SERVICE MANUAL
EXTRA 300S

Second Edition

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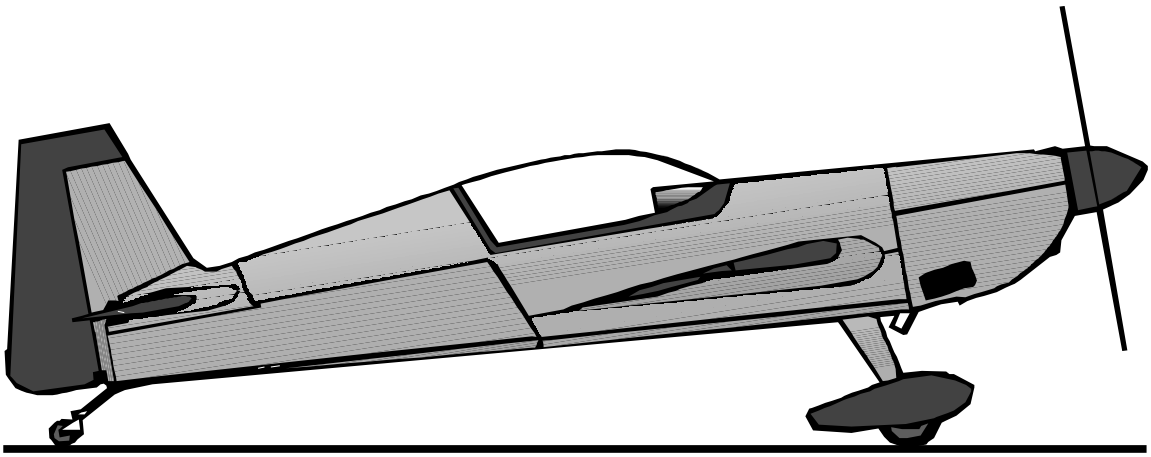

EXTRA - FLUGZEUGBAU GmbH

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2	1. August 1997	1. August 1997	Extra				
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SB-300-3-93	12.01.94	Upper Longeron Cutout-Bridge	01 thr. 17	94-043
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SB-300-3-95	12.05.98	Rudder pedal safety control stop	01 thr. 28	95-443
SB-300-1-01	26.03.01	Securing the wire stirrup of the gascolator bowl	01 thr. 30	-

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FAX MESSAGE

From: ..... Date: .....

Address: .....

.....

Tel. N°: ..... Fax N°: .....

To: EXTRA-FLUGZEUGBAU GmbH Fax N°: .....(49)-2858-913730

Aircraft Description:

Type: ..... Serial No: .....

Flight hours: ..... Landings: .....

O Standard Engine

O other (please specify).....

.....

Equipment installed:

O GOMOLZIG Exhaust silencer
O MTV-14-B-C/C190-17 4-blade propeller
O Steerable tail wheel
O Electrical actuated rudder pedal adjust.
O Accelerometer DSA 12
O ELT Pointer 3000
O Fire extinguisher
O Air induction screen
O P-1000 digital RPM indicator
O External power supply
O Landing gear spring cuffs installed
O Heating system
O other (please specify).....

.....

Detailed Description of Damage or Problem

FAX MESSAGE

From: ..... Date: .....

Address: .....

.....

Tel. N°: ..... Fax N°: .....

To: EXTRA-FLUGZEUGBAU GmbH Fax N°: .....(49)-2858-913730

Aircraft Description:

Type: ..... Serial No: .....

Flight hours: ..... Landings: .....

O Standard Engine

O other (please specify).....

.....

Equipment installed:

O GOMOLZIG Exhaust silencer
O MTV-14-B-C/C190-17 4-blade propeller
O Steerable tail wheel
O Electrical actuated rudder pedal adjust.
O Accelerometer DSA 12
O ELT Pointer 3000
O Fire extinguisher
O Air induction screen
O P-1000 digital RPM indicator
O External power supply
O Landing gear spring cuffs installed
O Heating system
O other (please specify).....

.....

Existing Technical Documentation:

Flight Manual incl. Revisions up to N° .....
Language: .....
Description of optional equipment (see section 9):

O Steerable tail wheel
O Electrical actuated rudder pedal adjust.
O Accelerometer DSA 12
O ELT Pointer 3000
O P-1000 digital RPM indicator
O External power supply

Service Manual incl. Revisions up to N° .....
and Service Bulletins up to S.B. N° .....
Maintenance instructions concerning optional equipment (see CH. 95):

O GOMOLZIG Exhaust silencer
O Steerable tail wheel
O Electrical actuated rudder pedal adjust.
O ELT Pointer 3000
O P-1000 digital RPM indicator
O External power supply
O Heating system

Notice:

Chapter 01

Introduction

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01-00-00 GENERAL

According to the regulations of the FAR part 23, this service manual provides educated maintenancestaff with information necessary for servicing, maintaining and repair of the EXTRA 300S. This manual contains a detailed description of systems including time limits for the particular components, troubleshooting and instructions for the performance of inspection and maintenance work. The instructions, that are necessary for disassembly, check, repair, maintenance or overhaul of vendor equipment are not incorporated in this manual. The modification instructions ("Umrüstanweisungen") of installed optional equipment shall be collected in Chapter 95.

Use the following documents in connection with this service manual:

Aircraft:

- Pilot´s Operating Handbook and Airplane Flight Manual
- Parts Catalogue
- Service Bulletins
- Aircraft Record
- Airplane Log Book and Engine Log Book

N O T E

Check the following Airplane Log Book documents are up-to-date and in accordance with current LBA regulations. Since the regulations of other nations may require other documents and data, owner of exported airplanes should check with their own aviation officials to determine their individual requirements.

Carried in the airplane:

- Aircraft Airworthiness Certificate
- Aircraft Registration Certificate
- Aircraft Radio Station Licence
- Certificate of Insurance
- Weight and Balance Data Sheet and associated papers
- Equipment list

Engine: **Lycoming AEIO-540-L1B5**
Lycoming AEIO-540-L1B5/D

- Operator´s Manual (P/N:60297-21)
- Service Letters, Bulletins and Instructions INDEX
- Service Letters, Bulletins and Instructions

Manufacturer: TEXTRON LYCOMING
Williamsport Division, 652 Oliver Street, Plant 17 701, USA

Propeller: **MTV-9-B-C/C 200-15 (3-blade)**
MTV-14-B-C/C 190-17 (4-blade)

- Operation- and Installation Manual E-124
- Overhaul Manual and Parts List E-220
- Service Bulletins

Manufacturer: MT-Propeller Entwicklung GmbH, Airport Straubing, 94348 Atting, Germany

** refer to the Lycoming Service Instruction No.1374 A and 1374 B*

Magneto: **a) SLICK No. 6251 and 6250 ***
SLICK No. 6351 and 6350
(for Lycoming AEIO-540-L1B5)

- Magneto Maintenance and Overhaul Manual
- Service Bulletins (refer to Lycoming Service Letters, Bulletins and Instructions INDEX)

Manufacturer: SLICK ELECTRO
530 Blackhawk Part Aveneue
Rockford, IL 61101 , USA

b) BENDIX Model No. D6LN-3000
(for Lycoming AEIO-540-L1B5/D)

- Service Bulletins (refer to Lycoming Service Letters, Bulletins and Instructions INDEX)

Manufacturer: TELEDYNE CONTINENTAL MOTORS
P.O. BOX 90 Mobile,
AL 36601,USA

Inverted Oil System: CHRISTEN 801 Series (mod.)

- Product Manual (P/N 03800.33)
- Service Bulletins

Manufacturer: CHRISTEN INDUSTRIE, INC.
1048 Santa Ana Valley Road
Hollister, California 95023, USA

Cleveland Wheels & Brakes

- Maintenance Manual
- Service Bulletins

Manufacturer: Parker Hannifin Corporation
1160 Center Road
Avon, Ohio 44011, USA

Other Vendor Equipment

(Vendor publication should be obtained directly from the vendor.)

- Operation- and Installation Manuals
- Service Bulletins

01-00-01 Trade Marks

Even when the ware or brand names used in this manual are not marked as registered trade-marks, this does not mean, that these names are free in the sens of trademark legislation.

01-10-00 SAFETY

To keep the security risks during the execution of the inspection and maintenance work as low as possible, observe the following points:

- Inspection and maintenance work has to be carried out only by qualified and authorized personnel.
- The execution has to be in accordance with the respective national safety requirements.
- Before beginning any work, this service manual has to be read and understood. In case of doubt or lack of information the manufacturer has to be contacted for advice.
- The safety notes given in this manual are to be observed unconditionally.

Refer to Chapter 02-10-06 for information concerning safety notes.

Chapter 02

How to Use the Service Manual

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02-00-00 GENERAL

The set-up of the manual, the chapters and the handling correspond to the regulations of the Air Transport Association of America, ATA Specification No. 100. Only the numbering of the pages and the layout have been changed to make working with this manual easier.

02-10-00 MANUAL DESCRIPTION

02-10-01 Manual Set-Up

The manual consists of groups, which are subdivided in chapters. Additionally there are preceding pages, which contain the List of Effective Pages, the Lists of Service Bulletins and the Record of Revisions. In the list of chapters the groups are marked by capital characters.

02-10-02 Chapter Set-Up

The chapter numbering system used in this manual represents the chapter set-up. It is a conventional dash-number breakdown. The number is composed of three elements which consist of two digits each:

02-10-02

chapter - section - subject

The first element shows the chapter (here: "How to Use the Service Manual"). The second element shows the first subdivision, which is called "section" (here: "MANUAL DESCRIPTION"). The third element shows the "subject", which is handled within the respective section (here: "Chapter Set-Up"). The first three digits refer to the definitions of the ATA Specification 100, where they exist; the other digits are defined by the manufacturer. If a more detailed

breakdown is necessary, bold faced headlines like the following are used:

Powerplant

02-10-03 Page Numbering

The page numbering begins at the coversheet of each chapter with "Page 1". In contrast to the ATA Specification 100, the particular sections and subjects don't start with a new numbering.

02-10-04 Figure Numbering

The figures are numbered in such a way that the first figure in each chapter starts at "*Figure 1*".

02-10-05 Layout

Apart from the headers and footers the layout consists of two columns. The right column contains text, titles, tables, schedules and figures (figures also can fill the whole page); the left column contains the chapter numbering, boxed textmarkers for notes and safety notes as well as explanations. The following figure1shows more details:

① *manufacturer´s masthead and manual title*

② *section and subject titles*

③ *chapter numbering*

④ *title*

⑤ *bar marking revised parts*

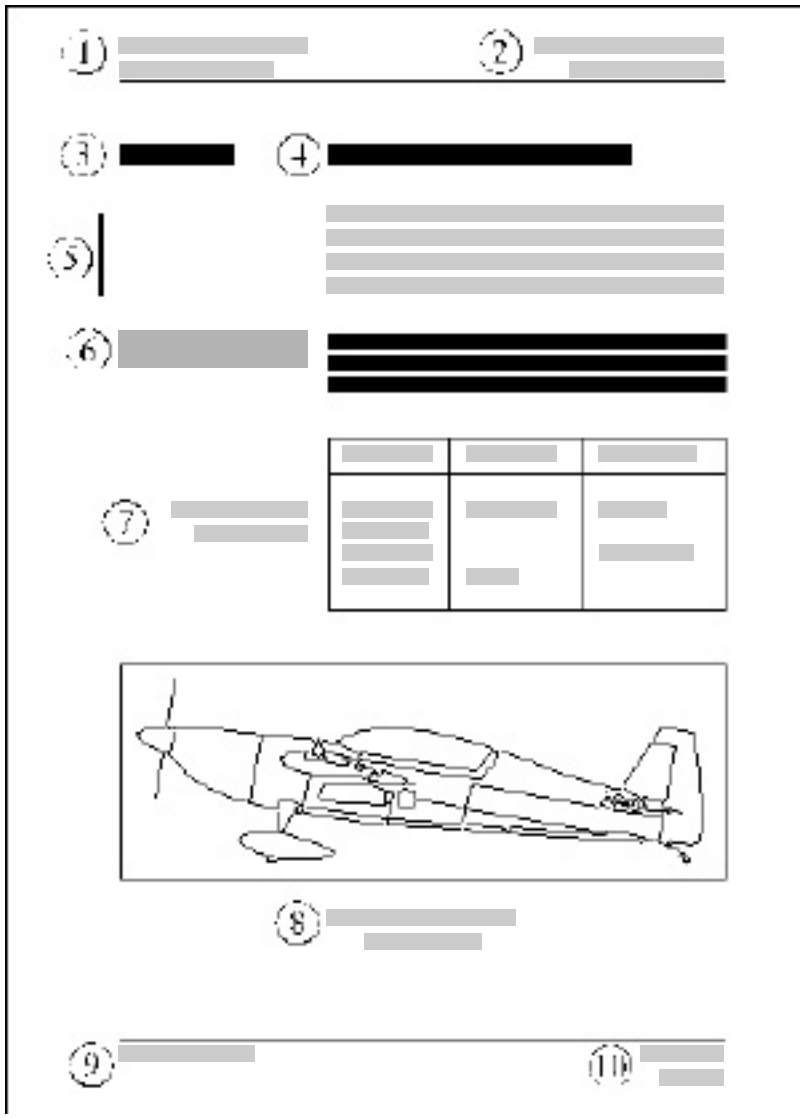
⑥ *boxed textmarker for notes and safety notes*

⑦ *explanations e.g. to tables*

⑧ *figure title and number*

⑨ *date of first issue resp. last revision*

⑩ *chapter and page numbers*



Layout
Figure 1

02-10-06 Notes/Safety Notes

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

D A N G E R

Represents an threatening danger for the personnel. The non-observation of this safety note will result in death or serious injuries.

W A R N I N G

Represents a possibly dangerous situation for the personnel. The non-observation of this safety note may result in injuries.

C A U T I O N

Represents a danger to equipment. The non-observation of this safety note results in destruction of equipment. This safety note does not exclude a possible danger for the personnel.

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

I M P O R T A N T

Represents an important hint. Often used when the non-observation could endanger pilot or passengers during flight.

N O T E

Represents an useful or remarkable hint.

02-20-00 HANDLING

02-20-01 Revisions

On receipt of a Service Manual the owner automatically participates on the revision service for the current revision period (The revision periods start each 1. january and take one year). Further revisions will only be sent to individuals that return the Registration Card they receive at the end of the free revision period. If the owner has changed or revisions (and documentation) are missing, the fax-format on page "I" can be used to initiate the revision service.

N O T E

Pages of this SERVICE MANUAL may not be exchanged and no alterations of or additions to the approved contents may be made without the EXTRA Flugzeugbau GmbH/LBA approval.

If a revision of pages is necessary, observe the following steps:

N O T E

Change revised pages immediately upon receipt.

1 Take out the old pages and destroy them.

2 Insert the new pages following the chapter and page numbers.

3 Replace the old pages "A, C = List of Effective Pages".

4 Enter the date on page"D = Record of Revision" and on page "2 = Record of Revision" of Ch. 04 if necessary.

Each revised page is marked at the bottom by the date of revision; revised parts of the new page are marked by a bar on the left margin.

02-20-02 Service Bulletin

The Service Bulletins describe *which* procedures and *how* and *when* they are to be carried out. Enter the receipt of each Service Bulletin in the Service Bulletin List (page E).

N O T E

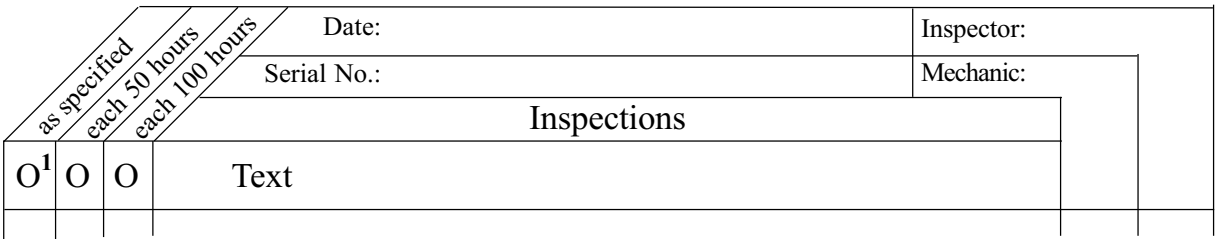
The owner is responsible for incorporating Service Bulletins to the above mentioned Service Bulletins List (page E).

02-20-03 Checklists

Observe the following steps when working with checklists:

1 Copy the respective check list for performing a check.

2 Enter the date at the top of the table.



3 Select the items to be worked out. The "O" at the beginning of the line is written in the column which indicates the point of time when an item has to be worked out. Specification for the first column are given by footnotes.

4 Work out the particular items and sign after execution (responsible mechanic and inspector) using the respective boxes behind the item.

5 After completion of the inspection check file the list with entries in the Aircraft Records.

6 Certify the completion of check in the Aircraft Log Book.

02-20-04 Fax-Formats

When contacting the EXTRA-FLUGZEUGBAU GmbH is advisable in case of questions and/or problems during maintenance of aircraft copy and use one of the Fax-formats You find on the preceding pages ("H-I") for correct identification of aircraft, equipment and existing technical instructions. The data we request there are helpful for us to provide You with the information You need.

Chapter 03

General Description

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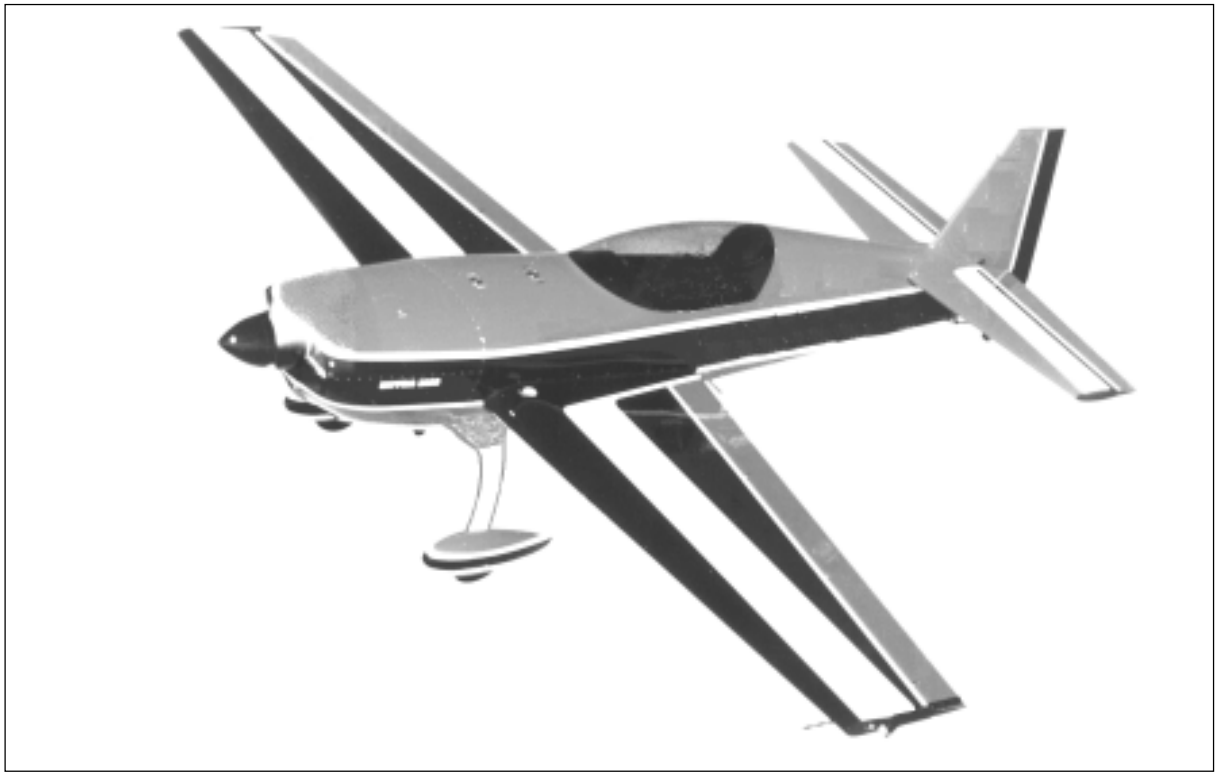
03-00-00 GENERAL

This chapter shows a short survey of the particular systems. A more detailed description of the systems you find in the respective chapters (see: CONTENTS page E).

The Extra EA 300S (refer to Figure 1) is designed as a light weight, single-engine, single-seat, low-wing monoplane using composite and steel materials. It has a fixed main landing gear and a tail wheel unit with full-swivel capability.



View EA 300S
Figure 1

03-10 DESCRIPTION

03-10-01 Construction

Manufacturer:	EXTRA-FLUGZEUGBAU GmbH Flugplatz Dinslaken D-46569 Hünxe, Germany
Fuselage:	steel tube design, covered with fabric and aluminium sheet metal, single piece canopy side hinged
Wing:	fibre composite design
Stabilizers :	fibre composite design
Landing gear:	2 main wheels, 1tail wheel, fibre composite strut design
Seat:	Seat to pedal distance, seat angle and seat back rest adjustable, 5 piece harness

03-10-02 Flight Control System

Pitch control:	push-pull rods
Roll control:	push-pull rods
Yaw control:	cable system
Pitch trim:	trim tab on the right elevator, bowden cable

03-10-03 Brake System

Main wheels:	hydraulically operated disc brakes, hydraulic cylinders actuated by brake pedals
Tail wheel:	no brake

03-10-04 Powerplant

Engine

Manufacturer:	TEXTRON LYCOMING Williamsport Division 652 Oliver Street Williamsport Plant 17 701 USA
Type:	AEIO - 540 L1B5 (6 cyl. air cooled, fuel injection, independent magneto ignition system, inverted flight oil system, special antivibration counter-weights)
or:	AEIO - 540 L1B5D (Same as engine AEIO-540 L1B5, but double magneto)
Rated horsepower:	300 hp at 2700 rpm

Propeller

Manufacturer:	MT Propeller Entwicklung GmbH & Co. KG Airport Straubing D-94348 Atting, Germany
Type:	MTV-9-B-C/C 200-15 (3-blade wood composite, hydraulic variable pitch with constant speed regulator, Propeller diameter: 200 cm)
Optional:	MTV-14-B-C/C 190-17 (4-blade, wood composite, hydraulic variable pitch with constant speed regulator, Propeller diameter: 190 cm)

03-10-05 Fuel System

Tanks:	2 integral wing tanks, 1 center and 1 acro tank behind the firewall (cockpit side)
Fuel supply:	mechanical engine driven pump, additional electrically operated boost pump

03-10-06 Electrical system

Power supply:	engine driven 12 V alternator, integrated DV converter, 28 Ah starter battery, master switch
Circuits:	equiped with automatic circuit breakers
Ignition:	magneto system, independent from electrical power supply

03-10-07 Instruments

Standard (minimal) equipment installed:

Instruments
Air speed indicator (0-240 kts)
Altimeter
Magnetic compass
Compass correction card
Tachometer
Oil pressure indicator
Oil temperature indicator
Manifold pressure indicator
Fuel flow indicator
Exhaust gas temperature indicator
Cylinder head temperature indicator
Ammeter
Fuel quantity indicator (Wing/Center tank)
Acceleration indicator (G-Meter)

Chapter 04

Airworthiness Limitations

Record of Revisions Chapter 04

Rev. No.	Date of Revision	Revised Pages	Description of Revision	LBA Approval Date and Sign of Approval
—	31. January 1995	—	First Edition	

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04-00-00 GENERAL

For each inspection listed here, refer to the applicable Chapter in this manual.

I M P O R T A N T

It is the operator's responsibility to make sure that time limits or life limits for items in this chapter are not exceeded.

The airworthiness limitations items include mandatory replacement times and structural inspection intervals which may only be changed with permission of the applicable airworthiness authority.

This airworthiness limitation section is approved by the regulatory authority and specifies maintenance required under paragraphs 43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been approved by the regulatory authority.

04-00-01 Temperature Limit

Composite structure is qualified up to 72°C (162°F). Structure temperatures above this limit are not approved. Not to exceed this temperature limit, only appropriate colour specification for composite structure as given by the manufacturer document EA-03205.19 must be used when finish restoration is required.

In case of doubt regarding to the classification of colour, contact EXTRA-FLUGZEUGBAU GmbH.

04-00-02 Operating Time

Only the airframe and components as listed in Chapter 04-10-00 are subject to a permissible operating time; concerning all other components recommended replacement times are given in Chapter 05-10-03.

The reliability of the composite primary parts has been convincingly demonstrated by fatique testing (Two times design life 2x6000 = 12000 hrs).

I M P O R T A N T

Every 1000 flight hours the "Significant Items Inspection" contained in Chapter 05-30-00 of this manual must be performed. This 1000 hours inspection releases the aircraft for further 1000 hours operation, up to max. of 6000 hours.

I M P O R T A N T

Prior to 6000 flight hours the "Major Inspection" contained in Chapter 04-20-00 must be performed. This inspection may release the aircraft for further operation, subject to approval of the regulatory authority.

04-10-00 LIFE LIMITED COMPONENTS

04-10-01 General

The replacement time of the life limited components listed in Ch. 04-10-02 must be accomplished not later than the specified period of operation for that component or in accordance with the manufacturer´s service data or airworthiness directives.

04-10-02 Replacement Time

Items shown here must be replaced during the regular maintenance periods.

Item	Replace
Wing	6000 h
Aileron	6000 h
Vertical Stabilizer	6000 h
Rudder	6000 h
Horizonal Stabilizer	6000 h
Elevator	6000 h
Landing Gear Spring	6000 h

04-10-03 Service Life Limited Components

The service life of the EA 300S composite structure as listed in section 04-10-02 has been set to 6000 flight hours. A "Major Inspection" on reaching 6000 flight hours may provide the necessary clearance for further flight. This "Major Inspection" is contained in Chapter 04-20-00.

04-20-00 MAJOR INSPECTION

The EXTRA 300S has been manufactured utilizing the latest knowledge of composite construction and requires new experience about those parts subject to wear. Until now insufficient experience about this point has been acquired. When such information is available it will be accomodated in later revisions of this manual and will include a major inspection procedure.

Chapter 05

Time Limits/Maintenance Checks

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05-00-00 GENERAL

This chapter contains charts for time limits, scheduled maintenance and unscheduled maintenance, and enables licensed personnel to carry out correct inspections on the EXTRA 300S. The periodic inspections and checks described and their recommended time intervals are minimum requirements for maintaining the aircraft in an airworthy condition. Further information will be given by the information service (Service Bulletins, Service Letters, etc.).

If operation of aircraft requires more frequent servicing, the check intervals may be shortened. However the check intervals must not be exceeded without explicit permission from the regulatory authority. Additional checks as well as changes must also be agreed by the regulatory authority.

In general this Manual does not give any information about vendor equipment. Such information can be taken from the vendor equipment maintenance instructions (refer to Chapter 01). However for practicability reason most of the applicable vendor equipment inspections are incorporated in the following checklists. But it has to be noted that the latest editions of inspections given by the vendors remain decisive. So, before beginning an inspection, the inspections of vendor equipment presented here must be compared with the originals referenced under the respective headlines of the checklists, and, in case of doubt (e.g. if originals have changed before changes could be transferred to this Manual by the Revision Service), contact EXTRA-FLUGZEUGBAU GmbH for advice. The maintenance instructions referenced in the checklists are also valid if further inspection of vendor equipment is necessary.

N O T E

For working with checklists refer to Chapter 02-20-03.

D A N G E R

Do not rotate the propeller nor allow any person to stay in the propeller operating area when performing an inspection or check with the master switch "ON" and the battery connected. The engine may be started unintentionally and may cause serious injuries or death.

05-10-00 TIME LIMIT COMPONENTS

05-10-01 General

All components not listed herein should be inspected as detailed in Chapter 05-20 „Maintenance Checks“ and repaired, overhauled as required. It is recommended that overhaul or replacement of components should be accomplished not later than the specified period of operation for that component or in accordance with the manufactures service data or airworthiness directives.

05-10-02 Overhaul Schedule

Items shown here must be overhauled at the times indicated.

Item	Overhaul
Engine (Textron Lycoming)	*
Engine accessories	together with engine
Magneto (Slick)	*
Double magnetos (Bendix)	*
Propeller (MT-Propeller)	*
Governer (Woodward)	*
All other components	on Condition

** refer to latest issue of Manufacturer´s Service Bulletin*

05-10-03 Recommended Replacement Times

It is recommended to replace the items shown in the following schedule at the times indicated. The times may be modificated by the respective national authorities.

Item	Replace
Battery (Sonnenschein)	2 years **
Batteries of the ELT (Pointer)	2 years **
Wheels (Cleveland, Parker)	on Condition
Tires	on Condition
Fuel, oil & brake hoses (Aeroquip)	after first 7 years, then 5 years
Seat belts (Hooker)	6 years **
Brake and Brake Assembly (Cleveland, Parker)	on Condition
Rudder control cable	on Condition
Fairleads	on Condition
Shock mounts (Lord Kinematics, Barry Controls)	on Condition
Bolts and Nuts	on Condition ***

** *on the recommendation of the manufacturer*

*** *if not stated otherwise*

05-20-00 SCHEDULED MAINTENANCE CHECKS

05-20-01 General

Scheduled maintenance checks or tasks must be carried out at 25, 50, 100, 200, 300, 400, 500 and 1000 hour intervals. In addition an annual inspection equal to the 100 hour inspection has to be performed.

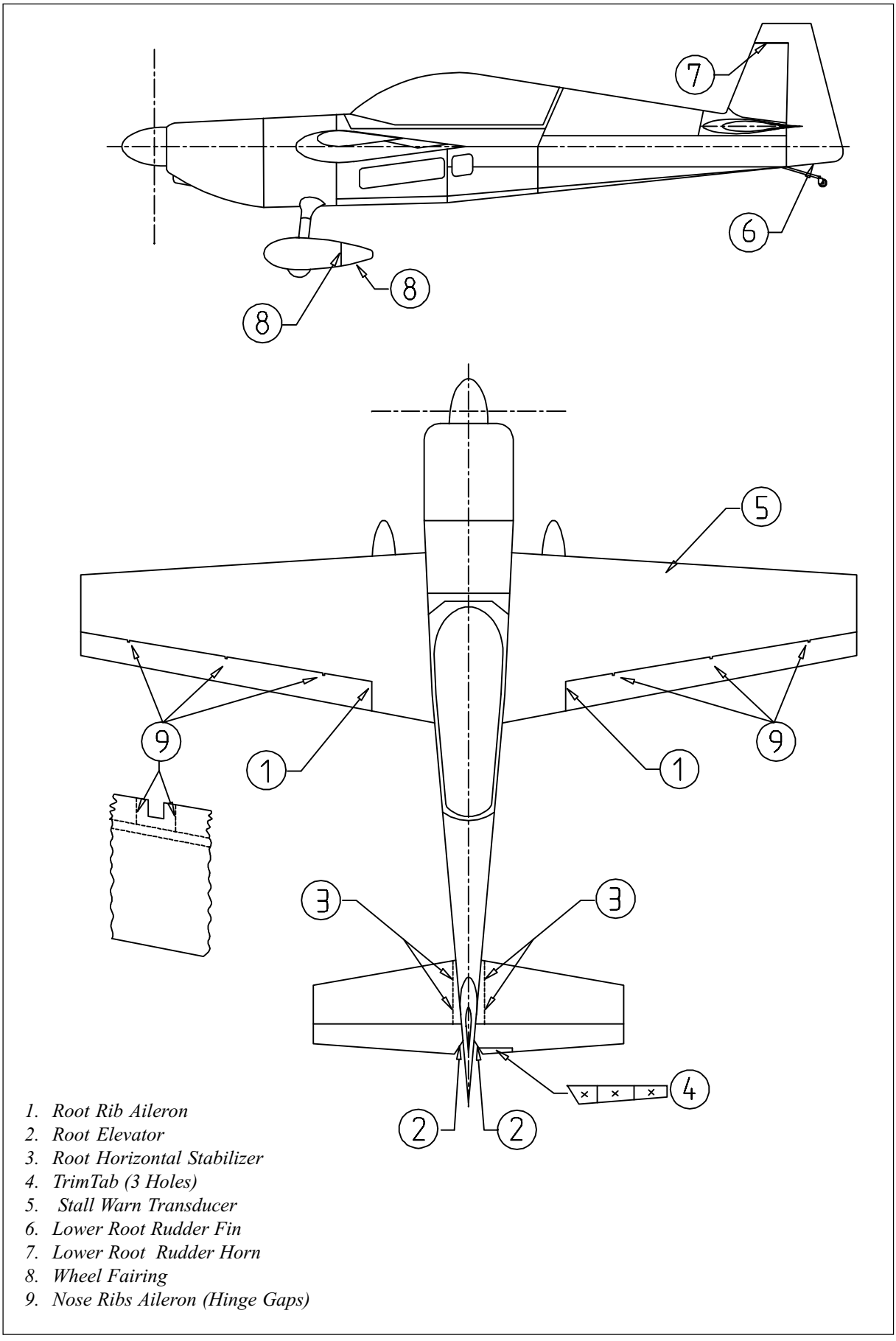
The following pages show a drain hole chart (Figure 1) and lubrication charts (Figures 2 - 4) which can be used in connection with the checklists.

05-20-02 25 Hour Inspection - Engine

A 25 hour inspection is necessary for the engine, because the engine is not equipped with an external oil filter. Therefore the engine oil has to be changed and the oil screen cleaned after every 25 hours. Refer to Figure 2 "Lubrication Chart 25 hours".

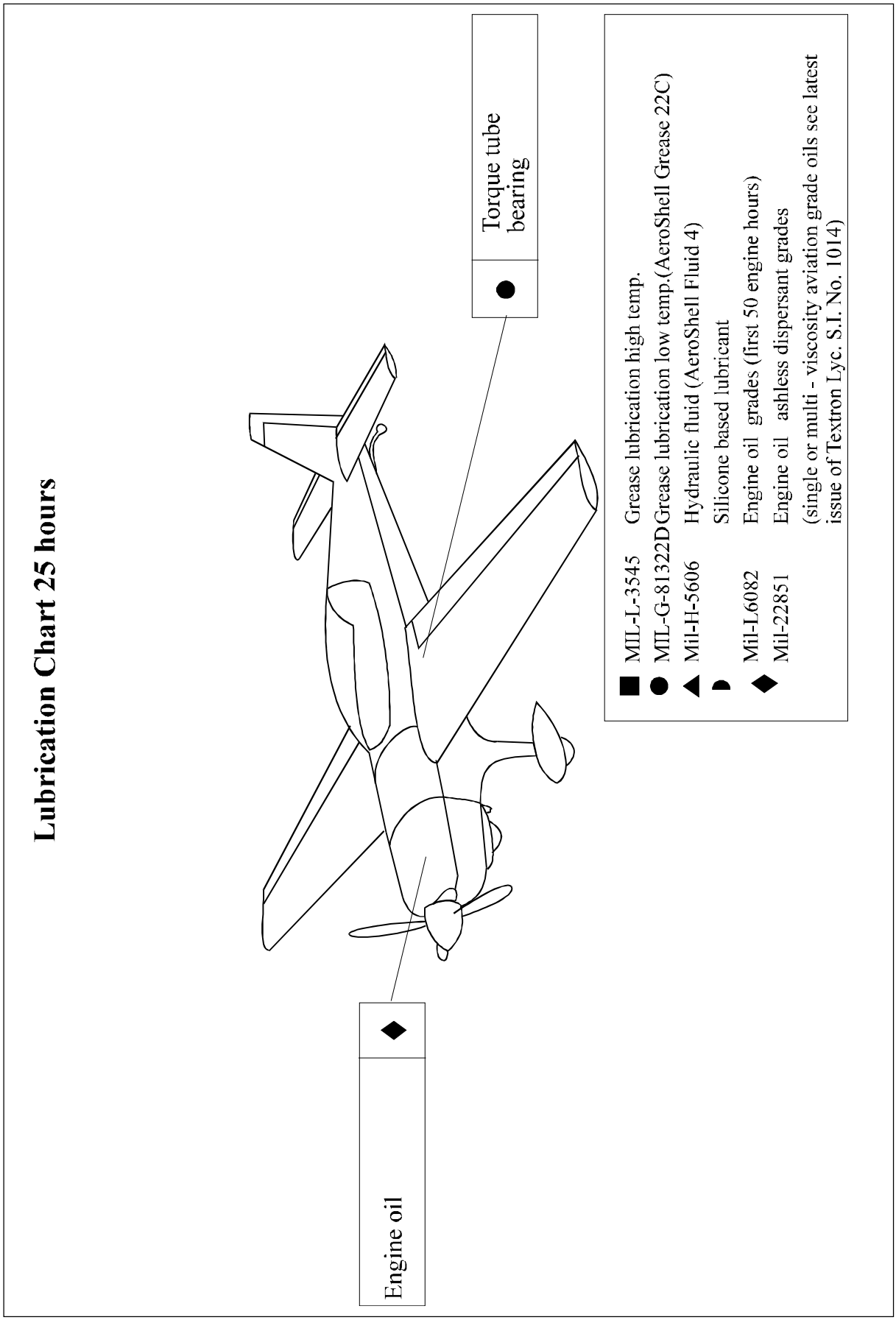
05-20-03 25 Hour Inspection - Aircraft

After the first 25 hours, a check equal to the 100-hour maintenance check has to be performed. Refer to Chapter 05-20-04.

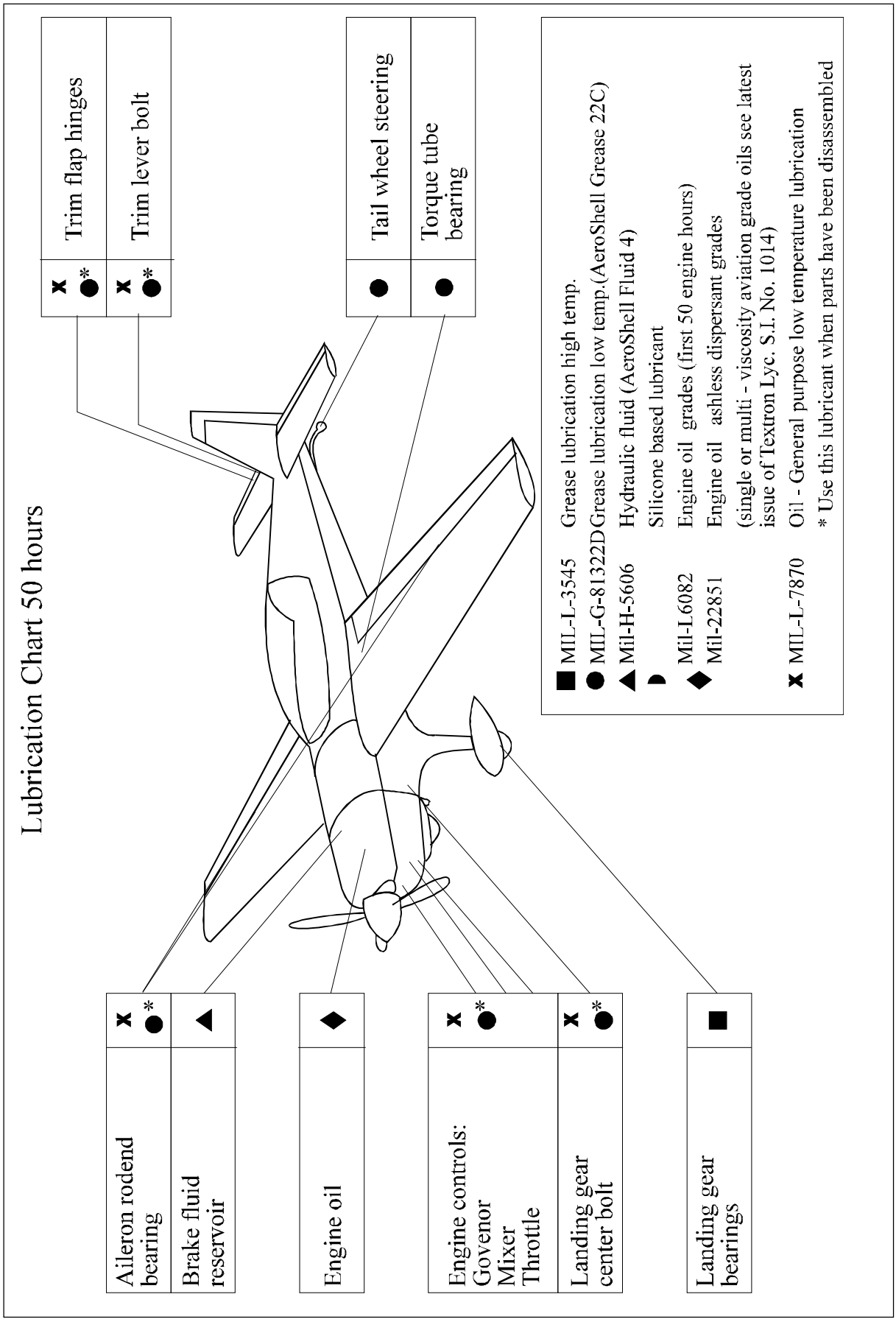


1. *Root Rib Aileron*
2. *Root Elevator*
3. *Root Horizontal Stabilizer*
4. *TrimTab (3 Holes)*
5. *Stall Warn Transducer*
6. *Lower Root Rudder Fin*
7. *Lower Root Rudder Horn*
8. *Wheel Fairing*
9. *Nose Ribs Aileron (Hinge Gaps)*

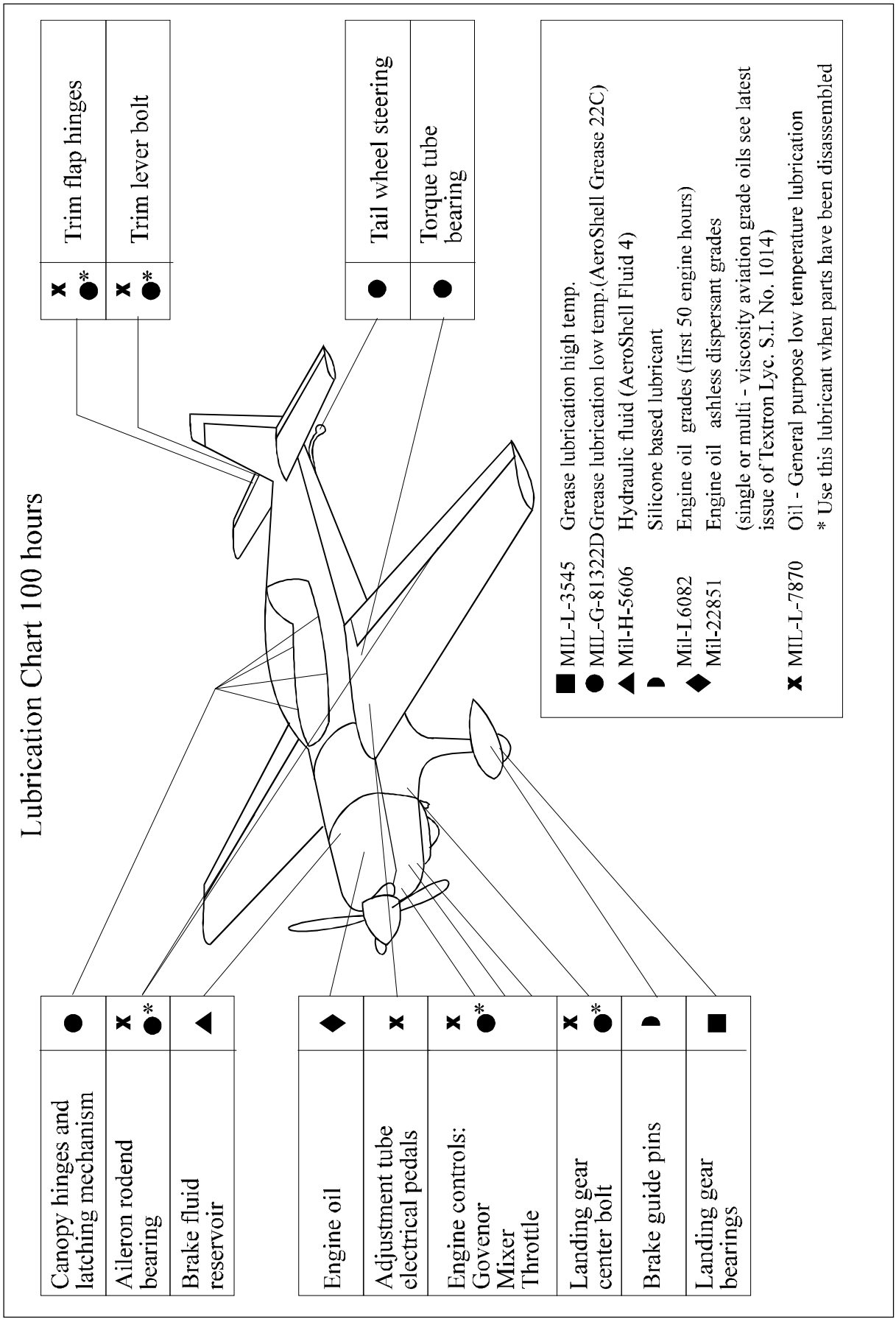
Drain and Vent Holes
Figure 1



Lubrication Chart 25 hours
Figure 2



Lubrication Chart 50 hours
Figure 3



Lubrication Chart 100 hours
Figure 4

05-20-04 Maintenance Checks Schedule

The maintenance checks described in this Chapter include all the scheduled checks which must be performed. Use the following schedule and the lubrication charts (Figures 2-4).

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
			Operational Checks		
	O	O	1 Start engine (in accordance with the Pilot`s Operating Handbook)		
	O	O	2 Check the fuel quantity indication.		
	O	O	3 Check oil pressure and temperature.		
	O	O	4 Check generator output.		
	O	O	5 Check magneto RPM-drop at 1800 RPM. (Allowed drop is 175 RPM and no greater diff. between L + R from 50 RPM)		
	O	O	6 Check ignition OFF function at 1000 RPM for a short moment.		
	O	O	7 Check response of the engine by power setting changes.		
	O	O	8 Check the Propeller response at 1800 RPM when changing pitch.		
	O	O	9 Check idle speed is between 650 and 750 RPM.		
	O	O	10 Check the fuel flow and manifold pressure indicator.		
	O	O	11 Check the EGT and CHT indicator.		
	O	O	12 Check mixer function per CHT/EGT indication.		
	O	O	13 Check idle mixture.		
	O	O	14 Check the function of the fuel selector valve.		
	O	O	15 Check the radio and the other electronic equipment.		
	O	O	16 Shut down engine using mixture lever. Check the alternator warning light or ammeter.		

