point fire extinguisher towards air inlets!

WARNING

Do not remove cowling while fire alight!

3.5.2 ENGINE FIRE IN FLIGHT

Fuel selector switch	OFF
Throttle	FULL OPEN
Mixture	PULL CUTOFF
Master switch	OFF
After engine failure: Ignition	OFF
Glide and emergency dead stick landing	EXECUTE
If fire does not stop and landing is not practical after 5 minutes	BAIL OUT

3.6 ICING – INADVERTENT ENCOUNTER

In the case of an icing encounter turn back or change altitude to obtain an outside temperature that is less conductive to icing. In advance, plan a landing at the nearest airfield.

With extremely rapid ice build-up select a suitable "off airport" landing field.

3.7 UNINTENTIONAL SPIN

Standard procedure for spin recovery:

Throttle	IDLE
Elevator and aileron	NEUTRAL
Rudder against direction of rotation	APPLY
After rotation stops:	
Rudder	NEUTRAL
Aircraft	RECOVER FROM DIVE

3.8 BAIL-OUT

Speed	REDUCE below 100 kts
Mixture	PULL CUTOFF
Canopy	UNLOCK & OPEN
Straps	OPEN
Aircraft to the left	LEAVE
Parachute	OPEN

3.9 EMERGENCY EXIT AFTER FLIP-OVER

Master switch	OFF
Fuel selector valve	OFF (Pull & Turn)
Seat belts	OPEN
Parachute harnesses (when wearing a parachute)	OPEN
Canopy handles	PULL TO OPEN

NOTE

If canopy fails to open, break with emergency escape tool	EVACUATE ASAP

3.10 ELEVATOR CONTROL FAILURE

In case of elevator control failure the aircraft can be flown with the elevator trim.

In this case trim nose up to the desired speed and control horizontal flight or descend with engine power.

For landing trim nose up and establish a shallow descend by adjusting throttle.

To flare, gently increase power to bring the nose up to landing attitude.

3.11 LIGHTNING STRIKE

In case the aircraft gets struck by a lightning:

Engine / Propeller Vibration	REDUCE RPM if necessary
Airspeed	REDUCE TO 110 kts
Load factors	AVOID higher loads than + 1,2 / 0,8G
Controlability	ASSESS HANDLING:
If satisfactory:	LAND ASAP
If not:	BAIL OUT

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4. NORMAL PROCEDURES

4.1 GENERAL

4.1.1 AIRSPEEDS FOR NORMAL OPERATION

Operation	IAS kts	IAS km/h
Climb out after take-off	90	160
Cruise climb	90 to 160	160 to 300
Best climb rate (V_y)	98	181
Best angle of climb (V_x)	78	144
Normal approach	80	150
Approach for short field landing	70	130

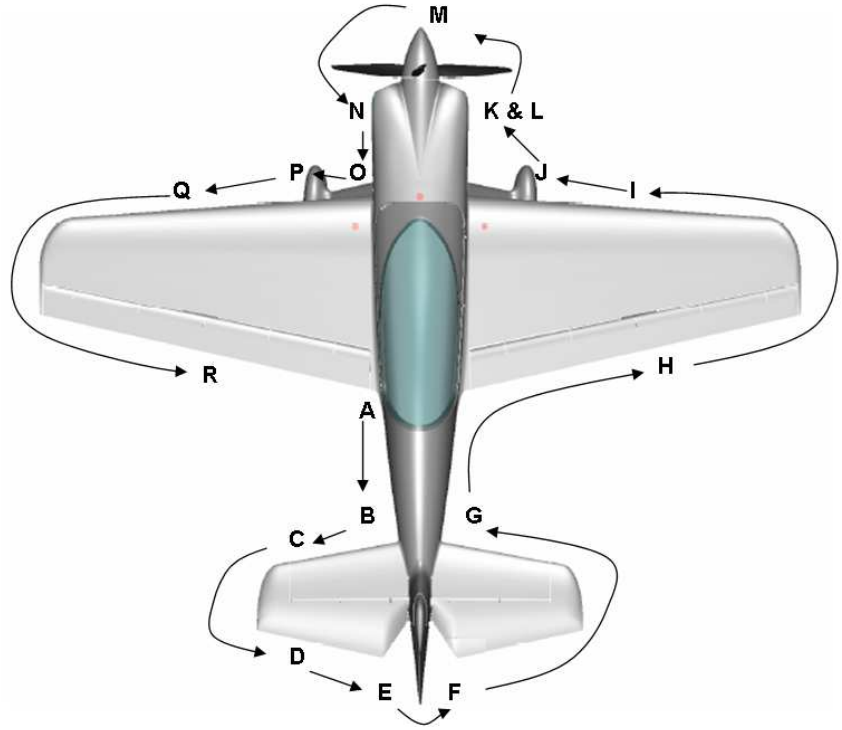
4.1.2 CHECKLIST AND PROCEDURES

This manual contains the checklist and procedures to operate the aircraft in the utility and the acrobatic category. The pilot should be familiar with all procedures contained in the Airplane Flight Manual, which must be carried on board. The pilot has to comply with checklist for daily check and inspections (see chapter 8).

4.2 PREFLIGHT INSPECTION

4.2.1 EXTERIOR INSPECTION ILLUSTRATION

A) Cockpit, Canopy
B) Left rear fuselage
C) Stabilizer leading edge
D) Elevator
E) Vertical stabilizer
F) Tail wheel
G) Right rear fuselage
H) Right wing trailing edge
I) Right wing leading edge
J) Right main gear
K) Right front fuselage
L) Engine
M) Propeller
N) Left front fuselage
O) Canopy
P) Left main gear
Q) Left wing leading edge
R) Left wing trailing edge



4.2.2 GENERAL

Visually check airplane for general condition during walk around inspection. Perform exterior check as outlined in the picture above in counter clockwise direction.

4.3 CHECKLIST PROCEDURES

A) Cockpit, Canopy

AFM and legal documents	CHECK ON BOARD
Ignition, Master switch	OFF
Clear of foreign objects	CHECK
Baggage compartment	CHECK
Front seat harness	SECURED
Controls free movement	CHECK
Throttle free movement	CHECK
Master switch	ON
Fuel capacity indication	CHECK
Master switch	OFF
Canopy frame and glass to damage	CHECK

B) Left rear fuselage

Fuselage skin to damage	CHECK
Static port - clean	CHECK
Smoke tank vent / overflow port - clean	CHECK

C) Stabilizer leading edge

Stabilizer leading edge and skin to damage	CHECK

D) Elevator

Elevator trailing edge and skin to damage	CHECK
Elevator hinges	CHECK
Elevator linkage	CHECK
Elevator for free movement and play	CHECK
Servotab for damage, hinges and free movement	CHECK

E) Vertical stabilizer

Vertical stabilizer leading edge and skin for damage	CHECK
Rudder trailing edge and skin for damage	CHECK
Rudder hinges	CHECK
Rudder linkage	CHECK
Rudder for free movement and play	CHECK

F) Tail wheel

General condition of strut	CHECK
Freedom of movement and play	CHECK

Tyre wear	CHECK

G) Right rear fuselage

Fuselage skin for damage	CHECK
Static port clean?	CHECK

H) Right wing trailing edge

Spade and spade arm	CHECK
Aileron linkage	CHECK
Wing trailing edge and skin for damage	CHECK
Aileron trailing- leading edge and skin for damage	CHECK
Aileron hinges	CHECK
Freedom of movement and play	CHECK

I) Right wing leading edge

Wing leading edge and skin for damage	CHECK
Fuel cap and fuel capacity	CHECK
Right wing tank	DRAIN WATER

J) Right main gear

Main gear strut to damage	CHECK
Tyre to pressure and wear	CHECK
Tire and wheel slip mark	CHECK

K) Right front fuselage

Fuselage skin for damage	CHECK

L) Engine

Oil quantity	CHECK

CAUTION

All items of this check below this line must be performed every 20 Flights!

Cowling	OPEN
Engine core to cracks	CHECK
Baffling to cracks	CHECK
Engine mount to cracks	CHECK
Exhaust system to cracks	CHECK
Exhaust system fixtures	CHECK
Cables and hoses to chafing	CHECK

Ignition cables and spark plugs	CHECK
Wiring	CHECK
Engine actuator cables to freedom of movement	CHECK
Oil and fuel system for leaks	CHECK
Cowling	CLOSE

M) Propeller

Blades to damage	CHECK
Hub to damage and oil leaks	CHECK
Play of blades in hub	CHECK

N) Left front fuselage

Fuselage skin for damage	CHECK

O) Canopy

Canopy frame and glass to damage	CHECK

P) Left main gear

Main gear strut to damage	CHECK
Tyre to pressure and wear	CHECK
Tire and wheel slip mark	CHECK

Q) Left wing leading edge

Wing leading edge and skin for damage	CHECK
Fuel cap and fuel capacity	CHECK
Left wing tank	DRAIN
Pitot tube for choking and damage	CHECK

R) Left wing trailing edge

Spade and spade arm	CHECK
Aileron linkage	CHECK
Wing trailing edge and skin for damage	CHECK
Aileron trailing- leading edge and skin for damage	CHECK
Aileron hinges	CHECK
Freedom of movement and play	CHECK

4.4 STARTING PROCEDURES

Startup:

Canopy	CLOSED and LOCKED
Straps	ATTACH and TIGHTEN
Fuel selector switch to ACRO tank	SWITCH
Avionic switch OFF	CHECK
Master switch	ON
Propeller control	PUSH FINE PITCH
Mixture	PUSH FULL RICH
Throttle	FULL OPEN
Electric fuel pump	ON 3 sec.
Throttle	IDLE, PUSH 3mm OPEN
Mixture	CUT-OFF
Elevator	PULL
Brake	APPLY
Propeller area FREE	CHECK and CALL
Starter	ENGAGE
When engine starts to fire	FEED IN MIXTURE
1000 rpm with throttle	ADJUST
Oil pressure	CHECK (must rise within 30 sec.)
Avionic switch	ON

Warm-up:

2 min 1000 rpm	CHECK
Afterwards 1500 rpm	ADJUST
Until oil temperature reaches 100 °F	CHECK

4.5 TAXIING THE AIRCRAFT

Brakes	RELEASE
Elevator pulled	KEEP

4.6 TAKEOFF PROCEDURES

4.6.1 BEFORE TAKEOFF

Run-up:

Canopy closed and locked	CHECK
Straps	TIGHTEN
Fuel selector to fuselage tank	CHECK
Fuel capacity	CHECK
Electric fuel pump	ON
Engine instrument readouts in the GREEN	CHECK
Mixture	PUSH FULL RICH
Brakes	APPLY
Elevator pulled	KEEP
Propeller control	PUSH FINE PITCH
Throttle to 1700 rpm	ADJUST
Magnetos 1 + 2	CHECK
Max. RPM drop 175 rpm	CHECK
Max. RPM difference 50 rpm	CHECK
Propeller control	3 x PULL COARSE PITCH
Afterwards	PUSH FINE PITCH
Throttle to Idle RPM / 700 rpm	ADJUST
Controls free	CHECK

4.6.2 TAKEOFF

Normal takeoff:

Throttle	FULL OPEN
@ 30 kts lift tail wheel	PUSH
@ 75 kts	LIFTOFF
@ 90 kts	CLIMB

Takeoff in crosswind:

Throttle	FULL OPEN
RPM Acrobatic: RPM max. 2700 rpm	ADJUST
RPM Utility: RPM max. 2670 rpm	ADJUST
Elevator	NEUTRAL
@ 70 kts in three point attitude	LIFTOFF

WARNING

No turns below 90 kts!

