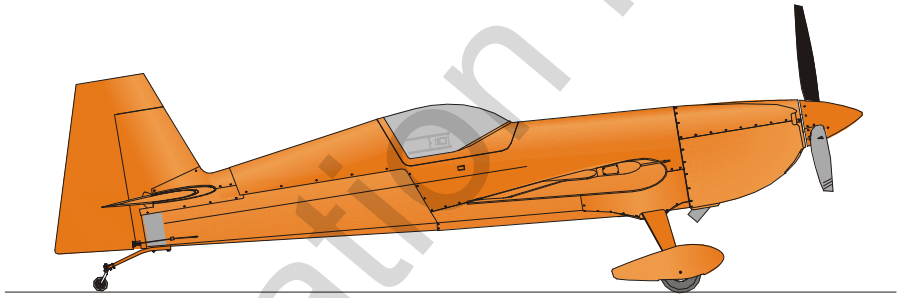
INFORMATION MANUAL

EXTRA 300/SC

MANUFACTURER

EXTRA Flugzeugproduktions- und Vertriebs- GmbH
Flugplatz Dinslaken
46569 Hünxe, Federal Republic of Germany



W A R N I N G

This is an Information Manual and may be used for general purposes only.

This Information Manual is not kept current.

It must not be used as a substitute for the official EASA Approved Pilot's Operating Handbook required for operation of the airplane.

Left blank intentionally

PILOT'S OPERATING HANDBOOK

AND

EASA APPROVED AIRPLANE FLIGHT MANUAL

Doc-No. EA - 0C701

NATIONALITY AND REGISTRATION MARKS

DESIGNATION OF AIRCRAFT

EXTRA 300/SC

SERIAL NO / YEAR OF MANUFACTURE

MANUFACTURER

EXTRA Flugzeugproduktions- und Vertriebs- GmbH
Flugplatz Dinslaken
46569 Hünxe, Federal Republic of Germany

EASA approved in the normal and acrobatic category based on FAR-23 AMDT. 34.
This document must be carried in the airplane at all times.

THIS HANDBOOK INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY THE EASA REGULATIONS AND ADDITIONAL INFORMATION PROVIDED BY THE MANUFACTURER AND CONSTITUTES THE EASA APPROVED AIRPLANE FLIGHT MANUAL.

This Handbook meets GAMA Specification No. 1 for Pilot's Operating Handbook and is EASA approved.

Signed: For the EASA
Roger Hardy
Certification Manager
General Aviation

Date: 17 July 2008

Left blank intentionally

LOG OF REVISIONS

Dates of issue for original and revised pages:	EASA Approval No. and Date of approval:
Original ..... 29. February 2008	EASA.A.C.08679 ..... 17. July 2008
Revision No. 1 ..... 12. February 2010	Approved under the authority of DOA N° EASA.21J.073
Revision No. 2 ..... 10. August 2010	Approved under the authority of DOA N° EASA.21J.073
Revision No. 3 ..... 10. January 2011	Approved under the authority of DOA N° EASA.21J.073
Revision No. 4 ..... 02. July 2012	EASA Major Change Approval N° 10044698 & N° 10044704 ..... 30. April 2013
Revision No. 5 ..... 5. September 2013	Approved under the authority of DOA N° EASA.21J.073 (ÄM-300-13-03 & ÄM-300-13-10) & EASA CSV Project Number 0010022327 ..... 08. January 2014
Revision No. 6 ..... 19. May 2014	Approved under the authority of DOA N° EASA.21J.073 (ref. ÄM-300-14-01,-05, -10, -14) ..... 19. December 2014
Revision No. 7 ..... 4. March 2016	Approved under the authority of DOA N° EASA.21J.073 ..... 23. March 2016
Revision No. 8 ..... 19. February 2019	The technical content of this document is approved under the authority of the DOA, ref.: EASA.21J.073 ..... 19. April 2019
Revision No. 9 ..... 26. July 2021	Approved under the authority of DOA N° EASA.21J.073 ..... 3. September 2021
Revision No. 10 ..... 15. July 2022	Approved under the authority of DOA N° EASA.21J.073 ..... 19. July 2022
Revision No. 11 ..... 26. March 2024	Approved under the authority of DOA N° EASA.21J.073 ..... 26. March 2024

LOG OF EFFECTIVE PAGES

Page	Date
Title	12. February 2010
i thru ii	26. March 2024
iii	29. February 2008
iv	12. February 2010
v	15. July 2022
vi	12. February 2010
1-1 thru 1-2	29. February 2008
1-3	12. February 2010
1-4 thru 1-5	2. July 2012
1-6 thru 1-8	29. February 2008
2-1	19. February 2019
2-2 thru 2-3	29. February 2008
2-4	19. February 2019
2-5	2. July 2012
2-6	19. February 2019
2-7	29. February 2008
2-8	2. July 2012
2-9	29. February 2008
2-10	2. July 2012
2-11 thru 2-12	29. February 2008
2-13	4. March 2016
2-14	2. July 2012
2-15	19. February 2019
2-16	29. February 2008
3-1	26. July 2021
3-2	29. February 2008
3-3	19. February 2019
3-4	29. February 2008
3-5	19. February 2019
3-6 thru 3-7	26. July 2021
3-8 thru 4-1	19. February 2019
4-2	29. February 2008
4-3	19. February 2019
4-4	29. February 2008
4-5 thru 4-7	19. February 2019
4-8	2. July 2012
4-9 thru 4-12	19. February 2019
5-1 thru 5-13	29. February 2008
5-14	19. February 2019
5-15 thru 5-16	29. February 2008
6-1	19. February 2019
6-2 thru 6-3	29. February 2008
6-4	19. February 2019
6-5 thru 6-6	29. February 2008
6-7	19. February 2019
6-8 thru 6-10	29. February 2008
6-11	26. July 2021
6-12	15. July 2022
6-13 thru 6-15	26. March 2024
6-16	15. July 2022
7-1 thru 7-3	29. February 2008
7-4	12. February 2010
7-5	29. February 2008
7-6 thru 7-7	15. July 2022
7-8 thru 7-10	29. February 2008
7-11	12. February 2010
7-12	10. January 2011
7-13 thru 14	15. July 2022
8-1 thru 8-4	29. February 2008
9-1	15.July 2022
9-2 thru 902-2	29. February 2008
902-3	2. July 2012
902-4 thru 902-5	29. February 2008
902-6 thru 902-10	2. July 2012
903-1	19. February 2019
903-2 thru 903-3	29. February 2008
903-4	19. February 2019
903-5 thru 903-7	29. February 2008
903-8 thru 904-1	19. February 2019
904-2 thru 904-3	29. February 2008
904-4	19. February 2019
904-5 thru 904-9	29. February 2008
904-10	19. February 2019
905-1	2. July 2012
905-2	29. February 2008
905-3	19. February 2019
905-4 thru 905-6	2. July 2012
906-1 thru 907-2	29. February 2008
907-3 thru 907-4	19. February 2019
908-1 thru 908-2	12. February 2010
908-3	2. July 2012
908-4	12. February 2010
908-5	2. July 2012
908-6	19. February 2019
908-7 thru 909-2	12. February 2010
909-3	19. February 2019
909-4	12. February 2010
910-1	15. July 2022
910-2	5. September 2013
910-3	15. July 2022
910-4	26. July 2021
911-1	19. February 2019
911-2 thru 911-8	19. May 2014
911-9	19. February 2019
911-10	19. May 2014
912-1 thru 912-4	19. May 2014
913-1 thru 913-8	19. May 2014
914-1 thru 914-8	19. February 2019
915-1 thru 915-8	26. July 2021
916-1 thru 916-6	26. July 2021
917-1 thru 917-22	15. July 2022

Left blank intentionally

INTRODUCTION

This handbook contains 9 sections, and includes the material required to be furnished to the pilot by FAR-23. It also contains supplementary data supplied by EXTRA Flugzeugproduktions- und Vertriebs- GmbH.

THIS MANUAL IS FURNISHED TO THE CIVIL AVIATION AUTHORITIES AS A PART OF THE CERTIFICATION MATERIAL FOR THIS MODEL.

NOTES

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

This Flight Manual is only valid in connection with the latest, new EASA approved revision. Refer to the EXTRA Homepage (direct link: http://www.extraaircraft.com/techserv.asp), where the POH Revision Index always shows the current revision status.

It is the responsibility of the pilot to be familiar with the contents of this 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 EXTRA Flugzeugproduktions- und Vertriebs- GmbH/EASA approval.
The editor has the copyright of this 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 EXTRA Flugzeugproduktions- und Vertriebs- 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 Flight Manual get lost, inform EXTRA Flugzeugproduktions- und Vertriebs- GmbH, Flugplatz Dinslaken 46569 Hünxe, Federal Republic of Germany.

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

NOTES AND SAFETY NOTES

Safety notes in this manual are marked by a boxed textmarker in the middle of the page and written in semi-bold characters. This manual distinguishes three warning levels:

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Additional information given in this manual are also marked by boxed textmarkers in the middle of the page and are written in semi-bold characters:

NOTICE

Is used to address practices not related to physical injury.

NOTE

Represents a useful or remarkable hint.

TERMINOLOGIE

The words "shall", "must" or "will" are used to express a mandatory requirement.

The word "should" is used to express nonmandatory provisions.

The word "may" is used to express permissible.

The term "page approved" on a page's footer means, that this page is approved by the applicable Aviation Authority.

MAIN TABLE OF CONTENTS

Section		*Page*
1	GENERAL	1-1
2	LIMITATIONS	2-1
3	EMERGENCY PROCEDURES	3-1
4	NORMAL PROCEDURES	4-1
5	PERFORMANCE	5-1
6	WEIGHT & BALANCE/EQUIPMENT LIST	6-1
7	AIRPLANE & SYSTEMS DESCRIPTIONS	7-1
8	AIRPLANE HANDLING, SERVICE & MAINTENANCE	8-1
9	SUPPLEMENTS	9-1

SECTION 1

GENERAL

Table of Contents

Paragraph *Page*

1.0 DESCRIPTION 1-3

1.1 SPECIFICATION OF CLASS 1-3

1.2 MANUFACTURER 1-3

1.3 TECHNICAL DATA 1-3
1.3.1 3-View Drawing 1-3
1.3.2 Main Data 1-4
1.3.3 Wing 1-4
1.3.4 Horizontal Tail 1-4
1.3.5 Elevator 1-4
1.3.6 Vertical Tail 1-4
1.3.7 Rudder 1-4

1.4 ENGINE 1-4

1.5 PROPELLER 1-5
1.5.1 Exhaust System 1-5

1.6 FUEL 1-5

1.7 OIL 1-5

1.8 LOADING 1-6

1.9 TERMINOLOGY 1-6

1.10 SECONDARY TERMINOLOGY 1-7

1.11 CONVERSION TABLE 1-8

Left blank intentionally

1.0 DESCRIPTION

The airframe of the EXTRA 300/SC is built of a tig-welded steel-tube construction. Wing, empennage and landing gear are manufactured of composite material. The aircraft is a single seater.

1.1 SPECIFICATION OF CLASS

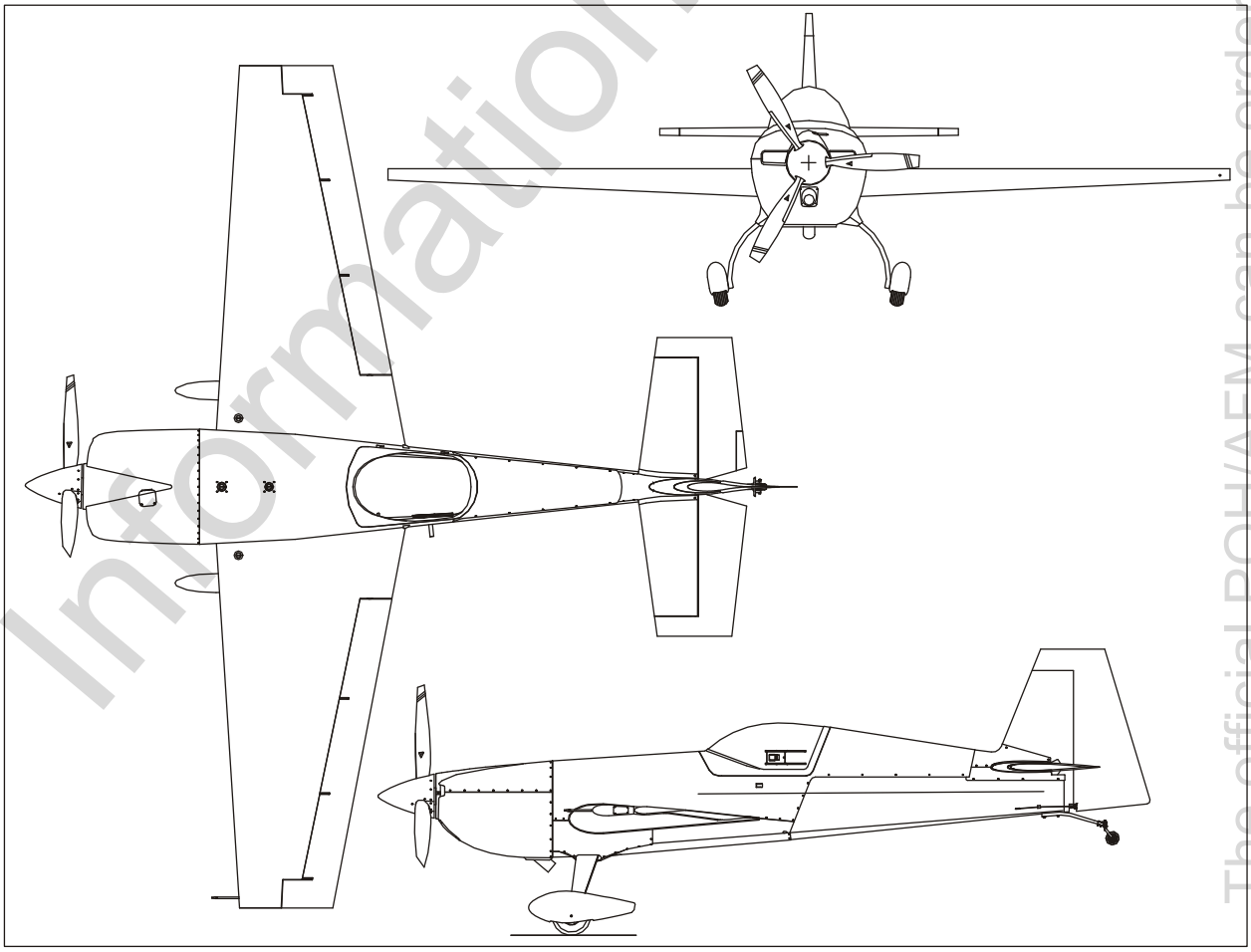
The aircraft is certified in normal and acrobatic category.
EASA - Approval No.: EASA.A.C.08679

1.2 MANUFACTURER

EXTRA Flugzeugproduktions- und Vertriebs- GmbH,
Flugplatz Dinslaken
46569 Hünxe,
Federal Republic of Germany.

1.3 TECHNICAL DATA

1.3.1 3-View Drawing



1.3.2 Main Data

- Length	6.88 m	(22.57 ft)
- Height	2.55 m	(8.36 ft)
- Span	7.50 m	(24.61 ft)
- Wheel-base	4.87 m	(15.98 ft)
- Wheel-track	1.80 m	(5.91 ft)

1.3.3 Wing

- Wing span	7.50 m	(24.61 ft)
- Wing-area	9.81 m²	(105.6 ft²)
- Airfoil	Root: MA 14.9 S	
	Tip: MA 12 S	
- Chord	Root: 1.786 m	(5.86 ft)
	Tip: 0.830 m	(2.72 ft)
- MAC	1.366 m	(4.48 ft)
- Aileron area	2 x 0.876 m²	(2x 9.429 ft²)
- Aileron deflection	up/down 30°, tolerance ±2°	

1.3.4 Horizontal Tail

- Span	2.66 m	(8.73 ft)
- Area	2.13 m²	(22.92 ft²)
- Airfoil	NACA 0009	

1.3.5 Elevator

- Area	1.04 m²	(11.19 ft²)
- Elevator-deflection	up/down 25°; tolerance ±1°	
- Trim-tab-deflection	up/down 32°, tolerance ±2°	

1.3.6 Vertical Tail

- Area	1.55 m²	(16.68 ft²)
- Airfoil	Wortmann FX 71-L-150/30	

1.3.7 Rudder

- Area	0.75 m²	(8.07 ft²)
- Rudder deflection	left/right 30°, tolerance +0°/-2°	

1.4 ENGINE

Manufacturer Textron-Lycoming Williamsport Plant PA 17701 USA.
Type: Lycoming AEIO-580-B1A
Rated power: 234.9 kW (315 HP)

1.5 PROPELLER

Manufacturer MT-Propeller Entwicklung GmbH, Federal Republic of Germany.
a) Standard: MTV-9-B-C/C198-25, 3-blade constant speed
b) Alternative: MTV-14-B-C/C190-130, 4-blade constant speed

1.5.1 Exhaust System

a) Standard: EA300-606000, Complete "6 in 1" system, with integrated silencer.
Manufacturer: Gomolzig Flugzeug- und Maschinenbau, Schwelm, Germany
b) Alternative 1: Extra300 6/1 Collector system, w/o silencer, stainless steel AISI 321
Manufacturer: Sky Dynamics Corporation, Moneta, USA
c) Alternative 2: Extra330-12-02B, "6 in 2" System, w/o silencer, Inconel 625
Manufacturer: Atelier Chabord, Epagny, France

1.6 FUEL

Type: AVGAS 100/100 LL
(for alt. fuel grades see latest issues of Textron Lyc. S.I. No 1070)
Minimum 100/130 octane. Maximum 100/130 octane

- Total fuel volume	224 L	(59.2 US Gallon)
- Front center tank	54 L	(14.3 US Gallon)
- Rear center tank	41 L	(10.8 US Gallon)
- Acro tank	9 L	(2.4 US Gallon)
- Wing tank	120 L	(31.7 US Gallon)
- Usable fuel in the system	221 L	(58.4 US Gallon)
- Usable fuel for acrobatic (acro and center tanks)	101 L	(26.7 US Gallon)

1.7 OIL

Maximum sump capacity: 16 qts.
Minimum sump capacity: 9 qts.

Average ambient air temperature	MIL-L-6082 or SAEJ1966 Spec Mineral Grades	MIL-L-22851or SAEJ1899 Spec 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 50
- 1°C til 32°C (30°F - 90°F)	SAE 40	SAE 40
- 18°C til 21°C (0°F - 70°F)	SAE 30	SAE 30,40 or 20W40
- 18°C til 32°C (0°F - 90°F)	SAE 20W50	SAE 20W50 or 15W50
< -12°C (10°F)	SAE 20	SAE 30 or 20W30

(single or multi - viscosity aviation grade oils see latest issue of Textron Lyc. S.I. No. 1014)

1.8 LOADING

Wing loading	(Acrobatic Cat.)	79.50 kg/m² (16.29 lbs./sqf)
	(Normal Cat.)	88.68 kg/m² (18.17 lbs./sqf)
Power loading	(Acrobatic Cat.)	3.32 kg/kW (5.46 lbs./HP)
	(Normal Cat.)	3.70 kg/kW (6.09 lbs./HP)

1.9 TERMINOLOGY

Air Speeds

CAS	Calibrated air speed. CAS is the same as TAS (True Air Speed) in std. atmospheric condition at sea level
KCAS	Calibrated speed in knots
GS	Ground speed
IAS	Indicated air speed
KIAS	Indicated speed in knots
TAS	True air speed. Is equal to CAS compensated for altitude, temperature and density
V_A	Maneuvering speed
V_{NE}	Never exceed speed
V_{NO}	Maximum structural crusing speed
V_S	Stalling speed or 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

1.10 SECONDARY TERMINOLOGY

fpm	Feet/minute
ft	Feet = 0.3048 m
in	inch = 2.54 cm
m	Meter
L	Litres
gal	US gallon = 3.79 litres
qts	US quart = 0.946 litres
hp	Horse power (english)
h	Hour
kts	Knots (NM/h) = 1.852 kilometer per hour
km/h	kilometer per hour
lbs	English pound = 0.4536 kg
hPa	hecto Pascal
inHg	Inches of mercury
MP	Manifold pressure
PA	Pressure altitude (ft)
nm	Nautical miles = 1.852 km
rpm	Revolutions per minute
CG	Center of gravity
Arm	Arm is the horizontal distance from reference datum
Moment	Weight of an item multiplied by its arm.

1.11 CONVERSION TABLE

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

SECTION 2

LIMITATIONS

Table of Contents

Paragraph *Page*

2.1 GENERAL 2-3

2.2 AIR SPEED (IAS) 2-3

2.3 CROSS-WIND COMPONENT 2-3

2.4 ENGINE 2-3
2.4.1 Fuel 2-4
2.4.2 Engine Limitations 2-4

2.5 PROPELLER 2-5

2.6 WEIGHT LIMITS 2-5

2.7 WEIGHT AND C.G. ENVELOPE 2-5
2.7.1 Normal Flight 2-5
2.7.2 Acrobatic Flight 2-5

2.8 ACROBATIC MANEUVERS 2-5
2.8.1 Normal Flight 2-5
2.8.2 Acrobatic Flight 2-6

2.9 LOAD FACTOR 2-7
2.9.1 Normal Flight 2-7
2.9.2 Acrobatic Flight 2-7

2.10 KINDS OF OPERATIONAL LIMITS 2-7

2.11 STRUCTUAL TEMPERATURE/COLOUR LIMITATION 2-7

2.12 MAXIMUM OPERATING ALTITUDE 2-7

2.13 TIRE PRESSURE 2-7

2.14 MARKINGS AND PLACARDS 2-7
2.14.1 Aircraft Identity Placard 2-7
2.14.2 Operating Placards 2-8
2.14.3 Instrument Markings 2-13

2.15 KINDS OF OPERATION EQUIPMENT LIST 2-14

Left blank intentionally

SECTION 2

LIMITATIONS

2.1 GENERAL

This section includes operating limitations, instrument markings, and basic placards necessary for the safe operation of the aircraft, its engine, standard systems, and standard equipment. The limitations included in this section have been approved by the EASA. Observance of these operating limitations is required by national aviation regulations.

N O T E

In case of the EXTRA 300/SC is equipped with specific options additional information required for safe operation will be contained in Section 9 "Supplements".

EASA Approval No.: EASA.A.C.08679

Any exceedance of given limitations have to be reported by the pilot and considered by corresponding maintenance or inspection procedure according to *MAINTENANCE MANUAL EXTRA 300/SC.*

2.2 AIR SPEED (IAS)

Never Exceed Speed	V_{NE}	219 knots	(406 km/h)
Max. Structural Cruising Speed	V_{NO}	154 knots	(285 km/h)
Maneuver speed (Acrobatic Cat.)	V_A	154 knots	(285 km/h)
(Normal Cat.)	V_A	138 knots	(256 km/h)

2.3 CROSS-WIND COMPONENT

Max. demonstrated cross-wind component for take-off and landing is 15 knots (27 km/h).

2.4 ENGINE

Engine-type Textron-Lycoming Lycoming AEIO-580-B1A with rated maximum 315 HP @ 2700 RPM.

2.4.1 FUEL

Minimum grade aviation gasoline: 100/100LL for alternate fuelgrades see latest revision of Lyc. S.I. No. 1070.

Total fuel capacity	224 L	(59.2 US Gallon).
Usable fuel capacity	221 L	(58.4 US Gallon).
Acrobatic flight only with center tanks.		
Total fuel capacity for acrobatic (acro & center tanks)	104 L	(27.5 US Gallon).
Usable fuel capacity for acrobatic (acro & center tanks)	101 L	(26.7 US Gallon).

2.4.2 ENGINE LIMITATIONS

a) RPM

- Max. Take-Off	2700 RPM
- Max. Continuous	2700 RPM

b) Oil temperature

- Max	118°C	245°F

c) Oil capacity

- Maximum sump capacity:	16 qts.
- Minimum sump capacity:	9 qts.

d) Oil pressure

- Minimum Idling	172 kPa	25 psig
- Normal	379 - 655 kPa	55 - 95 psig
- Starting, Warm up Taxi and Take-Off	793 kPa	115 psig

⚠ WARNING

It is normal for the oil pressure to "flicker" from 10 to 30 psi (69 to 207 kPa) 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 (kPa) the propeller pitch changes automatically to coarse (high) pitch with a corresponding decrease in RPM. Apply positive g to avoid engine stoppage.

e) Fuel pressure at inlet to fuel injector

- Max	65 psig
- Min	29 psig
- Min Idle	12 psig

f) Cylinder head temperature

- Max	241°C	465°F

2.5 PROPELLER

MT-Propeller Entwicklung GmbH, Federal Republic of Germany
a) Standard: MTV-9-B-C/C198-25, 3-blade constant speed
b) Alternative: MTV-14-B-C/C190-130, 4-blade constant speed

Maximum rotational speed
- Take-Off and Maximum Continuous: 2600 rpm*

N O T E*

RPM limitation due to compliance with applicable noise protection requirements (ICAO Annex 16 and FAR 36). However for non-US registered airplanes an enhanced rotational speed limitation of 2700 RPM may be permissable when registered in the Acrobatic Category only as ICAO Annex 16 grants an exception for airplanes specially designed for acrobatic purposes.

2.6 WEIGHT LIMITS

Max. allowed empty weight:		
- Acrobatic category	620 kg	(1367 lbs)
- Normal category	624 kg	(1376 lbs)
Max. allowed T/O weight:		
- Acrobatic category	780 kg	(1720 lbs)
- Normal category	870 kg	(1918 lbs)
Max allowed landing weight:		
- Acrobatic category	780 kg	(1720 lbs)
- Normal category	870 kg	(1918 lbs)

2.7 WEIGHT AND C.G. ENVELOPE

Vertical reference = fire-wall.
Horizontal reference = upper longerons in cockpit.

2.7.1 NORMAL FLIGHT

forward C.G.		rear C.G.	
820 kg (1808 lbs)		780 kg (1720 lbs)	
or below:	53.7 cm (21.1")	or below:	66.8 cm (26.3")
870 kg (1918 lbs):	54.5 cm (21.5")	870 kg (1918 lbs):	62.6 cm (24.6")

Straight line variation between points.

2.7.2 ACROBATIC FLIGHT

forward C.G.		rear C.G.	
780 kg (1720 lbs)		780 kg (1720 lbs)	
or below:	53.7 cm (21.1")	or below:	66.8 cm (26.3")

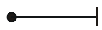
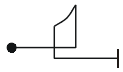
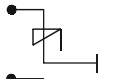
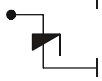
2.8 ACROBATIC MANEUVERS

2.8.1 NORMAL FLIGHT

All acrobatic maneuvers are prohibited except stall, chandelle, lazy eight and turns up to 60 degrees bank angle.

2.8.2 ACROBATIC FLIGHT

The plane is designed for acrobatics. Inverted flight maneuvers are limited to max 4 minutes. Recommended basic maneuver entry speeds are listed in the following list:

Maneuvers	Recommended entry speeds (IAS) min knots (km/h)	max knots (km/h)	Symbol	Remarks
Segment:				
Horizontal Line	V_S	V_{NE}		
45°climbing	80 (148)	V_{NE}		
90° up	V_A	V_{NE}		
45° diving	V_S	V_{NE}		reduce throttle
90° diving	V_S	V_{NE}		reduce throttle
1/4 Loop climb.	100 (185)	190 (352)		
Looping	100 (185)	190 (352)		
Stall turn	100 (185)	190 (352)		
Aileron roll	80 (148)	V_A		full deflection
Snap roll	80 (148)	140 (259)		
"Tail slide"	100 (185)	190 (352)		
Spin	V_S			
Inverted spin	V_S			
Knife edge	>150 (278)			< 10 s
Inverted Flight	>V_S	190 (352)		< 4 min

⚠ WARNING

Particular caution must be exercised when performing maneuvers at speeds above V_A [154 KIAS (285 km/h)]. Large or abrupt control inputs above this speed may impose unacceptably high loads which exceed the structural capability of the aircraft.

NOTE

For Acrobatic Maneuvers see Section 4. All maneuvers can be performed in positive and negative flight attitude.

2.9 LOAD FACTOR

2.9.1 NORMAL FLIGHT

Normal Cat.:	+ 6 g / - 3 g	for MTOW 870 kg (1918 lbs)

2.9.2 ACROBATIC FLIGHT

Acro Cat.:	+ 10 g / - 10 g	for MTOW 780 kg (1720 lbs)

2.10 KINDS OF OPERATIONAL LIMITS

Only VFR flights at day are allowed. The A/C may be operated at OAT from -20°C (-4°F) to +38°C (100°F). Flight in known icing-conditions is prohibited. Flights close to thunderstorms are prohibited. Smoking is prohibited.

2.11 STRUCTUAL TEMPERATURE/COLOUR LIMITATION

Structure is qualified up to 72°C (161,6°F). Structure temperatures (composite) above 72°C (161,6°F) are not permitted. In order not to exceed this temperature limit, color specification for composite structure (manufacturer document EA-03205.19) has to be complied with.

2.12 MAXIMUM OPERATING ALTITUDE

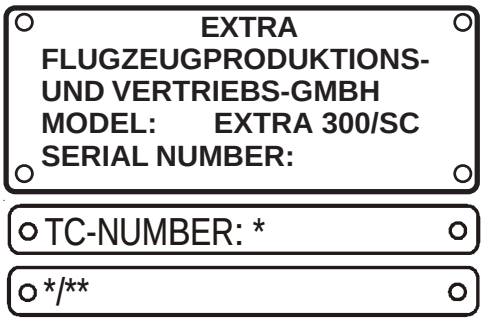
Max. certified operating altitude is 10,000 ft MSL (3048 m).

2.13 TIRE PRESSURE

The tire pressure is 2620 hpa (38 psi).

2.14 MARKINGS AND PLACARDS

2.14.1 AIRCRAFT IDENTITY PLACARD



*)The latest national aviation regulations must be observed in determining whether the placard is required.
**) call sign placard

2.14.2 OPERATING PLACARDS

V_A = 154 KTS (ACRO)
V_A = 138 KTS (NORMAL)

or

V_A = 285 km/h (ACRO)
V_A = 256 km/h (NORMAL)

(near the airspeed indicator)

The markings and placards installed in this airplane contain operating limitations which must be complied with when operating this airplane in the acrobatic category. Other limitations which must be complied with when operating this airplane in this category or in the normal category are contained in the airplane flight manual.

(in the cockpit)

This airplane is certified for VFR day operation. Operation under known icing conditions or close to thunderstorms is prohibited.

(on the instrument panel)

F U E L
AVGAS 100/100LL

(near each filler cap)

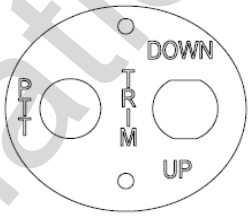
OIL

(on the seperate hatch / upper cowling)

ELEV. TRIM DOWN

(Next to the trim switch)

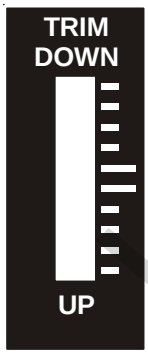
or



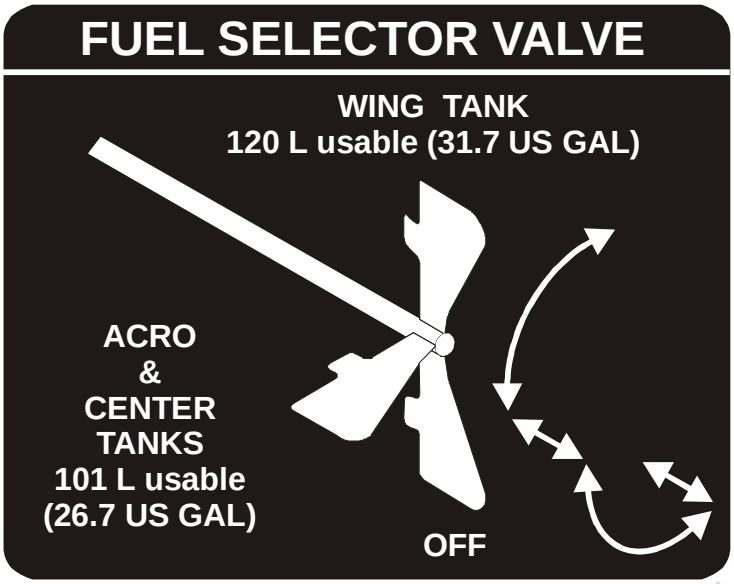
UP

(Next to the trim switch)

(On the control stick grip)



(On the instrument panel on the trim LED indicator)



(in cockpit next to fuel selector)

WING TANK
MUST BE EMPTY FOR ACROBATICS.
USABLE FUEL 120L (31.7 US GAL).

(On the instrument panel beneath wing tank fuel capacity indicator)

CENTER TANK INDICATION
SHOWS "ZERO" IN LEVEL FLIGHT
BELOW 9 L (2.37 US GAL).
UNUSABLE FUEL 3 L (0.8 US GAL).

(On the instrument panel beneath center tank fuel capacity indicator)

THE REMAINING FUEL IN LEVEL FLIGHT
CANNOT BE USED SAFELY WHEN BOTH
CENTER TANK INDICATORs READ "ZERO"!

(On the instrument panel beneath the acro & center tanks fuel capacity indicators)

ACROBATIC: +10G / -10G MTOW 780KG (1720LBS)

(In cockpit)

NORMAL: 6G / -3G MTOW 870KG (1918LBS)
ACROBATICS INCL. SPIN
NOT APPROVED!

(In cockpit)

NO SMOKING

(In cockpit)

USE OF HEADSETIS REQUIRED.
USE OF PARACHUTE IS RECOMMENDED

(On the right side of instrument panel)

LOW RPM ← PROP →HIGH RPM

(On RPM control in the cockpit)

RICH ← MIXTURE → LEAN

(On mixture control in the cockpit)

CLOSE ← THROTTLE → OPEN

(Near throttle control in the cockpit)

CANOPY LOCK

LOCK ← ● → UNLOCK ●

(Near canopy locking handles in the cockpit)

(Near the eyeball-type adjustable vents)

CAUTION
Particular caution must be exercised when performing maneuvers at speeds above V_A. Large or abrupt control inputs above this speed may impose unacceptably high loads which exceed the structural capability of the aircraft.

(In cockpit)

EA 300/SC

(In cockpit)

CALLSIGN

(In cockpit)

For	N	030	060	E	120	150
Steer						
For	S	210	240	W	300	330
Steer						

(Near Mag. Dir. Indicator)

WING TANK DRAIN

(Near the LH drain valve in the bottom fuselage cover)

CENTER TANK DRAIN

(Near the RH drain valve in the bottom fuselage cover)

GASCOLATOR DRAIN

(Near the drain valve on the RH lower side of the firewall)

**USE STRAIGHT MINERAL OIL
FOR A MINIMUM OF 50 HOURS**

(On the inside of the separate hatch / upper cowling)

**2.6 BAR
38 PSI**

(On the outside of the wheelpants)

**TORQUE TUBE
LUBRICATION**

(Near opening in middle of bottom fuselage cover)

**/ / / / / / / / NO STEP! \ \ \ \ \ \ **

(In the cockpit, on the aileron control rods)

(In cockpit, on the RH side)

Approved acrobatic maneuvers and recommended entry airspeeds					
Maneuvers	**Airspeeds**		**Maneuvers**	**Airspeeds**	
	min KIAS	**max KIAS**		**min KIAS**	**max KIAS**
Segment:					
Horizontal Line	V_S	V_{NE}	Aileron roll	80	V_A
45°climbing	80	V_{NE}	Snap roll	80	140
90° up	V_A	V_{NE}	"Tail-slide"	100	190
45° diving	V_S	V_{NE}	Spin	V_S	----
90° diving	V_S	V_{NE}	Inverted spin	V_S	----
1/4 Loop climb.	100	190	Inverted flight (Less than 4 min)	$> V_S$	190
Loop	100	190	Knife edge (Less than 10 s)	>150	----
Stall turn	100	190			

or

Approved acrobatic maneuvers and recommended entry airspeeds					
Maneuvers	**Airspeeds**		**Maneuvers**	**Airspeeds**	
	min	**max**		**min**	**max**
Segment:					
Horizontal Line	V_S	V_{NE}	Aileron roll	148 km/h	V_A
45°climbing	148 km/h	V_{NE}	Snap roll	148 km/h	259 km/h
90° up	V_A	V_{NE}	"Tail-slide"	185 km/h	352 km/h
45° diving	V_S	V_{NE}	Spin	V_S	----
90° diving	V_S	V_{NE}	Inverted spin	V_S	----
1/4 Loop climb.	185 km/h	352 km/h	Inverted flight (Less than 4 min)	$> V_S$	352 km/h
Loop	185 km/h	352 km/h	Knife edge (Less than 10 s)	>278 km/h	----
Stall turn	185 km/h	352 km/h			

(In cockpit)

2.14.3 INSTRUMENT MARKINGS

AIRSPEED INDICATOR

green arc	64 KIAS (119 km/h)	-	154 KIAS (285 km/h)			
yellow arc	154 KIAS (285 km/h)	-	219 KIAS (406 km/h)			
red line	219 KIAS (406 km/h)					

OIL PRESSURE INDICATOR

N O T E

Oil pressure indicator shows psig values even when labelled 'Psi'.
Range markings depending on instrument installed.

red line	25 psig						
yellow arc	25 psig	-	55 psig				
green arc	55 psig	-	95 psig	or	55 psig	-	90 psig
yellow arc	95 psig	-	115 psig	or	90 psig	-	100 psig
red line	115 psig			or	100 psig		

OIL TEMPERATURE INDICATOR

yellow arc	< 140 °F		
green arc	140 °F	-	210 °F
yellow arc	210 °F	-	245 °F
red line	245 °F		

CYLINDERHEAD TEMPERATURE INDICATOR

yellow arc	< 150 °F		
green arc	150 °F	-	435 °F
yellow arc	435 °F	-	465 °F
red line	465 °F		

RPM INDICATOR (Digital)

green LED	700 RPM	-	2400 RPM				
yellow LED	2400 RPM	-	2600 RPM	or	2400 RPM	-	2700 RPM
red LED	2600 RPM	-	3500 RPM	or	2700 RPM	-	3500 RPM

G-METER (Mechanical)

green arc	-5g	-	+8g
yellow arc	+8g	-	+10g
red line	+10g		

FUEL FLOW INDICATOR

green arc	0 gal / h	-	35 gal / h
red radial	35 gal / h		

MANIFOLD PRESSURE INDICATOR

Range markings depending on instrument installed.

green arc	10 "Hg	-	25 "Hg	or	10"Hg	-	30 "Hg
yellow arc	25 "Hg	-	29.5 "Hg		—		
red radial	29.5 "Hg				—		

2.15 KINDS OF OPERATION EQUIPMENT LIST

The aircraft may be operated in day-VFR when the appropriate equipment is installed and operable. No Pilot's Operating Handbook Supplement grants approval for IFR operation. Flight in icing conditions is prohibited.

The following equipment list identifies the systems and equipment upon which certification was predicated.
The following systems and items of equipment must be installed and operable for the particular kind of operation indicated.

	NORMAL	ACROBATIC
COMMUNICATION		
1. Transceiver-VHF	1	1
ELECTRICAL POWER		
1. Battery	1	1
2. Alternator	1	1
3. Ampermeter	1	1
FLIGHT CONTROL SYSTEM		
1. Elevator-trim control (electric)	1	1
FUEL		
1. Boost pump	1	1
2. Fuel quantity indicator (front center tank)	1	1
3. Fuel quantity indicator (rear center tank)	1	1
4. Fuel quantity indicator (wing tank)	1	1
5. Manifold pressure	1	1
6. Fuel flow indicator	1	1
7. Fuel pressure	0	0
LIGHT		
1. Wing-tip position/strobe light	*	*
NAVIGATION		
1. Altimeter	1	1
2. Airspeed indicator	1	1
3. Mag. direction indicator	1	1
4. Transponder[1]	1	1

[1]) In some airspaces Mode S Elementary Surveillance functionality is required

	NORMAL	ACROBATIC
ENGINE CONTROL		
1. RPM indicator	1	1
2. Exhaust gas temperature ind.	0	0
3. Cylinder head temperature ind.	0	0
OIL		
1. Oil temperature indicator	1	1
2. Oil pressure indicator	1	1
FLIGHT CREW EQUIPMENT		
1. Parachute	0	*/**
2. Seat belt	1	1
3. Headset	1	1

N O T E

The zeros (0) used in the above list mean that either the equipment or system, or both were not required for type certification.

Other equipment or systems in addition to those listed above may be required by the national operating regulations.

***) The asterisk used in the above list means that latest national aviation regulations must be observed in determining whether the equipment and/or system is required.**

****) According FAR Part 91 „General Operating and Flight Rules" each occupant of an US registered airplane must wear an approved parachute when performing acrobatic maneuvers.**

Extra Flugzeugproduktions- und Vertriebs- GmbH considers acrobatics without wearing an approved parachute to be unsafe.

Left blank intentionally

SECTION 3

EMERGENCY PROCEDURES

Table of Contents

Paragraph *Page*

3.0 INTRODUCTION 3-3
3.0.1 General 3-3
3.0.2 General Behaviour In Emergency Situations 3-3

3.1 AIRSPEEDS FOR EMERGENCY OPERATION 3-4

3.2 OPERATIONAL CHECKLIST 3-4
3.2.1 Engine Failure during Take-off Roll 3-4
3.2.2 Engine Failure immediately after Take-off 3-4
3.2.3 Engine Failure during Flight (Restart Process) 3-4
3.2.4 Oil System Malfunction 3-5
3.2.5 Alternator Failure 3-5

3.3 FORCED LANDINGS 3-5
3.3.1 Emergency Landing without Engine Power 3-5
3.3.2 Precautionary Landing with Engine Power 3-6

3.4 FIRES 3-6
3.4.1 During Start on Ground 3-6
3.4.2 Engine Fire in Flight 3-7

3.5 ICING 3-7
3.5.1 Inadverted Icing Encounter 3-7

3.6 UNINTENTIONAL SPIN 3-7

3.7 MANUAL BAIL-OUT 3-7

3.8 EMERGENCY EXIT AFTER TURN OVER 3-8

3.9 ELEVATOR CONTROL FAILURE 3-8

Left blank intentionally

SECTION 3

EMERGENCY PROCEDURES

3.0 INTRODUCTION

3.0.1 GENERAL

This section contains the checklist and procedures coping with emergencies that may occur. This checklist must be followed in various emergencies to ensure maximum safety for the pilot and/or aircraft. Refer to the Supplement Sections for emergency procedures associated with optional systems or equipment.

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

3.0.2 GENERAL BEHAVIOUR 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 each aircrew member:

1. Maintain aircraft control
2. Analyze the situation and take 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 judgement 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 CPD (circuit protection device) that affects flight operations or safety. Each successive attempt to restore an automatically disconnected power source, or the resetting of an automatically disconnected CPD can result in progressively worse effects.