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
	O	O	17 Check the optional electronic g-meter for the maximum g-loading. If extreme value exceeds ±10 G, contact EXTRA-Flugzeugbau GmbH. Correct date and time of the g-meter (refer to DSA-12 Manual).		
	O	O	18 Ignition OFF, main switch OFF, remove ignition key.		
	O	O	19 Check if ignition key is removable in OFF-position only, and if key functions in accordance with the requirements of the Teledyne Continental Service Bulletin No. 636.		
			Propeller		
			(refer to latest edition of MT-Propeller Operation and Installation Manual E-124 and Service Bulletins)		
			DANGER **Ground magneto primary circuit before working on propeller**		
		O	1 Remove spinner and check for cracks.		
	O	O	2 Check blade shake, max. 3 mm or 1/8 inch.		
	O	O	3 Check blade angle play, max. 2°.		
		O	4 Inspect outside condition of the hub and parts for cracks, corrosion, deterioration.		
		O	5 Inspect check nut for high pitch stop for tightness.		
	O	O	6 Check all safety means to be intact.		
	O	O	7 Check flange bolts or stopnuts for tightness.		
		O	8 Check front and rear spinnerplate for cracks and fixing.		
	O	O	9 Inspect bladeroot and hub for oil- and grease leaks.		
		O	10 Check position and condition of counterweights.		
	O	O	11 Check blades for cracks in the fibreglass-cover and blade erosion sheet. No cracks allowed. Refer to MT-Propeller SB No. 8		
O[1]			12 Overhaul propeller or perform a tear-down inspection.		

1 *refer to MT-Propeller Service Bulletin No. 1*

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
			Engine compartment		
			(Refer to latest edition of Textron Lycoming Operator´s Manual and SB's, of Christen Product Manual 801 Series and SB's, of Slick Magneto Maintenance and Overhaul Manual and SB's and of TCM/Bendix Service Support Manual, included in Form X40000 Master Service Manual and SB's)		
			DANGER **Ground magneto primary circuit before working on engine**		
	O	O	1 Remove engine cowling.		
	O	O	2 Inspect cowling and air inlet screen for damage, cracks, distortion, overheated areas and loose or missing blindnuts and secure attachment of oil level access plate.		
	O	O	3 After this inspection clean cowling.		
	O	O	4 Check fire protection according to EXTRA Service Bulletin 300-6-94. If necessary repaint the fire protection paint ("WIEDOFLUGAT" Brandschutzfarbe N 56582 / T508).		
O[1]	O	O	5 Drain oil sump in accordance with Chapter 12-10-04 “Engine Oil Replenishing”		
O[1]	O	O	6 Clean and inspect oil screen filter		
O[1]	O	O	7 Clean suction oil strainer at oil change (check strainer for foreign particles).		
O[1]	O	O	8 Clean pressure oil strainer (check for foreign particles)		
O[2]	O	O	8a Change full flow (cartridge type, AEIO-540-L1B5/D engine) oil filter element (check element for foreign particles).		
		O	9 Inspect oil temperature sensor unit for leaks and security.		
	O	O	10 Inspect flexible oil lines, oil return lines and fittings for leaks, security, chafing, dents, and cracks (ref: FAA AC 43.13-1A). Replace flexible oil lines at engine TBO per Lyc. SB 240. Check fire protection according to EXTRA SB 300-6-94.		
		O	11 Clean and inspect oil radiators and attachment.		
O[3]			12 Remove and flush oil radiators.		

1 at 10 and 25 hours and then each 25 hours
2 at 10 and 25 hours
2 each 500 hours

as specified	each 50 hours	each 100 hours		Date: / Serial No.:	Inspector: / Mechanic:
				Inspections	
	O	O		Inspect Christen Inverted Oil System for general condition, leaks, secure mounting and tight connections.	
O[1]			13	Clean and flush the Inverted Oil System with a suitable petroleum solvent, such as varsol according to Lycoming Operator's Manual.	
O[2]	O	O	14	Service engine with recommended lubricating oil in accordance with Chapter 12-10-04.	
	O	O	15	Inspect condition of spark plugs (Clean and adjust gap as required, adjust per Lycoming Service Instruction 1042). If fouling of spark plugs has been apparent, rotate buttom plugs to upper plugs and vice versa.	
	O	O	16	Inspect spark plug cable leads and ceramics for corrosion and deposits.	
	O	O	17	Perform a hot engine differential compression check in accordance with FAA AC 43.13-1A.	
		O	18	Inspect cylinders for cracked or broken fins.	
	O	O	19	Check cylinders for evidence of excessive heat which is indicated by discoloration.	
		O	20	Check fuel injector nozzles for loseness. Tighten to 60 inch pounds torque. Check fuel lines for fuel stains which are indicative for fuel leaks.	
	O	O	21	Inspect rocker box covers for evidence of oil leaks. If found, replace gasket; torque cover screws 50 Inch-pounds.	
O[3]			22	Remove rocker box covers and check for freedom of valve rockers when valves are closed. Look for evidence of abnormal wear or broken parts in the area of valve tips, valve keeper, springs and spring seats.	
		O	23	Inspect ignition harness for general condition, free from fraying or chafing and insulators for high tension leakage and continuity.	

1 each 300 hours
2 each 25 hours
3 each 400 hours

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
			TCM/Bendix magnetos		
		O	24 Check magneto-to-engine timing.		
		O	25 Remove all ignition harness spark plug terminals from spark plugs, clean and inspect following the respective sections of the applicable Support Manual.		
		O	26 Inspect magnetos with riveted impulse coupling for wear as specified in the latest revision of TCM/Bendix SB 599D.		
O[1]			27 Inspect magnetos equipped with snap-ring impulse coupling for wear as outlined in the PERIODIC MAINTENANCE Section of the applicable Support Manual, Paragraph 6.2.2.		
O[1]			28 Inspect magnetos as outlined in the PERIODIC MAINTENANCE Section of the applicable Support Manual, Paragraph 6.2.3. Clean and inspect all ignition harness outlet plates, covers or cap assemblies and grommets following the respective sections of the Manual mentioned above.		
O[2]			29 Overhaul or replace magnetos acc. to TCM/Bendix SB 643.		
			Slick magnetos		
		O	24 Adjust magneto to engine timing, refer to Slick Magneto Maintenance and Overhaul Manual		
		O	25 Inspect wiring connections, vent holes and P-lead attachment, refer to Slick Magneto Maintenance and Overhaul Manual.		
O[1]			26 Clean magnetos.		
O[1]			27 Inspect ball bearing assembly, impulse coupling, coil, contact points, condenser and carbon brush.		
O[3]			28 Replace ball bearings.		
O[1]			29 Lubricate magnetos.		
O[4]			30 Overhaul or replace magnetos.		

1 each 500 hours
2 at engine overhaul and at the expiration of 4 years
3 each 1000 hours
4 together with engine

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
		O	31 Check fuel injector for general condition, clean fuel inlet screen.		
	O	O	32 Inspect intake seals and O-rings for leaks and clamps for tightness.		
	O	O	33 Inspect flexible fuel lines, fuel injection lines and fittings for leaks, security, chafing, dents, and cracks (refer to Lycoming SB 342 each 100h; replace or overhaul as required or at engine overhaul). Check fire protection according to EXTRA SB 300-6-94.		
	O	O	34 Check fuel system for leaks.		
O[1]	O	O	35 Remove, clean and inspect gascolator screen and fuel filter bowl.		
	O	O	36 Inspect throttle, mixture, and propeller governor controls for security, travel, and operating conditions.		
	O	O	37 Inspect exhaust stacks, connections and gaskets (replace gaskets as required).		
	O	O	38 Inspect exhaust slipjoints for general condition.		
	O	O	39 Inspect exhaust system attachment.		
		O	40 Inspect crankcase for cracks, leaks, and security of seam bolts.		
	O	O	41 Check engine mounted accessories such as pumps, temperature and pressure sensing units for leaks, secure mounting and tight connections.		
	O	O	42 Inspect engine mount for cracks and loose mountings.		
	O	O	43 Inspect engine baffles free from cracks and fraying.		
		O	44 Inspect all wiring connected to the engine or accessories		
	O	O	45 Inspectengine shock mounts for deterioration (replace as required).		
		O	46 Inspect firewall seals (see EXTRA SB 300-6-94).		
		O	47 Inspect alternator, cable connections and accessories.		

1 clean at least every 90 days

as specified	each 50 hours	each 100 hours		Inspections	Date: / Serial No.:	Inspector: / Mechanic:
		O	48	Inspect condition and tension of alternator drive belt		
		O	49	Inspect security of alternator mounting		
		O	50	Inspect starter and starter drive		
	O	O	51	Check brake fluid level (fill as required).		
	O	O	52	Clean engine if necessary.		
	O	O	53	Lubricate all controls per lubrication chart.		
O[1]			54	Overhaul or replace propeller governor as required.		
O[2]			55	Complete overhaul of engine or replace with factory rebuilt		
	O	O	56	Reinstall engine cowling.		
				Fuselage		
	O	O	1	Remove tail fairing, tail side skins, main fuselage cover and landing gear cuffs per Chapter 51.		
		O	2	Remove bottom covering window and sheets including exhaust area covering sheet per Chapter 51.		
	O	O	3	Inspect main fuselage cover, bottom covering window and sheets including exhaust area covering sheet, tail fairing, tail side skins and landing gear cuffs for general condition, dents, cracks and loose screws and rivets.		
	O	O	4	Check installed parts for general condition and security of attachment.		
	O	O	5	Inspect fuselage for foreign matters.		
		O	6	Inspect steel tube construction for general condition, corrosion and cracks, above all in areas of load stress (e.g. wing, stabilizer, engine and seat attachments).		
	O	O	7	Visually inspect steel tube construction in the area of horizontal stabilizer attach brackets for cracks. In case of doubt remove horizontal stabilizer and use a dye check penetrant. In case of cracks are found contact EXTRA-FLUGZEUGBAU GmbH for repair advise.		
	O	O	8	Inspect fabric cover for general condition.		

1 refer to Woodward Service Bulletin No. 33580
2 *refer to Lycoming Service Instruction No. 1009*

as specified	each 50 hours	each 100 hours		Inspections (Date: / Serial No.: / Inspector: / Mechanic:)		
		O	9	Inspect wooden longerons for damage.		
		O	10	Clean and lubricate canopy hinge and latching mechanism.		
	O	O	11	Inspect seats and seat belts for security, attachment, proper operation, and condition. Control the time limit of the seat belts. Refer to Chapter 05-10-02 "Overhaul Schedule".		
		O	12	Inspect breather line for obstructions and security.		
		O	13	Inspect main and auxiliary wing spar connector for general condition.		
				Fuel system		
	O	O	1	Inspect the fuel lines for leaks, security, chafing, dents and cracks. Replace fuel lines as required.		
	O	O	2	Inspect fuel selector valve for operation and proper pointer indication		
	O	O	3	Drain fuel system		
	O	O	4	Check acro- and center tank attachment		
	O	O	5	Check acro-, center- and both wingtanks for leaks		
	O	O	6	Check boost pump		
	O	O	7	Check fuel filler caps for security and proper operation		
	O	O	8	Check proper seat and condition of sealing lip (from S.No 30)		
				Flight controls		
	O	O	1	Remove wing access panels.		
	O	O	2	Inspect control surfaces for security of attachment, free movement, dents, delaminations and cracks.		
	O	O	3	Inspect elevator trim system for proper operation and rigging.		
	O	O	4	Inspect hinges for condition, cracks and security; hinge bolts, hinge bearings, selflocking nuts.		
	O	O	5	Check free play in control system: torque tube, control surfaces, control stick, rod end bearing, deflector limiter.		
O[1]	O	O	6	Lubricate rear torque tube bearing.		

1 each 25 hours

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
	O	O	7 Lubricate aileron rodend bearings, trim flap hinges and trim lever bolt.		
		O	8 Lubricate adjustment tube of electrical pedal adjustment.		
	O	O	9 Check rudder cable system including sleeves, fairleads, pulleys and cable retracting springs per FAA-AC 43.13-1A.		
		O	10 Check for minimum 3.5 mm (1/8") clearance of rudder pedal versus safety stop when fully deflected for rudder cables having 50 h flight time minimum. On newly installed rudder cables the minimum spacing is 6 mm (1/4"). Refer to Figure 5. This check is to be performed with zero loading on the rudder pedals.		
		O	11 Rough check of safety stop clearance. With a force of approx. 90 kg (200 lbs) acting on the fully deflected rudder pedal the safety stop shall not be reached. If the stop is reached the control system indicates a too high flexibility which needs to be traced. In this case contact EXTRA for advice.		
	O	O	12 Inspect all flight control ventilation holes for obstruction.		
		O	13 Inspect elevator balance weight for looseness and condition.		
		O	14 Inspect push rods.		
			Landing gear		
	O	O	1 Check landing gear for general condition.		
	O	O	2 Check landing gear spring for dents and cracks.		
	O	O	3 Inspect landing gear spring mounting clamps and bolts for security.		
		O	4 Lubricate landing gear center bolt and landing gear bearings.		
		O	5 Check wheel rake (10° ± 0.5°) and toe-in (1.5° ± 0.5°) per Chapter 32.		
			Fairings:		
	O	O	1 Disassemble fairings.		
	O	O	2 Check fairings for dents and cracks.		
	O	O	3 Check fairing ventilation hole for obstruction.		

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
			Wheels		
			(refer to on-aircraft inspections presented in the latest edition of Cleveland Wheels & Brakes Maintenance Manual and Service Bulletins for wheel, tire and break inspections)		
	O	O	1 Visually inspect the wheels for corrosion, cracks, or other visible damage.		
	O	O	2 Check wheel nuts to be sure they are properly installed and have not worked loose. Bolt threads should be flush to 1-1/2 threads extending beyond the nut. Nuts should be on the side of wheel opposite the brake disc (outboard side of wheel).		
	O	O	3 Inspect the brake disc for rust, excessive grooves, large cracks, coning or other visible damage. Check if disc thickness is more than 0.325in/8.255mm. Coning of disc in excess of 0.015 in /0.381 mm is cause for replacement (see Fig. 6).		
		O	4 Remove wheels and wheel bearings. Inspect wheel bearing grease for contamination and solidification.		
		O	5 Inspect snap rings and grease seals for distortion or wear. Replace grease seal felts if they are hard or contaminated. Lightly saturate grease seals should be replaced if cracked, dried out, or distorted.		
		O	6 Inspect wheel bearings for excessive wear or damage. Replace on condition.		
		O	7 Repack bearings with AEROSHELL 22C (per MIL-G-81322), or equivalent. Reinstall wheels and safety.		
	O	O	8 Check wheel bearing clearance and wheels for free rotation.		
			Tires		
	O	O	1 Visually inspect tires for cuts, flat spots, and tread or sidewall damage. If changing of tires is necessary follow the instructions, including off-aircraft inspection of wheels, presented in the Cleveland Wheels & Brakes Component Maintenance Manual.		
	O	O	2 Check inflation pressure (2.8 bar / 40.6 psi). Proper inflation will provide maximum tire and wheel life.		

as specified	each 50 hours	each 100 hours		Inspections	Date: / Serial No.:	Inspector: / Mechanic:
				Brake system		
	O	O	1	Inspect brake assemblies for general condition.		
	O	O	2	Inspect master cylinders for leaks.		
		O	3	Inspect brake system plumbing for leaks and hoses for bulges and deterioration.		
		O	4	Lubricate brake guide pins using Silicone-base lubricant.		
	O	O	5	Visually inspect the brakes for corrosion, cracks, or other visible damage. Check inlet fitting bosses and anchor bolt lugs for cracks. Check inlet flares on aircraft side of rigid hydraulic tubing for fatigue cracks.		
	O	O	6	Check back plate attachment bolts to insure they are properly torqued and have not worked loose. Gaps between the back plate and cylinder would be evidence of this.		
	O	O	7	Check fit of brake cylinder anchor bolts in torque plate bushings for sloppiness. This can be accomplished by grasping the cylinder and moving it; slight movement is normal. Excessive movement is cause for removal and detailed inspection.		
	O	O	8	Linings should be visually checked for extreme chipping on the edges. Lining worn to a minimum thickness of 0.100 inch (2.54 mm) must be replaced.		
	O	O	9	Visually check torque plate for corrosion, cracks, loose anchor bolt bushings, or other visible damage. Anchor bolt bushings must be flat against torque plate surface.		
	O	O	10	Check for any brake fluid leaks.		
	O	O	11	Check brake fluid level.		
				Tail-wheel landing gear		
	O	O	1	Check tail-wheel landing gear for general condition.		
	O	O	2	Check tail-wheel landing gear spring for dents, cracks, and delaminations.		
	O	O	3	Check tail-wheel rubber tire condition.		

as specified	each 50 hours	each 100 hours	Inspections (Date: / Serial No.: / Inspector: / Mechanic:)		
	O	O	4 Inspect tail-wheel spring and swivel arm mounting bolts for security.		
			a) Standard: Full-swivel tailwheel		
	O	O	1 Check swivel arm for dents and cracks.		
	O	O	2 Check tail wheel for free rotation and swivel feature.		
		O	3 Check swivel arm and wheel bearing clearance, service.		
			b) Optional: Steerable tailwheel		
	O	O	1 Check for general condition and function. Pay attention to the free movement of the rudder.		
	O	O	2 Check the connector springs for light precompression.		
	O	O	3 Check the wheelfork for free rotation and steering function, damage, dents, cracks and corrosion.		
	O	O	4 Inspect wheelfork for damage, dents, cracks and corrosion.		
	O	O	5 Inspect the axle bolt and nut for fretting, wear, damage, and stretch.		
	O	O	6 Lubricate tail wheel steering.		
			Wing		
	O	O	1 Check wing for dents, cracks, and delaminations.		
		O	2 Inspect wing spar main bolts for looseness and security.		
		O	3 Check the safety wire and the safety screw of the wing main spar bolt.		
		O	4 Inspect wing spar main sleeves for looseness and bearing load.		
		O	5 Inspect wing auxiliary spar attachment.		
		O	6 Inspect wing ventilation holes for obstruction.		
	O	O	7 Check inside wing structure in the area of access panels.		

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
			Stabilizer		
	O	O	1 Check stabilizer for dents, cracks; stone nicks and delaminations.		
	O	O	2 Inspect stabilizer spars main bolts for looseness and security.		
	O	O	3 Inspect stabilizer auxiliary spars attachment.		
		O	4 Inspect stabilizer ventilation holes for obstruction.		
			Instruments		
		O	1 Inspect panel mounting for security and safety.		
		O	2 Check operation, mounting, and wiring of switches for condition and safety.		
		O	3 Check automatic circuit breaker mounting and wiring for condition and safety.		
		O	4 Inspect stall warner system for condition and security of installation, perform operational check.		
	O	O	5 Check wingtip position/strobe lights for security and operation.		
	O	O	6 Inspect compass and compass deviation card for proper indication and compensation.		
O[1]			7 Magnetic compass compensation.		
		O	8 Check pitot/static air pressure lines for condition and leaks, perform operational check.		
			Electrical system		
	O	O	1 Check engine bonding		
	O	O	2 Check tank bonding (wing- and center tank)		
		O	3 Check system wiring free from fraying or cracks		
		O	4 Inspect battery and attachment		
	O	O	5 Charge battery		

1 *Annual, each twelve calendar month*

05-20-05 Significant Items Inspection

Every **1000 flight** hours the "Significant Items Inspection" must be performed **in addition** to the 100-hour inspection.

1000 hours		Date: / Serial No.:	Inspector: / Mechanic:	
		Inspections EXTRA 300S		
		Wing		
		Leading edge		
O	1	Detailed visual inspection on the surface for erosion, scratches, stone nicks and impact damages.		
O	2	Detailed visual inspection on the bonding top/bottom for dents, cracks and delaminations.		
O	3	Inspect grounding rivets visually.		
		Main spar section		
O	4	Check bonding skin/spar for delaminations by coin tapping (Refer to Chapter 20-10-05).		
O	5	Detailed visual inspection on the sparweb for dents, cracks and delaminations by visual inspection through wing access holes using a boroscope.		
		Auxiliary spar section		
O	6	Check bonding skin/spar for delamination by coin tapping .		
O	7	Detailed visual inspection on the aux. spar web for dents, cracks and delaminations. Pay particular attention to the cutout for aileron cantilever.		
O	8	Inspect attachment fitting for damage, corrosion and link bolts security.		
		Spar carry-through		
O	9	Remove spar cap paint by a solvent. Perform visual inspection for dents and cracks. Check for delaminations by coin tapping. Restore finish in accordance with Chapter 51-70-05.		
O	10	Remove spar web paint by a solvent. Perform visual inspection for dents and cracks. Check for delaminations by coin tapping. Restore finish in accordance with Chapter 51-70-05.		

1000 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:	
O	11 Check main bolt sleeves for secure bonding to the spar.			
	Wing trailing edge			
O	12 Check bonding top/bottom for cracks and delaminations by coin tapping (Refer to Chapter 20-10-05).			
	Root and Tip			
O	13 Check root rib for cracks, delaminations and secure bonding to skin and spars by coin tapping (Refer to Chapter 20-10-05).			
O	14 Inspect tip rib visually for general condition.			
O	15 Check metall fittings (power supply support) for secure bonding to the carbon laminate			
	Aileron			
O	1 Check root and tip rib bonding to the skin laminate by coin tapping.			
O	2 Check bonding skin/spar for delaminations by coin tapping.			
O	3 Checkbonding top/bottom for cracks and delaminations by coin tapping (Refer to Chapter 20-10-05).			
O	4 Check hinge points (mounting brackets) and actuator for damages and cracks. Ensure proper attachment.			
O	5 Inspect spades visually for general condition. Check spade support for corrosion, cracks and deformations. Ensure proper attachment to aileron.			
O	6 Inspect ventilation holes for obstruction.			
	Surface general			
O	1 Check painting visually for general condition (blisters etc.).			
O	2 Check laminate for erosion, scratches and nicks.			
	Control system			
O	1 Inspect bell cranks for damage, corrosion, security of mounting and link bolts through wing access holes.			
O	2 Inspect control rods for corrosion.			
O	3 Check Rod end bearing for free movement and cleanliness.			

1000 hours	Date:	Inspector:
	Serial No.:	Mechanic:

	Inspections		
	Vertical Stabilizer		
	Leading edge		
O	1 Check surface for erosion, scratches, stone nicks and impact damages.		
O	2 Check bonding left/right for dents, cracks and delamination.		
	Front spar section		
O	3 Check bonding skin/spar for delamination by coin tapping (Refer to Chapter 20-10-05).		
O	4 Detailed visual sheet metal attachment fitting for damage, corrosion and link bolts security.		
	Rear spar section		
O	5 Check bonding skin/spar for delamination by coin tapping .		
O	6 Detailed visual rear spar web for dents, cracks and delamination. Pay particular attention to the cut out for rudder cantilever.		
O	7 Check steel sleeve for secure bonding to the spar.		
O	8 Replace attachment bolts and stop nuts. Check for proper torque in accordance with Chapter 20-10-02.		
	Root and Tip		
O	9 Check root rib for cracks, delamination and secure bonding to skin and spars by coin tapping.		
O	10 Inspect tip rib visually for general condition.		
	Rudder		
O	1 Check tip rib bonding to the skin laminate by coin tapping.		
O	2 Check bonding skin/spar for delamination by coin tapping.		
O	3 Check bonding trailing edge for cracks and delaminations by coin tapping.		
O	4 Detailed visual of mounting brackets for damages and cracks. Ensure proper attachment. Replace bolts and stop nuts for new ones in any case. Check for proper torque in accordance with Chapter 20-10-02.		
O	5 Check actuator lever for damage, cracks and proper attachment.		
O	6 Inspect ventilation holes visually for obstruction. Refer to Chapter 05-20-01, Figure 2 "Drain and Vent Holes".		

1000 hours	Date:	Inspector:
	Serial No.:	Mechanic:

		Inspections		
O	7	Check painting visually for general condition (blisters etc.).		
O	8	Check laminate for erosion, scratches and stone nicks.		
		Horizontal Stabilizer		
		Leading edge		
O	1	Check surface for erosion, scratches, stone nicks and impact damage.		
O	2	Check bonding top/bottom for dents, cracks and delamination.		
		Front spar section		
O	3	Check bonding skin/spar for delamination by coin tapping.		
		Rear spar section		
O	4	Check bonding skin/spar for delamination by coin tapping.		
		Spar carry-through		
O	5	Remove spar cap paint by a solvent. Perform visual inspection for dents and cracks. Check for delamination by coin tapping. Restore finish in accordance with Chapter 51-70-05.		
O	6	Remove Spar web paint by a solvent. Perform visual inspection for dents and cracks. Check for delaminations by coin tapping. Restore finish in accordance with Chapter 51-70-05.		
O	7	Replace attachment bolts and stop nuts. Check for proper torque in accordance with Chapter 20-10-02.		
O	8	Check steel sleeves for secure bonding to the spar.		
		Root and Tip		
O	9	Check root rib for cracks, delamination and secure bonding to skin and spars by coin tapping.		
O	10	Inspect tip rib visually for general condition.		
		Elevator		
O	1	Check tip rib bonding to the skin laminate by coin tapping.		
O	2	Check bonding skin/spar for delaminations by coin tapping.		
O	3	Check bonding trailing edge for cracks and delamination by coin tapping.		
O	4	Detailed visual inspection of mounting brackets for damage, cracks and proper attachment. Replace bolts and stop nuts. Check for proper torque in accordance with Chapter 20-10-02.		

1000 hours		Inspections	Date: / Serial No.:	Inspector: / Mechanic:
O	5	Check center section for delamination by coin tapping.		
O	6	Detailed visual of actuator lever for damage, cracks and proper attachment.		
O	7	Detailed visual of mass balance attachment and mounting boom for deformation, corrosion and cracks.		
O	8	Detailed visual of trim tab hinges, actuator lever for damage, cracks, excessive wear and proper bonding to the laminate. Detailed visual for delamination.		
O	9	Inspect ventilation holes for obstruction.		
		Surface general		
O	10	Check painting for general condition (blisters etc.).		
O	11	Check laminate for erosion, scratches, stone nicks and impact damages.		
		Fuselage		
O	1	Inspect tubular steel frame visually for corrosion, scratches and damages.		
O	2	Check wing main spar attachment for damage and corrosion. Inspect for dents and cracks.		
O	3	Detailed visual of the sheet metal of the wing auxiliary spar attachment for damage, corrosion. Inspect the sheet metal supports using a fluorescent dye penetrant to insure no cracks are evident.		
O	4	Detailed visual of cockpit frame visually for dents, cracks and delaminations.		
O	5	Inspect main fuselage cover visually for dents, cracks and delamination.		
		Flight controls		
O	1	Detailed visual of torque tube for damages, cracks, free-play and stop adjustments.		
O	2	Detailed visual of bell cranks for damage, cracks, corrosion, security of mounting and link bolts.		
O	3	Inspect control rods for loose or popped rivets and general condition.		
O	4	Inspect sticks (rear & front) for full travel, proper rigging, free-play, security of mounting and direction of control surface movement with relation to stick movement.		

1000 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
O	5 Check rod end bearings for free movement and cleanliness.		
O	6 Detailed visual of trim actuator lever for damages and cracks. Ensure proper attachment and condition of friction.		
	Main landing gear		
O	1 Inspect landing gear spring visually for dents, cracks and delaminations, especally at the axle attachment and the center bushing for wear and looseness.		
O	2 Check mounting clamp for damage and corrosion. Inspect for dents and cracks.		
O	3 Inspect mounting clamp bolts and nuts for fretting, wear, damage, stretch and proper torque (refer to Chapter 20-10-03).		
O	4 Check brakes discs for warping and wear. Inspect wheel brake cylinder mounting brucket for wear.		
O	5 Inspect brake lines for leakage, dents, cracks, chaffing, kinks and security of anchorage.		
O	6 Inspect axle attachment bolts and nuts for fretting, wear, damage, and stretch.		
O	7 Check tires for general condition.		
	Tail-wheel landing gear		
O	1 Inspect glass fibre spring visually for dents, cracks and delaminations.		
O	2 Inspect mounting bolts and nuts for fretting, wear, damage, stretch and proper torque.		
	Standard: Full-swivel tail-wheel		
O	1 Check tail-wheel for free rotation and general condition.		
O	2 Inspect swivel arm visually for damage, dents, cracks and corrosion. Check for swivel feature.		
O	3 Inspect axle bolt and nut for fretting, wear, damage, and stretch.		
O	4 Check rubber tire for general condition.		
	Optional: Steerable tail-wheel		
O	1 Check tail-wheel for general condition and function. Pay attention to the free movement of the rudder.		

1000 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
O	2 Check connector springs for light precompression.		
O	3 Inspect wheelfork visually for damage, dents, cracks and corrosion.		
O	4 Inspect axle bolt and nut for fretting, wear, damage, and stretch.		
O	5 Check rubber tire for general condition.		
	Engine compartment		
O	1 Check firewall for dents, cracks and deformation. Visual inspection of silicon seals for porosity and general condition.		
O	2 Inspect tubular engine mount for dents, cracks and corrosion. Check all bolts for security and condition.		
O	3 Visual inspection of rubber mounts (shock mounts) for porosity and general condition.		
O	4 Inspect flexible hose for damage and leakage.		
O	5 Visual inspection of fire sleeves for chaffing and general condition.		
O	6 Check electric wiring for proper connection.		
O	7 Check grounding straps for proper connection.		
O	8 Visual inspection of inverted oil system for general condition according to CHRISTEN 801instruction. Refer to CHRISTEN Product Manual P/N: 70047-001 or to TEXTRON LYCOMING Operator`s Manual P/N: 60297-21.		
O	9 Carry out general engine check as instructed by TEXTRON LYCOMING Operator`s Manual P/N: 60297-21.		
O	10 Visual inspection of cowling for dents,cracks,delamination and smoke marks.		
	Hardware		
O	1 Magnaflux or fluorescent dye-check of the wing main spar bolts by authorized personnel is required. (Remove only one bolt at a time). Inspect for security of the spar bolts and safety-screws.		
O	2 Check harness attachment fittings for cracks, deformations and corrosion.		
O	3 Check bolts and nuts in critical areas for fretting, wear, damage, stretch, proper torque and safety.		
O	4 Visual inspection of center tank fastening straps for cracks, damage and corrosion.		

1000 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:	
O	5 Visual inspection of battery fastening straps for cracks, damage and corrosion.			
O	6 Check the "quick pins" of the seat adjustment for cracks, deformations and corrosion. Inspect wear and proper function.			
O	7 Visual inspection of rudder pedal mounting to the attachment fittings. Check bolts for security.			
	Surface general			
O	Visual check of painting for deteriorated paint.			

05-50-00 UNSCHEDULED MAINTENANCE CHECKS

Unscheduled checks are only performed after abnormal events, which could possibly have caused damage to the aircraft or impaired the airworthiness.

I M P O R T A N T

In case of abnormal events or any exceedance of given limitations (load factor, never exceed speed, etc.) the manufacturer has to be contacted to find appropriate maintenance procedures. Therefore the procedures described in the following could be subjected to changes.

05-50-01 Violent Stopping of the Engine (Propeller Strike)

In a case where the propeller has struck the ground or the engine has been stopped violently (shock loading), the complete engine has to be disassembled and checked by an authorized company. The crankshaft might be damaged. The propeller has to be checked and repaired by an authorized company according to MT-propeller instruction. Refer to MT-propeller "Operation- and Installation Manual E-124".

05-50-02 Hard Landing

After an extremely hard landing or other unusual loads on the landing gear, perform a check as described in the following, even when there are no obvious signs of damage: If there are indications that structural parts are damaged, the manufacturer has to be consulted for possible and suitable repair methods.

	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
	Landing gear		
O	1 Examine landing gear mounting clamps for defects (e.g. cracks and deformed areas)		
O	2 Check clamp bolts of the landing gear for cracks, replace when necessary		
O	3 Examine wheel track and check if measurement correspond to the value given in Chapter 06-10-01.		
O	4 Remove and check the fairings for delamination, deformations and cracks		
O	5 Check the landing gear spring for delamination, deformations and cracks, especially in the area of the axle attachment		
O	6 Check fuselage structure in the area of landing gear attachment for deformation and cracks		
O	7 Examine wheel base and check if measurement correspond to the value given in Chapter 06-10-01.		
O	8 Check tires for cuts in the side wall		
O	9 Check wheel halves and brake discs for impacts, cracks and distortion according to CLEVELAND instruction.		
O	10 Check tail wheel for deformation and cracks, especially in the area of the axle attachment		
O	11 Check fuselage structure in the area of the tail wheel for deformation and cracks		
	Control surfaces		
O	12 Check control surfaces for proper operation		
O	13 Check control surface hinges for cracks, security and free movement		
O	14 Check the balance weights of the elevator for security of attachment		
O	15 Check the spades for security of attachment		
	Engine		
O	1 Check engine mount		

05-50-03 Engine Fire

After an engine fire, perform a check as described in the following:

For damage evaluation consult the manufacturer, before the aircraft is put back into service.

	Inspections	Date:	Inspector:
		Serial No.:	Mechanic:
O	1 Check all cables and hoses, replace when necessary		
O	2 Check engine according to the Lycoming Manual		
O	3 Check fire wall and engine cowling for damage by high temperatures (e.g. signs of blister on the protective paint) If necessary repaint the fire protection paint ("WIEDOFLUGAT" Brandschutzfarbe N 56582 / T508) .		

05-50-04 Lightning Strike

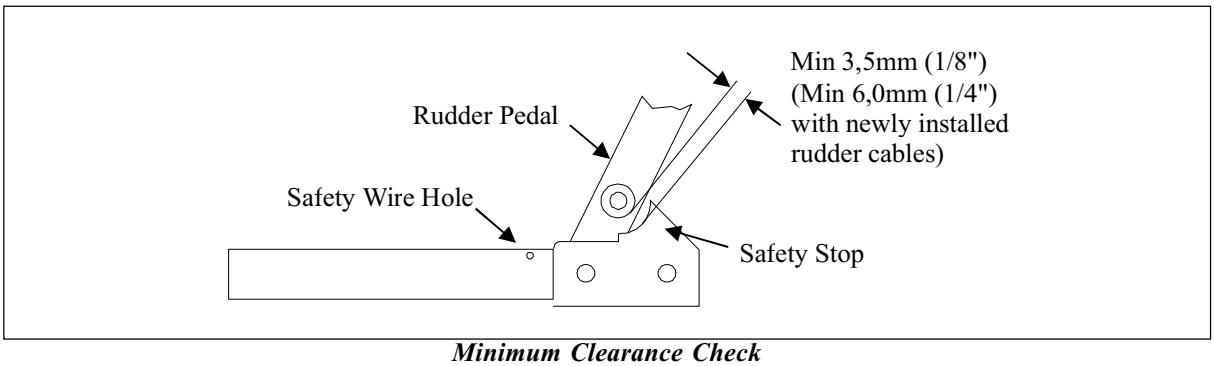
In the event of a lightning strike in flight or on ground check the following:

	Inspections	Date:	Inspector:
		Serial No.:	Mechanic:
O	1 Check engine according to Lycoming Service Bulletin 401.		
O	2 Check the skin of the strike area for burns and melting		
O	3 Inspect bolts and fasteneners for burns and melting .		
O	4 Check the electrical system, with running engine, for correct operation.		
O	5 Check the avionic and antenna for correct operation.		
O	6 Check the magnetic compass for correct readings.		

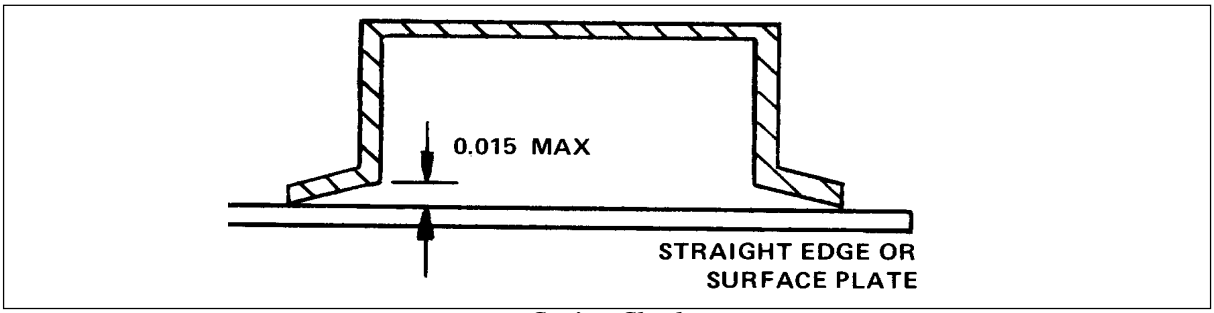
05-50-05 Flightline Inspections

These checks include pre-flight and postflight checks, as they are described in Sections 3 and 4 ("EMERGENCY PROCEDURES" and "NORMAL PROCEDURES") of the PILOT´S OPERATING HANDBOOK. When the aircraft is in operation, perform these checks daily.

as specified	each 50 hours	each 100 hours	Inspections	Date: / Serial No.:	Inspector: / Mechanic:
			General		
O[2]	O	O	1 Perform checks given for special equipment installed (refer to Chapter 95).		
O[2]	O	O	2 Reinstall access panels per Ch. 51.		
O[2]	O	O	3 Aircraft conforms to Specifications of respective Authority		
O[2]	O	O	4 All required airworthiness directives complied with.		
O[2]	O	O	5 All EXTRA mandatory Service Bulletins complied with.		
O[2]	O	O	6 All vendor Service Bulletins and Service Letters complied with.		
O[2]	O	O	7 Check for proper flight manual.		
O[2]	O	O	8 Aircraft papers in proper order.		



Minimum Clearance Check
Figure 5



Coning Check
Figure 6

2 as required

Chapter 06

Dimensions and Areas

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06-00-00 GENERAL

The for measuring and weighing the aircraft relevant reference planes are the following:

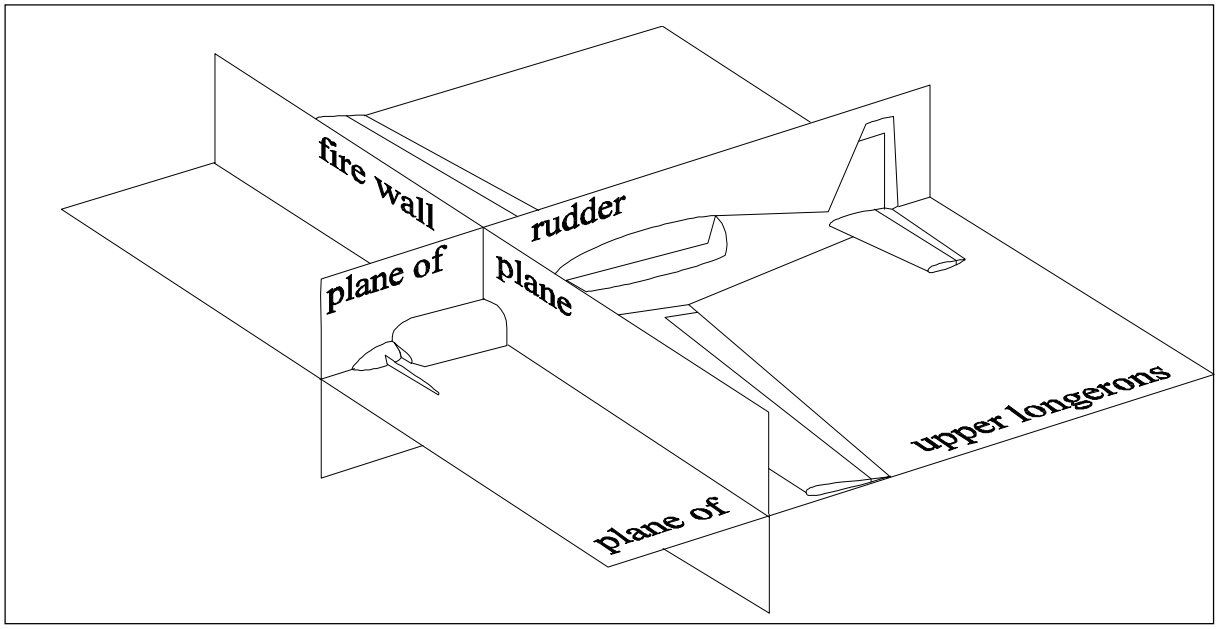
Reference Planes

Plane of upper longerons (horizontal plane)

Plane of rudder (Vertical/symmetry plane)

Fire wall plane (Vertical plane)

The following figure1shows the aircraft planes :



Axes and planes
Figure 1

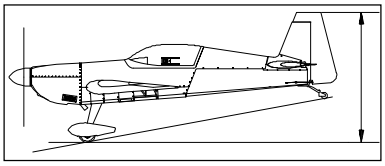
Unless otherwise stated, all measurements given in this manual are in metric (additional in feet) and are measured parallel to the corresponding reference planes.

06-10-00 MAIN DATA

06-10-01 Main Dimensions

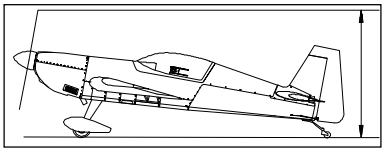
(Refer to Figure 2)

Length:	6.65 m (21.82 ft)



Height 1

Height 1:	2.62 m (8.60 ft)



Height 2

Height 2 :	2.59 m (8.45 ft)
Span:	7.50 m (24.61 ft)
Wheelbase:	4.75 m (15.58 ft)
Wheel-track:	1.80 m (5.91 ft)
MTOW:	Normal category 920 kg (2028 lbs) Acro (1 seat) 820 kg (1808 lbs)

06-10-02 Wing

Span:	7.50 m (24.61 ft)	
Area:	10.44 m² (112.38 ft²)	
Airfoil:	Root: MA 15 S.	Tip: MA 12 S
Chord:	Root: 1.85 m.	Tip: 0.93 m
MAC:	1.44 m (4.72 ft)	
Aileron area:	2 x 0.830 m² (2 x 8.94 ft²)	
Aileron deflection:	± 30°, tolerance ± 2°	

06-10-03 Horizontal Tail

Span:	3.20 m (10.50 ft)
Area:	2.56 m² (27.56 ft²)
Airfoil:	Wortmann FX 71-L-150/30

06-10-04 Elevator

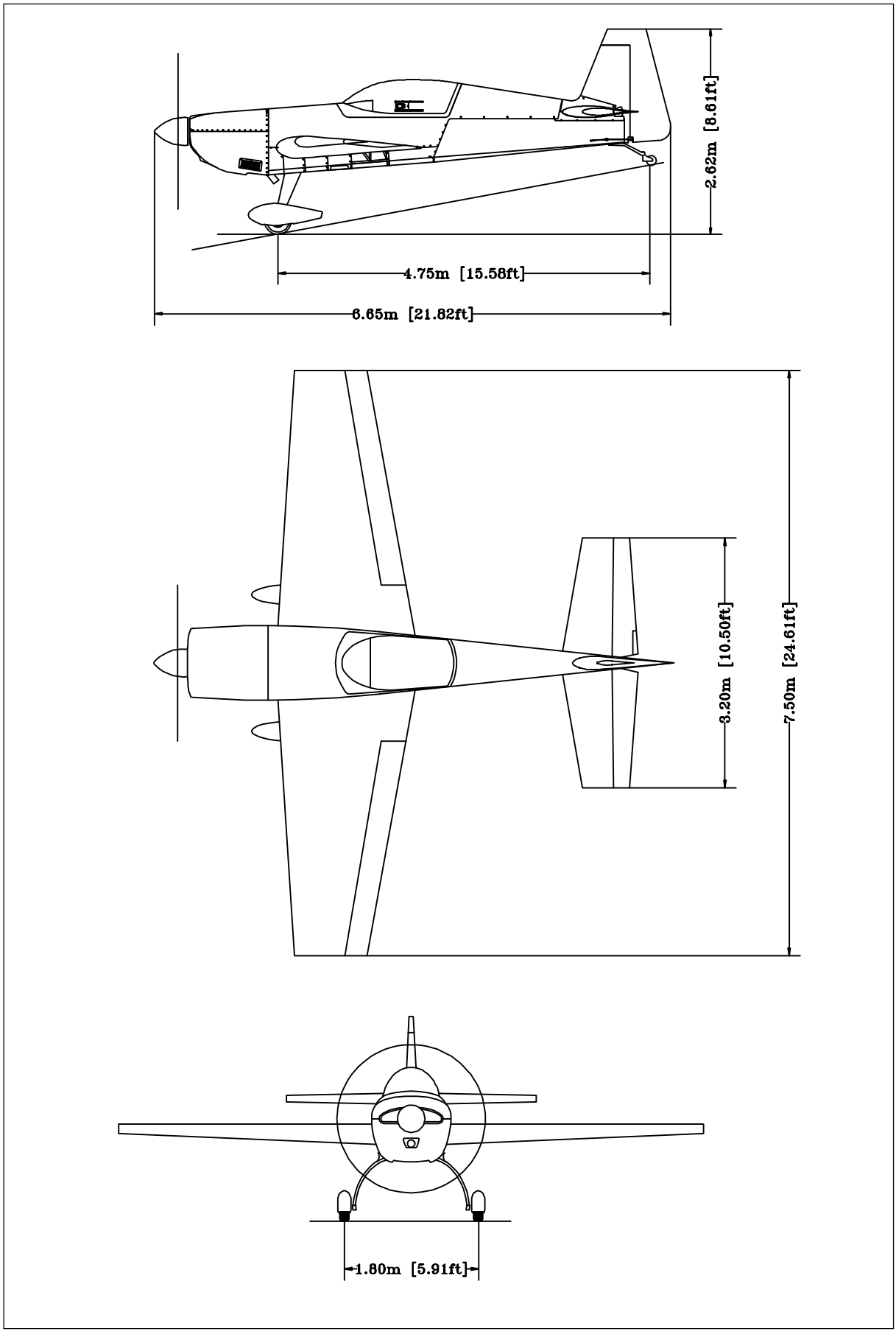
Area:	0.77 m² (8.29 ft²)
Elevator-deflection:	up 25°, down 25°, tolerance ± 2°
Trim-tab-deflection:	up 15°, down 15°, tolerance ± 2°

06-10-05 Vertical Tail

Area:	1.39 m² (14.96 ft²)
Airfoil:	Wortmann FX 71-L-150/30

06-10-06 Rudder

Area:	0.51 m² (5.49 ft²)
Rudder deflection:	left 30°, right 30°, tolerance ± 2°



Three-View EXTRA 300S
Figure 2

Chapter 07

Lifting and Shoring

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Chapter	Title	
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07-10-01	Balance Weight	3
07-20-00	**SHORING**	**4**
07-20-01	Shoring the Front	4
07-20-02	Shoring the Tail	5

07-10-00 JACKING

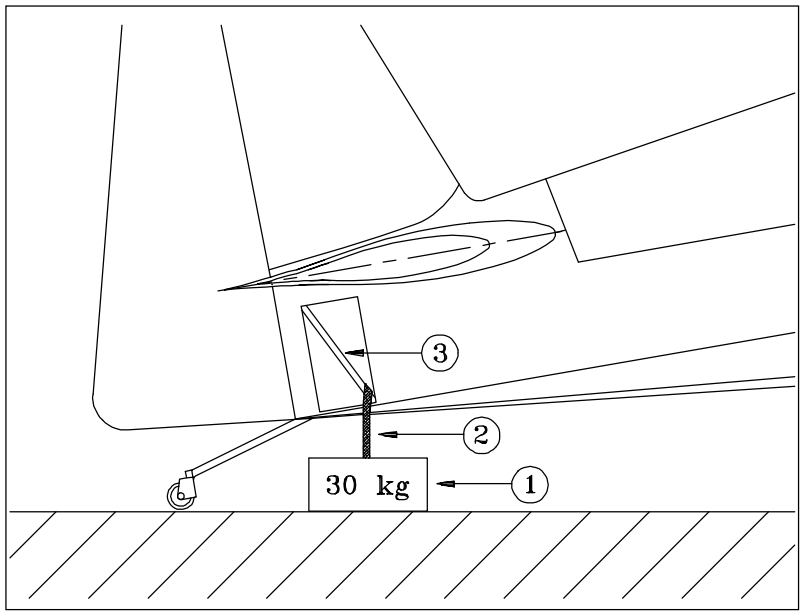
07-10-01 Balance Weight

Prior to the removal of the horizontal and/or vertical stabilizer(s) or prior to shoring the aircraft as described in Chapter 07-20-00 it is necessary to weight the tail to prevent aircraft from tilting onto the nose. In this case follow the steps described below (refer to Figure 1):

1 Put a weight (1) of min. 30 kg under the tail.

2 Remove the RH tail side skin and the tail cone access panel per Chapter 51.

3 Connect the weight with the now accessible steel tube (3) by means of a strap (2). Prevent damage of paint and control cables.