@ 90 kts	CLIMB

4.7 CLIMB

Takeoff power:

Acrobatic:	RPM max. 2700 rpm	ADJUST
Utility :	RPM max. 2670 rpm	ADJUST
Manifold pressure		AS REQUIRED

Airspeeds:

Normal climb	120 kts / 220 km/h
Best rate of climb	90 kts / 167 km/h
Best angle of climb	78 kts / 144 km/h

4.8 CRUISE

Max continuous power:

RPM max. 2500 rpm	ADJUST
Manifold pressure	AS REQUIRED
Set Mixture according to EGT-Indicator	ADJUST
Select right/left wing tank every 30 (min)	SWITCH

4.9 LANDING PROCEDURES

4.9.1 DESCENT

Mixture	PUSH FULL RICH
Fuel selector valve to acrobatic tank (ACRO)	SWITCH
Electric fuel pump	ON

Power during descent:

RPM min. 2000 rpm	ADJUST
Manifold pressure	AS REQUIRED
Watch CHT to prevent excessive cooling!	
Airspeed	AS REQUIRED

4.9.2 PRE LANDING

Straps	TIGHTEN
Mixture	PUSH FULL RICH
Fuel selector valve to ACRO tank	SWITCH
Propeller control	PUSH FINE PITCH
Approach speed	80 kts / 150 km/h

4.9.3 GO AROUND

Throttle	FULL OPEN
Airspeed	80 kts / 150 km/h

4.9.4 NORMAL LANDING

Approach speed	80 kts / 150 km/h
Three point attitude	TOUCHDOWN
Elevator pulled	DECELERATE

4.9.5 LANDING IN CROSSWIND

Approach speed	80 kts / 150 km/h
On main wheels	TOUCHDOWN
Elevator pulled	BRAKE

WARNING

The maximum demonstrated crosswind component for take-off and landing is 25 kts / 47 km/h.

4.9.6 SHORT FIELD LANDING

Approach speed throttle idle	80 kts / 150 km/h
Approach speed with power	70 kts / 130 km/h
Three point attitude	TOUCHDOWN
Brakes	APPLY as needed

4.9.7 AFTER LANDING

Electrical fuel pump	OFF
Elevator pulled	KEEP

4.10 SHUTDOWN

Throttle	IDLE
Avionic Switch	OFF
Mixture	PULL CUTOFF
Ignition	OFF
Master Switch	OFF

NOTE

Allow engine to cool down at idle for at least 1 min before shutdown.

4.11 AFTER LEAVING THE AIRCRAFT

4.11.1 SHORT TIME PARKING

Nose in the wind	TURN
Wheels with chocks	SECURE

4.11.2 LONG TIME PARKING

Fuel selector switch	OFF
Wheels with chocks	SECURE
Aircraft at tie down points	TIE DOWN
Control stick with straps	SECURE

4.12 ACROBATIC MANEUVERS

4.12.1 GENERAL

Prior to aerobatic flying the aircraft must be carefully checked regarding loose objects.

For solo flying, front cockpit's harness must be secured. Solo flying is allowed from the rear seat only.The pilot's harness must be as tight as possible.

NOTE

Note the maneuver's limitations according to chapter 2.

During zero-G maneuvers a loss of oil pressure is normal, it will stabilise again as any G´s are applied.

WARNING

The high G-forces possible in this aircraft can easily overstress the unaware pilot.

Each pilot must know his own limits and act careful accordingly.

Because of the probability concentration of CO gases in the cockpit while performing spins it is strongly recommended to leave the cockpit air vents open all the time.

Be careful while maneuvering above V_A = 174 kts / 322 km/h. Big and abrupt control inputs with elevator and / or rudder can overstress the airframe which can result in catastrophic failure.

4.12.2 MANEUVERS

Utility category:

Stall: Level and accelerated stalls up to MTOW, Airspeed and G-limits in the Utility category are to be respected.

Chandelle: Airspeed and G-limits in the Utility category must be respected.

Lazy eight: Airspeed and G-limits in the Utility category must be respected.

Steep turns: Airspeed and G-limits in the Utility category must be respected.

Acrobatic category:

Horizontal line: A horizontal line can be flown with any required speed between V_S und V_{NE}.

45° Climbing line: With max. continuous power the aircraft can sustain this line.

The speed will not drop below 80 kts / 144 km/h.

90° Vertical climbing line: A vertical climbing line can be entered with any required speed between V_S und V_{NE}.

NOTE

In long zero-g lines the propeller can go in high pitch due to a loss of oil pressure.

By applying any g-load the oil pressure will be restored.

45° Descending line: Reduce power to prevent exceeding V_{NE}.

90° Vertical descending line: Reduce power to prevent exceeding V_{NE}.

Snap roll: Snap rolls must not be flown above 174 kts / 322 km/h

Aileron roll: Full aileron deflection rolls can be flown up to 225 kts / 417 km/h = V_{NE}.

Quarter-looping upwards: Recommended minimum entry speed is 100 kts / 185 km/h. If another maneuver shall follow in the vertical line, more speed is required.

A full round loop requires an entry speed of at least 100 kts / 185 km/h.

Gyroscopic manoeuvers: All maneuvers with high rates of rotation in the pitch- and yaw axis cause high stress to the crankshaft!

NOTE

There is no RPM limitation for gyroscopic maneuvers

CAUTION

Be aware of the risk of a higher engine wear during gyroscopic maneuvers!

4.12.3 SPIN

Spin entry:

Airspeed	REDUCE
At reaching stall speed:	
Rudder to desired direction of spin	APPLY
Aileron	NEUTRAL
Elevator	PULL

The aircraft falls in a stable spin. The loss of altitude for 6 turns of standard spin (rudder deflected, aileron neutral, elevator pulled, power off) is about 2300 ft. Applying aileron against the direction of spin will cause a flat spin; aileron into the direction of spin will cause a spiral dive.

Applying aileron into the direction of spin will cause a flat spin; aileron against the direction of spin will cause a spiral dive.

To induce inverted spins the elevator must be pushed, and aileron action is reversed.

Spin recovery:

Rudder against direction of spin	APPLY
Throttle	IDLE
Ailerons	NEUTRAL
Elevator	NEUTRAL

The spin stops within a half revolution. Recovery is accelerated by aileron deflection into the direction of rotation.

WARNING

Recovery can be severely handicapped or completely blocked by aileron against rotation!

NOTE

If loss of orientation occurs during spin:

Throttle	IDLE
Hard rudder pedal	APPLY
Stick	CENTER

The spin stops within 1 turn and the aircraft can be recovered from the resulting dive.

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5. PERFORMANCE

5.1 GENERAL

Performance data charts on the following pages are presented to facilitate the planning of flights in detail and with reasonable accuracy under various conditions. The data in the charts have been computed from actual flight tests with the aircraft and engine in good condition and using average piloting techniques.

It should be noted that the performance information presented in the range and endurance charts allow for 60 minutes reserve fuel at specified speeds. Some indeterminate variables such as engine and propeller, air turbulence and others may account for variations as high as 10 % or more in range and endurance. Therefore, it is important to utilize all available information to estimate the fuel required for the particular flight.

5.1.1 PERFORMANCE CHARTS

Performance data are presented in tabular or graphical form to illustrate the effect of different variables. Sufficiently detailed informations are provided in the tables so that conservative values can be selected and used to determine the particular performance figure with reasonable accuracy.

All speeds in this chapter are indicated air speeds IAS except otherwise stated. The performance figures below are given under following conditions:

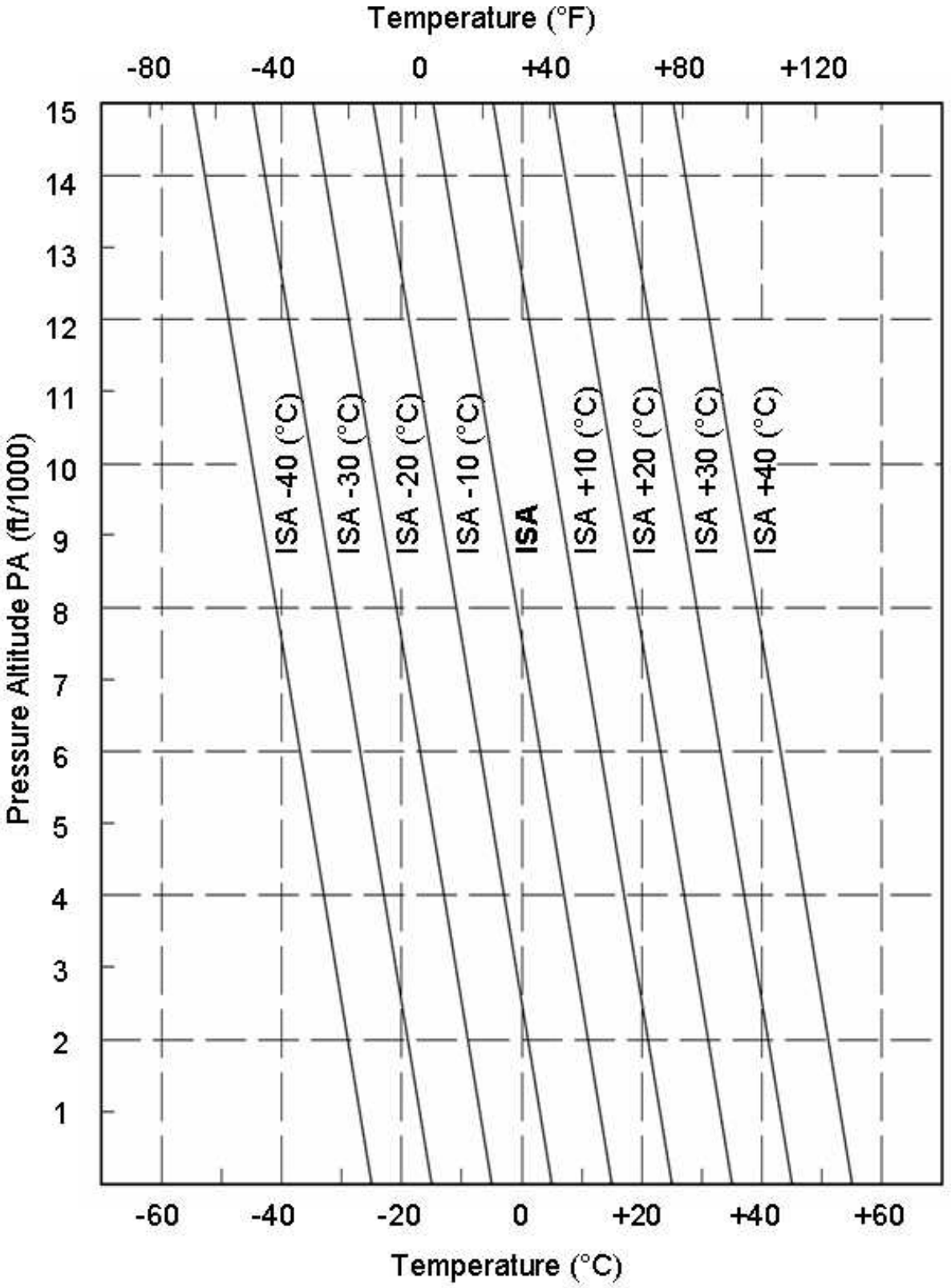
- Maximum allowed weight 999 kg / 2200 lbs except otherwise stated
- Take-off and landing on concrete surface
- No wind
- Standard atmospheric condition

5.1.2 DEFINITION OF TERMS

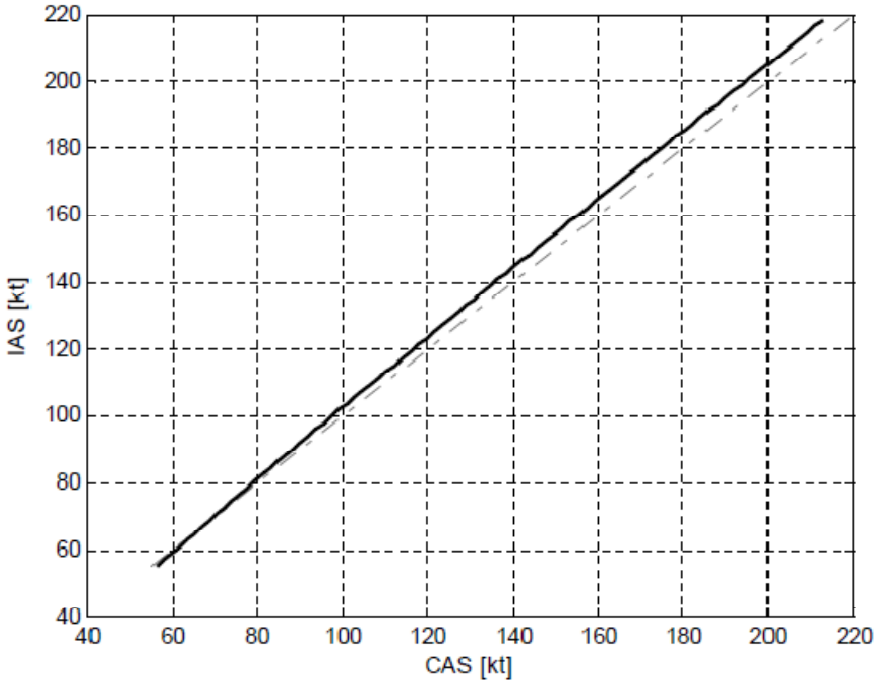
For definition of terms, abbreviations and symbols refer to chapter 1.

5.2 ISA CONVERSION

ISA Conversion of pressure altitude and outside air temperature are shown in the following figure.



5.3 AIRSPEED CALIBRATION



Indicated airspeed assumes zero instrument error.

5.4 STALL SPEED

Below 60 kts IAS the control's sensibility decreases and the stall is announced by a slight shudder 6 kts before stalling.
While executing power-on stalls the aircraft starts to wiggle around the pitch and roll axis. Deck angle is around 70° to 80°. Pitchdown and roll are about 30°, recovery can be achieved without altitude loss.

Power-off stalls are announced by slight shuddering of the aircraft 5 kts above the stall.

Pitchdown and roll are about 30°, altitude loss for recovery about 100 ft.

Stallspeeds (IAS):

Bank angle [°]	laod factor [-]	Utility 999 kg KIAS	Aeobatic 850 kg KIAS
0	1	57	52
15	1.04	58	53
30	1.15	61	56
45	1.41	67	62
60	2.00	80	74
75	3.86	111	103

5.5 TAKE-OFF PERFORMANCE

The mentioned take-off distances are valid for a hard surface runway, clean aircraft and no wind. For other conditions, use following factors:

Wind:	10 kts headwind	distances are reduced by 15 %
	20 kts headwind	distances are reduced by 30 %
	for each 3 kts tailwind	distances are increased by 10 %

Runway: Distances on a dry, hard grass runway are 10 % longer.
For wet, soft and uneven fields factors must be determined individually by the PIC.

5.5.1 TAKE-OFF DISTANCES FOR UTILITY CATEGORY TAKE-OFF WEIGHT

Conditions:	m_{TOW}	999 kg
	Lift-off speed	70 KIAS / 130 km/h
	Speed over 50 ft obstacle V_{50}	80 KIAS / 150 km/h
	Power setting	full throttle, 2670 rpm

Pressure altitude (ft)	Distance (m)	Temperature (°C)			
		ISA	ISA +10	ISA +20	ISA +30
0 / SL	Take-off run	216	236	256	278
	over 50 (ft) obstacle	351	372	404	438
1000	Take-off run	229	249	271	294
	over 50 ft obstacle	360	393	427	464
2000	Take-off run	242	264	287	312
	over 50 ft obstacle	381	416	452	491
3000	Take-off run	256	280	305	331
	over 50 ft obstacle	404	441	480	522
4000	Take-off run	271	296	323	351
	over 50 ft obstacle	428	467	509	553
5000	Take-off run	287	314	342	372
	over 50 ft obstacle	453	495	539	587
6000	Take-off run	305	333	364	396
	over 50 ft obstacle	481	526	573	624
7000	Take-off run	323	353	385	419
	over 50 ft obstacle	509	556	607	661
8000	Take-off run	343	376	410	447
	over 50 ft obstacle	541	592	647	704

5.5.2 TAKE-OFF DISTANCES FOR ACROBATIC CATEGORY TAKE-OFF WEIGHT

Conditions:

m_{TOW}	850 kg
Lift-off speed	70 KIAS / 130 km/h
Speed over 50 ft obstacle V_{50}	80 KIAS / 150 km/h
Power setting	full throttle, 2700 rpm

Pressure altitude	Distance	Temperature °C			
ft	m	ISA	ISA +10	ISA +20	ISA +30
	Take-off run	142	155	168	182
0 / SL	over 50 ft obstacle	224	244	265	287
	Take-off run	150	163	178	193
1000	over 50 ft obstacle	236	257	280	304
	Take-off run	159	173	189	205
2000	over 50 ft obstacle	251	273	297	323
	Take-off run	168	183	200	217
3000	over 50 ft obstacle	265	289	315	342
	Take-off run	178	194	212	230
4000	over 50 ft obstacle	280	306	334	363
	Take-off run	189	206	225	244
5000	over 50 ft obstacle	297	325	354	385
	Take-off run	200	219	238	259
6000	over 50 ft obstacle	315	345	376	409
	Take-off run	212	232	253	276
7000	over 50 ft obstacle	335	366	400	435
	Take-off run	226	247	270	294
8000	over 50 ft obstacle	356	390	425	463

5.6 RATE OF CLIMB PERFORMANCE

Speed for **best rate of climb** (V_y) 90 kts / 167 km/h

Speed **for best angle of climb** (V_x) 78 kts / 145 km/h

	Climb rate in ft/min for	
	best rate of climb	**best angle of climb**
Utility flight m_{TOW} = 999 kg	2720	2456
Acrobatic flight m_{TOW} = 850 kg	3266	3000

5.7 CRUISE PERFORMANCE, RANGE, ENDURANCE AND FUEL CONSUMPTION

In the range included is a 60 min reserve at the determined power setting,
starting with full fuel of 275 L / 72.5 US gal.

						Best power mix			**Economy mix Limit 75 %**			
Press.Alt. ft	**OAT °C**	**ISA °C**	**RPM 1/min**	**MP " Hg**	**TAS kts**	**FF L/h**	**Endurance h:min**	**Range NM**	**FF L/h**	**PWR %**	**Endurance h**	**Range NM**
4.000	9	9	2100	21.0	167	42	5:30	920	37	45	6:20	1050
4.000	9	9	2300	23.0	178	54	4:05	730	46	58	4:55	730
4.000	9	9	2400	24.0	185	66	3:05	570	57	73	3:50	700
10.000	-5	-5	2000	20.0	179	46	4:55	890	40	50	5:50	1050
10.000	-5	-5	2400	21.0	210	62	4:20	930	53	67	4:10	875

5.8 LANDING PERFORMANCE

The mentioned landing distances are valid for a hard surface runway, clean aircraft and no wind. For other conditions, use following factors:

Wind:	10 kts headwind	distances are reduced by 15 %
	20 kts headwind	distances are reduced by 30 %
	for each 3 kts tailwind	distances are increased by 10 %

Runway: Distances on a dry, hard grass runway are 10 % longer. For wet, soft and uneven fields factors must be determined individually by the PIC.