3.1 AIRSPEEDS FOR EMERGENCY OPERATION

Stall speed	64 KIAS (119 km/h)
Engine failure after take-off	90 KIAS (167 km/h)
Best recommended gliding speed (glide angle 1 : 6,2)	
-Acrobatic cat. (780 kg (1720 lbs))	90 KIAS (167 km/h)
-Normal cat. (870 kg (1918 lbs))	90 KIAS (167 km/h)
Precautionary landing with engine power	90 KIAS (167 km/h)
Landing without engine power	90 KIAS (167 km/h)
Maximum demonstrated cross wind component	15 Knots (27 km/h)

3.2 OPERATIONAL CHECKLIST

3.2.1 ENGINE FAILURE DURING TAKE-OFF ROLL

1. Throttle	IDLE
2. Brakes	APPLY
3. Mixture	IDLE CUT OFF
4. Ignition switch	OFF
5. Master switch	OFF

3.2.2 ENGINE FAILURE IMMEDIATELY AFTER TAKE-OFF

Stall speed 61 KIAS

1. Airspeed	90 KIAS (167 km/h)
2. Mixture	IDLE CUT OFF
3. Fuel selector valve	OFF (Pull & Turn)
4. Ignition switch	OFF
5. Master switch	OFF
6. Forced landing	PERFORM AS PRACTICABLE

3.2.3 ENGINE FAILURE DURING FLIGHT (RESTART PROCESS)

1. Aircraft attitude	UPRIGHT
2. Airspeed	90 KIAS (167 km/h)
3. Fuel quantity indicators	CHECK
4. Fuel selector valve	SELECT TANK with highest fuel level
5. Mixture	RICH
6. Boost pump	ON
7. Ignition switch	BOTH (or START if propeller has stopped)

3.2.4 OIL SYSTEM MALFUNCTION

If oil pressure indicates low:	Apply positive "g"
If oil pressure is not regained than:	
1. Airspeed	90 KIAS (167 km/h)
2. Throttle	REDUCE TO IDLE
3. Engine oil temperature	OBSERVE INDICATION
4. Land	ASAP

N O T E

If oil pressure drops to 0 psi (kPa) the propeller pitch changes automatically to coarse (high) pitch with a corresponding decrease in RPM.

3.2.5 ALTERNATOR FAILURE

I. Red alternator warning light illuminates:

1. Ammeter indication	CHECK
if indication is negative:	
2. Land	ASAP an overvoltage situation has occured battery is the only power source
if indication is positive:	
2. Land	AS SOON AS PRACTICAL red alternator warning light is defective
3. Ammeter	MONITOR

II. Ammeter has negative indication:

1. RPM or electrical load	INCREASE REDUCE
if ammeter indication is still negative	
2. Land	ASAP battery is the only power source

III. ALT OUTPUT circuit breaker has tripped (ammeter indication negative):

1. ALT OUTPUT circuit breaker	RESET
if ALT OUTPUT circuit breaker trips again:	
2. Land	ASAP battery is the only power source

3.3 FORCED LANDINGS

3.3.1 EMERGENCY LANDING WITHOUT ENGINE POWER

1. Seat belts, shoulder harnesses	SECURE
2. Airspeed	90 KIAS (167 km/h)
3. Mixture	IDLE CUT OFF
4. Fuel selector valve	OFF (Pull & Turn)

5. Ignition switch	OFF
6. Master switch	OFF
7. Touchdown	SLIGHTLY TAIL LOW
8. Brakes	OPTIMUM BRAKING

3.3.2 PRECAUTIONARY LANDING WITH ENGINE POWER

1. Seat belt, shoulder harness	SECURE
2. Airspeed	90 KIAS (167 km/h)
3. Selected field	FLY OVER, noting terrain and obstructions, then reaching a safe altitude and airspeed
4. Master switch	OFF
5. Touchdown	SLIGHTLY TAIL LOW
6. Ignition switch	OFF
7. Mixture	IDLE CUT OFF
8. Fuel selector valve	OFF (Pull & Turn)
9. Brakes	APPLY HEAVILY

3.4 FIRES

3.4.1 DURING START ON GROUND

1. Cranking	CONTINUE to get a start which would suck the flames and accumulated fuel through the air inlet and into the engine.
If engine starts:	
2. Fuel selector valve	OFF (Pull & Turn)
3. Power	1700 RPM for one minute.
4. Engine	SHUT DOWN
If engine fails to start:	
2. Cranking	CONTINUE, hold elevator up and apply brakes
3. Fuel selector valve	OFF (Pull & Turn)
4. Throttle	FULL OPEN
5. Mixture	IDLE CUT OFF
6. Master switch	OFF
7. Ignition switch	OFF

⚠ WARNING

Risk of burns due to flames shooting out.
Do not open engine compartment access doors while engine is on fire!

8.	After engine stop	ABANDON aircraft
9.	Fire	EXTINGUISH using fire extinguisher if available
10.	Aircraft	INSPECT

3.4.2 ENGINE FIRE IN FLIGHT

1.	Mixture	IDLE CUT OFF
2.	Fuel selector valve	OFF (Pull & Turn)
3.	Master switch	OFF
4.	Airspeed	90 KIAS (167 km/h), find your airspeed/attitude which will keep the fire away from the cockpit
5.	Land	AS SOON AS POSSIBLE

3.5 ICING

3.5.1 INADVERTED ICING ENCOUNTER

1. Turn back or change altitude to obtain an outside temperature that is less conductive to icing.
2. Plan a landing at the nearest airfield. With extremely rapid ice build-up select a suitable "off airport" landing field.

3.6 UNINTENTIONAL SPIN

Refer to section 4 (Normal Procedures) acrobatic maneuver, spin recovery

3.7 MANUAL BAIL-OUT

When in an emergency situation that requires abandoning the aircraft and while wearing a parachute, which is at least strongly recommended for acrobatics:

- Reduce speed to 90 Kts (167 km/h) if possible
- Pull mixture to lean
- Open canopy (push forward if applicable)
- Take off headset
- Open seat belt
- Leave airplane to the left side
- Try to avoid wing and tail
- Open parachute

3.8 EMERGENCY EXIT AFTER TURN OVER

1. Master switch	OFF
2. Fuel selector valve	OFF (Pull & Turn)
3. Seat belts	OPEN
4. Parachute harnesses (if wearing a parachute)	OPEN
5. Canopy handle	PULL TO OPEN

N O T E

If canopy fails to open break the canopy.

6. Aircraft	EVACUATE ASAP

3.9 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 flair the plane gently increase power to bring the nose up to landing attitude.

SECTION 4

NORMAL PROCEDURES

Table of Contents

Paragraph		*Page*
4.0	**GENERAL**	**3**
4.0.1	Airspeeds for Operation	3
4.0.2	Checklist and Procedures	3
4.1	**PREFLIGHT INSPECTION**	**4**
4.1.1	Exterior Inspection Illustration	4
4.1.2	General	4
4.2	**CHECKLIST PROCEDURES**	**4**
4.3	**STARTING PROCEDURES**	**6**
4.3.1	Cold Engines	6
4.3.2	Hot Engines	6
4.4	**TAXIING THE AIRCRAFT**	**6**
4.5	**TAKE-OFF PROCEDURE**	**7**
4.5.1	Before Take-off	7
4.5.2	Take-off	7
4.6	**CLIMB**	**8**
4.7	**CRUISE**	**8**
4.8	**LANDING PROCEDURES**	**8**
4.8.1	Descent	8
4.8.2	Approach	8
4.8.3	Before Landing	9
4.8.4	Normal Landing	9
4.9	**GO-AROUND**	**9**
4.10	**SHUTDOWN**	**9**
4.11	**LEAVING THE AIRCRAFT**	**10**
4.12	**ACROBATIC MANEUVERS**	**10**
4.12.1	General	10
4.12.2	Maneuvers	10
4.12.3	Spin	12
4.13	**NOISE LEVEL**	**12**

Left blank intentionally

SECTION 4

NORMAL PROCEDURE

4.0 GENERAL

4.0.1 AIRSPEEDS FOR OPERATION

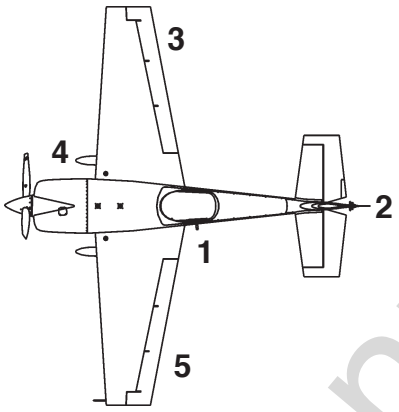
	870 KG (1918 LBS) KIAS (km/h)	780 KG (1727 LBS) KIAS (km/h)
Start:		
Rotate Speed	70 (130)	67 (124)
Climb:		
V_X	91 (169)	86 (159)
V_Y	100 (185)	95 (176)
Recommended Normal Climb Speed	106 (196)	101 (187)
Max. Cruise Speed	183 (339)	187 (346)
Landing:		
Approach	85 (157)	81 (150)
On Final	85 (157)	81(150)
Go-Around Speed	95 (176)	91(169)
Recommended Airspeed (maximum) For Flight In Rough Air (V_{NO})	154 (285)	146 (270)
Max. Demonstrated Cross Wind Component	15 Kts (27)	15 Kts (27)

4.0.2 CHECKLIST AND PROCEDURES

This handbook contains the checklist and procedures to operate the aircraft. The pilot should be familiar with all procedures contained in this Pilot's Operating Handbook, which must be carried on board. The pilot has to comply with Checklist for daily check and inspections (see Section 8, Handling, Servicing and Maintenance). Refer to the Supplement Sections for normal procedures associated with optional systems or equipment.

4.1 PREFLIGHT INSPECTION

4.1.1 EXTERIOR INSPECTION ILLUSTRATION



4.1.2 GENERAL

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

4.2 CHECKLIST PROCEDURES

1) Cockpit

1. Pilot's Operating Handbook	(AVAILABLE)
2. Airplane weight and balance	CHECKED
3. Ignition switch	OFF
4. Master switch	ON
5. Fuel quantity indicator front center tank	CHECK
6. Fuel quantity indicator rear center tank	CHECK

N O T E

Ensure at least one center tank having enough fuel for take-off, landing and go-around.

7. Fuel quantity indicator wing tank	CHECK
8. Master switch	OFF
9. Fuel selector *	ACRO & CENTER TANKS

N O T E*

Although safe operation does <u>not</u> require the use of the tanks in a specific sequence, it is recommended to set fuel selector to "ACRO & CENTER TANKS" position!

2) Empennage

1. All round inspection, canopy, surfaces, stabilizers, elevator, trim tab, rudder and tailwheel	CHECK
2. Horizontal stabilizer attachment bolts	CHECK FOR FREEPLAY BY MOVING THE TIP OF THE HORIZ. STABILIZER UP- AND DOWNWARDS

3) Right wing

1. Aileron, freedom of movement and security	CHECK
2. Trailing edge	CHECK
3. Fuel tank vent opening (right landing gear)	CHECK
4. Fuel quantity	CHECK
5. Fuel tank filler cap	CHECK
6. Right landing gear, wheel and brake	CHECK

4) Nose

1. Engine oil dipstick	CHECK
2. Propeller and spinner	CHECK
3. Air inlet	CHECK
4. Fuel tank filler caps (front & rear center)	CHECK
5. Fuel drain for center & acro and wing tank	DRAIN FOR AT LEAST 4 SECONDS TO CLEAR SUMP OF POSSIBLE WATER; CHECK CLOSED
6. Fuel filter drain	DRAIN FOR AT LEAST 4 SECONDS TO CLEAR FILTER OF POSSIBLE WATER; CHECK CLOSED

5) Left wing

1. Left landing gear, wheel and brakes	CHECK
2. Fuel quantity	CHECK
3. Fuel tank filler cap	CHECK
4. Pitot cover	REMOVE
5. Trailing edge	CHECK
6. Aileron, freedom of movement and security	CHECK

6) Before starting engine

1. Preflight inspection	COMPLETE
2. Parachute	CHECK SECURED
3. Seat, seatbelts, shoulder harnesses	ADJUST AND LOCK
4. Canopy	CLOSE AND LOCK

⚠ CAUTION

Handles of the canopy lock mechanism must be in the most opposite position indicated with a red line on the canopy frame. Check gap between canopy frame and fuselage fairing!

5. Brake	CHECK
6. Master switch	ON
7. Electrical equipment	OFF

4.3 STARTING PROCEDURES

4.3.1 COLD ENGINES

The following starting procedures are recommended, however, the starting conditions may necessitate some variation from these procedures.

1. Perform pre-flight inspection.
2. Set propeller governor control in "High RPM" position.
3. Open throttle approximately 1/4 travel.
4. Turn boost pump "ON".
5. Move mixture control to "FULL RICH" until a slight but steady fuel flow is noted (approximately 3 to 5 seconds) and return mixture control to "IDLE CUT-OFF". Turn boost pump "OFF".
6. Engage starter.
7. When engine fires release the ignition switch back to "BOTH".
8. Move mixture control slowly and smoothly to "FULL RICH".
9. Check the oil pressure gauge. If minimum oil pressure is not indicated within 30 seconds, shut off the engine and determine trouble.

4.3.2 HOT ENGINES

Because of the fact that the fuel percolates and the system must be cleared of vapor, it is recommended to use the same procedure as outlined for cold engine start.

4.4 TAXIING THE AIRCRAFT

1. Canopy	CLOSE AND LOCK
2. Brake	CHECK
3. Altimeter	Set on QFE or QNH
4. Electrical equipment	ON
5. Radio	Set and test
6. Mixture	Leave in "FULL RICH" position

Operate only with the propeller in minimum blade angle (High RPM).
Warm-up at approximately 1000-1200 RPM. The engine is ready for take-off when the throttle can be opened without the engine faltering.

4.5 TAKE-OFF PROCEDURE

4.5.1 BEFORE TAKE-OFF

Before you line up at the runway for take-off:

1. Oil pressure and oil temperature	CHECK
2. Magnetos	CHECK as follows:
Engine RPM:	Set to1800 min^{-1}

Pay attention to the three small LEDs in the "Status" area on the upper left corner of the digital RPM indicator (P-1000) face:

Ignition switch position:	LEFT
Status area:	Right red LED illuminates
Display:	Shows RPM drop
Ignition switch position:	RIGHT
Status area:	Left red LED illuminates
Display:	Shows RPM drop
Ignition switch position:	BOTH
Status area:	Right and left red LED remain off The middle LED is not allowed to alert, otherwise the difference is more than permissible.

N O T E

During the short circuit (grounding) of a single magneto, the respective red LED must illuminate. The maximum allowed RPM drop at 1800 min^{-1} is 175 min^{-1}. The maximal difference between the magnetos shall not be more than 50 RPM (identify with the illuminated yellow LED).

3. Alternator Output	CHECK Ammeter indication is positive
4. Propeller control	MOVE through its complete range to check operation and return to full HIGH RPM position.
5. Boost pump	ON (check indicator movement on the fuel flow gauge).
6. Flight controls	CHECK free and correct
7. Trim	SET to appropriate takeoff position (half way nose down)

4.5.2 TAKE-OFF

Set throttle smoothly to max. and let the airspeed go up to 65 to 70 KIAS (120 to 130 km/h). A light pressure on the stick lifts the tail to the horizontal position. Rotate the aircraft at 70 KIAS (130 km/h). Proceed climbing at recommended climb speed.

4.6 CLIMB

RPM above 2400 should be used only for acrobatic maneuvers when necessary for maximum performance in order to avoid unnecessary noise.

Turn boost pump "OFF".

4.7 CRUISE

1. Altitude	- As selected
2. Throttle/RPM	- Adjust for cruising speed
3. Mixture	- Adjust for minimum fuel consumption
4. Trim	- As required
5. Fuel	- Check periodically

N O T E

Ensure at least one center tank having enough fuel for landing and go-around.

4.8 LANDING PROCEDURES

4.8.1 DESCENT

1. Throttle	- Reduce
2. Mixture	- "FULL RICH"
3. RPM Control	- Set to 2400 RPM
4. Trim	- Adjust
5. Fuel selector*	- "ACRO & CENTER TANKS"

N O T E*

Although safe operation does <u>not</u> require the use of the tanks in a specific sequence, it is recommended to set fuel selector to "ACRO & CENTER TANKS" position!

4.8.2 APPROACH

1. Boost pump	- ON
2. Mixture	- set to "Rich"
3. Airspeed	- reduce to approach speed
4. Propeller pitch	- set to low angle (High RPM).

N O T E

It is recommended to set the RPM to 2400 during approach and landing in order to avoid unnecessary noise.

In case of "Go Around", RPM control must be set to max. RPM before applying power.

4.8.3 BEFORE LANDING

1. Landing approach	- proceed at 85 KIAS (157 km/h)
2. Airspeed on final	- maintain 85 KIAS (157 km/h)
3. Elevator trim	- adjust

N O T E

Stall speed will be

MTOW = 870 kg : 64 KIAS (119 km/h)

4.8.4 NORMAL LANDING

1. Landing	- perform as practicable with respect to surface and weather condition
2. Touchdown	- 3 point landing

N O T E

The rudder is effective down to 30 KIAS (56 kmh)

3. Throttle	- CLOSE / IDLE
4. Braking	- Minimum required

4.9 GO-AROUND

Decide early in the approach if it is necessary to go around and then start go-around before too low altitude and airspeed are reached.

Proceed as follows:

1. RPM control	- "HIGH RPM" / Full forward
2. Throttle	- "OPEN" / Take-off power
3. Airspeed	- Minimum 90 KIAS (167 km/h) rotate to go-around altitude

4.10 SHUTDOWN

1. Boost pump	- "OFF"
2. Engine	- Run for 1 min. at 1000 RPM
3. Dead cut check	- Perform
4. Electrical equipment	- "OFF"
5. Mixture	- "IDLE CUT OFF"
6. Ignition switch	- "OFF"
7. Master switch	- "OFF"

4.11 LEAVING THE AIRCRAFT

1. Canopy	- Close and lock
2. Aircraft	- Secure
3. Pitot cover	- Attach
4. Log book	- Complete

4.12 ACROBATIC MANEUVERS

4.12.1 GENERAL

NOTE

Prior to executing these maneuvers tighten harnesses and check all loose items are stowed. Start the maneuvers at safe altitude and max continuous power setting if not otherwise noted.

For maneuver limits refer to Section 2 LIMITATIONS.

At high negative g-loads and zero g-periods it is normal that oil pressure and RPM indication might drop down momentarily returning to normal status at positive g-loads.

⚠ WARNING

The high permissible load factors of the airplane may exceed the individual physiological limits of pilot. This fact must be considered when pulling or pushing high g's.

4.12.2 MANEUVERS

⚠ WARNING

Particular caution must be exercised when performing maneuvers at speeds above V_A [154 KIAS (285 km/h)]. Large or abrupt control inputs above this speed may impose unacceptably high loads which exceed the structural capability of the aircraft.

Acrobatics is traditionally understood as maneuvers like loop, humpty bump, hammerhead turn, aileron roll etc..

This manual does not undertake to teach acrobatics, however, it is meant to demonstrate the plane's capabilities.

For this reason maneuvers are divided into segments. The segments are described. Limitations are pointed out.

- Segment horizontal line:
  A horizontal line may be flown with any speed between V_S and V_{NE}

- Segment line 45° climbing:
  The plane will follow the line at max. power. The speed will not decrease below 80 KIAS (148 km/h).

- Segment line 90° up:
  Any entry speed may be used. Out of a horizontal pull-up at 200 KIAS (370 km/h) the vertical penetration will be 2.500 ft. The speed will gradually decrease to 0.

N O T E

In extremely long lines an RPM decay may occur. This is related to a loss of oil pressure. Positive g´s should be pulled immediately in order to protect the engine. Oil pressure will return immediately.

- Segment line 45° diving:
  Throttle must be reduced in order to avoid exceeding V_{NE}.

- Segment lin 90° diving:
  Throttle must be reduced to idle in order to avoid exceeding V_{NE}.

Above segments may be filled up with aileron rolls on snap rolls. Watch V_A = 154 KIAS (285 km/h) for aileron rolls with max. deflection.
Snap rolls should not be performed at speeds above 140 KIAS (259 km/h).

- Segment 1/4 loop, climbing:
  The minimum recommended speed is 100 KIAS (185 km/h). If the maneuver is to be followed by a vertical line, a higher entry speed is required depending on the expected length of the line. A complete loop can be performed at speeds above 100 KIAS (185 km/h).

N O T E

Since the maximum horizontal speed is 183 KIAS (339 km/h), higher speeds should be avoided in acrobatics since an unnecessary loss of altitude would occur.

- Torque maneuvers:
  All maneuvers with high angular velocity associated with high propeller RPM must be considered dangerous for the engine crankshaft.

Although wooden composite propeller blades are used, the gyroscopic forces at the prop flange are extremely high.

⚠ C A U T I O N

If performing a gyroscopic maneuver such as flat spin, power on, or knife edge spin, reduce RPM to 2400 in order to minimize the gyroscopic forces.

N O T E

Fuel consumption during acrobatic maneuvers is higher than stated in Section 5.

4.12.3 SPIN

To enter a spin proceed as follows:
- Reduce speed, power idle
- When the plane stalls:
  - kick rudder to desired spin direction
  - hold ailerons neutral
  - stick back (positive spinning), Stick forward (negative spinning)

The plane will immediately enter a stable spin.
- Ailerons against spin direction will make the spin flatter.
- Ailerons into spin direction will lead to a spiral dive.

Above apply for positive and negative spinning.

To stop the spin:
- Apply opposite rudder
- Make sure, power idle
- Hold ailerons neutral
- Stick to neutral position

After one turn of spinning the plane will recover within about 1/2 turn.
After six turns of spinning the plane will recover within about 1 turn.
Recovery can still be improved by feeding in in-spin ailerons.

N O T E

If ever disorientation should occur during spins (normal or inverted) one method always works to stop the spin:

- Power idle
- Kick rudder to the heavier side
  (this will always be against spin direction)
- Take hands off the stick

The spin will end after 1/2 thru 1 turn. The plane will be in a steep dive in a side-slip.
Recovery to normal flight can be performed easily.

N O T E

After one turn of spinning the altitude loss including recovery is within about 1500 ft.
After six turns of spinning the altitude loss including recovery is within about 3300 ft.

4.13 NOISE LEVEL

a) EASA approved noise level for MTV-9-B-C/C198-25 @2600RPM : 76.3 dB(A)
The noise level has been established with the standard Gomolzig (6 in 1) exhaust system incl. silencer (EA300-606000) in accordance with ICAO Annex 16, Volume I, Part II, Chapter X, 4th Edition July 2005.

b) EASA approved noise level for MTV-14-B-C/C190-130 @2600RPM: 72.7 dB(A)
The noise level has been established with the standard Gomolzig (6 in 1) exhaust system incl. silencer (EA300-606000) in accordance with ICAO Annex 16, Volume I, Part II, Chapter X, 5th Edition July 2008.

No determination has been made by the EASA for the FAA that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out any airport.

SECTION 5

PERFORMANCE

Table of Contents

Paragraph *Page*

5.1 GENERAL 5-3
5.1.1 Performance Charts 5-3
5.1.2 Definitions of Terms 5-3
5.1.3 Sample Problem 5-3

5.2 ISA CONVERSION 5-5

5.3 AIRSPEED CALIBRATION 5-6

5.4 STALL SPEED 5-7

5.5 TAKE-OFF PERFORMANCE 5-8

5.6 RATE OF CLIMB PERFORMANCE 5-9

5.7 TIME, FUEL & DISTANCE TO CLIMB 5-10

5.8 CRUISE SPEED 5-11

5.9 ENDURANCE 5-12

5.10 RANGE 5-13

5.11 CRUISE PERFORMANCE 5-14

5.12 TIME , FUEL & DISTANCE TO DESCEND 5-15

5.13 LANDING PERFORMANCE 5-16

Left blank intentionally

SECTION 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.
It should be noted that the performance information presented in the range and endurance charts allow for 45 minutes reserve fuel at specified conditions. 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 information is 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). The performance figures below are given under following conditions:
1. Take-off Weight 870 kg (1918 lbs)
2. Take-off and landing on concrete surface.
3. No wind.
4. Standard atmospheric condition.

5.1.2 Definitions of Terms

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

5.1.3 Sample Problem

Except in § 5.6 all examples presented in the performance charts refer to the conditions of the sample problem outlined here.

CONDITIONS

Takeoff:	Weight (MTOW):	870 kg (1918 lbs)
	Field Pressure Alt:	2000 ft (610 m)
	Temperature:	15°C
	Wind Component (Headwind):	10 KT
	Field Length:	3000 ft
Cruise:	Total Distance:	400 NM
	Pressure Altitude:	8000 ft (2438 m)
	Temperature (ISA):	-1°C
Landing:	Weight:	750 kg (1653 lbs)
	Field Pressure Alt:	2000 ft (610 m)
	Temperature:	15°C
	Wind Component (Headwind):	5 KT
	Field Length:	2000 ft

TAKE-OFF

§ 5.5 shows the Take-Off Distance.
Example:

T/O Weight:	870 kg (1918 lbs)
Ground Roll:	138 m (453 ft)
(decreased by 8% due to headwind):	127 m (417 ft)
Total Distance to clear a 50 ft obstacle:	298 m (978 ft)
(decreased by 8% due to headwind):	274 m (899 ft)

These distances are well within the available field length in this sample problem.

CLIMB

§ 5.6 shows the Rate Of Climb Performance.
(conditions outlined in Fig. 5.6 deviate from the sample problem given here).

Pressure altitude:	6000 ft
Outside air temperatur:	+5°C
Weight:	840 kg (1852 lbs)
Climb Rate:	1895 ft/min

§ 5.7 shows the Time, Fuel and Distance to Climb.
Example (climb from 2000 ft (610 m) to 8000 ft (2438 m)):

Time to Climb:	(3.6 - 1.0) min = 2.6 min
Fuel to Climb:	(7.5 - 2.0) Liters = 5.5 Liters (1.45 US Gal.)
Distance to Climb:	(6.3 - 1.6) NM = 4.7m NM

CRUISE

Cruise Altitude and Power Setting should be determined for most economical fuel consumption and several other considerations.
§ 5.11 shows the Cruise Performance data for a T/O Weight of 870 kg (1918 lbs) with maximum fuel (224 l).
The conditions in the examples of the following Figures are:

Pressure altitude:	8000 ft (2438 m)
Power Setting:	65 %

§ 5.8 shows the cruise speed: 166 kts (307 km/h)

§ 5.9 shows the endurance: 3.3 h

§. 5.10 shows the range: 544 NM (1007 km)
The desired total distance in this sample problem is well within this value.

DESCENT

§ 5.12 shows Descent Time, Distance and Fuel data.
Example (descent from 8000 ft (2438 m) to 2000 ft (610 m)):
Time to Descent : (8 - 2) min = 6 min
Distance to Descent : (22.4 - 5) NM = 17.4 NM
Fuel to Descent : (4 - 1) Liters = 3 Liters (0.79 US Gal.)

LANDING

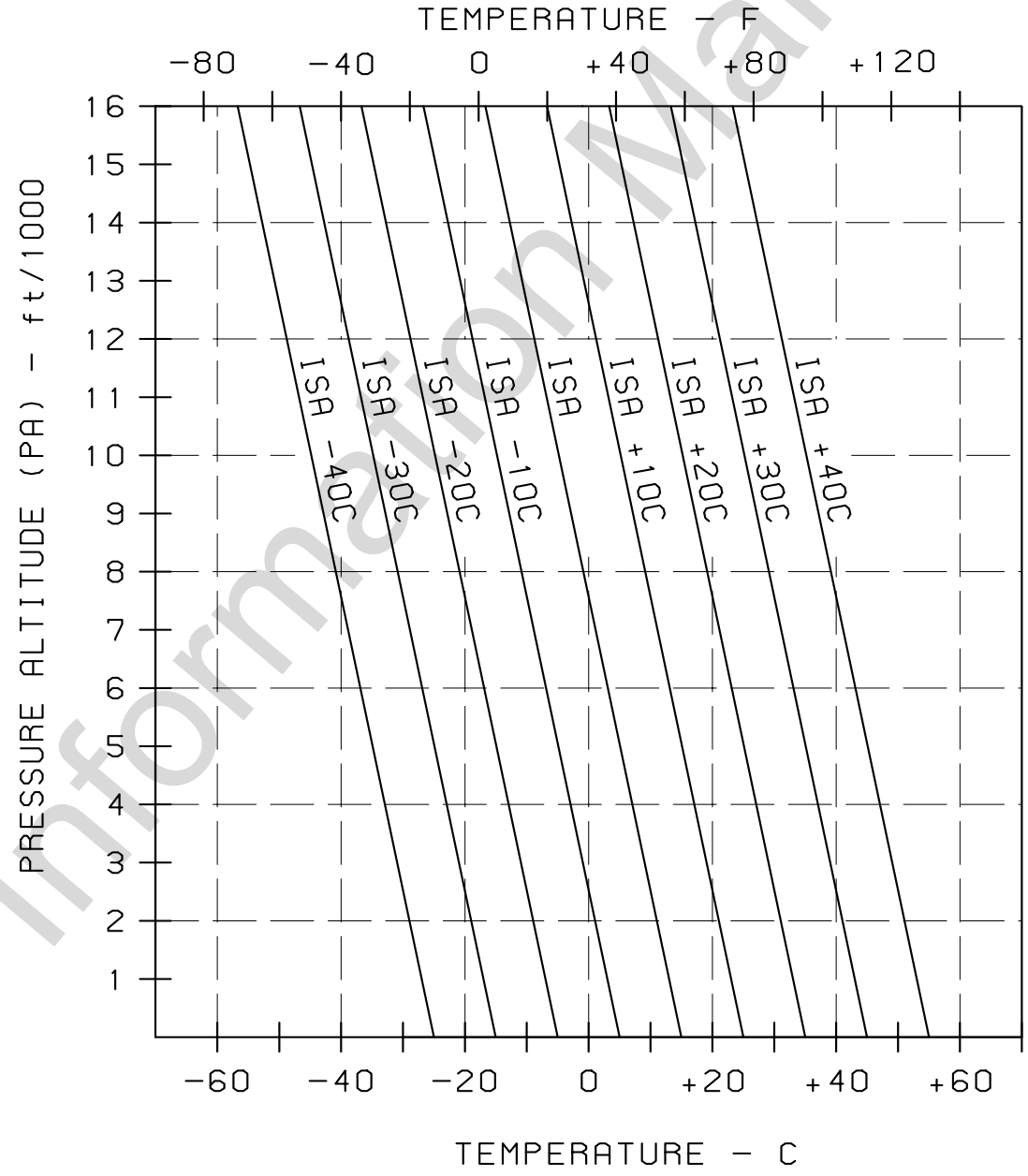
§ 5.13 shows the Landing Distance.
Example:

Landing Weight:	750 kg (1653 lbs)
Ground Roll:	166 m (545 ft)
(decreased by 15% due to headwind):	141 m (463 ft)
Total Distance to clear a 50 ft obstacle:	511 m (1677 ft)
(decreased by 15% due to headwind):	434 m (1424 ft)

These distances are well within the available field length in this sample problem.

5.2 ISA CONVERSION

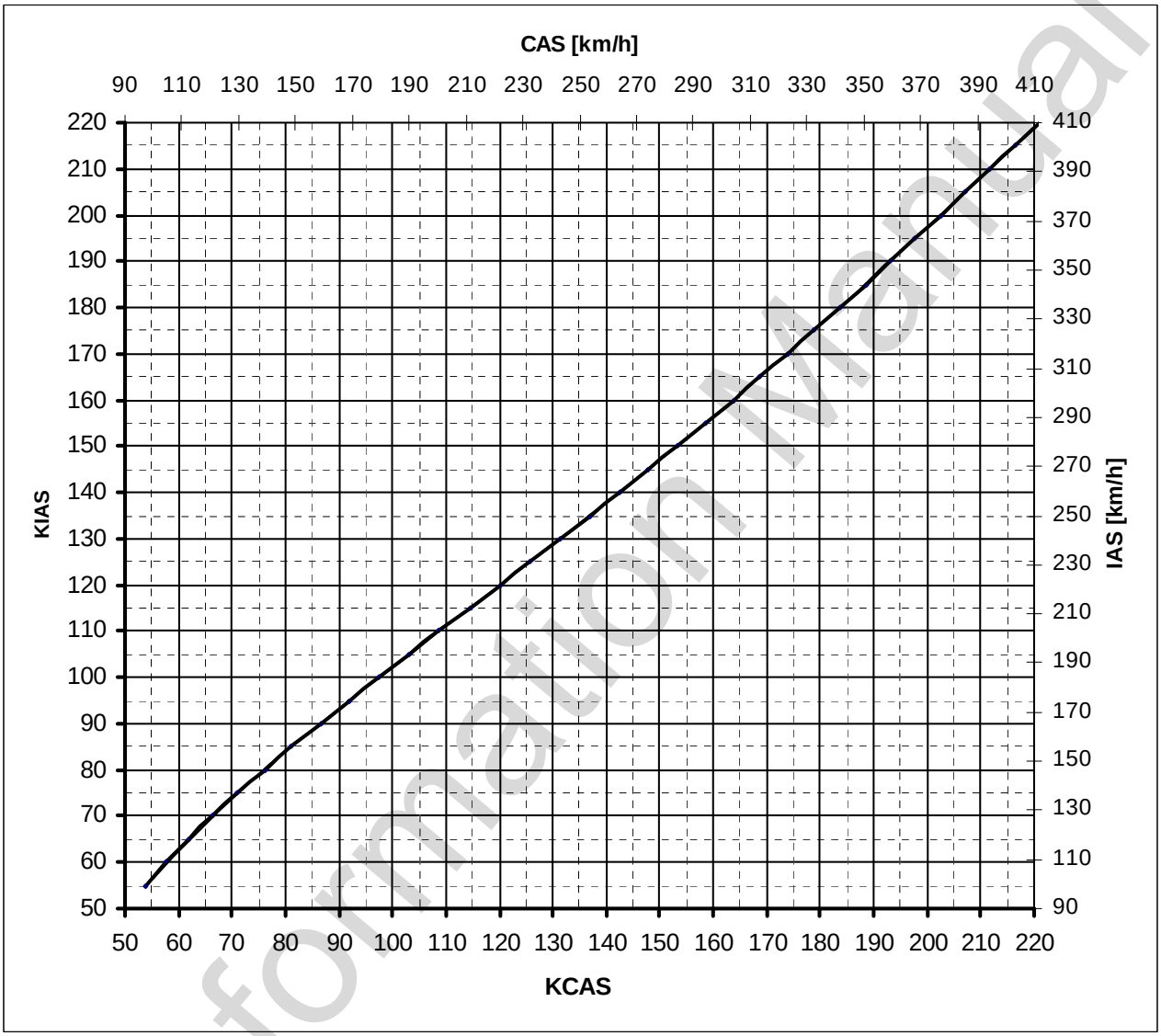
ISA Conversion of pressure altitude and outside air temperature.



5.3 AIRSPEED CALIBRATION

N O T E

Indicated airspeed assumes zero instrument error.



5.4 STALL SPEED

CONDITION:

POWER IDLE
FORWARD C/G

STALL SPEEDS

ANGLE OF BANK

WEIGHT	CATEGORY	0° 1g KIAS (km/h)	30° 1,15 g KIAS (km/h)	45° 1,41 g KIAS (km/h)	60° 2 g KIAS (km/h)
870 kg (1918 lbs)	NORMAL	64 (119)	69 (128)	77 (143)	91 (169)
780 kg (1720 lbs)	ACRO	61 (113)	65 (120)	73 (135)	86 (159)

Max altitude loss during stall recovery is approximately 100 ft

5.5 TAKE-OFF PERFORMANCE

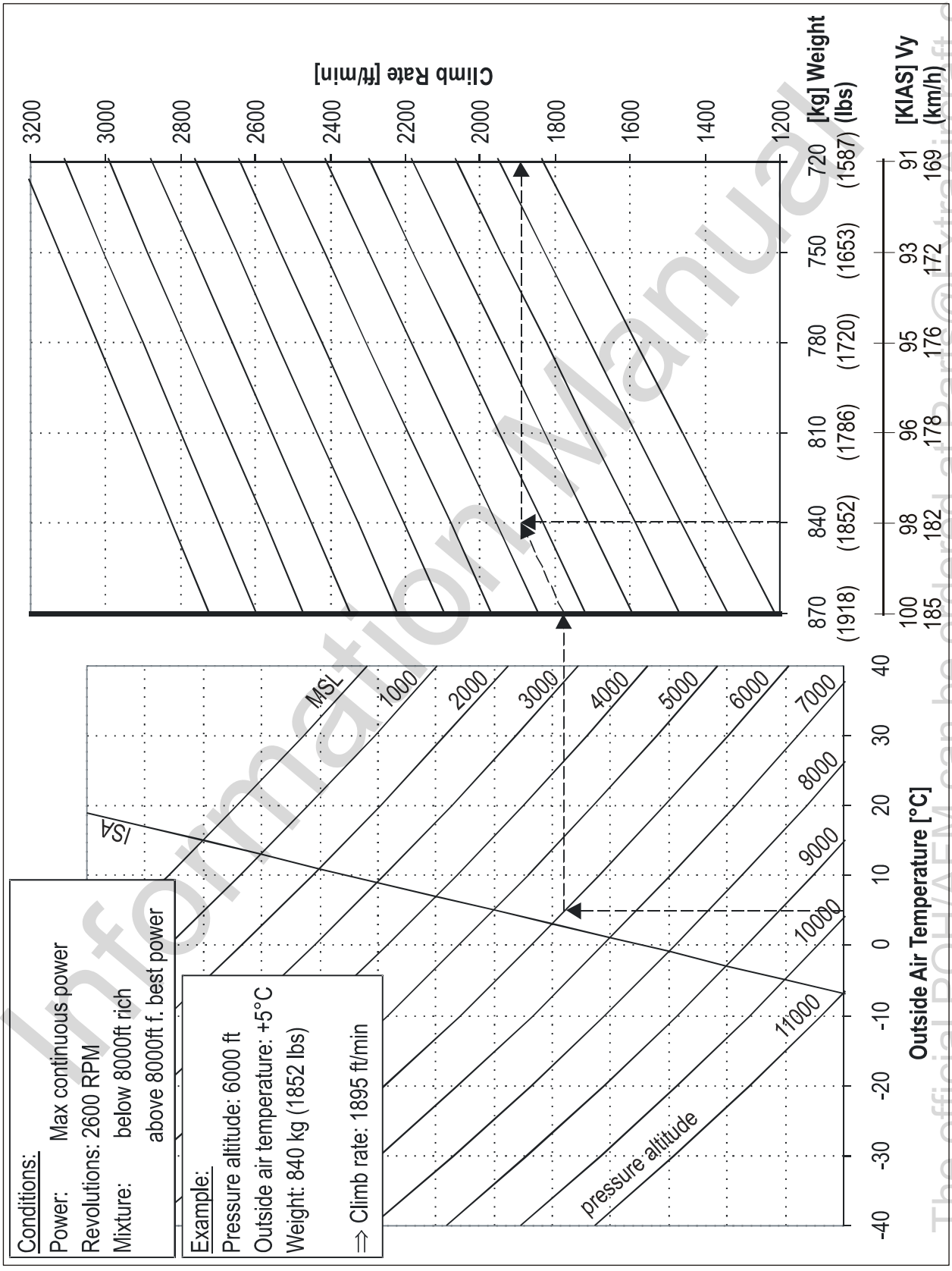
Power : T/O Power
Runway: Concrete

N O T E

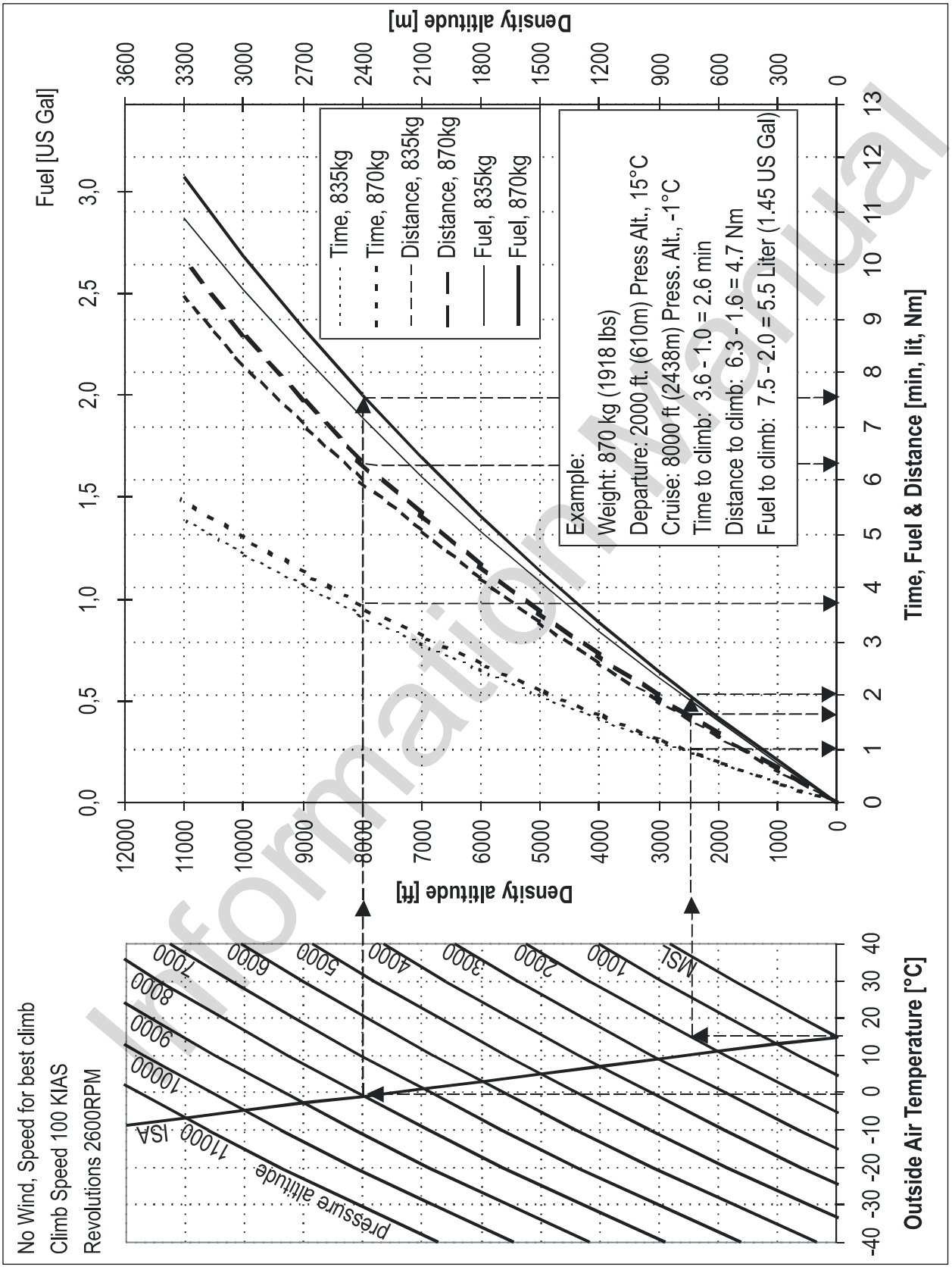
For every 5 kts (9.3 km/h) headwind, the T/O distance can be decreased by 4%. For every 3 kts (5.6 km/h) Tailwind [up to 10 kts (18.5 km/h)], the T/O distance is increased by 10%. On a solid, dry and plain Grass Runway, the T/O is increased by 15%.