Balance Weight
Figure 1

07-20-00 SHORING

Shoring the Extra 300S is necessary, when the main landing gear or the tail wheel has to be removed or installed.

07-20-01 Shoring the Front

1 Remove the fore access panels up to aft the main landing gear as per Chapter 51-00-01.

2 Install a balance weight (3, Figure 2) at the tail as per Chapter 07-10-01.

3 Hoist the aircraft by means of both engine hoisting points (1).

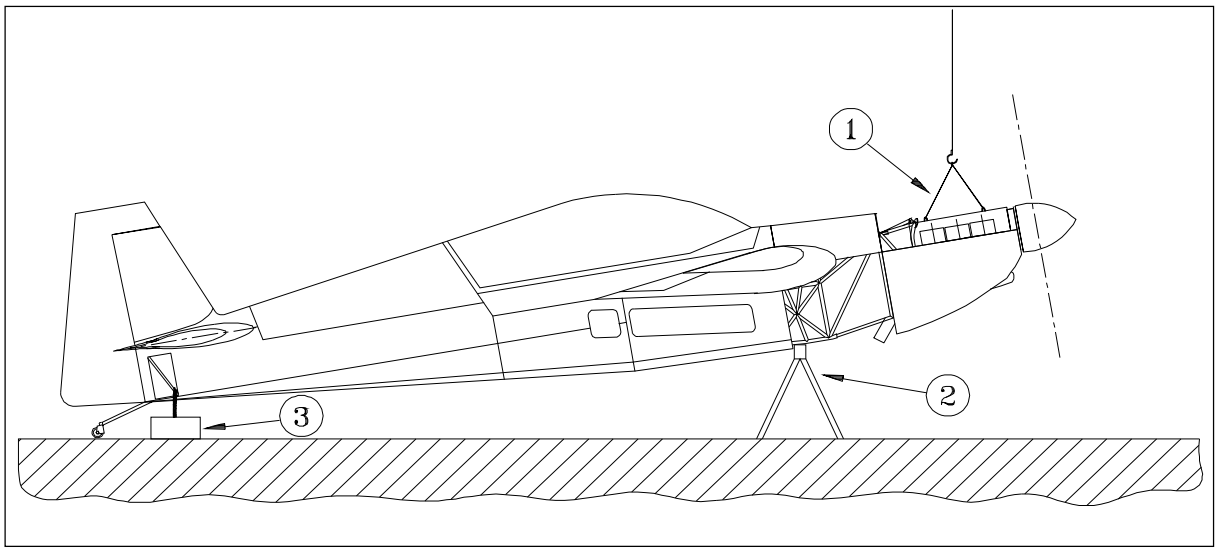
C A U T I O N

Prevent damage of ventilation tubing, brake lines and center tank drain, when shoring the aircraft.

4 Shore the aircraft by means of two supports (2), which are to put under the left and right bottom longeron each in the area behind the landing gear as shown in Figure 2. This is possible also, when the landing gear is installed.

W A R N I N G

Maintain hoisting strap as a security device to prevent nose over of the aircraft during maintenance work.



Shoring the Front
Figure 2

07-20-02 Shoring the Tail

Refer to Figure 3.

1 Secure the main wheels with wheel chocks.

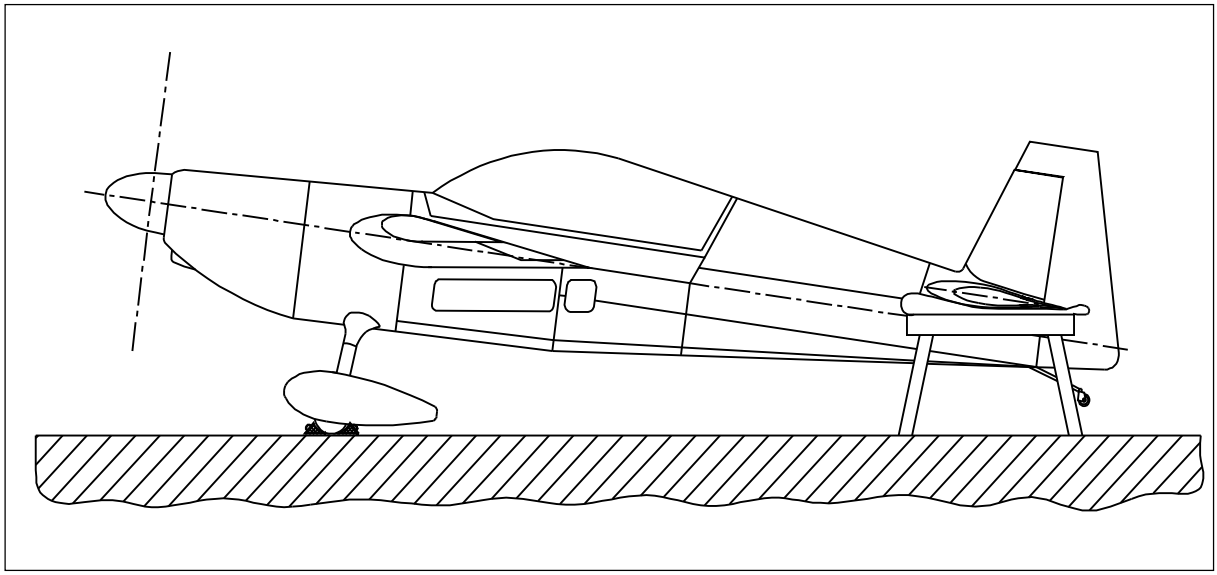
2 Make available two ca. 2.5 feet high, ca. 1 foot wide and ca. 3 feet long supports.

3 Cushion the supports.

C A U T I O N **Don´t handle the elevator when lifting the tail.**

W A R N I N G **Do not lift the tail higher than necessary for supporting. The aircraft may tilt onto the nose.**

4 Lift the tail some centimeters by handling carefully the horizontal fins and put the cushioned supports under each side of the horizontal stabilizer.



Shoring the Tail
Figure 3

Chapter 08

Leveling and Weighing

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Chapter	Title	
08-00-00	**GENERAL**	**3**
08-10-00	**WEIGHING**	**4**
08-20-00	**LEVELING**	**7**

08-00-00 GENERAL

This chapter contains all informations and procedures that are necessary for weighing and leveling the EXTRA 300S and for determining the Center of Gravity.

Weigh the aircraft and determine the Center of Gravity each 5 years, after installation of additional equipment or after repairs.

I M P O R T A N T

Weigh, read the scales and calculate with carefulness. Incorrect weighing or determination of Center of Gravity endanger the pilot and the aircraft.

08-10-00 WEIGHING AND CALCULATION OF C OF G

N O T E

Weigh the aircraft only on even floor and in closed halls (wind protected). Use three identical scales.

1 Ensure that the aircraft is fully equipped with equipment in locations according to the equipment list (PILOT´S OPERATING HANDBOOK & FLIGHT MANUAL (POH&FM), Section 6.6).

2 Defuel the aircraft (wing tanks center- and acro tank) to the unusable fuel level.

3 Replenish engine oil to the minimum sump capacity for acrobatic flight (refer to POH&FM Section 1.7)

4 Remove foreign objects (e.g. tools, luggage).

5 Clean and dry the aircraft.

6 Put the seat to middle position and close canopy.

7 Weigh two of those wheel chocks that will be used for securing the main wheels. Enter the weight below in Page 5 "Tare weight scale 1/2 (chocks)".

8 Weigh the jack that will be used for jacking the tail wheel. Enter the weight below in Page 5 "Tare weight scale 3 (jack)".

9 Roll the main wheels onto the scales 1 and 2.

10 Level the aircraft as per ch. 08-20-00.

11 Put the control surfaces to neutral position.

12 Drop perpendiculars from the underside of the fire wall, the centers of the main wheels and the tail wheel and mark on the floor to get the arms X_1 and X_2 (see Page 6).

13 Enter the arms on page 6.

14 Read the scales and enter the weights below. Calculate the net weights and transfer the values to Page 6.

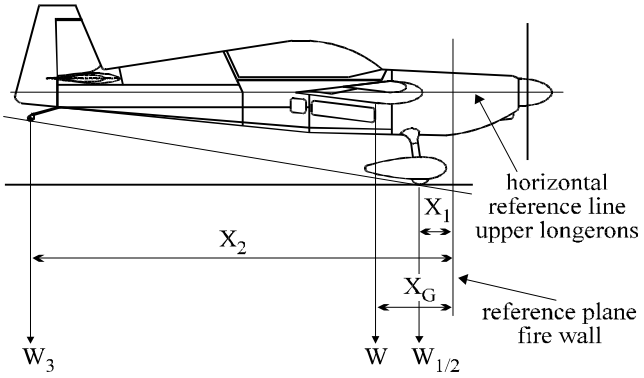
15 Calculate C of G using the formula given below (Page 6).

Gross weight scale 1	. . . . .	kg
Tare weight scale 1 (chocks)	–.	kg
Net weight scale 1 (W_1)	. . . . .	kg
Gross weight scale 2	. . . . .	kg
Tare weight scale 2 (chocks)	–.	kg
Net weight scale 2 (W_2)	. . . . .	kg
Gross weight scale 3	. . . . .	kg
Tare weight scale 3 (jack)	–.	kg
Net weight scale 3 (W_3)	. . . . .	kg

Empty Weight and Center of Gravity Position
EA 300S

Data according to "TC Data-Sheet" and "Pilot´s Operating Handbook and LBA approved Airplane Flight Manual" Doc.-No.: EA - 04701

Equipment according to Equipment List dated: . . . . . .



Legend:
X_1 = Arm: fire wall - main wheels
X_2 = Arm: fire wall - tail wheel
X_G = Arm: fire wall - Center of Gravity
W_1 = Net weight main wheel LH
W_2 = Net weight main wheel RH
W_3 = Net weight tail wheel
W = Empty weight

$$X_G = \frac{W_1 \cdot X_1 + W_2 \cdot X_1 + W_3 \cdot X_2}{W} \qquad W = W_1 + W_2 + W_3$$

Item	Weight		Arm		Moment	
Main wheel LH	(W_1)	kg ·	(X_1)	cm =	. . . . .	kgcm
Main wheel RH	(W_2)	kg ·	(X_1)	cm =	. . . . .	kgcm
Tail wheel	(W_3)	kg ·	(X_2)	cm =	. . . . .	kgcm
Empty weight	(W)	kg	**Total moment**		. . . . .	kgcm

$$\frac{\text{Total moment}}{\text{Empty weight}} = X_G$$

Empty weight is (W) . . . . . kg*.

W_{min}: 595kg
W_{max}: 697kg (acro)
W_{max}: 711kg (Normal Cat.)

Center of Gravity is (X_G) . . . . . cm aft fire wall.

Weighing performed by: . . . . . .

Aircraft Inspector: . . . . . Sign: . . . . . .

** If value exceeds the given tolerances, contact the manufacturer.*

08-20-00 LEVELING

N O T E

Level the aircraft only on even floor and in closed halls (wind protected).

1 Secure each main wheel with two wheel chocks.

W A R N I N G

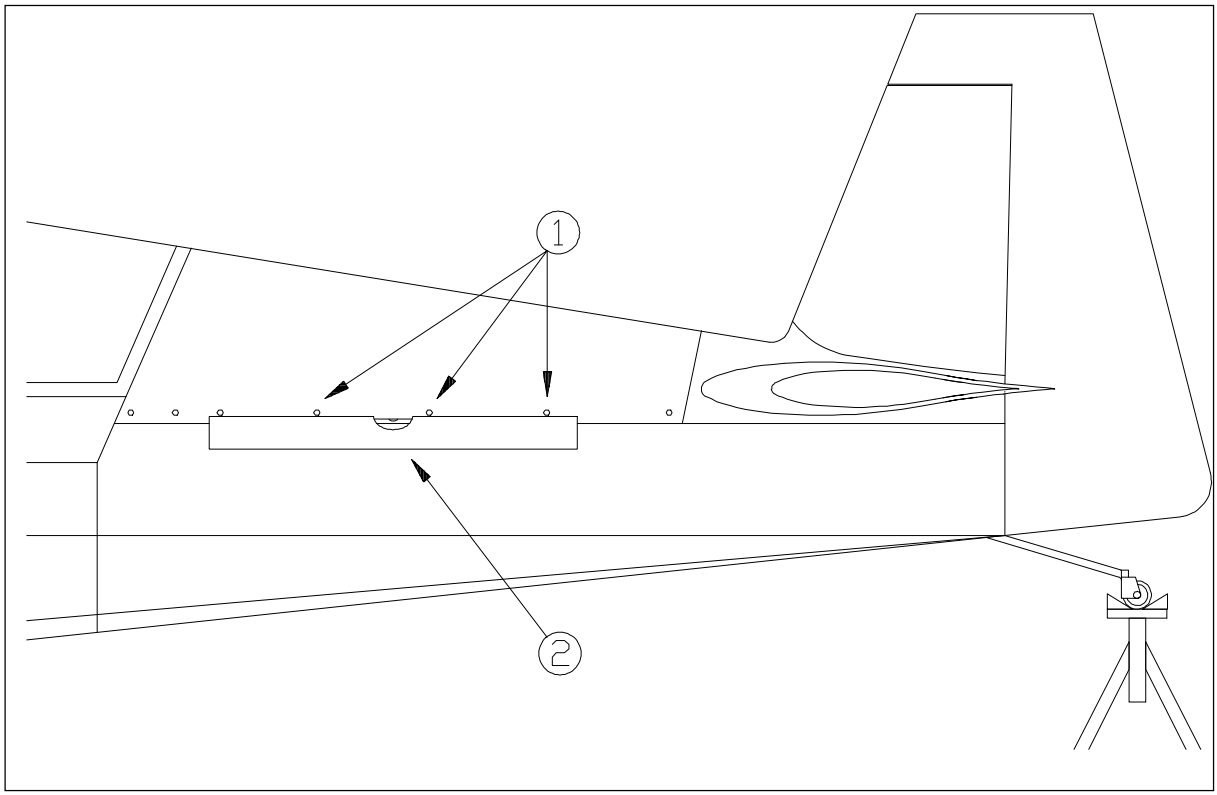
Do not lift tail wheel higher than necessary for leveling. The aircraft may tilt onto the nose.

C A U T I O N

Prior to levelling, ensure aircraft is clear of obstructions.

2 Lift tail and put the jack (height: ~90 cm (~3 ft)) under the tail wheel, which has to be in the rearmost position.

3 Level the aircraft to its horizontal reference line using a spirit level (2), which is to put under the bolts of the rear part of the main fuselage cover (1) (refer to Figure 1). Adjust pitch by changing the jack height.



Leveling
Figure 1

Chapter 09

Towing and Taxiing

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Chapter	Title	
09-00-00	**GENERAL**	**3**
09-10-00	**TOWING**	**3**
09-20-00	**TAXIING**	**3**

09-00-00 GENERAL

This chapter describes the procedures and precautions nescessary for proper ground handling of the EXTRA 300S.

09-10-00 TOWING

D A N G E R

When preparing for ground handling operation ensure that the ignition switch is off.

The aircraft should be moved on the ground by hand without using a towing vehicle or tow bar. For moving the aircraft on the ground, push by hand the wing leading edges or pull at the inboard portion of the propeller blades.

09-20-00 TAXING

Before attempting to warmup or taxi the aircraft, ground personnel should be checked by qualified pilots or other responsible personnel. All taxiing should be done at slow speed, and the controls should be positioned such that the effects of gusty wind are minimized.

C A U T I O N

Taxiing over loose gravel or cinders should be done at low engine speed to minimize damage to the airframe surfaces due to stone damage.

The aircraft is taxiing as follows:

1 Start and warm engine up in accordance with the Pilot´s Operating Handbook (PN: EA-04701) Section 4.3 "Starting Procedures".

C A U T I O N

Only operate with the propeller at minimum blade angle (High RPM).

2 Taxi forward a few feet and check brake effectiveness.

3 While taxiing, make shallow turns to test the brakes and the steerable tail wheel if installed.

4 Keep the Mixture in "FULL RICH" position.

Chapter 10

Parking, Mooring, Storage and Return to Service

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10-00-00	**GENERAL**	**3**
10-10-00	**PARKING / STORAGE**	**3**
10-20-00	**MOORING**	**4**
10-30-00	**RETURN TO SERVICE**	**4**

10-00-00 GENERAL

This chapter provides the procedures recommended to park or to moor the aircraft so that the likelihood of ground damage is minimized.

10-10-00 PARKING / STORAGE

When parking the aircraft, set the nose in the wind. Additionally both main wheels must be chocked fore and aft to prevent movement of the aircraft.

C A U T I O N

When chocking the wheels, ensure that the chocks used are not too large to come in contact with the wheel farings. The use of too large chocks may damage the farings.

N O T E

For maximum protection, hangar the aircraft during severe weather and strong winds.

The outdoor storage requires adequate mooring and tie-down facilities. The following precautionary measures are recommended for keeping the aircraft serviceable and ready-to-fly.

1. Refer to Chapter 10-20-00 " Mooring" for mooring instructions.

D A N G E R

Do not rotate the propeller with the master switch on and the battery connected. The engine could start unintenionally and may course serious injuries or death.

2. Maintain an oil film on internal engine parts, frequently pull the propeller through. Run the engine for 15 minutes at 1500 RPM (or until oil temperature normalizes) once every two weeks.
3. After the engine run, pressurize the fuel system, push the mixture control to RICH, and open throttle half way to fill the fuel injector with fuel.

4. Install protective covers over pitot tube, engine cowling openings, canopy, etc.
5. Maintain a good wax finish on all exterior surfaces.

10-20-00 MOORING

This section provides the procedures recommended for a normal tie-down of the aircraft.

Proper tie-down procedure is the best precaution against damage to the aircraft by gusty or strong winds. To tie-down the aircraft securely, proceed as follows:

1. Head the aircraft into the wind
2. Place chocks fore and aft of each main wheel.

C A U T I O N

When chocking the wheels, ensure that the chocks used are not too large to come in contact with the wheel farings. The use of chocks that are too large may damage the farings.

3. Drive stakes into the ground approximately three feet outboard of each wing tip and to either side of tail wheel.
4. Install one tie-down ring in each wing tip rib.
5. Tie a sufficiently strong rope to each wing tie-down ring and anchor to the ground stakes. Allow a little slack in each tiedown rope.
6. Tie the center of the rope to the tail wheel fork and anchor the rope ends to the ground stakes at either side of the tail wheel.
7. Ensure that the canopy is closed waterproof and locked.

10-30-00 RETURN TO SERVICE

If the aircraft has been storage for an extended period of time, it is advisable to perform a 50-hour periodic inspection. Refer to Chapter "05-20-04 Scheduled Maintenance Checks".

Chapter 12

Servicing

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12-10-02	Defueling	5
12-10-03	Fuel Drains	6
12-10-04	Replenishment of Engine Oil	6
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12-20-02	Interior Cleaning	14
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12-30-00	**UNSCHEDULED SERVICING**	**16**
12-30-01	Removal of Snow and Ice	16

12-00-00 GENERAL

This chapter describes the procedures and precautions nescessary for proper servicing of the EXTRA 300S. The specified intervals (refer to chapter 5) are considered adequate to meet average requirements under normal operating conditions.

It is advisable, however, to shorten service and maintenance intervals when operating under abnormal conditions, such as extreme temperature ranges, dusty atmospheric conditions, high humidity and moisture, rough runways, or unusual operating requirements.

12-10-00 REPLENISHING

The replenishing procedures contained in this section provide the proper methods for replenishing consumed fuel, engine oil and brake fluid. Also included are methods for inflation of tires.

12-10-01 Refueling

Refueling is accomplished by pumping or pouring fuel into the two wing tanks or/and the center tank through their respective filler caps. When fueling the aircraft, the following safety precauntions must be followed:

D AN G E R

* **Never refuel the aircraft with the engine running.**
* **Always ensure that the aircraft is grounded before refueling.**
* **Ensure that no one is smoking within 100 feet of the aircraft.**
* **Ensure that all aircraft electrical systems are deenergized while refueling.**
* **Ensure that no aircraft radar or powerful transmitters are operating within 100 feet of the aircraft during fueling.**
* **If fuel is spilled, ensure that the area of spillage is thoroughly flushed with water and that all residual fuel and vapor have dissipate or neutralized prior to starting the aircraft engine.**

Fuel Grade and Limitations

The recommended minimum aviation grade fuel for the AEIO-540-L1B5 engine is AVGAS 100 or 100LL.

I M P O R T A N T

Under no circumstances should fuel of lower octane rating or automotive fuel (regardless of octane rating) be used. It is recommended that personnel be familiar with Service Instruction No.1070 regarding specified fuel for Lycoming engines.

Fuel System Capacities

The EXTRA 300S fuel system capacities are as follows:
Total fuel capacity 171 litres (45.1 US Gallon).
Usable fuel capacity 169 litres (44.6 US Gallon).

I M P O R T A N T

For acrobatic flight wing tanks must be empty.

For acrobatic flight (center and acro tank only):
Usable fuel capacity 49 litres (12.9 US Gallon).

I M P O R T A N T

After refueling, it has to be ensured that all fuel tank caps are securely installed pior to flight.

Additionally one has to wait at least five minutes for moisture and sediment to settle before draining and checking the fuel drain valves.

12-10-02 Defueling

Using appropriate containers, defuel the aircraft by pumping or by siphoning off fuel through the filler ports and by opening all drain valves (refer to Chapter 12-10-03).

D A N G E R

During the aircraft defueling observe the safety precautions specified in section "12-10-01 Refueling".

12-10-03 Fuel Drains

The EXTRA 300S has three fuel drain valves to provide for drainage of moisture and sediment. The center- and acro tank drain valve is located at the RH bottom of the fuselage behind the landing gear, the wing tank drain is located at the left side. The third drain which is interconnected to the fuel gascolator is located in the lowest point at right side of the firewall.

A quantity of fuel must be drained prior to the first flight of the day and at least five min. after refueling to inspect for water and/or contamination. Continue draining each drain valve until free of water or contamination.

D A N G E R

Do not drain the fuel system when the engine or the exhaust is hot or while the wind is strong.

I M P O R T A N T

After draining, you have to be sure that the fuel drain valve is returned to the closed position and the valve is not leaking outside the aircraft.

12-10-04 Replenishment of Engine Oil

The engine oil replenishment is accomplishment by pouring oil into the oil filler spout. The oil quantity can be conveniently checked by use of the dipstick attached to the oil filler spout cap.

Oil quantity

The oil quantity is checked as follows:

1 Check oil level after engine has been stopped long enough for oil to drain back into sump.

2 Open the hatch on the upper part of the cowling.

3 Unsrew oil filler cap and dipstick from engine oil filler spout.

4 Remove cap and dipstick from engine and wipe oil from dipstick with a clean cloth or paper towel.

5 Return dipstick into filler spout and tighten finger tight.

6 Unsrew and remove dipstick. Check oil level on dipstick versus the markings stamped on the dipstick.

7 If replenishment is required see "Replenishment of Engine Oil" below.

8 Return dipstick into filler spout and tighten cap finger tight.

C A U T I O N

When tightening the filler spout cap ensure that is secure. But do not overtighten, as this may damage the "O" ring seal in the cap.

9 Close the hatch on the upper part of the cowling.

Replenish engine oil

Replenish engine oil using oil of the following specification:

Aviation Grade Straight Mineral oil

MIL-L-6082 or SAE J1966 Aviation Grade Straight Mineral oil shall be used to replenish oil supply during the first 25 hours of operation and at the first 25-hour oil change. Continue to use this grade of oil the first 50 hours of operation or until oil consumption has stabilized. The aircraft is delivered from EXTRA-Flugzeubau with proper break-in oil (MIL-L-6082 Aviation Grade Straight Mineral oil).

Ashless Dispersant Oil

MIL-L-22851 or SAE J1899 Ashless Dispersant Oil shall be used after the first 50 hours of the engine operation.

Additive Oil

If an engine has been operating on straight mineral oil for several hundred hours, a change to additive oil should be undertaken with caution. If the engine is in an extremely

dirty condition, the switch to additive oil should be deferred until after engine has been overhauled.

When changing from straight mineral oil to additive oil take the following precautionary steps:

I M P O R T A N T

1 **Do not mix additive oil and straight mineral oil. Drain straight mineral oil from engine and fill with additive oil.**

2 **Do not operate engine longer than five hours before again changing oil.**

3 **Check oil screen for evidence of sludge.**

Change oil and clean oil screen element every 10 hours if sludge is evident. Resume normal oil drain periods after sludge conditions improve.

Recommended Viscosity of Engine Oil:

Average Ambient Air Temperature	MIL-L-6082 or SAE J1966 Spec. Mineral Grades	MIL-L-22851 or SAE J1899 Spec. Ashless Dispersant Grades
All Temperature	----------	SAE 15W50 or SAE 20W50
Above 27°C (80°F)	SAE 60	SAE 60
Above 16°C (60°F)	SAE 50	SAE 40 or SAE 50
-1°C (30°F) to 32°C (90°F)	SAE 40	SAE 40
-18°C (0°F) to 21°C (70°F)	SAE 30	SAE 30, SAE 40 or SAE 20W40
-18°C (0°F) to 32°C (90°F)	SAE 20W50	SAE 20W50 or SAE 15W50
Below -12°C (10°F)	SAE 20	SAE 30 or SAE 20W30

N O T E

Refer to latest revision of Lycoming Service Instruction No. 1014 for further information.

Replenish engine oil as follows:

1 Open the hatch on the upper part of the cowling and unsrew oil filler cap.

2 Using a clean paper towel wipe any oil foreign material from the edges of the filler spout opening. Also wipe oil from the dipstick.

3 Pour oil of proper specification and viscosity into filler spout to achieve desired oil level.

4 Replace oil filler spout cap/ dipstick and tighten finger tight. Close the hatch on the upper part of the cowling and secure engine cowling.

Oil System Capacities:

	U.S. Quarts	Liters	Imp. Quarts
Total Engine Capacitiy	16	15,18	13,32
Minimum Safe Quantity Acrobatic:	12	11,38	9,99
Minimum Safe Quantity Normal:	9	8,53	7.49

12-10-05 Oil Change

The engine oil must be changed after 25 hours of operation. It should be refilled in accordance with section "12-10-04 Engine Oil Replenishing" and the latest revision of Lycoming Service Instruction No. 1014.

At the time of each oil change the engine oil screen at the engine should be removed, cleaned, and inspected for metal particles.

Change engine oil as follows:

1 Remove the cowling of the aircraft.

2 Remove the exhaust port of the second engine cylinder (for easy access to the oil drain).

3 Cut the safety wire securing the oil drain plug.

4 Place a suitable container under the oil drain.

5 Unscrew engine oil drain plug and allow the oil to drain thoroughly.

6 Remove the oil temp. sensor carefully. Do not cut the wire.

7 Remove remaining safety wire from drain plug and safety wire hole on engine.

8 Using a clean rag or paper towel, wipe drain plug clean and area on engine around oil drain.

9 Reinstall drain plug and safety wire.

10 Remove, clean, inspect and reinstall engine oil strainers in accordance with Lycoming Operating Manual.

11 Reinstall oil temp. sensor.

12 Replenish engine oil as per Chapter 12-10-04.

13 Reinstall the exhaust port of the second cylinder using new sealing rings.

14 Reinstall and secure the cowling.

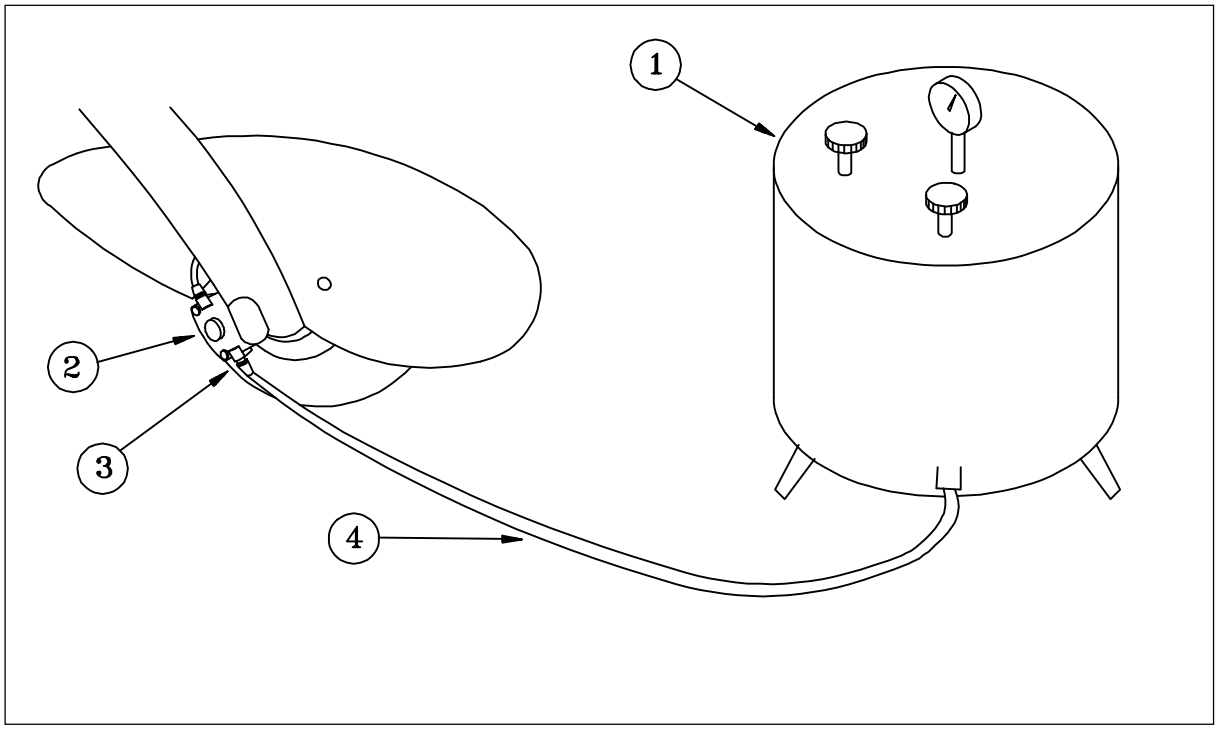
12-10-06 Replenishment of Brake Fluid

In order to assure proper brake action, it is necessary to have positive transfer of hydraulic pressure through the system. Any air trapped in the system must be removed. Follow the procedure described below using a bleed tank (1, Figure 1):

1 Remove engine cowlings and main fuselage cover as per Chapter 51-00-01.

2 Remove fluid reservoir filler plug and screw a clear plastic hose with appropirate fitting into the filler hole at the top of the fluid reservoir; respectively remove screw plug from the vinyl tubing ending at the right landing gear leg (from Serial No. 28).

3 Remove bleeder fitting cap (3) of the wheel brake assembly (2).



Replenishment of Brake Fluid
Figure 1

4 Be certain that the bleeding equipment to be used is absolutely clean and is filled with brake fluid that conforms to Specification MIL-H-5606, (refer to Chapter 05-20 Lubrication Charts) and is uncontaminated.

5 Maintain an adequate supply of fluid during the entire operation. A low fluid supply will allow air to be drawn into the system.

6 Ensure master cylinders are in neutral position.

7 Attach the connector hose (4) to the bleeder fitting.

8 Turn the bleeder fitting 1/2 rotation to the left for opening.

9 Slowly pump clean hydraulic fluid in the system. Bleeding should continue until no more air bubbles are expelled from the system (observe the immersed end of the clear hose), and a firm brake pedal is obtained (fill each side of the system with min. 0.33 ltr (0.1 U.S. Gallons) for complete change).

10 Fill the fluid reservoir up to full reservoir capacity and the complete vinyl tubing (from Serial No. 28).

11 Reinstall fluid reservoir filler plug, resp. screw plug.

12 Close bleeder fitting.

13 Disconnect the connector hose.

14 Reinstall bleeder fitting cap.

15 Check the brake operation.

12-10-07 Tire Inflation

For the EXTRA 300S the required tire pressure is 2.8 bar (40.6 Psi) for both main wheels. When inflating tires, it has to be used regulated air pressure through valve sems.

12-20-00 SCHEDULED SERVICING

12-20-01 Exterior Cleaning

The painted surface of the aircraft have a long lasting, all-weather finish and should require no buffing or rubbing out in normal conditions. However, it is desirable to wash and polish it to preserve the outstanding exterior. Cleaning is best accomplished with cool water, mixed with a mild aircraft detergent, if required.

C A U T I O N

Do not use so called "mild" household detergents to wash aircraft exterior. Such detergents may damage finish and corrode aluminum components.

In order to remove especially heavy dirt from the wing leading edges due to insect splatter and the like, it is good practice to undertaken cleaning immediately after the flight, since deposits of this kind are more difficult to remove when dry. All lubricated components are to be covered before cleaning.

Roughly twice a year, the complete surface should be treated with a non-silicone car polish and repolished to high gloss. But do not apply wax or use pre-wax cleaners during initial paint curing period. Use only mild aircraft detergent and cool water when washing exterior during the first 90 days after repainting.

C A U T I O N

Never use cleaning agents containing silicone!

In order to maintain good visibility at all times, the canopy Plexiglas should begiven good care and kept clean at all times. Techniques and materials used to clean glass should be avoided since Plexiglas is softer than glass and subject to damage by solvents and abrasive glass cleaning agents.

Therefore it should be pay particular attention to using ample water applied with clean sponges and leather, otherwise even the smallest dust partiles will tend to scratch the glazing.

C A U T I O N

Never polish plexiglass dry!

Dull or scratched canopy sections can be returned to their transparent state by treating with especially formulated plexiglass cleaning agents.

12-20-02 Interior Cleaning

Prior the first acrobatic flight of the day it is recommended to clean the interior with a vacuum cleaner to remove dust and loose dirt. If liquid is spilled on the cockpit floor, blot it up promptly with cleansing tissue or rags. Continue blotting until no more liquid is taken up.

C A U T I O N

Never use gasoline, benzine, alcohol, acetone, carbon tetracloride, fire extinguisher fluid, anti-ice fluid, lacquer thinner, or glass cleaner to clean the canopy. These materials will damange the canopy and may cause severe crazing.

12-20-03 Engine Cleaning

Accumulation of dirt and oil within the engine compartment creates a fire hazard and hampers inspection. All cleaning operations have to be performed in well ventiated work areas, and it is ensure that adequate fire-fighting and safety equipment is avaiable.

The engine is cleaning as follows:

1 Allow the engine after running to cool before cleaning.

C A U T I O N

2 The magnetos, alternator, starter, the air inlets and the engine cowling (the inside of the engine cowling is covered with water soluble fire protection paint) must be protected against cleaning agents.

3 Wash down engine compartment using a nonflammable engine cleaning agent.

4 Thorougly rinse with clean, warm water to remove all traces of cleaning agents.

5 It is very important not to start the engine before the cleaning agent has been completely removed or has evaporated.

12-30-00 UNSCHEDULED SERVICING

12-30-01 Removal of Snow and Ice

After snowfall, the snow should be removed immediately from surface of the aircraft. Otherwise the water formed from melted snow will freeze on the surface or in slots and gaps of fairings.

C A U T I O N

Do not use sharp tools for removing the snow.

If the aircraft shows sign of ice formation, it is recommended to defrost in a room. Remove as much snow as possible with a soft bristle boom, make sure the wheels and brakes are clear, and tow the aircraft into a room with elevated temperature. This method is particularly desirable, since it will melt any undetected ice and snow that could constitute a flight hazard.

Chapter 20

Standard Practices - Airframe

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20-00-00 GENERAL

The design of the airframe is according to standard procedures and requires no special tools or procedures for maintenance. For that reason, only the bolts used in the Extra 300S with relevant torque values and measuring techniques are described in the following.

20-10-00 STANDARD PRACTICES AIRFRAME

20-10-01 Type of Bolts

For the Extra 300S, LN-bolts (LN="Luftfahrt Norm"), AN-bolts (AN="Army/Navy") and DIN-bolts (DIN="Deutsche Industrie Norm") are used. The type of bolt can be identified by the designation on bolt head and by the surface treatment.

LN-Bolts

Hex head LN 9037, LN 9038 K and LN 9355 aircraft bolts are made of high-strength type 1.7220.5 alloy steel. The bolts are centerless ground, threaded after heat treatment and cadmium plated per specification LN 9368-3000.2.

Bolts according LN 9037 are standard aircraft bolts with undrilled shank. The specification LN 9355 indicates bolts with shank drilled for cotter pin. The specification LN 9038 K indicates bolts with drilled head for safety wire and a shank up to the head.

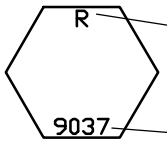
The adding numbers after the dash of bolt spec. indicates the dimensions of the bolt. These numbers are not marked on the head of the LN bolt. Measure the diameter and length to specify the type dimension of the LN bolt. The length of LN aircraft bolt is measured from under the head to the end of the shank.

Example: LN 9037-08042

Bolt Head Identification

Metric thread size (M8=8mm) and Lenght (042=42mm/ 1.65 inch)

Bolt Head:



Letter (R,L,P,H = Identification of Manufacturer)

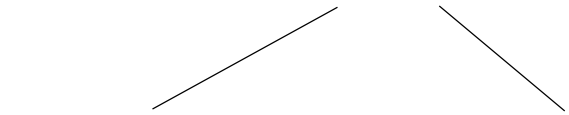
LN Specification

AN-Bolts

Hex head AN aircraft bolts are made of high-strength type 4037 or 8740 alloy steel. The bolts are centerless ground, threaded after heat treatment and cadmium plated per specification QQ-P-416A, Type II, Class 3.

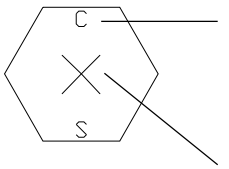
For the Extra 300S bolts with shank drilled for cotter pin or drilled head for safety wire are used. The adding letter "A" after the dash number specifies bolts with undrilled shank. For bolts with drilled head a letter "H" is added after the AN number. The length of AN aircraft bolts is measured from under the head to the end of the shank.

Example: AN 3 - 5A



Bolt Head Identification
Diameter $^{3}/_{16}$" (4.8 mm)

AN hex head bolt
Length $^{5}/_{8}$" (15.9 mm)
Undrilled shank



Letter (Identification of Manufacturer, not always given.)

Cross (Alloy Steel)

Letter (also adjected)

DIN-Bolts

Hex head DIN 931, DIN 933 and hex socket head DIN 912 bolts are standard bolts made of steel with undrilled shank. The surface treatment is chromatized yellow.

Unlike the DIN 931 and DIN 912 the shank of a DIN 933 bolt goes up to the head. The numerical code shown on the head of a DIN bolt specifies the strength type. Also, most bolts will bear a wide variety of finitials or symbols which identify the manufacturer. Measure the diameter and length to specify the type dimension of the DIN bolt. The length of DIN bolt is measured from under the head to the end of the shank.

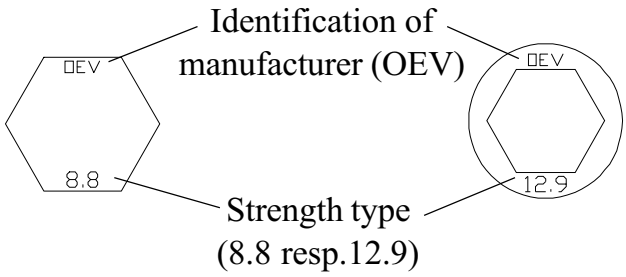
Example: DIN 931, M10 x 80 - 8.8

Bolt Head Identification

Standard hex head bolt
Metric thread size M10
Length 80mm (3.15")
Strength type 8.8

Bolt Head:

DIN 931: DIN 933:



20-10-02 Width Across Flats for Metric Bolts

Thread diameter	Width across flats
M4	7 mm
M5	8 mm
M6	10 mm
M8	13 mm
M10	17 mm
M12	19 mm
M16	24 mm
M20	30 mm
M24	36mm

20-10-03 Torque Values

Nuts, except of counter nuts are mainly stop nuts according to LN 9348 or selflocking nuts according to AN 363.

a) Standard torque values allowed for bolts and nuts according to DIN and LN must be adhered to as follows:

Metric thread size	Torque value (Nm)	(in.lbs)
M4	1,8	16
M5	3.9-4.3	35-38
M6	6.2-6.8	55-60
M8	15.2-16.8	144-148
M10	29.5-32.5	261-287
M12x1.5	51-57	452-504

b) Standard torque values allowed for bolts and nuts according to AN and MS must be adhered to as follows:

Inch thread size	Torque value (in.lbs)	(Nm)
1/4 -28	3,5-4,5	30-40
5/16 -24	6,7-9,5	60-85
3/8 -24	10,7-12,5	95-110
7/16 -20	30,5-33,9	270-300
1/2 -20	32,8-46,3	290-410
9/16 -18	88,1-67,8	480-600

I M P O R T A N T

On all bolt connections, the specified torque and locking method must be observed. Do not reuse stop nuts if they can be run up finger tight!

20-10-04 Special Torque Values

Adhere to the special torque values for the following items:

Item	Torque value (Nm)	(in.lbs)
Engine Mounting (Bolts AN7-50A / Metal Stop Nut NAS 363C-720)	55	480
Engine Mount to Fuselage (Bolt Din 912, M12-12.9 / Stop Nut DIN 985, M12-8-B2C)	80	720
Longeron Cutout Bridge (Upper Bolts DIN 912 M8-8.8 / Stop Nut LN 9348-08) (Lower Bolt DIN 912 M10x230 / Stop Nut LN 9348-10)	18 33	160 292
Horizontal Stabilizer Front Spar Bolts (Bolt LN 9037-10054 / Stop Nut LN 9348-10)	33	292
Horizontal Stabilizer Rear Spar Bolts (Bolt LN 9037-08042 / Stop Nut LN 9348-08), for S/N 1 through 29	14	124
Horizontal Stabilizer Rear Spar Bolts (Bolt LN 9037-10054 / Stop Nut LN 9348-10), for S/N 30 following	33	292
Vertical Stabilizer Rear Spar Bolt (Bolt LN 9037-10054 / Stop Nut LN 9348-10)	38	336
Wing Main Spar Safety-Bolts (Bolt LN 9038 K-08020)	15	133
Brake Back Plate Bolts (Cleveland)	Refer to Cleveland Maintenance Manual	
Wheel Assembly Bolts (Cleveland)		
Torque for Engine	Refer to Lycoming Overhaul Manual	
Torque for Propeller	See MT-propeller Installation Manual E-124	

I M P O R T A N T

On all bolt connections, the specified torque and locking method must be observed. Do not reuse stop nuts if they can be run up finger tight!

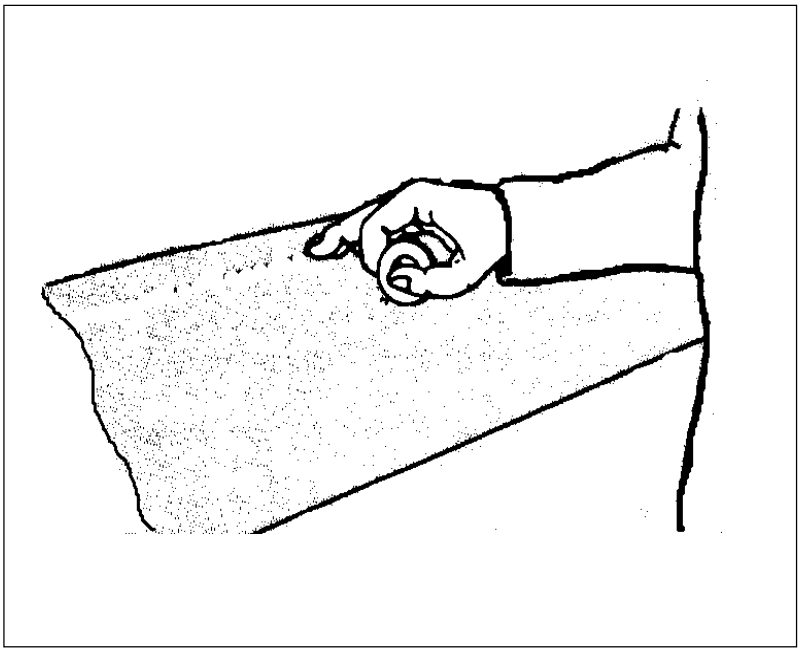
20-10-05 Measuring Techniques

When using stop nuts, the safety torque (friction torque or braking torque) should be added to the table standard values. This value is indicated on the dial of the torquemeter, before the nut contacts the attachment surface.