Landing distances:

999 kg Landing weight

Pressure altitude	Distance	Temperature °C			
ft	m	ISA	ISA +10	ISA +20	ISA +30
	Landing run	428	461	496	532
0 / SL	over 50 ft obstacle	710	765	823	883
	Landing run	443	478	515	552
1000	over 50 ft obstacle	736	794	854	916
	Landing run	460	496	534	573
2000	over 50 ft obstacle	763	823	886	951
	Landing run	477	514	554	595
3000	over 50 ft obstacle	791	854	919	988
	Landing run	494	534	575	618
4000	over 50 ft obstacle	820	886	954	1026
	Landing run	513	554	597	642
5000	over 50 ft obstacle	851	919	991	1065
	Landing run	532	575	620	667
6000	over 50 ft obstacle	882	954	1029	1107
	Landing run	552	597	644	694
7000	over 50 ft obstacle	916	991	1069	1151
	Landing run	573	620	670	721
8000	over 50 ft obstacle	951	1029	1111	1197

850 kg Landing weight

Pressure altitude	Distance	Temperature °C			
ft	m	ISA	ISA +10	ISA +20	ISA +30
	Landing run	272	293	316	339
0 / SL	over 50 ft obstacle	452	487	524	562
	Landing run	282	304	327	351
1000	over 50 ft obstacle	468	505	543	583
	Landing run	292	316	340	365
2000	over 50 ft obstacle	485	524	564	605
	Landing run	303	327	352	379
3000	over 50 ft obstacle	503	543	585	628
	Landing run	314	340	366	393
4000	over 50 ft obstacle	522	564	607	652
	Landing run	326	352	380	408
5000	over 50 ft obstacle	541	585	630	678
	Landing run	338	366	395	424
6000	over 50 ft obstacle	561	607	655	704
	Landing run	351	380	410	441
7000	over 50 ft obstacle	583	630	680	732
	Landing run	365	395	426	459
8000	over 50 ft obstacle	605	655	707	761

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6. WEIGHT & BALANCE AND EQUIPMENT LIST

6.1 GENERAL

This section describes the procedure for establishing the basic weight and moment of the aircraft. Sample forms are provided for reference. Procedures for calculating the weight and movement for various operations are also provided. A comprehensive list of all equipment available for this aircraft is included.

NOTE

It is the responsibility of the pilot to ensure that the aircraft is loaded within the limits.

6.2 AIRCRAFT WEIGHING PROCEDURE

A) Drain all fuel tanks to non-usable fuel level.

B) Position scales (capable of min. 300 kg each) under each wheel.

C) Support tail wheel until water level (firewall vertical) shows aircraft in level attitude.

D) Read each scales´ reading, subtract support's weight if necessary.

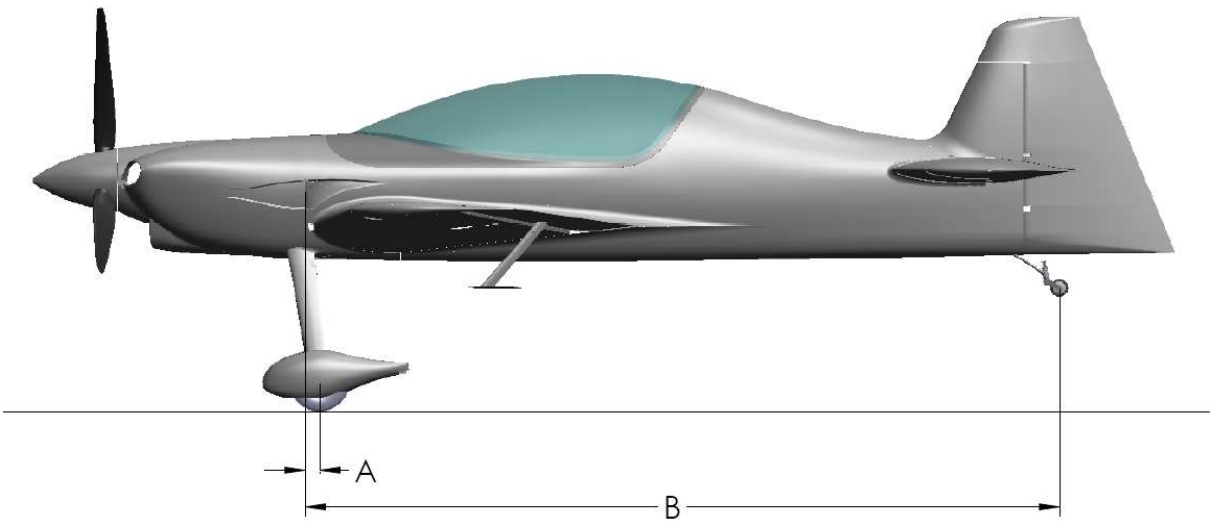
Determination of the momentum arms:

A) The firewall is vertical reference plane, use plumb-bob to mark plane on the ground.

B) By using a plumb bob draw a line from middle of right wheel axle to middle of left axle.

C) By using a plumb bob mark the tail wheel's axle center. Tail wheel must be aligned straight.

D) Measure distance from reference plane to main wheel axles (Arm A), distance from reference plane to tail wheel axle (Arm B).



6.2.1 OWNERS WEIGHT AND BALANCE RECORD

Enter all weight change data from aircraft log book in the table below.

XA42 S/N:						
Date	**Description of modification**	**Weight change Added (+), Removed (-)**			**Operational empty weight**	
		Weight kg	**Arm m**	**Moment kg / m**	**Weight Kg**	**Moment kg * m**
	Empty weight as delivered	____	____	____		

6.3 CENTER OF GRAVITY CALCULATION (SAMPLE)

6.3.1 Sample

Left main wheel:	M_{lmw}	=	294.0 kg
Right main wheel:	M_{rmw}	=	305.4 kg
Tail wheel:	M_{tw}	=	53.7 kg
Empty weight:	M_E	=	$M_{lmw} + M_{rmw} + M_{tw}$
		=	653.1 kg
Main wheels – vertical reference plane:	A	=	118 mm
Tail wheel - vertical reference plane:	B	=	4488 mm
Center of gravity, Empty aircraft	X_E	=	477 mm

6.4 LOADING WEIGHTS AND MOMENTS

The maximum number of occupants is 2.

Weight Occupant + Parachute		Pilot (rear seat) Arm = 1,73 m / 68.1 in		Copilot (front seat) Arm = 0,86 m / 33.86 in	
		Moment			
kg	lbs	Kg x m	in x lbs	Kg x m	inch x lbs
55	121	95,15	8258,64	47,30	4105,45
60	132	103,80	9009,42	51,60	4478,67
65	143	112,45	9760,21	55,90	4851,90
70	154	121,10	10511,00	60,20	5225,12
75	165	129,75	11261,78	64,50	5598,34
80	176	138,40	12012,57	68,80	5971,56
85	187	147,05	12763,35	73,10	6344,79
90	198	155,70	13514,14	77,40	6718,01
95	209	164,35	14264,92	81,70	7091,23
100	220	173,00	15015,71	86,00	7464,46
110	242	190,30	16517,28	94,60	8210,90

Fuel Acro Tank, Arm = 0,285 m / 11.22 in (Avgas, density 0,72)

Liter	US Gallons	Kg	lbs	Kg x m	inch x lbs
10	2.64	7,2	15,87	2,05	178,06
20	5.28	14,4	31,75	4,10	356,24
30	7.92	21,6	47,62	6,16	534,30
40	10.56	28,8	63,49	8,21	712,36
50	13.20	36	79,36	10,26	890,42
60	15.85	43,2	95,24	12,31	1068,59
65	17.17	46,8	103,18	13,34	1157,68

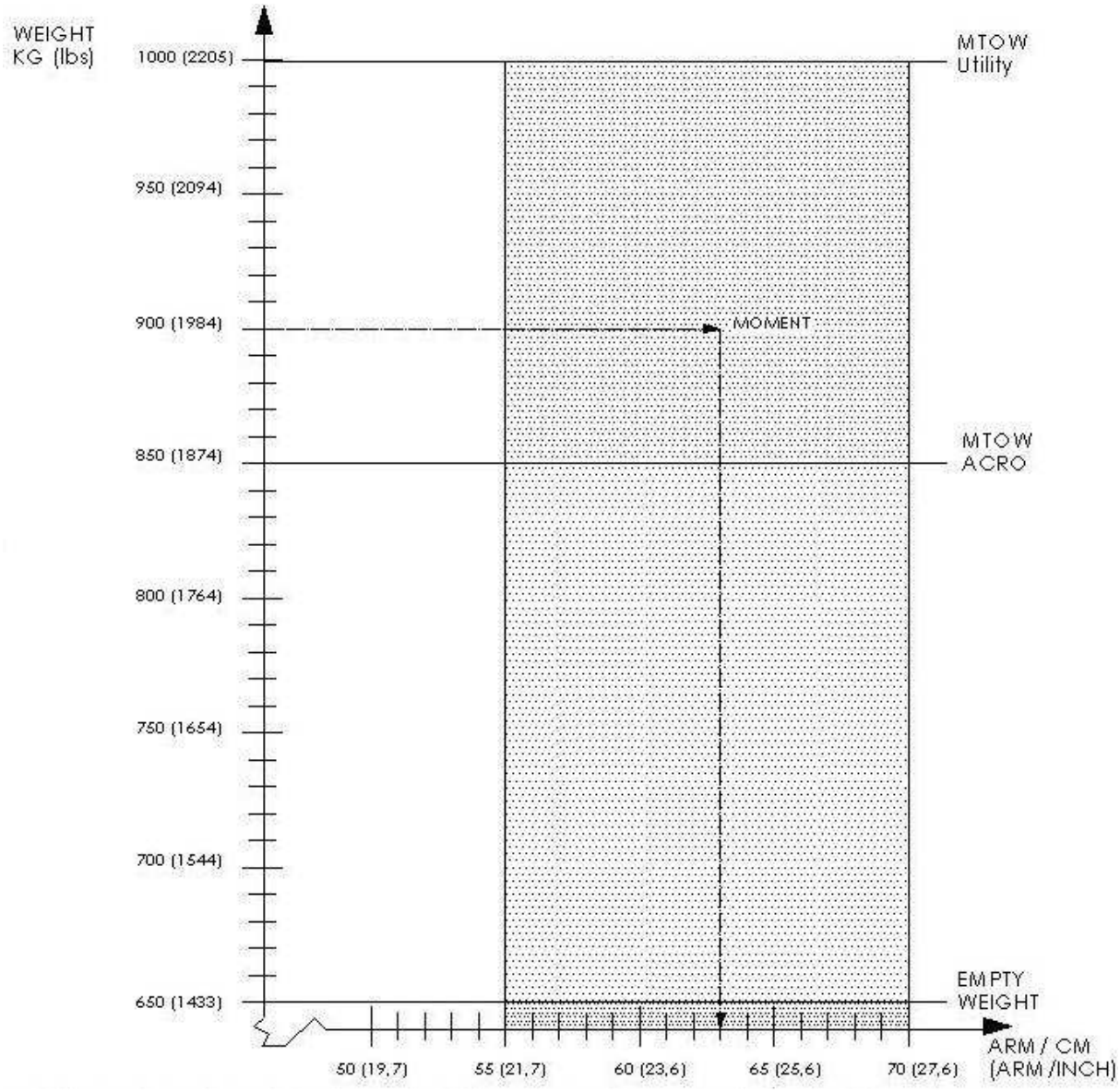
Fuel Wing Tanks, Arm = 0,34 m / 13.38 in (Avgas, density 0,72)