OAT			0°C (32°F)		15°C (59°F)		30°C (86°F)	
T/O weight	Rotation Speed	PA Roll	T/O over	T/O Roll 50 ft	T/O over	T/O Roll 50 ft	T/O over	T/O 50 ft
kg (lbs)	KIAS	ft	m (ft)	m (ft)	m (ft)	m (ft)	m (ft)	m (ft)
870 (1918)	70	SL	96 (315)	207 (679)	115 (377)	248 (813)	133 (436)	285 (935)
		2000	115 (377)	248 (814)	138 (453)	298 (978)	160 (525)	342 (1122)
		4000	138 (453)	298 (978)	166 (545)	357 (1171)	192 (630)	410 (1345)
		6000	166 (545)	358 (1175)	199 (653)	429 (1407)	230 (755)	492 (1614)
800 (1764)	68	SL	78 (256)	167 (548)	93 (305)	200 (656)	107 (351)	230 (755)
		2000	94 (308)	200 (656)	112 (367)	240 (787)	128 (420)	276 (906)
		4000	112 (367)	241 (791)	134 (440)	288 (945)	154 (505)	331 (1086)
		6000	135 (443)	289 (948)	161 (528)	346 (1135)	185 (607)	397 (1302)
750 (1653)	66	SL	67 (220)	114 (374)	79 (259)	170 (558)	93 (305)	200 (656)
		2000	80 (262)	173 (568)	95 (312)	204 (669)	112 (367)	240 (787)
		4000	97 (318)	207 (679)	114 (374)	248 (814)	134 (440)	288 (945)
		6000	116 (381)	249 (817)	137 (449)	294 (965)	161 (528)	347 (1138)

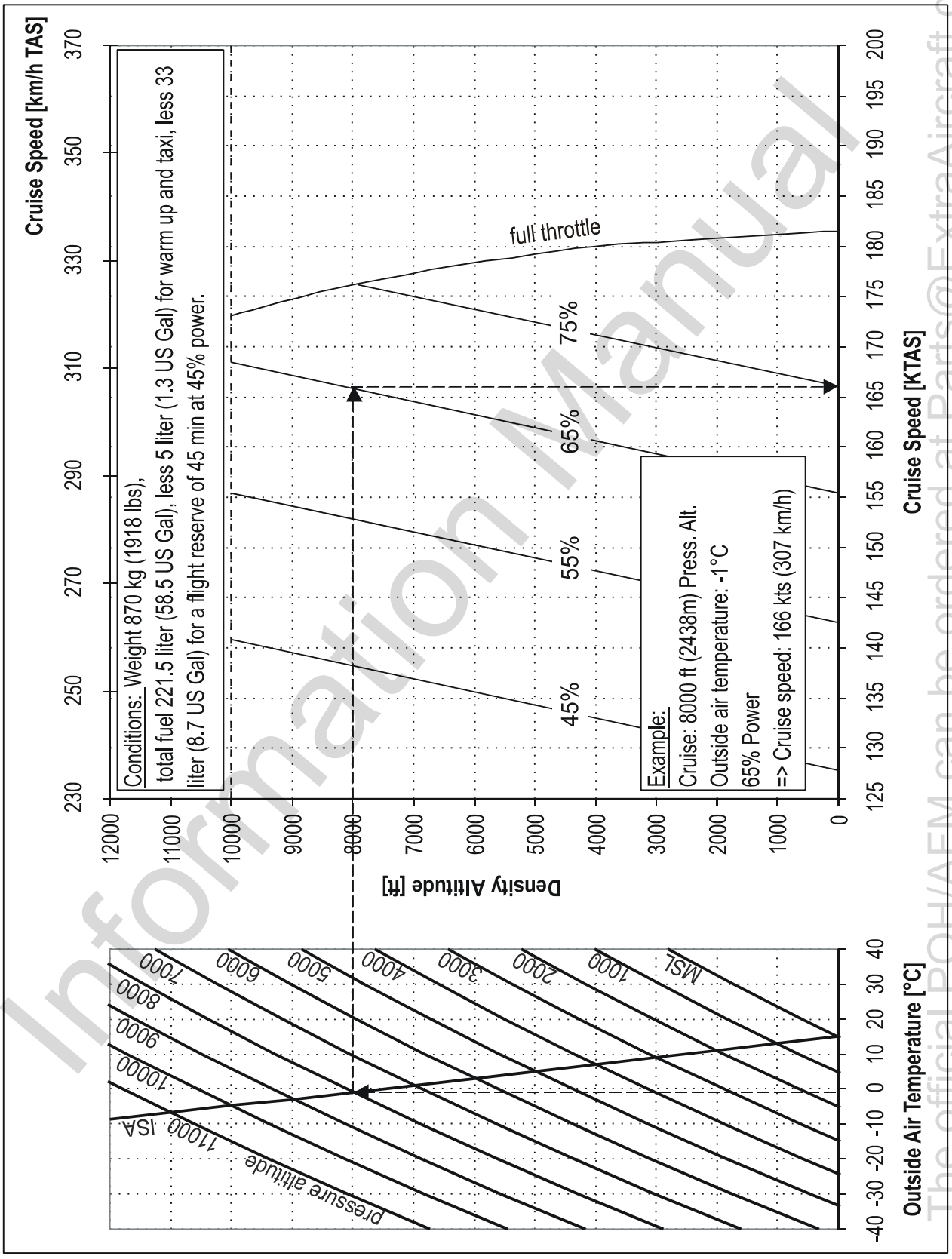
5.6 RATE OF CLIMB PERFORMANCE



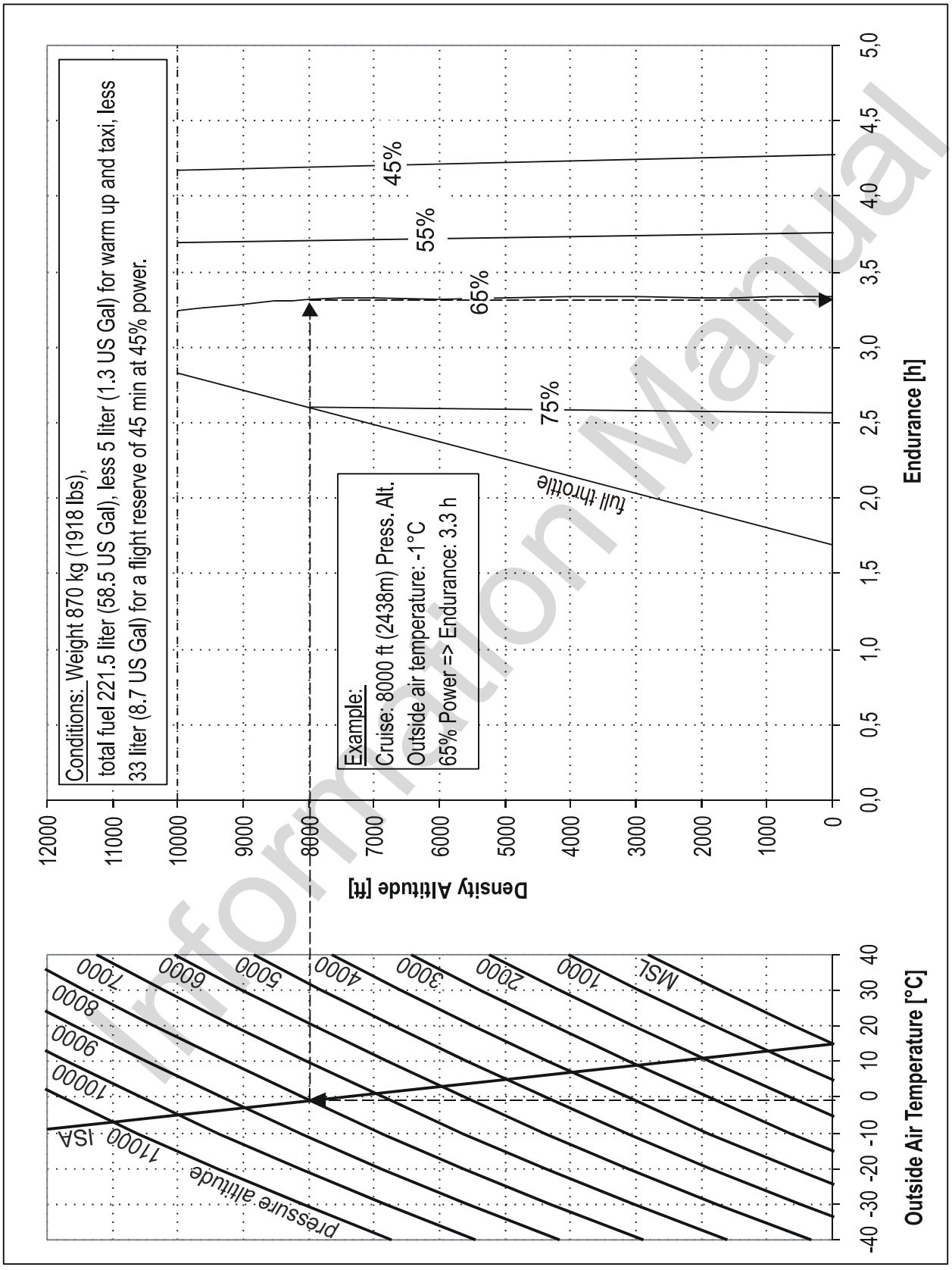
5.7 TIME, FUEL & DISTANCE TO CLIMB



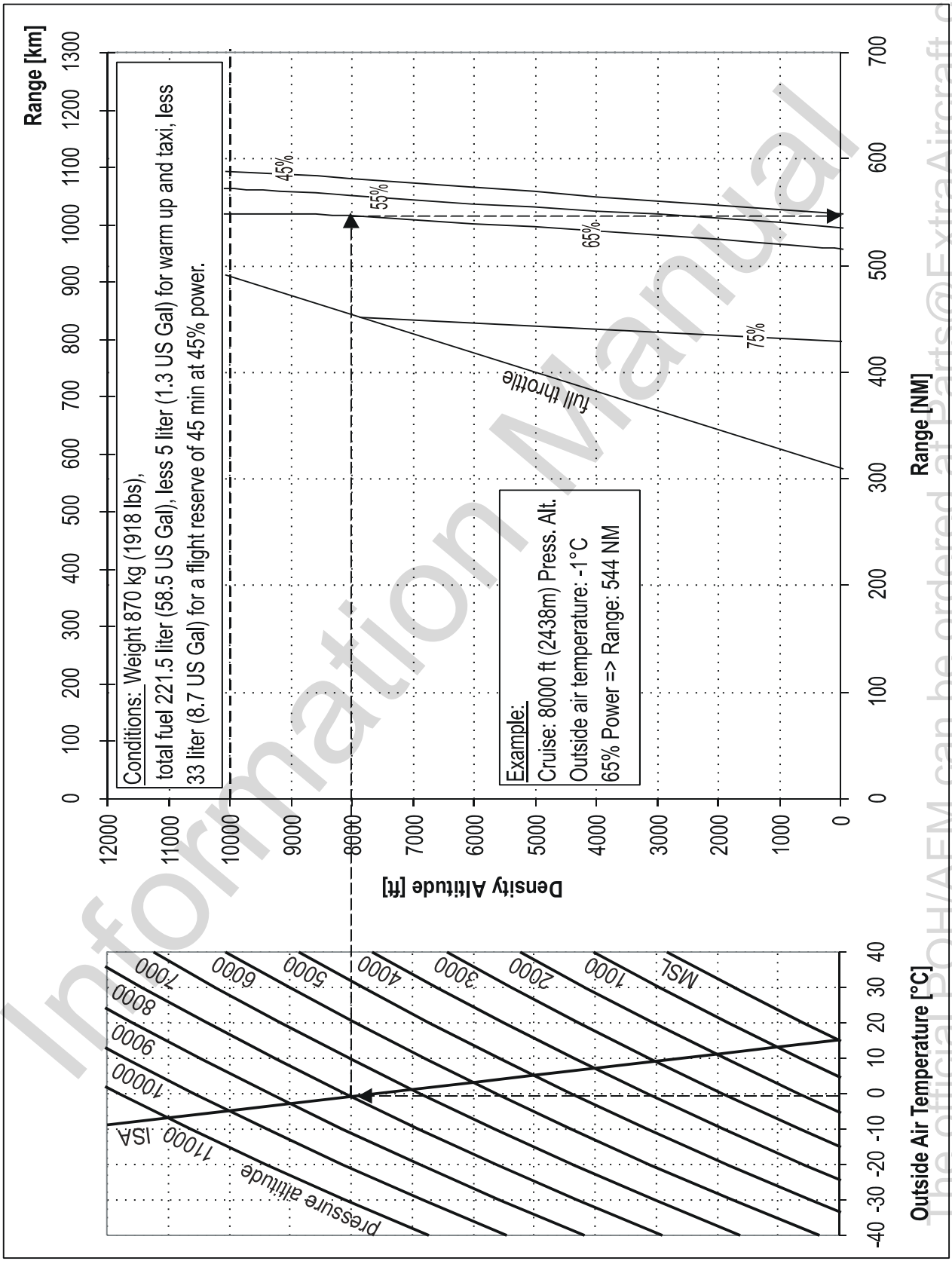
5.8 CRUISE SPEED



5.9 ENDURANCE



5.10 RANGE



5.11 CRUISE PERFORMANCE

Range and Endurance values for a T/O Weight of 870 kg (1918 lbs).Fuel for warm up and Take-Off from SL, max continuous Power climb (2600 RPM) to cruising altitude, a reserve of 33 liter (8.7 US Gal.) for 45 minutes with 45% Power, and 3 liters (0.8 US Gal.) unusable fuel are taken into account. (At ISA - Conditions.)

PA	Eng.	Manif. Press.	Power Setting		Fuel Consumption		TAS	IAS	Endur. *1	Range *1	Mixture *2
ft (m)	RPM	IN HG	%	Hp	l/h	(gal/h)	Kts	Kts	h	NM	Best ...
2000	2600	27,3	91	288	86,7	22,9	180	176	2,13	381	Power
	2500	26,5	85	268	79,7	21,1	176	172	2,32	406	Power
	2400	24,9	75	236	71,5	18,9	169	165	2,58	433	Power
	2200	23,9	65	205	55,2	14,6	158	154	3,32	524	Economy
	2000	23,4	55	173	48,9	12,9	145	141	3,74	543	Economy
	2000	20,1	45	142	43,0	11,4	130	126	4,25	555	Economy
4000	2600	25,3	85	268	79,7	21,1	179	169	2,33	412	Power
	2400	24,9	75	236	71,5	18,9	171	161	2,58	439	Power
	2200	23,9	65	205	55,2	14,6	161	151	3,32	531	Economy
	2000	23,4	55	173	48,9	12,9	148	138	3,74	551	Economy
	2000	20,1	45	142	43,0	11,4	133	123	4,24	564	Economy
6000	2600	22,6	75	236	71,5	18,9	174	161	2,59	446	Power
	2200	23,9	65	205	55,2	14,6	163	150	3,32	538	Economy
	2000	23,4	55	173	48,9	12,9	150	137	3,72	558	Economy
	2000	20,1	45	142	43,0	11,4	136	123	4,22	572	Economy
8000	2600	20,1	65	205	55,2	14,6	166	151	3,31	544	Economy
	2000	23,4	55	173	48,9	12,9	153	138	3,71	565	Economy
	2000	20,1	45	142	43,0	11,4	138	123	4,19	580	Economy
10000	2600	17,3	55	173	48,9	12,9	156	135	3,69	571	Economy
	2000	20,1	45	142	43,0	11,4	141	120	4,16	587	Economy

N O T E

***1 For temperatures above/below Standard (ISA), increase/decrease Range 1,7% and Endurance 1,1% for each 10°C (18°F) above/below Standard Day Temperature for particular altitude.**

***2 Leaning with exhaust gas temperature (EGT) gage:**
For the adjustment "Best Power", first lean the mixture to achieve the top exhaust tempe-rature (peak EGT) and then enrich again until the exhaust temperature is 100°F lower than peak EGT. For the adjustment "Best Economy", simply lean the mixture to achieve the top exhaust temperature (peak EGT).

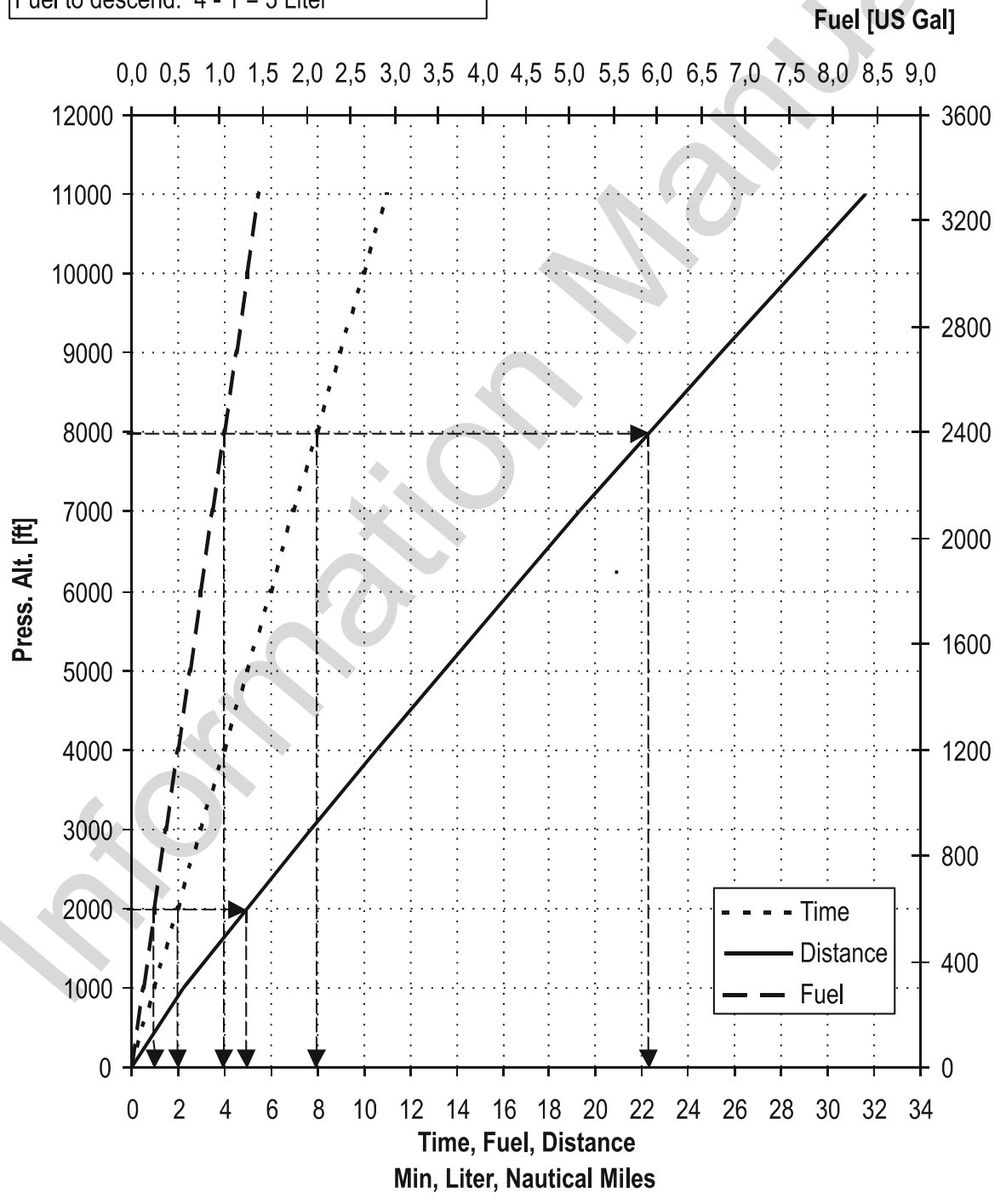
⚠ C A U T I O N

Always return the mixture to full rich before increasing power settings.

5.12 TIME , FUEL & DISTANCE TO DESCEND

Example:
Cruise at 8000 ft (2438m) Press Alt.
Descend to: 2000 ft (610m) Press. Alt.
Time to descend: 8 - 2 = 6 min
Distance to descend: 22.4 - 5 = 17.4 NM
Fuel to descend: 4 - 1 = 3 Liter

Associated conditions:
Descend speed: 150 KIAS
Descent rate: 1000 ft/min
MP: as required (ca. 15" Hg, 2500 RPM)
valid for all aircraft weights and all OATs, no wind



5.13 LANDING PERFORMANCE

Power : Idle
Runway: Concrete
Brakes: maximum

N O T E

For every knot headwind, the landing distance can be decreased by 3%.
On a solid, dry and plain Grass Runway, the landing is increased by 15%.

OAT			0°C (32°F)		15°C (59°F)		30°C (86°F)	
Landing weight [kg] / (lbs)	Airspeed [KIAS]	PA [ft]	Land. Roll [m] / (ft)	Land. over 50 ft [m] /(ft)	Land. Roll [m] / (ft)	Land. over 50 ft [m] / (ft)	Land. Roll [m] / (ft)	Land. over 50 ft [m] / (ft)
870 (1918)	85	SL	171 (561)	527 (1729)	177 (581)	548 (1798)	185 (607)	586 (1923)
		2000	181 (594)	558 (1831)	188 (617)	580 (1903)	197 (646)	602 (1975)
		4000	192 (630)	592 (1942)	199 (653)	615 (2018)	208 (682)	639 (2096)
		6000	203 (666)	627 (2057)	211 (692)	652 (2139)	220 (722)	678 (2224)
800 (1764)	83	SL	158 (518)	488 (1601)	164 (538)	507 (1663)	171 (561)	527 (1729)
		2000	165 (541)	518 (1699)	175 (574)	537 (1762)	181 (594)	558 (1831)
		4000	177 (581)	548 (1798)	185 (607)	570 (1870)	192 (630)	592 (1942)
		6000	188 (617)	582 (1909)	195 (640)	605 (1985)	203 (666)	627 (2057)
750 (1653)	81	SL	150 (492)	465 (1526)	156 (512)	483 (1585)	163 (535)	502 (1647)
		2000	159 (522)	492 (1614)	166 (545)	511 (1677)	173 (568)	532 (1745)
		4000	168 (551)	522 (1713)	176 (577)	543 (1781)	184 (604)	565 (1854)
		6000	179 (587)	553 (1814)	186 (610)	575 (1886)	194 (636)	598 (1962)

SECTION 6

WEIGHT AND BALANCE AND EQUIPMENT LIST

Table of Contents

Paragraph *Page*

6.1 GENERAL 3

6.2 AIRCRAFT WEIGHING PROCEDURE 3
6.2.1 Weight and Balance Record 4

6.3 CENTER OF GRAVITY CALCULATION (SAMPLE PROBLEM) 5
6.3.1 Sample 7
6.3.2 Weight and Balance Loading Form 7

6.4 LOADING WEIGHTS AND MOMENTS 8

6.5 WEIGHTS AND MOMENT LIMITS 10

6.6 EQUIPMENT LIST 11

Left blank intentionally

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

6.2 AIRCRAFT WEIGHING PROCEDURE

The aircraft weight is determined by weighing all three wheel loads simultaneously by three scales with the aircraft levelled. (Upper fuselage reference line horizontal)

Datum line for weight arms x is the fire wall.

X_1 = distance: fire wall - main wheel

X_2 = distance: fire wall - tail wheel

X_N = distance: fire wall - item N

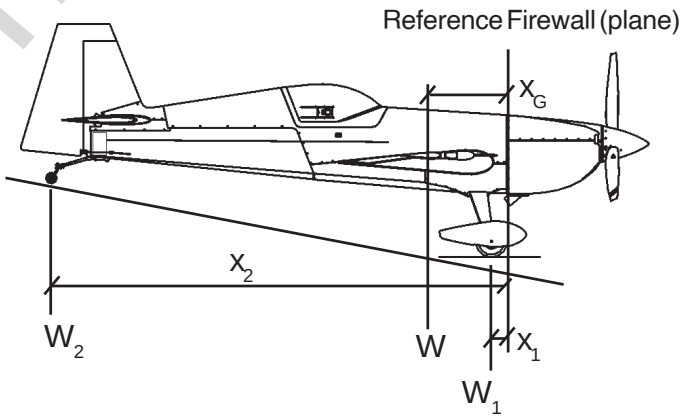
X_G = distance: fire wall - Center of Gravity

W_1 = Sum of weights indicated by the two scales below the main wheels

W_2 = Weight indicated by the scale below the tail wheel

W = Total weight = W1 + W2

$$X_G = \frac{(W_1 \times X_1) + (W_2 \times X_2)}{W} = \text{C/G position}$$



$$\mathbf{W = W_1 + W_2\ ,\quad X_G = \frac{(W_1 \times X_1) + (W_2 \times X_2)}{W}}$$

If a new weight is added to the known old weight and C/G position the resulting new weight and C/G can be obtained by a simple calculation.

Situation before adding item:

Wo, Xo = Airplane weight, C/G position
Wn, Xn = Weight, distance from fire wall of item to add

New Weight of airplane and new C/G:

$W = Wo + Wn$

$XG = \frac{Wo \times Xo + Wn \times Xn}{W}$ = C/G position

6.2.1 Weight and Balance Record

Enter below all weight change data from aircraft log book.

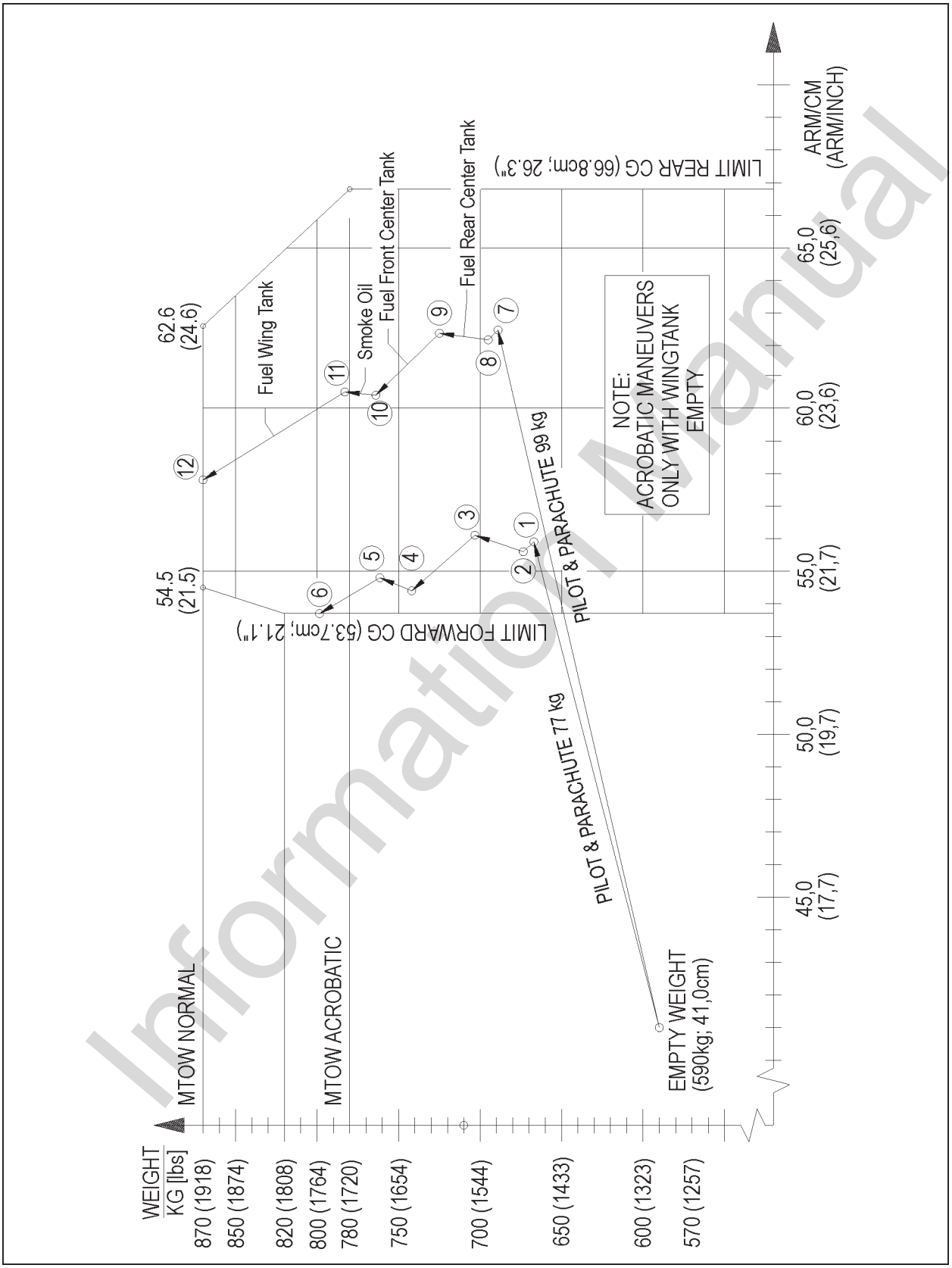
EXTRA 300/SC	SERIAL NUMBER:					
Date	Description of modification	Weight change Added (+), Removed (-)			Running empty weight	
		Wt./kg [lbs]	Arm/cm [inch]	Moment/kg*cm [lbs*inch]	Wt./kg [lbs]	Moment/kg*cm [lbs*inch]
	Basic empty weight incl. unusable fuel	___	___	_____		

6.3 CENTER OF GRAVITY CALCULATION (SAMPLE PROBLEM)

Position	PILOT & PARACHUTE		FUEL IN ACRO TANK 9 LTR (2.37 US GAL)		FUEL IN REAR C. TANK 41 LTR (10.8 US GAL)		FUEL IN FRONT C. TANK 54 LTR (14.3 US GAL)		OIL IN SMOKE TANK 23 LTR (6.1 US GAL)		FUEL IN WING TANK 120 LTR (31.7 US GAL)	
	(kg)	(lbs)	(kg)	(lbs)	(kg)	(lbs)	(kg)	(lbs)	(kg)	(lbs)	(kg)	(lbs)
(1)	69	152.1	-	-	-	-	-	-	-	-		
(2)	69	152.1	6.5	14.3	-	-	-	-	-	-		
(3)	69	152.1	6.5	14.3	29.5	65	-	-	-	-		
(4)	69	152.1	6.5	14.3	29.5	65	38.9	85.8	-	-		
(5)	69	152.1	6.5	14.3	29.5	65	38.9	85.8	19.6	43.2		
(6)	69	152.1	6.5	14.3	29.5	65	38.9	85.8	19.6	43.2	86.4	190.5
(7)	99	218.3	-	-	-	-	-	-	-	-		
(8)	99	218.3	6.5	14.3	-	-	-	-	-	-		
(9)	99	218.3	6.5	14.3	29.5	65	-	-	-	-		
(10)	99	218.3	6.5	14.3	29.5	65	38.9	85.8	-	-		
(11)	99	218.3	6.5	14.3	29.5	65	38.9	85.8	19.6	43.2		
(12)	99	218.3	6.5	14.3	29.5	65	38.9	85.8	19.6	43.2	86.4	190.5

Refer to figure on next page

6.3 CENTER OF GRAVITY CALCULATION (SAMPLE PROBLEM)(CONT.)



6.3.1 Sample

Refer to Center of Gravity Calculation Figure in § 6.3:

	Weights		Moments	
Take-off Condition:				
Aircraft Empty Weight (without any fuel)	590.0 kg	(1300.7 lbs)	24190 kg cm	(20996 in lbs)
(7) Pilot & Parachute	99.0 kg	(218.3 lbs)	18810 kg cm	(16326 in lbs)
(8) Fuel in Acro Tank (9 L)	6.5 kg	(14.3 lbs)	167 kg cm	(145 in lbs)
(9) Fuel in Rear Center Tank (41 L)	29.5 kg	(65.0 lbs)	2022 kg cm	(1755 in lbs)
(10) Fuel In Front Center Tank (54 L)	38.9 kg	(85.8 lbs)	921 kg cm	(799 in lbs)
(11) Oil in Smoke Tank (Section 902)	19.6 kg	(43.2 lbs)	1303 kg cm	(1131 in lbs)
(12) Fuel in Wing Tank (120L)	86.4 kg	(190.5 lbs)	2851 kg cm	(2475 in lbs)
	869.9 kg	(1917.8 lbs)	50264 kgcm	(43627 in lbs)

To find C/G follow line "Pilot & Parachute 99 KG" from Empty Weight to Point 7.
Now follow line via points 8 thru 11 to point 12.

Refer to Weight and Moment Limits Figure in § 6.5 to find:
Weight 869.9 kg (1917.8lbs) Moment 50264 kg cm (43627 in lbs)
C/G ~ 57.8 cm (22.8 in)

6.3.2 Weight and Balance Loading Form

	WEIGHT	ARM	MOMENT
BASIC EMPTY WEIGHT			
PILOT (arm with respect to seat position)			
FUEL ACRO TANK		25,8 cm (10,2")	
FUEL REAR CENTER TANK		68,5 cm (27,0")	
FUEL FRONT CENTER TANK		23,7 cm (9,3")	
OIL SMOKE TANK (See Section 902)		66,5 cm (26,2")	
FUEL WING TANK		33 cm (13,0")	

$\Sigma W =$ $\Sigma (W \times X) =$

$$XG = \frac{\Sigma (W \times X)}{\Sigma W} =$$

6.4 LOADING WEIGHTS AND MOMENTS

WEIGHT Pilot & Parachute		PILOT REAR SEAT POSITION ARM = 190 cm *(75")*		PILOT FRONT SEAT POSITION ARM = 170 cm *(67 ")*	
KG	LBS	MOMENT KG x CM (INCH x LBS)			
70	154	13300	(11546)	11900	(10331)
75	165	14250	(12370)	12750	(11068)
80	176	15200	(13195)	13600	(11806)
85	187	16150	(14020)	14450	(12544)
90	198	17100	(14845)	15300	(13282)
95	209	18050	(15675)	16150	(14003)
100	220	19000	(16500)	17000	(14740)

FUEL

ACRO TANK
Arm = 25,8 cm (10,2")

LITER	(US GAL)	KG	(LBS)	KG x CM	(IN LBS)
9	2,4	6,5	14,3	167	145

REAR CENTER TANK
Arm = 68,5 cm (27,0")

LITER	(US GAL)	KG	(LBS)	KG x CM	(IN LBS)
5	1,3	3,6	7,9	247	214
10	2,6	7,2	15,9	493	428
15	4,0	10,8	23,8	740	642
20	5,3	14,4	31,8	986	856
25	6,6	18,0	39,7	1233	1070
30	7,9	21,6	47,6	1480	1284
35	9,2	25,2	55,6	1726	1499
40	10,6	28,8	63,5	1973	1713
41	10,8	29,5	65,1	2022	1755

FRONT CENTER TANK

Arm = 23,7 cm (9,3")

LITER	(US GAL)	KG	(LBS)	KG x CM	(IN LBS)
5	1,3	3,6	7,9	85	74
10	2,6	7,2	15,9	171	148
15	4,0	10,8	23,8	256	222
20	5,3	14,4	31,8	341	296
25	6,6	18,0	39,7	427	370
30	7,9	21,6	47,6	512	444
35	9,2	25,2	55,6	597	518
40	10,6	28,8	63,5	683	593
45	11,9	32,4	71,4	768	667
50	13,2	36,0	79,4	853	741
54	14,3	38,9	85,7	921	800

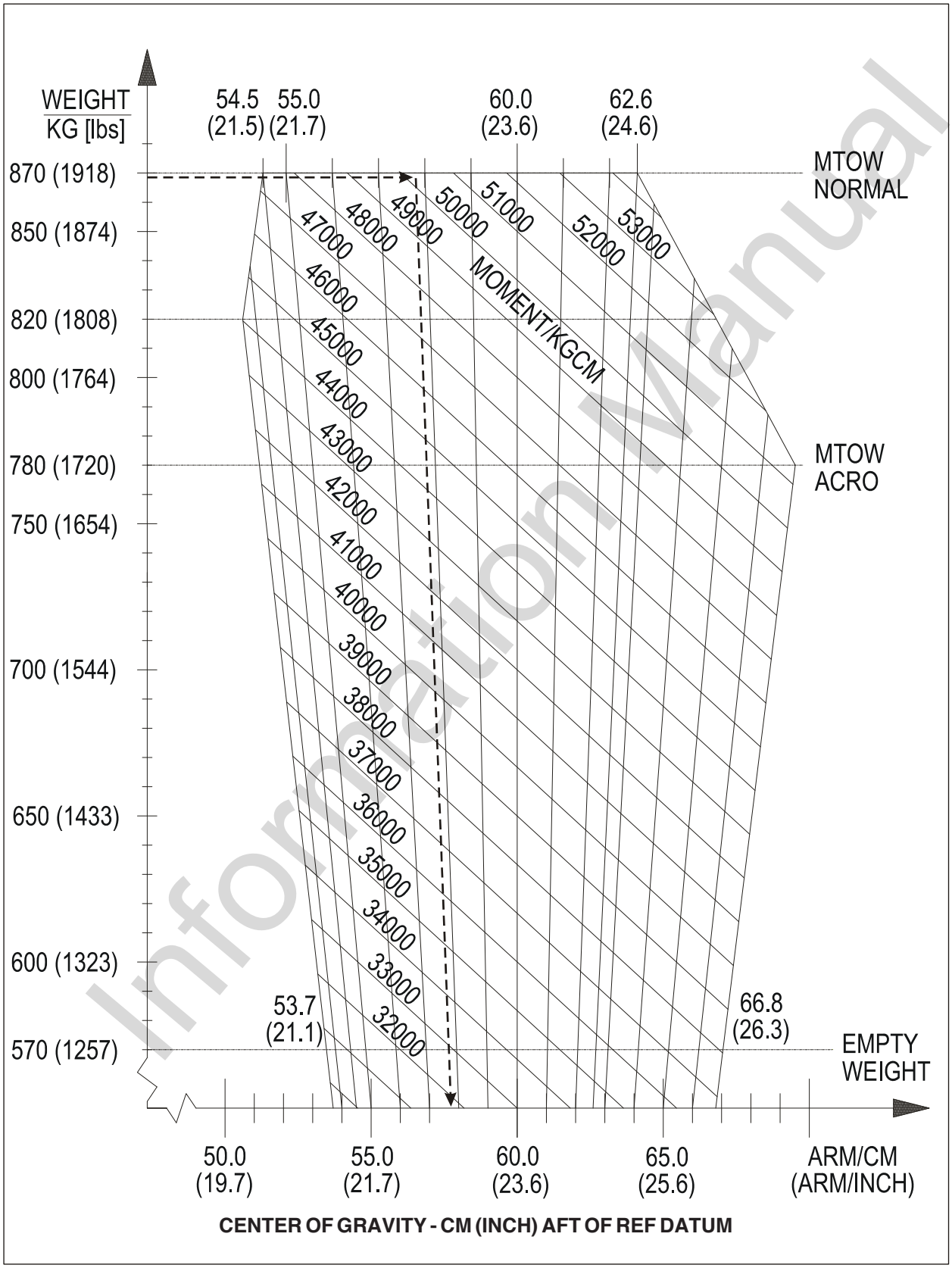
WING TANK

Arm = 33 cm (13,0")

LITER	(US GAL)	KG	(LBS)	KG x CM	(IN LBS)
5	1,3	3,6	7,9	119	103
10	2,6	7,2	15,9	238	206
15	4,0	10,8	23,8	356	309
20	5,3	14,4	31,8	475	413
25	6,6	18,0	39,7	594	516
30	7,9	21,6	47,6	713	619
35	9,2	25,2	55,6	832	722
40	10,6	28,8	63,5	950	825
45	11,9	32,4	71,4	1069	928
50	13,2	36,0	79,4	1188	1031
55	14,5	39,6	87,3	1307	1134
60	15,8	43,2	95,3	1426	1238
65	17,2	46,8	103,2	1544	1341
70	18,5	50,4	111,1	1663	1444
75	19,8	54,0	119,1	1782	1547
80	21,1	57,6	127,0	1901	1650
85	22,4	61,2	134,9	2020	1753
90	23,8	64,8	142,9	2138	1856
95	25,1	68,4	150,8	2257	1959
100	26,4	72,0	158,8	2376	2063
105	27,7	75,6	166,7	2495	2166
110	29,0	79,2	174,6	2614	2269
115	30,4	82,8	182,6	2732	2372
120	31,7	86,4	190,5	2851	2475

6.5 WEIGHTS AND MOMENT LIMITS

EXAMPLE: **At 869.9 kg (1917.8 lbs) and 50264 kgcm (43627 in lbs)**
CG Location is 57.8 cm (22.8 in) aft of Reference Datum.