Always torque nuts for fastening, if possible. When bolts are torqued there might be an additional torque value due to shaft friction. This torque can be determined by a torquemeter before the bolt head contacts the attachment surface and should be added to the table value.

20-10-06 Coin Tapping

Inspection for damage is more critical for composite structure than for conventional structures. A large washer or similar object is a valuable tool for detecting debonds in the airframe surface. When a large washer is lightly bounced against a solid structure, a clear metallic ring should be heard. If delamination is present, a dull thud will be heard. This procedure is shown in the following Figure 1:



Coin Tapping
Figure 1

20-10-07 Flexible Hose

The EXTRA 300S is equipped for the oil, fuel, and brake lines with "AEROQUIP-hoses Aerospace Division". From Serial No. 29 equivalent "STRATOFLEX-hoses Aerospace Connectors Division" are used. Maintenance work or overhaul of these hoses requires the attention of the manufacturer informations and bulletins. For the replacement of hose and hose assemblies the EXTRA-Flugzeugbau GmbH should be contacted.

Replacement of Flexible Hose

Hose and hose assemblies should be checked for deterioration at each inspection period. Leakage, separation of the cover or braid from the inner tube, cracks, hardening, lack of flexibility, and excessive "cold flow" are apparent sign of deterioation and reason for replacement. The term "cold flow" describes the deep, permanent impressions in the hose produced by pressure of hose clamps or supports.

The entire assembly must be replaced, if failure occurs in a flexible hose before the timelimit (refer to Chapter 05-10-02 *Overhaul Schedule*) of the hose is achieved. Obtain a new hose assembly of the correct size and length, complete with factory-installed end fittings.

Installation of Flexible Hose Assemblies

The flexible hose must not be twisted on installation, since this reduces the life of the hose considerably and may be loosen the fittings. Twisting of the hose can be determined from the identification stripe running along its length.

The minimum bend radius for flexible hose varies according to size and construction of the hose and the pressure under which the hose is to operate. Bends that are too sharp will reduce the bursting pressure of flexible hose considerably below its rated value.

The flexible hose should be installed so that it will be subject to a minimum of flexing during operation.

The AERROQUIP-hoses inside the engine compartment are to be covered with AEROQUIP AE102 fire sleeves. The correct size of fire sleeves can be taken from the following table:

N O T E

The STRATOFLEX-hoses used in the engine compartment are factory equipped with fire sleeves.

Hose	Fire sleeve
MIL-H-8794-4 / AE303-4 / 111-4	AE102-10
MIL-H-8794-6 / AE303-6 / 111-6	AE102-12
MIL-H-8794-8 / AE303-8 / 111-8	AE102-16
MIL-H-8794-10 / AE303-10 / 111-10	AE102-18

20-10-08 Fittings

For the oil lubrication, the fuel system, and the brake system only AN-fittings are used in the Extra 300S. All these fittings are made of aluminium alloy and are colored blue for identification purposes. The dash number following the AN number indicates the size of the hose for which the fitting is made, in 16ths of an inch. This size measures the inner diameter (I.D.) of the hose. The material code letter (Aluminum alloy: code D) follows the dash number.

Example: Elbow AN 822-8D

N O T E

Apply Loctite 577 on all National Pipe Threads (NPT) before installation.

20-20-00 ASSEMBLY INSTRUCTION

20-20-01 General

N O T E

Make appropriate logbook entry of compliance with this Assembly Instruction after Container Shipping.

In case of the aircraft is delivered in a container it has to be assembled on arrival.

For assembly of aircraft main components follow the instructions as outlined in the Chapter 20-20-02.

These instructions can not replace the skill, craftsmanship and sound technical knowledge of qualified personnel. In case of doubt or lack of information, the manufacturer of the respective component should be contacted for advice.

Unless otherwise specified all bolts and connections should be torqued as listed in Chapter 20-10-03. At some locations special torque values considered necessary. Refer to Chapter 20-10-04. The stated direction "Front" and "Rear" are to be considered in respect of pilot`s seating direction.

20-20-02 Assembly Instruction after Container Shipping

Complete each step of the assembly procedure in the order shown below.

1 Check the condition of fastening of the aircraft components in the container. Note any damage.

2 Remove the fuselage/engine assembly from the container. Prevent the aircraft from nosing over by keeping down the tail.

3 Weight the tail per Chapter 07.

4 Remove the aircraft components out of the container. Small parts, hardware, spinner dome and the wheel fairings You find in the cockpit.

5 Inspect all removed items for damage prior to assembly. Damaged items have to be replaced or if possible repaired according to Chapter 51.

C A U T I O N

In order to prevent the aircraft from nosing over the assembly has always to start with the empennage.

6 Prior to assembly remove engine cowling, main fuselage cover, and canopy per Chapters 51 and 53.

N O T E

In contrast to the instructions given in the respective Chapters don‘t reinstall these items before completion of the whole assembly.

7 Remove provisional attached rudder and vertical stabilizer per Chapters 27 and 55.

8 Install horizontal stabilizer with elevator per Chapter 55. The procedure described there is also applicable to the installation of the complete horizontal tail. Consider to connect the ground bonding lead of the elevator too.

9 Connect elevator push pull rod actuator lever per Chapter 27-01-01.

10 Connect trim wire to the tab actuator lever using fitted clamp.

11 Inspect for full travel and elevator deflection in relation to stick movement.

12 Inspect for full travel and trim tab deflection in relation to trim handle movement.

13 Install the vertical stabilizer per Chapter 55.

14 Reinstall rudder to the vertical stabilizer per Chapter 27-21-01.

15 Inspect for full travel and rudder deflection in relation to rudder pedal movement.

16 Install the wing per Chapter 57.

17 Install navigation/strobe lights per Chapter 33-41-01.

18 Install propeller in accordance with MT-Propeller installation instructions E-124 latest revision.

19 Remove tail weight.

20 Check if all switches are in Off-position and connect battery.

21 Perform operational check of electrical equipment. Shut-off master switch after completion.

22 Perform operational check and rigging of control system.

23 Inspect fluid filled lines for leaks.

24 Check security of main spar bolts.

25 Install wheel fairings, main fuselage cover and rear support angle, canopy, engine cowlings, and access panels (Refer to Chapter 51-00-01 and 53).

26 Check all control surfaces for freedom of movement and security.

27 Perform a compass compensation according to „Aircraft Inspection and Repair FAA AC 43.13“.

28 Check correct servicing of aircraft.

29 Perform an engine run up. Refer to Chapter "05-20-04 Scheduled Maintenance Checks". Start the engine in accordance with the Pilot’s Operating Handbook and Airplane Flight Manual (POH).

30 Inspect aircraft for foreign objects.

31 Final inspection by licensed aircraft inspector.

I M P O R T A N T

After first flight check fuselage interior/exterior for fuel leaks. Check all bolts on fairings and cover sheets for tight fit.

Chapter 23

Communication

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23-00-00 GENERAL

The aircraft is equipped with a BECKER communication system. Maintenance work or overhaul of the this system requires consultation of the manufacturer. (Refer to BECKER Flugfunkwerk GmbH).

23-10-00 Speech communication

The VHF-communication system consists of:

1 transmitter/receiver, VHF radio BECKER AR 3201

2 circuit breaker 5Amp.

3 VHF whip antenna (Moba 210 FA) BECKER 1A001

4 switch (radio master)

23-10-01 BECKER AR 3201

N O T E

The informations given for VHF radio AR 3201 are based on the manufacturer´s operator´s and installation manual. Refer to BECKER operator´s and installation manual for further information.

Operation Instructions

For a better understanding of the following operation instructions refer to Figure 1 additionally.

1 Switch on

2 Frequency selection

Frequency selection is only possible when the channel selector knob is in the "A"-position.

3 Channel memories

The AR 3201 is fitted with 4 non-volatile channel memories, which can be programmed from the front panel.

4 Channel storage

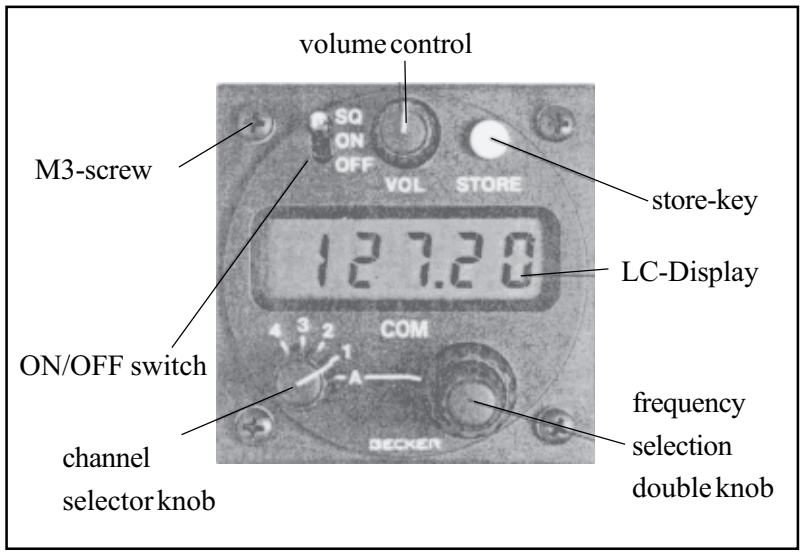
- Turn the channel selector in position "A".
- Select the desired frequency with the double knob
- Switch the channel selector over to the desired channel memory (1,2,3or4)
- Push the store key and hold it until the formerly stored frequency disappears and the newly selected one appears on the LC-display.

5 Channel recall

Every stored frequency can be recalled by turning the channel selector knob

6 Squelch

Bringing the ON\OFF switch into SQ position switches the squelch on. This suppresses disturbing noises and enhances the comfort of the radio communication.



Becker AR 3201 Front View
Figure 1

Installation Instruction

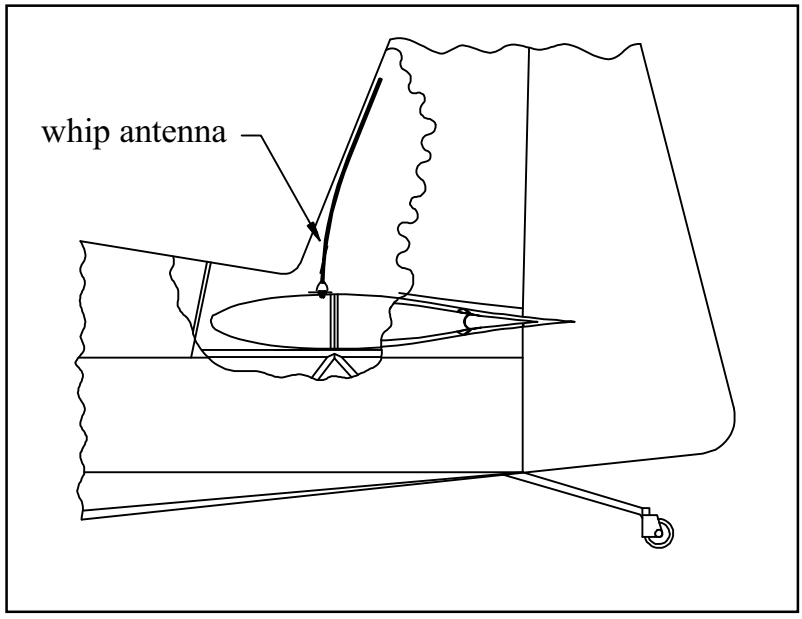
The AR 3201 VHF transceiver is installed in the rear instrument panel, rear mounted and secured with 4 M3-screws. For the electrical installation the AR 3201 is interconnected through the wiring harness ref.431.001-950 following the wiring diagram (see section "Wiring Diagram" in the Becker instruction booklet and refer to Chapter 92 "Schematics" in this manual).

23-10-02 Circuit Breaker

The AR 3201 VHF transceiver is protected against elect. short circuit by a 5 Amp.circuit breaker on the rear instrument panel.

23-10-03 VHF Whip antenna (Moba 210 FA) BECKER 1A001

The VHF whip antenna is installed in the fuselage and is towered with the whip into the rudder fin (Refer to Figure 2). A "RG 50" coaxial cable connects this whip antenna directly to the AR 3201 VHF transceiver.



Whip antenna
Figure 2

The VHF whip antenna is removed as follows:

1 Assure the master switch is OFF

2 Remove the main fuselage cover and the fin fairing (Refer to Chapter 51-00-01)

3 Disconnect the antenna to the coaxial cable.

4 Remove the nut holding the antenna to the support plate. (Up to Serial No. 26 the support plate had a lower position)

5 Pull the antenna carefully out of the rudder fin.

Chapter 24

Electrical Power

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24-00-00 GENERAL

This Chapter describes the electrical power system and its operation. This covers the battery system and the alternator system.

The battery system consists of the dryfit A200 battery (Sonnenschein GmbH, Büdingen, Germany), the master relay and the associated wiring. The battery is located at the left bottom aft of the firewall; the master relay some centimeters above.

The alternator system consists of the alternator (PRESTO-LITE; ALX8421LS) with integrated DC converter and the B-00371-25 Lamar alternator control box which contains an voltage regulator adjusted to 13.8 Volts and an overvoltage trip cutting the circuit at 16 volts. The alternator is mounted at the right front of the engine. The alternator control box is located at the upper left of the firewall (cockpit side).

24-30-00 DC-GENERATION

(Refer to Figure 0 of Chapter 94) Power for the electrical system is provided by an alternator and/or the battery. The alternator serves as the main component to power the electrical system and charge the battery during normal conditions. The battery is used for starting the engine and powering the electrical system when alternator power is not available (engine not running). The battery also powers the electrical system in case of alternator failure.

A rocker type master switch is used for energizing the master relay, which connects power to the electrical system. The master switch is in series with the field switch so that the complete electrical system can be cut of by means of a master switch.

The voltage regulator, receiving power from the battery via the master switch in combination with the field switch, energizes the alternator field. With the alternator field energized, the operating alternator will produce an output to the electrical system. The voltage regulator varies the output voltage of the alternator to meet the requirements of the electrical system loads. An ammeter is installed into the system to provide an indication of current flow from or to the battery.

The negative side of the battery is connected to the aircraft steel tube design (negative ground). This provides a ground for the system through use of the steel tube design. The positive side of the battery is connected to the coil of the master relay. This relay remains in relaxed state until the master switch is placed to the ON-position. Placing the master switch in the ON-position provides a ground for the master relay energizing this relay. With the master relay energized, a circuit exists from the battery through an ammeter to the bus bar.

The bus bar powers the electrical equipment and accessories furnished on the aircraft. The energized master relay will also allow power from the battery to the starter relay.

Placing the field switch to the ON-position likewise will provide a circuit from the bus bar through a 60 amp alternator and a 5 amp alternator field circuit breaker to the

voltage regulator. The voltage regulator will supply and regulate voltage to the alternator field and protects circuit against overvoltage. With the alternator operating (engine running) and the field energized, the alternator will develop electrical power. The alternator supplies power to the bus bar through the 60 amp alternator circuit breaker. With the alternator power available, the battery will be charged from the bus bar. The ammeter, which is in series with the battery and the bus bar will indicate the current flow to the battery. When the battery reaches a state of full charge, the ammeter will show an indication near "0".

24-31-00 MAINTENANCE PRACTICES

I M P O R T A N T

If replacement of wiring passing the firewall is necessary, renew the sealing of the bushing grooves and gaps at the engine side of the firewall. Use PRC-812 (Products Research & Chemical Corporation, USA) firewall sealant.

24-31-01 Battery

Removal/Installation

C A U T I O N

Ensure the master switch is in Off-position.

1 Remove the main fuselage cover as per Chapter 51-00-01.

2 Disconnect the electrical wiring.

3 Remove the 4 attachment nuts (LN9348-06) and the top attachment frame.

4 Remove the battery.

5 Install in reverse sequence of removal.

24-31-02 Master Relay

Removal/Installation

C A U T I O N

Ensure the master switch is in Off-position.

1 Remove the main fuselage cover as per Chapter 51-00-01.

2 Disconnect electrical wiring.

3 Remove the DIN933 M5x12 attachment bolts, the DIN9021 M5x20 washers and the LN9348-05 stopnuts.

4 Remove the master relay.

5 Install in reverse sequence of removal.

24-60-00 DC ELECTRICAL LOAD DISTRIBUTION

(Refer to Figure 0 of Chapter 91) From the main bus which physically corresponds to the bus bar the electrical load is distributed through circuit breakers and switches.

The bus bar is located at the back side of the circuit breakers, the circuit breakers themselves are located at the lower rear instrument panel so as the lever switches. Subminiature pushbotton switches for the radio are mounted on the control sticks and the throttle controls.

More information concerning the wiring shows Figure 0 of Chapter 91.

24-61-00 MAINTENANCE PRACTICES

I M P O R T A N T

If replacement of wiring passing the firewall is necessary, renew the sealing of the bushing grooves and gaps at the engine side of the firewall. Use PRC-812 (Products Research & Chemical Corporation, USA) firewall sealant.

24-61-01 Circuit Breaker

Removal/Installation

C A U T I O N

Ensure the master switch is in Off-position.

1 Remove the lower panel attachment screws.

2 Turn down the panel.

3 Loosen the bus bar attachment screws and remove bus bar if necessary.

4 Disconnect wiring.

5 Remove the attachment nut at the front side of the instrument panel.

6 Remove the circuit breaker.

7 Install in reverse sequence of removal.

24-61-02 Lever Switch

Removal/Installation

C A U T I O N

Disconnect battery

1 Remove the lower panel attachment screws.

2 Turn down the panel.

3 Disconnect wiring.

4 Remove the attachment nut at the front side of the instrument panel.

5 Remove the switch.

6 Install in reverse sequence of removal.

24-61-03 Subminiature Pushbotton Switch

Removal/Installation

C A U T I O N

Disconnect battery

1 Remove the attachment nut.

2 Tie out the switch some centimeters.

3 Loosen the soldered connections.

4 Remove the switch.

5 Install in reverse sequence of removal.

Chapter 25

Equipment and Furnishings

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25-10-00 FLIGHT COMPARTMENT

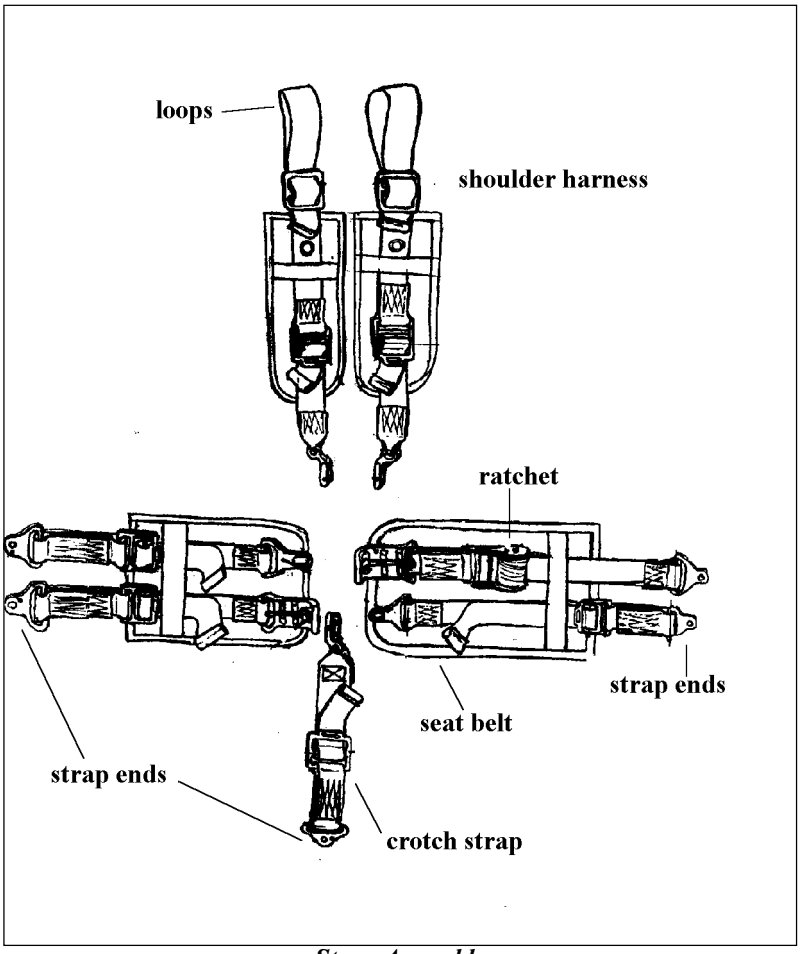
The pilot seat of the EXTRA 300S is standard equipped with special aerobatic seat belt / shoulder harnesses. An aircraft document bag is installed on the right cockpit side.

25-10-01 Seat

The seat is a carbon composite construction of which the back rest position and angle is mechanically adjustable on ground by quickpins. The steel tube structure of the seat is an integral part of the fuselage. The back rest is connected to a separate steel frame. Seat and back rest are attached to the respective steel constructions by AN526-1032-R16 maschine screws.

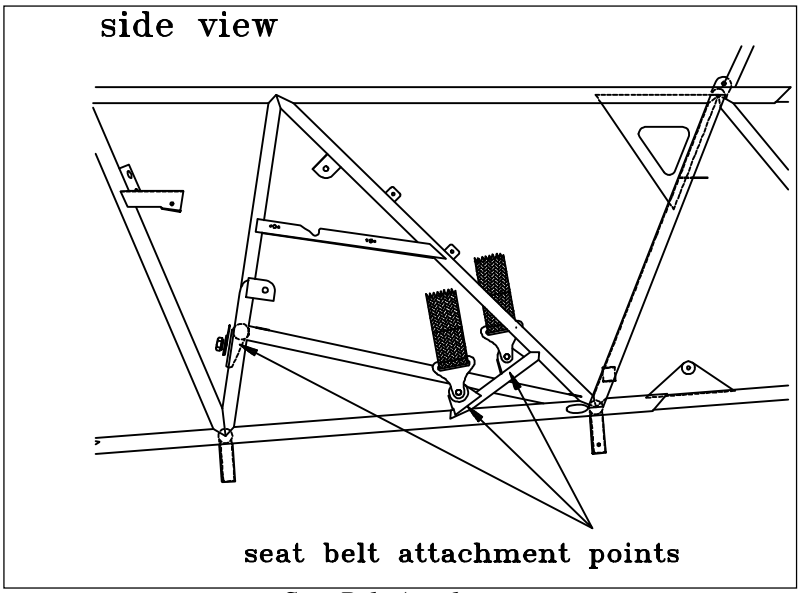
25-10-03 Seat Belts

(Refer to Figure 1) The seat is equipped with a special aerobatic seat belt / shoulder harnesses from the manufacturer "Hooker custom Harness". Such an assembly of straps consists of a right anf left shoulder harness, two right and two left seat belts and a crotch strap. All belts are adjustable. The seat belts have a separate single point release for redundant safety during acrobatic maneuvers. To assure safe operation one release must be closed to the right and the other one to the left. Prior to acrobatic flight the seat belt should be tightened firmly with the ratchet.



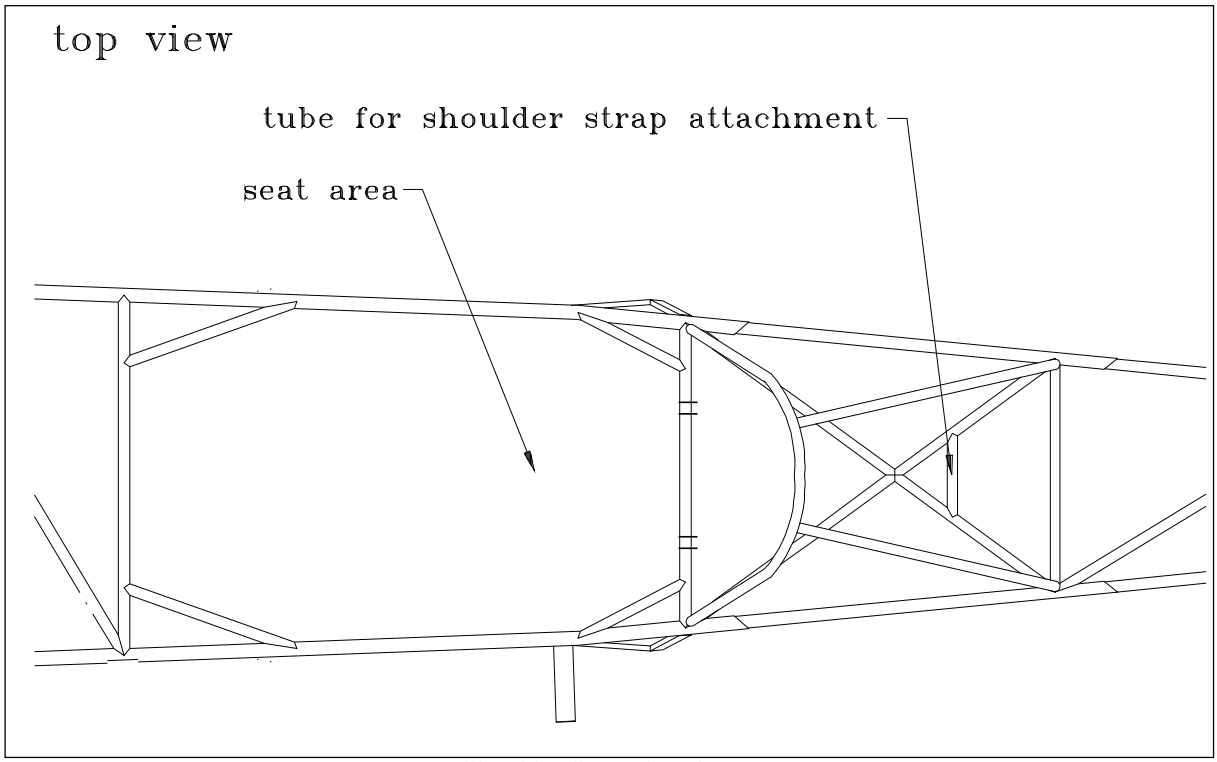
Strap Assembly
Figure 1

Each strap end is fitted with LN 9037-0820 bolts, LN9348-08 stop nuts and DIN 125 M8 washers to its own fitting at the steel frame (refer to Figure 2).



Seat Belt Attachment
Figure 2

The shoulder strap loops are attached to a horizontal steel tube as shown in Figure 3.



Shoulder Strap Attachment
Figure 3

25-10-04 Aircraft Document Bag

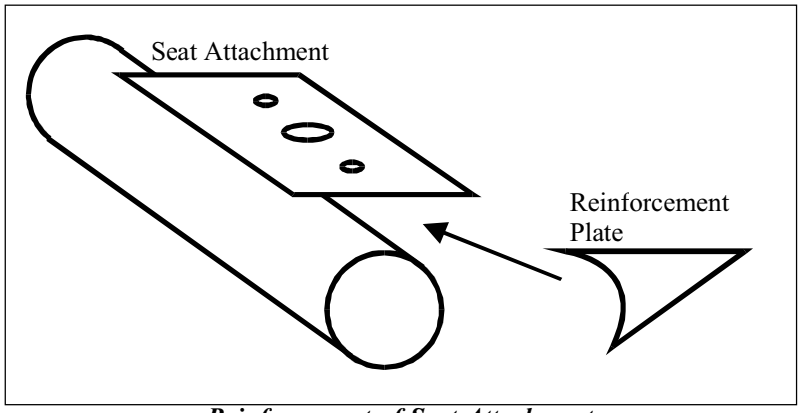
The aircraft document bag is mounted with three AN 526 C 1032 R8 bolts and DIN 9021 M5x20 washers on the right inside of the cockpit frame.

25-11-00 MAINTENANCE PRACTICES

25-11-01 Reinforcement of Seat Attachment

For the Serial No's 01 thru 22, it is advisable to strengthen the seat attachments weld a reinforcement plate at the position as shown on Figure 7. Use steel grade 1.7734.4 or AN 4130 in conjunction with the TIG welding procedure (Tungsten Inert Gas, also called WIG welding) , thickness 1mm (0.04").

N O T E **Any welding needs to be done in accordance with FAA AC43.13-1A manual.**



Reinforcement of Seat Attachment
Figure 7

Chapter 27

Flight Controls

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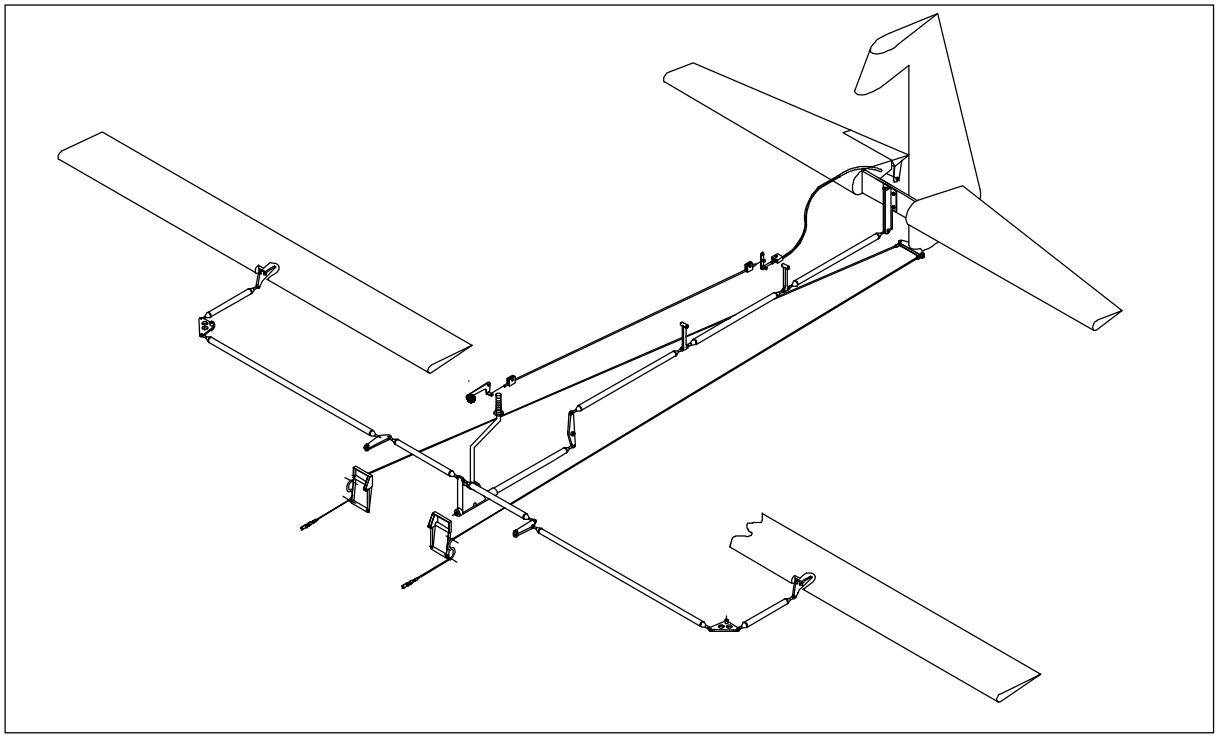
27-00-00 GENERAL

(Refer to Figure 1) The EXTRA 300S is standard equipped with a conventional control stick and adjustable rudder pedals. The control surfaces are operated by a direct mechanical linkage. The control surface deflections are shown in Figure 2. From Serial N° 29 there is a rubber plugged hole in the bottom fuselage cover for rear torque tube bearing lubrication.



Controls
Figure 1

27-00-01 Free Play in the Control System

** measured at the trailing edge and max. chord*

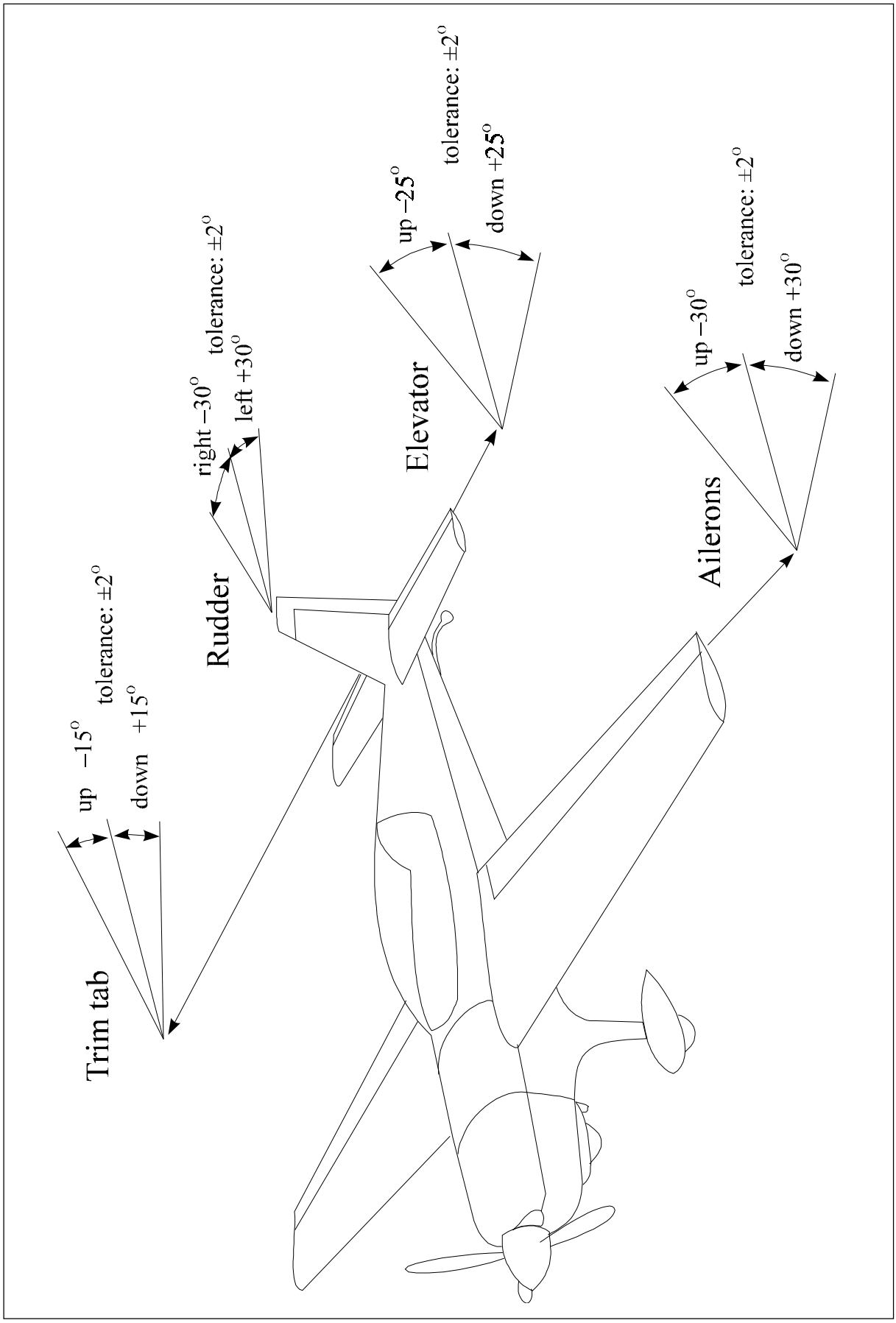
With controls (stick and rudder pedals) locked, the free play measured at the control surfaces must not exceed the values listed:

Aileron: ±1 mm*

Elevator: ±1 mm*

Trim tab: ±2 mm*

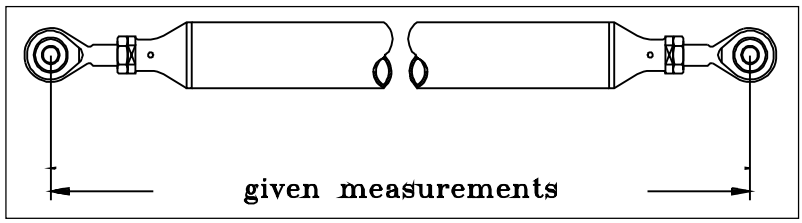
The rudder has a direct cable connection with retracting springs and is therefore always under tension.



Control Surface Deflections
Figure 2

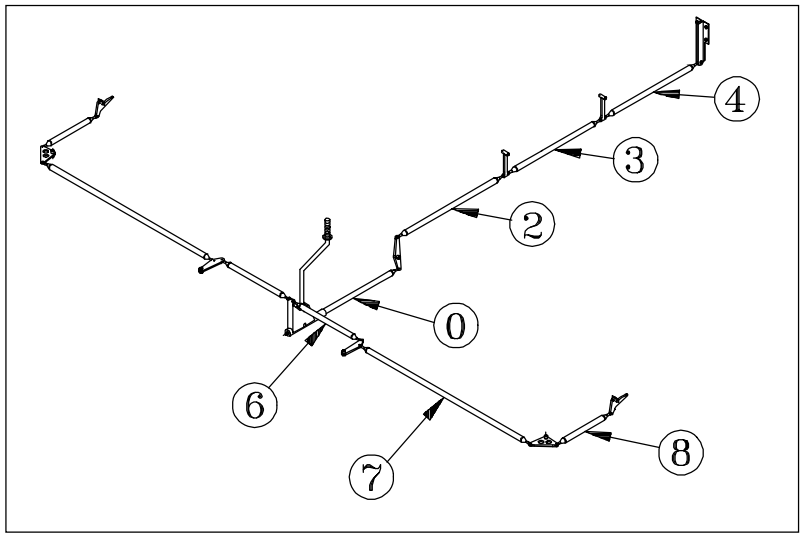
27-00-02 Control Rod Lengths

The measurements given in this chapter refer to the distances between the centers of the rod end bearings (see Figure 3).



Control Rod Measurement
Figure 3

Refer to the following Figure 4 for identification of the control rods.



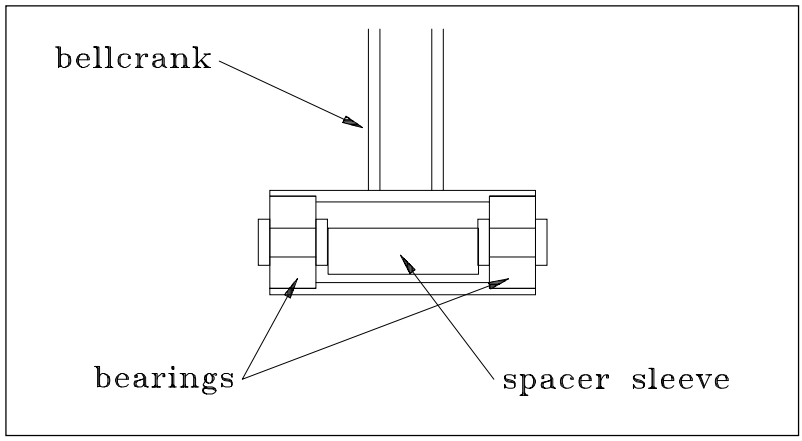
Control Rod Identification
Figure 4

Control rod	Measurements
0	811 mm
2	729 mm
3	588 mm
4	891 mm
6	520 mm
7	1863 mm
8	420 mm

27-01-00 MAINTENANCE PRACTICES

N O T E

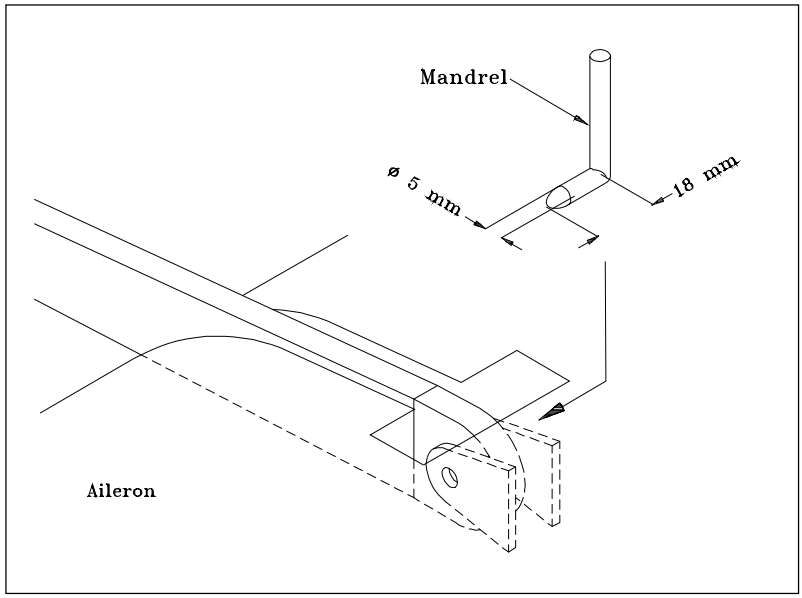
When installing a bellcrank or control stick the spacer sleeve inside the bearing could be displaced as shown in Figure 5. Use a mandrel to adjust the spacer sleeve.



Spacer Sleeve Displaced
Figure 5

N O T E

When installing a control surface use mandrels as shown in the following Figure 6 to preset the control surface. Then press out each mandrel by pushing a bolt into the bearing.



Control Surface Mounting Aid
Figure 6

27-01-01 Control Rod Removal/Installation

Refer to Figure 7. All control rods are attached to the control levers in the same way with AN bolts, washers and self-locking nuts. The control rods inside the wing are interconnected by ground bonding leads fastened to the rod ends by additional nuts. So the rod ends have to be disassembled, when the ground bonding leads shall be disconnected. In this case also refer to Chapter 27-01-05.

For the EXTRA 300S up to serial No. 21 castle nuts and cotter pins are used instead of the selflocking nuts (except the control stick to control rod connection for which is also used a selflocking nut).

1 Remove the respective access panels.

N O T E

In case of removal of the control rod connected to the control stick also observe the instructions given in the Chapters 27-01-03.

2 Remove the M6 attachment bolts (1).

3 Remove the control rod.

4 Reverse procedure to install the control rod. Replace the selflocking nuts.

27-01-02 Bellcrank Removal/Installation

Refer to Figure 7

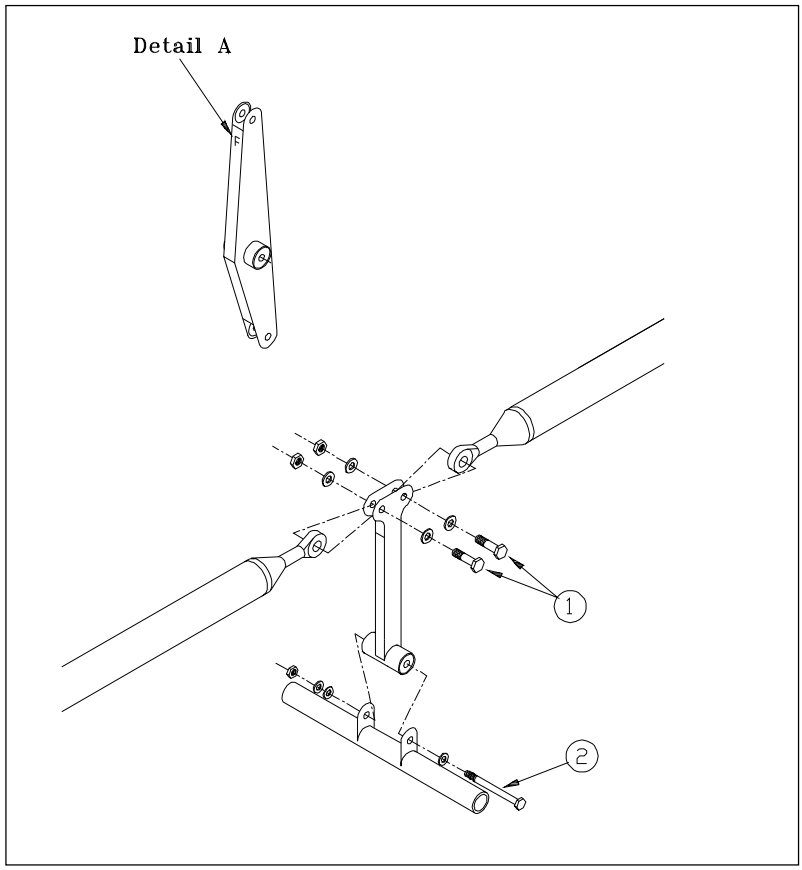
1 Remove the respective access panels.

2 Remove the adjacend control rods per Chapter 27-01-01.

3 Remove the M5 attachment bolt (2).

4 Remove the bellcrank.

5 Reverse procedure to install the bellcrank using sufficient washers (min. 2) at the nut side of the bolt to cover the shank (except the rocker type bellcrank: use only one washer on each side). Replace the selflocking nuts. Observe the first Note of Chapter 27-01-00. To ensure installation of the elevator rocker type bellcrank in correct direction this bellcrank is marked by an "F" which indicates the front side (refer to Detail A of Figure 7).



Control Levers and Rods Removal/Installation
Figure 7

27-01-03 Control Stick Removal/Installation

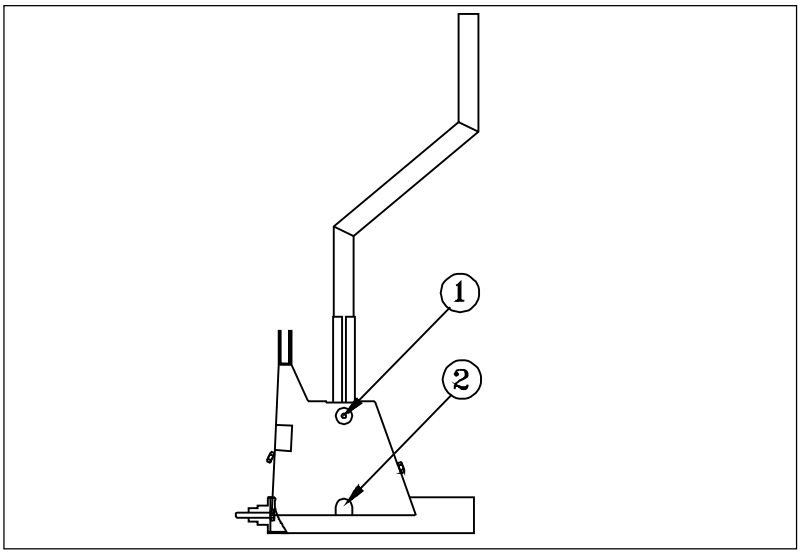
Refer to Figure 8.

1 Remove the leather protection cuff.

2 Disconnect the electrical wiring.

3 Remove the control stick attachment bolt (1).

4 Disconnect the control stick from the control rod per Chapter 27-01-01. Use the control stick to move the control rod attachment bolt to the mounting hole area (2).



Control Stick Removal/Installation
Figure 8

5 Remove the control stick.

6 Reverse procedure to install the control stick. Replace the selflocking nuts. Observe the first Note of Chapter 27-01-00.