Liter	US Gallons	Kg	lbs	Kg x m	inch x lbs
10	2.64	7,2	15,87	2,45	212,48
20	5.28	14,4	31,75	4,90	424,95
30	7.92	21,6	47,62	7,34	637,43
40	10.56	28,8	63,49	9,79	849,91
50	13.20	36	79,36	12,24	1062,38
60	15.85	43,2	95,24	14,69	1274,86
70	17.17	46,8	103,18	17,14	1487,34
80	21.13	57,6	126,99	19,58	1699,81
90	23.77	64,8	142,86	22,03	1912,29
100	26.41	72,0	158,73	24,48	2124,77
110	29.06	79,2	174,61	26,93	2337,24
120	31.70	86,4	190,48	29,38	2549,72
130	34.34	93,6	206,35	31,82	2762,20
140	36.98	100,8	222,22	34,27	2974,67
150	39.62	108	239,10	36,72	3187,15
160	42.27	115,2	253,97	39,17	3399,63
170	44.91	122,4	269,85	41,62	3612,10
180	47.55	129,6	285,72	44,06	3824,58
190	50.19	136,8	301,59	46,51	4037,06
200	52.83	144,0	317,46	48,96	4249,53
210	55.47	152,2	335,54	51,41	4462,01

Smoke Tank, Baggage Arm = 2,62 m / 103.15 in (Paraffin, density 0,85)

Liter	US Gallons	Kg	lbs	Kg x m	inch x lbs
5	2.64	4,25	9.37	12,37	1073,45
10	5.28	8,5	18.74	24,74	2146,90
15	7.92	12,75	28.11	37,10	3220,35
20	10.56	17,0	37.48	49,47	4293,80
25	13.20	21,25	46.85	61,84	5367,25
28	15.85	23,8	52.47	69,26	6011,32

6.5 WEIGHTS AND MOMENTS LIMITS



Example: At 900kg (1984 lbs) and 56700 kgcm (49203 in lbs)
CG Location is 63 cm (24,8 in) aft of Reference Datum.

UTILITY FLIGHT

Maximum takeoff weight	Forward CG	Rear CG
999 kg / 2200 lbs	550 mm / 21,65 in / 25 %	700 mm / 27.55 in / 33 %

ACROBATIC FLIGHT

Maximum takeoff weight	Forward CG	Rear CG
850 kg / 1874 lbs	550 mm / 21,65 in / 25 %	700 mm / 27.55 in / 33 %

6.6 EQUIPMENT LIST

XA42 S/N: _____

Qty	Item	Manufacturer	Part or P/N	Weight (kg)	Arm (m)	Required (R) Optional (O)
1 1 1 1	Engine Magneto LH Magneto RH Slick Start	Lycoming Engines Slick Slick Unison	AEIO-580-B1A 6350 6393 SS1001	202.30 2.00 2.30 0.27	-0.61 -0.15 -0.15 -0.02	R R R R
4	Shock Mount	Lord	J-7764-20	0.43	-0.29	R
1	Alternator	B&C	SD20	4.40	-0.15	R
1	Voltage Regulator	B&C	LR3C-14	0,25	0,3	R
1	Starter	B&C	BC315-100-2	4.70	-0.90	R
1	Fuel Injector	Bendix	RSA-10AD1	3.90	-0.69	R
1	Aux. Fuel Pump	Weldon Pump	8120-G	1.10	+0.41	R
2	Oil Cooler	Setrab	50-113-7612	0.50	-0.07	R
1	Fuel, Oil and Sensor Hose Set	Welbhoff	div.	4.20	-0.25	R
1 1	Exhaust System LH Exhaust System RH	Gomolzig Gomolzig	XA42-7810-151 XA42-7810-156	3.90 3.90	-0.61 -0.61	R R
1	Propeller Vernier Control	ACS Products	A-790 101”	0.61	+0.86	R
1	Mixture Vernier Control	ACS Products	A-970 113.5”	0.65	+0.98	R
1	Throttle Control	ACS Products	A-920 67.5”	0.50	+0.65	R
1 1	Propeller Spinner	MT Propeller MT Propeller	MTV-9-B-C/C203- 20d	30.50 0.80	-1.22 -1.35	R R
1	Governor	MT Propeller	P-880-5	1.30	-0.95	R
1 1	Cowling bottom Cowling top	XtremeAir GmbH XtremeAir GmbH	XA42-7110-150 XA42-7110-152	5.80 3.60	-0.65 -0.65	R R
1	Canopy	XtremeAir GmbH	XA42-5210-050	13.10	+1.50	R
1	Main Tank Assy	XtremeAir GmbH	XA42-2810-050	5.10	+0.20	R
2	Main Wheel and Brake Assy	Beringer	Kit Nr. 3A-01	1.00	+0.12	R
2	Main Wheel Tires	Michelin	Aviator 5.00-5	1.20	+0.12	R
1	Tail Wheel Assy	XtremeAir GmbH	XA42-3220-051	2.00	+4.80	R
1	Tail Wheel	Continental	105/45-65	0.25	+4.80	R
1	Smoke Switch	Conrad	646H	0.03	+1.50	R
1	Trim Switch	Conrad	647H	0.03	+1.39	R
1	Ignition Switch	ACS Products	A-510-2	0.06	+1.40	R
5	Circuit Breaker Switches	E-T-A	3I30-FII0-P7TI- W12QYZ	0.03	+1.45	R
9	Circuit Breaker	E-T-A	7277-2-div.	0.02	+1.25	R
1	Main Bus Fuse Holder	Sinus live	SH 150	0.05	+1.20	R
1	Battery	Enersys Energy	Genesis EP	6.10	+0.27	R
1	Fuel Capacity Indicator	Westach	A3T13	0.19	+1.20	R
1	Fuel Probe Main Tank	Westach	395-5S-1B	0.15	+0.05	R
2	Fuel Probe Wing Tank	VDO	226-801-015-001G	0.20	+0.35	R
1	Fuel Selector Valve	Andair	FS 20x5-MB	0.12	+1.40	R

Qty	Item	Manufacturer	Part or P/N	Weight (kg)	Arm (m)	Required (R) Optional (O)
1	Ampere Shunt	Westach	237-30	0.09	+1.15	R
1	Tachometer	Noris Automation	NIR2-060-FG-476	0.15	+1.15	R
1	RPM Sensor	JPI	420815-1	0.05	-0.18	R
1	Magnetic Compass front Magnetic Compass back	Airpath	C-2300	0.25	+1.15	R
1	Oil Pressure and Oil Temperature Indicator	Westach	2DA3-249KV	0.08	+1.15	R
1	Oil Pressure and Oil Temperature Sensor	Westach	387-150KV	0.12	-0.13	R
1	G-Meter front G-Meter back	Falcon Gauges	GM510-2	0.36	+1.15	R
1	Clock/Timer	ADI	CT60	0.07	+1.15	R
1	Airspeed Indicator front Airspeed Indicator back	Winter	6FMS 533	0.22	+1.15	R
1	Altimeter front Altimeter back	United Instruments	5934PM-34.84	0.37	+1.15	R
1	Fuel Pressure Indicator	UMA	T04-212U-100-010	0.16	+1.15	R
1	Fuel Pressure Sensor	UMA	T1EU 100G	0.09	-0.18	R
1	Manifold Pressure	UMA	7-100-20	0.14	+1.15	R
1	EGT/CHT Indicator	JPI	EDM 100-6C	0.15	+1.19	R
1	Radio	Funkwerk Avionics	ATR 500	0.40	+1.20	R
1	Radio Antenna	Comant	CI-122	0.39	+2.33	R
1	Transponder	Funkwerk Avionics	TRT 800H	0.60	+1.20	O
1	Transponder Antenna	Comant	CI-105	0.10	+0.36	O
1	ELT	Kannad	406 AF-Compact	0.85	+2.40	O
1	ELT Antenna	RAMI	AV-200	0,18	+2,90	O
2	Brake Master Cylinder	Beringer	HBA01	0.10	+0.80	R
2	Brake Fluid Reservoir	Beringer	Reservoir Kit	0.02	+0.80	R
1	Safety Belt Assy	Hooker Harness	1H 2130-J	4.00	+1.69	R
1	Smoke Oil Pump	Marco	164 020 12	1.40	+2.40	O
1 1	Sighting Device LH Sighting Device RH	XtremeAir GmbH XtremeAir GmbH	XA42-5770-101 XA42-5770-102	0.10 0.10	+1.42 +1.42	O O

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7. DESCRIPTION AND OPERATION OF AIRCRAFT AND SYSTEMS

7.1 AIRCRAFT

The XA42 is designed and manufactured by

XtremeAir GmbH, Harzstraße 2, Am Flughafen Cochstedt, 39444 Hecklingen, Germany,

in accordance with the EASA CS-23, categories utility and acrobatic, to fulfill normal operations and acrobatic flying up to the Unlimited aerobatic level.

The aircraft is a two seat, light weight, single engine construction with a carbon fiber reinforced composite fuselage structure. The primary structure is carbon fiber reinforced composite. The items are qualified up to 85 °C / 185 °F. To avoid high temperatures, the painting has to meet the requirements under color specification for composite structure.

The standard aircraft is designed to operate within a range of ambient air temperature from -20 °C to +38 °C / -4 °F to 100 °F at sea level.