CENTER OF GRAVITY - CM (INCH) AFT OF REF DATUM

6.6 EQUIPMENT LIST

EXTRA 300/SC S/N:

Qty.	Item	Manufacturer	Model No	Part No	Weight (kg)	Arm (m)	R O A*	Inst
	Venting and Heating (21)							
1	Cabin Heating System	Extra		Option 300/SC KBS11	2.551	0.141	O	
	Communications (23)							
1	VHF-COM	Becker	AR 4201	00652	0.670	1.200	R	
1	VHF-COM (8.33kHz ch. spacing)	Becker	AR 6201	33041	0.850	1.200	A	
1	VHF-COM, (8.33kHz ch. spacing)	Funkwerk	ATR 833	32363	0.600	1.200	A	
1	COM unit	TRIG Acionics	TY91	00882-00-01	0.35	0.960	A	
1	Panel Mount Controller	TRIG Acionics	TC90	00857-00-01	0.09	1.300	A	
	Electrics (24)							
1	Ammeter (+/-30A)	VDO		32406	0.080	1.260	R	
1	Ammeter (+/-20A)	Datcon		33413	0.134	1.260	A	
1	Alternator (14V; 8 Amps)	B&C	SD-8	31726	1.32	-0.150	R	
1	Battery (24 Ah)	Concorde	RG-25XC	03617	10.52	0.175	R	
1	Battery (11 Ah)	Concorde	RG-12LSA	33697	5.90	0.175	A	
1	12V Power Socket	Sutars		31494	0.028	1.290	O	
1	External Power Receptical (Piper Type Socket)	Cole Hersee		31731	1.300	1.900	O	
	Cockpit (25)							
1	Safety Belt Assy (seat belts, single ratchet, shoulder harness, crotch strap)	Hooker		FK0002 or FK0019	3.30	1.950	R	
1	Safety Belt Assy (seat belts, double ratchets, shoulder harness, crotch strap)	Hooker		31856	3.70	1.950	A	
1	ELT 3000 System	Pointer	3000-10 3000-11	50025 02154	0.990	1.383	O	
1	ELT 406 MHz System incl. Antenna (for Artex)	Artex Artex	ME406 110-773	32173-PG 33524	1.205 0.08	1.360 2.92	O O	
1	ELT 406 AF COMPACT	KANNAD		34210	1.11	1.360	A	
1	ELT 406 AF INTEGRA	KANNAD		34422	0.99	1.360	A	
1	ELT Antenna (for Artex or KANNAD)	Rami	AV-200	33965	0.08	2.92	AO	
	Flight Controls (27)							
2	Electric Actuator Pedal Adjustment	SKF		01996	1.625	1.605	O	
	Fuel System (28)							
1	Fuel Qty Probe Front Center Tank	VDO		32610	0.184	0.220	R	
1	Fuel Qty Probe Front Center Tank	Datcon		33410	0.212	0.220	A	
1	Fuel Qty Probe (MVP-50P) Front Center Tank	CENTROID		34679	0.152	0.220	A	

*) R = required, O = optional, A = alternative

Qty.	Item	Manufacturer	Model No	Part No	Weight (kg)	Arm (m)	ROA*	Inst
1	Fuel Qty Probe Rear Center Tank	VDO		32611	0.184	0.700	R	
1	Fuel Qty Probe Rear Center Tank	Datcon		33409	0.212	0.700	A	
1	Fuel Qty Probe (MVP-50P) Rear Center Tank	CENTROID		34678	0.150	0.700	A	
1	Fuel Qty Probe Wing Tank LH	VDO		FM4006	0.120	0.280	R	
1	Fuel Qty Probe (MVP-50P) Wing Tank RH	VDO		FM4006	0.120	0.280	O	
1	Fuel Qty Ind. Front Center Tank	VDO		00390	0.120	1.260	R	
1	Fuel Qty Ind. Front Center Tank	Datcon		33411	0.145	1.260	A	
1	Fuel Qty Ind. Rear Center Tank	VDO		00390	0.120	1.260	R	
1	Fuel Qty Ind. Rear Center Tank	Datcon		33411	0.145	1.260	A	
1	Fuel Qty. Ind. Wing Tank	VDO		200171	0.120	1.260	R	
1	Fuel Qty. Ind. Wing Tank	Datcon		33412	0.145	1.260	A	
	Ind./Rec. Systems (31)							
1	Instrument Panel	Extra		7C102.001	0.400	1.300	R	
1	Instrument Panel, alternative (Aluminum)	Extra		8C503.___	0.470	1.300	A	
1	Instrument Panel, alternative (Carbon)	Extra		8C506.___	0.300	1.300	A	
1	Instrument Panel (MVP-50)	Extra		8C502.32	0.403	1.300	A	
1	Accelerometer (2 1/4")	Falcon		01206	0.294	1.270	R	
1	Dig. Accelerometer (2 1/4")	TL	TL-3424_EXT	32582	0.520	1.265	A	
1	Flighthour Counter	Winter		01605	0.150	1.260	O	
1	Digital Clock	Astrotech		FI0004	0.113	1.260	O	
1	Digital Clock	Mid-Continent	6420093-0	36222	0.142	1.260	A	
1	PFD/MFD/EIS	GARMIN	G3X TOUCH	34788	1.329	1.260	A	
	Landing Gear (32)							
2	Main Wheel Tires	Misc.		02323	2.447	0.110	R	
1/1	Wheel fairing (CFK)	Extra		53102.301 -LV-L/R	1.500	0.160	O	
	Lights (33)							
2	Strobe Lights	AVEO Engineering		34217	0.055	0.420	O	
	Navigation (34)							
1	Transponder (Mode A/C)	Becker	ATC4401	31002	0.730	1.200	O	
1	Transponder (Mode S)	Becker	BXP6401-2-(01)	31860	0.780	1.200	A	
1	Blind Encoder Plug	Becker	BE6400-01-(01)	32100	0.100	1.100	O	
1	Transponder	f.u.n.k.e.	TRT800H	32090	0.600	1.200	A	
1	Transponder (Mode S)	TRIG Avionics	TT21 (class 2)	00675-00-01	0.350	0.960	A	
1	Transponder (Mode S)	TRIG Avionics	TT22 (class 1)	00745-00-01	0.350	0.960	A	

*) R = required, O = optional, A = alternative

Qty.	Item	Manufacturer	Model No	Part No	Weight (kg)	Arm (m)	R O A*	Inst
1	Panel Mount Control	TRIG Avionics	TC20	00649-00	0.090	1.300	A	
1	Blind Encoder Module	ACK Technologies	A-30.9	32960	0.200	1.100	A	
1	Slip and Skid ind. (Libelle)	Rieker		FI0009	0.050	1.310	O	
1 1	Cradle Kit (for EKP V) GPS Receiver	AvMap Avionics AvMap Avionics	UX0DS300AM UX0GUM00AM	34992 34994	0.160 0.083	1.310 2.350	O O	
1	Magnetic Compass	Airpath	C2300	00189	0.260	1.29	R	
1	Magnetic Compass	SIRS Navigation Ltd	PG2A	33085	0.132	1.290	A	
1	Air Speed Indicator	United Instr.	UI8030 B.882	32811	0.322	1.290	R	
1	Air Speed Indicator (dual scale)	United Instr.	UI8030 B.896	33630	0.322	1.290	A	
1	Air Speed Indicator (metric)	Winter	6531-559	32812	0.205	1.290	A	
1	Airspeed Indicator	Mikrotechna Praha	LUN1106.K2B4/SC	34155	0.500	1.280	A	
1	Airspeed Indicator (metric)	Mikrotechna Praha	LUN1106.P2B4/SC	34156	0.500	1.280	A	
1	Altimeter	United Instr.	UI5934PD-3 A.134	30416	0.610	1.280	R	
1	Altimeter	United Instr.	UI5934PD-3M A.665	33652	0.610	1.280	R	
1	Altimeter (metric)	Winter	4FGH10	31393	0.330	1.280	A	
1	Altimeter	Mikrotechna Praha	LUN1128.10B6	34159	0.590	1.280	A	
1	Vertical Speed Indicator	United Instr.	UI7030 C.27	01485	0.350	1.280	O	
1	Vertical Speed Ind. (metric)	United Instr.	UI7030-M C.194	33653	0.350	1.280	A	
1	Vertical Speed Ind.	Mikrotechna Praha	LUN1144.B0B1	34161	0.400	1.280	A	
1	Vertical Speed Ind. (metric)	Mikrotechna Praha	LUN1144.F0B1	34162	0.400	1.280	A	
1	Horizon, electric digital	RC Allen	RCA 2600-2	obsolete	0.241	1.225	O	
1	Horizon, electric digital	RC Allen	RCA 2600-2 102-0202-01	obsolete	0.128	1.290	A	
1	Horizon, electric digital	RC Allen	RCA 2600-3	obsolete	0.454	1.217	O	
1	Horizon, electric digital	RC Allen	RCA 2600-3 102-0203-01	obsolete	0.180	1.290	A	
1	Horizon, electric digital	RC Allen	RCA 2610-2	34921	0.241	1.225	O	
1	Horizon, electric digital	RC Allen	RCA 2610-2-G	34923	0.128	1.290	A	
1	Horizon, electric digital	RC Allen	RCA 2610-3	34922	0.454	1.217	O	
1	Horizon, electric digital	RC Allen	RCA 2610-3-G	34924	0.180	1.290	A	
1	Slip indicator for RCA 2600	RC Allen	444-0010-01	33529	0.030	1.310	O	
1/1	Sighting device (45°/90°)	Extra		8C801.030 -01/02	0.250	1.260	O	
1/1	Sighting device (45°/90°) big	Extra		8C801.050 -01/02	0.260	1.250	O	
	Fuselage (53)							
1	Bottom fuselage cover (Belly fairing)	Extra		2C203.021 -VF	5.200	0.562	R	
1	Bottom fuselage cover with window	Extra		8C416.020 -VF	5.850	0.562	A	
	Propeller (61)							
1	Propeller (3-blade)	MT-Propeller	MTV-9-B-C/C198-25	32285	30.500	-1.150	R	
1	Spinner	MT-Propeller	P-810-2	31415	0.800	-1.200	R	

*) R = required, O = optional, A = alternative

Qty.	Item	Manufacturer	Model No	Part No	Weight (kg)	Arm (m)	ROA*	Inst
1	Propeller (4-blade)	MT-Propeller	MTV-14-B-C/C190-130	33970	30.6	-1.150	A	
1	Spinner	MT-Propeller	P-967	31560	0.8	-1.200	A	
1	Governor (2700RPM)	MT-Propeller	P-880-5	31509	1.10	-0.910	R	
1	Governor (2600RPM)	MT-Propeller	P-880-41	32941	1.10	-0.910	A	
1	Governor (2700RPM)	Woodward	A-210 988	01209	1.10	-0.910	A	
	Power Plant (71)							
4	Shock Mount	Barry	94016-02	01817	0.425	-0.29	R	
4	Shock Mount	Lord	J-7764-20	31093	0.535	-0.29	A	
	Engine (72)							
1	Engine, AEIO-580-B1A; includ. vacuum pump drive at pad #1	Lycoming	ENPL-RT10568 or RENPL-RT10568 or HENPL-RT10568	31429 34097 34098	191.8	-0.720	R A A	
1 with 4 1 1	Engine, AEIO-580-B1A; long studs drive spline washer	Lycoming	ENPL-RT10427 or RENPL-RT10427 or HENPL-RT10427 	32712 34099 34100 34059 32759 32758	191.8	-0.720	A A A 	
1	Inverted oil pickup; (at pad #1 of engine vacuum pump)	B&C	VAC-2/6	32425	0.31	-0.220	R	
1	Ignition switch	TCM	10-357200-1	00185	0.15	1.260	R	
1	Ignition switch	ACS Products Co.	A-510-2	35595	0.15	1.260	A	
	Engine Fuel & Control (73)							
1	Throttle Control Cable	Teleflex		33051	0.420	0.050	R	
1	Throttle Control Cable (9 ft)	Teleflex	CCX633	34984	0.450	0.050	A	
1	Throttle Control Cable	Cablecraft	580-540-502	obsolete	0.570	0.050	A	
1	Fuel Injector	Precision/Avstar	RSA 10 AD 1	61M26404	3.90	-0.680	R	
1	Mech. Fuel Pump	Crane Lear Romec	RG9080-J4A	62E22581	0.57	-0.300	R	
1	Mech. Fuel Pump	Hartzell Engine Tech.	PN 200F-5002	62E23186	0.57	-0.300	A	
	Engine Indicating (77)							
1	RPM Indicator, (2600RPM) digital P1000	Horizon	P100-230-635-00	33624	0.68	1.260	R	
1	RPM Indicator, (2700RPM) digital P1000	Horizon	P100-230-643-00	02489	0.68	1.260	A	
1 1	RPM Indicator digital (max 2600 RPM) Magn. Pickup Tach Sender	UMA UMA	T19-801-1XX FAA TSO-C49b T1A9-1	35800	0.68 0.03	1.60 -0.15	A A	
1	RPM Indicator		FAA TSO-C49b			1.60	A	
1 1 1	CHT/EGT Indicator 2 1/4") EGT Probe CHT Probe	Westach Westach Westach	EF300/SC-2DA1 712-2 DWK 712-7 DK	32570	0.07 0.06 0.05	1.260 -0.370 -0.200	O O O	
1 1 1	CHT/EGT Indicator (2 1/4") EGT Probe CHT Probe	UMA UMA UMA	D2-ET1K7K-CT600J-01 2BU20 2B18 or 2B02	33438	0.07 0.06 0.05	1.260 -0.370 -0.200	A A A	

*) R = required, O = optional, A = alternative

Qty.	Item	Manufacturer	Model No	Part No	Weight (kg)	Arm (m)	R O A*	Inst
1	Manifold Pressure/ Fuel Flow Ind.	United Instr.	UI6331-H.217	33448	0.540	1.260	R	
1	Manifold Pressure/ Fuel Flow Ind.	United Instr.	UI6331-H.186	03247	0.540	1.260	A	
1	Engine Data Management System	JPI	EGT-701	93102.029 -PG	2.25	0.106	O	
6	EGT Probe	JPI	M-111				O	
6	CHT Probe (spark plug gasket)	JPI	M-113				O	
1	OAT Probe	JPI	400510				O	
1	Oil Temp. Probe	JPI	400500-L				O	
1	Manifold Press. Probe	JPI	604010				O	
1	RPM Probe	JPI	420815-1				O	
1	Fuel Flow Transducer	Flowscan	201-B or FXT-201				O	
1	Fuel Flow Transducer	Shadin	680501 or 680600				A	
1	Engine Instr. Display	Electronics Intern.	MVP-50P-EX-05	34647	0.91	1.260	O	
1	Engine Instr. Display	Electronics Intern.	MVP-50P-EX-06	34648	0.91	1.260	A	
1	Engine Data Converter	Electronics Intern.	EDC-33P	33283	0.45	0.280	O	
1	Fuel Flow Transducer	Electronics Intern.	FT-60	33288	0.15	-0.570	O	
6	EGT Probes	Electronics Intern.	P-110	33569	0.26	-0.720	O	
6	CHT Probes	Electronics Intern.	P-100	33568	0.16	-0.720	O	
1	Oil Temp Probe	Electronics Intern.	P-120	33289	0.07	-0.090	O	
1	OAT Probe	Electronics Intern.	P-128	33290	0.02	0.880	O	
1	Man. Press. Transducer	Electronics Intern.	PT-30ABS	33284	0.11	0.200	O	
1	Oil Pressure Transducer	Electronics Intern.	PT-100GA	33286	0.05	0.050	O	
1	Fuel Press. Transducer	Electronics Intern.	PT-30GA	33285	0.05	0.050	O	
1	Resistive Fuel Level Mod.	Electronics Intern.	RFLM-4-12V	33109	0.20	0.120	O	
	Exhaust (78)							
1	Exhaust System "6 in 1" (incl. Silencer) with	Gomolzig	EA300-606000	33891	8.48	-0.390	R	
1	2" inlet/outlet cooling shroud	Gomolzig	EA300-606009	32153				
1	Exhaust System "6 in 1" (w/o Silencer)	Sky Dynamics	Extra300 6/1	32347	7.42	-0.390	A	
1	Exhaust System "6 in 2" (w/o Silencer)	Chabord	Extra330-12-02B	33792	5.93	-0.390	A	
	Oil Systems (79)							
1	Single Oil cooler rear,	Aero Classics	8000353	31417	1.65	-0.22	R	
1	Single Oil cooler rear,	Niagara Thermal Prod.	20009A	34674	1.65	-0.22	A	
1	Additional Oil Cooler Sys.	Meggitt/Stewart Warner	8406R	00107	2.00	-0.80	O	
1	Additional Oil Cooler Sys.	Niagara Thermal Prod.	20002A	34675	2.00	-0.80	A	
1	Additional Oil Cooler Sys.	Aero Classics	8001602	34676	2.00	-0.80	A	
1	Oil Press. / Oil Temp. Ind.	Westach	2DA3-3KV, 2 1/4"	FI3002	0.09	1.260	R	
1	Oil Temp. Probe	Westach	W399-S9		0.08	-0.110	R	
1	Oil Press. Sender	Mediamate	387-100MM or 387-100KV		0.12	0.040	R	
1	Oil Press. / Oil Temp. Indicator (2 1/4")	UMA	D2-OP130U-OT300U-01	33428	0.09	1.260	A	
1	Oil Temp. Probe	UMA	1B3A		0.08	-0.110	A	
1	Oil Press. Sender	UMA	N1EU150G(-A) or T1EU150G(-A)		0.12	0.040	A	

*) R = required, O = optional, A = alternative

Qty.	Item	Manufacturer	Model No	Part No	Weight (kg)	Arm (m)	R O A*	Inst
	Smoke (96)							
1	Single Pump Smoke System	Extra		8C111.001 -VM	4.591	0.605	O	

SECTION 7

DESCPRIPTION AND OPERATION
OF AIRCRAFT AND SYSTEMS

Table of Contents

Paragraph *Page*

7.1 THE AIRCRAFT 7-3

7.2 FUSELAGE 7-3

7.3 WINGS 7-3

7.4 EMPENNAGE 7-4

7.5 FLIGHT CONTROL SYSTEM 7-4
7.5.1 Primary Control System 7-4
7.5.2 Longitudinal Flight Control System 7-4
7.5.3 Lateral Flight Control System 7-4
7.5.4 Directional Flight Control System 7-4
7.5.5 Secondary Control 7-4

7.6 INSTRUMENT PANEL 7-6

7.7 LANDING GEAR 7-7

7.8 SEATS, SEAT BELTS 7-8

7.9 CANOPY 7-8

7.10 POWER PLANT 7-8
7.10.1 Engine 7-8
7.10.2 Oil System 7-9
7.10.3 Engine Installation 7-9
7.10.4 Propeller 7-9
7.10.5 Throttle 7-9
7.10.6 Mixture 7-10
7.10.7 RPM-Control 7-10
7.10.8 Fuel Selector Valve 7-10
7.10.9 Exhaust System 7-10

7.11 FUEL SYSTEM 7-10

7.12 ELECTRICAL SYSTEM 7-13

7.13 CABIN ENVIRONMENT CONTROL 7-13

Left blank intentionally

SECTION 7

DESCPRIPTION AND OPERATION OF AIRCRAFT AND SYSTEMS

7.1 THE AIRCRAFT

The aircraft EXTRA 300/SC is designed and developed by EXTRA Flugzeugproduktions- und Vertriebs- GmbH, Dinslaken 46569 Hünxe, Federal Republic of Germany, in accordance with the Joint Aviation Authorities FAR-23 acrobatic category to fullfill the primary flight training, and acrobatic training up to the unlimited acrobatic level.

The EXTRA 300/SC is a light weight, robust, single piston-engined, one-seat aircraft with a fuselage structure in tig-welded steel-tube construction.
The landing gear, wing, and tail are made of epoxy, reinforced with glass- and carbonfiber.
The items are qualified up to 72°C.
The aircraft is designed to operate within a range of ambient air temperature from -20°C to +38°C (-4°F => 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 structure consists of a steel tube construction integrating the wing and empennage connections as well as the seat. The lower part of the fuselage and the sides below the wing are covered with a carbon belly fairing. Within the exhaust area aluminum sheet metal is used. The rear part of the fuselage is covered with Ceconite® 102.
The upper fuselage body surface is one part from firewall to vertical stabilizer including the correlated frame for the canopy. It consists of a carbon sandwich laminate.
The canopy itself is a single part. The canopy frame is a carbon laminate construction.
For additional pilot protection a roll bar is installed behind the pilot's seat.

7.3 WINGS

The wing is a CRP construction. The dual chamber main spar - being a fail safe design - consists of carbon roving caps combined with CRP webs. Core foam is a PVC foam. The wing shell is built from a Honeycomb sandwich with CRP laminates. Wing box ribs are made of carbon fiber composite with honeycomb core. The ribs in the nose section are made of wood. The connection to the fuselage is arranged by two bolts piercing through the spar parallel to the centerline of the fuselage and two brackets at the rear spars.
The ailerons are supported at four points in spherical bearings. In addition the aileron tip has a shielded horn balance.
To reduce pilot's hand forces the hinge line of the ailerons is positioned 25% of the aileron chord. Furthermore the ailerons are equipped with "spades" to decrease pilot's forces. The aileron control push-pull rods are connected to the aileron at the second bearing point (in span-wise direction). To prevent flutter, the ailerons are mass balanced at the leading edge of the shielded horn.

7.4 EMPENNAGE

The EXTRA 300/SC possesses a cruziform empennage with stabilizers and moveable control surfaces. The spars consist of PVC foam cores, CRP caps and webs. The shell is built from honeycomb sandwich with CRP laminates. The control surfaces are mounted in spherical bearings and balanced aerodynamically with unshielded horns at the tip. To prevent flutter, the rudder and the elevator are mass balanced. The balance weights are installed in the leading edges of the unshielded horns.
The R/H elevator side incorporates a trim tab supported by two piano type hinges.

7.5 FLIGHT CONTROL SYSTEM

7.5.1 PRIMARY CONTROL SYSTEM

The EXTRA 300/SC is equipped with a conventional control stick and mechanically adjustable rudder pedals. The primary control surfaces are operated through a direct mechanical linkage.

7.5.2 LONGITUDINAL FLIGHT CONTROL SYSTEM

The control stick bearing is housed in a torque tube, which is also linked to the lateral flight controls. The stick movements are transferred to the elevator by carbon push-pull rods.

7.5.3 LATERAL FLIGHT CONTROL SYSTEM

Aluminium and carbon push-pull rods connect the torque tube to the ailerons. The connections feature sealed rod ends. The ailerons are statically as well as dynamically balanced. (Dynamically with spades).
The ailerons are supported by lubricated, sealed bearings.

7.5.4 DIRECTIONAL FLIGHT CONTROL SYSTEM

The rudder pedals with brake pedals are mechanically adjustable and operate the rudder through a control cable system. Springs keep the cables under tension when the pedals are not operated.

7.5.5 SECONDARY CONTROL

The elevator trim uses a trim servo connected to the trim tab by a double Bowden cable. The trim switch is either located on the control stick or together with the trim position indicator on the right upper side of the instrument panel. The double cable actuation of the trim tab is a fail safe design to prevent flutter in case of a single control joint failure.
The canopy is operated from the inside and outside by the interior locking handles. These handles are used for locking as well as for normal and emergency operation.
The starter/magneto switch is located on the left side of the instrument panel.

Left blank intentionally

7.6 INSTRUMENT PANEL

Refer to the following figures and the related lists for the instruments, switches, lamps and circuit breakers installed in the EXTRA 300/SC.

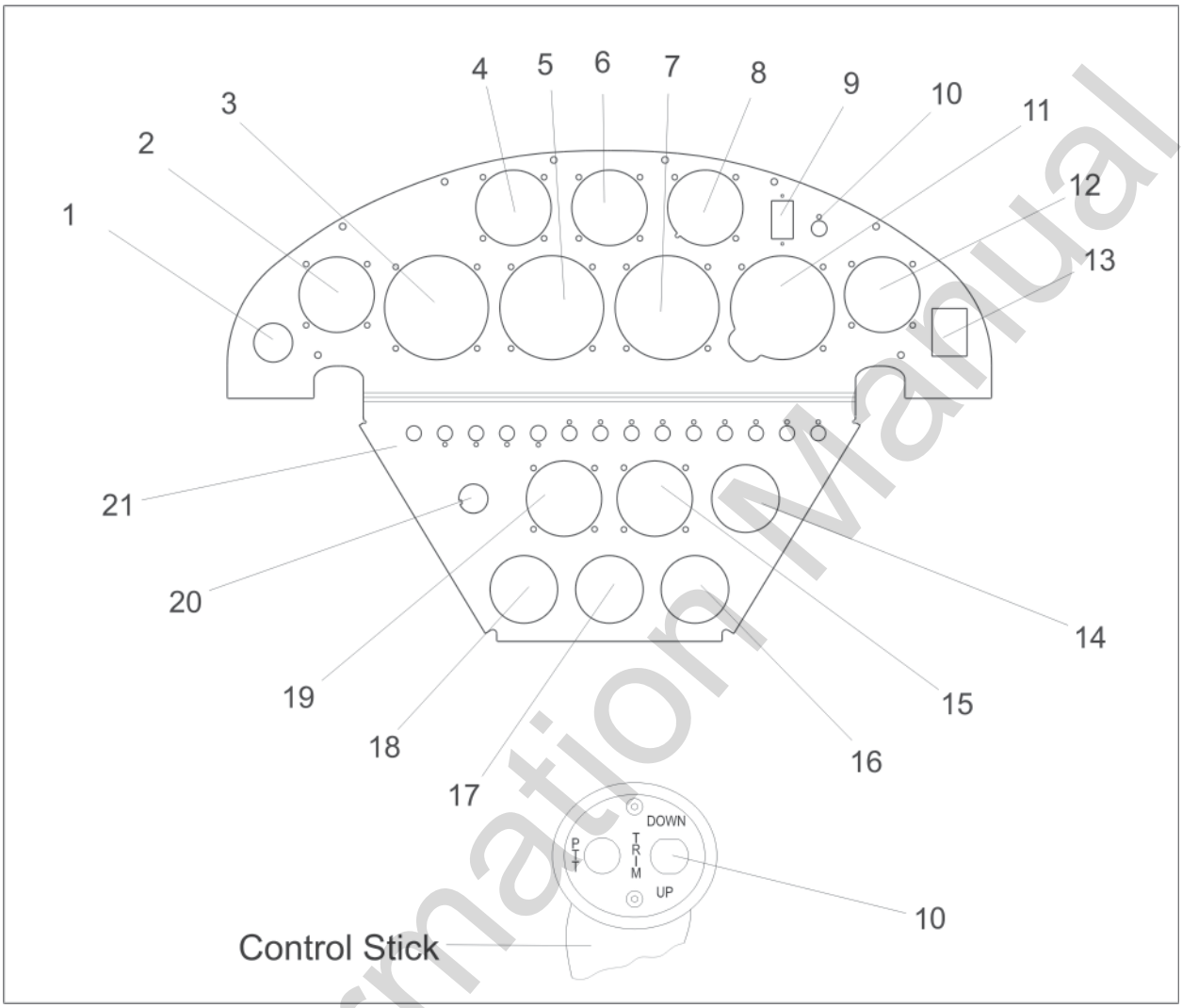


Figure 7-1: Instrument panel (some optional equipment is shown as well)

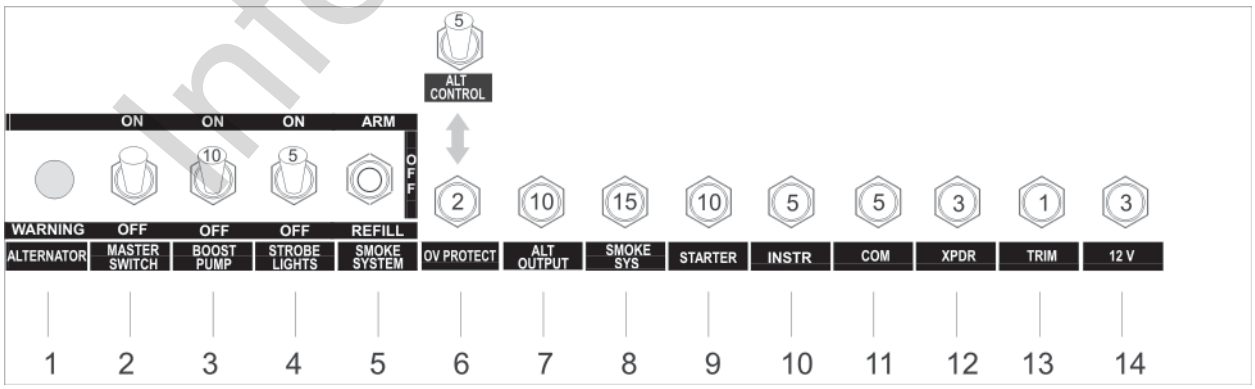


Figure 7-2: Switches, circuit breakers, light

Position	*Item*
1	12 Volt power source jack*
2	COM
3	Air speed indicator
4	Blank
5	Manifold pressure / fuel flow
6	Magn. direction indicator
7	RPM indicator
8	Accelerometer*
9	Trim position indicator
10	Trim position switch (on panel or control stick)
11	Altimeter
12	XPDR
13	ELT*
14	Ammeter
15	Oil pressure / oil temperature
16	Fuel quantity Rear center tank
17	Fuel quantity Front center tank
18	Fuel quantity Wing tanks
19	EGT / CHT indicator*
20	Magneto selector switch & starter
21	Switches, circuit breakers, light as listed below:

Switches, Circuit Breakers, Light (Figure 7-2)

Position	*Item*
1	Alternator warning light incl. press-to-test feature
2	Master switch
3	Boost pump switch circuit breaker
4	Strobe lights switch circuit breaker*
5	Smoke system switch*
6	Overvoltage protection circuit breaker or alternator control circuit breaker switch
7	Alternator output circuit breaker
8	Smoke system circuit breaker*
9	Starter circuit breaker
10	Instruments circuit breaker
11	COM circuit breaker
12	XPDR circuit breaker
13	TRIM circuit breaker
14	12 V circuit breaker*

* Optional equipment

N O T E

These lists may be modified by the minimum equipment requirements of individual certifying authorities!

7.7 LANDING GEAR

The EXTRA 300/SC is designed as a conventional tail-wheel airplane. The main gear is a composite construction with a multichamber spring made of glass fiber webs and caps. The main wheels have a size of 5.00-5 and they are equipped with hydraulic disc brakes. The tail wheel has a solid rubber tire with full-swivel capability.

7.8 SEATS, SEAT BELTS

The seat is a shaped carbon composite construction. It´s back rest position and angle is mechanically adjustable on ground by quickpins and bolts. The lower seat surface itself is fixed.
The seat belt assembly consists of right and left shoulder straps, two right and two left lap belts and a negative g-strap. All belts are adjustable. The lap belts have a separate single point release for redundant safety during acrobatic maneuvers. If one release is opened unintentionally the second one guarantees full safety. To assure safe operation one release must be closed to the right and the other one to the left. For acrobatic maneuvers the seat belt system should be tightened firmly.

7.9 CANOPY

The canopy is manufactured in one section and can be manually operated by interior locking handles located on the left side on the canopy.
To open the canopy from inside proceed as follows: Pull together the interior locking handles and lift canopy to the right. The canopy strap will limit the opening angle.
To lock the canopy pull together the interior locking handles and then release.
To open the canopy from the outside use the interior handles by reaching through the small window (bad weather window) and proceed as mentioned above.
Generally the emergency operation is equal to the normal procedure. When opening the canopy in normal flight the low pressure over the canopy will flip the canopy fully open immediately. However complete jettison of the canopy is possible. In this case the canopy can be finally unlatched at its RH hinge line by the following action: push canopy slightly forward while opening.

7.10 POWER PLANT

7.10.1 ENGINE

The power plant consists of one Textron-Lycoming six-cylinder, horizontally opposed, aircooled, direct drive, fuel injection engine type with inverted oil system.
The rated power at 2700 RPM is 315 HP (234.9 kW).
The rated power at 2600 RPM is 303 HP (225.9 kW).
The rated power at 2400 RPM is 286 HP (213.3 kW).

Engine specification: Textron - Lycoming AEIO-580-B1A

The AEIO-580-B1A engine is equipped with special antivibration counterweights.
The following accessories are included in the power plant installation:

-Fuel Injector:	Precision
-Magnetos:	Slick
-Alternator:	B&C
-Starter:	Sky-Tec
-Fuel pump:	Gates Lear
-Shielded ignition system	
-Propeller governor drive	
-Transistor voltage regulator	

The engine is operated with the following manual controls:

-Throttle control
-RPM control
-Fuel mixture 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.

100/130 aviation grade fuel (AVGAS 100/100LL) is the minimum grade recommended by the manufacturer of the engine.
100/130 aviation fuel is also the maximum grade.

7.10.2 OIL SYSTEM

The engine oil is cooled using a Single Oil Cooler. The oil cooler is mounted on the aft, right hand side of the engine. The oil level is determined by a dip-stick which is accessible through an opening in the upper cowling.

Oil capacity:

Max. sump capacity:	16 qts.
Min. sump capacity:	9 qts.

N O T E

With the engine in good condition the minimum engine oil capacity is safe for maximum endurance in the aerobatic category.

For temperatures and oil grades refer to Section 1.7.

7.10.3 ENGINE INSTALLATION

The engine is mounted with four shock-mounts to the tig-welded steel tube engine support, which is attached to the fuselage with four bolts on the firewall plane.

The engine cowling is divided into two parts, a lower and an upper part both made of carbon fibre reinforced epoxy. The parts are fixed by a number of screws and the upper cowling has a separate hatch for easy access to the oil dip-stick.

7.10.4 PROPELLER

The propeller is a 3-blade wood composite, constant speed propeller type MTV-9-B-C/C198-25 with a diameter of 1,98 m (77.95 in).

7.10.5 THROTTLE

Control lever (cub-type) mounted on the left side of the cockpit.

7.10.6 MIXTURE

Vernier control located at the right side of the cockpit (red knob).

7.10.7 RPM-CONTROL

Vernier control located at left side of the cockpit (blue knob).
Preselection of RPM possible due to constant speed governor.

7.10.8 FUEL SELECTOR VALVE

A rotary fuel selector valve is mounted behind the firewall on the right side of the fuselage. A torque tube connects the valve to the cockpit handle. Pull and turn the handle 90° to open the valve to the Acro & Center tanks. A further 90° turn switches to the wing tank fuel supply.

Position down = CLOSED
Position left = ACRO & CENTER TANKS
Position up = WING TANK

7.10.9 EXHAUST SYSTEM

The EXTRA 300/SC is equipped with a Gomolzig 6 in 1 exhaust system with integrated silencer.
As an option the EXTRA 300/SC can be equipped with a complete 6 in 1 exhaust system manufactured by Sky Dynamics Corporation. The system is made from stainless steel an has no silencer. If it is installed, the aircraft can receive an airworthyness certificate only in the Acrobatic Category.

7.11 FUEL SYSTEM

The fuel system consists of two separate, independent tank systems (refer to Figure 7-3).

- Acro & Center tanks system
- Wing tank system

Acro & Center tanks system:
An acro tank of 9 liters (2.37 US Gal.) is mounted in the fuselage just behind the firewall. The front center tank is mounted above having a capacity of 54 liters (14.3 US Gal.). Behind the main spar of the wing the rear center tank is installed containing 41 liters (10.8 US Gal.). The acro tank is connected to the center tanks in a gravity feed system. To prevent any crossflow between the center fuel tanks, check valves are placed in the respective supply lines upstream the interconnection to the acro fuel tank.
Each center tank has a 2" diameter filler cap for gravity refueling on the top of the forward fuselage. The caps are labelled "FUEL AVGAS 100/100LL". Usable fuel in acro & both center tanks is 101 liters (26.7 US Gal.).
Although the center tanks can be filled seperately they can only be used in combination by selecting the ACRO & CENTER TANKS position of the fuel selector. However the pilot can affect the center of gravity position of the aircraft by filling the tanks unequally. In each case, even when one center tank is empty, the fuel supply to the engine is safe.

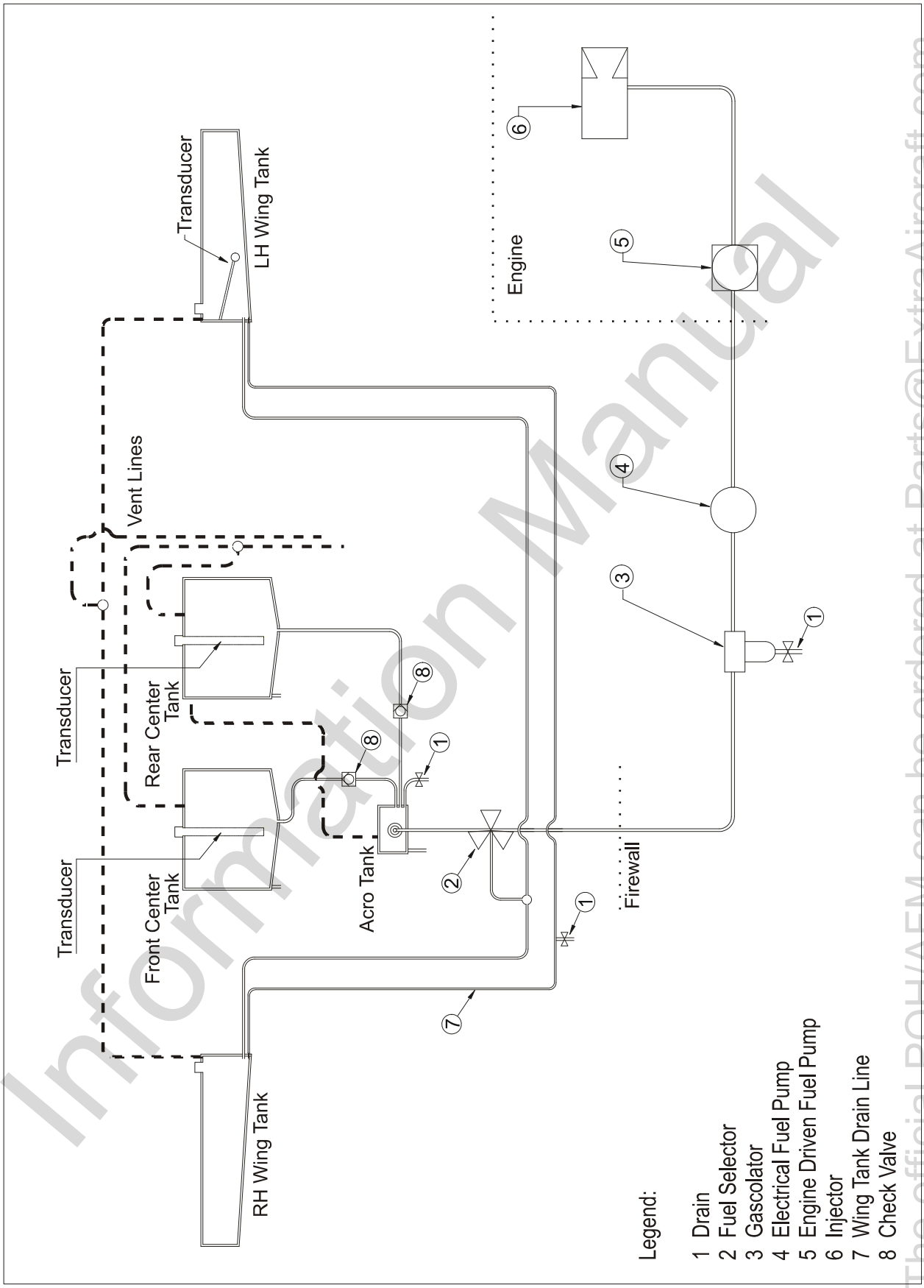


Figure 7-3: Fuel system

N O T E S

When ACRO & CENTER TANKS are selected in flight the tank with the higher fuel level will empty slightly faster than the other.

When both front and rear center tank indications read "ZERO" the remaining fuel in the acro tank is less than 9 liters (2.37 US Gal.). 2.5 liters (0.66 US Gal.) of this remaining fuel are not usable.

The center tanks are made from aluminum and are covered by a separate shell made of GRP for safety. The space between the aluminum tank and the safety GRP shell is vented and drained overboard. In case of a crack in the aluminium tank, the leaking fuel is dumped overboard, while the GRP shell will indicate the location of the leak by coloring blue.

Wing tank system:
The root section of each wing in front of main spars forms an integral fuel tank providing two interconnected tanks with 120 liters (31,7 US GAL.) total capacity. Each side of the wing has a 2" diameter filler cap for gravity refueling. The caps are labelled "FUEL AVGAS 100/ 100LL".The wing tank can be completely emptied in flight .

N O T E

The wing tank must be empty when flying aerobatic maneuvers.

Adequate venting is provided in each tank by ventilation-tubes.
All ventilation and drain lines merge at the right side of the fuselage and end on the upper main gear leg.
In addition to the engine driven fuel pump an electrically driven auxiliary fuel pump (boost pump) with by-pass and having sufficient capacity to feed the engine at take-off power is fitted as a safety device against failure of the engine-driven pump. The boost pump switch is located on the instrument panel.
A fuel filter with drain is installed between the fuel selector valve and the boost pump.
Separate drains are located at the lowest point of each tank system: the acro & center tanks drain on the right underside and the wing tank drain on the left underside of the fuselage just behind the main gear attachment.
Normal float type transducers and electrically operated fuel indicators are used.
Alternatively, variable capacitance type transducers for the center tanks are used.

7.12 ELECTRICAL SYSTEM

The electrical power generation system (refer to fig. 7-4) consists of a 12 V alternator with rectifier and transistor voltage regulator. The alternator is mounted on and driven by the engine.
The field current is controlled by the voltage regulator to give a nominal output of 13,8 V under all load conditions.

Circuit protection against over-voltage is provided by the voltage regulator.
Depending on the system installed there are two possible scenarios if an overvoltage occurs:

1) The regulator causes the OV PROTECT circuit breaker to trip. In this case a relais disconnects the alternator from the aircraft system. This is indicated by the lit alternator warning light. The system is reset is by pressing the OV PROTECT circuit breaker.
2) The regulator disconnects the alternator from the aircraft system and activates the alternator warning light. The alternator will be off-line until power is cycled by turning OFF and ON the ALT CONTROL circuit breaker switch.
Consider that in flight with active alternator warning the battery is the only power source.

The maximum load taken from the alternator is 8.4 Amps (@2700 RPM).
A 12 V leak proof battery is connected across the alternator output to stabilize the supply and to maintain all essential services in the event of an alternator failure and when the engine is not operating. The battery is mounted behind the firewall.
The master-switch is located on the instrument panel.
The system is equipped with an ampere meter, which allows monitoring the battery state of charge.
All electrical circuits are protected by circuit breakers or fuses. All circuit breakers are located on the instrument panel and are easily accessible to the pilot during flight.
The electrical system is adequately suppressed to ensure satisfactory operation of the radio equipment.
All wires, switches, circuit breakers etc. are manufactured to related aeronautical specifications.

7.13 CABIN ENVIRONMENT CONTROL

A ventilation system in the canopy is provided for the supply of fresh air to the cabin. The bad weather window is equipped with a ventilation scoop to provide supply of fresh air to the cabin. Additionally, to the right and left side of the cockpit an eyeball-type adjustable vent is installed.