7 Check for potential chafing of the wiring after installation.

27-01-04 Torque Tube Removal/Installation

1 Remove the respective access panels.

2 Remove the control stick and the respective rod per Chapters 27-01-01 and 27-01-03.

3 Loosen the bolts of the front and rear bearing blocks.

4 Disassemble the bearing blocks and remove the torque tube.

5 Reverse procedure to install the torque tube. Ensure that the lubrication hole of the rear bearing block is on the bottom. Lubricate the rear bearing with Aeroshell grease 22C or equivalent (MIL-G-81322D).

27-01-05 Control Rod Length Adjustment

The standard measurements are given in Chapter 27-00-02

1 Remove the respective access panels.

2 Disconnect one rod end from the respective bellcrank.

3 Loosen the check nut.

N O T E

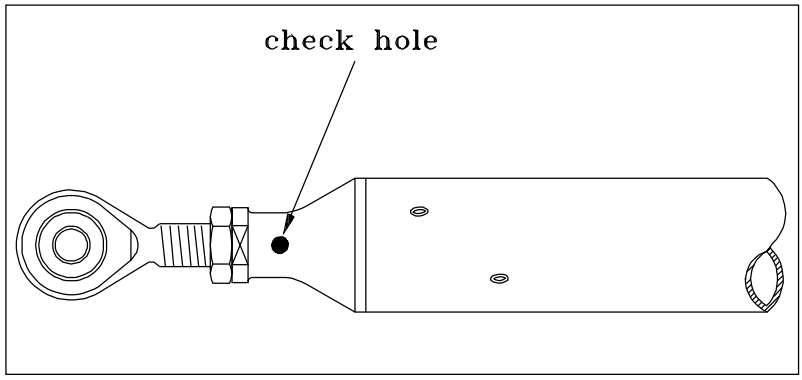
It might be necessary to adjust both rod ends to get the correct length. In this case the free thread of both rod ends should have the same length.

I M P O R T A N T

Observe that the rod ends joined to the rocker type bellcrank should be adjusted long enough not to obstruct the travel.

I M P O R T A N T

Ensure that the threaded rod is visible in the check hole (Figure 9) in any case.



Control Rod Check Hole
Figure 9

4 Turn the rod end in the desired direction to change the length.

5 Ensure that the rod end is in proper alignment with the respective control lever and tighten the check nut.

6 Reinstall the control rod per Chapter 27-01-01.

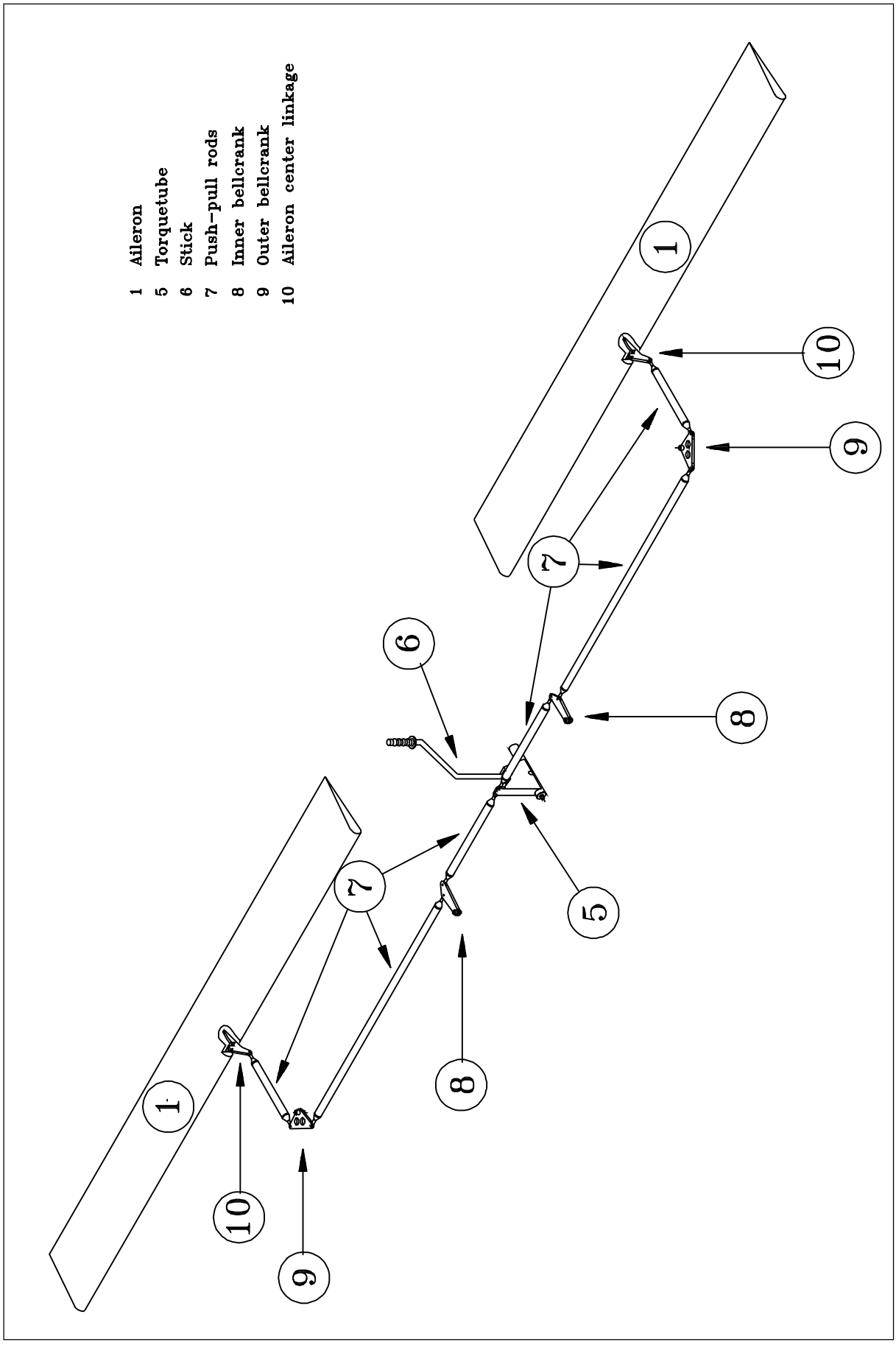
7 Ensure that the control rods don't jam when the control sticks are moved between the extreme positions.

27-10-00 AILERONS

(Refer to Figure 10) The aileron (1) is direct mechanical linked to the control stick (6) by the aileron center linkage (10) with spade arm, push-pull rods (7), bellcranks (8-9) and the torque tube (5). The bell cranks have two sealed ball bearings. Each aileron is mounted at three points in spherical bearings pressed into aluminium hinge arms. For lightning protection reason each hinge arm is grounded to the corresponding attachment bracket at the aileron by bonding leads. The rod end bearings of the push-pull rods located in the wing are also interconnected by bonding leads. The travel stops are located at the torque tube.

To reduce pilot's hand forces the hinge line of the ailerons is positioned at 25% of the aileron chord at the root and 21,5% at the tip. Furthermore, the ailerons are equipped with spades. To prevent flutter the ailerons are mass balanced in the overhanging leading edge.

Two access panels are located at the bottom surface of each side of the wing.



Aileron Control
Figure 10

27-11-00 MAINTENANCE PRACTICES

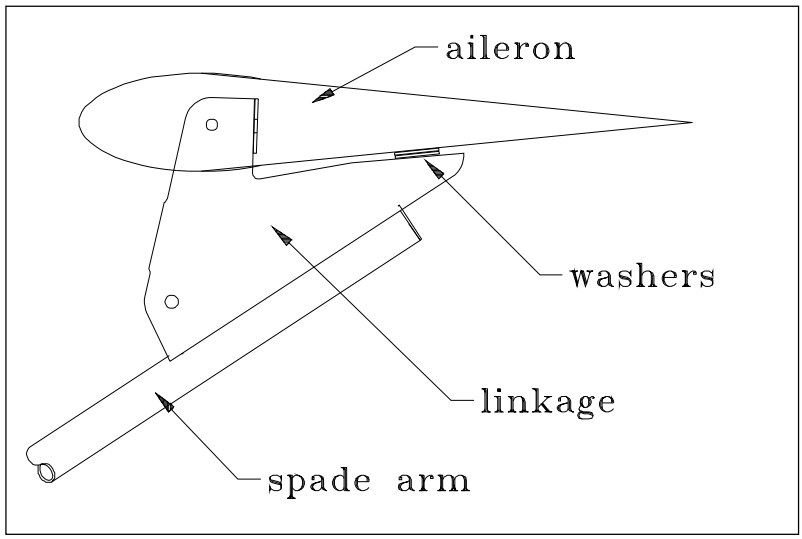
27-11-01 Aileron Removal/Installation

1 Disconnect the actuator rod from the aileron center linkage.

2 Disassemble the spade if necessary observing the quantity and location of washers.

3 Loosen the hinge bolts and the ground bonding leads and remove the bolts.

4 Install in reverse sequence of removal. Ensure that the spade is installed with the same quantity and location of washers. Observe aileron to linkage connection (refer to Figure 11) and spade to mounting plate connection (refer to Figure 13). From Serial No. 9 the washers of the aileron to linkage connection have been omitted. Also observe the second Note of Chapter 27-01-00.



Aileron to Linkage Connection
Figure 11

27-11-02 Aileron Rigging

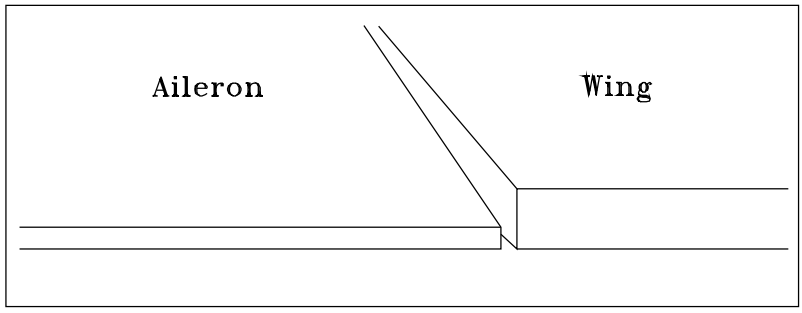
Before beginning any adjustments inspect control rods, levers and hinges for signs of wear or damage, check if the control rod lengths correspond with the measurements given in Chapter 27-00-02. If necessary replace parts and correct lengths per Chapter 27-01-05.

1 Secure the control stick in the neutral position.

2 Check if the control rods connecting the torque tube and the inner wing bellcranks have correct length (Refer to Chapter 27-00-02).

3 Adjust length if necessary per Chapter 27-01-05.

4 Check if the ailerons are in 0°-position (The trailing edge bottom of the aileron is in alignment with the trailing edge bottom of the wing as shown in Figure 12).



Trailing Edge Alignment
Figure 12

5 If necessary adjust the length of the control rods connecting the aileron center linkage to the outer wing bellcrank per Chapter 27-01-05.

6 Check if the left aileron travel is within the given tolerances (up/down 30°, ±2°). Use a conventional protractor.

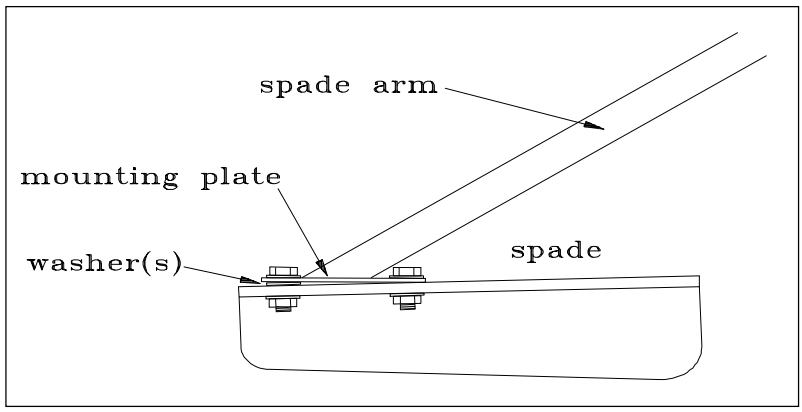
7 Adjust the travel stops if necessary.

8 Follow step 6 for the right aileron. If the travel of the right aileron exceeds the given tolerances, contact the manufacturer.

9 Check if the movement of the control sticks is free over the whole travel range and check if the control stick travel is symmetrically to each side. If it is not contact the manufacturer.

27-11-03 Spade Rigging

For roll trim the spade rigging angle of incidence has to be changed. Insert washer(s) between the spade and the mounting plate (refer to Figure 13). For example: When the aircraft rolls to the left, insert washer(s) at the front attachment bolt of the right spade. (From Serial N° 29 even spades are used).



Spade Rigging
Figure 13

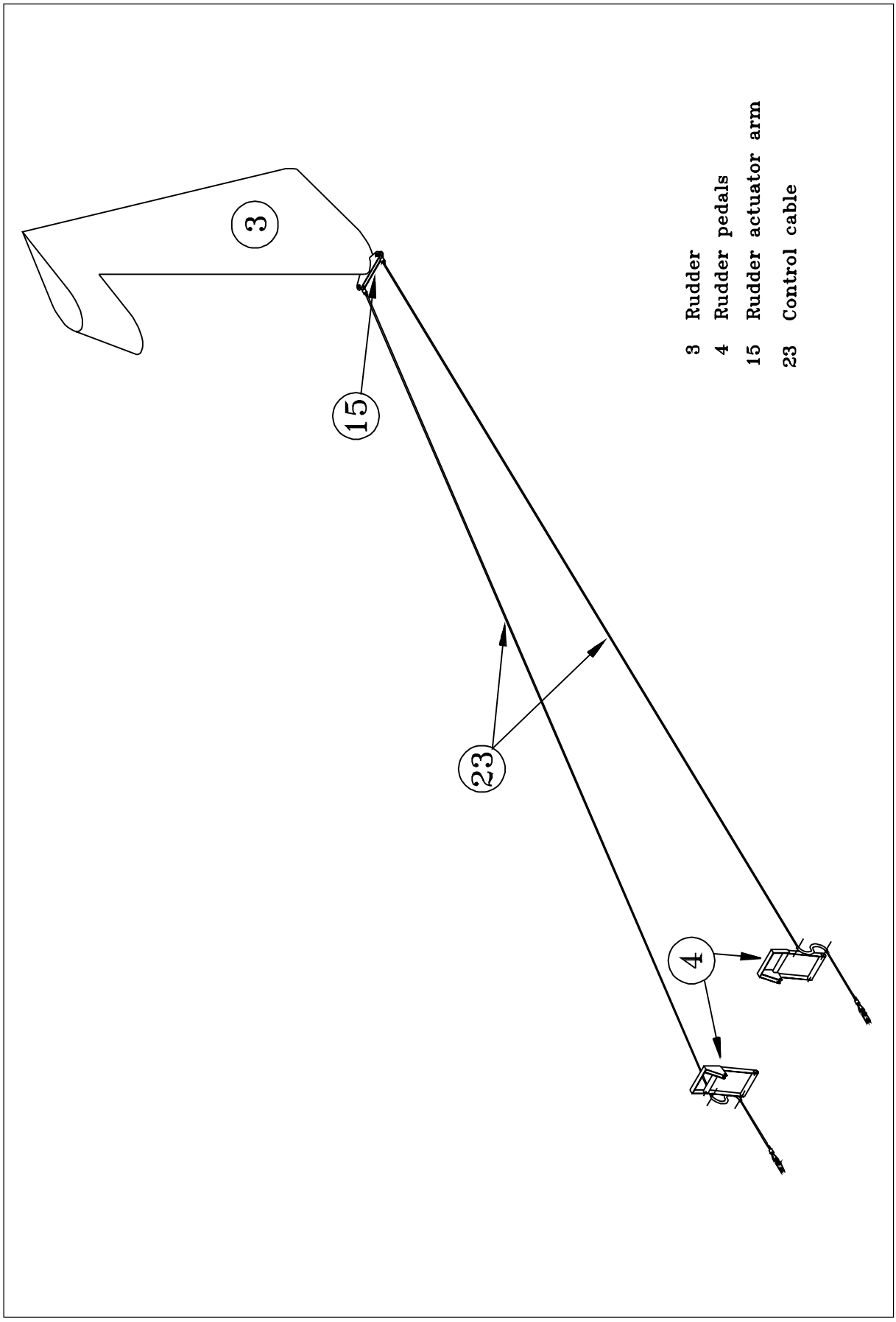
27-20-00 RUDDER

(Refer to Figure 14) The rudder pedals (4) are connected via a cable system (23) to the bottom hinge bellcrank (15). The cables are guided by fairleads. Pedal retracting springs keep the cables under tension when they are not operated. Adjustment is made by an electrical actuator. The rudder (3) is mounted at three points in spherical bearings pressed into a aluminium hinge resp. into aluminium hinge arms. For lightning protection reason each hinge (arm) is grounded to the corresponding attachment bracket at the rudder by bonding leads. A travel stop plate is located at the bottom hinge bracket. A second safety stop is located at the rudder pedal bearing having the only purpose of protecting the lower brake system fitting in case of rudder cable failure.

I M P O R T A N T

This second stop must not be reached under normal operation conditions. Missallignment or exessive elongation of the rudder cabels will result in misuse of this second stop and a subsequent overload of the rudder bearing. An subsequent inflight failure of the footrest could occur.

To prevent flutter the rudder is mass balanced. The mass balance weight of the rudder is installed in the rudder horn.



Rudder Control
Figure 14

27-21-00 MAINTENANCE PRACTICES

I M P O R T A N T

Perform checks 10-11 of "Flight Controls" presented in Chapter 05-20-04 after each maintenance work affecting the rudder control cables.

27-21-01 Rudder Removal/Installation

1 Disconnect the rudder control cables from the bottom hinge bellcrank.

2 Loosen the hinge bolts and the ground bonding leads and remove the bolts.

3 Install in reverse sequence of removal. Observe the second Note of Chapter 27-01-00.

27-21-02 Bottom Hinge Bracket Removal/Installation

1 Remove the rudder per Chapter 27-21-01.

2 Loosen the attachment bolts.

3 Remove the bottom hinge bracket with the travel stop plate.

4 Install in reverse sequence of removal.

27-21-03 Bottom Hinge Bellcranks Removal/ Installation

1 Remove the rudder per Chapter 27-21-01.

2 Loosen the attachment bolts.

3 Remove the bottom hinge bellcranks.

4 Install in reverse sequence of removal.

27-21-04 Control Cable Removal

1 Remove the respective access panels.

2 Remove the front cable attachment bolts.

3 Remove the cable to rudder bellcrank attachment bolts.

4 Cut the control cable behind the front shrinking sleeve.

5 Remove the control cable by pulling it out to the back.

27-21-04 Control Cable Installation

Use only control cables manufactured by EXTRA FLUGZEUGBAU GmbH. Those cables are prepared for simply installation.

1 Remove the respective access panels per Chapter 51.

2 Move the pedal adjustment in a position as shown in Figure 15.

3 Fix pedals in 90° position using templates as shown in Figure 16.

4 Secure the rudder in 0°-position.

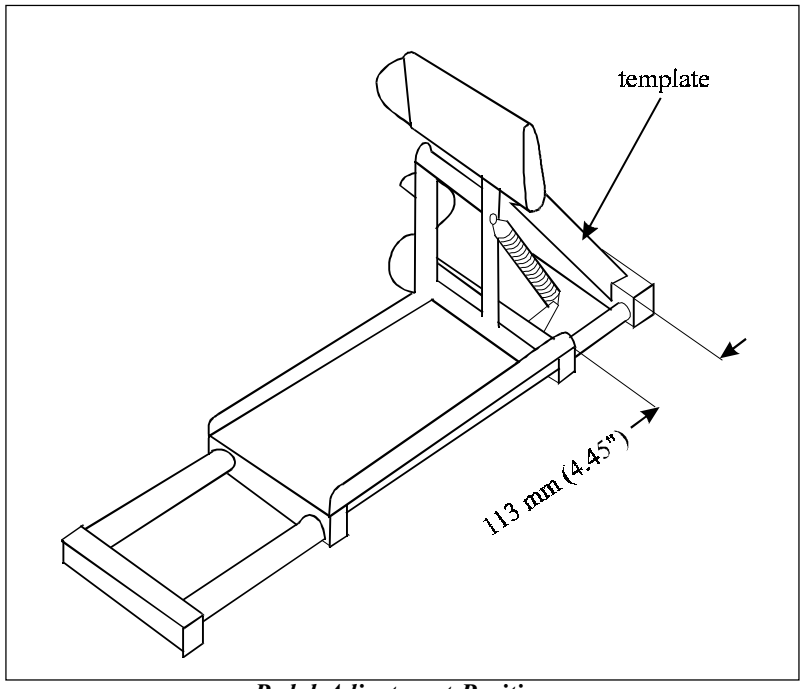
5 Slip 110 mm teflon protective hose on the control cable up to the pre-assembled control cable end.

6 Mount the shackle of the pre-assembled control cable end to the front cable attachment point.

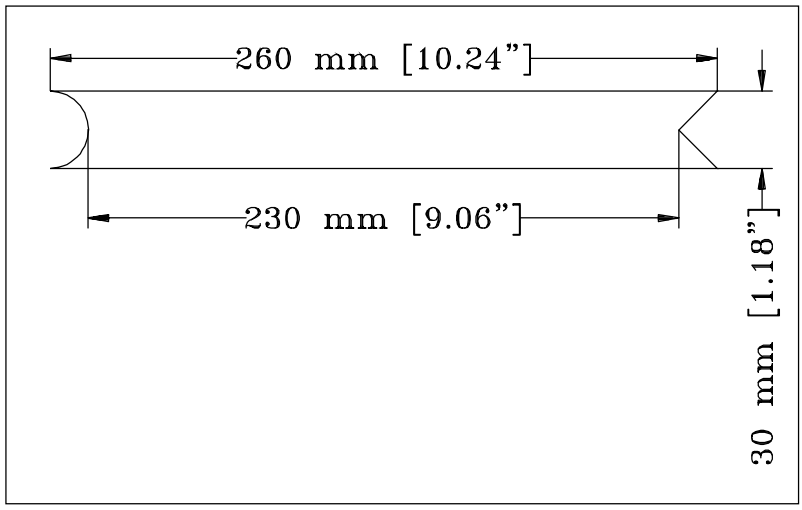
7 Thread the other end through S-shaped tube at the pedal, the fairleads and the hole in the fabric to the tail.

8 Slip 600 mm teflon protective hose on the control cable end. The protective hose should extend to the first fairlead inside the fuselage.

9 Pre-install the LN9355-06-20 bolt, the sleeve, the 3 DIN 125 M6 outer washers (1 washer above, 2 washers below), the 4 DIN 125 M8 inside washers (2 washer above, 2 washers below), the LN9348-06 stop nut, and the thimble to the bottom hinge bellcrank.



Pedal Adjustment Position
Figure 15



Pedal Fix Template
Figure 16

10 Slip the 771095 shrinking sleeve and the NICOPRESS (National Telephone Supply Co., Cleveland Ohio) 18-3-M sleeve on the cable end.

11 Move the cable around the thimble and tighten.

I M P O R T A N T

Clamping has to be performed in accordance with the Service Bulletin 300-1-93 and the Instruction No. 32 of the National Telephone Supply Co., Cleveland Ohio.

12 Clamp the sleeve. Consider to let a distance of 1 mm between the thimble and the sleeve.

13 Cut the free end of the cable (20 mm behind the sleeve).

14 Move the teflon protective hose up to the sleeve and fix with an appropriate adhesive.

15 Slip the shrinking sleeve on the sleeve and the end of the teflon hose and heat up with a heat gun.

16 Follow the steps 5 to 15 for the LH control cable.

17 Remove rudder and rudder pedals securing devices.

18 Check free travel of rudder.

27-21-05 Fairlead Removal/Installation

1 Remove the fairlead retaining clip.

2 Pull the fairlead halves out of the sleeve.

3 Reverse procedure to install the fairlead.

27-21-06 Rudder Rigging

Inspect the control cables, the fairleads and the bottom hinge assembly (with the travel stop plate) for signs of wear or damage before beginning any adjustments. Replace parts if necessary.

1 Secure the rudder pedals following step 2 and 3 of Chapter 27-21-04.

2 Check if the rudder is in 0°-position. (Rudder horn leading edge in alignment with the leading edge of the vertical stabilizer.)

3 Replace the control cables and adjust the length per Chapter 27-21-04 if necessary.

4 Check if the rudder travel is within the given tolerances (left/right 30°, ±2°).

5 If the rudder travel is out of limits, contact the manufacturer for advice.

27-30-00 ELEVATOR AND TAB

Refer to Figure 17. The control movements are transferred from the control stick (6) to the elevator (2) by push-pull rods (7) and bellcranks (11, 12). The bell cranks have two sealed ball bearings. The elevator is mounted at five points in spherical bearings pressed into aluminium hinge arms. For lightning protection reason each hinge arm is grounded to the corresponding attachment bracket at the elevator by bonding leads. The travel stops are located at the torque tube.

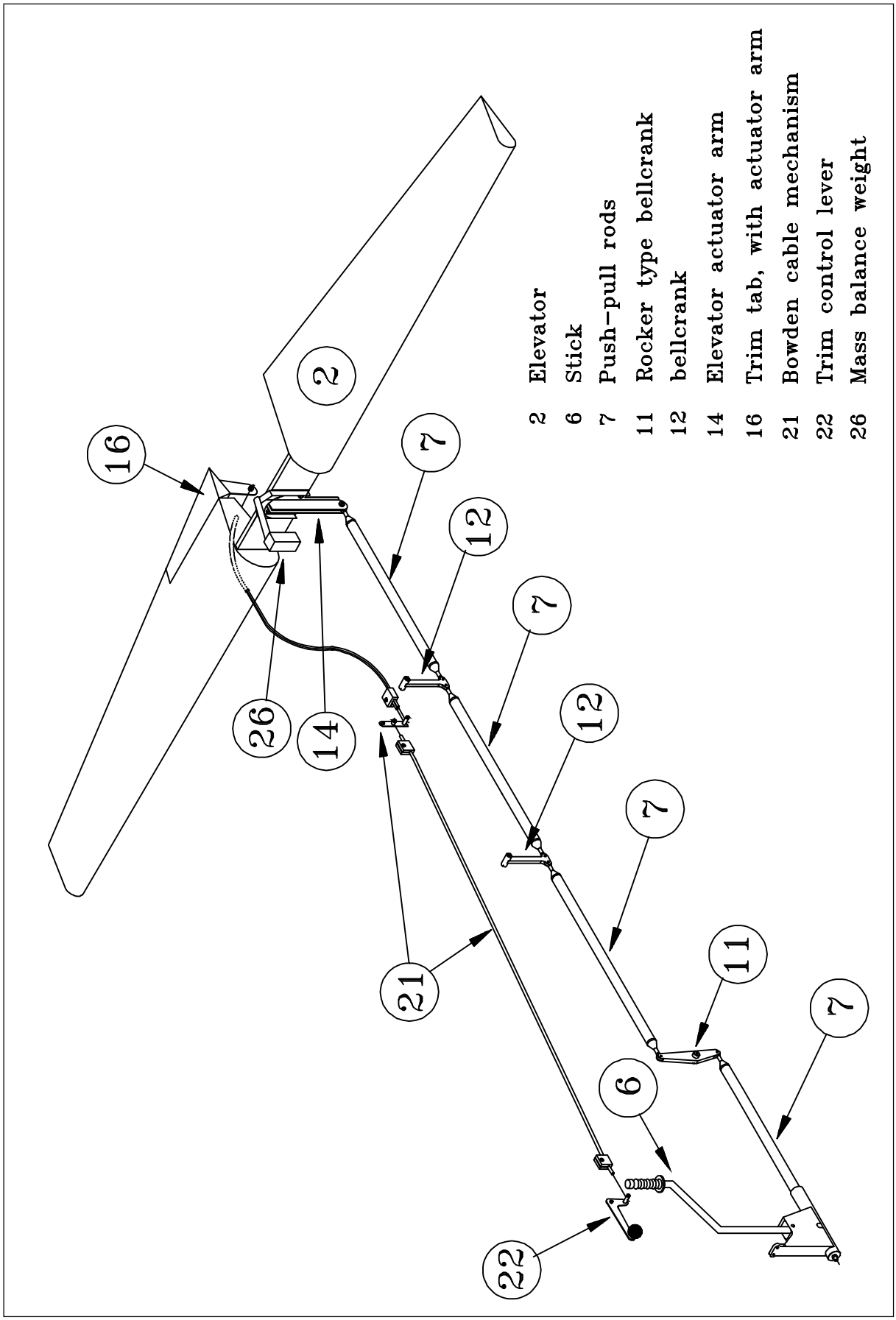
The mass balance weight (26) is mounted on the center bracket of the elevator extending into the fuselage.

An access panel is located at the right side of the rear fuselage.

Trim Tab

The elevator trim control lever (22) is located at the right side in the cockpit. Pitch trim is done by means of the trim tab (16) on the right elevator trailing edge operated by a bowden cable mechanism (21). The trim tab is mounted by two piano hinges.

The trim tab is not mass balanced.



Elevator and Trim Tab Control
Figure 17

27-31-00 MAINTENANCE PRACTICES

27-31-01 Elevator Removal/Installation

Before the removal of the elevator, the vertical stabilizer has to be disassembled.

1 Remove the respective access panels.

2 Remove the rudder per Chapter 27-21-01

3 Remove the vertical stabilizer per Chapter 55-21-01.

4 Loosen the bowden cables from the trim tab. If a replacement is necessary order new cable.

5 Disconnect the elevator actuator arm from the push-pull rod.

6 Loosen the hinge bolts and the ground bonding leads and remove the bolts.

7 Install in reverse sequence of removal. Observe the second Note of Chapter 27-01-00.

27-31-02 Trim Tab Removal/Installation

1 Loosen bowden cables. If a replacement is necessary order new cable.

2 Disconnect the safety cotter pins and remove the hinge pins.

3 Install in reverse sequence of removal.

27-31-03 Elevator Rigging

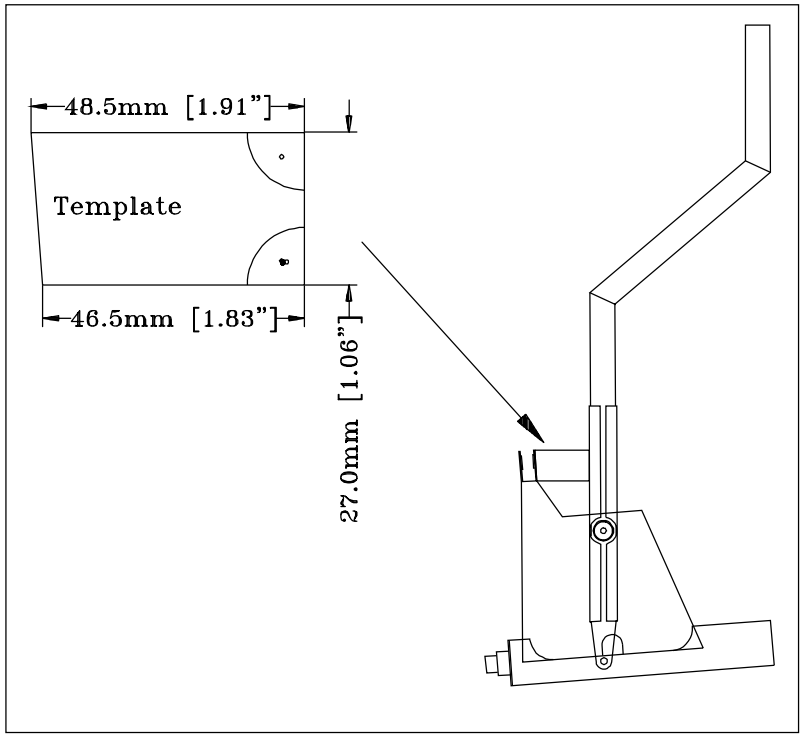
1 Remove the respective access panels.

I M P O R T A N T

Before beginning any adjustments, inspect control rods, levers and hinges for signs of wear or damage and check if control rod lengths correspond with the measurements given in Chapter 27-00-02. Replace parts and correct lengths if necessary per Chapter 27-01-05.

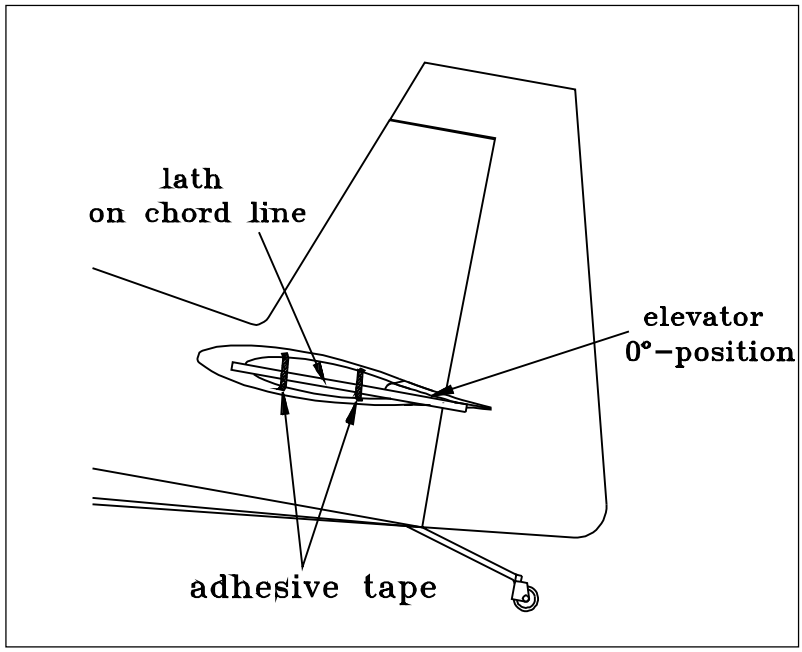
2 Remove the control stick leather protection cuff.

3 Secure the control stick in the neutral position. (Control strick perpendicular to the upper longerons. Use a template like shown in Figure 18).



Neutral Position of the Control Stick
Figure 18

4 Check if the elevator is in 0°-position. (Trailing edge on chord line. Fasten a lath to the tip rib of the horizontal tail per Figure 19 using adhesive tape.)



Lath on Chord Line
Figure 19

5 If necessary adjust the length of the middle tail control rod per Chapter 27-01-05.

6 Check if the elevator travel is within the given tolerances (up/down 25°, ±2°). Use a conventional protractor.

7 Adjust the travel stops if necessary.

8 Check if the control stick travel is symmetrically.

9 If it is not, contact the manufacturer.

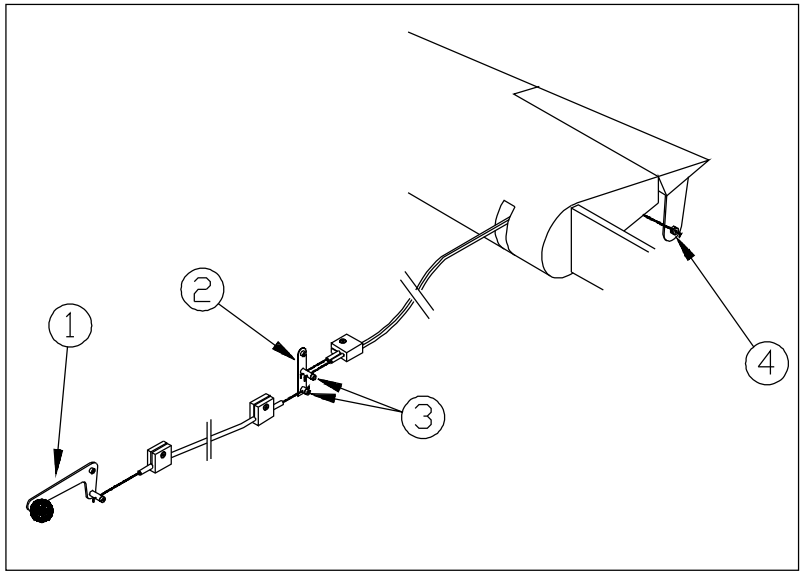
27-31-04 Trim Tab Rigging

Refer to Figure 20.

1 Secure the control stick in normal position.

2 Secure the trim control lever (1) in horizontal position.

3 Adjust the fuselage bellcrank (2) in middle position. Use new selflocking nuts (3).



Trim Tab Rigging
Figure 20

4 Bring the trim tab in 0°-position. Use new selflocking nuts (4).

5 Bring the trim lever in extreme positions and check if trim tab travel is ±15° (tolerance ±2°). If it is not, check free travel of the trim levers, fuselage bellcrank and bowden cables.

Chapter 28

Fuel

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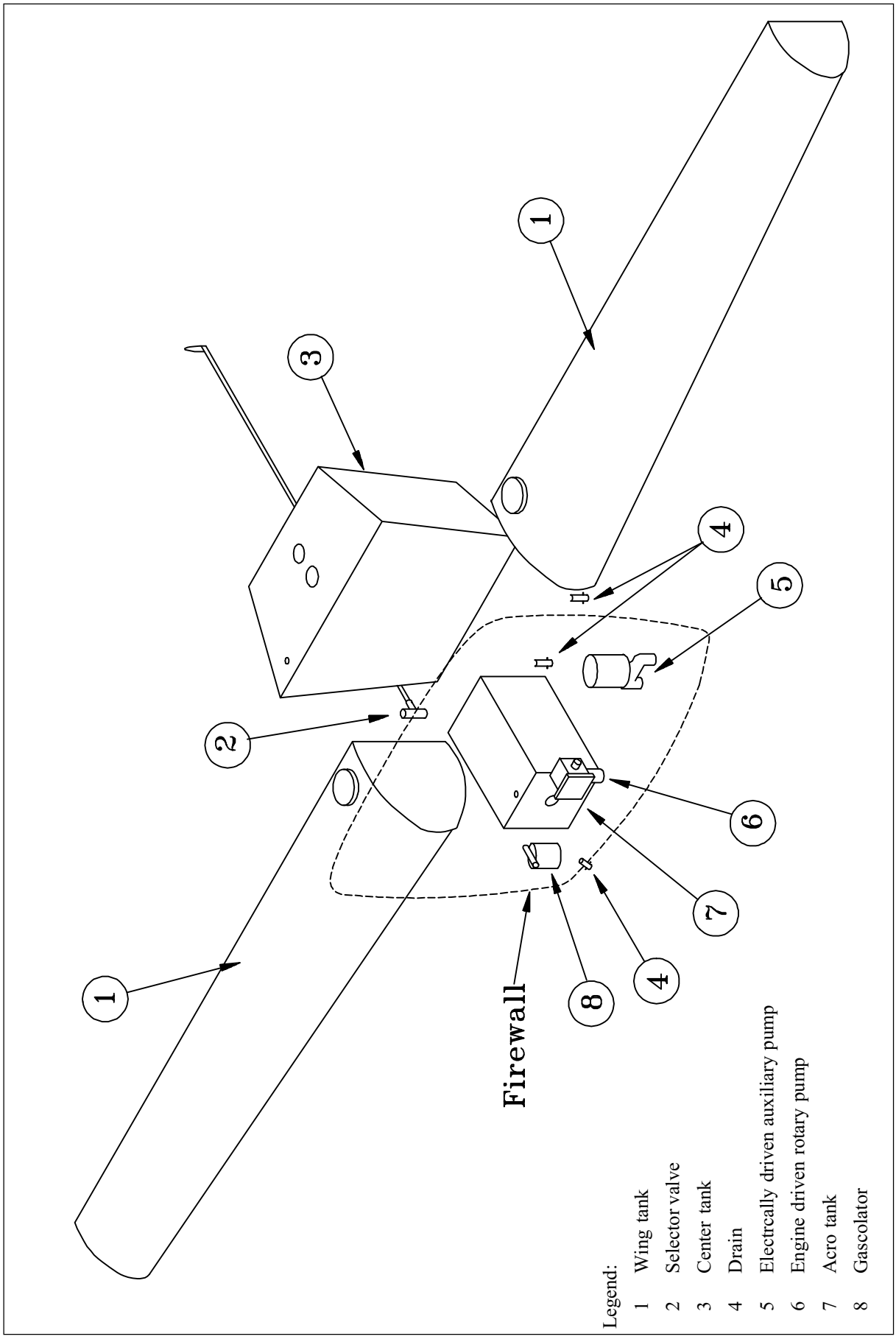
28-00-00 GENERAL

The fuel system (refer to Figure 1) consists of one center tank (3), an acro tank (7), two wing tanks (1), a fuel selector valve (2), a gascolator (8) , an electrically driven auxiliary pump (5) and an engine driven rotary pump (6). Concerning the fuel drains (4) also refer to Chapter 12-10-03.

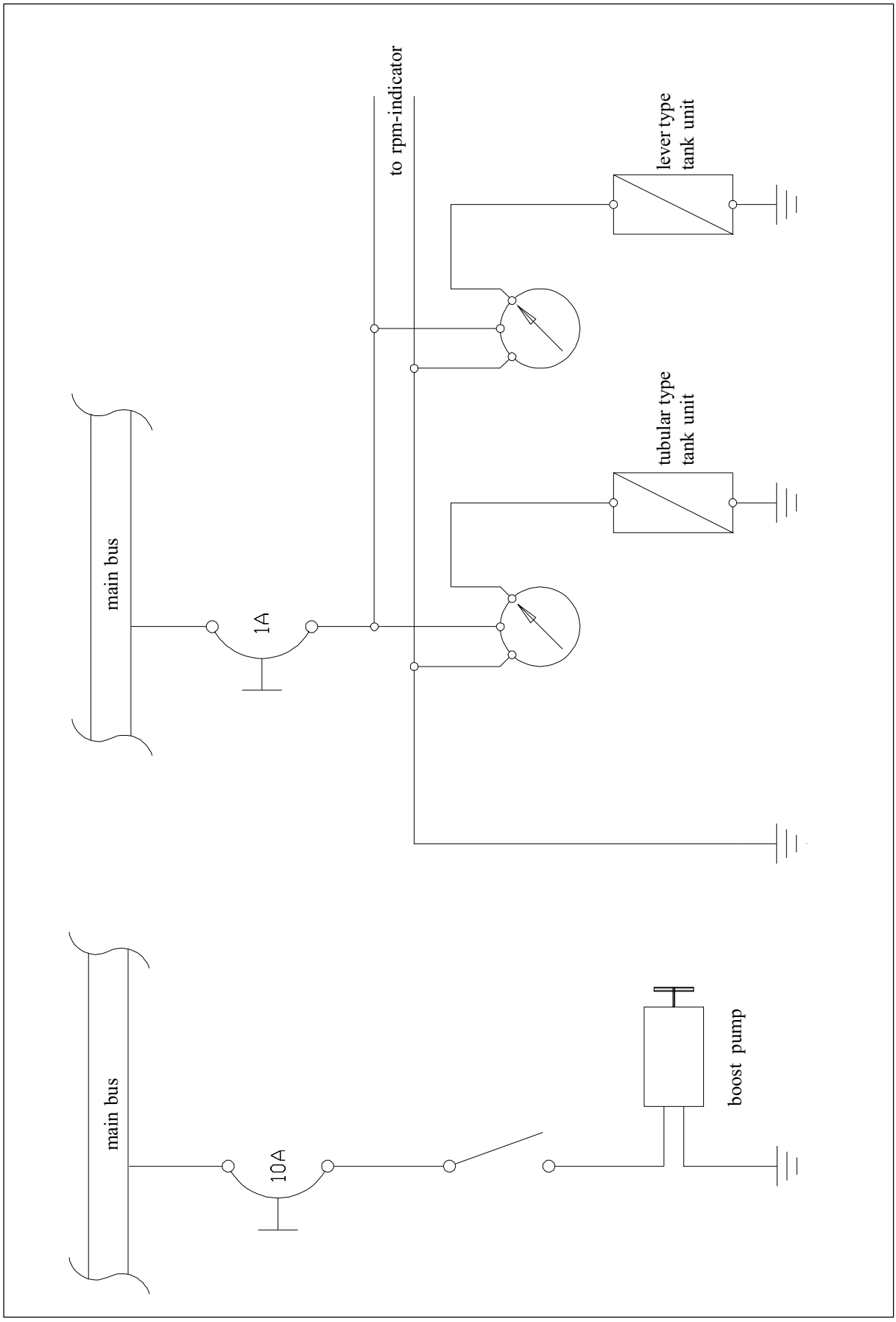
On the instrument panel one fuel quantity indicator for the center tank and one for the wing tanks, the switch for the boost pump and circuit breakers are installed (see Figure 14). The electrical wiring is shown on Figure 2.

Fuel Tank Capacities

Center tank:	42 l
Acro tank:	9 l
Wing tank LH:	60 l
Wing tank RH:	60 l
Total capacity	171 l
Unusable fuel:	2 l



Fuel System
Figure 1



Electrical Wiring
Figure 2

28-01-00 MAINTENANCE PRACTICES

28-01-01 Refueling/Defueling

Refer to Chapter 12 for detailed refueling/defueling procedures.

28-01-02 Reduction of Fuel Tank Vapor Hazards

General Precautions

During all ventilation or maintenance procedures involving the fuel system, observe the following general precautions.

1 Defueling should be outdoors with the aircraft at least 100 feet from hangars or other aircraft.

2 No smoking should be allowed within 100 feet of the aircraft.

3 Suitable fire fighting equipment should be available. Foam or soda type extinguishing agents are recommended.

4 Ground the aircraft to prevent static electricity from causing sparks. If a ramp ground is available it should be connected to exhaust stack. If a ramp ground is not provided, a temporary ground can be obtained by driving a metal rod into the ground and attaching a ground wire between the rod and the aircraft exhaust stack.

5 Flame and spark producing equipment should not be operated within 100 feet of the aircraft.

6 The aircraft should have its battery removed.

7 Only personnel working on the aircraft should be allowed in the immediate area, and no other maintenance should be performed while the tanks are being worked on.

8 When a fuel tank is opened for repair, air ventilation (refer to Page 7) should be started immediately to reduce vapor concentrations.

9 When draining fuel, ensure that suitable containers are available and that drained fuel is stored safely. Do not allow fuel to drip to the ground and form pools.

10 If it is necessary to ventilate a tank when the aircraft is in hangar, ensure that vapors do not accumulate to explosive or toxic levels in the hangar.

W A R N I N G

When fuel is being drained, there is little control over the release of fuel vapor. This vapor should be dissipated as quickly as possible. Compressed air or explosion-proof blowers may be used for the purpose.

Air Ventilation

1 Completely drain the fuel system per Chapter 12-10-02.

2 Remove inspection doors (refer to Chapter 28-11-03) and tank caps.

3 Use compressed air or an explosion-proof blower to blow air into the tank until tank interior is dry and free of vapor.