It is possible to start the engine using the aircraft battery at -20 °C / -4 °F without preheating.

7.2 FUSELAGE

The fuselage is made out of carbon-honeycomb sandwich.

Canopy frame and the empennage are part of the fuselage structure. The fuselage also includes the substructure of the seats and the instrument panels.

The canopy itself is a single carbon fiber reinforced composite part. It opens to the right hand side, is locked on the left hand side and its opening angle is limited by a strap. Emergency jettison is achieved by simply unlocking the canopy, while the lower pressure on the upper outside of the canopy will pull it up and tear it away.

7.3 WING

The wing shell is designed as CFRP sandwich shell which is closed by an aft shear web. An overlap joint, laminated with the lower wing shell provides bonding of the two wing shells at the wing nose area. The wing spar is designed as double box-type spar and guided through the fuselage as one piece. Lateral loads and twisting moments are conventionally transferred to the fuselage through root ribs combined with a secondary spar and lateral-force bolts. In front area of the spar, there are four tank ribs laminated to the shells which limit the tank capacity of the integral fuel tanks. Inspection holes are integrated into the lower wing shell to allow easy inspection of aileron control bell cranks, which are mounted on a wing rib.

The connection to the fuselage is arranged by two bolts through the spar parallel to the center line of the fuselage and two shear force bolts at the secondary spars.

Ailerons are designed as "powered ailerons" to reduce pilot's hand forces, having a separate airfoil and are hinged at 25% chord. They are actuated through pushrods which act on a CFRP arm bolted from the bottom to the aileron. This arm extends to 450 mm below the wing and holds so called "spades", sandwich plates to reduce aerodynamic aileron forces to a minimum. The aileron shell is designed as a single-cell CFRP sandwich shell which is reinforced by unidirectional CFRP tapes. The aileron is hinged in maintenance-free teflon-bearing bushings mounted on GFRP brackets integrated into the wing connecting ribs.

To prevent flutter the ailerons are weight balanced in the overhanging leading edge.

7.4 EMPENNAGE

The aircraft has a cruciform empennage with stabilizers and moveable control surfaces.

The rudder is balanced aerodynamically at the tip. Stabilizer spar consists of PVC foam cores, CRP caps and CRP laminates. The shell is built using honeycomb sandwich with CRP laminates.

The control surfaces are built by CRP. On the R/H elevator half a trim tab is fitted with two hinges. The control surfaces are mounted in stainless steel bushings. To prevent flutter, rudder and elevator are mass balanced. The balance weight for the rudder is installed in the rudder tip while the balance weight for the elevator is mounted in the compensating tips.

7.5 FLIGHT CONTROL SYSTEM

7.5.1 PRIMARY CONTROL SYSTEM

The XA42 is standard equipped with conventional control stick and adjustable rudder pedals.

The primary control surfaces are operated through direct mechanical linkages.

7.5.2 LONGITUDINAL FLIGHT CONTROL SYSTEM

The elevator is actuated via a conventional control stick. The control movements are from there transferred to the elevator through an idler and push rods.

7.5.3 LATERAL FLIGHT CONTROL SYSTEM

Push and pull rods are connected by sealed ball bearings from the torque tube to the ailerons. The ailerons are statically as well as dynamically balanced (dynamically with spades).

The airplane is not provided with an inflight controllable aileron trim device.

7.5.4 DIRECTIONAL FLIGHT CONTROL SYSTEM

The rudder is actuated by control cables. Control input is carried from the pilot pedals which also include the brake function. The control cable leads directly to the lever inside the rudder. The limit stops of the control system are attached to this lever. The deflection is ±30 °.

7.5.5 SECONDARY CONTROL

The elevator trim is a flettner trim system. An electrical linear drive moves a lever that acts as a positioner for a servo flettner tab. The electric motor is operated by a toggle switch on the lefthand sidepanel and cut off by means of limit switches in the respective end positions. The trim position is picked up electrically by a potentiometer and displayed by a series of LEDs.

The canopy lock is operated from the outside by pulling the handle on left side of the canopy. Inside a handle is located in the cockpit, used for locking as well as for normal operation and for emergency release.

The starter/magneto switch is located on the righthand sidepanel.

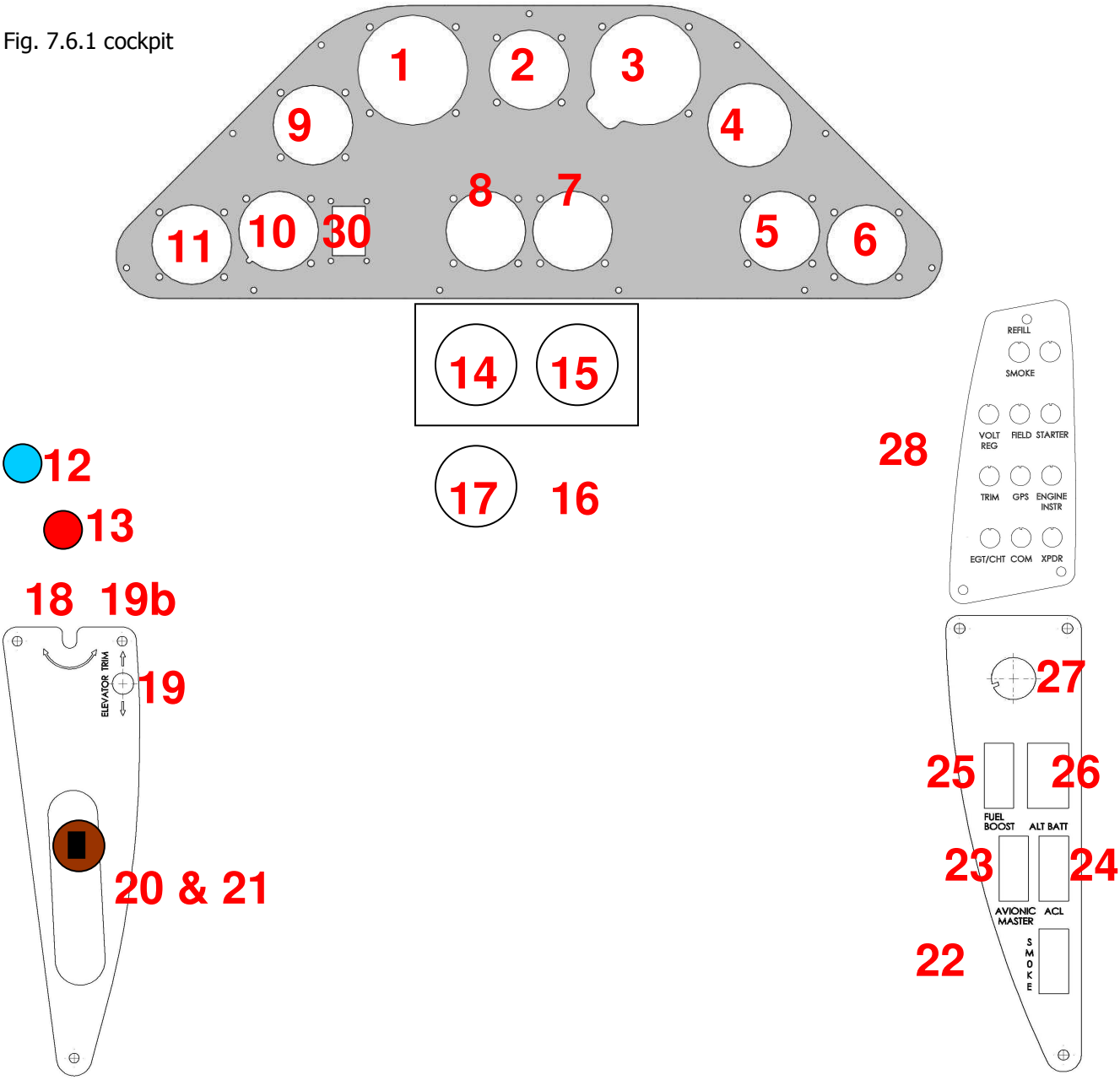
7.6 INSTRUMENTATION

7.6.1 INSTRUMENT PANEL

For instrumentation of the instrument panel refer to the following figure.

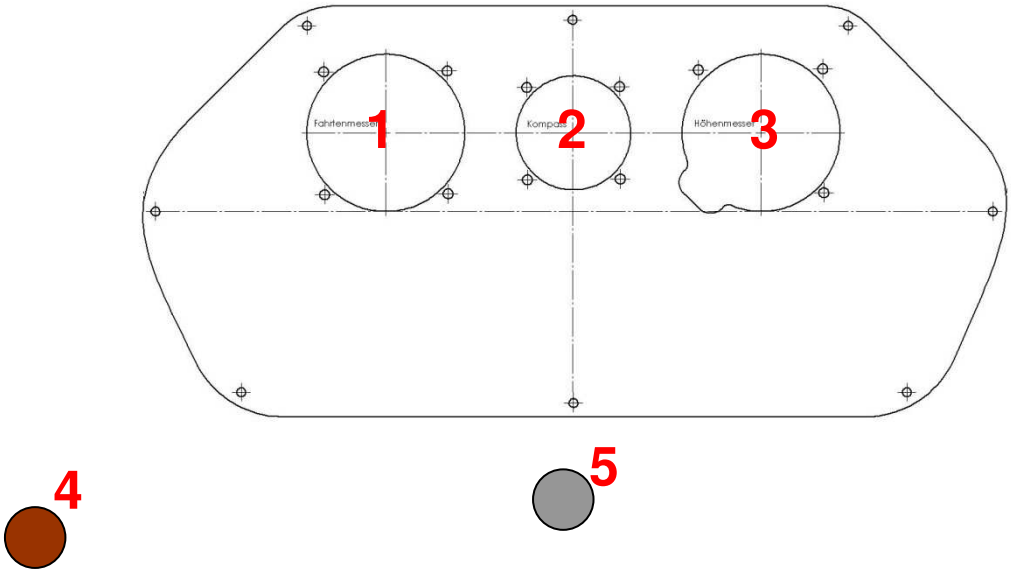
The table below shows whether the instruments are standard or optional equipment.