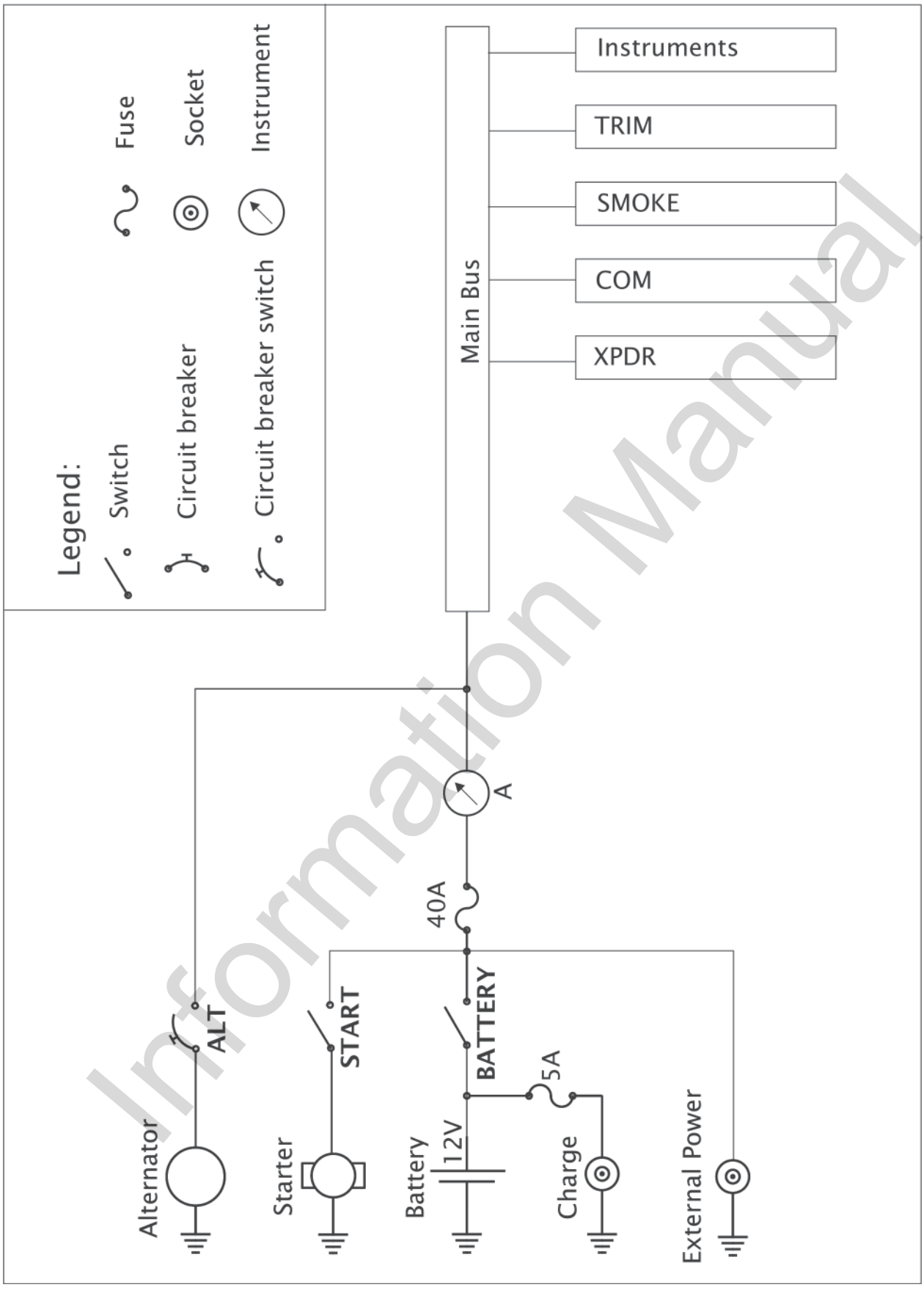


Figure 7-4, Electrical system

SECTION 8

HANDLING, SERVICING AND MAINTENANCE

Table of Contents

Paragraph *Page*

8.1 INTRODUCTION 8-3

8.2 AIRPLANE INSPECTION PERIODS 8-3

8.3 PILOT CONDUCTED PREVENTIVE MAINTENANCE 8-3

8.4 ALTERATIONS OR REPAIR 8-3

8.5 SERVICING 8-3

8.6 GROUND HANDLING 8-4

Left blank intentionally

SECTION 8

HANDLING, SERVICING AND 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 which is stamped on a plate on the L/H rear part of the fuselage.

c) A service 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 and 25 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 on preventive maintenance that may be performed by pilots. All other maintenance required on the airplane is to be accomplished by appropriately licensed personnel. Airplane dealer should be contacted for further information

Preventive maintenance should be accomplished with an appropriate service manual.

8.4 ALTERATIONS OR REPAIR

Alterations or repairs of the airplane must be accomplished by licensed personel.

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 Section 2 (Limitations) and Section 7 (Descriptions and Operation).

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.

b) If the aircraft is parked in the open, 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.

SECTION 9

SUPPLEMENTS

Doc-No. EA-0C701.1

Table of Contents

Section			Pages
9		**Supplements**	**4 p.**
901	☐	**Steerable Tail Wheel**	**4 p.**
902	☐	**Smoke System**	**10 p.**
903	☐	**BECKER ATC 4401 Transponder**	**8 p.**
904	☐	**BECKER BXP 6401 Transponder**	**10 p.**
905	☐	**Digital RPM Indicator**	**6 p.**
906	☐	**Accelerometer TL 3424_EXT**	**6 p.**
907	☐	**External Power**	**4 p.**
908	☐	**ARTEX ME-406 ELT**	**8 p.**
909	☐	**Electric Pedal Adjustment**	**4 p.**
910	☐	**Airplanes registered in Brazil and operating under the Agência Nacional de Aviação Civil requirements**	**4 p.**
911	☐	**f.u.n.k.e. TRT800H Transponder**	**10 p.**
912	☐	**Cabin Heating System**	**4 p.**
913	☐	**KANNAD 406 AF COMPACT/INTEGRA ELT**	**8 p.**
914	☐	**EI MVP-50P**	**8 p.**
915	☐	**TRIG TY91 VHF Radio**	**8 p.**
916	☐	**TRIG TT21/22 Transponder**	**6 p.**
917	☐	**GARMIN G3X TOUCH**	**22 p.**

Left blank intentionally

9 SUPPLEMENTS

9.1 INTRODUCTION

Section 9 "Supplements" of the Pilot´s Operating Handbook contains all information, necessary for a safe and efficient operation of the airplane when equipped with one or more of the various optional systems and equipment not provided with the standard airplane.

9.2 NOTES

The described systems and equipment are certified by the EASA for the *EXTRA 300/SC.* Pages and contents of this section may not be exchanged and alterations of or additions to the approved contents may not be made without the EXTRA Flugzeugproduktions- und Vertriebs- GmbH/EASA approval. The editor has the copyright of these Supplements and is responsible for edition of revisions. The log of effective pages is found under section 0.4 of this Pilot's Operating Handbook.

Each Supplement section (e.g. steerable tailwheel) covers only a single system, device, or piece of equipment and is a self-contained, miniature Pilot´s Operating Handbook. The owner is responsible for incorporating prescribed amendments and should make notes about these on the records of amendments. It is responsibility of the pilot to be familiar with the contents of relevant supplements.

POH Supplements must be in the airplane for flight operations when the subject equipment is installed or special operations are to be performed.

The Table of Contents shows all EXTRA Supplements available for the EXTRA 300/SC. A check mark in the *Section* column indicates that the corresponding supplement must be included in this POH.

Left blank intentionally

SECTION 901

STEERABLE TAIL WHEEL

Table of Contents

Paragraph *Page*

901.1 GENERAL 901-3

901.2 LIMITATIONS 901-3

901.3 EMERGENCY PROCEDURES 901-3

901.4 NORMAL PROCEDURES 901-3

901.5 PERFORMANCE 901-3

901.6 WEIGHT AND BALANCE 901-3

901.7 DESCRIPTION OF THE SYSTEM 901-3

901.8 HANDLING, SERVICING AND MAINTENANCE 901-4

Left blank intentionally

901 STEERABLE TAIL WHEEL

901.1 GENERAL

To improve taxi and handling quality, the EXTRA 300/SC can be equipped with an optional steerable tailwheel. The deflection angle of this tailwheel is arranged by the rudder control up to plus/minus 30°. When exceeding this deflection, the tailwheel has governed a full-swivel capability using a release mechanism.

901.2 LIMITATIONS

The operation limitations are not effected due to the use of the steerable tailwheel.

901.3 EMERGENCY PROCEDURES

There is no change of basic emergency procedures with the installation of the steerable tailwheel.

901.4 NORMAL PROCEDURES

There are no changes for the described normal procedures after installation of the steerable tailwheel. In addition to the existing normal procedures the light precompression of connector springs and movement of the rudder have to be checked during the preflight check.

901.5 PERFORMANCE

Changes in flight performance due to installation of the steerable tailwheel are not noticeable. The given basic performance data under section 5 are still valid.

901.6 WEIGHT AND BALANCE

A change of the running empty weight and resulting C/G position after installation of the steerable tailwheel is neglectable, because of minor differences in weight and C/G between standard and optional steerable tailwheel.

901.7 DESCRIPTION OF THE SYSTEM

The 5 inch tailwheel has a solid rubber tire and is rotatable by means of a wheelfork, which is connected to a bearing steelsleeve. This steelsleeve itself contains also the release mechanism, which gives the wheelfork a full-swivel capability exceeding plus/minus 30° deflection. The steelsleeve is glued into the glasfiberspring, which is bolted to the tail hardpoint of the aircraft. The steering of the tailwheel is accomplished by a direct mechanic link (rudder control cable) from the rudder pedals. The steering deflection of the tailwheel is controlled by the rudder movement and dampened by anti shimmy connector springs.

901.8 HANDLING, SERVICING AND MAINTENANCE

During 50 hour inspection, the bearing steelsleeve has to be lubricated on the point of lubricating. Additionally all parts of the tailwheel have to be inspected visually for deformations, cracks and corrosion.

SECTION 902

SMOKE SYSTEM

Table of Contents

Paragraph *Page*

902.1 GENERAL 902-3

902.2 LIMITATIONS 902-3

902.3 EMERGENCY PROCEDURES 902-4

902.4 NORMAL PROCEDURES 902-4

902.5 PERFORMANCE 902-5

902.6 WEIGHT AND BALANCE 902-6

902.7 DESCRIPTION OF THE SYSTEM 902-6

902.8 HANDLING, SERVICING AND MAINTENANCE 902-8

Left blank intentionally

902 SMOKE SYSTEM

902.1 GENERAL

For performing at airshows, the EXTRA 300/SC is equipped with a smoke system.

902.2 LIMITATIONS

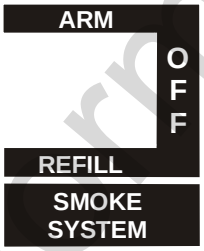
For safe operation of the smoke system the following limitations have to be considered:

1) **Specification** of the smoke oil: Straight paraffin oil, viscosity 30-50 cSt at 20°C (68°F), initial boiling point >330°C (626°F)
   For example: *Fauth FC05, Texaco Canopus 13* or equivalent
2) Local **airfield** and **weather conditions** have to be considered:
   For the prevention of a fire alarm, inform the flight control before you activate the smoke system
3) Recommended **Manifold pressure**: min. 20" Hg
4) The activation of the smoke system **on ground is only allowable for a brief system test**.
5) Wearing a parachute is strongly recommended

Operating Markings & Placards:

External placard: Next to the smoke oil refill connector at the fuselage bottom

On smoke activation switch positioned on top of the throttle lever



On the instrument panel around the 3 position toggle smoke system control switch

On the instrument panel beneath the circuit breaker

Near the center drain valve in the bottom fuselage cover

902.3 EMERGENCY PROCEDURES

FAILURE OF THE SMOKE-SYSTEM

1. "SMOKE SYS" Switch:	OFF
2. "SMOKE SYS" Circuit breaker	PULL

FIRE IN FLIGHT

1. "SMOKE SYS" Switch:	OFF

If the fire (after the smoke system is shut off) will not extinguish proceed as follows:

2. Mixture	IDLE CUT OFF
3. Fuel selector valve	OFF (Pull & Turn)
4. Master switch	OFF
5. Airspeed	90 KIAS (167 km/h), find your airspeed/ attitude that will keep the fire away from the cockpit
6. Land	*AS SOON AS POSSIBLE*
7. If fire persists or aircraft is uncontrollable and wearing a parachute	BAIL OUT

SMOKE IN THE COCKPIT

1. "SMOKE SYS" Switch:	OFF
2. Bad weather window	OPEN
3. Ventilation	OPEN
4. If smoke persists in the cockpit, land	*AS SOON AS PRACTICAL*

902.4 NORMAL PROCEDURES

The smoke system includes features for refilling the smoke oil tank and smoke generation:

A) REFILL

A separate refill hose is delivered with the smoke system which has to be used for filling the smoke oil tank from the paraffin oil supply cansister or barrel.

1. Refill hose	CONNECT hose nipple to quick connector at the fuselage bottom; IMMERSE the other end into the paraffin oil in the canister/barrel
2. "SMOKE SYS" Switch:	REFILL (pull to unlock)

N O T E

The refilling should start within max. 30 sec. If this is not the case, the refill lines, fittings and filter (if installed) have to be checked for soiling or leaks. Refilling procedure can be supported by reducing the suction height e.g. lifting the canister. The fully filled status is sensed by the floating device which automatically switches the refilling off.

After automatic refill shut-off :

3. "SMOKE SYS" Switch:	OFF
4. Refill hose	DISCONNECT

⚠ CAUTION

A shut-off failure of the refill process can be recognized by smoke oil spilling out of the vent line. In this case, turn off refill switch. The floating device switch in the smoke oil tank has to be checked accordingly.

B) SMOKE GENERATION

1. Bad weather window and ventilation	CLOSE
2. "SMOKE SYS" Switch:	ARM
3. Manifold Pressure	minimum 20" Hg
4. Switch in the throttle lever for smoke generation	ON - OFF

NOTE

It is recommended to operate the smoke system only in forward flight, because during reverse maneuvers (for example tail slide) smoke might enter the cockpit via the air vent.

C) SMOKE TANK DRAINING

1. Place suitable container under the smoke tank drain
2. Open smoke tank drain
3. Close smoke tank drain when tank is empty

902.5 PERFORMANCE

Not affected.

902.6 WEIGHT AND BALANCE

Capacity		Mass		Moment	
Litre	US gal	Kg	lbs	Kgcm	in-lbs
5	1.3	4.3	9.4	286	248
10	2.7	8.5	18.7	565	490
15	4	12.8	28.1	851	739
20	5.3	17	37.5	1131	982
23	6.1	19.6	43.2	1303	1131

Arm of Smoke Tank 66,5 cm (26,2");Specific Weight of the paraffin oil = 0.85 kg/Litre

N O T E

The smoke system does not feature a capacity dipstick. In the case of unknown filling, the smoke oil tank should be drained and refilled with a known quantity. If this is not possible, the most adverse case has to be taken for CG calculation. (This may be either completely full or completely empty tank).

902.7 DESCRIPTION OF THE SYSTEM

On pilot's demand the smoke system produces a trail of smoke by injection of smoke oil (straight paraffin oil) into the engine exhaust. The smoke oil is vaporised by the exhaust gas heat and is visible as dense smoke after leaving the exhaust.

The system consists of (refer to Fig. 902-1):

1 Floptube smoke oil tank
2 Ventilation line
3 Overpressure/check valve in smoke oil supply line to the nozzle
4 Refill/Injection pump
5 Two relais (changeover contact type) for pump control
6 Smoke switch (ON-OFF type) on the throttle lever
7 SMOKE SYS (three-position, pull-to-unlock) switch in the instrument panel
8 SMOKE SYS circuit breaker in the instrument panel
9 Float switch
10 Filter element in the refill line
11 Smoke tank drain
12 Quick connector in the belly fairing
13 Distribution block (for optional Chabord exhaust "6in2" only)

The smoke oil tank is filled by a pump (reversed polarity) through a quick connector located in the aircraft belly fairing. This line includes a filter to prevent dirt to enter the smoke system. A filled smoke oil tank is detected by a float switch placed in the tank which shuts the pump off.
The same pump (normal polarity) injects the smoke oil from the smoke oil tank through an overpressure/check valve and the injector nozzle into the hot exhaust gas to generate smoke.
For refilling the smoke oil tank the "SMOKE SYS" switch has to be switched to the "REFILL"-position (pull to unlock).
For smoke system activation the "SMOKE SYS" switch has to be switched to the "ARM" position. Then the smoke „ON-OFF“ toggle switch can be used to control the smoke pump.

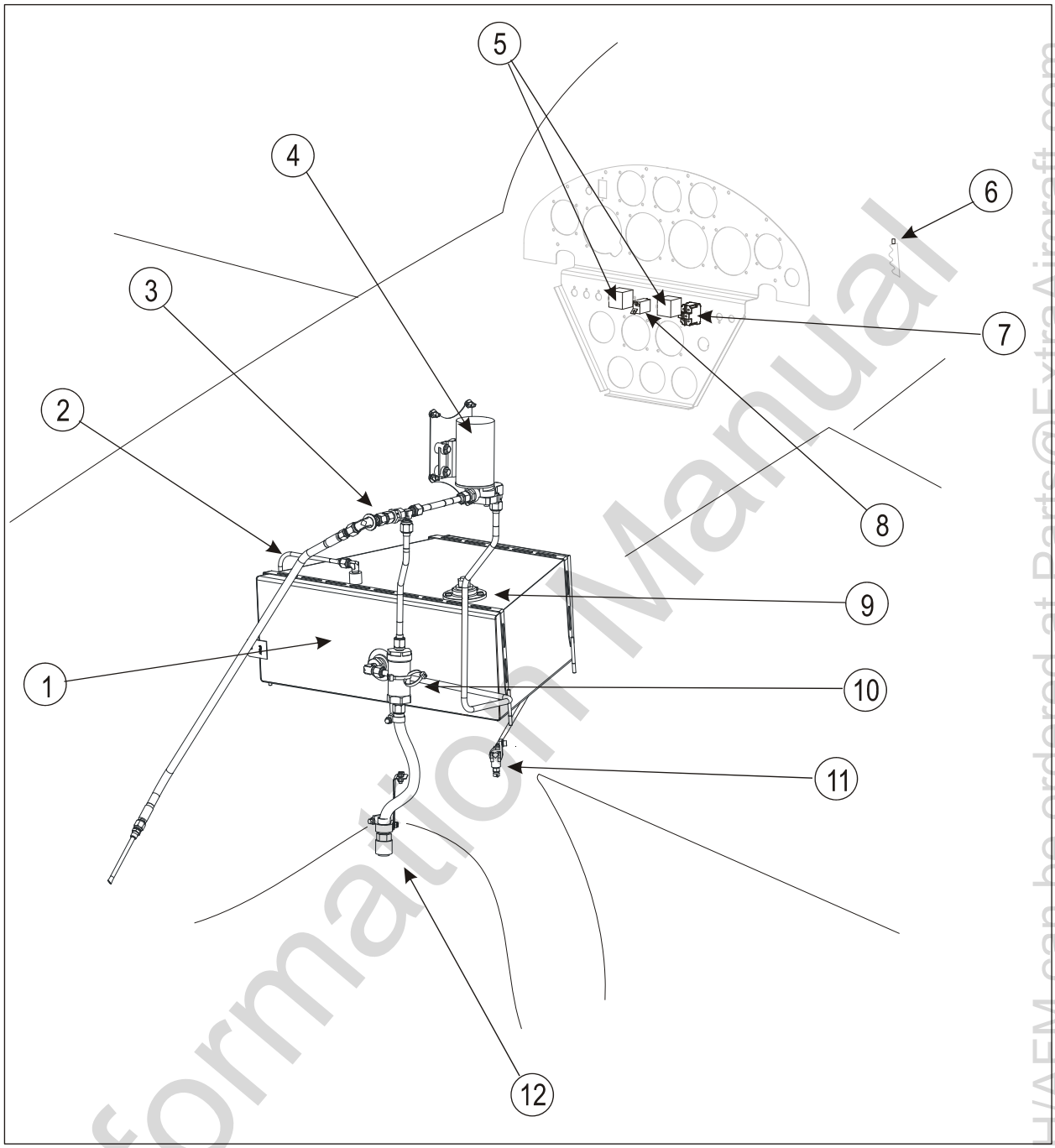


Figure 902-1, Smoke System Overview (up to SN SC022)

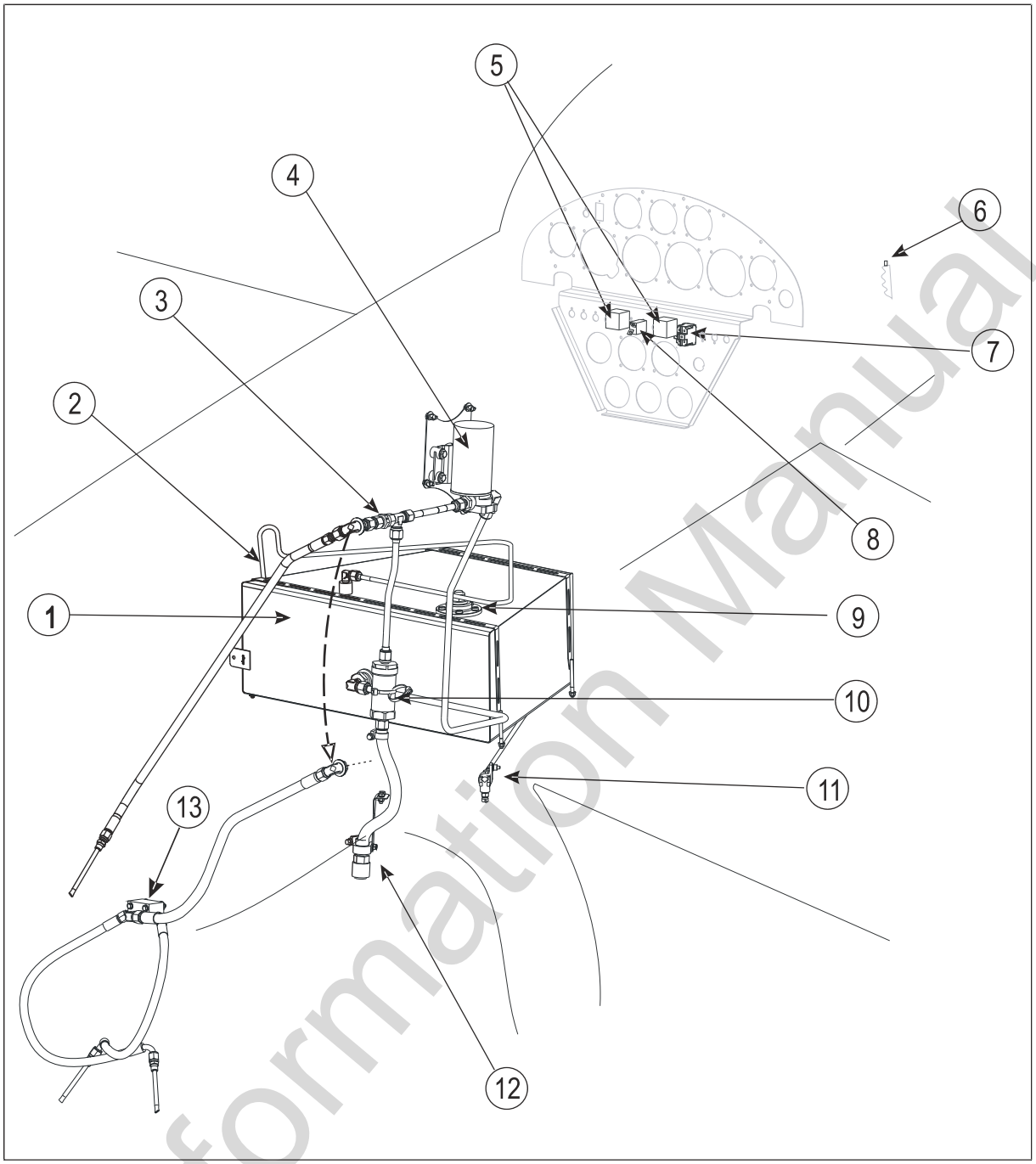


Figure 902-2, Smoke System Overview (from SN SC023 and on);
alternative routing for "6 in 2" exhaust also shown

902.8 HANDLING, SERVICING AND MAINTENANCE

At every refilling:

- Check automatic shut-off

Additionally during the 100h Check

- Check the system for leakage (lines, fittings, tank)
- Check the smoke oil tank for proper attachment
- Clean the overpressure/check valve: if required, remove oil residue
- Clean the injector nozzle: if required, remove carbon debris
- Clean the filter element

After each flight with activated Smoke System

- Clean the aircraft belly fairing and the rudder control cables from smoke oil residue.

⚠ CAUTION

Smoke oil contamination with foreign particle impingement will be a contributing factor on premature wear and frayed areas of the rudder control cables.

Left blank intentionally

SECTION 903

BECKER ATC 4401 TRANSPONDER

Table of Contents

Paragraph *Page*

903.1 GENERAL 903-3
903.1.1 Controls and Indicators 903-4
903.1.2 Switching on the Unit (pre-flight check) 903-4
903.1.3 Squawk Selection 903-5
903.1.4 Flight Operation in Mode A (transponder reply code only) 903-7
903.1.5 Flight Operation in Mode A+C (reply code and altitude code) 903-7
903.1.6 Squawk Ident 903-7
903.1.7 Test 903-7
903.1.8 Configuration Mode 903-8

903.2 LIMITATIONS 903-8

903.3 EMERGENCY PROCEDURES 903-8
903.3.1 Important Codes 903-8

903.4 NORMAL PROCEDURES 903-8

903.5 PERFORMANCE 903-8

903.6 WEIGHT AND BALANCE 903-8

Left blank intentionally

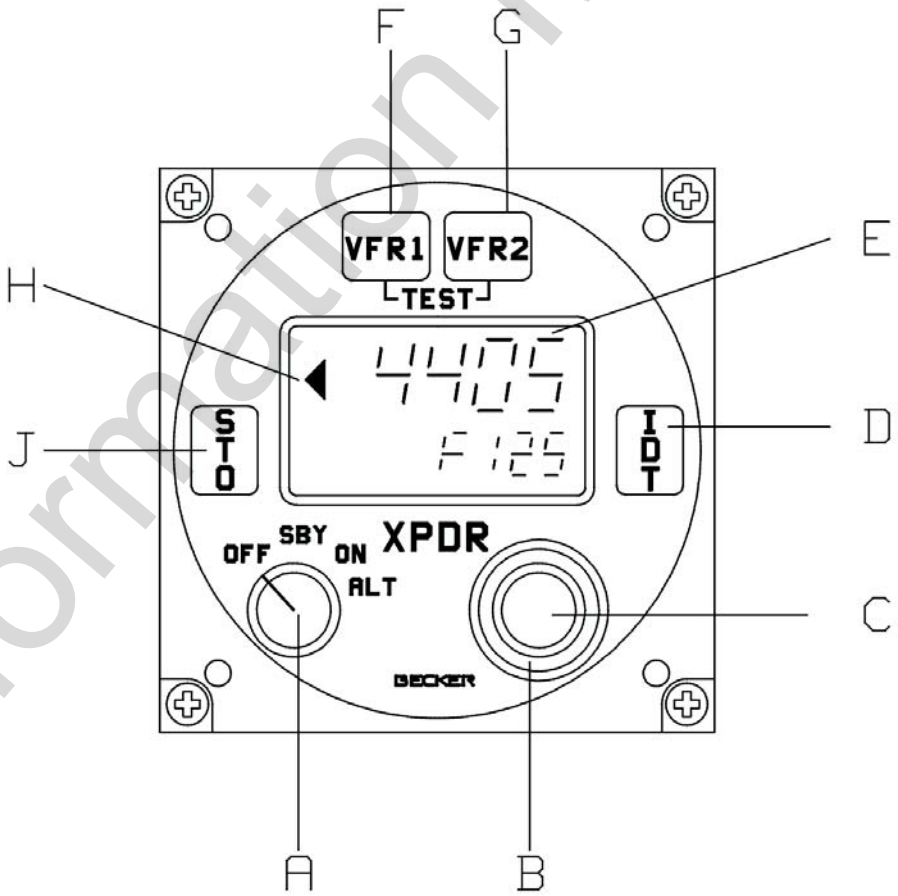
903.1 GENERAL

The Becker panel mounted ATC 4401 Transponder is a radio transmitter and receiver that fulfills the role of the airborne beacon equipment according to the requirements of the Air Traffic Radar Beacon System (ATCRBS). Its functionality includes replying to ATCRBS Mode A and Mode C interrogations.

It operates on radar frequencies, receiving ground radar interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. The ATC 4401 is equipped with IDENT capability that activates the Special Position Identification (SPI) pulse.

N O T E

The ATC 4401 owner accepts all responsibility for obtaining the proper license before using the transponder. Refer to Becker Pilot's Guide.



903.1.1 CONTROLS AND INDICATORS

A	OFF/SBY/ON/ALT rotary mode switch with 4 detent positions	OFF position : Transponder is switched off (expect panel lighting). SBY position : Standby mode is switched on. ON position : Mode A is switched on. ALT position : Mode A+C is switched on.
B	Rotary coding switch with 8 detents positions, continuously rotable	Control of the cursor in one of the 4 code digits or from the display field
C	Rotary coding switch with 8 detents positions continuously rotable	Setting the code digits from 0 to 7.
D	Ident push-button IDT	In Mode A and Mode A+C this triggers the transmission of an identification impulse additional to the Mode A reply code for approx. 18 seconds. During this time "Idt" appears in the bottom line of the LC display.
E	2-line LC display	Code indication (top line): Codes from 0000 to 7777 are possible.
		"Mode indication (bottom line) : SBY mode: ""SbY"" is displayed."
		"Mode A (ON): ""On"" appears in the display ""IDT"" is displayed the duration of the identification function."
		"Mode A+C (ALT):If a valid altitude is present, the flight level (height in steps of 100 ft) preceded by F (e.g.""F241""= 24100 ft) appears. If no valid altitude code is present, ""FÑ-"" is diplayed. The flight level display can be switched off in the configuration mode. ""Idt"" is displayed for the duration of the identification function."
F	Code push-button VFR1	Activates a first user-specific VFR code
G	Code push-button VFR2	Activates a second user-specific VFR code.
H	Reply indication REPLY	The triangle signals a Transponder reply.
J	Store push-button STO	Stores user-specific VFR codes or changes in the configuration mode

903.1.2 SWITCHING ON THE UNIT (PRE-FLIGHT CHECK)

1 Check that the circuit breaker is set and switch on the aircraft power supply .

NOTICE

Damage due to current peaks.

Do not switch on the transponder if the engine is being started or shut down.

2 Using mode switch (A), switch the transponder from **OFF** to **SBY**. A test then follows automatically for 3 seconds. The display is flashing with all digits and the unit is subject to a self-test simultaneously.

3 After the switch-on test has elapsed and no error-message is written in the display, the transponder switches to the mode set on the mode switch (A).

N O T E

The blind encoder is only powered if the transponder is not switched OFF (at least SBY). A blind encoder needs a warm-up time (sometimes a several minutes). Therefore although the solid state transponder needs no warm-up time, turn the transponder to SBY immediately after starting the engine.

903.1.3 SQUAWK SELECTION

1 The transponder remains switched in the standby mode until requested by the ground station (ATC) to transmit a code, e.g. „squawk alpha 6426“.

2 Using the double rotary switch (B,C) set the 4-digit code requested by ATC as follows :

a Using switch (B) move the cursor to the particular digit. Digits 0 to 7 can then be set using switch (C).

N O T E S

If switch (B) is turned clockwise or counter-clockwise, the cursor is moved one position to the right or the left. The cursor appears only in the code display and is indicated by the flashing digit. If no cursor is visible, the first digit flashes after a clockwise rotation and the last digit after a counter-clockwise rotation. When the code is being changed in the ON or ALT position, the transponder temporarily switches to the standby mode.

The active time of the cursor and the rate of flashing can be changed in the configuration mode.

b If the cursor is not moved again within of 3 seconds (can be changed in configuration mode) or if the cursor is moved so far that it can no longer be seen in the display field or the identification switch is pressed (in the ON or ALT mode), the code currently set is switched active.

N O T E S

Whilst settings are taking place, the transmission branch of the transponder is inhibited to prevent unintentional transmission.

If only two digits were named by ATC, e.g. „Squawk alpha 64“, then a zero is to be used for positions three and four, i.e. „6400“.

c The last used code is stored in each case and is also activated when the transponder is switched on.

SPECIAL VFR CODINGS

Two user-specific VFR codes can be stored and activated on the transponder.

1 Storing a new VFR code:

a Set the code to be stored in accordance with section B.

b Press store push-button **STO** (J), the set code then flashes.

c Press the **VFR1** push-button (F) or the **VFR2** push-button (G) wit-hin 3 seconds to store the code under the corresponding button.

d If neither button (F) or (G) is pressed within 3 seconds, the flashing stops and the storage operation is aborted.

N O T E

If one of the two buttons (F) or (G) is pressed without the STO button having been pressed beforehand, then the stored code allocated this button appears in the code display and is switched to active after 3 seconds (can be changed in the configuration mode). If the same button is again pressed within 3 seconds, the previous code appears.

2 Activation of the VFR codes:

a Press the **VFR** push-button **1** or **2** (F, G). The selected code is then displayed. After 3 seconds, the displayed code becomes activate and overwrites the previously-set reply code.

b Pressing button (F) or (G) again within 3 seconds reactivates the previously-set reply code.

N O T E

When the unit is delivered, the store buttons are not assigned a code. This means that if these buttons are pressed for 0.5 seconds, „— —“ is shown in the code display and the transponder then switches back to the previously-active code.

IMPORTANT CODES:

1200 The VFR code for any altitude in the US (Refer to ICAO standards elsewhere)

7000 The VFR code commonly used in Europe (Refer to ICAO standards)

0021 The VFR code commonly used in Germany (default is set to 0021 at time of installation)

7500 Hijack code (Aircraft is subject to unlawful interference)

7600 Loss of communications

7700 Emergency

7777 Military interceptor operations (Never squawk this code)

0000 Military use (Not enterable)

Avoid selecting code 7500 and all codes in the 7600-7777 range. These trigger special indicators in automated facilities. Only the code 7500 will be decoded as the hijack code. An aircraft's transponder code (if available) is utilized to enhance the tracking capabilities of the ATC facility, therefore care should be taken when making routine code changes.

N O T E

Unintentional transmission of an emergency code is prevented in that the transponder replies are inhibited whilst the code is being set. This applies particularly where the new code is being set in the ON or ALT modes. Also if a special code is called up, no transponder reply takes place during the period in which the previous code can be reactivated (approximately 3 seconds).

903.1.4 FLIGHT OPERATION IN MODE A (TRANSPONDER REPLY CODE ONLY)

1 Select squawk as described above.

2 Set mode switch (A) from **SBY** to **ON**. The transponder immediality replies with the set code. A triangle on the left next to the code signals the tranponder replies.

903.1.5 FLIGHT OPERATION IN MODE A+C (REPLY CODE AND ALTITUDE CODE)

1 Select squawk as described above.

2 ATC requests the transmission „alpha/charlie“ or „charlie“, switch the transponder to **ALT** using mode switch (A).

3 The transponder replies using the code set and in response to mode C requests it tansmits the flight level of the aircraft to ATC. A triangle on the left next to the code signals the transponder replies.

903.1.6 SQUAWK IDENT

After a „squawk ident“ request from ATC, press Ident button **IDT** (D) briefly. This transmits an additional special pulse (SPI) for approx. 18 seconds, which enables the aircraft to be clearly identified on the radar screen of the controller. **'Idt'** appears in the bottom line of the LC display during this time.

903.1.7 TEST

The following different tests are integrated in the transponder or can be triggered at the transponder :

1 Automatic switching-on test, in which the display (E) is flashing with all digits for 3 seconds. The unit is subject to a self-test in this time.

2 A permanent test runs in the background of the transponder operation. The built-in FPGA organizes the required resources for this. The transmitter recognizes a missmatching or own abnormal behavior and delivers an alarm signal to the FPGA.

3 A further test of the unit is triggered, if the **VFR1** button (F) and **VFR2** button (G) are pressed simultaneously. At this test all segments must flash into display (E) as long as the buttons are pushed. Additional the transmitter and evaluation are tested on correct function in the SBY, ON and ALT modes.

4 In case of a failure appears the report e.g. '**E10**' in the top line of the display. Switch OFF the transponder at such '**E**' fault indications.

903.1.8 CONFIGURATION MODE

The configuration Mode is used to set the unit on the ground and must not be called up in flight. Refer to BECKER's Pilot's Guide for further information.

903.2 LIMITATIONS

Not applicable.

903.3 EMERGENCY PROCEDURES

903.3.1 IMPORTANT CODES

7600 Loss of communications.

7500 Hijacking.

7700 Emergency (All secondary surveillance radar sites are ready to receive this code at all times).

See the Airman’s Information Manual (AIM) for a detailed explanation of identification codes.

903.4 NORMAL PROCEDURES

Not applicable

903.5 PERFORMANCE

Not applicable

903.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

SECTION 904

BECKER ATC 6401 TRANSPONDER

Table of Contents

Paragraph		*Page*
904.1	**GENERAL**	**904-3**
904.1.1	Controls and Indicators	904-4
904.1.2	Switching on the Unit (pre-flight check)	904-4
904.1.3	Display	904-5
904.1.4	Squawk Selection	904-5
904.1.5	Squawk Ident	904-6
904.1.6	Selftests of the Unit (BITs)	904-6
904.1.7	Selection Mode	904-7
904.1.8	Flight Operation in Mode A/C/S (reply code and altitude code)	904-9
904.1.9	VFR Code Activation	904-10
904.1.10	Configuration Mode	904-10
904.2	**LIMITATIONS**	**904-10**
904.3	**EMERGENCY PROCEDURES**	**904-10**
904.3.1	Important Codes	904-10
904.4	**NORMAL PROCEDURES**	**904-10**
904.5	**PERFORMANCE**	**904-10**
904.5	**WEIGHT AND BALANCE**	**904-10**

Left blank intentionally

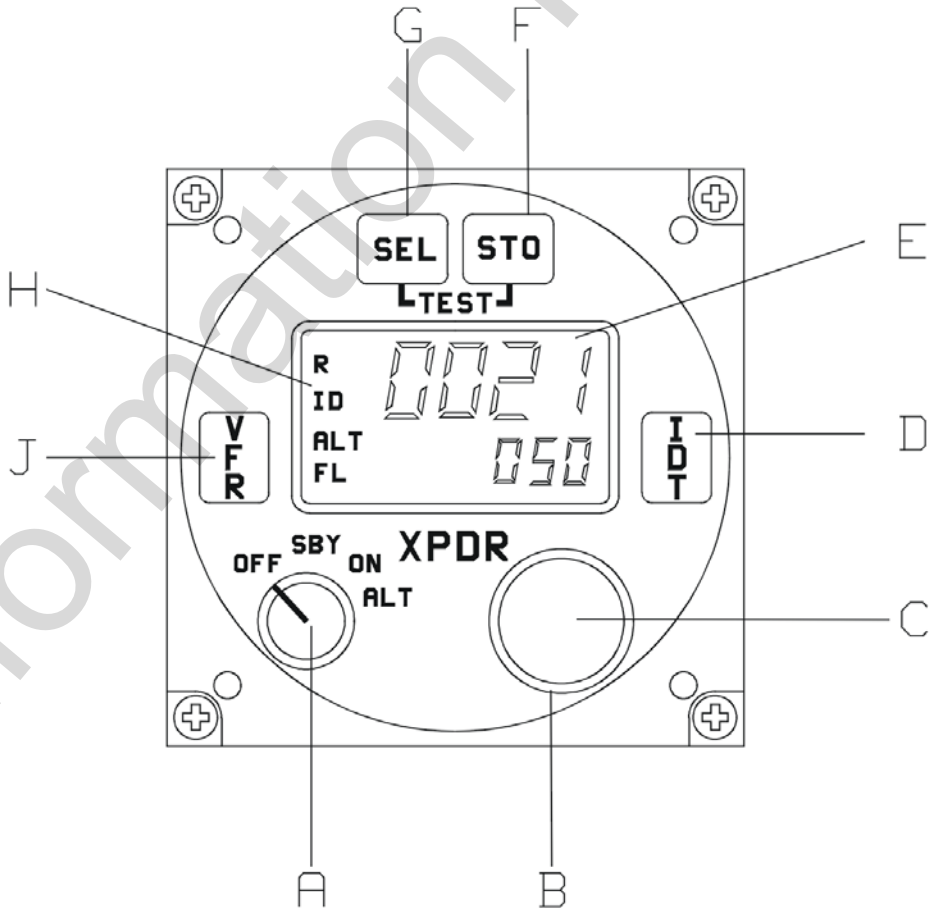
904.1 GENERAL

The Becker panel mounted ATC 6401 Transponder is a radio transmitter and receiver that fulfills the role of the airborne beacon equipment according to the requirements of the Air Traffic Radar Beacon System (ATCRBS). Its functionality includes replying to ATCRBS Mode A, C and Mode S interrogations.

It operates on radar frequencies, receiving ground radar interrogations at 1030 MHz and transmitting a coded response of pulses to ground-based radar on a frequency of 1090 MHz. The ATC 6401 is equipped with IDENT capability that activates the Special Position Identification (SPI) pulse.

N O T E

The ATC 6401 owner accepts all responsibility for obtaining the proper license before using the transponder. Refer to Becker Pilot's Guide.



904.1.1 CONTROLS AND INDICATORS

A	Mode Selector	Rotary switch with 4 positions	OFF position : Transponder is switched off SBY position : Standby mode is switched on ON position: Mode A/S is switched on. Transmission of altitude information is suppressed ALT position: Mode A/C/S is switched on and the altitude information is transmitted.
B	Rotary switch	Rotary optical encoder (rotary mode of C)	Rotary switch to change settings (16 steps per turn)
C	Button	Push-button (mode of B)	Push to jump from digit to digit for settings or from one menu to the next; generally used as an enter key
D	IDT	Push-button	Activates the Special Identifier (SPI) in ad- dition to the reply code for approx. 18 seconds; during this time "ID" appears in the LC display
E	Display, part 1	2-line LCD display	Displays the following informations: - code indication in the top row - flight level in the bottom row - various informations in the bottom row - additional indicators on the left side (see Ref. H)
F	STO	Push-button	Stores the selected values to the settings
G	SEL	Push-button	Opens and selects the menu
H	Display, part 2	LCD indicators	Displays additional indicators, (R for reply, ID for Ident, ALT for XPDR ALT mode or ON for XPDR ON mode, FL for flight level)
J	VFR	Push-button	Activates VFR code in the upper row of the display

904.1.2 SWITCHING ON THE UNIT (PRE-FLIGHT CHECK)

1 Check that the circuit breaker is set and switch on the aircraft power supply.

NOTICE

Damage possible due to current peaks.

Do not switch on the transponder if the engine is being started or shut down.

2 Using mode selector (A), switch the transponder from **OFF** to **SBY**. A test then follows automatically for 1 seconds. The display shows '**WAIT**' and the unit is subject to a self-test simultaneously.

3 After the switch-on test has elapsed and no error-message is written in the display, the transponder switches to the mode set on the mode selector (A).

N O T E

The blind encoder is only powered if the transponder is not switched OFF (at least SBY). A blind encoder needs a warm-up time (sometimes a several minutes). Therefore although the solid state transponder needs no warm-up time, turn the transponder to SBY immediately after starting the engine.

904.1.3 DISPLAY

Transponder's code is displayed in the top line using high readability font, at all times in modes SBY, ON, ALT. Depending on the configuration settings, the Aircraft Identification (AI) or Flight Number (FN) is displayed in the bottom line. Flight level is displayed in ALT mode in the bottom line of the display (altitude= FL x 100 in ft).

904.1.4 SQUAWK SELECTION

1 The transponder remains switched in the standby mode until requested by the ground station (ATC) to transmit a code, e.g. „squawk alpha 6426".

2 Using the rotary switch (B) and the button (C) set the 4-digit code requested by ATC as follows:

a Using switch (C) move the cursor to the particular digit. Digits 0 to 7 can then be set using the rotary switch (B).

N O T E S

Whilst settings are taking place, the transmission branch of the transponder is inhibited to prevent unintentional transmission.