4 Continue ventilation whenever tank is open and being worked on.

W A R N I N G

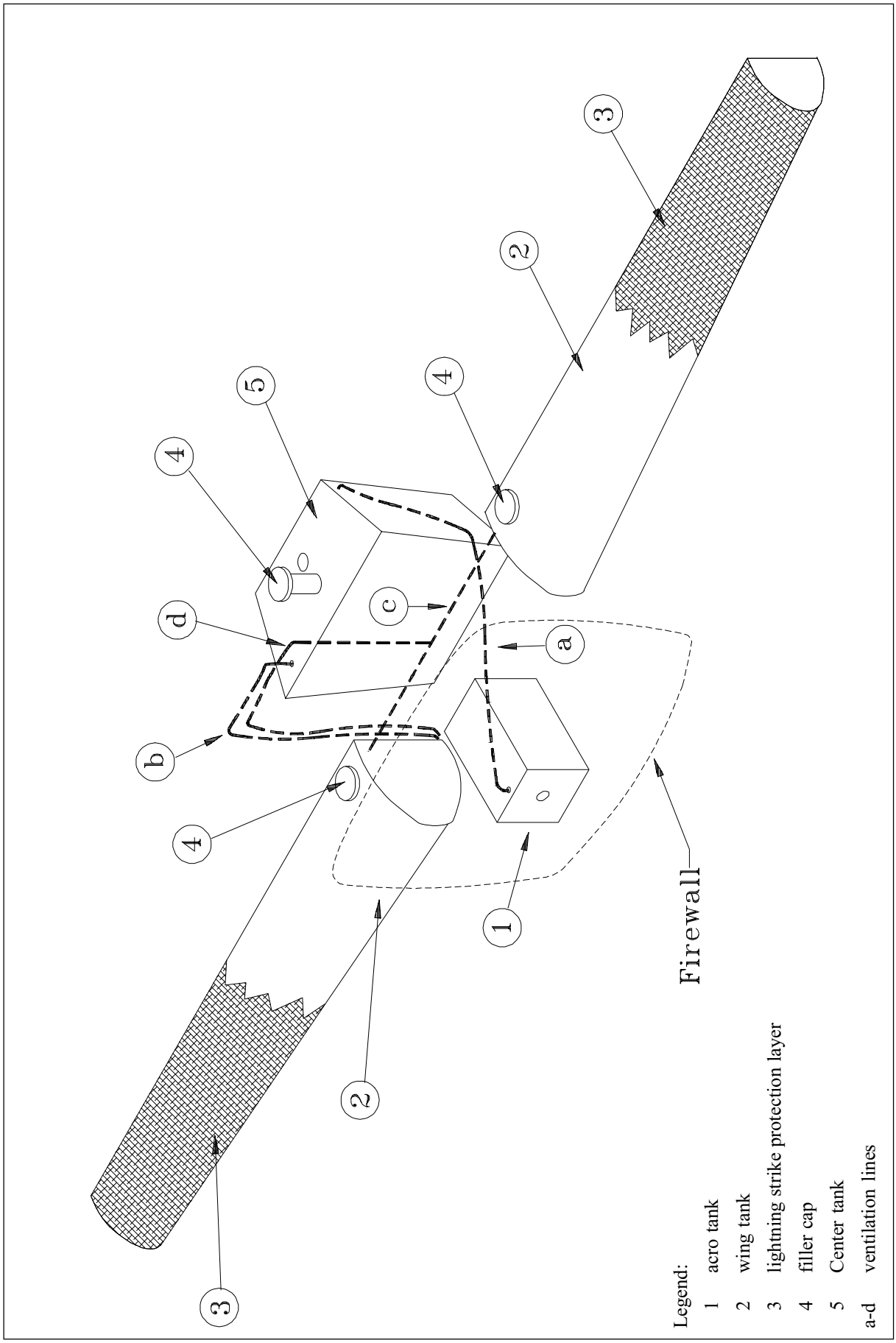
If flammable vapors from cleaning solvents are allowed in the tank increase air circulation to dissipate them.

28-10-00 STORAGE

The EXTRA 300S is equipped with two independent fuel systems: The center- and acro tank system and the wing tank system.

The acro tank (1, Figure 3) incorporating an inverted flight fuel supply system is mounted in the fuselage just behind the firewall. It is connected to the center (5) tank which is mounted behind the main spar area by a flexible hose. Fueling the center and acro tank is by means of the fuselage 2" diameter filler cap (4). For leak detection the center and the acro tank are furnished with a GRP tank shell. In case of leakage blue colored fuel is shining through. The center and the acro tank are grounded. The acro tank deaerates (a) into the center tank that itsself deaerates by a ventilation tube (b) ending at the right side of the main landing gear spring.

The root section of each wing – in front of the main spars – forms an integral fuel tank of approximately 150 cm (59") length (2). Each wing tank has a 2" diameter filler cap (4) for gravity fueling. From Serial No. 30 sealing lips are additionally installed at the filler necks inside the wingtank. For sealing 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) has been applied to the inside of the wing tanks. For lightning protection reason the shell in the area of the wing tank has an outer layer of carbon fiber with incorporated aluminium thread (3). The wing tanks are grounded. Each tank is provided with an alu ventilation tube (c) for adequate venting. The ventilation tubes are interconnected to a main tube (d), ending outside of the fuselage at the right side of the main landing gear spring.



Storage
Figure 3

28-11-00 MAINTENANCE PRACTICES

28-11-01 Center Tank Removal/Installation

1 Remove the main fuselage cover (refer to Chapter 51).

2 Drain the fuel system per Chapter 12-10-02.

3 Loosen the electrical facilities and the hose fixtures.

4 Remove the bottom hose fitting.

5 Remove the subpanel if installed.

C A U T I O N

Prevent the drain tube of the GRP tank shell from breaking when handling the center tank.

4 Loosen and remove the metal attachment belts with the rubber stripes.

5 Turn the center tank several times and remove through the cockpit (It might be necessary to move the pedals several times).

6 Install in reverse sequence of removal.

28-11-02 Acro Tank Removal/Installation

1 Remove the main fuselage cover and the 1. bottom covering sheet per Chapter 51.

2 Drain the fuel system per Chapter 12-10-02.

3 Loosen the electrical facilities and the hose fixtures.

4 Loosen and remove the metal attachment belts with the rubber stripes.

5 Remove the acro tank.

6 Install in reverse sequence of removal.

28-11-03 Acro Tank Flop Tube Removal/Installation

1 Drain the fuel system per Chapter 12-10-02.

2 Remove the acro tank per Chapter 28-11-02.

3 Disconnect the hose (5, Figure 5) and the elbow fitting (4).

4 Loosen the flop tube fitting (3) and take the flop tube assembly (2) out of the acro tank (1).

W A R N I N G

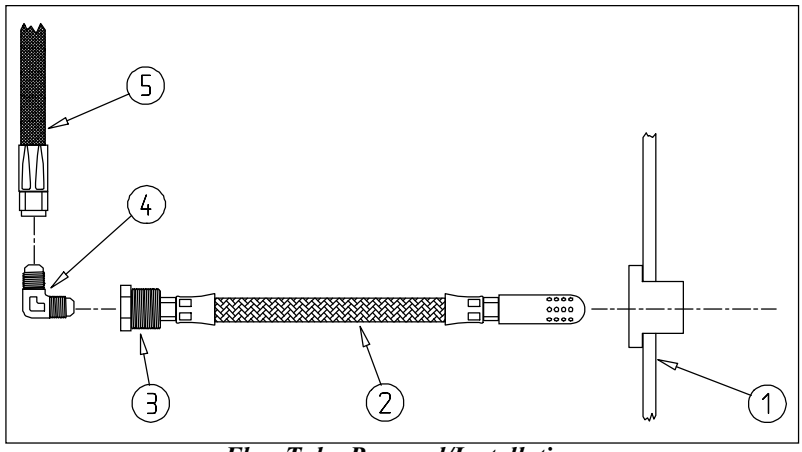
Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

5 Clean the sealing surfaces mechanically and with Acetone.

N O T E

If the flop tube assembly has to be replaced install a complete new assembly (Part Number: PC-64204A21).

6 Install in reverse sequence of removal after applying Loctite 577 to the flop tube fitting thread.



Flop Tube Removal/Installation
Figure 5

28-11-04 Wing Tank Inspection Door Removal/Installation

1 Drain the fuel system per Chapter 12-10-02.

2 Disconnect the ground bonding leads and if necessary (LH wing tank) the electrical wiring of the lever-type tank unit (3, Figure 6).

3 Remove the inspection door bolts.

4 Remove the inspection door flange (1).

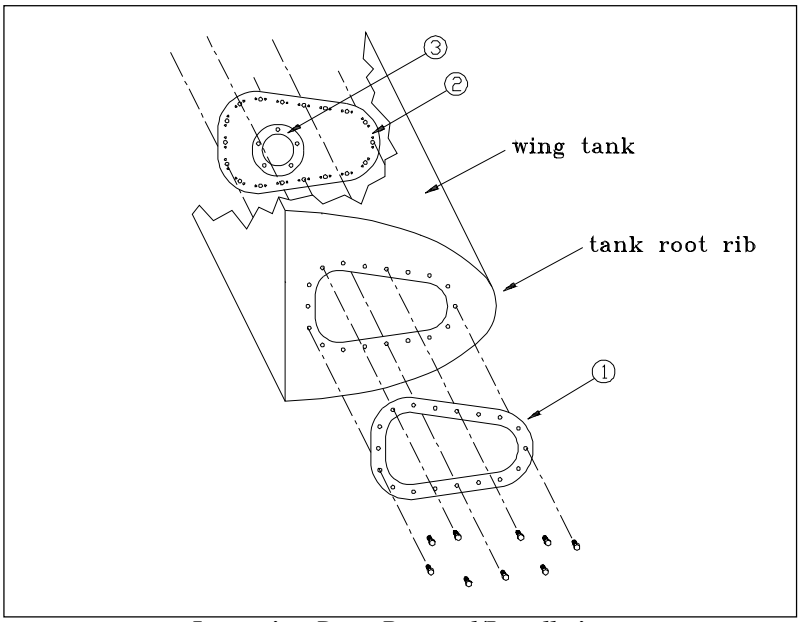
5 Push the inspection door (2) into the tank, then turn and remove.

W A R N I N G

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

6 Clean the sealing surfaces mechanically and with Acetone.

7 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) to the sealing surfaces (inspection door and tank root rib).



Inspection Door Removal/Installation
Figure 6

28-11-05 Wing Tank Outlets Removal/Installation

1 Remove the inspection door (1) (refer to Figure 7) per Chapter 28-11-04.

2 Remove the union nuts (2) and the elbow tubes (3).

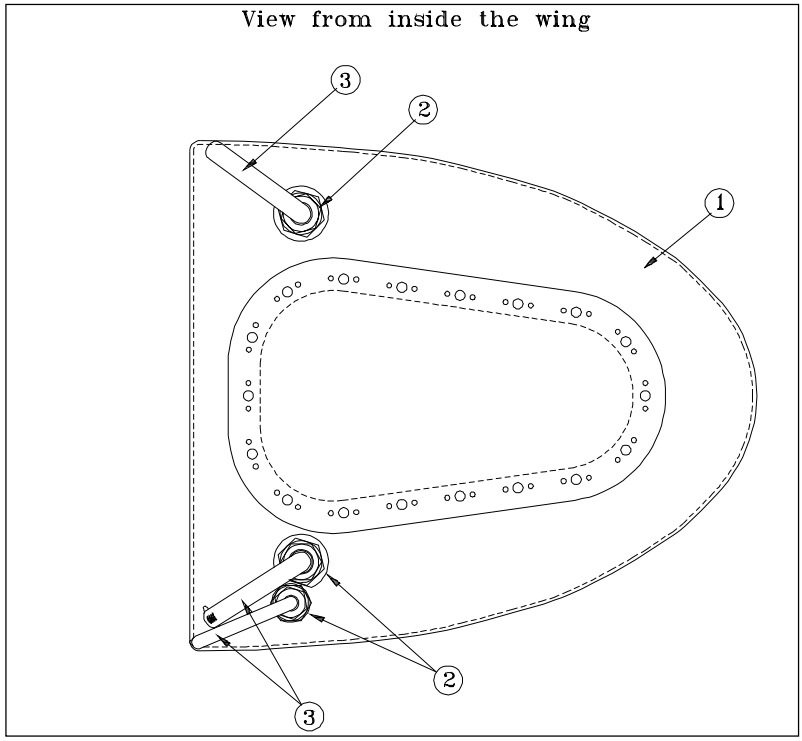
3 Remove AN 924 nut and washers and remove AN 832 fitting.

W A R N I N G

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

4 Clean sealing surfaces mechanically and with Acetone.

5 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) to the sealing surfaces (fitting to tank root rib). Ensure that the outlet end positions are in the upper- resp. undermost edge of the wing tank (see Figure 7 below).



Wing Tank Outlets Removal/Installation
Figure 7

28-11-06 Center Tank Filler Neck Removal/Installation

1 Remove the main fuselage cover per Chapter 51.

2 Completely drain the fuel system per Chapter 12.

3 Loosen the lower hose clip.

4 Remove the filler neck.

5 Install in reverse sequence of removal.

28-11-07 Wing Tank Filler Neck Removal/Installation

1 Completely drain the fuel system per Chapter 12.

2 Remove wing tank inspection door per Chapter 28-11-03.

3 Unscrew filler neck lock ring (4, Figure 8) with sealing lip (5) using a tool as shown in Figure 8.

4 Remove filler neck (3) with filler cap (1) and O-ring (2).

W A R N I N G

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

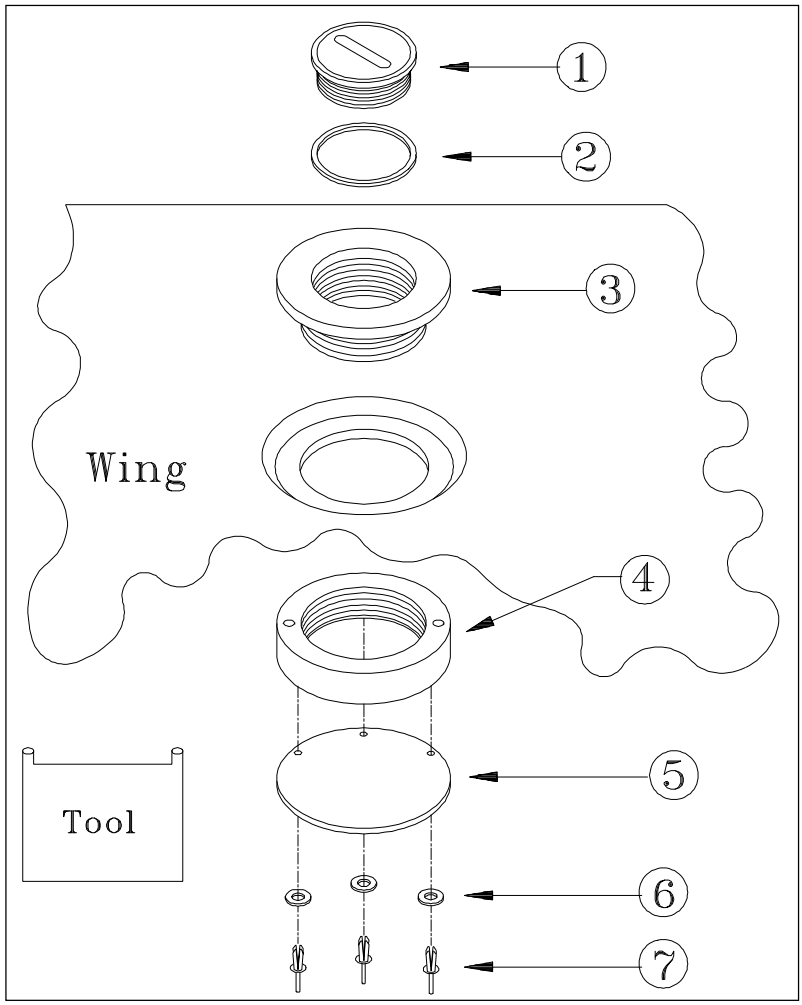
5 Clean all sealing surfaces with Acetone.

6 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) to the sealing surfaces (wing/filler neck).

28-11-08 Filler Neck Sealing Lip Replacement

1 Carefully drill out the body-bound rivets (7, Figure 8).

2 Install the new sealing lip driving in new washers (6) and body-bound rivets.



Filler Neck and Sealing Lip Removal/Installation
Figure 8

28-11-09 Ventilation Line Replacement

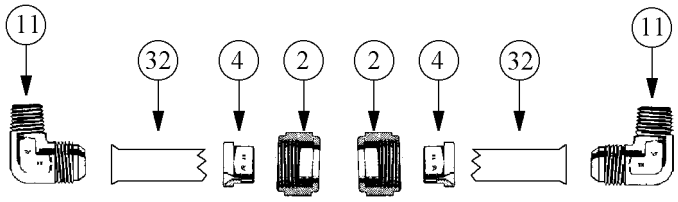
Refer to Figure 9. Small letters (a-c) refer to the marks of Figure 3.

General information concerning fittings you find in Chapter 20-10-08.

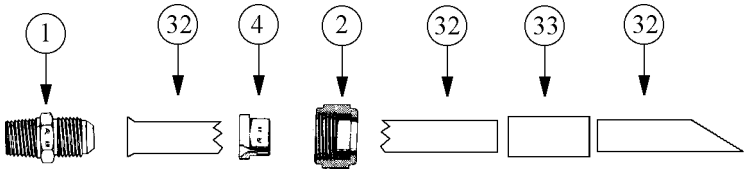
N O T E

Use only, tubes and fittings as required in the following.

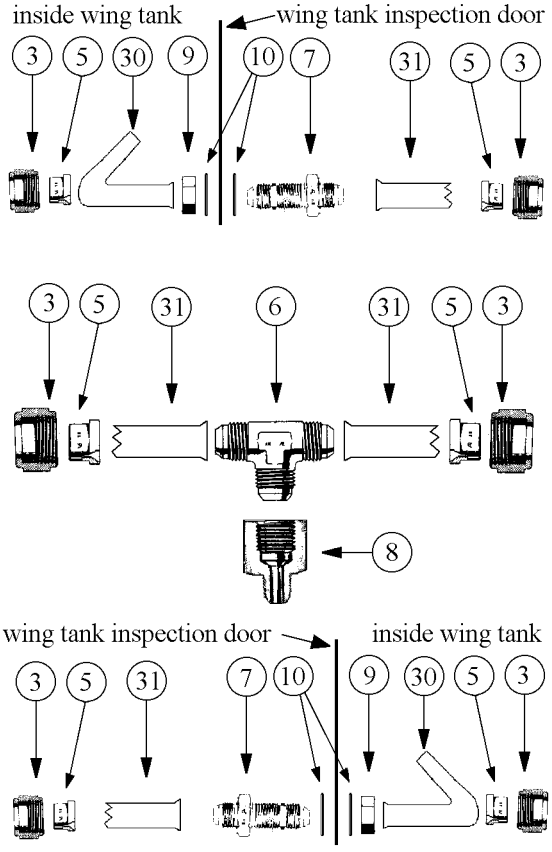
Acro to center tank connection (a)



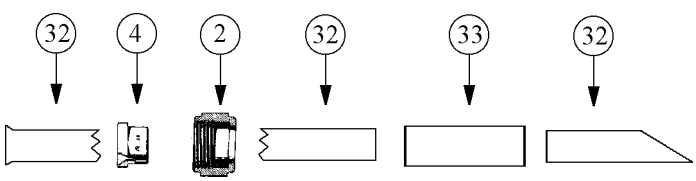
Center tank to main landing gear spring connection (b)



Wing tank to wing tank connection (c)



Tee-fitting to main landing gear spring connection (d)



Fittings and washers

1 AN816-4D
PN: PC-00159

2 AN818-4D
PN: PC-00161

3 AN818-6D
PN: PC-00160

4 AN819-4D
PN: PC-00860

5 AN819-6D
PN: PC-00162

6 AN824-6D
PN: PC-00168

7 AN832-6D
PN: PC-00170

8 AN894-6-4D
PN: PC-00154

9 AN924-6D
PN: PC-00177

10 AN960-C916
PN: PC-01852

11 AN822-4D
PN: PC-00155

Tubes

30 strainer tube
PN: PC-63202.2

31 alu tube 5052-0, Ø3/8 inch
PN: PC-00122

32 alu tube 5052-0, Ø1/4 inch
PN: PC-00123

33 vinyl tubing
PN: PC-01607

Ventilation lines
Figure 9

28-20-00 DISTRIBUTION

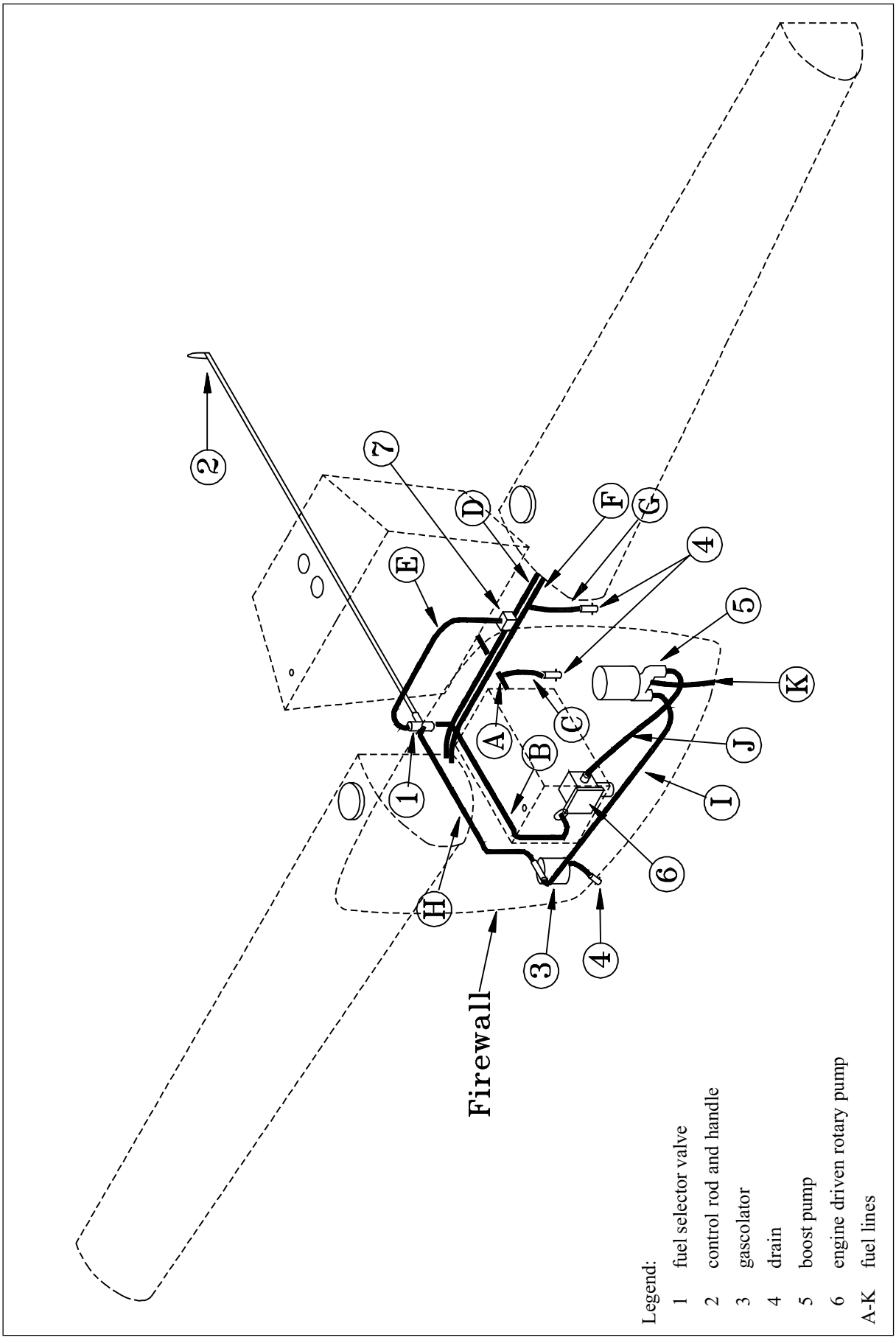
(Refer to Figure 10) Flexible hoses and aluminium tubes (A-J) connect the particular components of the fuel system. From Ser. No. 30 the drain line "K" has been added. The fuel lines connecting the wing tanks (D) meet at an aluminium 3-port tee-block (7) in the bottom center of the fuselage.

From Serial No. 14 the wing tanks of the Extra 300S are equipped with a separate drain line as shown in Figures 10 and 14. Up to Serial No. 13 the wing tank drain as described in Figure 14 was connected to the tee-block which then was furnished with 4 ports with an AN816-4D fitting.

In addition to the engine driven fuel pump (6), an electrically driven boost pump (5) 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 gascolator (3) is installed between the fuel selector valve and the auxiliary fuel pump at the firewall (engine side). A fuel selector valve (1) is located behind the firewall on a separate support. A control rod connects the selector valve to the control handle (2).

From Serial No. 25 a selector valve of an Allen 6S122 type and a modified control handle has been used. From Serial No. 27 the fuel selector valve is marked by the letters "WT" (Wing Tank), "E" (Engine), and "CT" (Center Tank) to ensure correct installation of fuel lines. Concerning these changes refer to Figure 11, Sheet 2 and "Detail A".

Drains (4) are located at the gascolator and the left and right side of the bottom fuselage.



Distribution
Figure 10

28-21-00 MAINTENANCE PRACTICES

28-21-01 Fuel Selector Valve and Control Rod Removal/Installation

(Refer to Figure 11 Sheet 1 resp. Sheet 2 from Serial No. 25)

1 Drain the fuel system per Chapter 12-10-02.

2 Disconnect the fuel lines on the selector valve.

3 Loosen the control rod attachment bolt (5).

4 Loosen the selector valve attachment bolts (2).

5 Remove the selector valve (1).

6 Remove the control handle attachment bolt (7).

7 Remove the washers (8) and spring (9) if installed, the control rod (6) and the control handle (10).

8 Install in reverse sequence of removal. Ensure that all control handles (3, 10) are installed in the same direction like shown in Figure 11 Sheet 1 (up to S. No. 24). Use LOCTITE when installing the attachment bolts of the new type selector valve.

28-21-02 Selector Valve Lubrication (up to S. No: 24)

1 Drain the fuel system per Chapter 12-10-02.

2 Disconnect the control rod following the steps 3, 6 and 7 of Chapter 28-21-01.

3 Disconnect the control handle (3, Figure 11, Sheet 1) by removing the control handle attachment screw (4).

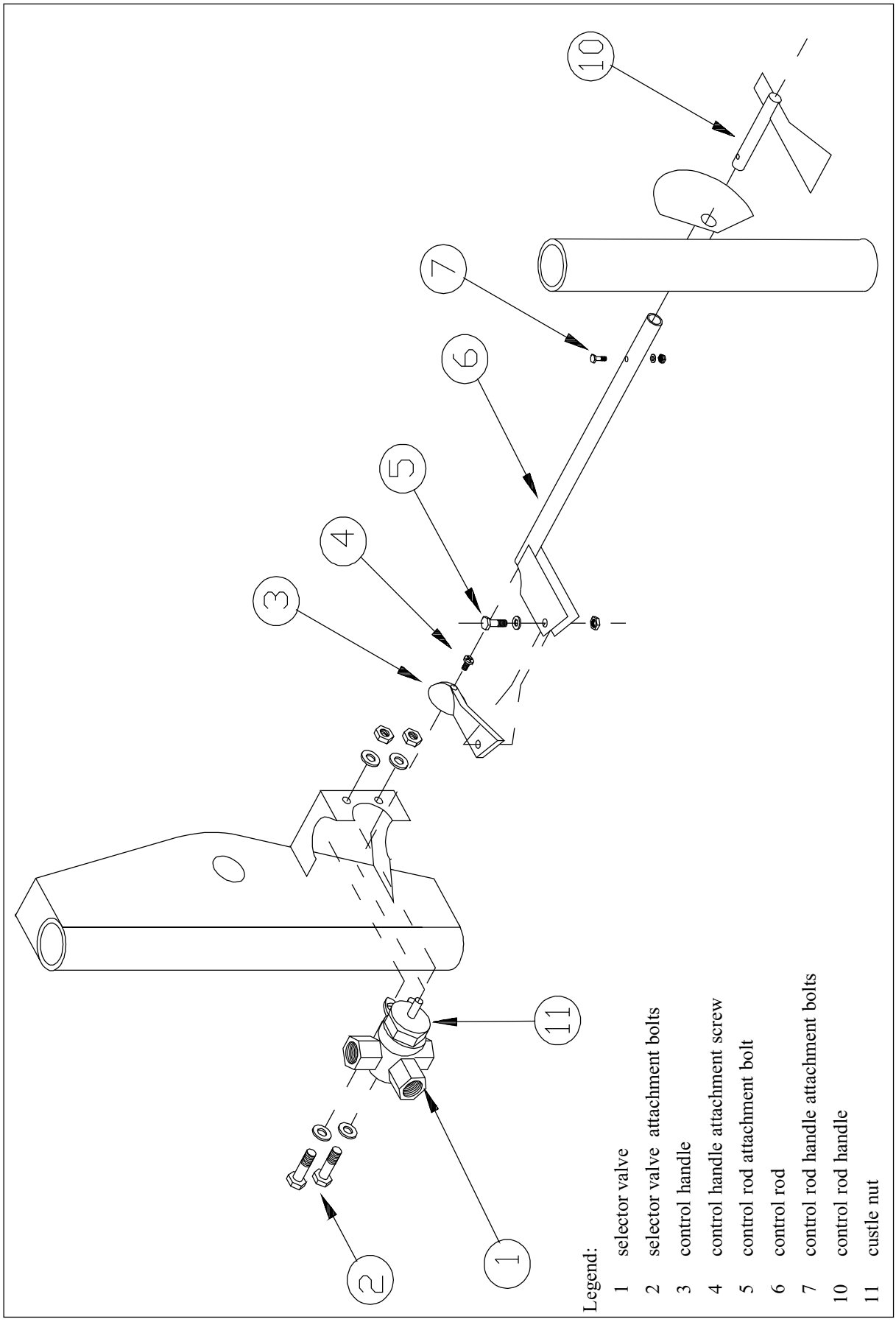
4 Loosen and remove the castle nut (11).

5 Lubricate with FUELUBE (FLEET SUPPLIES, INC., Cleveland, USA).

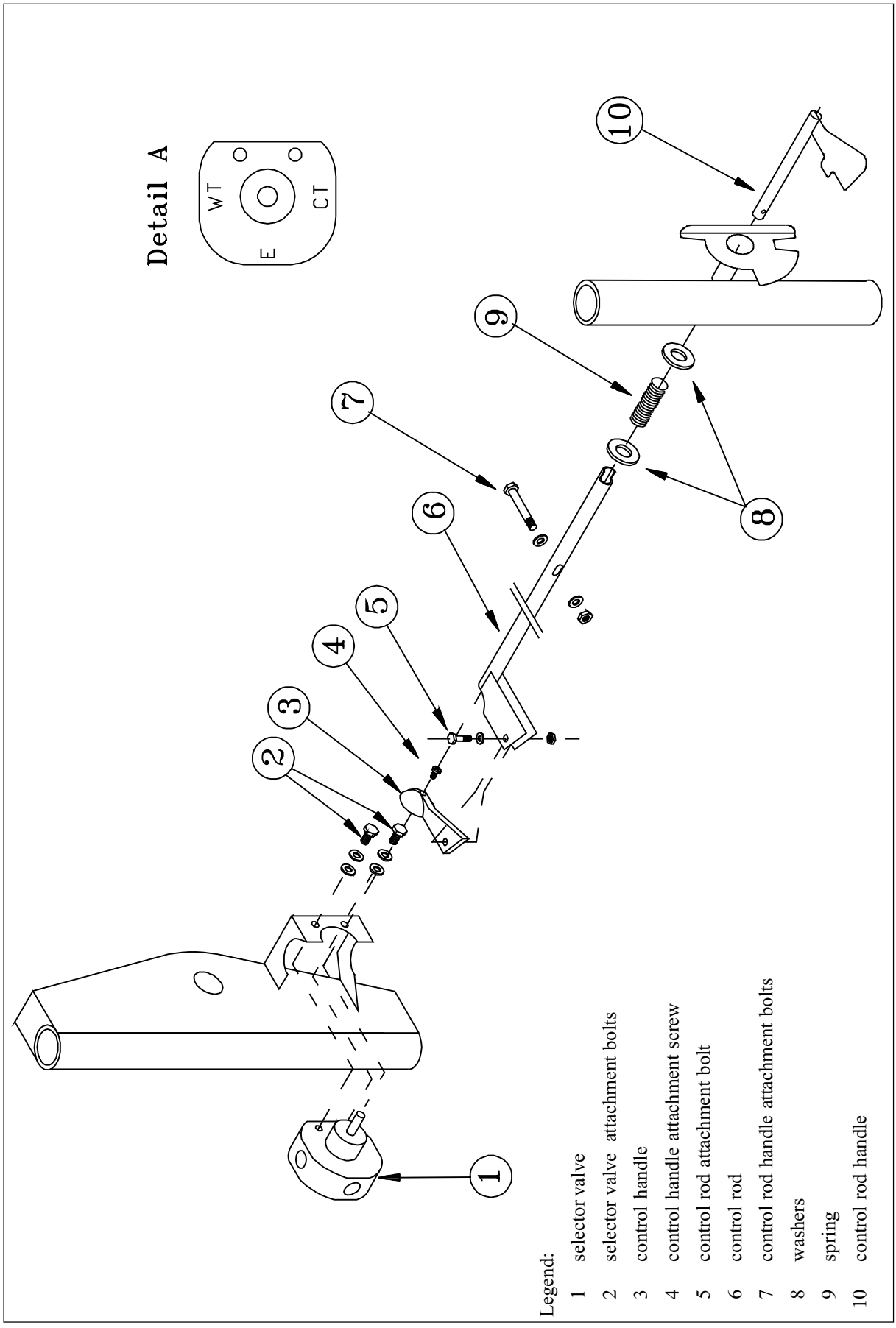
6 Screw up the castle nut.

7 Reinstall the control handle (3).

8 Reinstall the control rod.



Fuel Selector Valve and Control Rod Removal/Installation up to S.No: 24
Figure 11, Sheet 1



Fuel Selector Valve and Control Rod Removal/Installation from S.No: 25
Figure 11, Sheet 2

28-21-03 Gascolator Removal/Installation

1 Drain the fuel system per Chapter 12-10-02.

2 Disconnect the fuel lines on the gascolator.

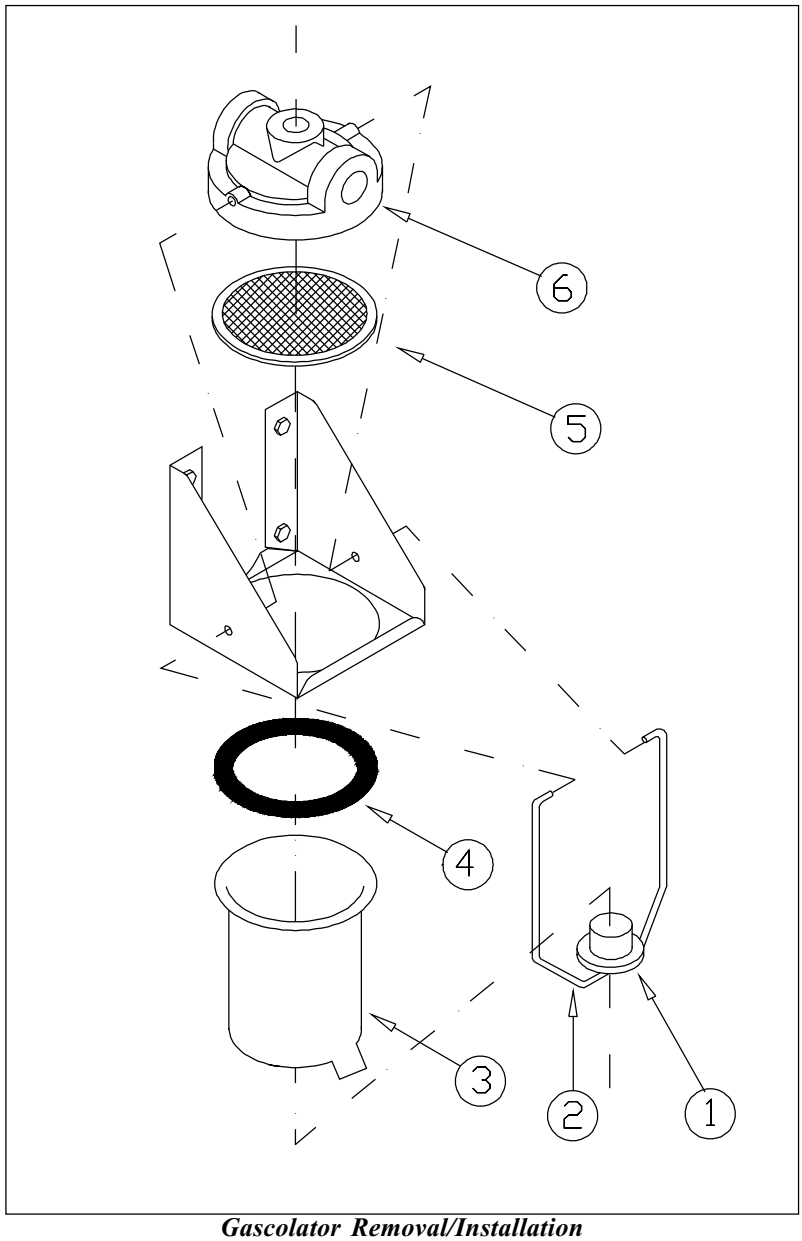
3 Loosen the knurled nut (1).

4 Remove the mounting bracket (2).

5 Remove the fuel reservoir (3) and the sealing ring (4).

6 Remove the strainer (5) and the gascolator cover (6).

7 Install in reverse sequence of removal.



Gascolator Removal/Installation
Figure 12

28-21-04 Electrical Boost Pump Removal/Installation

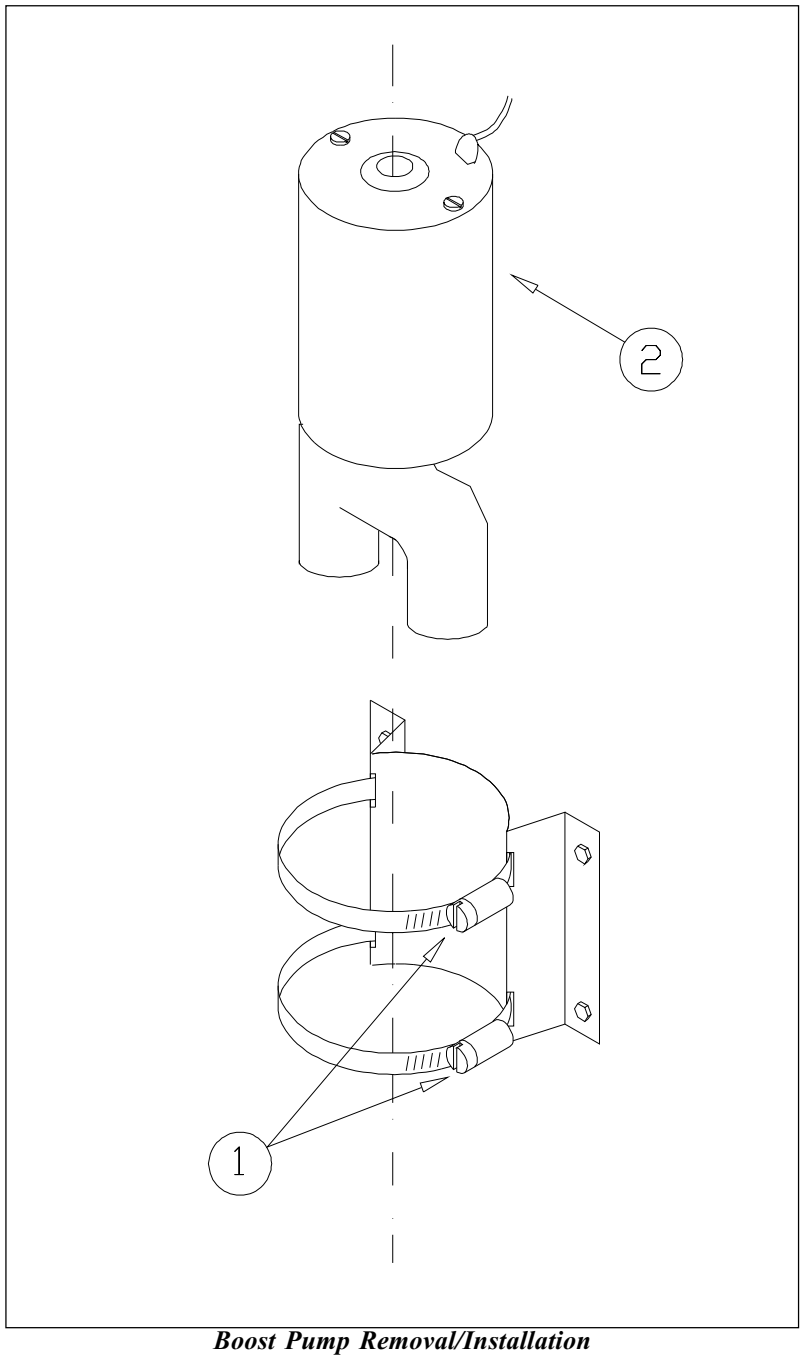
1 Drain the fuel system per Chapter 12-10-02.

2 Disconnect the plug and the fuel lines on the boost pump.

3 Loosen the clamping device screws (1).

4 Remove the boost pump (2).

5 Install in reverse sequence of removal.



Boost Pump Removal/Installation
Figure 13

28-21-05 Fuel Line Replacement

Refer to Figure 14. The letters (A-G and 2) refer to the markings of Figure 10.

General information concerning hoses and fittings you find in Chapter 20-10-07/08.

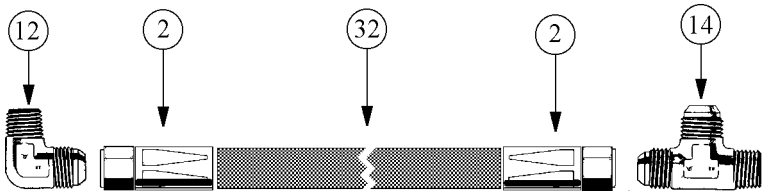
I M P O R T A N T

If replacement of fuel lines passing the firewall is necessary, renew the sealing of the rubber grommet grooves and gaps at the engine side of the firewall. Use PRC-812 (Products Research & Chemical Corporation, USA) firewall sealant. Cover the fuel lines of the engine department with AEROQUIP AE102 fire sleeves as per Chapter 20-10-07.

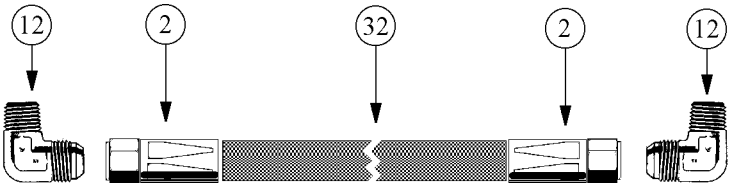
N O T E

Use only hoses, tubes and fittings as required in the following.