Fig. 7.6.1 cockpit



Instrument	Position	Standard	Optional
Air speed indicator	1	x	
Magnetic direction indicator	2	x	
Altimeter	3	x	
Tachometer	4	x	
Oil temperature / oil pressure	5	x	
EGT scanner	6	x	
Manifold pressure	7	x	
Fuel pressure	8	x	
Volt-Ampere meter	9	x	
G-Meter	10	x	
Clock	11	x	
Prop	12	x	
Mixture	13	x	
Radio	14	x	
Transponder	15	x	
Fuel capacity indicator	16	x	
Fuel Selector Valve	17	x	
Throttle Friction	18	x	
Elevator trim switch	19	x	
Elevator trim indicator	19b	x	
Throttle with smoke ON/OFF switch	20 & 21	x	
Smoke pump circuit breaker switch	22	x	
Avionic Master circuit breaker switch	23	x	
ACL circuit breaker switch	24	x	
Electric fuel pump circuit breaker switch	25	x	
Split Master Switch: Battery, Gen.	26	x	
Ignition key	27	x	
Circuit breakers	28	x	
PTT button	29	x	
ELT Remote Switch	30		x

Fig. 7.6.3 Instrument Panel front



Instrument	Position	Standard	Optional
Air speed indicator	1	x	
Magnetic direction indicator	2	x	
Altimeter	3	x	
Throttle	4	x	
PTT button	5	x	

7.7 LANDING GEAR

Landing gear is a taildragger configuration made out of spring steel.

Tail wheel is a swivel-mounted solid rubber wheel.

Main landing gear wheels have a size of 5.00”.

Main landing gear is equipped with hydraulic disc brakes.

7.8 SEAT AND SEATBELTS

The seat has an economically shaped glass / carbon reinforced structure.

The rudder pedal´s position is adjustable.

Seatbelts consist of two shoulder straps, two left and two right lap belts and a crotch strap.

All belts are adjustable and the lap belt has a stainless steel ratchet tightener.

NOTE

During all acrobatic maneuvers the seat belts must be as tight as possible!

7.9 CANOPY

The canopy is one single part that is hinged on the right hand side via 3 integral hinges equipped with brass bushings to the fuselage and locked on the left hand side of the aircraft. The lock is redundant as there are three bolts moving in opposite directions. The canopy can be opened manually by pulling the interior or exterior lever and lifting it up to the right hand side. A strap in the back of the canopy will prohibit its opening range.

To securely close and lock the canopy pull the lever and let the canopy slip over the latch.

In case of emergency the operation is equal to the procedures above. Due to the shape of the canopy there is a lower pressure on the upper side that will immediately open the canopy after it is unlocked.

7.10 POWER PLANT

7.10.1 ENGINE

The power plant is a Lycoming AEIO-580-B1A with a rated maximum take-off power of 235 kW / 315 hp @ 2700 rpm. It is a six-cylinder, horizontally opposed, air cooled, direct drive, fuel injection engine type with inverted oil system.

For the present TBO refer to latest issue of Textron – Lycoming service letters.

The AEIO-580-B1A engine is equipped with special counterweights.

The power plant installation includes the following accessories:

• Alternator:	B&C	SD-20
• Fuel Injector:	Bendix	RSA-10AD1
• Fuel pump:	Weldon Pump	8120-G
• Magnetos:	Slick	6350 / 6393
• Propeller governor	MT Propeller	P-880-5
• Starter:	B&C	BC315-100-2
• Voltage regulator	B&C	LR3C 14V-4A

The engine is operated with the following manual controls:

- Throttle control
- Fuel mixture control
- RPM control

The propeller governor monitors the RPM automatically and prevents overspeeding. In the event that oil pressure is lost the propeller is automatically adjusted to coarse pitch in order to avoid overspeeding.

The use of 100/130 aviation grade fuel (AvGas 100) is the minimum grade recommended by the manufacturer of the AEIO-580 B1A engine.

7.10.2 OIL SYSTEM

The oil is cooled by a two oil coolers mounted on the left and right hand side in the engine compartment. The oil level is determined by a dipstick. A thermostatic valve is fitted upstream of the oil cooler. This valve ensures a quick warmup of the oil after engine start.

Oil capacity and grades:

Maximum sump quantity:	15.15 L / 16 qt
Minimum sump quantity:	8.52 L / 9 qt

For oil temperatures and oil grades refer to chapter 1.

7.10.3 ENGINE INSTALLATION

The engine is attached to the steel tube engine mount using 4 shock mounts. The engine mount itself is connected to the fuselage with 14 bolts on the firewall surface.

The cowling is separated in a lower and an upper part; both are carbon fiber / glass fiber reinforced composites. The upper cowling houses a hatch to easily check the oil dipstick.

7.10.4 PROPELLER

The aircraft is equipped with a constant speed, 3 blade MTV-9-B-C/C203-20d propeller. The diameter is 2030 mm. It is produced by MT Propeller Entwicklungs GmbH, blades are made out of wood and composite.

7.10.5 THROTTLE

Parallel-motion control mounted on the left side of both cockpits.

7.10.6 MIXTURE

Vernier-control located at the left side of the rear cockpit (red knob).

7.10.7 RPM CONTROL

Vernier-control on the left side of the rear cockpit (blue knob).

Preselection of RPM possible due to constant speed governor.

7.10.8 EXHAUST SYSTEMS

The aircraft is equipped with an exhaust system that merges three pipes on each side of the engine into one tail pipe on each side. These two tail pipes exit the cowling through special outlets.

7.11 FUEL SYSTEM

7.11.1 GENERAL

The fuel system consists of two separate wing tanks and one acro tank. For utility flights all the tanks may be used. During acrobatic flights the wing tanks must be empty. The total volume of all three tanks is 275 L / 72.5 US gal.

The acro tank which must be used for take-off, landing and acrobatics has a capacity of 65 L / 17.1 US gal. The fuel selector valve is labeled "ACRO" accordingly. Fuel is picked up through a flop tube from an 11 L / 2.9 US gal header tank located underneath the acro tank. This header tank's capacity adds to the acro tank, meaning the usable fuel is in fact 76 L / 20.0 US gal, but due to the fact that the fuel probe does no extend in the header tank, the header tank is excluded from the fuel capacity indication and therefore also flights must be planned without these 11 L / 2.9 US gal. The header tank is gravity fed by the acro tank via a ¾" tube. During inverted flight, the header tank is not refilled, which limits the time of inverted flight to the use of 11 L, app. 3 min at full power. In case the inverted flight is extended too long and the engine quits, it takes app. 10 sec. to refill the header tank enough for the engine to restart. Therefore it is recommended not to perform inverted flight for more than 2 min uninterruptedly. Due to the flop tube in the header tank, the acro tank can be flown down to 0.5 L even at high yaw and bank angles. The acro tank is mounted in and supported by the tank compartment of the fuselage.

The two wing tanks are located in the inner 3 compartments (wing root) in front of the main spar of both sides of the wing. Each can fit 105 L / 27.7 US gal of fuel and can be flown down to 0.5 L in straight and level flight. The total volume of the wing tanks is 210 L / 54,4 US gal. With 5 ° yaw ½ ball out and corresponding bank 0,5 L / 0.13 US gal remain non usable.

The tanks all have their own filler cap with a diameter of 46 mm each.

Venting of the wing tanks is accomplished through a system that connects the wing tank vent hoses to the top of the acro tank. Then the acro tank is vented through another vent hose which exits the fuselage to run along the left landing gear leg to the wheel cover, where it is vented to the outside of the aircraft.

To drain the tanks they all have a flush drain valve located at the lowest point that allows appropriate drainage.

To avoid impurity there are filters installed at the pickup points of each tank and also there is a fuel filter in between the fuel selector valve and the fuel pump.

For security reasons an electrically driven auxiliary fuel pump is installed in addition to the mechanical driven fuel pump of the motor. The pump has a bypass and is able to supply the motor at takeoff conditions. It also can be used as a boost pump. The switch is located on the righthand side electrical panel of the cockpit.

To indicate the amount of fuel there are probes installed in each tank. The wing tank indicators use a float device / potentiometer technology and the main tank has a capacitive operated indicator.

To verify the fuel indication in the tanks, the use of dipstick XA-2840-230 is highly recommended.

7.11.2 FUEL SELECTOR VALVE

The fuel selector can be operated from the rear cockpit (pilot). There is no access from the front cockpit (front seat occupant / guest). The fuel selector valve is mounted below the main tank and behind the firewall.

A linkage with universal joints connects the selector lever and the valve.

To select the tank in use:

Lift the knob and turn the handle 90° (LEFT / RIGHT) or 180° (ACRO) so that the red knob points towards the tank in use. To turn off the fuel supply, lift the knob and turn it until it faces downwards (OFF).

Fig. 7.11.2: Fuel Selector

7.12 ELECTRICAL SYSTEM

The electrical system is a 12-Volt direct current system. Power is supplied by a gear-driven alternator (13.75 (V) DC, 20 (A)) with regulator (field is switched via alternator switch) which feeds the onboard battery (12 (V), 18 (Ah)). In case of emergency, the battery will supply all direct-current loads with power for 30 minutes. The electrical system is controlled by means of switches which are arranged on the righthand electronic panels. The instruments are secured via individual circuit breakers on the righthand electronic panel. The system contains the master switch relay and the starter with own relay.

7.13 CABIN ENVIRONMENT CONTROL

To ensure a comfortable climate and fresh air supply inside the cabin, the aircraft is equipped with a ventilation system in the canopy frame.

The right NACA inlet in the canopy frame feeds the canopy defog system, it is actuated by a lever on the righthand side of the canopy frame.

The two eyeball airvents are fed by the left NACA inlet can be opened/closed from the pilot´s seat, from the front sear they can be individually adjusted by turning the front rim.

7.14 BAGGAGE COMPARTMENT

The baggage compartment is located behind the seat and may carry

up to 10 kg / 22 lbs of secured baggage.

WARNING

The baggage compartment must be empty during acrobatic flying!

Before loading the baggage compartment, check CG limits are not exceeded according to weight & balance calculation!

7.15 PITOT – STATIC SYSTEM

Total pressure is taken from a pitot tube mounted on the lefthand wingtip.

Static pressure is taken from static ports on both fuselage sides between the wing trailing edge and the stabilizer leading edge. Airspeed indicator and altimeter are attached to these pressure lines.

7.16 SMOKE SYSTEM

The smoke system consists of a carbon fiber tank with 27 L / 7.13 US gal capacity, located behind the pilot´s seat. The tank is equipped with a flop tube. In front of the smoketank is an electric pump which feeds via hoses weld-on type injectors on the two tail pipes of the exhaust system. Inline between the pump and the injectors is an electric shutoff valve, mounted on the firewall.