If only two digits were named by ATC, e.g. „Squawk alpha 64", then a zero is to be used for positions three and four, i.e. „6400".

b The last used code is stored in each case and is also activated when the transponder is switched on.

IMPORTANT CODES:

1200 The VFR code for any altitude in the US (Refer to ICAO standards elsewhere)

7000 The VFR code commonly used in Europe (Refer to ICAO standards)

0021 The VFR code commonly used in Germany (default is set to 0021 at time of installation)

7500 Hijack code (Aircraft is subject to unlawful interference)

7600 Loss of communications

7700 Emergency

7777 Military interceptor operations (Never squawk this code)

0000 Military use (Not enterable)

Avoid selecting code 7500 and all codes in the 7600-7777 range. These trigger special indicators in automated facilities. Only the code 7500 will be decoded as the hijack code. An aircraft's transponder code (if available) is utilized to enhance the tracking capabilities of the ATC facility, therefore care should be taken when making routine code changes.

N O T E

Unintentional transmission of an emergency code is prevented in that the transponder replies are inhibited whilst the code is being set. This applies particularly where the new code is being set in the ON or ALT modes. Also if a special code is called up, no transponder reply takes place during the period in which the previous code can be reactivated (approximately 3 seconds).

904.1.5 SQUAWK IDENT

After a „squawk ident" request from ATC, press Ident button **IDT** (D) briefly. This transmits an additional special pulse (SPI) for approx. 18 seconds, which enables the aircraft to be clearly identified on the radar screen of the controller. **'Idt'** appears in the bottom line of the LC display during this time.

904.1.6 SELFTESTS OF THE UNIT (BITS)

The following different tests are integrated in the transponder or can be triggered at the transponder:

1 The IBIT (Initiated Built-in Test) can be activated in any mode (excluding the configuration mode) with the push of (F) and (G) at the same time. The action starts with the leading edge of the second pushed button. The IBIT works as follows in all modes:

The test starts with all available test routines including the transmitter test routine. During the test, '**IBIT**' is indicated on the display.The test takes not longer than 1 second. If the IBIT was successful, the XPDR switches immediately into the normal operating mode. During the IBIT any action from other switches is not recognized.

Negative results of the IBIT are indicated on the display with '**FAILURE**'. The transponder may be not switched into ON or ALT mode if any failure was found.

2 The CBIT (Continuous Built-in Test) works as follows:

The continuous BIT acts as a kind of watchdog during operation. Negative results of the CBIT are indicated on the display with '**FAILURE**'. In this case the transponder may be not switched into ON or ALT mode (display indication of operating mode set to **'SBY'**) if any failure was found.

3 The PBIT (Power-on Built-in Test) works as follows:

The XPDR has a power-on BIT after switching on. During the PBIT any action from other switches are not accepted.

During the PBIT the XPDR is in the SBY mode but this is not indicated on the display. The operating mode indication on the display starts immediately after finalisation of the PBIT.

Negative results are indicated on the display with '**FAILURE**'. The transpondermay be not switched into ON or ALT mode if any failure was found.

The PBIT takes not longer than 1 second. If the test was successful, the XPDR switches immediately into the normal operating mode.

904.1.7 SELECTION MODE

Press **SEL** button (G) and rotate encoder (B) for selection. In selection mode additional information is displayed in the bottom line of the display. Some of the data are editable, some are read only:

VFR	4096 code presetting	editable
AI	Aircraft Identifier (Tail Number)	fixed; read only from address module (an be replaced by FN). If no valid AI is stored, "---------" is displayed.
FN	Flight Number or Company Call Sign	editable; can be replaced by AI (fixed) byselecting "AI DEF"
AA	Aircraft Address (24-bit ICAO)	fixed; read only from addressmodule (unique number for each aircraft)
MA	Maximum Airspeed	fixed; read only from address module
AT	Aircraft Type	fixed; read only from address module
CFG	Configuration	available in SBY mode only
INS	Installation setup	available in SBY mode only; protected by password

AIRCRAFT IDENTIFICATION (AI OR FN)

With flight plan:
The definition out of the flight plan: e.g. Flight Number or Company Call Sign

Without flight plan (VFR):
Tail Number (Call Sign)

The indication of **'AI'** in the bottom line of the display is in mode SBY and ON only if selected in configuration menu. The Aircraft Identifier (fixed) is available in any mode after pressing **SEL** button (G) and turning the rotary encoder (B). The default value for AI is the Tail Number of the aircraft and is stored in the Address Module.

If a flight plan exists, it has to be checked, which AI has to be used. If a Flight Number is assigned it has to be entered. If a Company Call Sign is mentioned, this has to be entered. To enter it see below. It will be stored in the EEPROM of the control head. In this case the indication on the display changes to **'FN'** (Flight Number). If the Call Sign (Tail Number) is mentioned, no change, as it is the default setting from the Address Module.

SETTING THE FLIGHT NUMBER:

1 Press **SEL** button (G) to enter the select mode.

2 Rotate (B) until '**AI**' is displayed.

3 Push (C) to switch to '**FN**'. The cursor is set on the first character.

4 Rotate (B) to change this character.

5 Push (C) to set the cursor to the next character.

6 Repeat steps 4 and 5 until the flight number is entered.

7 If the flight number consists of less than 7 characters, put a space at the end to fill the remaining characters with spaces.

8 Store the changes with **STO** button (F). For leaving the setting procedure without storing, push the **SEL** button (G).

N O T E

Aircraft Identifier / Flight Number consists of max. 7 characters (on the left- hand side oriented). No dashes or spaces shall be included. If the FN con- sists of less than 7 characters, the remaining characters on the right side shall be filled with spaces.

SWITCHING BACK TO DEFAULT AI:

1 Press **SEL** button (G) to enter the select mode.

2 Rotate (B) to the indication '**FN=XXXXXXX**'.

3 First push on (C) indicates'**FN=AI DEF**' (inverted).

4 Can be set to '**AI=DEF**' with **STO** button (F).

CHANGING THE FLIGHT NUMBER:

1 Press **SEL** button (G).

2 Rotate (B) until '**FN**' is displayed.

3 Push (C) twice to enter the FN editing mode.

4 Change the FN as described above.

VFR CODE PRESETTING

Press the **SEL** button (G) to get into configuration mode (selection is indicated in the left bottom corner of the display under the operating mode indication).

1 Rotate (B) to the indication '**VFR=XXXX**'.

2 First push to button (C) now left digit of the code is inverted.

3 Now the digit can be changed with (B).

4 Second push to button (C) now next left digit of the code is inverted.

5 The next digit can be changed with (B)

6 and the same for next digits.

7 Fifth push to button (C) now again first digit is inverted.

8 Changes can be stored with **STO** button (F) at any time, inversion stops in this case.

9 A VFR code that was preset in this way can be activated as described in chapter *VFR Code Activation*.

10 A timeout for inversion (10 sec) is introduced if no action happens. Nothing stored, as long as (F) is not pressed.

N O T E

It is possible to leave the setting procedure with SEL button (G) at any time and normal mode is available then. Indication SEL on the display changes back to mode indication. If STO button (F) was not used, no change has been stored.

904.1.8 FLIGHT OPERATION IN MODE A/C/S (REPLY CODE AND ALTITUDE CODE)

1 When ATC requests the transmission „squawk“, switch the transponder to **ALT** using mode switch (A).

N O T E

In exceptions the altitude has to be turned off, i.e. switch the transponder to ON using mode switch (A).

2 The transponder replies using the selected Code and in response to mode C interrogation it transmits the altitude of the aircraft to ATC. A '**R**' on the left next to the Code on the display signals the transponder replies.

N O T E

Switch the transponder to Stand-by (SBY), if the Code has to be changed. Otherwise if could happen that a Code with a special meaning (see chapter K, e.g. highjack) will be transmitted and unwanted actions could take place.

904.1.9 VFR CODE ACTIVATION

1 Press the **VFR** push-button (J). The preselected code is then displayed. After 3 seconds, the displayed code gets active and overwrites the previously-set reply code.

2 Pressing push-button (J) again within 3 seconds reactivates the previously-set reply code.

N O T E

When the unit is delivered, the VFR button is not assigned a code. This means that if this button is pressed for 0.5 seconds, „——“ is shown in the code display and the transponder then switches back to the previously-active code.

904.1.10 CONFIGURATION MODE

The configuration mode is available from SBY mode only. To get into configuration mode press button **SEL** (G), turn rotary encoder (B) until '**CFG**' appears in the bottom row of the display. Refer to BECKER's Pilot's Guide for available options.

904.2 LIMITATIONS

Not applicable.

904.3 EMERGENCY PROCEDURES

904.3.1 IMPORTANT CODES

7600 Loss of communications.

7500 Hijacking.

7700 Emergency (All secondary surveillance radar sites are ready to receive this code at all times).

See the Airman's Information Manual (AIM) for a detailed explanation of identification codes.

904.4 NORMAL PROCEDURES

Not applicable

904.5 PERFORMANCE

Not applicable

904.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

SECTION 905

DIGITAL RPM INDICATOR

Table of Contents

Paragraph		*Page*
905.1	**GENERAL**	**905-3**
905.2	**LIMITATIONS**	**905-3**
905.3	**EMERGENCY PROCEDURES**	**905-3**
905.4	**NORMAL PROCEDURES**	**905-3**
905.5	**PERFORMANCE**	**905-3**
905.6	**WEIGHT AND BALANCE**	**905-3**
905.7	**DESCRIPTION AND OPERATION OF THE SYSTEM**	**905-4**
905.8	**HANDLING, SERVICING AND MAINTENANCE**	**905-6**

Left blank intentionally

905 DIGITAL RPM INDICATOR

905.1 GENERAL

The EXTRA 300/SC is standard equipped with the "P-1000" Digital RPM indicator. Depending on the category in which the aircraft is registered, one of the following instrument models is installed:
P100-230-635-00 (max. 2600RPM)
P100-230-643-00 (max. 2700RPM)

905.2 LIMITATIONS

The operation limitations are not affected by the installation of the "P-1000" Digital RPM indicator.
The model of digital RPM indicator installed must match the applicable RPM limitation approved for the propeller installed. Refer to the applicable noise level limitation included in section 2 or within any relevant supplement.
The face of the indicator is placarded with the unchanged engine RPM operating range. Additionally the operating RPM ranges are indicated by a large green, yellow, and a red LED. These LEDs are located on the upper right corner of the indicator face.

Model P100-230-635-00 (max. 2600RPM):

Green	Yellow	Red
2400 / 700	2600 / 2400	3500 / 2600

Model P100-230-643-00 (max. 2700RPM):

Green	Yellow	Red
2400 / 700	2700 / 2400	3500 / 2700

905.3 EMERGENCY PROCEDURES

Not affected.

905.4 NORMAL PROCEDURES

Not affected.

905.5 PERFORMANCE

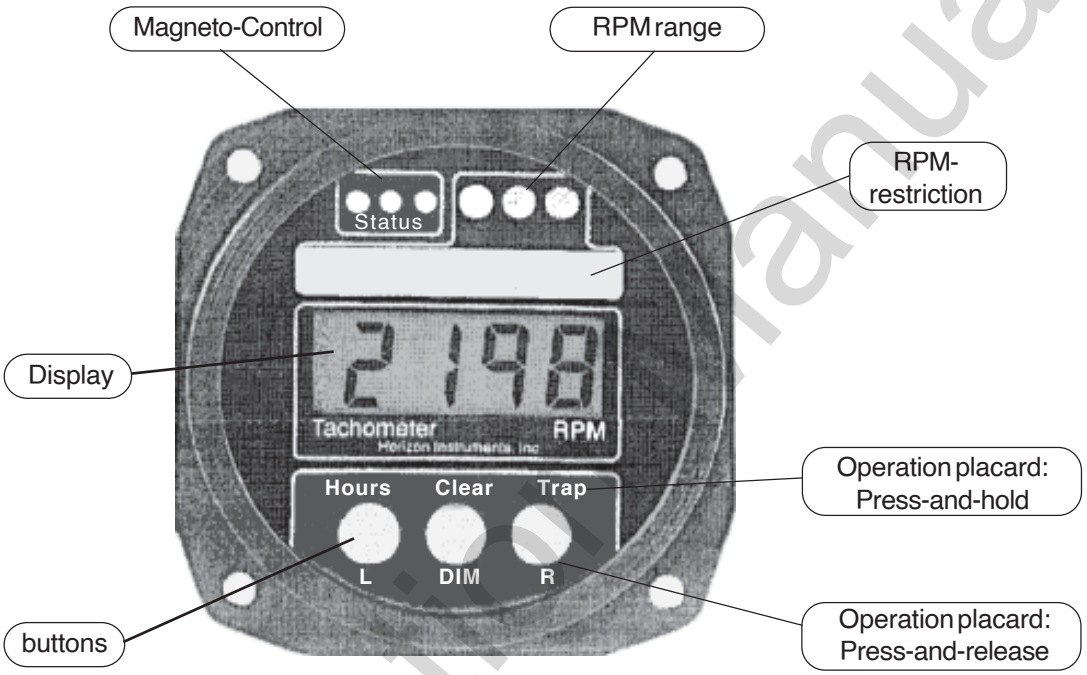
Not affected.

905.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

905.7 DESCRIPTION AND OPERATION OF THE SYSTEM

The operation of the indicator is straight-forward. After power is supplied to the indicator, the engine is started, and the self tests are performed, the default display of the engine RPM appears on the display. The default display is insured via the use of internal timers that will restore the display to the current RPM even in the event that one of the panel buttons becomes stuck or defective.
Internally, two independent tachometers watch the pulses received from each magneto. Each tachometer is accurate to less than 1 RPM and can be individually enabled/disabled via buttons on the face of the indicator.



RPM RANGES

Engine operating ranges are indicated by the large green, yellow, and red LEDs.
These LEDs are located on the upper right corner of the indicator face.

MAGNETO-CHECK

Three small LED magneto system alert indicator lights are located within the "Status" aera on the upper left corner of the indicator face.
The left and right red LED alert indicator lights, when illuminated, indicate, because of loss of ignition signal to the tachometer, a possible malfunction of the respective left or right magneto ignition system.
While performing a magneto check during engine run-up, the red alert indicator lights will illuminate, thus identifying the grounding of the respective right or left magneto systems.

Ignition Switch Position	Tachometer Magneto Alert Indicator Lights	
	LEFT Status LED	RIGHT Status LED
OFF	ON	ON
RIGHT	ON	OFF
LEFT	OFF	ON
BOTH	OFF	OFF

Between the left and right magneto ignition system alert indicators is a yellow **RPM synchronization indicator**. This small yellow indicator is illuminated when there is a difference of more than 50 RPM between the right and left tachometers.

This indicator also may flicker during extreme RPM excursions of the engine.

OPERATION BUTTONS

There are three panel buttons. Each button has two modes of operation.

PRESS-AND-HOLD operation mode

(press and hold for more than 2/3 of a second)

This operation mode is placarded above each button. *(Hours, Clear, Trap)*

Engine time *(Hours)*
The left button, upon depression, will cause the tachometer to display the non-fractional portion (0000.) of the current accumulated engine hours. When the button is released, the fractional part of the engine hours (.00) is displayed for a short period of time. The clock is started whenever the engine RPM exceeds 800 RPM and is recorded in real hours.

Clear (Clear)
The middle button clears the RPM trap. During depression of the switch, the RPM trap is zeroed. When the button is released, the trap will record the current engine RPM.

Engine RPM (Trap)
The right button will cause the tachometer to display the current contents of the RPM trap. This trap records the **highest engine RPM** achieved before the button was pressed.

PRESS-AND-RELEASE operation mode

(press and release in less than 2/3 of a second)

This operation mode is placarded below each button. *(L , DIM , R)*

Masks *(L , R)*
During normal operation, the tachometer presents the average of the left and right internal tachometers on the display. However, a mechanism **exists to mask** either tachometer from the display, leaving the remaining tachometer to determine magneto/ignition problems.

Quickly pressing and releasing the left button *(L)*, causes the tachometer to mask the left tachometer.

Quickly pressing and releasing the right button *(R)*, causes the tachometer to mask the right tachometer.

Dimmer *(DIM)*
Quickly pressing and releasing the middle button *(DIM)*, causes the tachometer to alternately dim or brighten the LED indicators (except the large red LED of the RPM Range).

905.8 HANDLING, SERVICING AND MAINTENANCE

Not affected.

SECTION 906

ACCELEROMETER TL-3424_EXT

Table of Contents

Paragraph *Page*

906.1 GENERAL 906-3

906.2 LIMITATIONS 906-3

906.3 EMERGENCY PROCEDURES 906-3

906.4 NORMAL PROCEDURES 906-3

906.5 PERFORMANCE 906-3

906.6 WEIGHT AND BALANCE 906-4

906.7 DESCRIPTION 906-4

Left blank intentionally

906 ACCELEROMETER TL-3424_EXT

906.1 GENERAL

The TL-3424_EXT accelerometer can be installed as an option in the 300/SC. It is used in a special password protected configuration. This configuration helps the pilot to operate the aircraft within limits and allows supervising the operation by the aircraft manufacturer or e.g. an air race jury.

In detail the TL-3424_EXT accelerometer allows:

1. displaying current acceleration values,
2. displaying the minimum and maximum acceleration,
3. recording of all acceleration and speed values into the long-term memory,
4. recording of any exceedance of limits,
5. storing marks in the long-term memory,
6. warning the pilot before reaching load limits by a sound to hear on the head set,
7. indicating to the pilot, when he has exceeded a load or speed limit by a sound on the head set and the G/V LIMITS WARNING LIGHT and
8. transferring recorded data to a computer.

906.2 LIMITATIONS

Markings and Placards: **G/V LIMITS WARNING LIGHT** next to the red warning light.

906.3 EMERGENCY PROCEDURES

Not affected.

906.4 NORMAL PROCEDURES

Not affected.

906.5 PERFORMANCE

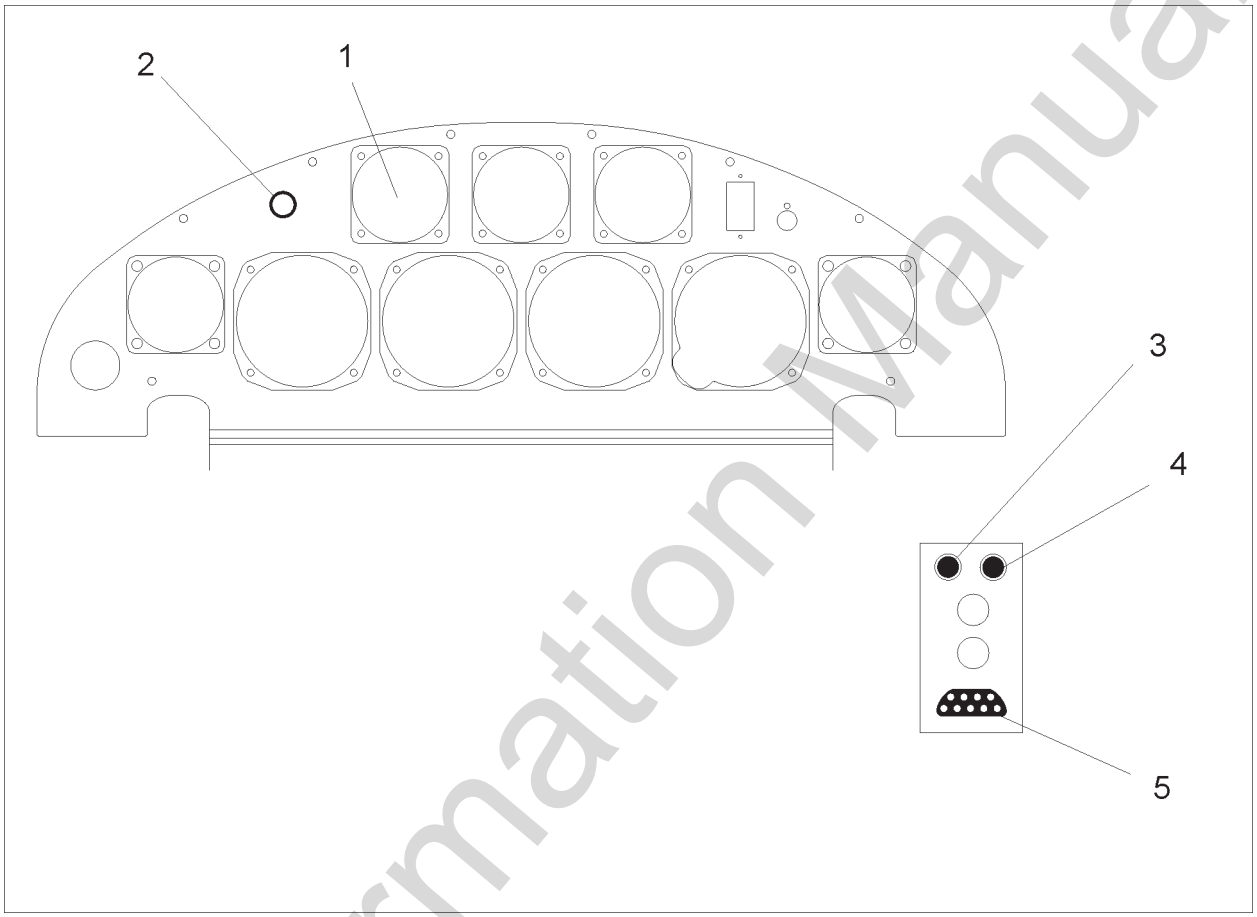
Not affected.

906.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

906.7 DESCRIPTION

The complete installation consists of:



1 TL-3424_EXT Accelerometer

2 G/V LIMITS WARNING LIGHT

3 USER BUTTON

4 CONTROL AND MARKER BUTTON

5 RS-232c (D-SUB 9 pins [female])

The TL-3424_EXT is complete weight acceleration management. The instrument incorporates a high-precision sensor for measuring acceleration in the vertical axis. The instrument also incorporates a sensor connected to the Pitot/static-system for measuring the indicated airspeed.

It is possible to download the measured values from the instrument via the serial cable RS-232c into a PC.

Pressing the Control and Marker Button enters marks into the memory records and enables the user manual control of the memory recording.

The TL-3424_EXT checks all measured values at two levels - for a warning and an alarm limit signalization. If the measured values are above the warning limit and below the alarm limit an intermitted sound is heard on the head set and the G/V LIMIT WARNING LIGHT flashes. If the measured value exceeds the alarm limit a continuous sound is heard on the head set and the G/V LIMIT WARNING LIGHT illuminates continuously.

When the alarm warning has been activated, the instrument will display a service message after the next turn-on of the instrument to inform the user of the exceeded acceleration.

The USER BUTTON is programmed in the main set-up to display the minimum and maximum acceleration overview.

MEMORY

The following memory types are included in the TL-3424_EXT:

1.) A long-term memory storing the last recorded ~30 minutes (20,000 lines, entries every 0.1 seconds).

2.) A „Scheck"-Report storing all cases of limit exceedance and the values in the immediate vicinity of this event (160 lines per case).

3.) A Line Report storing the last 64 values of limit exceedance (acceleration and speed).

A rolling type memory is used. This means, that in case the available memory capacity is exceeded, the oldest memory lines will be overwritten.

PRESETTINGS

The following values or definitions are preset in the special configuration of the TL-3424_EXT:

WARNING MAX	+9.5 g
WARNING MIN	-9.5 g
ALARM MAX	+10.1 g
ALARM MIN	-10.1 g
SPEED LIMIT	220 KIAS
Record begins at	50 KIAS
LANGUAGE	English

SAMPLE RATE	0.1
USER BUTTON	Pressing the button shows the minimum and maximum acceleration on the display or turns out the G & V LIMITS WARNING LIGHT when lit.
CONTROL AND MARKER BUTN.	Pressing the button enters marks into the memory records

SYMBOLS

The following symbols are used in the TL-3424_EXT display.

Display Symbol	Meaning
▷	recording to memory
II	Recording paused
ACC	Acceleration values indicated
up/down arrows	storing expected, release buttons when setting arrows vanish

CONTROLLING THE INSTRUMENT VIA NAV-MENU

There are black labels on the display. Each is affiliated to the left and the right button. The left label is for the Left button. The right label is for the Right button. Before pressing a button, read the information on the label. Its functions are different in every menu.

To store a value into the memory, press both buttons simultaneously. Release buttons when the setting arrows vanish.

SETTING THE DISPLAY BRIGHTNESS

Press and hold both buttons while switching on the TL 3424 to enter the setup.

Follow the menu navigation.

SETTING A MARKER

When recording is indicated by the ▷ symbol press the CONTROL AND MARKER BUTTON to create an entry in the long-term memory.

The message „MARKER # HAS BEEN STORED“ is displayed for one second.

SECTION 907

EXTERNAL POWER

Table of Contents

Paragraph *Page*

907.1 GENERAL 907-3

907.2 LIMITATIONS 907-3

907.3 EMERGENCY PROCEDURES 907-3

907.4 NORMAL PROCEDURES 907-3

907.5 PERFORMANCE 907-4

907.6 WEIGHT AND BALANCE 907-4

907.7 DESCRIPTION OF THE SYSTEM 907-4

907.8 HANDLING, SERVICING AND MAINTENANCE 907-4

Left blank intentionally

907 EXTERNAL POWER

907.1 GENERAL

The EXTRA 300/SC can be equipped with an external power receptacle system (Piper Type socket). This system provides the capability to start the engine independent of the board battery and further allows feeding the electrical system for longer periods.

907.2 LIMITATIONS

The operation limitations are not affected due to the installation of the external power receptacle system.
For the location of the external power receptacle the following placard has to be attached next to the receptacle:

EXTERNAL POWER 12V

For protection of the electrical connection cable against overheating the following placard has to be attached on the instrument panel:

EXTERNAL POWER 12V
DO NOT CRANK FOR MORE THAN 10 SECONDS!
Allow 20 seconds to cool-down between attempts. Repeat up to 6 times.
Then let starter cool for 30 minutes.

907.3 EMERGENCY PROCEDURES

Not affected.

907.4 NORMAL PROCEDURES

The following starting procedures are recommended, however, the starting conditions may necessitate some variation from these procedures.

1. Perform Pre-flight inspection.
2. Set propeller governor control to "High RPM" position.
3. Open throttle approximately 1/4 travel.
4. **Master switch "OFF"**

NOTICE

Risk of damage of electrical system due to reversion of polarity!
Check correct polarity before connecting the power plug to the receptacle.

5. Put the external power plug into the board receptacle.
6. Turn boost pump "ON".

7. Move mixture control to "FULL RICH" until a slight but steady fuel flow is noted (approximately 3 to 5 seconds) and return mixture control to "IDLE CUT-OFF".

   Turn boost pump "OFF".

8. Apply the brakes.

⚠ DANGER

Propeller strike possible.
Do not allow any person to stay close to the propeller area!

NOTICE

Risk of damage due to propeller strike or air stream.
Remove any objects from the propeller operating area! Hold the canopy tight!

9. Start Engine.
10. When engine fires release the ignition switch back to "BOTH".
11. Pull the external power plug from the board receptacle.
12. Move mixture control slowly and smoothly to "FULL RICH".
13. Check the oil pressure gauge. If minimum oil pressure is not indicated within 30 seconds, shut off the engine and determine trouble.
14. **Master switch "ON".**

907.5 PERFORMANCE

Not affected.

907.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

907.7 DESCRIPTION OF THE SYSTEM

The external power receptacle with its spring-loaded door is attached left under the seat and reachable from outside. It is directly connected to the aircraft electrical system and does not feature an inverse-polarity protection (refer to Fig. 7-4). So it is advisable to check correct polarity of the external power plug.
During the engine start, the master switch has to be switched in **"OFF"**-position for the disconnection of the battery from the aircraft electric circuit.

907.8 HANDLING, SERVICING AND MAINTENANCE

Not affected.

SECTION 908

ARTEX ME-406 ELT

Table of Contents

Paragraph *Page*

908.1 GENERAL 908-3

908.2 LIMITATIONS 908-3

908.3 EMERGENCY PROCEDURES 908-4

908.4 NORMAL PROCEDURES 908-4

908.5 PERFORMANCE 908-4

908.6 WEIGHT & CENTER OF GRAVITY 908-4

908.7 SYSTEM DESCRIPTION 908-5
908.7.1 Switch Operation 908-5
908.7.2 Self Test Mode 908-5

908.8 HANDLING, SERVICING AND MAINTENANCE 908-6
908.8.1 Transmitter Test 908-6
908.8.2 Self Test 908-6

Left blank intentionally

908.1 GENERAL

To improve the passive security, the EXTRA 300/SC can be equipped with an optional Emergency Locator Transmitter ARTEX ME-406.

In the event of a crash, the ME-406 activates automatically (automatic fixed „AF" configuration), and transmits the standard swept tone on 121.5 MHz lasting until battery power is gone. This 121.5 MHz signal is mainly used to pinpoint the beacon during search and rescue operations. In addition, for the first 24 hours of operation, a 406 MHz signal is transmitted at 50-second intervals. This transmission lasts 440 ms and contains identification data programmed into the beacon and is received by Cospas-Sarsat satellites. The transmitted data is referenced in a database (maintained by the national authority responsible for ELT registration) and used to identify the beacon and owner.

When the ELT is activated, the buzzer 'beeps' and the panel LED pulses periodically. The time between pulses lengthen after a predetermined transmitter 'on' time.

N O T E

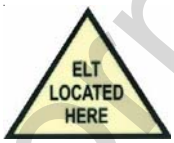
In October 2000 the International Cospas-Sarsat Program, announced at its 25th Council Session held in London, UK that it plans to terminate satellite processing of distress signals from 121.5 and 243 MHz emergency beacons on February 1, 2009.

Accuracy
Doppler positioning is employed using both 121.5 MHz and 406 MHz signals. Position accuracy of the 121.5 MHz signal is within an area of approximately 15-20 km radius about the transmitter. Due to the better signal integrity of the 406 MHz, its location accuracy is within about a 3 km radius.

908.2 LIMITATIONS

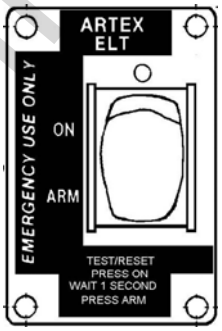
The operation limitations are not effected due to the installation of the ARTEX ME-406 ELT.

For the location and operation of the transmitter the following placards have to be attached to the aircraft:



(outside on the left fuselage in the vicinity of the ELT unit)

ELT (above the ELT circuit breaker; circuit breaker and placard installed up to SN SC027 only)



(next to the ELT remote switch)

(as close to the ELT remote switch as practical)

908.3 EMERGENCY PROCEDURES

- In case of a forced landing turn the remote switch in the rear panel to the "ON" position prior to touch down.

Although the ELT will be activated automatically after an aircraft accident or forced landing with high G-force,

- turn additionally the remote switch in the rear panel to the "ON" position.

After sighting rescue aircraft:

- Switch the remote switch to the "ARM" position to prevent radio interference.
- Attempt contact with rescue aircraft with the radio transceiver set to a frequency of 121.5 MHz. If no contact is established, switch the remote switch to the "ON" position immediately.

If the function of the remote switch is in doubt proceed as follows:

- Use the unit master switch at the ELT unit analogously.

FUNCTION CHECK OF THE ELT

If the aircraft receiver is operable listen on 121.5 MHz for ELT transmission. Ensure that the antenna is clear of obstruction.

908.4 NORMAL PROCEDURES

Not affected.

908.5 PERFORMANCE

Not affected.

908.6 WEIGHT & CENTER OF GRAVITY

Refer to the equipment list in Section 6 of this Handbook.

908.7 SYSTEM DESCRIPTION

The ELT installation consists of the ELT unit and a buzzer, both fastened to the fuselage structure in front of the seat between the pedals, an antenna located on the main fuselage cover behind the cockpit, and a remote switch with LED indication located on the instrument panel. The switch has the positions ARM and ON.

908.7.1 SWITCH OPERATION

In a crash, an acceleration activated crash sensor (G-switch) turns the ELT 'on' automatically when the ELT experiences a change in velocity (or deceleration) of 4.5 fps ±0.5 fps. Activation is also accomplished by means of the cockpit mounted remote switch or the switch on the ELT. To deactivate the ELT set either switch to the 'ON' position, then back to 'ARM'.

The ELT does not have an 'OFF' position. Instead, a jumper between two pins on the front D-sub connector must be in place for the G-switch to activate the unit. The jumper is installed on the mating half of the connector so that when the connector is installed, the beacon is armed. This allows the beacon to be handled or shipped without 'nuisance' activation (front connector removed).

N O T E

The ELT can still be manually activated using the local switch on the front of the ELT. Care should be taken when transporting or shipping the ELT not to move the switch or allow packing material to become lodged such as to toggle the switch.

908.7.2 SELF TEST MODE

Upon turn-off (from „ON" back to „ARM" state), the ELT automatically enters a self-test mode that transmits a 406 MHz test coded transmission that monitors certain system functions before returning to the 'ARM' mode. The transmission is ignored by any satellite that receives this signal, but the ELT requires it to check output power and correct frequency. If the ELT is left activated for approximately 50 seconds or more, a distress signal is generated that is accepted by the satellites.

In addition to 121.5 and 406 MHz signal integrity, other operating parameters are checked during the self-test. Error codes are then generated if other problems are found. The error codes are displayed by a series of „blinks" of the ELT LED, remote LED and audio indicator. See „Installed Transmitter Test" section for more details and a description of the error codes.

N O T E

Any time the ELT is activated, it is transmitting a 121.5 MHz distress signal. Therefore, all activations of the ELT should be kept to a minimum. Local or national regulations may limit testing of the ELT or impose special requirements or conditions to perform testing. For the „self test", Artex recommends that the ELT be „ON" for no more than 5 seconds. Testing should occur during the first 5 minutes after the hour.

908.8 HANDLING, SERVICING AND MAINTENANCE

908.8.1 TRANSMITTER TEST

ARTEX recommends that the ELT be tested every 1-2 months. Follow the steps outlined in the 908.8.2 SELF TEST paragraph.

N O T E

The self-test time is accumulated in a register on the battery pack. The register records activation time in 30 second increments so all activations will count as at least 30 seconds, even if the actual time is much less. Total allowable time is 60 minutes as determined by FAR 91.207 and RTCA DO-204. After this time has been accumulated a 7-flash error will be presented after the self-test. The battery must be replaced at this point for the ELT to remain in compliance. Always follow ELT testing requirements per local or national authorities.

Always perform the tests within the first 5 minutes of the hour. Notify any nearby control tower of your intentions, in accordance with AC 43.13. If outside of the US, always follow all local or national regulations for testing of ELT's.

N O T E

Do not allow test duration to exceed 5 seconds. A false alarm may be generated.

Any time the ELT is activated, it is transmitting a 121.5 MHz distress signal. After approximately 50 seconds, a „live" 406 MHz distress signal is transmitted and is considered valid by the satellite system.

Whenever the ELT is switched from „ON" to „ARM" a 406 MHz signal is transmitted, however, it is specially coded as a „self test" signal that is ignored by the COSPAS-SARSAT satellites.

908.8.2 SELF TEST

• Tune a receiver (usually the aircraft radio) to 121.5 MHz. Turn the ELT aircraft panel switch „ON" for about 1 second, then back to the „ARM" position. The receiver should voice about 3 audio sweeps.

• At turn-off (back to 'ARM' state) the panel LED should present 1 pulse (buzzer will not sound for 1 pulse). If more are displayed, determine the problem from the list below.

1 Flash Indicates that the system is operational and that no error conditions were found.

3 Flashes Bad load detected. Detects open or short condition on the antenna output or cable. These problems can probably be fixed by the installer.

• Check that the RF cable is connected and in good condition. Perform continuity check of center conductor and shield. Check for a shorted cable.

• Check for intermittent connection in the RF cable.

• If this error code persists there may be a problem with the antenna installation. This can be checked with a VSWR meter. Check the antenna for opens, shorts, resistive ground plane connection.

4 Flashes Low power detected. Occurs if output power is below about 33 dBm (2 watts) for the 406 signal or 17 dBm (50 mW) for the 121.5 MHz output. Also may indicate that 406 signal is off frequency. For this error code the ELT must be sent back for repair or replacement.

5 Flashes Indicates that ELT has not been programmed, or is incorrectly programmed. Does not indicate erroneous or corrupted programmed data.

6 Flashes Indicates that the G-switch loop between pins 5 and 12 at the D-sub connector is not installed. ELT will not activate during a crash.

• Check that the harness D-sub jumper is installed by verifying less than 1 ohm of resistance between pins 5 and 12.

7 Flashes Indicates that the ELT battery has too much accumulated operation time (> 1hr, see below). Battery may still power ELT; however, it must be replaced to meet FAA specifications. May also indicate damage to the battery circuit.

Left blank intentionally

SECTION 909

ELECTRIC PEDAL ADJUSTMENT

Table of Contents

Paragraph *Page*

909.1 GENERAL 909-3

909.2 LIMITATIONS 909-3

909.3 EMERGENCY PROCEDURES 909-3

909.4 NORMAL PROCEDURES 909-3

909.5 PERFORMANCE 909-3

909.6 WEIGHT AND BALANCE 909-3

909.7 DESCRIPTION OF THE SYSTEM 909-4

909.8 HANDLING, SERVICING AND MAINTENANCE 909-4

Left blank intentionally

909 ELECTRIC PEDAL ADJUSTMENT

909.1 GENERAL

To improve seat and control convenience, the EXTRA 300/SC can be equipped with an optional electric pedal adjustment system. The pedal adjustment system provides an in-flight capability to adjust the pedals according the pilots size and operation. For example a more relaxed, stretched seating position for long cross-country flights is possible.

909.2 LIMITATIONS

An adjustment of the pedal position during takeoff and landing is not allowed. It is recommended not to adjust the pedals when radio transmissions are made or when the magnetic direction indicator is used.

909.3 EMERGENCY PROCEDURES

Pedal Run-away

Pedal switch	USE in reverse direction of run-away
if no effect:	
Pedal Circuit Breaker	PULL

909.4 NORMAL PROCEDURES

On ground:

Rudder pedals	ADJUST position using the pedal switches CHECK full control inputs rudder and aileron CHECK full rudder deflection while braking

In flight:

Rudder pedals	ADJUST position using the pedal switches CHECK heels reach the pedal swivel axes and aileron control rods are free

909.5 PERFORMANCE

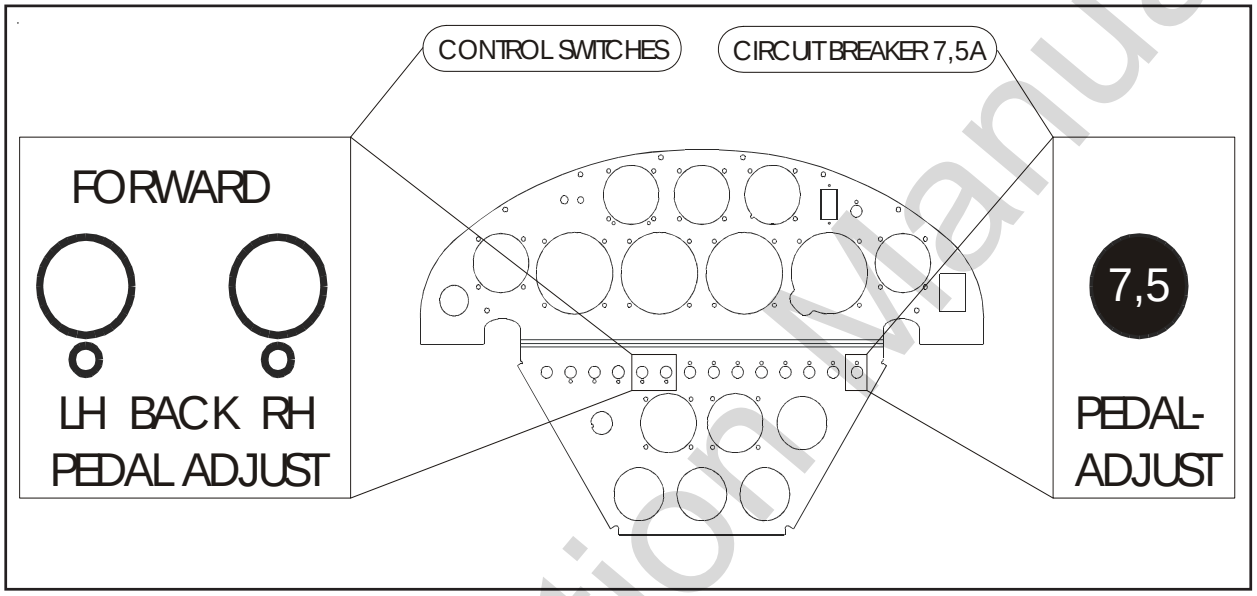
Not affected.

909.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

909.7 DESCRIPTION OF THE SYSTEM

The optional electrical pedal adjustment system which is guided on slide tubes, replaces the mechanical rudder pedal adjustment. Such a pedal system consists of a foot rest and the rudder pedal itself, including brake pedal and brake cylinder. An S-shaped cable leader is attached to the rudder pedal, through which the control cable runs from the rudder actuator arm to the front cable attachment at the steel frame. The stepless pedal adjustment is realized by electromechanical actuators which are controlled separately by switches on the instrument panel (refer to figure below). The total travel of the system is limited to 11.8 cm (4.6") by a front and a rear stop switch at the slide tube attachment. A full travel from the most rearward to the most forward position takes approximately 7 sec.



909.8 HANDLING, SERVICING AND MAINTENANCE

Not affected.

SECTION 910

AIRPLANES REGISTERED IN BRAZIL AND OPERATING UNDER THE AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL REQUIREMENTS

Table of Contents

Paragraph *Page*

910.1 GENERAL 910-3

910.2 LIMITATIONS 910-3
910.2.1 KINDS OF OPERATIONAL LIMITS 910-3
910.2.2 OPERATING PLACARDS 910-4

910.3 EMERGENCY PROCEDURES 910-4

910.4 NORMAL PROCEDURES 910-4

910.5 PERFORMANCE 910-4

910.6 WEIGHT & CENTER OF GRAVITY 910-4

910.7 SYSTEM DESCRIPTION 910-4

910.8 HANDLING, SERVICING AND MAINTENANCE 910-4

Left blank intentionally

910.1 GENERAL

This supplement is approved by the EASA on behalf of the „Agência Nacional de Aviação Civil“ – ANAC for Brazilian registered aircraft, in accordance with the „Regulamento Brasileiro da Aviação Civil“ – RBAC 21, Section 21.29.

The information contained within this supplement is to be used in conjunction with the basic AFM/POH and supplements. The information contained herein supplements or supersedes that in the basic manual and approved supplements only in those areas indicated.

The following POH/AFM supplements are ANAC approved:

Section	Title
901	Steerable Tail Wheel
902	Smoke System
903	BECKER ATC 4401 Transponder
904	BECKER BXP 6401 Transponder
905	Digital RPM Indicator
906	Accelerometer TL-3424_EXT
907	External Power
908	ARTEX ME-406 ELT
909	Electric Pedal Adjustment
911	f.u.n.k.e. TRT800H Transponder
912	Cabin Heating System
913	KANNAD 406 AF COMPACT/INTEGRA ELT
914	EI MVP-50P
915	TRIG TY91 VHF Radio
916	TRIG TT21/22 Transponder

Compliance with the limitations contained in the basic manual and approved supplements is mandatory.