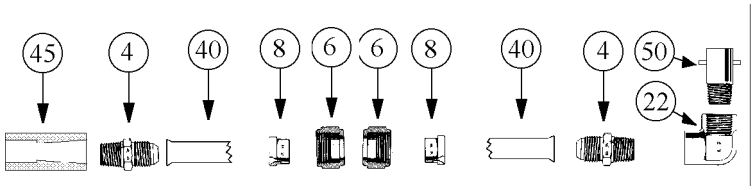
Center tank to acro tank connection (A)



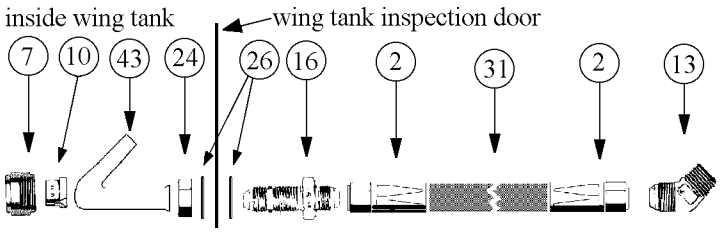
Acro tank to shut off valve connection (B)



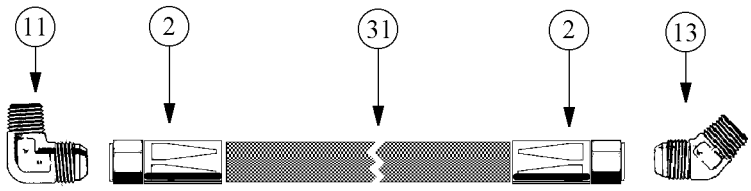
Acro/center tank drain (C)



Wing tank to Tee-block connection (D)



Tee-block to shut-off-valve connection (E)



Fittings and washers

2 AN491-6D
PN: PC-00150
3 AN491-8D
PN: PC-00151
4 AN816-4D
PN: PC-00159
6 AN818-4D
PN: PC-00161
7 AN818-6D
PN: PC-00160
8 AN819-4D
PN: PC-00860
10 AN819-6D
PN: PC-00162
11 AN822-6D
PN: PC-00164
12 AN822-8D
PN: PC-00163
13 AN823-6D
PN: PC-00166
14 AN826-8D
PN: PC-01988
16 AN832-6D
PN: PC-00170
22 AN916-1D
PN: PC-00180
24 AN924-6D
PN: PC-00177
26 AN960-C916
PN: PC-01852

Hoses*

31 AEROQUIP 303-6
PN: PC-00403
32 AEROQUIP 303-8
PN: PC-00404

Tubes

40 alu tube 5052-0, Ø1/4 inch
PN: PC-00123
43 strainer tube
PN: PC-64202.2
45 Adapter tube
PN: PC-64203.6

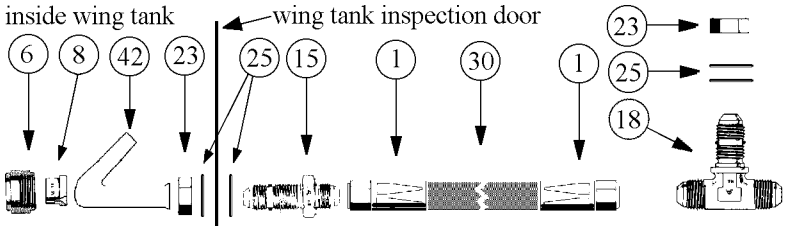
Valves

50 drain valve
PN: PC-01211

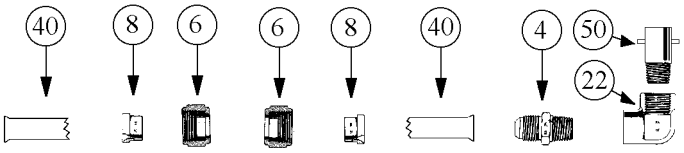
**) Refer to Chapter 20-10-07*

Fuel Lines Airframe Department
Figure 14, Sheet 1

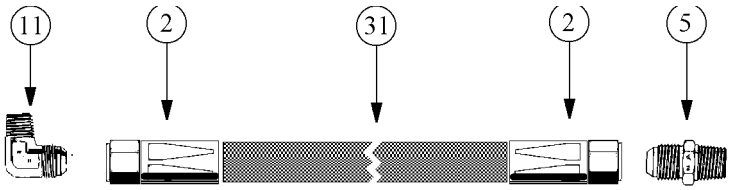
Wing tank to Tee fitting connection (from S. No: 14) (F)



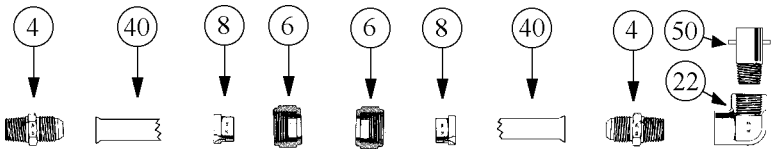
Wing tank drain assembly (from S. No: 14) (G)



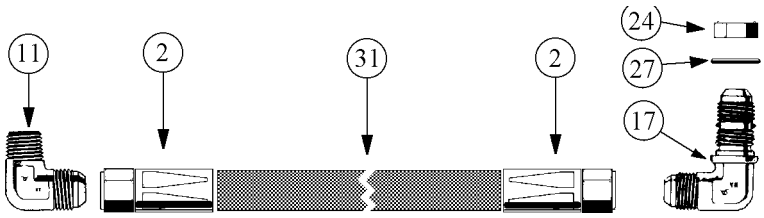
Selector valve to gascolator (H)



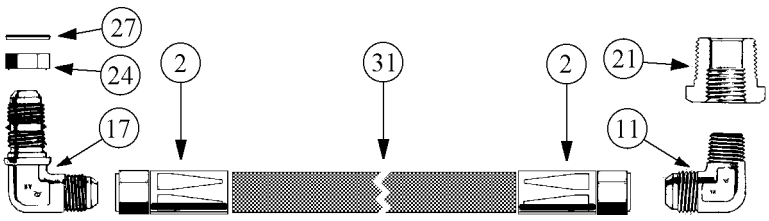
Gascolator drain assembly (I)



Gascolator to boost pump connection (J)



Boost pump to engine driven fuel pump connection (K)



Fittings and washers

1 AN491-4D
PN: PC-00149
2 AN491-6D
PN: PC-00150
4 AN816-4D
PN: PC-00159
5 AN816-6D
PN: PC-00158
6 AN818-4D
PN: PC-00161
8 AN819-4D
PN: PC-00860
11 AN822-6D
PN: PC-00164
15 AN832-4D
PN: PC-00171
17 AN833-6D
PN: PC-00172
18 AN834-4D
PN: PC-01644
20 AN911-1D
PN: PC-00988
21 AN912-9D
PN: PC-00176
22 AN916-1D
PN: PC-00180
23 AN924-4D
PN: PC-00178
24 AN924-6D
PN: PC-00177
25 AN960C-716
PN: PC-00810
27 O-ring MS29512-06
PN: PC-01270

Hoses*

30 AEROQUIP 303-4
PN: PC-00402
31 AEROQUIP 303-6
PN: PC-00403

Tubes

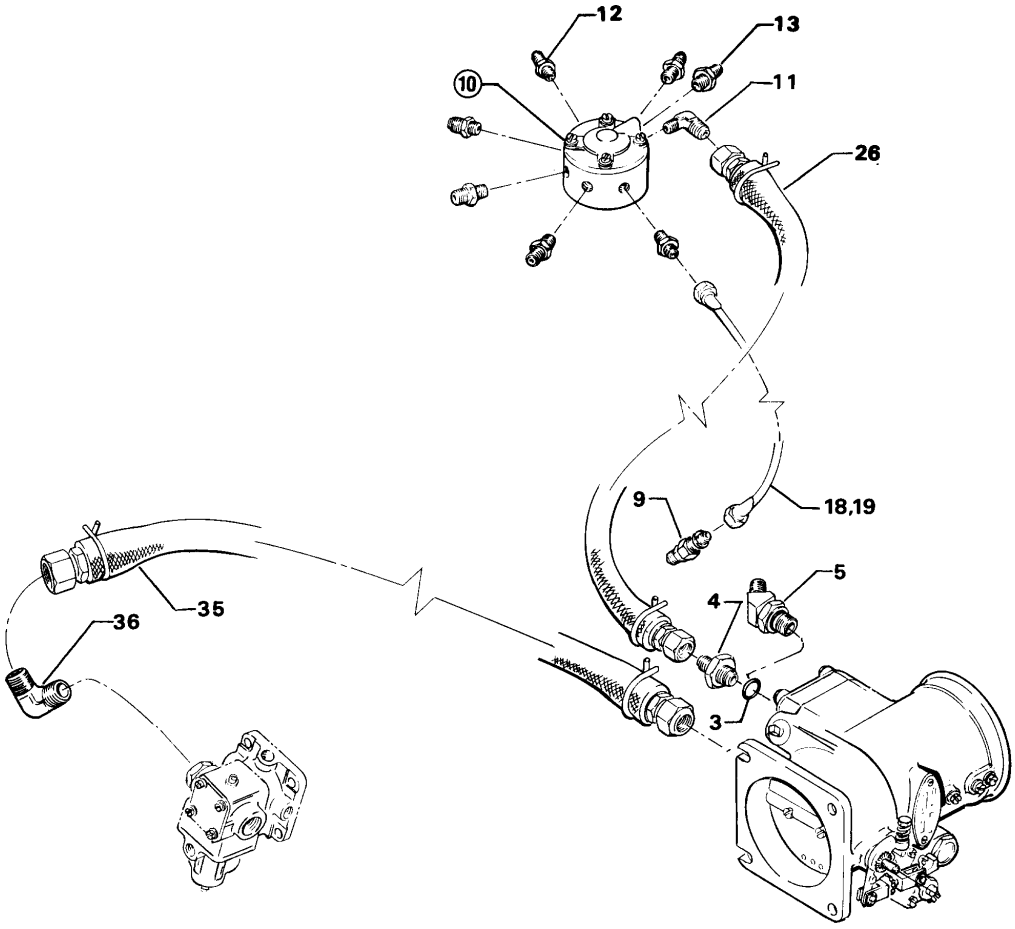
40 alu tube 5052-0, Ø1/4 inch
PN: PC-00123
42 strainer tube
PN: PC-64202.4

Valves

50 drain valve
PN: PC-01211

**) Refer to Chapter 20-10-07*

Fuel Lines Airframe Department
Figure 14, Sheet 2

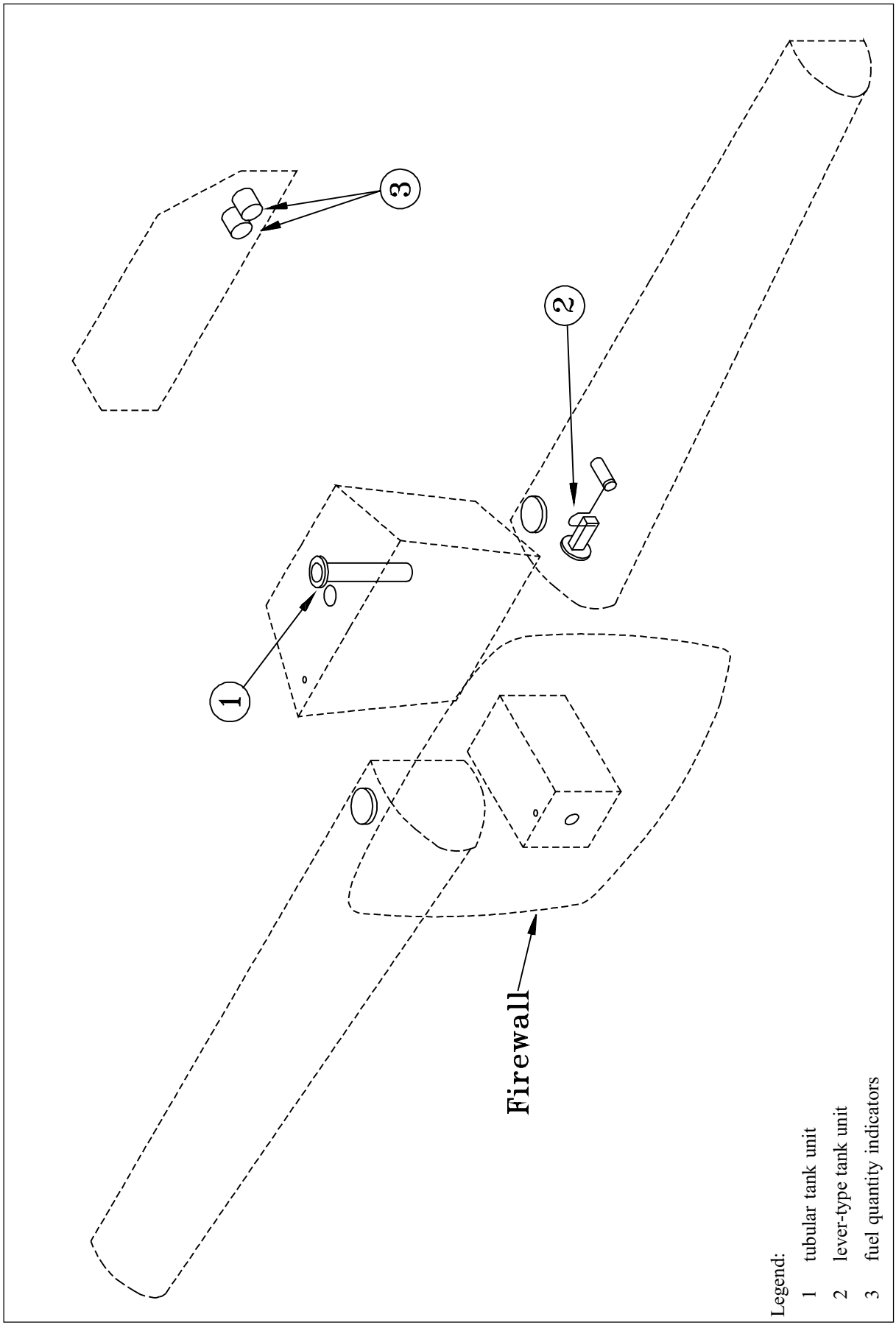


3	LW-MS29512-6	SEAL, Oil, 5/64 dia. sect. x 15/32 I.D.
4	LW-AN919-6	REDUCER, Flared tube, 1/4 tubing
5	LW-76304	ELBOW, Adjustable, 45°
9	LW-18265	NOZZLE, Injector
10	LW-77418	MANIFOLD ASSY., Fuel
11	LW-MS20822-4	ELBOW, 1/4 tube & 1/8 NPT, 90°
12	LW-STD-148	NIPPLE, Union, 1/8 NPT
13	LW-12604	NIPPLE, 1/8 tube to 1/8 NPT
18	LW-12098-0-200	TUBE ASSY., Fuel manifold to nozzle cyls. 1, 2, 5, 6
19	LW-12098-0-170	TUBE ASSY., Fuel manifold to nozzle cyls. 3, 4
26	LW-12798-4S242	HOSE ASSY., Fuel injector to fuel manifold
35	LW-12799-6S322	HOSE, Fuel pump to injector
36	LW-MS20822-6-8	ELBOW, 3/8 flared tube & 1/2 NPT (90°), fuel pump outlet

Fuel Lines Engine Department
Figure 14, Sheet 2

28-40-00 INDICATING

(Refer to Figure 16) For fuel contents indicating the center tank is equipped with a tubular tank unit (1) and the left wing tank with a lever-type tank unit (2). They transmit the fuel levels to the respective fuel quantity indicators at the instrument panel (3). In contrast to the fuel quantity indicator of the center tank the one in the wing tank is not adjustable. If the indication is inexact the float wire of the tank unit has to be adjusted (refer to Chapter 28-41-05).

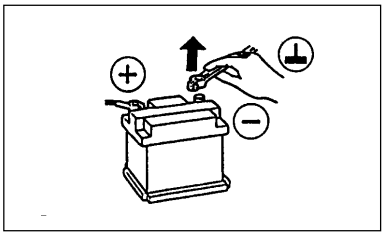


Indicating
Figure 16

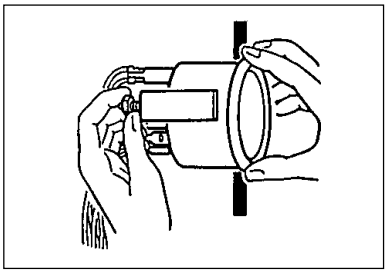
28-41-00 MAINTENANCE PRACTICES

28-41-01 Fuel Quantity Indicator Removal/Installation

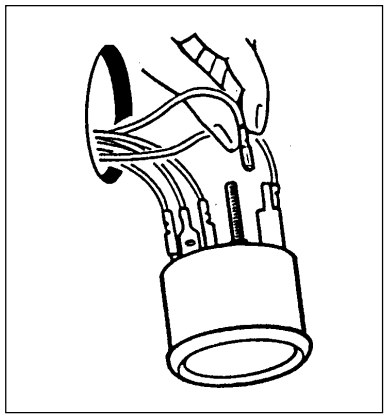
1 Disconnect battery.



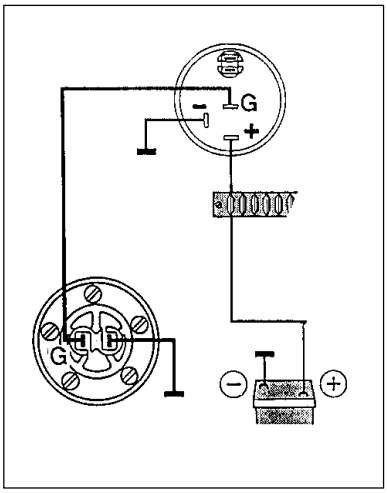
2 Loosen the nuts, remove the mounting bracket and remove the fuel quantity indicator.



3 Disconnect the wiring (the lamp is not used).



4 Install in reverse sequence of removal observing the wiring diagram.

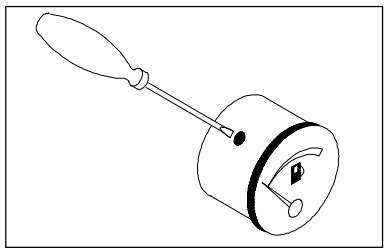


28-41-02 Fuel Quantity Indicator Calibration (Center Tank)

1 Drain the fuel system (refer to Chapter 12-10-02).

2 Remove the fuel quantity indicator following step 2 of Chapter 28-41-01.

3 Bring indicator to „0"-position by turning the adjustment screw.



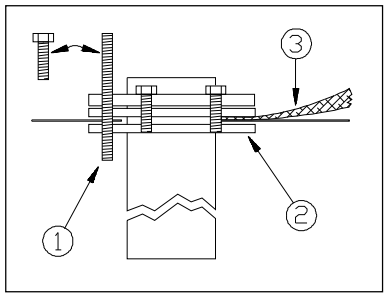
4 Reinstall the fuel quantity indicator.

28-41-03 Tubular Tank Unit (Center Tank) Removal/Installation

1 Drain the fuel system per Chapter 12-10-02.

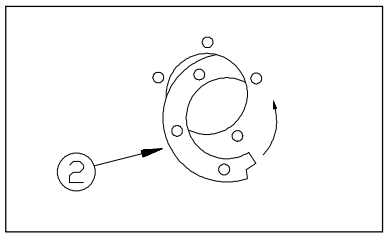
2 Loosen one bolt and replace by a M5 threaded rod (1) for securing the slotted retainer ring (2).

3 Remove the other bolts and the ground bonding lead (3).



4 Lift tubular tank unit and sealing ring over the threaded rod.

5 Remove the threaded rod and turn out the slotted retainer ring (2).



W A R N I N G

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

6 Clean sealing surfaces mechanically and with Acetone.

7 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) for sealing to both sides of the sealing ring.

28-41-04 Lever-type Tank Unit (Wing Tank) Removal/Installation

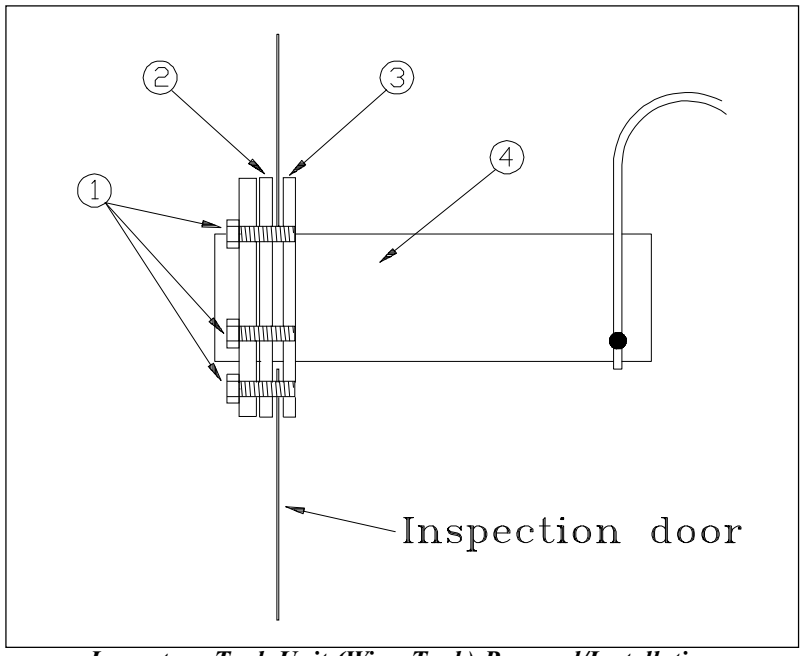
(refer to Figure 17 below)

1 Disconnect the electrical wiring.

2 Remove LH inspection door (refer to Chapter 28-11-03)

3 Remove tank unit bolts (1).

4 Remove the retainer ring (3) the tank unit (4) and the sealing ring (2).



Lever-type Tank Unit (Wing Tank) Removal/Installation
Figure 17

W A R N I N G

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

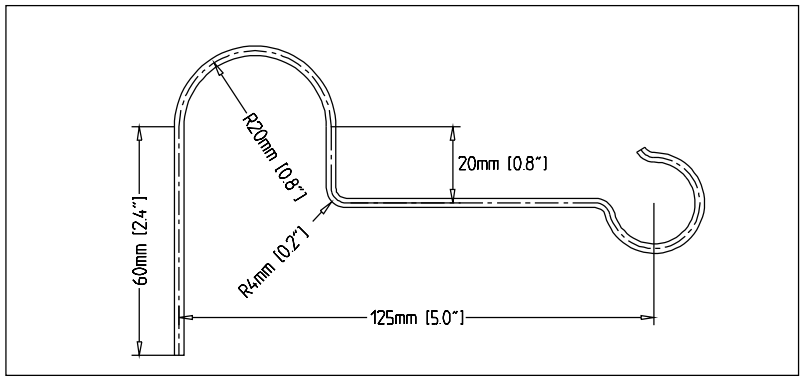
5 Clean sealing surfaces mechanically and with Acetone.

6 Install in reverse sequence of removal after applying 3M Brand Fuel Resistant Coating 776 (3M, St. Paul, USA) for sealing to both sides of the sealing ring and the grooves inside the tank..

28-41-05 Float Wire Adjustment

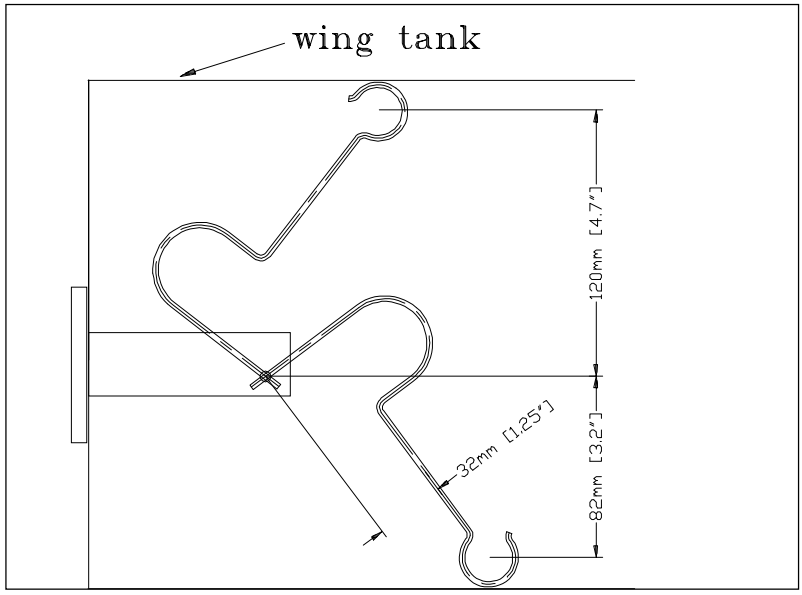
1 Remove the lever-type tank unit per Chapter 28-41-04.

2 Remove the float wire and bend it in form like shown in the following Figure 18:



Float Wire Adjustment
Figure 18

3 Reinstall the float wire observing the distances shown in Figure 19, pay attention to a proper alignment and tighten well the attachment bolt.



Float Wire Installation
Figure 19

4 Reinstall the lever-type tank unit per Chapter 28-41-04.

Chapter 31

Indication \ Recording System

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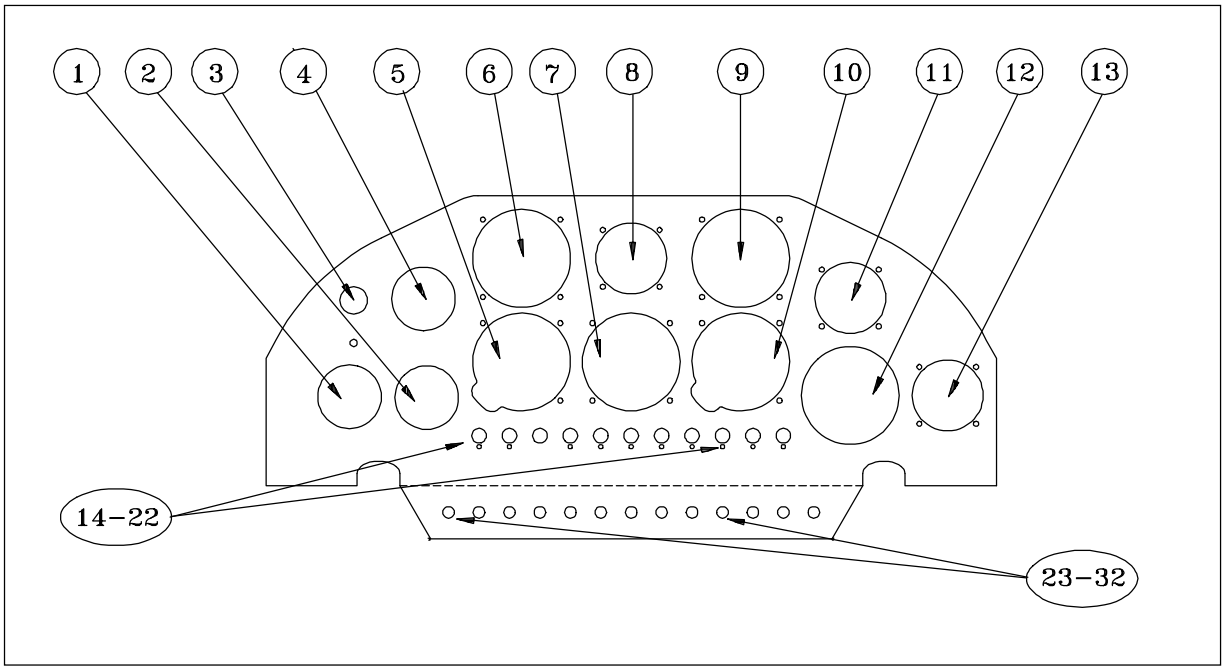
31-15-01	Instrument Panel	5
31-50-00	**CENTRAL WARNING SYSTEMS**	**6**
31-50-01	Stall Warning System	6

31-10-00 INSTRUMENT PANEL

The instrument panel consists of an aluminium sheet which is canted several times. It is fastened to the main fuselage cover and the steel frame with machine screws, bolts and special washers. The instrument panel top cover is part of the main fuslage cover, which itself is furnished with an instrument access panel as shown in Chapter 51-00-01.

The equipment of the instrument panel shows the following Figure 1 and the adjacend chart.

The chart may be modified by the minimum equipment requirements of individual certifiying authorities.



Instrument Panel
Figure1

Pos	Item	Pos	Item
1	Fuel Quantity Wing Tank	17	Boost Pump Switch
2	Fuel Quantity Center Tank	18	Nav Light Switch
3	Magneto Selector Switch & Starter	19	Strobe Light Switch
4	Amperemeter	20	Radio Master Switch
5	Altimeter	21	Left Pedal Adjustment Switch
6	Air Speed Indicator	22	Right Pedal Adjustment Switch
7	Manifold Pressure / Fuel Flow	23	Circuit Breaker Stall Warninig
8	Magn. Direction Indicator	24	Circuit Breaker Alt Field
9	Oil Pressure / Oil Temperature	25	Circuit Breaker Alt Output
10	G-Meter	26	Circuit Breaker Starter
11	EGT / CHT	27	Circuit Breaker Boost Pump
12	RPM Indicator	28	Circuit Breaker Nav Lights
13	COM	29	Circuit Breaker Strobes
14	Master Switch	30	Circuit Breaker Radio
15	Field Switch	31	Circuit Breaker Fuel + RPM Gauges
16	Low Voltage Monitor	32	Circuit Breaker Pedal Adjustment

31-15-00 MAINTENANCE PRACTICES

I M P O R T A N T

If replacement of the manifold, fuel, and oil pressure lines inside the engine department is necessary, cover the pressure lines with AEROQUIP AE102 fire sleeves as per Chapter 20-10-07.

The instruments can be removed in either the way described in chapter 34 (f.e. altimeter removal/installation), if the instruments are to be removed in firewall direction, or in Chapter 28 (fuel quantity indicator removal/installation) if the instruments are to be removed in cockpit direction. The removal/installation procedures of the switches and circuit breakersYou find in Chapter 24.

N O T E

In case of extensive maintenance work it is advisable to remove the main fuselage cover for better access to the instruments.

31-15-01 Instrument Panel

Removal/Installation

1 Unscrew the upper instrument panel attachment screws.

2 Remove the main fuselage cover.

3 Disconnect pressure and pitot/static lines, electrical wiring and ground bonding leads.

4 Remove oil pressure indicator.

5 Cup the respective tie-wraps.

6 Remove the two lower panel attachment screws.

7 Tilt the panel towards the cockpit side.

8 Disconnect pitot/static lines, electrical wiring and ground bonding leads and instruments (if still installed).

9 Remove the panel.

10 Reverse procedure for installation.

31-50-00 CENTRAL WARNING SYSTEMS

31-50-01 Stall Warning System

The EXTRA 300S is equipped with a stall warning system as standard. This system is designed to warn the pilot by an audible alarm horn, which is fitted under the panel cover. The stall warning switch is located at the RH wing leading edge. The electrical circuit of the stall warner is independently secured with an automatic 1 ampere circuit breaker in the instrument panel (refer to Figure 1).

The stall warning switch has been adjusted at the factory after a test flight. It is set to trigger the warning approx. 5-10 knots prior to stalling in normal flight. The switch should require no adjustment in normal service.

Chapter 32

Landing gear

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32-11-02	Top Half of the Mounting Clamp	5
32-11-03	Tail spring	6
32-11-04	Tail Wheel Fork Assembly	7
32-11-05	Tail Wheel	7
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32-10-00 LANDING GEAR

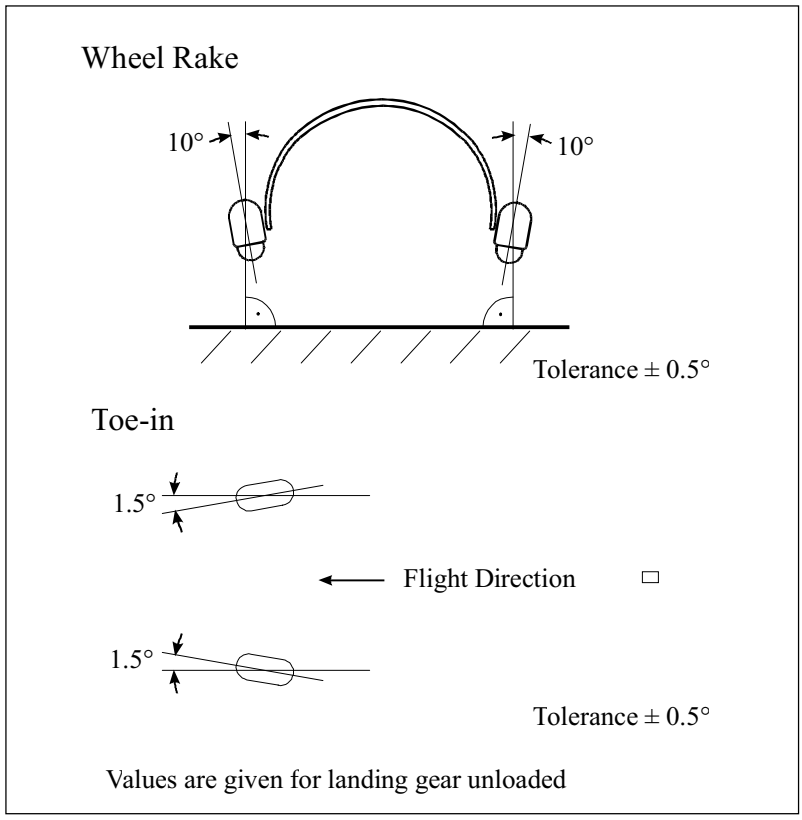
The EXTRA 300S is designed as a conventional tail wheel airplane, with an unretractable landing gear.

The landing gear consists of a 2 wheel main landing gear and a tail wheel.

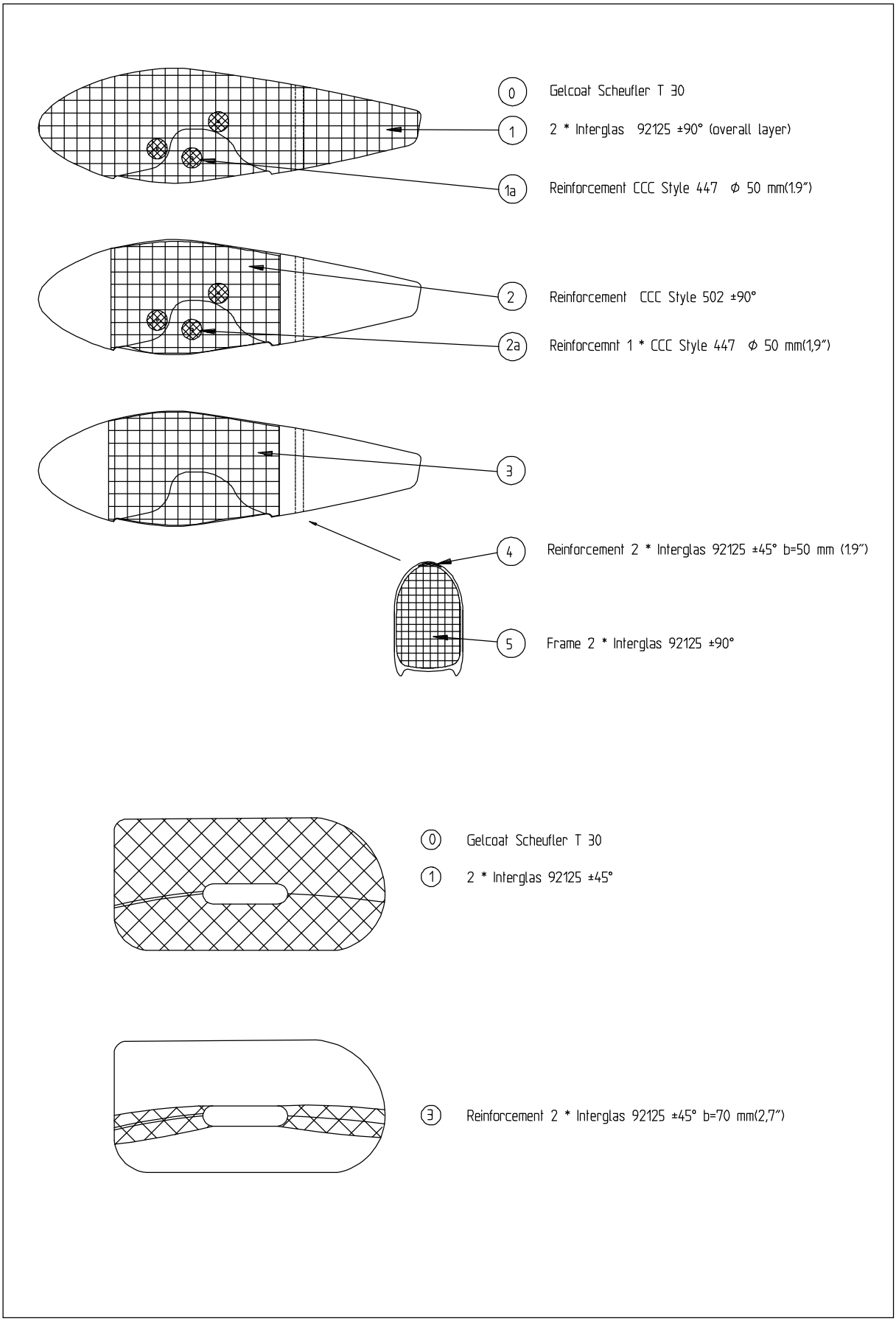
The main wheels are interconnected and attached to the fuselage by means of an U-shaped carrier. This carrier is of integral glasfibre design and incorporates wheel alignement, spring and dampening action. The attachment area to the fuselage is covered by a cuff of which the layer sequence is shown in Figure 1.

The tail wheel is self steering with full swivel capability.

The values for wheel rake and toe-in of main landing gear are given in Figure 1A.



Wheel Rake and Toe-in
Figure 1A



Layer Sequence Fairing and Cuff
Figure 1

32-11-00 MAINTENANCE PRACTICES

32-11-01 Main Landing Gear

Removal/Installation

Refer to Figure 2

1 Remove the engine cowling, the landing gear cuffs and the 1. bottom covering sheet as per chapter 51-00-01.

2 Shore the aircraft as per Chapter 07-20-00

3 Drain brake system.

4 Unfasten the ventilation tubings and disconnect the brake lines from the brake assembly.

5 Remove the four landing gear attachment stop nuts (LN9348-10) (1) and the DIN 125 M10 washers.

6 Remove the bottom halves of the mounting clamps (2), the anti abrasion strips (3) and the landing gear (4).

7 Install in reverse sequence of removal using new stop nuts. For correct position of landing gear the mandrel, which is located at the bottom of the fuselage, is to put into the respective sleeve at the top of the landing gear spring. Replenish brake fluid per Chapter 12.

32-11-02 Top Half of the Mounting Clamp

Removal/Installation

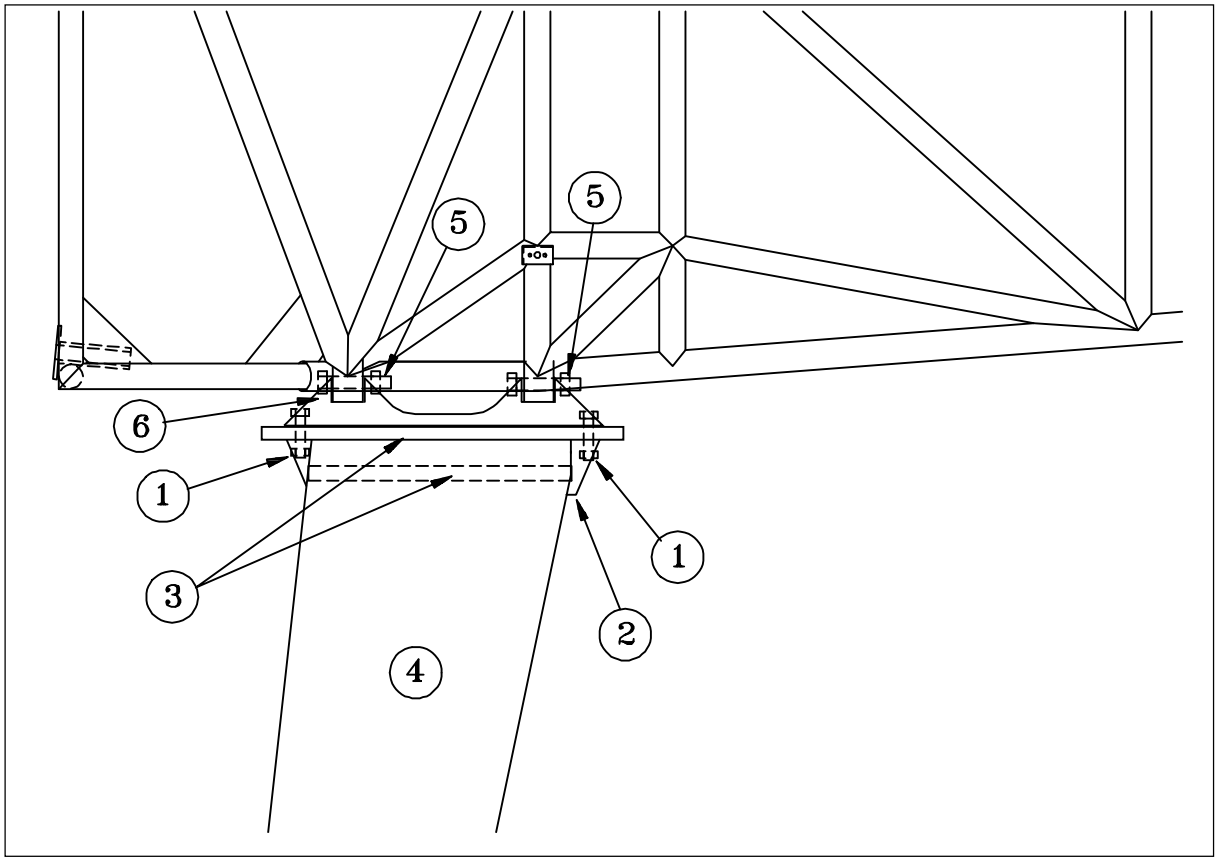
Refer to Figure 2

1 Remove the main landing gear as per Chapter 32-11-01.

2 Remove the LN9348-10 stop nuts, the DIN125 M10 washers and the LN9037-10054 bolts (5).

3 Remove the top half of the mounting clamp (6).

4 Reverse procedure for installation.



Main Landing Gear Mounting
Figure 2

32-11-03 Tail spring

Removal/Installation

Refer to Figure 3.

1 Shore the tail as per Chapter 07-20-02.

2 Remove the tail cone access panel as per Chapter 51-00-01.

3 Remove the tail spring attachment bolts (1-3).

4 Remove the tail spring (4).

5 Reverse procedure for installation; consider to fasten the breather line using the MS21919-DG12 clamp (5).

32-11-04 Tail Wheel Fork Assembly

Disassembly/Assembly

Refer to Figure 3.

1 Shore the tail as per Chapter 07-20-02.

2 Remove the attachment bolt, washers and stopnut (6).

3 Disassemble the special washers (7), bearings (8), and the tail wheel fork (9).

4 Reverse procedure for assembly.

32-11-05 Tail Wheel

Disassembly/Assembly

Refer to Figure 3.

1 Shore the tail as per Chapter 07-20-02.

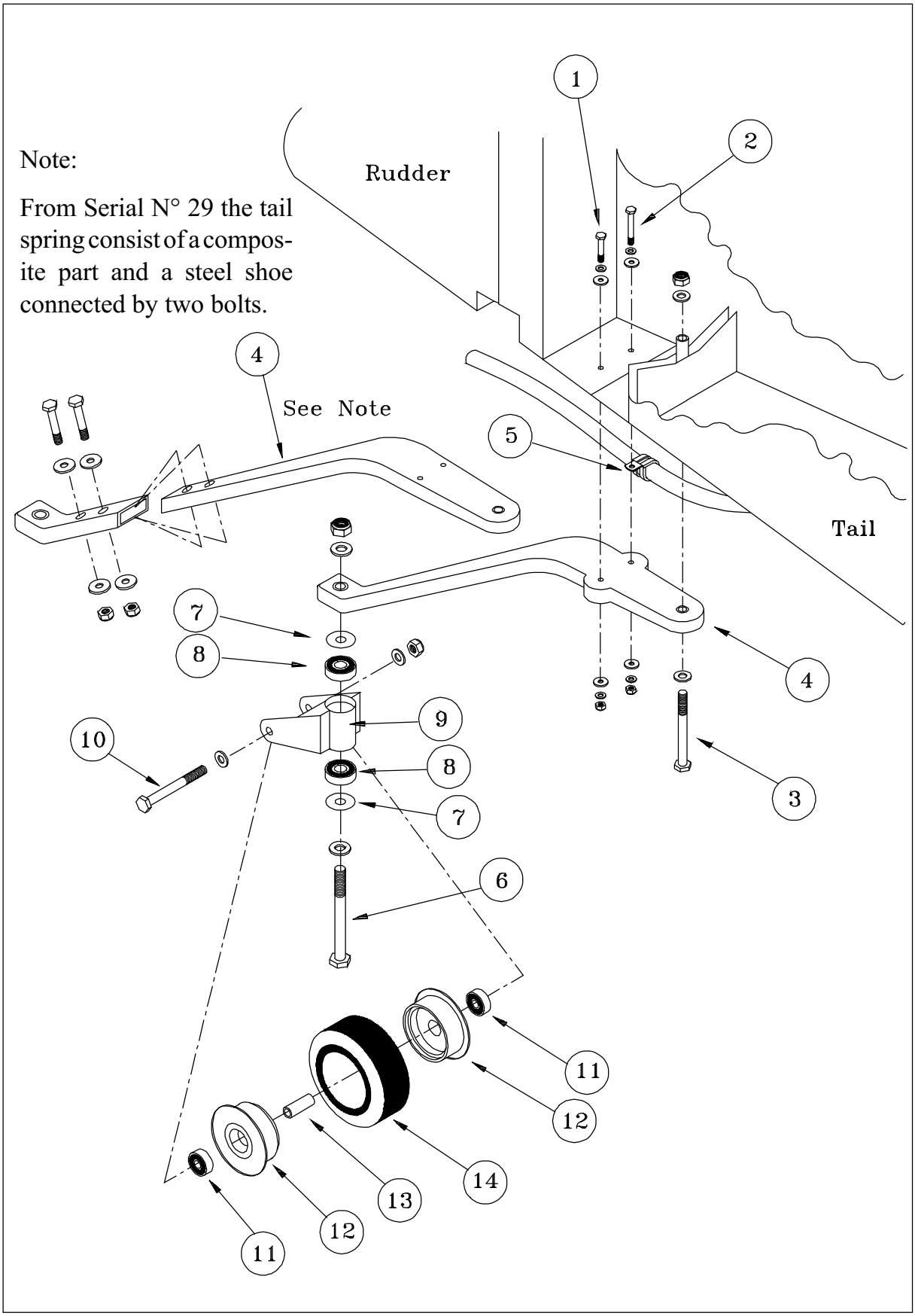
2 Remove the attachment bolt, washers, and stopnut (10).

3 Remove the tailwheel.

4 Disassemble the bearings (11), the wheel halves (12), the spacer sleeve (13), and the solid ruber tire (14).

5 Reverse procedure for assembly.

.



Tail Wheel, Fork and Spring
Figure 3

32-40-00 WHEELS AND BRAKES

32-40-01 General

This Chapter provides maintenance personnel with necessary procedures to accomplish both on-aircraft and off-aircraft maintenance of Cleveland design wheel and brake assemblies. Such maintenance shall include inspection, removal, servicing, refinishing, and installation of assemblies.

The main wheels have standard brand 500x5 rims, six-ply rated 5.00-5-tyres with tubes, according to FAA Standard TSO-C62. Up to Serial No. 25 Cleveland 40-78B type wheels with 30-9 type brake assemblies, and from Serial No. 26 Cleveland 40-151 type wheels with 30-164 type brake assemblies are used. The main wheels are covered with glas fibre designed fairings of which Figure 1 shows the layer sequence.

The tailwheel consists of a 5 inch tire and an aluminium rim.

The Cleveland design features an external brake in which the disc is external to the wheel with the brake caliper floating over the disc.