The electric circuit of the pump is secured via a circuit breaker switch on the right hand console, the smoke ON/OFF switch is on the left hand side console on top of the throttle lever.

When the smoke system is switched "ON" and direction is switched to "SMOKE", the pump is switched on, the valve opens and the system is injecting smoke oil in the exhaust.

To fill the system the refill hose´s end with the male connector plug is connected to the female connector plug behind the pilot´s seat, the loose end of the refill hose put in the smoke oil reservoir.

The pump direction switch needs to be in position "REFILL" and "ON", then the valve remains closed, the polarity of the pump is reversed and the pump feeds the smoke oil into the smoke tank.

The tank is full when smoke oil starts to pour from the smoke tank ventline on the bottom of the fuselage. Then the smoke switch must be turned "OFF" and the pump direction switch returned to "SMOKE".

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8. HANDLING, SERVICE & MAINTENANCE

8.1 INTRODUCTION

a) The airplane owner should establish contact with the dealer or certified service station for service and information.

b) All correspondence regarding the airplane must include its serial number (see type placard).

c) A maintenance manual with revision service may be procured from the manufacturer.

8.2 AIRPLANE INSPECTION PERIODS

As required by national operating rules all airplanes must pass a complete annual inspection every twelve calendar months. In addition to the annual inspection airplanes must pass a complete inspection after every 100 flights hours with a minor check after 50 hours.

The airworthiness authority may require other inspections by the issuance of airworthiness directives applicable to the aircraft, engine, propeller and components. The owner is responsible for compliance with all applicable airworthiness directives and periodical inspections.

8.3 PILOT CONDUCTED PREVENTIVE MAINTENANCE

Pilots operating the airplane should refer to the regulations of the country of certification for information of preventive maintenance that may be performed by pilots. All other maintenance required on the airplane is to be accomplished by appropriately licensed personnel. A licensed maintenance company should be contacted for further information.

Preventive maintenance should be accomplished with the appropriate service manual.

8.4 CHANGES OR REPAIRS

Only licensed personnel is permitted to accomplish changes or repairs. Changes to the aircraft must be performed by the manufacturer exclusively. Intention is to protect the aircraft's airworthiness state. Informations regarding repairs are contained in the maintenance manual.

8.5 SERVICING

In addition to the airplane inspection periods (8.2) information for servicing the aircraft with proper oil and fuel is covered in the chapter 2 and 7.

8.6 GROUND HANDLING

a) Due to its low weight and the free swiveling tail wheel two persons can easily move the airplane by hand. The best spot to push is the leading edge of the wings; the best spot to pull is the propeller close to the root of the blades.

b) If the aircraft is parked in the open, secure the wheels with chocks.

When windy, tie down the aircraft. For this purpose, use ropes to tie down the tail wheel and each wing at the outer aileron hinges.

The control stick can be set fix with the seatbelt.

If the aircraft is parked outdoors, it must be protected against the effects of weather, the degree of protection depending on severity of the weather conditions and the expected duration of the parking period.

When the airplane is parked in good weather conditions for less than a half day, park the aircraft headed into the wind and place wheel chocks at the main wheels.

c) To level the aircraft, the tail wheel is rested on a balance and jacked to a position that the fuselage reference line firewall is vertical.

d) There are two engine hoists provided on the top of the engine which can be used to lift the airplane with a crane. (Tail wheel resting on ground)

8.7 CLEANING AND PROTECTION

For cleaning the aircraft, use clean water and an automotive paint cleaner.

Use a leather to dry the surfaces.

NOTE

Never dry-wipe the canopy glass!

Use only clear warm water and special clean leather.

Never use fuel, alcohol, aceton etc. to clean the canopy!

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9. SUPPLEMENTS

LOG OF EFFECTIVE PAGES

	Issue
Chapter 09, Page I and Chapter 09, Page 1.1	A.01
Chapter09, Page 2.1 and Chapter 09, Page 2.2	A.01

TABLE OF CONTENT

Supplement No.	Title	Installed
9.1	EMERGENCY LOCATION TRANSMITTER	
9.2	TRANSPONDER TRT 800 H	

9.1 EMERGENCY LOCATION TRANSMITTER

9.1.1 GENERAL

Emergency Location Transmitter (ELT) intalled is the Kannad 406 AF-COMPACT.
This supplement is a permanent part of the handbook and must be used as long as ELT is installed.
ELT is self powered by the ELT battery (replacement every 6 years).
ELT powered remote switch eliminated the need for aircraft power.
ELT qualifications: ETSO-2C91a & ETSO-2C126, (EUROCAE ED62), FAA TSO-C126 (RTCA-DO-204)

9.1.2 Limitations

In europe an ELT is mandatory for bordercrossing flights.

9.1.3 Emergency Procedures

To send an emergency signal, switch the ELT to "ON"

9.1.4 Normal Procedures

There are no changes to POH chapter 4.

9.1.5 Performance

There are no changes to POH chapter 5.

9.1.5 Weight and balance

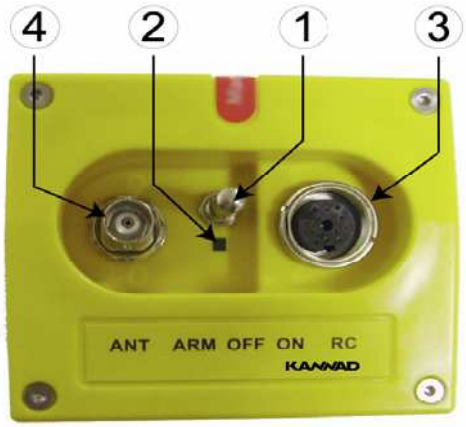
Changes of CG and changes in empty weight are to be considered

if the ELT is removed according to chapter 6 of this POH.

9.1.7 Description of aircraft and systems

Controls:

1. 3-position switch ARM/OFF/ON;
2. Visual indicator (red);
3. DIN 12 socket for connection to an optional Remote Control Panel, a programming dongle or a programming equipment;
4. BNC connector for the antenna.



Features:

- COSPAS-SARSAT Class II -20 °C to +55 °C
- 406 MHz transmission
- 121.5 MHz transmission
- G-Switch sensor (compliant with EUROCAE ED62 specifications)
- Battery (KIT BAT200 P/N: S1840510-01)

9.2 TRANSPONDER TRT 800H

9.2.1 GENERAL

This supplement contains information for efficient use of the aircraft's transponder. The Funkwerk Avionics TRT 800H is installed. These informations must be used with the complete manual. This supplement is a permanent part of the manual and must be used as long as the transponder TRT 800H is installed.

Transponder Mode-S according to ED73B, Class 1, Level 2s, Comm A/B, extd squitter. For maximum flight level 35.000 (ft), maximum velocity 250 (kts).

EASA approval number is: EASA.21O.269 and a Form 1 and A/C address connector is part of the standard delivery.

NOTE

Refer to latest edition of Funkwerk Avionics TRT 800H Operation Manual to get familiar with the TRT 800H Transponder.

9.2.2 LIMITATIONS

This aircraft must not be operated in controlled airspace if transponder is inoperative.

9.2.3 EMERGENCY PROCEDURES

To send an emergency signal, Turn **7... / .7.. / ..0. / ...0** to switch the four digits of the standby Squawk-Codes (lower line).

Push vertical arrows to swap stand-by and active emergency squawk.

9.2.4 NORMAL PROCEDURES

There are no changes to POH chapter 4.

Funkwerk Avionics TRT 800 H

9.2.5 PERFORMANCE

There are no changes to POH chapter 5.

9.2.6 WEIGHT AND BALANCE

Changes of CG and changes in empty weight are to be considered if the transponder is removed according to chapter 6 of this POH.

9.2.7 DESCRIPTION OF AIRCRAFT AND SYSTEMS

Features:

- Level 2es Class 1 Non-Diversity Mode S Transponder, providing downlink of aircraft information
- radio transmitter and receiver for ground radar interrogations on 1030 (MHz) and transmission of coded reply pulses to ground-based radar on 1090 (MHz)
- Replies to ATCRBS interrogations using the ICAO 24-bit mode S address, which is unique to the particular aircraft
- Mode A replies, consisting of any one of 4,096 codes (squawk), which differ in the position and number of pulses
- Mode C replies, including encoded flight level
- Mode S replies, including aircraft address and flight level
- Acquisition Squitter, including aircraft address and flight level
- Extended Squitter, additionally including position and velocity
- IDENT capability for activating the Special Position Identification (SPI) pulse for 18 (s)

- certified to EUROCAE ED-73B and CS-ETSO-2C1 1 2a
- maximum flight level 35000 ft, maximum velocity 250 knots
- Display information contains code, reply symbol, mode of operation and pressure altitude
- temperature compensated high precision piezo-resistive pressure sensor
- RS-232 I/O data port
- 8 entries for AA-/AC-Code, FID, Ground-Switch, GPS-/Interfacesetting

Operations – Table of functions:

ON/OFF	ON press for 0,5 (s) OFF press for 3 (s)
VFR	activate VFR (also deactivate) (select VFRD/VFRW) store active squawk as VFR/VFRW squawk
	swap active and stand-by squawk
IDENT	activate SPI pulse
MODE	select mode ACS, A-S or stand-by
FID	select FID setting (in stand-by mode; press for 5 (s))
X…/.X../..X./…X	set according squawk digit
..X.	set cursor when entering AA/AC/FID
.X..	change values/select options

After power ON the display shows the name of the instrument and the software version as shown in Fig. 9.2.7.2.

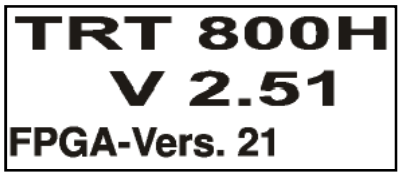


Fig. 9.2.7.2 power ON display

Operations - Transponder Mode Selection:

Press MOD (repeatedly) to select from the following modes:

• ACS Standard condition; transponder responds to mode A, C and S interrogations.

• A-S Altitude is not transmitted (neither on C nor on S requests). Other S data are transmitted.

• STBY Transponder only responds to directly addressed Mode S interrogations, squitter remains active.

If a ground switch is connected, actuation of this switch will cause the transponder switch to STBY.

Operations - Squawk Setting:

Turn the knob to adjust the numbers, push the horizontal arrow to step from digit to digit of the stand-by Squawk-Codes (lower line). Push the vertical arrow to swap stand-by and active squawk.