Foreign operating rules and any references to such rules in the basic manual and approved supplements are not applicable in Brazil. The a ircraft must be equipped and operated in accordance with Brazilian operating requirements.

N O T E

A Kinds of Operation Equipment List may not necessarily apply in Brazil.

910.2 LIMITATIONS

910.2.1 KINDS OF OPERATIONAL LIMITS

Operation is limited to VFR-day. Use of GPS is prohibited as primary means for navigation. GPS may only be used as supplemental means for navigation.

Wide Area Augmentation System (WAAS) functionality:

Since the WAAS is not available in Brazil, any kind of Global Navigation Satellite System (GNSS) approaches is prohibited even though a GPS System installed may be capable of receiving WAAS.

The following equipment list identifies the systems and equipment upon which certification was predicated. The following systems and items of equipment must be installed and operable for the particular kind of operation indicated:

	NORMAL	ACROBATIC
Wing-tip strobe lights	2	2

910.2.2 OPERATING PLACARDS

The following placard has to be attached to the aircraft replacing the related placard in English language:

COMBUSTÍVEL
AVGAS 100/100LL

(adjacent to both wing fuel tank filler caps as well as front and rear fuselage center fuel tank filler cap)

910.3 EMERGENCY PROCEDURES

Not affected.

910.4 NORMAL PROCEDURES

Not affected.

910.5 PERFORMANCE

Not affected.

910.6 WEIGHT & CENTER OF GRAVITY

Not affected.

910.7 SYSTEM DESCRIPTION

Not affected.

910.8 HANDLING, SERVICING AND MAINTENANCE

Not affected.

SECTION 911

f.u.n.k.e. TRT800 Transponder

Table of Contents

Paragraph		*Page*
911.1	**GENERAL**	**911-3**
911.1.1	Features	911-3
911.1.2	Operation	911-4
911.1.3	Display-Contrast	911-6
911.1.4	Flight-ID (FID)	911-6
911.1.5	Display Flight-ID	911-6
911.1.6	Configure Flight-ID	911-6
911.1.7	Transponder Mode selection	911-7
911.1.8	Squawk-Setting	911-7
911.1.9	VFR – Squawk	911-8
911.1.10	ID – Special Position Identification (SPI): “Squawk Ident”	911-8
911.1.11	Error-Codes	911-8
911.2	**LIMITATIONS**	**911-9**
911.3	**EMERGENCY PROCEDURES**	**911-9**
911.3.1	Important Codes	911-9
911.4	**NORMAL PROCEDURES**	**911-9**
911.5	**PERFORMANCE**	**911-9**
911.6	**WEIGHT AND BALANCE**	**911-9**

Left blank intentionally

911.1 GENERAL

N O T E

In order to operate the Mode S transponder it is necessary to request an ICAO 24-bit Aircraft Address at the responsible national aviation authorities. The received Code is assigned to the specific transponder/aircraft and must be configured within the transponder. The 24-bit address is stored in an external memory which allows the transponder being exchanged without requiring any further configuration.

N O T E

The TRT800H owner accepts all responsibility for obtaining the proper license before using the transponder. For this purpose and for detailed and further information refer to f.u.n.k.e. TRT800H Operation and Installation Manual (Doc. No. 03.2125.010.71e).

911.1.1 FEATURES

- Class 1 Level 2es non-diversity Mode S transponder for ground based interrogations at 1030 MHz and response at 1090 MHz
- Replies to (Secondary) Radar Interrogations

  Mode A replies with a Squawk (one of 4096 possible Codes; e.g. flight plan number, Squawk assigned by a controller or the VFR Squawk 7000)

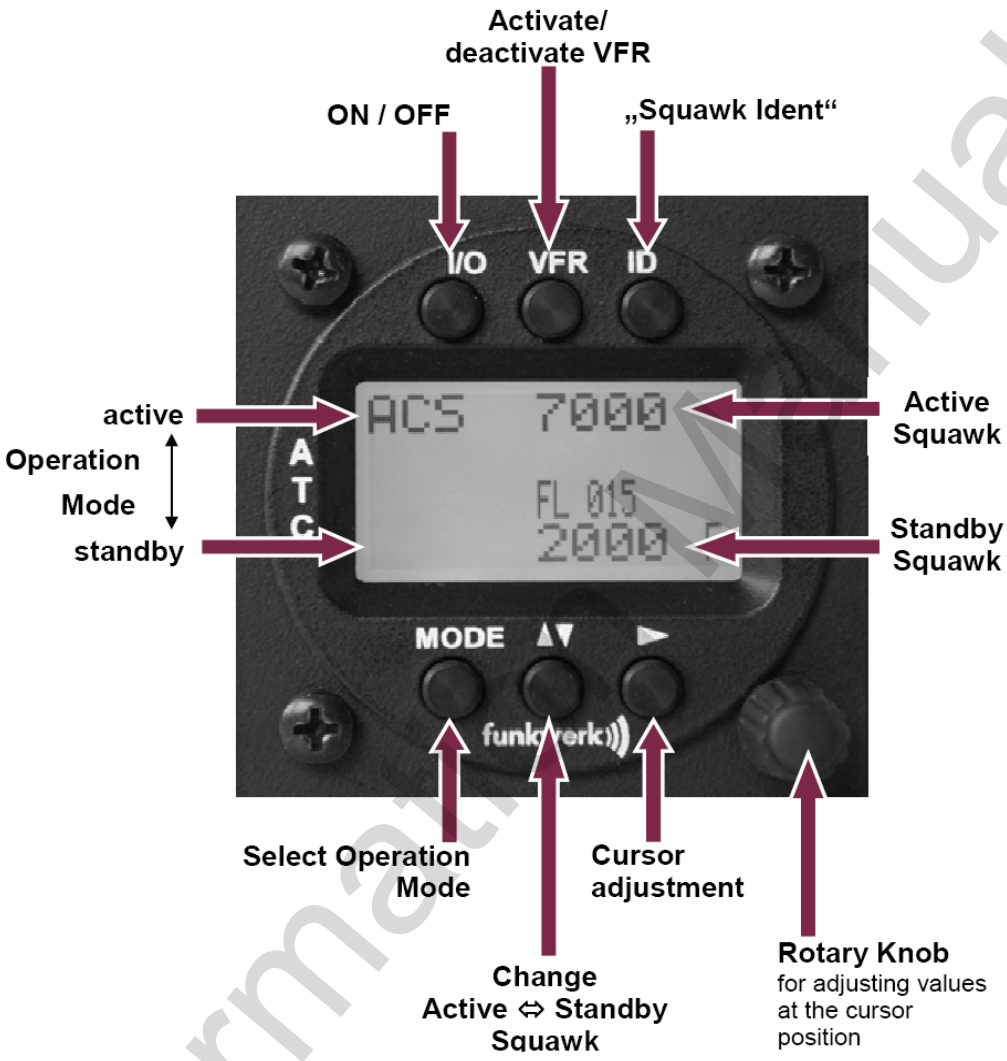
  Mode C replies, including encoded flight level

  Mode S replies, including aircraft address and flight level

  Extended Squitter, containing additional information on position and velocity
- IDENT capability for activating the „Special Position Identification“- Pulse (SPI) for 18 seconds, which is requested by the Controller „Squawk Ident“
- Display information contains Squawk code, mode of operation and pressure altitude.
- Temperature compensated high precision piezo-resistive pressure sensor
- 8 storable entries for AA-/AC-Code, FID, Ground-Switch, RI-Code and GPS-/Interface-setting (stored in external memory TRT800EMxx)

911.1.2 OPERATION

CONTROLS



I/O ON/OFF
Switch ON: press **I/O** button for approx. 0,5 s
Switch OFF: press **I/O** button for approx. 3 s

VFR VFR
activate/deactivate VFR Squawk (press shortly)
store active Squawk as VFR/VFRW-Squawk (press button 3 s)

▼▲CHANGE
change between active and standby-Squawk
works as cursor back button (opposite function of the cursor button) during entering values and also for navigating backwards through the configuration menu.

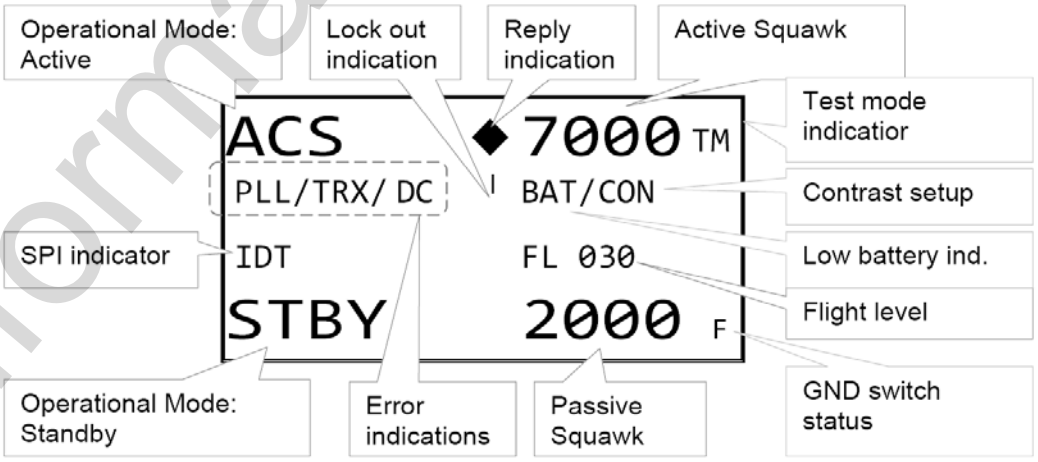
ID IDENT
„Squawk Ident", sends Ident marking (SPI) for 18 s
Enter Flight-ID (FID) setup (in standby mode, press button for approx. 5s)

MODE MODE
Select transponder operational mode

▶CURSOR
Set position of Cursor

● Rotary Knob
Adjust/Enter values at current cursor position, select options; set standby Squawk

DISPLAY



911.1.3 DISPLAY-CONTRAST

In active mode (not standby) press ▶ for 2 s.

Display indicates “CON” Now adjust contrast (CON) with **rotary knob**.

Return to normal operation: press ▶ or wait 5 s.

911.1.4 FLIGHT-ID (FID)

The FID is an identifier required for Mode S Operation. During future application of flight plans a FID could be assigned on a per flight basis. If no FID is assigned (today’s normal case) the registration marking of the aircraft should be used as FID. The FID should not contain dashes or blanks. The FID must not be confused with the 24-bit Aircraft Address.

911.1.5 DISPLAY FLIGHT-ID

Press **MODE** (repeatedly) until „STBY“ appears

Press and hold **ID** while a counter is shown beside the active squawk.

During a few seconds Flight Identification is displayed.

911.1.6 CONFIGURE FLIGHT-ID

Press **MODE** (repeatedly) until „STBY“ appears

Press and hold **ID** while a counter is shown beside the active squawk.

Release **ID** when “CHANGE FID” is displayed

N O T E

Enter FID left-aligned, without any blanks or dashes (!), e.g. 12345621DEFAV for the marking D-EFAV. The last remaining digits shall be filled with blanks.

Enter Flight-Id with ▶ and **rotary knob.**

Press **MODE** to save and return to STBY

Please refer to TRT800H Operation and Installation Manual (Doc. No. 03.2125.010.71e) Section 4.5.4 for configuration of the 24-bit Address (AA) and Aircraft Category (AC).

911.1.7 TRANSPONDER MODE SELECTION

Press **MODE** (repeatedly) to select from following Modes:

- **STBY** „Standby“

  Transponder does not respond to any interrogation. Squitter and ADS-B output is not active.

- **A C S** „Mode A+C+S“

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

- **A – S** „Mode A+S, no C“

  Altitude is not transmitted (neither on C nor on S requests). All other Mode-S data as well as Mode-A replies are transmitted.

  If no 24-bit address (AA) was defined or entered as “000000“ the transponder operates as a Mode A/C transponder, in that case the following Modes are possible apart from Standby:

- **A C –** „Mode A+C“

  Transponder replies only on Mode A and Mode-C interrogations.

- **A – –** „Mode A“

  Transponder replies only on Mode A interrogations.

N O T E

In STBY (Standby) mode, all transponder transmissions are disabled completely! Therefore, the transponder is not visible in this mode to air traffic control or the anti-collision systems onboard other aircraft.
Never use the STBY mode in flight unless you are requested to do so by air traffic control. Always remember to put the transponder in active mode prior to take off!

911.1.8 SQUAWK-SETTING

The active Squawk is displayed in the upper line, while the standby Squawk is presented at the lower line.

Setting the Standby Squawk:

- Press ▶ to set the cursor („^“), turn **rotary knob** to set numbers of the standby Squawk.
- Press ▼▲ to activate the Standby Squawk (this moves the current active Squawk into Standby)

911.1.9 VFR – SQUAWK

The transponder features a user-defined squawk code for VFR-flight (factory setting: 7000):

- Activate VFR-Squawk:

  Press **VFR** („VFR“ is indicated), now the active Squawk is moved into Standby but not visible because the indication of the Standby Squawk is overlapped by „VFR“

- Display Standby Squawk:

  Press **VFR** or ▼▲ or use the **rotary knob** (the VFR Squawk remains active!)

- Now the Standby Squawk can be adjusted by using the **rotary knob** and activated with ▼▲.
- In order to store the current active Squawk as new VFR-Squawk (replacing the factory setting 7000):

  Press and hold **VFR** until an „S“ is indicated (approx. 3 s); after releasing the button „VFR“ is shown.

911.1.10 ID – SPECIAL POSITION IDENTIFICATION (SPI): “SQUAWK IDENT”

Press **ID** to activate transmission of the special position identification pulse with every reply within 18 seconds; “IDT” appears on the display

By pressing **ID** a special position identification pulse (SPI) is transmitted with every reply within 18 seconds, which causes an accented marking on the controller’s screen. The „Special Position Identification“ has to be activated after the „Squawk Ident“ request of the controller.

911.1.11 ERROR-CODES

Value	Meaning	Remarks
PLL	PLL Error	Internal Error
TRX	Transmit Failure	Check antenna and wiring
DC	Low internal voltage	Internal error
FPG	FPGA-Failure	Internal error
BAT	Battery Power too low	maybe battery/generator fault

911.2 LIMITATIONS

Not applicable.

911.3 EMERGENCY PROCEDURES

911.3.1 IMPORTANT CODES

7600 Loss of communications.

7500 Hijacking.

7700 Emergency (All secondary surveillance radar sites are ready to receive this code at all times).

See the Airman's Information Manual (AIM) for a detailed explanation of identification codes.

911.4 NORMAL PROCEDURES

Not applicable.

911.5 PERFORMANCE

Not applicable.

911.6 WEIGHT AND BALANCE

Refer to the Equipment List in Section 6 of this Handbook.

Left blank intentionally

SECTION 912

CABIN HEATING SYSTEM

Table of Contents

Paragraph *Page*

912.1 GENERAL 912-3

912.2 LIMITATIONS 912-3

912.3 EMERGENCY PROCEDURES 912-3

912.4 NORMAL PROCEDURES 912-3

912.5 PERFORMANCE 912-3

912.6 WEIGHT & CENTER OF GRAVITY 912-3

912.7 SYSTEM DESCRIPTION 912-4

912.8 HANDLING, SERVICING AND MAINTENANCE 912-4

Left blank intentionally

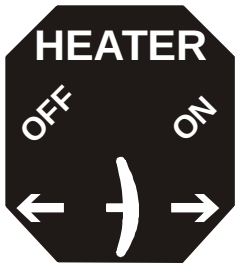
912.1 GENERAL

The 300/SC can be equipped with a cabin heating system, which allows feeding the cockpit with warm air. The system uses fresh outside air, which is heated up by the engine exhaust muffler. The system is controlled by a handle in the cockpit.

912.2 LIMITATIONS

The operation limitations are not affected due to the installation of the cabin heat system.

The following operation placard has to be attached to the aircraft:



(next to the handle)

912.3 EMERGENCY PROCEDURES

Engine fire:

Heater	OFF

912.4 NORMAL PROCEDURES

Not affected.

912.5 PERFORMANCE

Not affected.

912.6 WEIGHT & CENTER OF GRAVITY

Refer to the equipment list in Section 6 of this Handbook.

912.7 SYSTEM DESCRIPTION

On the left front engine baffle a 3" air intake (1, figure 1) with screen is positioned. From there fresh air is routed through a 3" ducting (2) to the exhaust muffler heat shroud (3), where it is heated up. A selector box (4) is placed on the engine side of the firewall. Using the main handle (9) the warm air can there be guided into the cockpit or dumped overboard. A distribution box (5) is located on the aft side of the firewall. The distribution box incorporates the flanges for the 2" ducting (6) to the air outlets (7) at the pilot's feet.

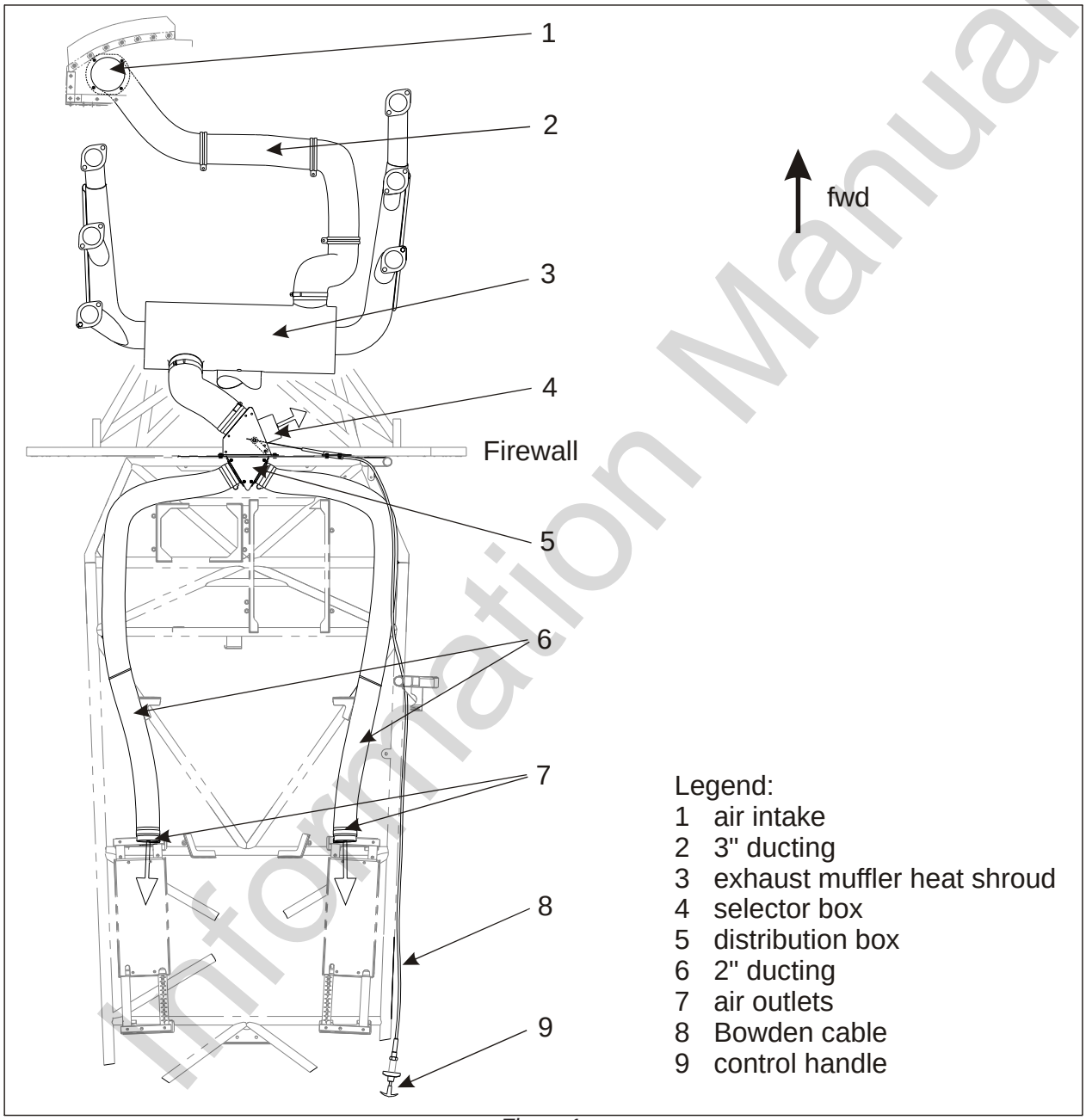


Figure 1

912.8 HANDLING, SERVICING AND MAINTENANCE

Not affected.

SECTION 913

KANNAD 406 AF COMPACT/INTEGRA ELT

Table of Contents

Paragraph		*Page*
913.1	**GENERAL**	**913-3**
913.2	**LIMITATIONS**	**913-3**
913.3	**EMERGENCY PROCEDURES**	**913-4**
913.4	**NORMAL PROCEDURES**	**913-4**
913.5	**PERFORMANCE**	**913-5**
913.6	**WEIGHT & CENTER OF GRAVITY**	**913-5**
913.7	**SYSTEM DESCRIPTION**	**913-5**
913.7.1	Switch Operation	913-6
913.8	**HANDLING, SERVICING AND MAINTENANCE**	**913-6**
913.8.1	Periodic Inspection	913-6
913.8.2	Battery Replacement	913-7

Left blank intentionally

913.1 GENERAL

To improve the passive security, the EXTRA 300SC can be equipped with an optional Emergency Locator Transmitter KANNAD AF 406 COMPACT or INTEGRA ELT.

In the event of a crash, the AF 406 activates automatically (automatic fixed „AF" configuration), and transmits the standard swept tone on 121.5 MHz lasting until the battery is depleted. This 121.5 MHz signal is mainly used to pinpoint the beacon during search and rescue operations. In addition, for the first 24 hours of operation, a 406 MHz signal is transmitted at 50-second intervals. This transmission lasts 440 ms and contains identification data programmed into the beacon and is received by Cospas-Sarsat satellites. The transmitted data is referenced in a database (maintained by the national authority responsible for ELT registration) and used to identify the beacon and owner.

When the ELT is activated, the panel LED pulses periodically. The time between pulses lengthens after a predetermined transmitter 'on' time.

N O T E

In October 2000 the International Cospas-Sarsat Program, announced at its 25th Council Session held in London, UK that it plans to terminate satellite processing of distress signals from 121.5 and 243 MHz emergency beacons on February 1, 2009.

ACCURACY

Doppler positioning is employed using both 121.5 MHz and 406 MHz signals. Position accuracy of the 121.5 MHz signal is within an area of approximately 15-20 km radius about the transmitter. Due to the better integrity of the 406 MHz signal, its location accuracy is within about a 3 km radius.

913.2 LIMITATIONS

The operation limitations are not affected by the installation of the KANNAD AF 406 COMPACT or INTEGRA ELT.

For the operation of the transmitter the following placard is on the front face of the remote switch:

(on the ELT remote switch)

913.3 EMERGENCY PROCEDURES

- In case of a forced landing switch the remote switch in the instrument panel to the "ON" position prior to touch down.

Although the ELT will be activated automatically after an aircraft accident or forced landing with high G-force,

- switch additionally the remote switch in the rear panel to the "ON" position.

After sighting rescue aircraft:

- Switch the remote switch to the "ARM" position to prevent radio interference.
- Attempt contact with rescue aircraft with the radio transceiver set to a frequency of 121.5 MHz. If no contact is established, switch the remote switch to the "ON" position immediately.

If the function of the remote switch is in doubt proceed as follows:

- Use the master switch at the ELT unit analogously.

FUNCTION CHECK OF THE ELT

- If the aircraft receiver is operable, check ELT function by listening on 121.5 MHz for ELT transmission. Ensure that the ELT antenna is clear of any obstructions.

913.4 NORMAL PROCEDURES

It is recommended by the manufacturer to test the ELT to detect any possible failure.

An operational check must be performed regularly by a pilot or maintenance personnel from the cockpit (Remote Control Panel). It is recommended to perform a self-test once a month but it **should not be done more than once a week**.

Each self-test consumes energy from the battery. Should self-tests be carried out more often than the maximum allowed, the battery life-time might be shorter than specified.

SELF-TEST PROCEDURE

- Check that the antenna is correctly connected

Do not perform self-test without antenna connected.

- Tune aircraft radio to 121.5 MHz and adjust volume to ensure you can hear it.
- Switch from position „OFF“ to position „ARM“ or press RESET & TEST on the Remote Control Panel (ensure that the ELT switch is in position „ARM“).

Close to the end of the self-test a short (3-4 sweeps) 121.5 transmission is made.

- confirm this on the aircraft radio.
- After a few seconds, the test result is displayed with the red visual indicator:
- One long flash indicates that the system is operational and that no error conditions were found.
- A series of short flashes indicates the test has failed.

Remark: The number of flashes gives an indication of the faulty parameter detected during the self-test.

Flashes	Meaning
3 + 1	Low Battery Voltage
3 + 2	Low RF Power
3 + 3	Faulty VCO Locking (Faulty Frequency)
3 + 4	No Identification Programmed

If self-test fails, contact the distributor as soon as possible. Unless a waiver is granted, flight should be cancelled.

913.5 PERFORMANCE

Not affected.

913.6 WEIGHT & CENTER OF GRAVITY

Refer to the equipment list in Section 6 of this Handbook.

913.7 SYSTEM DESCRIPTION

The ELT installation consists of the ELT unit fastened to the fuselage structure in front of the control stick between the pedals, an antenna located on the main fuselage cover behind the cockpit, and a remote switch with a red visual indicator (LED) located on the instrument panel. The remote switch has the positions 'ON', 'ARMED' and 'RESET/TEST'.The switch on the ELT unit has the positions 'ARM', 'OFF' and 'ON'.

913.7.1 SWITCH OPERATION

In a crash, an acceleration activated crash sensor (G-switch) turns the ELT ‘on’ automatically. Activation is also accomplished by switching the cockpit mounted remote switch or the switch on the ELT to the 'ON' position. To deactivate the ELT switch the switch on the ELT unit to the ‘OFF’ position.

N O T E

With remote switch disconnected or during transport the ELT can still be manually activated using the local switch on the front of the ELT. Care should be taken when transporting or shipping the ELT not to move the switch or allow packing material to become lodged such as to toggle the switch.

It is possible to stop the ELT in case of unintentional activation:

- Switch to 'OFF'.

Regulations state that no transmission must be interrupted unless all means are used to contact and inform the Air Traffic Controller of this action.

N O T E

As 406 MHz transmission is effective 50 seconds after the ELT activation, if it is switched off within this delay, no further radio contact will be necessary.

913.8 HANDLING, SERVICING AND MAINTENANCE

Refer to the following applicable manufacturer instructions for further detailed information or when working on the Kannad 406 AF ELT:

- Installation and Operation Manual 406 AF-COMPACT ELT (P/N: DOC08038E Rev. 04)
- Initial Installation Manual 406 AF-INTEGRA ELT (P/N: DOC09081C Rev. 02)
- Operation Manual 406 AF-INTEGRA ELT (P/N: DOC09078C Rev. 02)

Manufacturer:

Kannad Aviation (McMurdo Group)
Orolia SAS
Z.I. des 5 Chemins BP 23
56520 Guidel (F)

913.8.1 PERIODIC INSPECTION

Depending if the ELT is opened or not, PART 145 or FAR 145 (or equivalent) may be required. Refer to local regulations.

913.8.2 BATTERY REPLACEMENT

Carried out by an accredited PART 145 or FAR 145 (or equivalent) maintenance station.

BATTERY REPLACEMENT REQUIREMENTS

Battery replacement is mandatory:

- after more than 1 hour of real transmission (cumulated duration);
- before or on the battery expiration date;
- after use in an emergency;
- after an inadvertant activation of unknown duration.

Only an original and approved battery pack included in battery KIT BAT200 (P/N S1840510-01) supplied by KANNAD must be installed. [SAFT-FRIWO , Lithium Manganese Dioxide, 2 x M20 (D-type) cells]

KANNAD refuses all responsibility and invalidates all warranty should other packs be installed.

Battery packs or KITs are available from any KANNAD distributor or dealer.

A list of distributors is available on http://www.kannad.com

Left blank intentionally

Section 914

EI MVP-50P

Table of Contents

Paragraph *Page*

914.1 GENERAL 914-3

914.2 LIMITATIONS 914-3
914.2.1 Instrument Markings 914-3

914.3 EMERGENCY PROCEDURES 914-4

914.4 NORMAL PROCEDURES 914-4

914.5 PERFORMANCE 914-4

914.6 WEIGHT & CENTER OF GRAVITY 914-5

914.7 SYSTEM DESCRIPTION 914-5
914.7.1 Instrument Panel Layout 914-6

914.8 HANDLING, SERVICING AND MAINTENANCE 914-7

Left blank intentionally

914.1 GENERAL

The MVP-50P is a Glass Panel Engine Monitor that provides both analog and digital displays with digits that blink and change colors when yellow or red operating ranges are reached. All of these features are designed to alert the pilot the moment any monitored function exceeds its normal operating limit.

The following features are not available in the configuration installed in the EXTRA 300/SC:

- External dimmer potentiometer
- External warning and caution light
- Voice alarm
- System Screen
- Weight and Balance (not applicable, do not use!)
- Checklists 1 - 3 (not applicable, do not use!)
- Gear warning and TAS Setup Screen
- Pressure Altitude Calibration Screen
- Flaps, Trim and Special Function Calibration Screen
- Calibrating Airspeed
- Gear Position and Unsafe Indicators
- Gear Warning

An additional fuel contents transmitter is installed in the RH wing, when the MVP-50P is used.

This supplement is written for Software Version 2.7 and is not suitable for earlier software versions. This software version corresponds to the MVP-50P Operating Instructions (Doc. OI 1002051 Revision D: 4/25/08). Some differences in operation may be observed when comparing the information in this supplement to later software versions. Verify the information herein with the MVP-50P Operating Instructions you received with your unit. There you will also find further information.

There are two different configurations available:
-MVP-50P-EX-05 max 2600 RPM for Normal Category
-MVP-50P-EX-06 max 2700 RPM for Acro Category

914.2 LIMITATIONS

914.2.1 INSTRUMENT MARKINGS

The following markings deviate from the values given in Section 2 of this Handbook:

RPM INDICATOR (for configuration MVP-50P-EX-05)

green range	2000 rpm - 2600 rpm
red line	2600 rpm

RPM INDICATOR (for configuration MVP-50P-EX-06)

green range	2000 rpm - 2700 rpm
red line	2700 rpm

FUEL PRESSURE INDICATOR

green range	0 psig -	14 psig
red line	14 psig	

914.3 EMERGENCY PROCEDURES

Not affected.

914.4 NORMAL PROCEDURES

During engine start:

MVP-50P	ON

Magneto Check:

Engine RPM	SET to 1800 min^{-1}
MVP-50P	MONITOR engine RPM
Ignition switch position	LEFT
MVP-50P	CHECK RPM drop and "R.Mag Out" warning
RPM	NOTE indicated value
Ignition switch position	RIGHT
MVP-50P	CHECK RPM drop and "L.Mag Out" warning
RPM	NOTE indicated value
Ignition switch position	BOTH
Noted RPM values	COMPARE Difference must not exceed 50 RPM

914.5 PERFORMANCE

Not affected.

914.6 WEIGHT & CENTER OF GRAVITY

Refer to the equipment list in Section 6 of this Handbook.

914.7 SYSTEM DESCRIPTION

The MVP-50P Main Engine Screen displays the primary engine and aircraft instruments. This screen is displayed on power-up and is the screen that should be monitored for most of the flight.

Figure 1, MVP-50 with Main Engine Screen

Buttons operate as follows:

Push-Select	Moves the cursor, selects functions and changes digits.
Exit	Exits out of a field or screen and returns the display to the Main Engine Screen.
Screens	Switches the display between screens as selected in the Screens Button Setup.
Menu	Displays a menu (if available) for the current screen.

To assist the pilot in identifying the current operating band (green, yellow, red, etc.), the MVP-50P displays the digital value for each function in its appropriate color band. When a function reaches a red or yellow operating band, blinking digits for that function will alert the pilot. To acknowledge the alarm and stop the blinking on the MVP-50P display, press any button while viewing the Main Engine Screen. To determine the current operating band for a function, refer to the pointer position in the color band or the color of the digits.

N O T E

Any instrument can fail at any time. Acquire proper training to safely operate this aircraft without the use of this instrument. Refer to the Operating Instructions for further operating and safety information.

914.7.1 INSTRUMENT PANEL LAYOUT

Generally an alternate panel is used to carry the MVP-50. For that reason the circuit breaker layout also changes as shown in Figure 2.

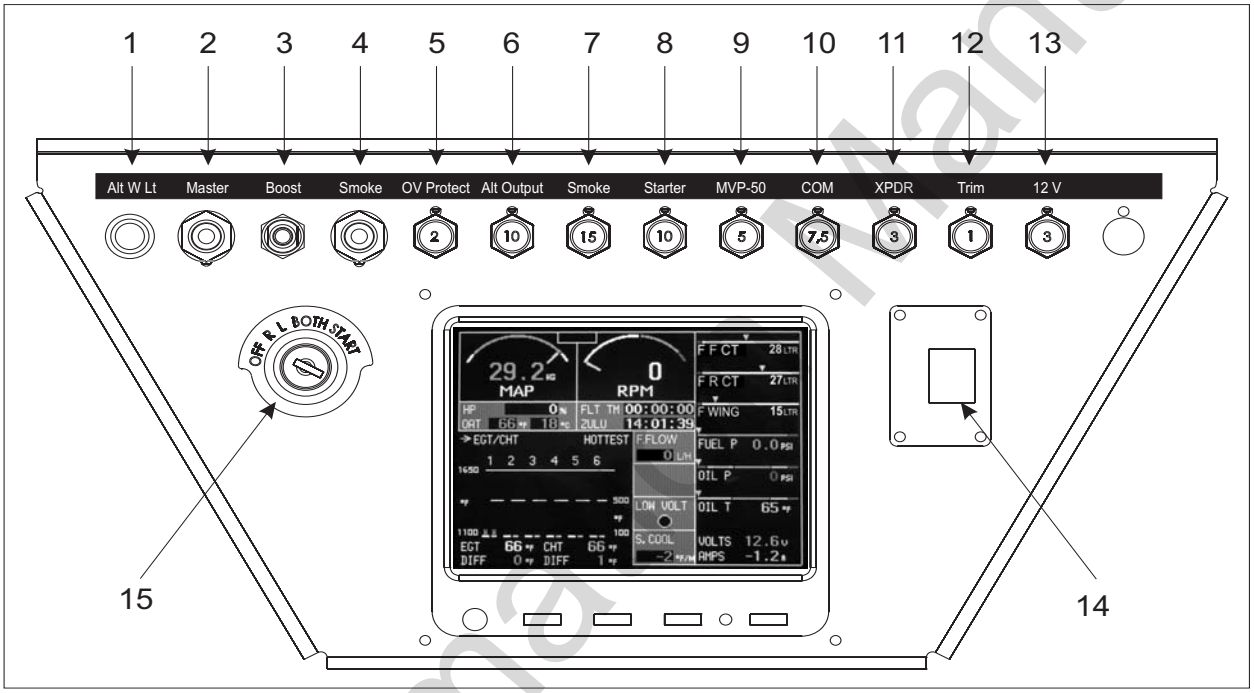


Figure 2, Alternate Panel Layout

Position Fig. 2	Item
1	Alternator warning light incl. press-to-test feature
2	Master switch
3	Boost pump circuit breaker switch
4	Smoke switch, 3-way
5	Overvoltage protection circuit breaker
6	Alternator output circuit breaker
7	Smoke system circuit breaker
8	Starter circuit breaker
9	MVP-50 circuit breaker
10	COM circuit breaker
11	Transponder circuit breaker
12	Electrical trim system circuit breaker
13	12 V circuit breaker
14	ELT Switch
15	Starter switch

914.8 HANDLING, SERVICING AND MAINTENANCE

The Level #1 password (for maintenance) is 00200.

The Level #2 Password (for system configuration) is published only by the aircraft manufacturer.

Left blank intentionally

SECTION 915

TRIG TY91 VHF Radio

Table of Contents

Paragraph *Page*

915.1 GENERAL 915-3

915.2 LIMITATIONS 915-3

915.3 EMERGENCY PROCEDURES 915-3

915.4 NORMAL PROCEDURES 915-3

915.5 PERFORMANCE 915-3

915.6 WEIGHT AND BALANCE 915-3

915.7 DESCRIPTION 915-4
915.7.1 Controls and Indicators 915-4
915.7.2 Frequency Memory 915-5
915.7.3 Stuck Mic Function 915-6
915.7.4 Configuration Mode 915-6
915.7.5 General Low Temperature Operation 915-6
915.7.6 Warning Messages 915-7
915.7.7 Fault Annunciation 915-7

Left blank intentionally

915.1 GENERAL

The TY91 VHF radio system is an ED-23C compliant class C (25 kHz offset carrier) and class E (8.33 kHz single carrier) VHF radio.

The TY91 VHF radio is controlled using a separate front panel controller, called the TC90. This allows the radio to be mounted separately from the instrument panel, and reduces the amount of panel space taken by the VHF radio.

The TC90 is certified to ETSO 2C169a, and TSO C169a.

915.2 LIMITATIONS

The following table lists devices installed and their applicable system software versions.

Device	System Software Version
TY91 VHF Radio	1.5 or later
TC90 controller	1.4 or later

915.3 EMERGENCY PROCEDURES

Not affected.

915.4 NORMAL PROCEDURES

Not affected.

915.5 PERFORMANCE

Not affected.

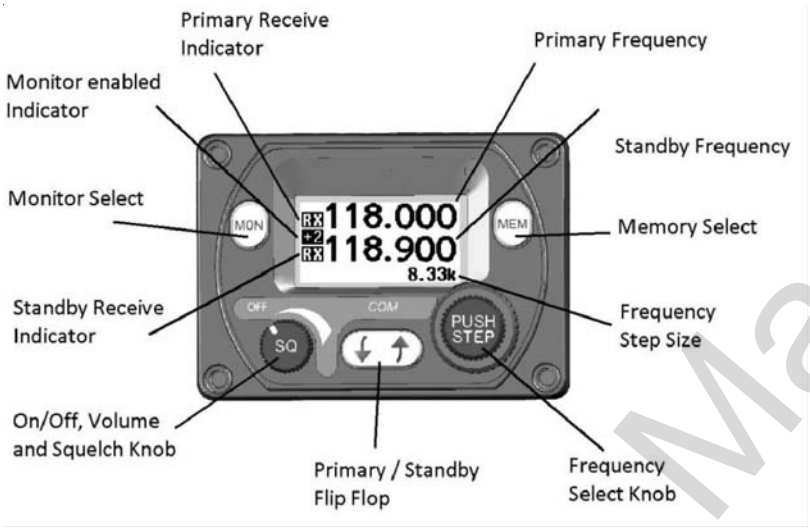
915.6 WEIGHT AND BALANCE

Not affected.

915.7 DESCRIPTION

915.7.1 CONTROLS AND INDICATORS

Front Panel



Display

The display shows the primary and standby frequencies and a series of icons to indicate the operating mode of the radio.

The primary frequency is at the top and the standby frequency is at the bottom half of the screen. The **TX** icon shows that the radio is transmitting. An **RX** icon shows that the frequency is active and the audio will be heard through the headphone and speaker outputs. The standby frequency will only be received during the MONITOR function which is indicated by a **+2** icon when active.

The bottom right hand side indicates what frequency step size is selected.

On/Off, Volume and Squelch Knob

The left hand knob controls the power to the VHF radio, adjusts the audio volume, and controls the squelch. Turning this knob clockwise will switch on the radio and then increase the volume. Turning anticlockwise will reduce the volume and eventually will click off.

Pressing this knob toggles the automatic squelch on and off, which can be used to listen for faint stations and as a simple audio test.

Tuning Knobs

The right hand concentric knobs are used to tune the radio. The large knob adjusts the MHz portion of the standby frequency, and the smaller knob adjusts the kHz portion of the standby frequency.

Pressing the end of the small knob changes the channel spacing that the small knob operates through. If the radio is configured for 8.33 kHz operation, the steps toggle between 8.33 kHz

channels and 25 kHz channels. If the radio is configured only for 25 kHz operation, the steps toggle between 25 kHz and 50 kHz channels.

Changing the step size does not change the behaviour of the radio, only the tuning knob step size – it helps to quickly tune a frequency.

Flip-flop Button

The flip-flop button swaps the frequency in the standby position into the active position, and moves the active frequency to the standby position.

MON Button

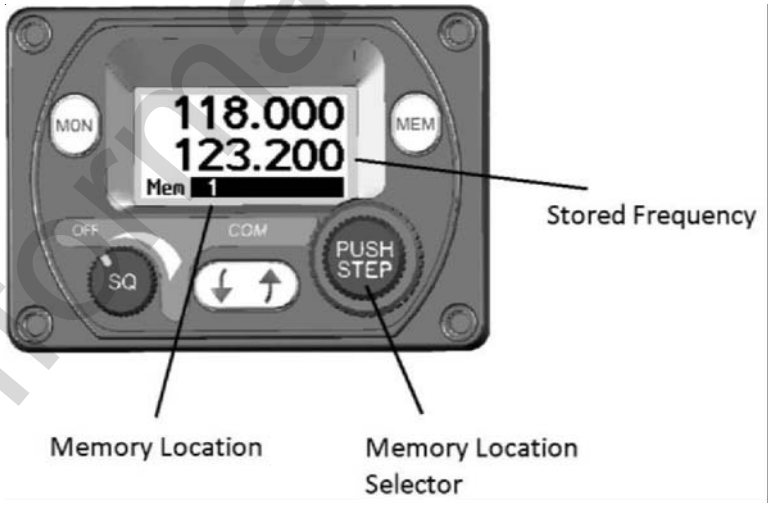
The VHF radio includes a dual-frequency listen feature; pressing the MON button toggles this feature on and off.

When the monitor is active, a **+2** icon appears next to the standby frequency, and the radio will scan between the active and standby frequencies listening for transmissions. The primary channel has priority – a transmission on the primary channel will interrupt the secondary channel. As an aid to identifying which channel is active, the **RX** icon will light next to the active channel and the secondary channel will appear slightly quieter than the primary.

This is useful in an aircraft with only a single radio since it allows you, for example, to copy the ATIS whilst maintaining a listening watch on the ATC frequency.

915.7.2 FREQUENCY MEMORY

If no GPS is connected and the MEM button is pressed, or if the large knob is rotated beyond the remote database the controller will access the internal quick reference memory. There are 9 quick reference memory locations and the bottom edge of the screen will display which memory location is currently selected (1 – 9).



Rotating the small frequency selector knob will step through the memory locations. The standby frequency window will display the stored frequency.

To store a frequency in one of the memory locations it must first be tuned and active as the primary frequency. Press MEM to enter the memory mode in the usual way. Select the channel you want to overwrite with the tuning knobs.

Now press, AND HOLD, the MEM button for 2 seconds. The current active frequency will be moved to the selected memory location, overwriting the existing contents.

915.7.3 STUCK MIC FUNCTION

If the PTT switch is stuck in the ON or transmit position, the radio will automatically cut out after 35 seconds as a safety measure.

915.7.4 CONFIGURATION MODE

Additional setup items can be accessed by holding down the MON button for 5 seconds. The menu options can be selected using the larger inside tuning knob and the parameter value can be altered using the smaller outside tuning knob.

AUX In Volume	Sets the volume level of the auxiliary input
AUX In Mute	Mutes the auxiliary audio when a VHF transmission is received by the radio
Sidetone Volume	Sets the volume level of sidetone heard when transmitting
Radio Squelch	Sets the sensitivity of the radio squelch
Enable 8.33 kHz	Sets the frequency step size to 8.33/25 kHz or 25/50 kHz
Brightness	Sets the LCD backlight brightness

915.7.5 GENERAL LOW TEMPERATURE OPERATION

The TY91 is certified to operate correctly down to -20°C, but at low temperatures the controller display may be impaired. On a cold day you may need to wait for the cockpit to warm up to ensure normal operation.

915.7.6 WARNING MESSAGES

If the VHF radio detects a problem, the screen will indicate WARNING and a brief statement of the problem. Depending on the nature of the problem, your VHF radio may not be working properly. Note the message on the screen and pass that information to your avionics maintenance organisation. Press the flip-flop button to clear the message.

The following warnings may be seen:

Remote Hot	The remote radio is overheating
Stuck Mic	The PTT switch has been closed for more than 35 seconds.
Low Volts	The aircraft power input is below 10 volts.
No Radio	Connection between the controller and the remote radio has been lost.
Radio Fault	The remote radio is reporting an unspecified fault.

915.7.7 FAULT ANNUNCIATION

If the VHF radio detects a catastrophic internal failure, the screen will indicate FAULT and a brief statement of the problem. Note the FAULT message at the bottom of the screen and pass that information to your avionics maintenance organization. The fault may be cleared by re-cycling the power to the radio but if the fault is still present the message will reappear.

Left blank intentionally

SECTION 916
TRIG TT21/22 Transponder

Table of Contents

Paragraph *Page*

916.1 GENERAL 916-3

916.2 LIMITATIONS 916-3

916.3 EMERGENCY PROCEDURES 916-3

916.4 NORMAL PROCEDURES 916-3

916.5 PERFORMANCE 916-3

916.6 WEIGHT AND BALANCE 916-3

916.7 DESCRIPTION 916-4
916.7.1 Controls and Indicators 916-4
916.7.2 Altitude Encoder Warm Up 916-5
916.7.3 General Low Temperature Operation 916-5
916.7.4 ADS-B Monitor 916-5
916.7.5 Display Brightness Control 916-6
916.7.6 Warning Messages 916-6
916.7.7 Fault Annunciation 916-6

Left blank intentionally

916.1 GENERAL

The TT21/TT22 Mode S transponder system is an ED-73C compliant Mode S level 2els datalink transponder, with support for ADS-B extended squitter, elementary surveillance and SI codes, which also meets the relevant environmental requirements of ED-14F.

The TT21 has a nominal power output of 125 Watts, and meets the power output requirements for Class 2. The TT22 has a nominal power output of 250 watts, and meets the power output requirements for Class 1. The ADS-B function meets DO-260B class B0 for the TT21 and class B1S for the TT22. The TT21/TT22 is certified to ETSO 2C112b and ETSO C166a, and to FAA TSO C112c and C166b.

The TT21/TT22 transponder is controlled using a separate front panel controller, called the TC20. This allows the transponder to be mounted separately from the instrument panel, and reduces the amount of panel space taken by the transponder. The TC20 includes an altitude encoder. The TC20 is certified to ETSO 2C112b and ETSO C88a, and to FAA TSO C112c and TSO C88b.

916.2 LIMITATIONS

The following table lists devices installed and their applicable system software versions.

Device	System Software Version
TT21/22 transponder	2.12 or later
TC20 controller	1.14 or later

916.3 EMERGENCY PROCEDURES

Not affected.

916.4 NORMAL PROCEDURES

Not affected.

916.5 PERFORMANCE

Not affected.

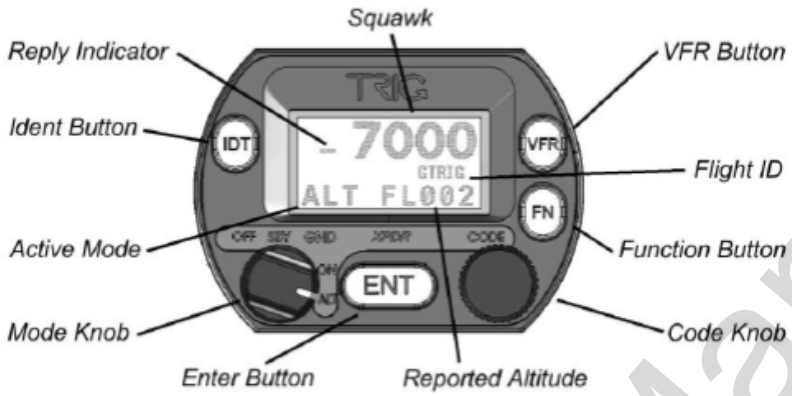
916.6 WEIGHT AND BALANCE

Not affected.

916.7 DESCRIPTION

916.7.1 CONTROLS AND INDICATORS

Front Panel



Display

The display shows the operating mode of the transponder, the reported pressure altitude, and the current squawk code and Flight ID. The reply indicator is active when the transponder replies to interrogations.

The pressure altitude is displayed as a Flight Level, which is the pressure altitude in hundreds of feet. When non-standard atmospheric conditions apply, this may not match the altimeter indicated altitude, but will be correctly displayed by the ATC radar.

Mode Selector Knob

The left hand knob controls the power to the transponder and the operating mode.

OFF Power is removed from the transponder.

SBY The transponder is on, but will not reply to any interrogations.

GND The transponder will respond to Mode S ground interrogations from surface movement radar.

ON The transponder will respond to all interrogations, but altitude reporting is suppressed.

ALT The transponder will respond to all interrogations.

When airborne, the transponder should always be set to ALT unless otherwise directed by Air Traffic Control. When you are taxiing on the ground, the transponder should be set to GND mode. If your installation includes a squat switch or is configured with an automatic air/ground system it will switch automatically and you do not need to manually select the GND position.

Push Buttons

IDT Press the **IDT** button when ATC instructs you to “Ident” or “Squawk Ident”. This activates the SPI pulse in the transponder replies for 18 seconds. IDT will appear in the display.

FN Pressing the **FUNC** button provides access to changing the Flight ID and the ADS-B position monitor (depending on installation) and display brightness control.

VFR Pressing the **VFR** button sets the transponder to the pre-programmed conspicuity code. Pressing the button again restores the previous squawk code.

ENT The ENT button enters a digit in the code selector.

Code Selector Knob

The right hand knob is used to set squawk codes and the Flight ID. The **FN** button selects which will be updated. Turning the knob will highlight the first digit on the display, and the digit can be changed as required. Press the **ENT** button to advance to the next digit. When ENT is pressed on the last digit, the new squawk code or Flight ID will replace the previous value. If the code entry is not completed within 7 seconds, the changes are ignored and the previous code restored.

1200 VFR code in the USA

7000 VFR code commonly used in Europe.

7500 Hijack code

7600 Loss of communications

7700 Emergency code

The Flight ID should correspond to the aircraft call sign entered on your flight plan. If no flight plan is active, the aircraft registration should be used as your Flight ID. Use only letters and digits. If the Flight ID is less than 8 characters long, entering a blank character will end it.

916.7.2 ALTITUDE ENCODER WARM UP

The built in altitude encoder uses a sensor that is temperature dependent. A small internal heater circuit keeps the sensor at the correct temperature. When the ambient temperature is below 0 °C there may be a delay between switching on the transponder and seeing an altitude reported. In very cold weather this delay can be several minutes. You should always switch on the transponder (usually to GND mode) before taxiing to the runway, to ensure that the sensor is operating before you become airborne.

916.7.3 GENERAL LOW TEMPERATURE OPERATION

The transponder is certified to operate correctly down to -25 °C, but at low temperatures the display may be impaired. On a cold day you may need to wait for the cockpit to warm up to ensure normal operation.

916.7.4 ADS-B MONITOR

The ADS-B Monitor is only available on installations that include an ADS-B position source. The ADS-B Monitor provides a display of the position information that is being transmitted in ADS-B position reports. This can provide confirmation that the correct information is being transmitted, particularly where the GPS source is remote from the transponder.

In the event that valid position information is NOT available from the GPS, the latitude and longitude display will be replaced by dashes; if no valid latitude and longitude is shown then ADS-B position information is NOT being transmitted.

Loss of ADS-B position information will also result in a WARNING message being displayed.

916.7.5 DISPLAY BRIGHTNESS CONTROL

Pressing the **FN** button will allow access to change the display brightness. A bar will appear on the display with the title “Brightness” above the bar. Rotate the Code Knob to select the desired brightness level. Press **FN** to save the setting and return to the Squawk code display.

916.7.6 WARNING MESSAGES

If the transponder detects a problem, the screen will indicate WARNING and a brief statement of the problem. Depending on the nature of the problem, your transponder may not be replying to interrogations. Note the message on the screen and pass that information to your avionics maintenance organisation. Press **ENT** to clear the message; if the fault is still present the message will reappear.

916.7.7 FAULT ANNUNCIATION

If the transponder detects a catastrophic internal failure, the screen will indicate FAULT and a brief statement of the problem. No replies will be made to interrogations when a fault has been detected.

Some FAULT indications can be recovered by switching the transponder off and back on again, although in all cases a FAULT code implies that there is a fault with the transponder or the installation. Note the FAULT message at the bottom of the screen and pass that information to your avionics maintenance organization.

SECTION 917
GARMIN G3X TOUCH

Table of Contents

Paragraph		*Page*
917.1	**GENERAL**	**917-3**
917.1.1	Abbreviations and Terminology	917-4
917.2	**LIMITATIONS**	**917-6**
917.2.1	System Software Requirements	917-6
917.2.2	Databases	917-6
917.2.3	Aerobatic Maneuvers	917-6
917.2.4	Synthetic Vision	917-6
917.2.5	Moving Maps	917-6
917.2.6	Terrain Display	917-6
917.2.7	Terrain Alerts	917-6
917.2.8	Traffic Display	917-7
917.2.9	Surface Operations	917-7
917.2.10	Glide Range Ring	917-7
917.2.11	Powerplant Gauge Markings	917-7
917.2.12	Weight and Balance	917-7
917.2.13	Glove Usage	917-7
917.2.14	Screenshots	917-7
917.2.15	Service Required	917-7
917.2.16	Portable Electronic Devices	917-8
917.2.17	Kinds of Operations	917-8
917.2.18	Placards	917-8
917.3	**EMERGENCY PROCEDURES**	**917-9**
917.3.1	ADC Failure (GSU 25)	917-9
917.3.2	Attitude Failure (GSU 25)	917-9
917.3.3	Attitude Aligning / Keep Wings Level	917-9
917.3.4	AHRS ALIGN	917-9
917.3.5	EIS Failure	917-9
917.3.6	G3X Touch Failure Annunciations	917-10
917.3.7	Heading Failure, Loss of Magnetometer Data, or Magnetic Field Error	917-10
917.3.8	PFD Failure	917-10
917.3.9	Navigation Data Failure (GPS)	917-10
917.3.10	TERRAIN ALERTS	917-11
917.3.11	WARNINGs, and CAUTIONs	917-12
917.4	**NORMAL PROCEDURES**	**917-14**
917.4.1	Before Starting Engine	917-14
917.4.2	After Starting Engine	917-14
917.4.3	COM Radio Tuning	917-14
917.4.4	Lateral Navigation	917-15
917.4.5	Barometric Minimums Alert	917-15
917.5	**PERFORMANCE**	**917-15**
917.6	**WEIGHT AND BALANCE**	**917-15**

917.7 SYSTEM DESCRIPTION 917-15
917.7.1 Switch and Circuit Breaker Labels 917-16
917.7.2 Flight Instruments 917-16
917.7.3 Course Deviation Indicator (CDI) 917-18
917.7.4 G-Meter 917-19
917.7.5 Engine Indication System 917-19
917.7.6 Communication / Navigation / Surveillance System 917-19
917.7.7 Minimum Altitude Display and Alerting 917-19
917.7.8 Additional Warnings 917-19
917.7.9 Function Summary 917-20
917.7.10 Electrical System Overview 917-21

917.1 GENERAL

NOTE

This supplement describes only functions and capabilities which are part of the certification (i.e. Day VFR). For information about further features refer to G3X Touch Pilots' Guide. Those further features are NOT part of the certified scope and may only be used for additional information.

The G3X Touch provides one or more of the following functions:

- Primary Flight Display (PFD)
  Provides attitude, air data, heading, and navigation information to the pilot.
- Multi-Function Display (MFD)
  Provides pilot awareness of factors that may affect the overall conduct of the flight such as advanced moving map including terrain, obstacle and traffic alerts, and SafeTaxi® airport diagrams. Georeferenced FliteCharts® or Jeppesen® ChartView™ charts are optional features.
- Engine Indication System (EIS)
  Provides engine and airframe operating parameters to the pilot.

The G3X Touch is installed in the following configuration:

- One GDU 450, 7" touchscreen display, split-screened providing PFD, MFD and EIS functions.

Single 7" GDU 450

This display comes with a built-in GPS receiver for VFR operations and native infrared touchscreen interface.

PFD installation requires the installation of a GSU 25(C) ADAHRS, GMU 11 magnetometer, and the GTP 59 temperature probe.

The EIS functions installed require the installation of a remote mounted GEA 24 Engine Airframe unit and associated engine sensors.

MFD functions are supported by an internal GPS receiver. The COM frequency and STBY frequency can be controlled from the G3X Touch Display.

Use of this supplement requires the installation of Garmin G3X Touch Electronic Flight Instrument hardware and system software version 9.00 or a later software version in the aircraft. Pilots are advised to carefully review the contents of this Airplane Flight Manual Supplement before operating the airplane.

The following table lists the Pilot's Guide applicable to the respective system software version.

System Software Version	Pilots Guide Part Number
9.00 or later	190-02472-00, Rev D or later

917.1.1 ABBREVIATIONS AND TERMINOLOGY

The following glossary is applicable within the airplane flight manual supplement:

AC	Advisory Circular
ADAHRS	Air Data Attitude Heading Reference System
ADC	Air Data Computer
ADS-B	Automatic Dependent Surveillance-Broadcast
AFM	Airplane Flight Manual
AFMS	Airplane Flight Manual Supplement
AHRS	Attitude Heading Reference System
ALT	Altitude
AMMD	Airport Moving Map Display
ATT	Attitude
Baro	Barometric
CDI	Course Deviation Indicator
COM	Communication
DG	Directional Gyro
EIS	Engine Indication System
EMS	Engine Monitoring System
FPM	Feet Per Minute
GDU	Garmin Display Unit
GEA	Garmin Engine and Airframe
GMU	Garmin Magnetometer Unit
GPS	Global Positioning System
GS	Ground Speed
GSU	Garmin Sensor Unit (ADAHRS)
GTP	Garmin Temperature Probe
HDG	Heading

HSI	Horizontal Situation Indicator
IAS	Indicated Airspeed
IBBS	Integrated Backup Battery System
K factor	Fuel flow transducer calibration factor
KPH	km/h indication on display
KT	knot indication on display
MFD	Multi-Function Display
N/A	Not Available
NAV	Navigation
NOTAM	Notice to Airmen
NRST	Nearest
PFD	Primary Flight Display
OAT	Outside Air Temperature
OBS	Omni Bearing Selector
REV	Revision or Reversion
RPM	Revolutions per Minute
SD Card	Secure Digital Card
STBY	Standby
SYNC	Synchronize
TAS	True Airspeed
TAWS	Terrain Alert and Warning System
TFR	Temporary Flight Restriction
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omni-directional Range
VSI	Vertical Speed Indicator
WAAS	Wide Area Augmentation System
XTK	Cross Track Error

917.2 LIMITATIONS

917.2.1 SYSTEM SOFTWARE REQUIREMENTS

The G3X Touch must utilize the following or later FAA approved software versions for this AFMS revision to be applicable:

Component	Software Version
G3X Touch Electronic Flight Instrument	9.00

NOTE

This section is not intended to be a comprehensive list of approved software. It is intended to provide a means to determine if this AFMS revision is applicable to the software that is installed in the aircraft. Do not use this AFMS revision if the installation has a software version less than that shown in the table above.

917.2.2 DATABASES

Databases identified as intended for helicopters must not be used. These databases are identified by the word “HELI” or “HELICOPTER” in their title, as displayed on the database status page.

Database updates via SD card must be done while the aircraft is on the ground and stationary. Database transfers or updates are prohibited in flight.

917.2.3 AEROBATIC MANEUVERS

Do not conduct aerobatic maneuvers if uninterrupted attitude information is required on the PFD.

917.2.4 SYNTHETIC VISION

The synthetic vision presentation must not be used as the sole reference for aircraft control (without reference to the primary flight instruments).

The synthetic vision presentation must not be used as the sole reference for navigation or obstacle/terrain/traffic avoidance.

917.2.5 MOVING MAPS

Moving map displays (ownship position relative to map features) must not be used as the primary or sole means of navigation or course guidance.

917.2.6 TERRAIN DISPLAY

Maneuvers and navigation must not be based solely on the display of terrain or obstacles on the moving map terrain displays.

917.2.7 TERRAIN ALERTS

Terrain alerts must be inhibited when landing at an airport that is not in the airport database.

917.2.8 TRAFFIC DISPLAY

The display of traffic is intended as an aid to visual acquisition and must not be used as the sole basis for aircraft maneuvering.

917.2.9 SURFACE OPERATIONS

The optional SafeTaxi or Chartview functions shall not be used as the sole basis for ground maneuvering. SafeTaxi and Chartview functions do not comply with the requirements of AC 20-159 and are not qualified to be used as an airport moving map display (AMMD). SafeTaxi and Chartview use is limited to airport surface orientation to improve flight crew situational awareness during ground operations.

917.2.10 GLIDE RANGE RING

In the event of engine failure or engine malfunction, the Glide Range Ring must not be used to determine gliding distance. Refer to the airplanes' Pilot's Operating Manual / Airplane Flight Manual for engine failure emergency procedures and glide distance data.

917.2.11 POWERPLANT GAUGE MARKINGS

Fuel flow values may be in error by as much as 15 % if the K factor calibration is improperly set. Do not depend solely on the fuel flow indication or the fuel totalizer to determine fuel used, fuel remaining, or fuel reserves.

The fuel computer functions must not be used as the primary means of determining the quantity of fuel in the tanks. The aircraft fuel quantity gauge(s) are the primary means of determining fuel quantity.

The Manifold Pressure gauge and the Propeller RPM gauge are the primary means for power setting as described in Section 5 of this Handbook.

The % power display is for information purposes only.

917.2.12 WEIGHT AND BALANCE

The weight and balance tool provided by the G3X Touch is for flight planning purposes only. Consult the aircraft's Pilot's Operating Handbook for the official weight and balance data.

917.2.13 GLOVE USAGE

No device or apparel may cover the pilot's fingers used to operate the G3X Touch display.

917.2.14 SCREENSHOTS

Do not take screenshots of the G3X Touch displays while in flight.

917.2.15 SERVICE REQUIRED

It is prohibited to initiate flight when a "Service Required" advisory is present on the PFD, MFD, or EIS display.

917.2.16 PORTABLE ELECTRONIC DEVICES

Data provided to a portable electronic device from the G3X Touch Bluetooth interface is not approved to replace any aircraft display equipment, including navigation or traffic/weather display equipment.

917.2.17 KINDS OF OPERATIONS

No change.

917.2.18 PLACARDS

(Trim Indication on PFD)

917.3 EMERGENCY PROCEDURES

917.3.1 ADC FAILURE (GSU 25)

ADC FAIL

ADC failure is indicated by:

- Red X over the airspeed and altitude tapes.
- Red X over the vertical speed tape.
- Red X over the TAS and OAT fields.

-> Use primary/mechanical Airspeed Indicator and Altimeter.

917.3.2 ATTITUDE FAILURE (GSU 25)

AHRS FAIL

Attitude failure is indicated by:

- removal of the sky/ground presentation.
- Red X over the sky/ground presentation.
- “ATTITUDE FAIL” on the PFD display.

OR Degraded Attitude is indicated by:

- Amber AHRS ALIGN displayed on the sky presentation

-> Use real horizon as usual.

917.3.3 ATTITUDE ALIGNING / KEEP WINGS LEVEL

If the “ALIGNING KEEP WINGS LEVEL” indication occurs during flight, the G3X Touch has detected an invalid attitude solution and will not display any attitude information.

-> Use the real horizon as usual to maintain 1° nose up pitch and wings level flight. The system will display attitude when internal accuracy tolerances have been met.

-> Limit aircraft attitude to +10° bank, +5° pitch, 200 KTAS or less.

-> If attitude does not return, continue to use the real horizon for aircraft attitude control.

917.3.4 AHRS ALIGN

This annunciation indicates that the AHRS is beginning to fail and the internal sensors are trying to realign themselves. The attitude presentation behind the annunciation is still valid but should be crosschecked using the real horizon.

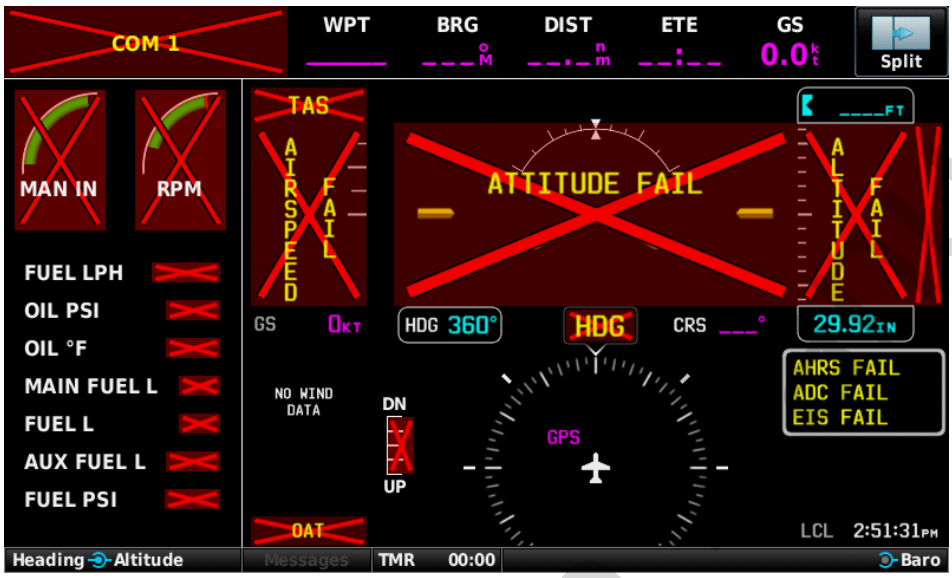
917.3.5 EIS FAILURE

EIS failure is indicated by the loss of displayed information on the EIS, including a blank or frozen display, a red ‘X’ over the display, or an unresponsive display of EIS parameters.

Loss of EIS is not an emergency. The aircraft cannot be operated outside of the engine limitations.

917.3.6 G3X TOUCH FAILURE ANNUNCIATIONS

If a G3X Touch function fails, a large red 'X' is typically displayed over the instrument(s) or data experiencing the failure. Upon G3X Touch power-up, certain instruments remain invalid as equipment begins to initialize. All instruments should be operational within one minute of power-up. If any instrument remains flagged the G3X Touch should be serviced by a Garmin-authorized repair facility.



Red Flags on G3X Screen

917.3.7 HEADING FAILURE, LOSS OF MAGNETOMETER DATA, OR MAGNETIC FIELD ERROR

A heading failure, loss of magnetometer data, or magnetic field error is indicated by removal of the digital heading readout, a red X, and an Amber "HDG" on the display.

-> Use primary magnetic compass.

NOTE

If the G3X Touch DG/HSI has a valid GPS signal the G3X Touch DG/HSI instrument will display the GPS track information in magenta.

917.3.8 PFD FAILURE

PFD failure is indicated by the loss of displayed information on the PFD, including a blank, frozen, or unresponsive display.

-> Use real horizon for attitude, primary flight instruments for airspeed, altitude and magnetic heading, and external navigation data for navigation reference.

917.3.9 NAVIGATION DATA FAILURE (GPS)

Navigation data failure may be indicated by any or all of the following:

- Loss of course deviation information on PFD
- Loss of glidepath information on PFD
- Loss of bearing pointer on HSI

-> Refer directly to external navigation data.

If no alternate navigation sources are available and 'REV' is displayed on HSI:

-> Use the CDI and compass for course information.

-> Use external navigation data for navigation reference.

917.3.10 TERRAIN ALERTS

Aural Alert	Visual Alert	Action
"Terrain Ahead! Pull Up!" "Terrain, Terrain Pull up! Pull Up!" "Obstacle Ahead! Pull Up!" "Obstacle, Obstacle Pull Up! Pull Up!" "Sink Rate, Pull Up!" "Pull Up!"	 -OR-  -OR-  NOTE: The arrow indicates the terrain is outside the Synthetic Vision field of view.	Initiate maximum performance climb (maximum takeoff power and best angle of climb airspeed) NOTE: Only the climb maneuver is recommended, unless it is determined, based on all available information, that turning in addition to climbing is the safest course of action.
"CAUTION, Terrain" "CAUTION, Terrain Ahead" "CAUTION, Obstacle" "CAUTION, ObstacleAhead" "CAUTION, SinkRate"	 -OR-  -OR-  NOTE: The arrow indicates the obstacle is outside the Synthetic Vision field of view.	Take corrective action until the alert ceases. Using all available information to determine the appropriate action, alter the flight path away from the threat by stopping descent, climbing, and/or turning.

917.3.11 WARNINGS, AND CAUTIONS

The following tables show the color and significance of the warning, caution, and advisory messages which may appear on the G3X Touch display.

WARNING Annunciations - Red

Annunciation	*Pilot Action*	*Cause*
Red X	Reference the data source or alternate equipment.	A red X through any display field indicates that display field is not receiving data or is corrupted.
Red Engine Parameter	Take appropriate action to correct condition causing engine parameter exceedance.	The engine parameter has exceeded the warning threshold.
	Select full screen mode on display to view WARNING annunciations.	Display is in split screen mode and WARNING annunciations are not displayed.

CAUTION Annunciations - Amber

Annunciation	*Pilot Action*	*Cause*
HDG (amber background)	Use primary compass	Displayed heading is outside of the internal accuracy limits.
	Select full screen mode on display to view CAUTION annunciations.	Display is in split screen mode and CAUTION annunciations are not displayed.
AHRS ALIGN - Keep Wings Level	Crosscheck attitude indication with real horizon. Limit aircraft attitude to ±10° bank and ±5° pitch as AHRS Aligns - OK to taxi.	Attitude and Heading Reference System is aligning. AHRS may not align with excessive pitch/bank angles.
AHRS ALIGN	Crosscheck attitude indication with real horizon and other sources of attitude information (airspeed, heading, altitude, etc.)	The AHRS monitors have detected a possible AHRS malfunction or an error with the attitude presentation. The AHRS is attempting to realign itself.
AHRS FAIL ATTITUDE FAIL	Use real horizon.	The GSU 25 AHRS has failed.
ADC FAIL	Use primary airspeed and altimeter indicator.	The GSU 25 air data computer has failed.

Annunciation	*Pilot Action*	*Cause*
(Flashing) MESSAGE	Press the flashing message annunciation to view a new system message.	A new system message has annunciated.
Amber EIS Parameter	Take appropriate action to correct condition causing engine parameter exceedance.	The engine parameter has exceeded the caution threshold.
TAWS N/A, TAWS FAIL	Use vigilance, terrain depiction and TAWS alerting is no longer provided.	Database errors or lack of required GPS position.

917.4 NORMAL PROCEDURES

917.4.1 BEFORE STARTING ENGINE

Item	Condition
Database Acknowledgement (PFD)	Press CONTINUE button

NOTE

The data link weather advisory and current database information are displayed during power-up including valid operating dates, cycle number, and database type. When this information has been reviewed for currency (to ensure that no databases have expired), the pilot is prompted to continue.

Item	Condition
AVIONICS switch	OFF
BACKUP BATTERY switch	ON to power EIS

917.4.2 AFTER STARTING ENGINE

Item	Condition
Altimeters	SET (PFD and primary Altimeter)
AVIONICS switch	ON

-> Touch the Barometric Pressure Display on the PFD.
-> Enter the desired pressure using the keypad and touch ENTER.
-> Verify Barometric setting on the primary Altimeter matches the G3X Touch.

or:

-> turn the knob associated with the PFD to set the barometric pressure.

917.4.3 COM RADIO TUNING

The COM Frequency Box is composed of two fields; one active frequency is on the left side and the standby frequency is on the right.

To tune the COM radio:

-> Touch STBY com display window
-> Enter the frequency using the keypad or dual concentric knob
-> Touch ENTER to enter the frequency in the STBY window, or,
-> Touch <-> to transfer the entered frequency directly into the COM window.

To transfer STBY frequency to Active frequency:

-> Touch the Active COM frequency field

917.4.4 LATERAL NAVIGATION

GPS DIRECT TO

-> Press DIRECT TO button
-> Select Waypoint
-> Execute DIRECT TO

GPS OBS

-> Select GPS
-> Select waypoint and make it the active waypoint.

To set the CDI to the desired course:

-> Touch the Selected Course (OBS) window on the PFD.
-> Enter the desired GPS course. Press ENTER
-> Establish Intercept Heading

917.4.5 BAROMETRIC MINIMUMS ALERT

A barometric minimums alert is provided in the G3X Touch to enhance the pilot's awareness of approaching altitude minimums.

Setting the barometric minimums alert bug:

-> On the PFD, Touch the HSI.
-> Touch the Highlight Minimums window.
-> Enter Barometric Altitude Minimums and touch ENTER

917.5 PERFORMANCE

No change.

917.6 WEIGHT AND BALANCE

See current weight and balance data.

917.7 SYSTEM DESCRIPTION

The G3X Touch System increases situational awareness by complementing the traditional instruments on the panel with an easy-to-scan Primary Flight Display (PFD) that features information as listed in the *917.7.9 Function Summary* paragraph.

The mechanical airspeed indicator, altimeter and compass remain the primary instruments.

917.7.1 SWITCH AND CIRCUIT BREAKER LABELS

The following labels are used on the instrument panel together with the GARMIN G3X:

Switches:

Circuit Breakers:

917.7.2 FLIGHT INSTRUMENTS

Attitude information is displayed over a virtual blue sky and synthetic ground with a white horizon line. The Attitude Indicator displays the pitch (indicated by the yellow symbolic aircraft on the pitch scale), roll, and slip/skid information.

The horizon line is part of the pitch scale. Pitch markings occur at 2.5° intervals through all pitch ranges.

The inverted white triangle indicates zero on the roll scale. Major tick marks at 30° and 60° and minor tick marks at 10°, 20°, and 45° are shown to the left and right of the zero. Angle of bank is indicated by the position of the pointer on the roll scale. Slip/skid is indicated by the location of the ball.

Bezel Overview (GDU 450)

NRST key Press to display the Nearest Page for viewing the nearest airports, intersections, NDBs, VORs, waypoints, frequencies, and airspaces

Direct-To k. Press to activate the Direct-To function, enter a destination waypoint establish a direct-to course to the selected destination

MENU key Press once to view the Page Menu
Press twice to view the Main Menu
Press a third time to clear the Main Menu enabled.

BACK key Press to return to the previous screen
Press and hold to return to the default MFD Page

Pointers

The Standard Rate Turn Bank Angle Pointers are green pointers displayed on the roll scale that show the bank angle corresponding to a standard rate turn.

Standard Rate Turn Bank Angle Pointers

Turn Rate Indicator

The Turn Rate Indicator is located at the top of the HSI. Tick marks to the left and right of the displayed heading denote standard turn rates (3 deg/sec). A magenta Turn Rate Trend Vector shows the current turn rate. The end of the trend vector gives the heading predicted in 6 seconds, based on the present turn rate. A standard-rate turn is shown on the indicator by the trend vector stopping at the standard turn rate tick mark, corresponding to a predicted heading of 18° from the current heading. At rates greater than 4 deg/sec, an arrowhead appears at the end of the magenta trend vector and the prediction is no longer valid.

Airspeed Indicator

The Airspeed Indicator may be displayed as a vertical tape or a round dial. When the Airspeed Indicator is displayed as a tape, it displays a range of 35 knots (or 70 KPH) on a rolling number gauge using a vertical tape. Numeric labels and major tick marks are shown at intervals of 10 KT (or 20 KPH). Minor tick marks are at intervals of 5 KT (or 10 KPH). The current airspeed is displayed in the black pointer. The True Airspeed (TAS) is displayed above the scale in white digits and the Ground Speed (GS) is displayed below the scale in magenta digits.

Altimeter

The Altimeter may be displayed as a vertical tape or a round dial. When the Altimeter is displayed as a tape, it displays 400 feet (or 225 m) of barometric altitude values at a time on a rolling number gauge using a moving tape. Numeric labels and major tick marks are shown at intervals of 100 feet (or 25 m). Minor tick marks are at intervals of 20 feet (or 5 m). The current altitude is displayed in the black pointer. The barometric pressure setting is displayed below the Altimeter in inches of mercury (in Hg) or hectopascals (hPa) when metric units are selected.

The Selected Altitude is displayed above the Altimeter in the box indicated by a selection bug symbol. A bug corresponding to this altitude is shown on the altimeter; if the Selected Altitude exceeds the range shown on the tape, the bug appears at the corresponding edge of the tape.

The Altitude Alerting function provides the pilot with visual and aural alerts when approaching the Selected Altitude. Whenever the Selected Altitude is changed, the Altitude Alerter is reset. The following will occur when approaching the Selected Altitude:

- Passing within 1000 feet (305 m[1]) of the Selected Altitude, the Selected Altitude (shown above the Altimeter) flashes for 5 seconds and an aural tone is generated.
- When the aircraft passes within 200 ft (61 m[1]) of the Selected Altitude, the Selected Altitude flashes for 5 seconds and an aural tone is generated to indicate that the aircraft is approaching the selected altitude.
- After reaching the Selected Altitude, if the pilot flies outside the deviation band (±200 feet (61 m[1]) of the Selected Altitude), the Selected Altitude changes to Amber text on a black background, flashes for 5 seconds, and an aural tone is generated.

Vertical Speed Indicator

The Vertical Speed Indicator (VSI) may be displayed as a tape or an arc segment. The VSI displays the aircraft vertical speed using a non-moving tape labeled at 500, 1000 and every 1000 fpm (or 2.5, 5 and every 5 m/s) up to the maximum with minor tick marks every 100 feet up to 1000 fpm (or 0.5 m up to 5 m/s). The current vertical speed is displayed using a white arrow along the scale.

917.7.3 COURSE DEVIATION INDICATOR (CDI)

The HSI contains a Course Deviation Indicator (CDI), with a Course Pointer, To/From Indicator, and a sliding deviation bar and scale. The course pointer is a single line arrow (GPS1) which points in the direction of the set course. The To/From arrow rotates with the course pointer and is displayed when the active NAVAID is received.

The Course Deviation Indicator (CDI) moves left or right from the course pointer along a lateral deviation scale to display aircraft position relative to the course. If the course deviation data is not valid, the CDI is not displayed.

Another Lateral Deviation Scale and combination Course Deviation and To/From Indicator is located below the slip/skid indicator.

Lateral Deviation Indication

The color indicates the current navigation source: magenta (for GPS). The full-scale limits for the CDI are defined by a GPS-derived distance when coupled to GPS. The CDI has the same angular limits as a mechanical CDI. If the CDI exceeds the maximum deviation on the scale (two dots) while coupled to GPS, the crosstrack error (XTK) is displayed below the white aircraft symbol.

In addition to the flight instruments, the PFD also displays supplemental information, including the Outside Air Temperature (OAT), wind data, User Timer, and G-Meter.

[1]) indication can slightly differ from this value due to rounding reasons

917.7.4 G-METER

When switching on the G3X the G-meter indication follows the preset, in which the G-forces are shown when they exceed +2.1 g or -0.5 g.

In the respective menu page you can change the indication of G-forces to permanently ON or OFF. This setting is switched back to the preset with each power cycle.

917.7.5 ENGINE INDICATION SYSTEM

The G3X Touch EIS displays engine, electrical, and other system parameters. Additional EIS information can be viewed by selecting the Eng Page on the MFD.

Green bands on the instruments indicate normal ranges of operation; amber and red bands indicate caution and warning, respectively. When unsafe operating conditions occur, the corresponding caution readout will display solid amber and the warning readout will flash red. If sensory data to an instrument becomes invalid or unavailable, a red “X” is displayed across the instrument.

917.7.6 COMMUNICATION / NAVIGATION / SURVEILLANCE SYSTEM

The Communication/Navigation/Surveillance (CNS) system includes the communication unit. This function can be accessed from the boxes that make up the CNS Data Bar located at the top of the PFD and/or MFD.

CNS Data Bar

917.7.7 MINIMUM ALTITUDE DISPLAY AND ALERTING

When enabled by the pilot, an altitude minimums bug will be displayed in cyan on the barometric altitude tape. Altitude minimums are accessed under the PFD Options Menu -> Minimums sub menu and can be set by touchscreen keypad or dual-concentric knob.

Both visual and aural altitude minimums alerts are provided. During a descent to minimums, the minimums bug will change from cyan to white when the aircraft descends to within 100 ft (30 m[1]) of minimums. An aural “Minimums, Minimums” alert will be triggered when the aircraft’s altitude descends through minimums and the minimums bug will change to Amber. As the aircraft altitude climbs back above minimums, the minimums bug will change to white 50 ft (15 m[1]) above minimums and cyan 150 ft (46 m[1]) above minimums. Alerting is rearmed once the aircraft is 150 ft (46 m[1]) or more above the minimum’s altitude.

917.7.8 ADDITIONAL WARNINGS

The following additional warnings are displayed on the PFD:

Alternator warning: **ALTERNATOR**

Starter engaged warning: **STARTER**

Main bus low voltage warning: **MAIN BUS**

[1]) indication can slightly differ from this value due to rounding reasons

917.7.9 FUNCTION SUMMARY

Flight Instrumentation

altimeter
airspeed indicator
magnetic heading indicator and directional gyro
artificial horizon
vertical speed indicator
slip/turn coordinator
synthetic vision
HSI and GS indicator
wind aloft
OAT
G-meter
flight path marker
trend indicators
true airspeed and ground speed
density altitude

Engine Indication

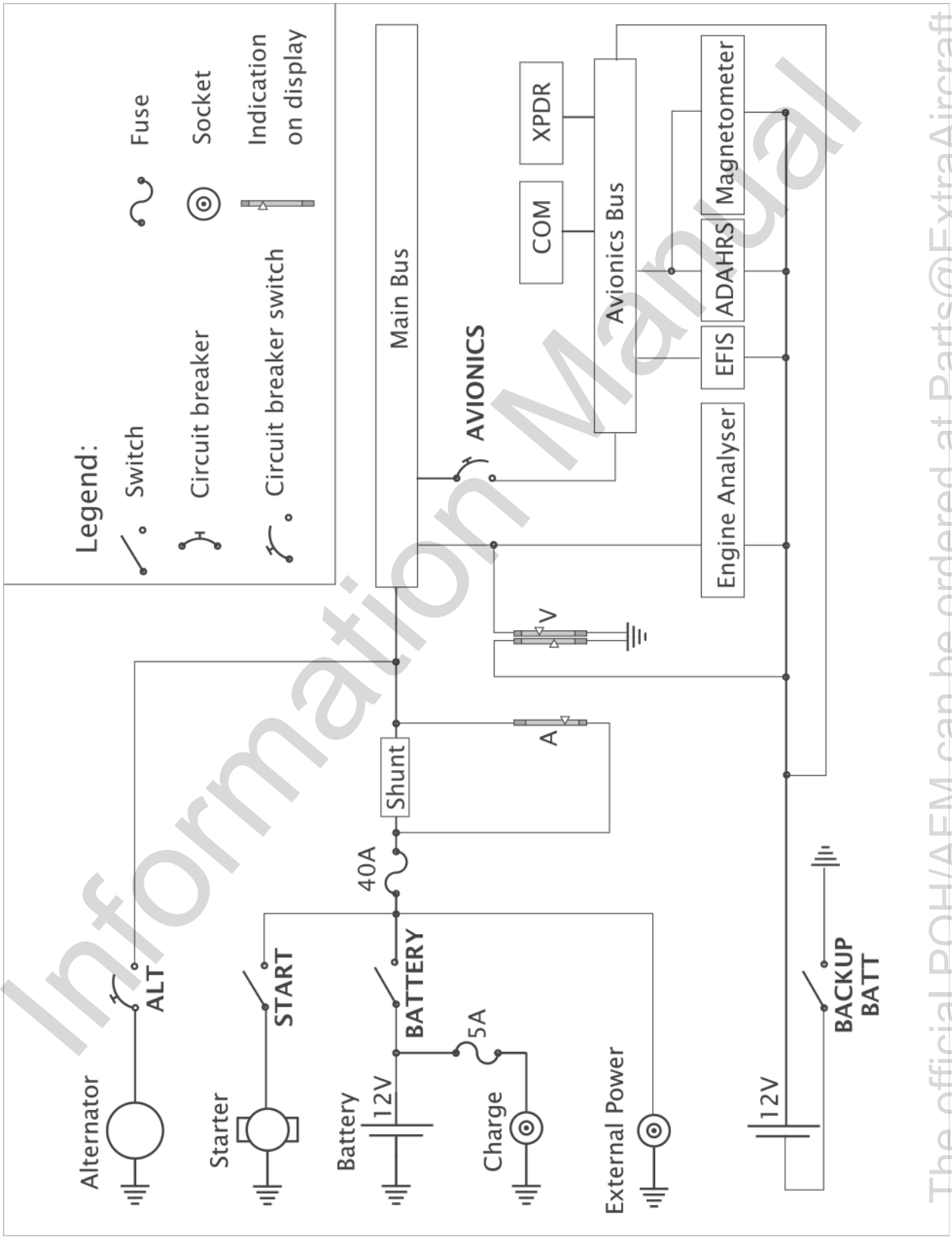
engine speed
manifold pressure
oil temperature
oil pressure
fuel pressure
cylinder head temperature
exhaust gas temperature
fuel flow
fuel computer

System Indication

fuel level
ammeter
trim indication
system voltage
alternator annunciation
starter engaged annunciation
low voltage annunciation
timers and clock

917.7.10 ELECTRICAL SYSTEM OVERVIEW

When the G3X Touch is installed the electrical system of the EXTRA 300/SC is modified as shown in the following Figure:



Left blank intentionally