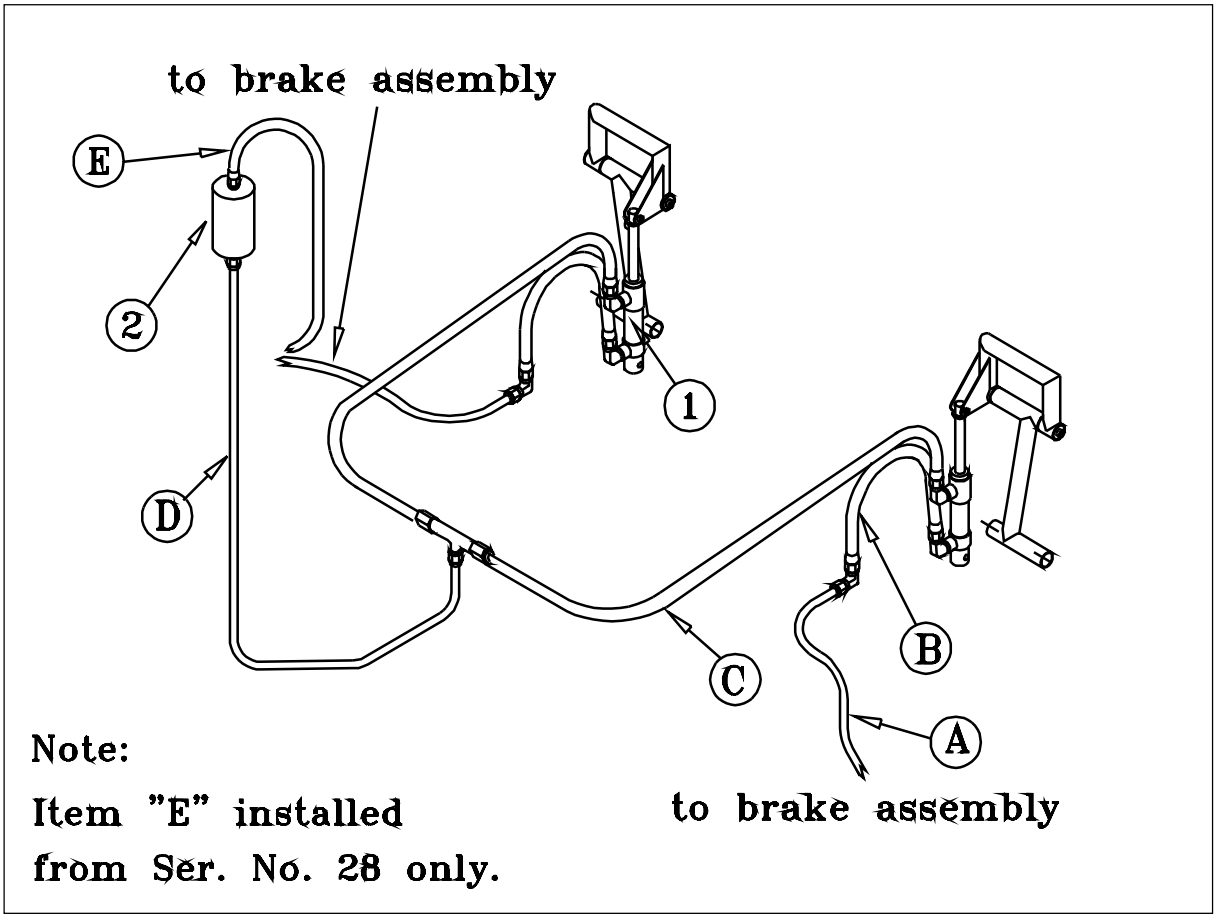
The brake system (refer to figure 4) consists of a brake assemblies located at the inner side of the wheels, Cleveland 10-20 master cylinders (1) at the rudder pedals, and a single brake fluid reservoir (2) mounted on a separate support in front of the instrument panel. The particular parts of the brake system are interconnected by brake lines consisting of aluminium tubes and flexible hoses (In Figure 4 details are only outlined, for accurate identification of parts refer to Figure 5. The capital letters in Figure 5 refer to the marks in Figure 4).

The tail wheel has no brake.

I M P O R T A N T

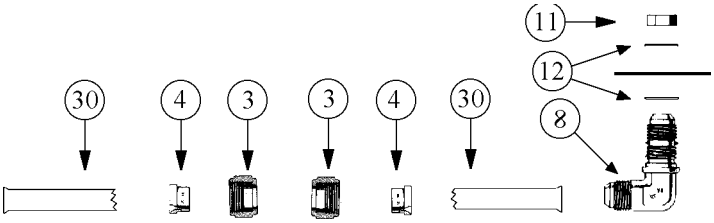
Test brakes after maintaining the brake system. Actuated brakes shall keep the aircraft standing with engine runnung at 1.800 rpm and maximum propeller angle of attack. With applied brakes and powersetting above 1800 rpm the wheels may slide on grass.

N O T E **For further information concerning main wheels and brakes refer to Cleveland Wheels and Brakes Maintenance Manual.**

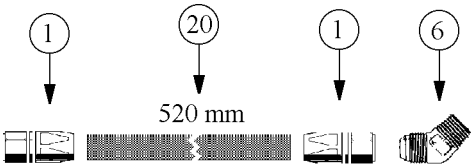


Brake System
Figure 4

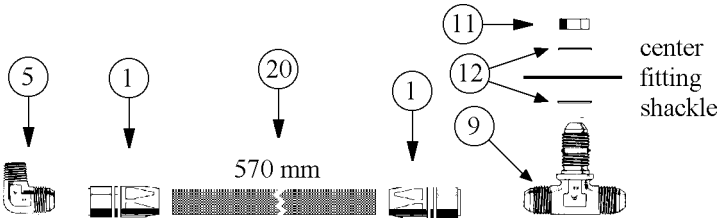
Brake assembly to outer fitting shackle connection (A)



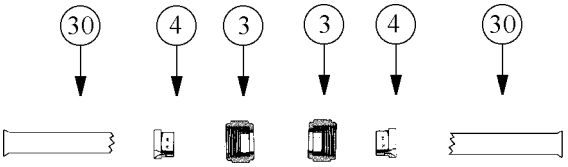
Outer fitting shackle to pedal bottom port connection (B)



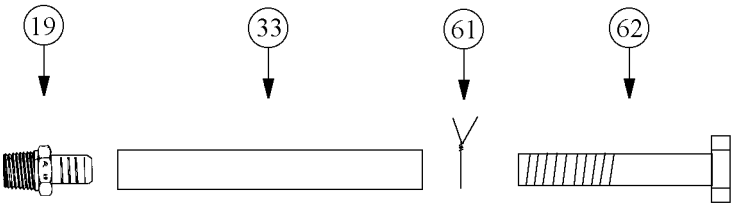
Pedal top port to center fitting shackle connection (C)



Center fitting shackle to reservoir connection (D)



Reservoir to main landing gear spring connection (E)



Fittings and washers

1 AEROQUIP 816-4D
PN: PC-00901
2 AN816-4D
PN: PC-00159
3 AN818-4D
PN: PC-00161
4 AN819-4D
PN: PC-00860
5 AN822-4D
PN: PC-00155
6 AN823-4D
PN: PC-00167
7 AN832-4D
PN: PC-00171
8 AN833-4D
PN: PC-00173
9 AN834-4D
PN: PC-01644
10 AN837-4D
PN: PC-00174
11 AN924-4D
PN: PC-00178
12 AN960-C716
PN: PC-00810
19 Adapter tube to pipe
PN: PC-200173

Hoses

20 AEROQUIP 701-4
PN: PC-00910

Tubes

30 alu tube 5052-0, Ø1/4 inch
PN: PC-00123
33 vinyl tubing
PN: PC-01607

Other Parts

61 safety wire
PN: PC-00781
62 bolt LN 9037-05022
PN: PC-00034

Brake Lines
Figure 5

32-45-00 MAINTENACE PRACTICES

32-45-01 Master Cylinder

Removal/Installation

1 Drain the brake system.

2 Disconnect the fuel lines.

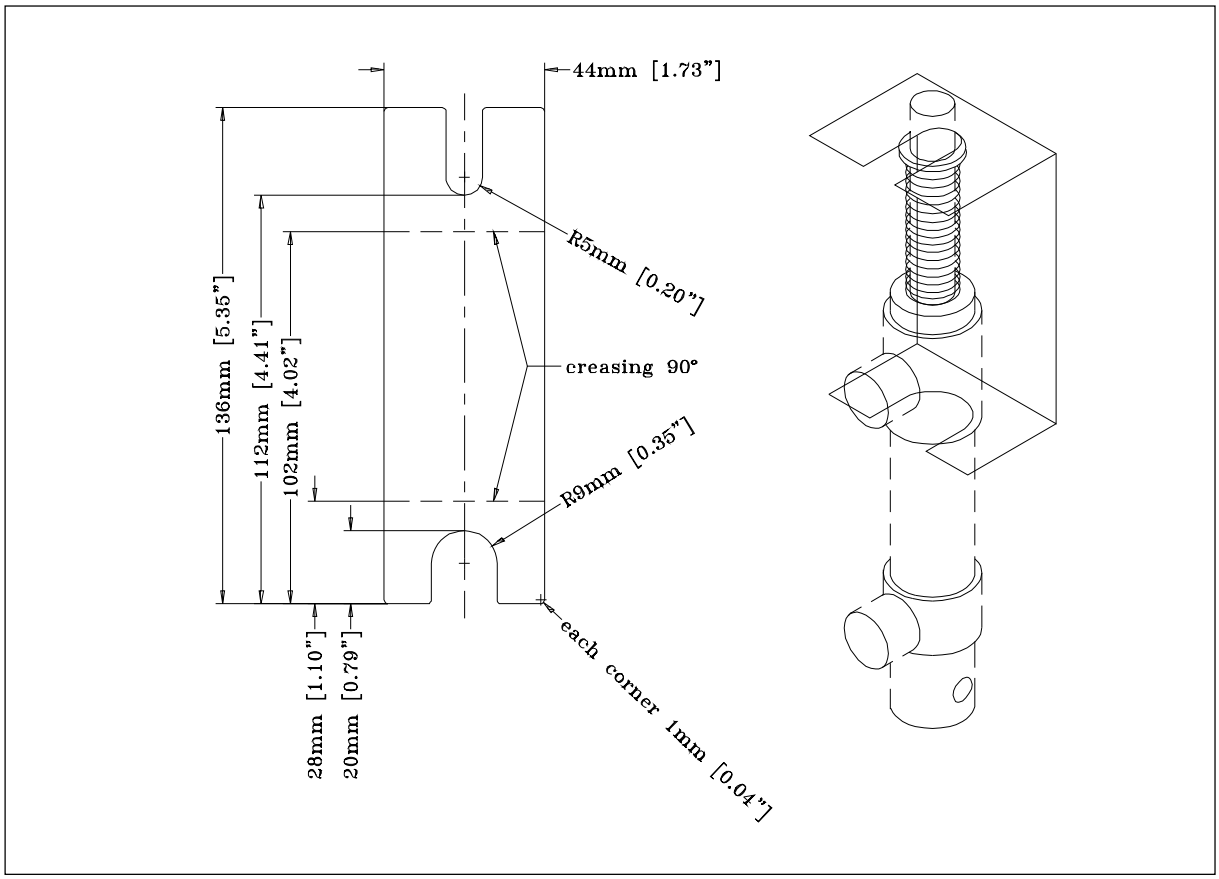
3 Fix the master cylinder spring using a mounting aid as shown in Figure 6 (Cleveland master cylinder only).

4 Remove the attachment bolts.

5 Remove the master cylinder.

7 Remove mounting aid (Cleveland only).

6 Install in reverse sequence of removal.



Master Cylinder Mounting Aid
Figure 6

Chapter 33

Lights

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33-10-00 FLIGHT COMPARTMENT

For controlling the generator function a low voltage monitor is installed at the rear lower instrument panel. The indicator is dimmable and has a built-in bulb testing device („press to test“).

The electrical wiring is panel internal.

33-40-00 EXTERIOR

Refer to Figure 1. The lighting units (1) installed at the wing tips incorporate the red or green navigation lights on the forward section, a strobe light in the center and a clear tail position light on the aft section. They are mounted at the wing tip panel (2). The strobe light power supplies (10) are mounted on special attachment plates (11) inside the wing.

The wiring is routed through an aluminium tube inside the wing and along the left resp. right upper longeron to the rear instrument panel. Ground bonding leads are installed between the fuselage, the aluminium tube, (the pitot tube mount*), the strobe light power supply and the wing tip panels.

** LH wing only*

The switches and circuit breakers are located at the lower instrument panel.

33-41-00 MAINTENANCE PRACTICES

33-41-01 Navigation/Strobe Lights Removal/Installation

Refer to Figure 1.

WARNING

High Voltage! Wait 5 minutes after shutting off before starting any work on the strobe light system.

1 Disconnect the battery and wait 5 minutes.

NOTE

To change a navigation light bulb or glass the removal of the Phillips screws (6) is sufficient for access.

2 Remove the lighting unit (1) in combination with the wing tip panel (2) per Chapter 57.

3 Remove the lighting cover Phillips screws (6).

4 Remove the lighting cover and pull out the strobe light (7) some centimetres.

5 Remove the lighting unit attachment bolts M4x12/20 (8).

6 Remove the lighting unit.

7 Install in reverse sequence of removal after applying Silicon between the wing tip panel and the lighting unit.

33-41-02 Strobe Light Power Supply Removal/Installation

Refer to Figure 1.

WARNING

High Voltage! Wait 5 minutes after shutting off before starting any work on the strobe light system.

1 Remove the wing tip attachment plate with the lighting unit per Chapter 33-41-01 following the steps 1 to 5.

2 Disconnect the electrical wiring of the power supply.

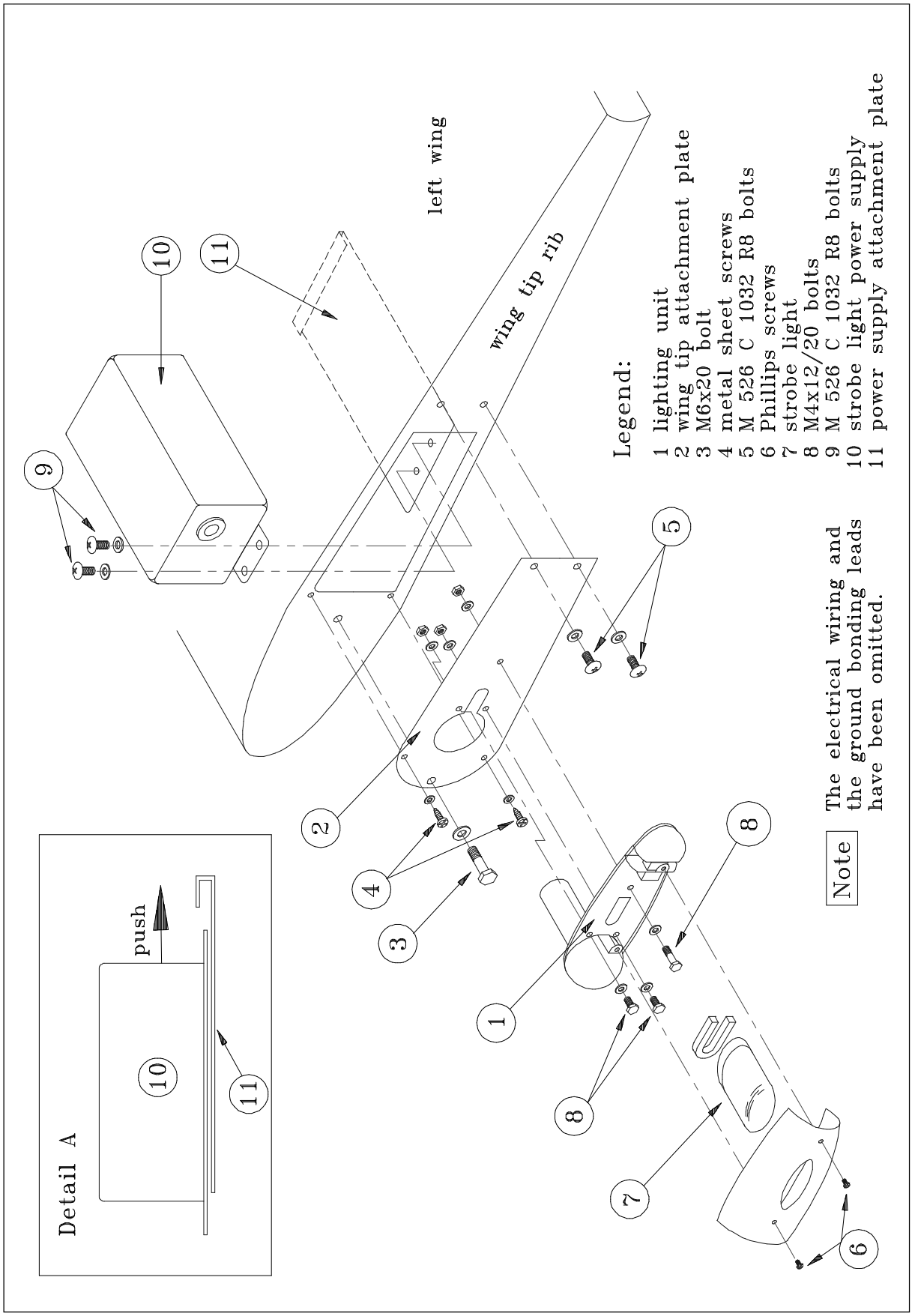
3 Remove the AN 526 C 1032 R8 bolts (9) and disconnect the ground bonding lead.

4 Pull out the power supply (10) 2 centimetres and remove.

CAUTION

DC units are polarity sensitive. Black lead is negative.

5 Install in reverse sequence of removal observing Detail A of Figure 1 when attaching the power supply on the attachment plate (11).



Navigation/Strobe Lights Removal/Installation
Figure 1

Chapter 34

Navigation

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34-00-00 GENERAL

The Extra 300S is equipped with an altimeter, an airspeed indicator and a magnetic compass. Optional a turn and bank indicator is obtainable. The colour markings in instruments follow US-FAR, part 23 recommendation.

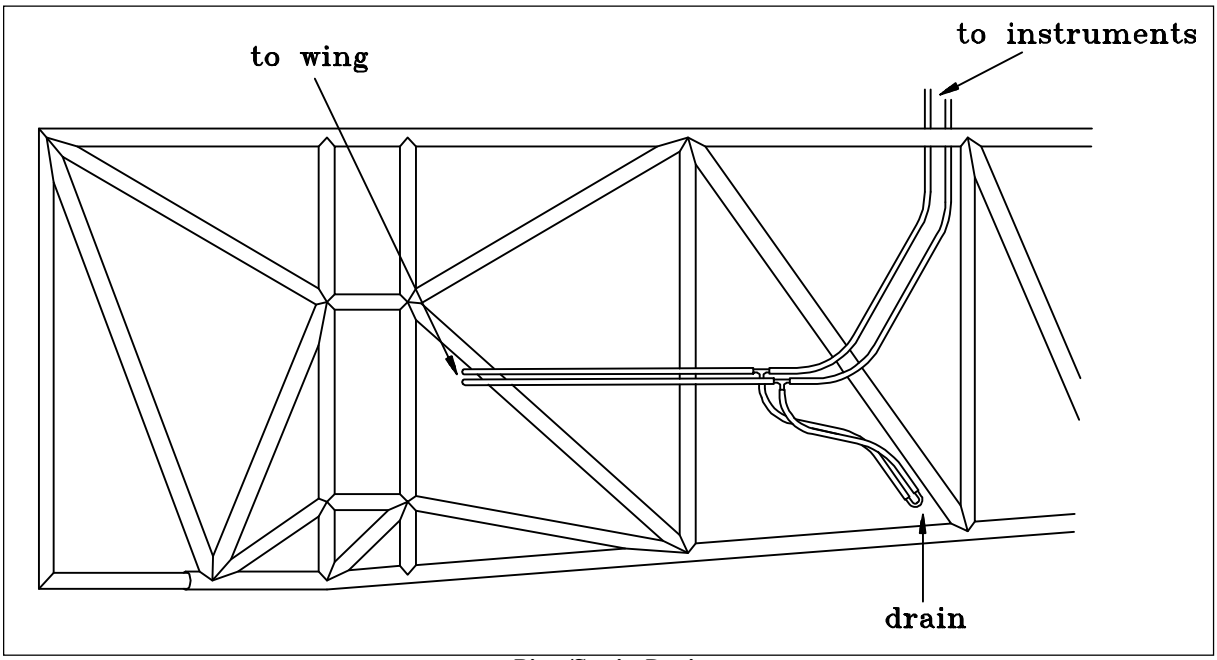
To get the pitot and static pressure a pitot/static head is installed at the LH wing leading edge.

34-10-00 FLIGHT ENVIRONMENT DATA

This Section describes that portion of the system which senses the environmental conditions and uses the data to influence navigation.

34-10-01 Pitot/Static System

The pitot/static tube is designed to pick up pitot pressure and static pressure. It is screwed through the L.H. outboard leading edge into an attachment block located at the rear web of the main spar. From there the pressures are transmitted by means of a vinyl tubing which is routed through an aluminium tube inside the wing to the left side of the fuselage and further to the instrument panels. The ends of each vinyl tube are marked with the letters "P" or "S" for pitot resp. static pressure line. The pitot/static system can be drained by means of an U-shaped drain which is located at the left side of the cockpit as shown in Figure 1.



Pitot/Static Drain
Figure 1

34-10-02 Altimeter

The altimeter is designed to measure pressure changes of the atmosphere by means of an aneroid capsule, the pressure changes corresponding to changes in altitude. In this instrument the shaft of pinion drives via gearwheels the pointer shaft of the large pointer. Further gearwheels are used to move the small pointer. The altimeter has a scale marked in feet (ft.). Three pointers provide an indication of the altitude; each full turn of the large pointer reads 1,000 feet, each full turn of the middle pointer 10,000 feet. By turning the knob at the bottom left of the instrument, the barometric pressure reading is set in millibars.

Barometric range:	946 thru 1050 millibars
Reading range:	-1,000 thru 20,000 feet
Temperature range:	-55°C thru +70°C

34-10-03 Airspeed Indicator

The airspeed indicator shows the speed of the aircraft relative to the atmosphere. The pitot airspeed indicator measures the difference between pitot pressure and static pressure, the former being picked up by the pitot head at the pitot location of the air flow and applied to the airspeed indicator via tubing, the latter also being picked up by the pitot head. The sensing element of the airspeed indicator is an open diaphragm which senses internally the pitot pressure and externally the static pressure, the difference between the two increasing with increasing speed. This difference produces distortion of the diaphragm which is translated to the pointer via a system of levers an gearwheels.

The reading of the airspeed indicator is in knots.

Max. operation altitude:	12,000 m
Operating temperature range:	-30°C thru +50°C

34-15-00 MAINTENANCE PRACTICES

34-15-01 Pressure Head Removal/Installation

The pressure head consists of an inner steel tube, an outer aluminium tube and a top cap which are screwed.

1 Unscrew the top cap.

2 Unscrew the outer aluminium tube.

3 Unscrew the inner steel tube.

4 Install in reverse sequence of removal applying silicone in the gap between the outer aluminium tube and the hole of the wing leading edge.

34-15-02 Pitot Head Attachment Block Removal/Installation

1 Remove the Pitot head per Chapter 34-15-01.

2 Remove the wing tip attachment plate with the lighting unit per Chapter 57-35-01.

3 Disconnect the vinyl tubing.

4 Remove the LN9348-05 stop nuts and the DIN125 M5 washers.

5 Disconnect the ground bonding leads.

6 Remove the attachment block.

7 Install in reverse sequence of removal. Use new stop nuts.

34-15-03 Altimeter Removal/Installation

1 Remove the instrument access door.

2 Remove the vinyl tube.

3 Remove the attachment bolts and nuts.

4 Hand the altimeter under the instrument panel and remove.

5 Install in reverse sequence of removal.

6 Perform an operation test.

34-15-04 Airspeed Indicator Removal/Installation

1 Remove the instrument access door.

2 Remove the vinyl tubing.

3 Remove the attachment bolts and nuts.

4 Hand the airspeed indicator under the instrument panel and remove.

5 Install in reverse sequence of removal. Observe correct installation of vinyl tubing: "Stat. Druck" = static pressure, "Meßdruck" = Pitot pressure.

6 Perform an operation test.

34-20-00 ATTITUDE AND DIRECTION

This Section describes that portion of the system which uses magnetic or inertia forces to sense and display the direction or attitude of the aircraft.

34-20-01 Magnetic Compass

The magnetic compass shows the course of the aircraft in relation to magnetic north. Its measuring range is 360° in increments of 5°. Its case is filled with silicone oil to dampen the movements. The compass correction card is located as shown in Chapter 31.

The magnetic compass must be inspected whenever the engine, magnetizable metals or parts of the electrical resp. ignition system has been replaced, changed or added, otherwise per Chapter 05.

34-20-02 Turn and Bank Indicator

The turn and bank indicator indicates the turning rate of the aircraft about its vertical axis. This instrument comprises an electrically driven gyro, suspended in a gimbal system and whose spin axis is parallel to the lateral axis of the aircraft. The gimbal is connected to the bar pointer of the indicator by a lever system. This bar pointer also indicates the rate at which the aircraft is turning.

In addition, the front of the instrument houses a sphere located in a globe filled with a damping fluid. The change in this indication shows the pilot whether the aircraft is slipping.

34-25-00 MAINTENANCE PRACTICES

34-25-01 Magnetic Compass Removal/Installation

1 Remove the instrument access door.

2 Remove the compass attachment bolts and nuts.

3 Remove the magnetic compass.

4 Install in reverse sequence of removal.

5 Perform a compass compensation and replace the compass correction card.

34-25-02 Turn and Bank Indicator Removal/Installation

1 Remove the instrument panel cover per Chapter 31-15-01.

2 Remove the indicator attachment bolts and nuts.

3 Disconnect the electrical wiring.

4 Hand the turn and bank indicator under the instrument panel and remove.

5 Install in reverse sequence of removal.

6 Perform an operation test.

Chapter 51

Standard Practices and Structures - General

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51-00-00 GENERAL

51-00-01 Access Panel Identification

For the Extra 300S all removable covers and fairings are defined as access panels (refer to Figure 1 and the adjacent chart). If maintenance or repair is not restricted to a small area it is advisable to remove all access panels before beginning work or checks.

N O T E

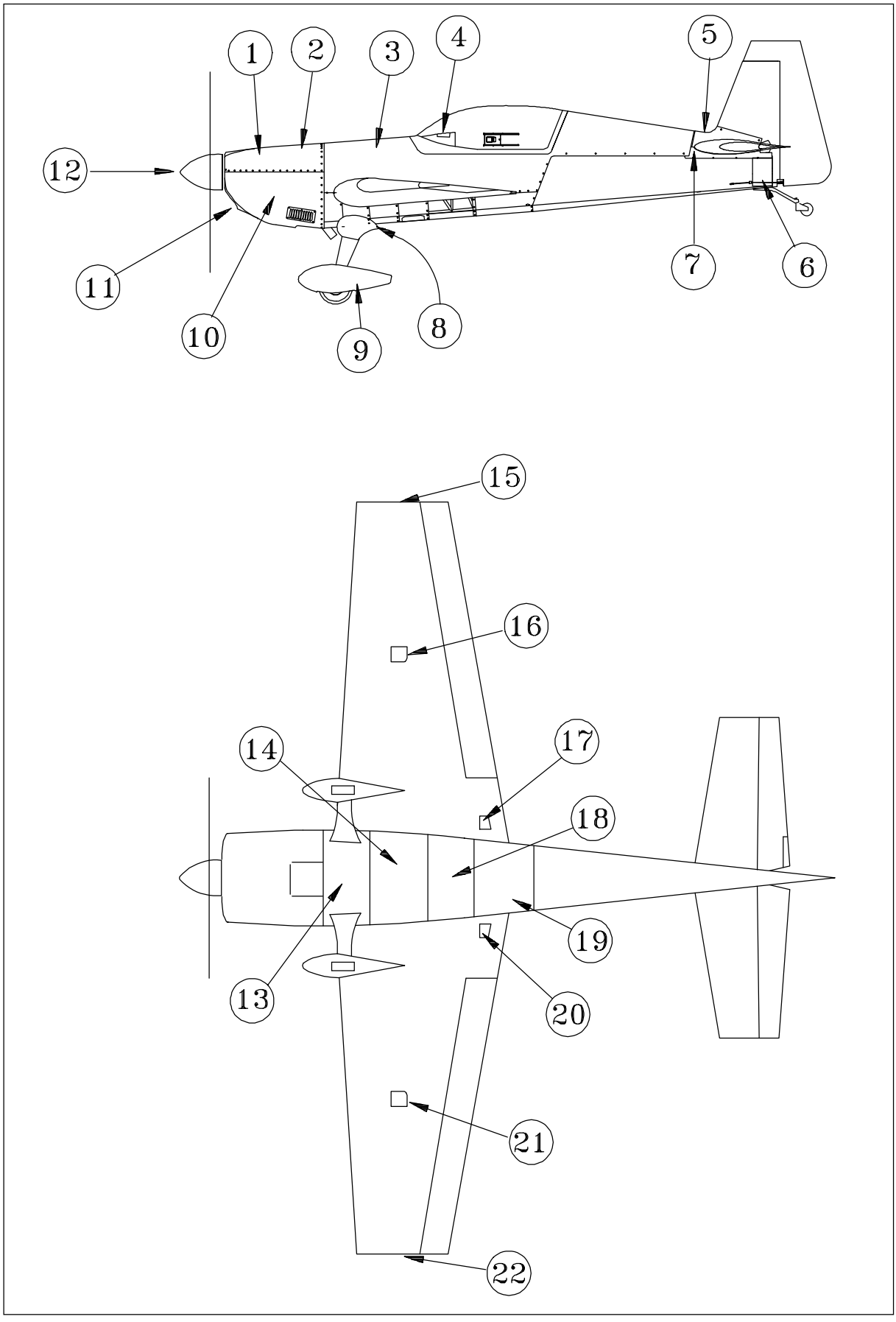
Access panels partly overlap. Remove the front panels first.

All panels are screwed.

Unscrew the upper instrument panel attachment screws and the filler neck screws before removal of the main fuselage cover.

For the removal/installation of the wing tip panels refer to Chapter 57.

Prior to unscrewing of the air inlet screen remove bottom half of the engine cowling not to lose the attachment stopnuts and washers.



Access Panel Identification
Figure 1

Position	Item
1	Top half of the engine cowling
2	Oil filler access door
3	Main fuselage cover
4	Instrument access door
5	Tail fairing
6	Tail cone access panel (RH)
7	Tail side skin (LH/RH)
8	Cuff (LH/RH)
9	Wheel speed fairing (LH/RH)
10	Bottom half of the enginge cowling
11	Air inlet screen
12	Spinner
13	1. bottom covering sheet
14	2. bottom covering sheet
15	LH wing tip panel
16	LH outbourd access panel
17	LH inboard access panel
18	3. bottom covering-window
19	4. bottom covering sheet
20	RH inboard access panel
21	RH outboard access panel
22	RH wing tip panel

51-10-00 INVESTIGATION

51-10-01 Damage Classification

WARNING

All damage of composite parts must first be classified by qualified personnel. In case of doubt with regard to the classification of damage, if a clear definition of the extent of damage is not possible, or if a repair of damage inspite of the valid manufacturer documentation is doubtful, contact EXTRA-FLUGZEUGBAU GmbH.

WARNING

Only the Damages Classes 2, 3 and 4 may be repaired by qualified personnel. In case of Damage Class 1 it has to be contacted EXTRA-FLUGZEUGBAU GmbH.

According to the Luftfahrt-Bundesamt (Federal German Aviation Authority) four damage classes are defined:

Damage Class 1:

Large scale destruction requiring a partial reconstruction of the component or large scale repair. Each destruction over 300 mm diameter and each damage of a spar is a large scale destruction. EXTRA-FLUGZEUGBAU GmbH has to be contacted prior to repair.

Damage Class 2:

Damage to primary structures and to secondary structures to the following extent: Holes and fractures extending through a sandwich component and a scale under 300 mm diameter.

Damage Class 3:

Damage to primary structures and to secondary structures to the following extent: Small holes or fractures in the external covering layers, if not accompanied by damage to supporting layers or internal covering layers.

Damage Class 4:

Erosion, scratches or nicks not accompanied by fractures or breakages. Damage to fairings belong to this class.

51-10-02 Repair Criteria and Limits

I M P O R T A N T

ll damage of composite parts must first be classified prior to repair. Refer to Chapter "51-10-01 Damage Classification".

I M P O R T A N T

Only the Damages Classes 2, 3 and 4 may be repaired by qualified personnel. In case of Damage Class 1 it has to be contacted EXTRA-FLUGZEUGBAU GmbH.

The decision whether to repair or replace a major unit of structure will be influenced by factors such as time and labor available, and by comparison of labor costs with the price of replacement assemblies. Past experience indicates that replacement, in many cases, is less costly than major repair. Certainly, when the aircraft must be restored to its airworthy condition within limited time, replacement is preferable.

51-30-00 MATERIALS

This Section describes metallic and non-metallic materials used in the repair of the Extra 300S and gives the sources of supply (manufacturers and supplier).

51-30-01 Composite Parts

IMPORTANT

Only approved materials have to be used for the repair of composite parts.

Epoxy-system

Manufacturer: RÜTGERS, BAKELITE Aktiengesellschaft, Varzinerstr. 49, D-47138 Duisburg 12, Germany

Resin: Rütapox L20

Hardener: Rütapox SL

Ratio of comp.: 100 parts *L20* / 34 parts *SL* (weight ratio)

Glass fibre fabrics

Manufacturer: INTERGLAS, Interglas AG Söflinger Straße 246, Postfach 3820, D-89077 Ulm, Germany

Style	WLB-No.* LN 9169	US-style	weave patterns	weigh g/m²
90070	8.4505.60	1610	plain	80
92110	8454860	none	twill 2/2	163
92125	8455160	none	twill 2/2	280
92140	8455160	none	twill 2/2	390

*All glass fabric is made of alkali-free E glass with Volan-A finish or with finish I 550.

Carbon fibre fabrics

Manufacturer: CCC, C. Cramer GmbH & Co. KG
Postfach 209,
D-48619 Heek-Nienborg, Germany

Style CCC	WLB-No.* DIN 65147	US-style	weave patterns	weight g/m²
447	8,3507;80	none	plain	160
452	8,3520;80	none	twill 2/2	204
459	-	none	cross-twil	220

*WLB: Werkstoff Leistungsblatt, according to German standard DIN-WL

Glass rovings:

Manufacturer: GEVETEX Textilglas-GmbH
Postfach 426,
D-5100 Aachen, Germany

Supplier: Lange & Ritter GmbH
Postfach 100321,
D-7016 Gerlingen, Germany

Type: Vetrotex EC14 - 2400-P185

Carbon rovings:

Manufacturer: Tenax Fibers GmbH & Co. KG
Kasinostr. 19-21
D-42103 Wuppertal

Supplier: Tenax Fibers GmbH & Co. KG
Kasinostr. 19-21
D-42103 Wuppertal

Type: TENAX J HTA 5131 1600tex f24000 t 0
(WLB: 8.3614.85)

Core material

a) PVC Foam:

Manufacturer:	DIAB Divincell International Gmbh Max-von-Laue-Straße 7 D-30966 Hemmingen, Germany
Supplier:	see above
Type:	Divinycell HT 50

b) Honeycomb:

Manufacturer:	EUROCOMPOSITES S.A: B.P.95, Zone Industrielle, L-6401 Echternach / Luxembourg
Type:	ECA-I-R 4.8-29-R

Filler material for resin:

Manufacturer:	EBERHARD Chemie GmbH Olpener Straße 405, D-51109 Köln 91 (Merheim), Germany
Type:	- Cotton flakes - Microballoons BJO - 0930

Paint:

Manufacturer:	GLASURIT GmbH Max-Winkelmannstr. 80, D-48165 Münster/Hiltrup, Germany
Supplier:	WESSELS AG Pagenstecherstraße 121, D-49090 Osnabrück, Germany
Type:	
285-100	Glassodur-Rapidfüller AC 85-0100
929-73	Glassodur-MS-Härter SC 29-0173
352-91	Glassodur-Einstellzusatz SV 41-0391

1006-202/3	Glassit Spritzfüller SP 60-7023
948-36	Glassit Härterpaste, rot SB 48-3360
21-	Glassodur-PUR-Acryl-Lack AD/AE 2
929-73	Glassodur-MS-Härter SC 29-0173
352-91	Glassodur-Einstellzusatz SV 41-0391

51-30-02 Metal Components

I M P O R T A N T

Only approved materials have to be used for the repair of metal components.

Steel tubing:

Manufacturer: MHP
Mannesmann Hoesch Präzisrohr GmbH
Postfach 1713,
D-59061 Hamm, Germany

Supplier: HEINE+BEISSWENGER Stiftung + CO
Postfach 1510,
D-70705 Fellbach, Germany

Type: WLB 1.7734.4
18mm x 1.0mm, 20mm x 1.0mm,
22mm x 1.0mm, 22mm x 1.5mm,
25mm x 1.5mm

Steel sheet metal :

Manufacturer: BÖHLER Edelstahl GmbH
München, Germany

Supplier: BÖHLER Edelstahl GmbH
Hansa Allee 321,
D-40549 Düsseldorf, Germany

Type: WLB 1.7734.4
1.0mm, 1.5mm, 2.0mm, 3.0mm

Paint:

Manufacturer:	GLASURITGmbH Max-Winkelmannstr. 80, D-48165 Münster / Hiltrup, Germany
Supplier:	WESSELS AG Pagenstecherstraße 121, D-49090 Osnabrück, Germany
Type:	
801-1552	Glassofix Grundfüller-EP AC 01-1492
965-32/2	Glassofix Härter-EP SC 65-0322
21-	Glassodur-PUR-Acryl-Lack AD/AE 2
1929-73	Glassodur-MS-Härter SC 29-0173
352-91	Glassodur-Einstellzusatz SV 41-0391

51-30-03 Aluminium Components

Aluminium sheet metal:

Manufacturer:	Kaiser Aluminium & Chem. Corp. Spokane, Washington
Supplier:	Westdeutscher Metallhandel Postfach 104245 45141 Essen
Type:	WLB 3.1364. T3511 or 2024 T3 0.6mm; 0.8mm; 1.2mm

Control rod tubings:

Manufacturer:	Aluminium AG CH-5737 Menziken
Supplier:	Karstens & Knauer GmbH&Co D-28865 Lilienthal
Type:	WLB 3.1354. T3 ø 25x1mm

Paint:

Manufacturer:	GLASURIT GmbH Max-Winkelmannstr. 80, D-48165 Münster / Hiltrup, Germany
Supplier:	WESSELS AG Pagenstecherstraße 121, D-49090 Osnabrück, Germany
Type:	
Primer:	
283-150	Glassofix-Grundfüller AB83-1150
352-228	Glassofix-Zusatzlösung SC12-0228
Lacquer:	
21-	Glassodur-PUR-Acryl-Lack AD/AE 2
1929-73	Glassodur-MS-Härter SC 29-0173
352-91	Glassodur-Einstellzusatz SV 41-0391

Aluminium hardware metal (brackets, pedestals, castings, etc.):

Paint:

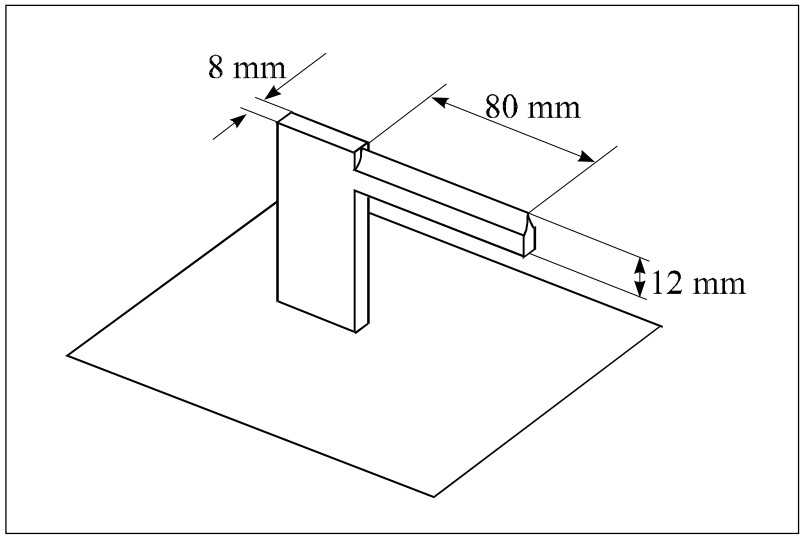
Manufacturer:	Parker & Anchem, Ambler, PA 19002
Supplier:	Aircraft Spruce
Chem. coating:	Alodine No. 1201 (MIL-C-5541)
Lacquer:	see above

51-60-00 CONTROL SURFACE BALANCING

51-60-01 Weighing and Determination of Control Surface Moments

All weighing of control surfaces is performed with surface removed from aircraft. Weighing and determination of control surfaces moments is necessary after repairs or painting. Weigh the control surfaces including the mass balances in disassembled condition. The aileron weight includes the spade. Copy page 31, enter the values (W, m, r) there and check whether the surface weights or moments are within the given tolerances. If they are not, contact the manufacturer for advice.

For the determination of control surface moments follow the steps as described below and use two balancing mandrels like shown in the Figure 2:



Balancing Mandrels
Figure 2

Procedure

1 Remove the control surface (refer to chapter 27).

2 Reinstall the bolts in two brackets.

3 Put the control surfaces on the balancing mandrels (use a wire for the trim tab).

4 Weigh by means of a conventional spring balance (kg/g-indication) at the given weighing points (Figure 3) and enter the weight (m) in Figure 4.

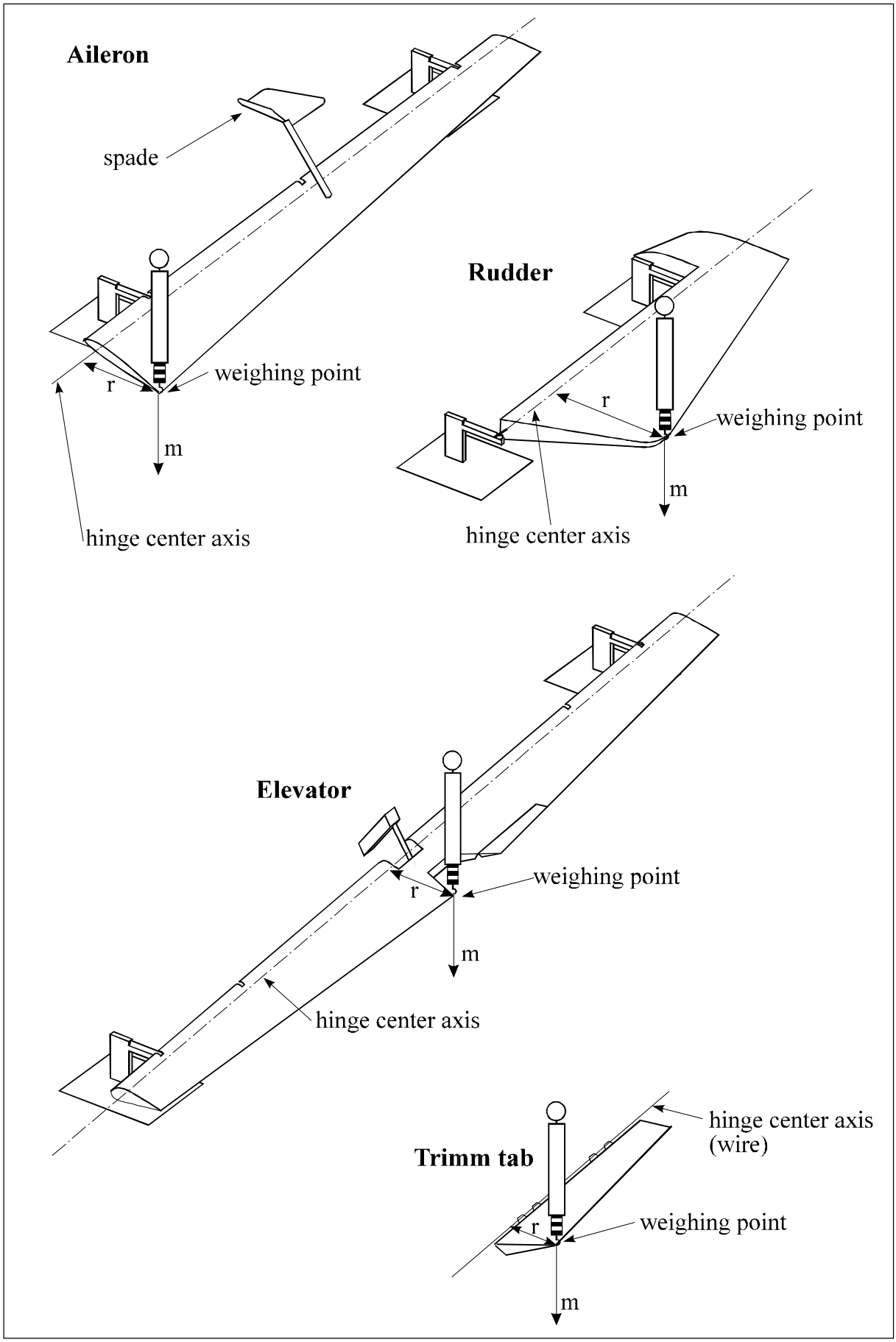
5 Measure distance of hinge center line to weighing point (r) and enter the value in Figure 4.

6 Calculate the control surface moment (M) in Figure 4.

I M P O R T A N T

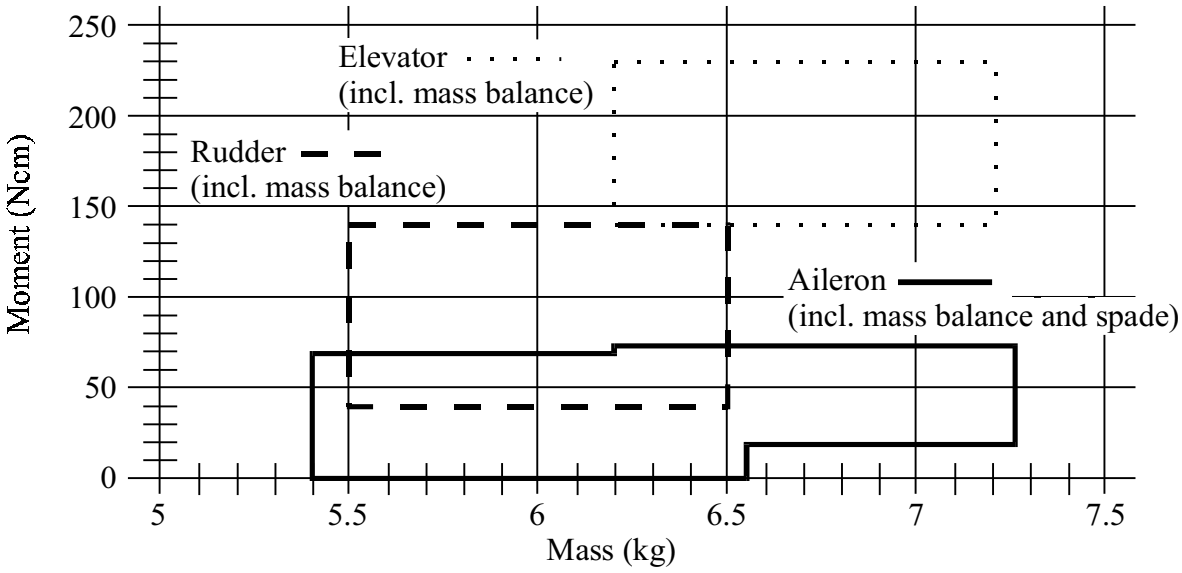
If values exceed the given tolerances in Figure 4 contact the manufacturer before beginning any changes of control surfaces.

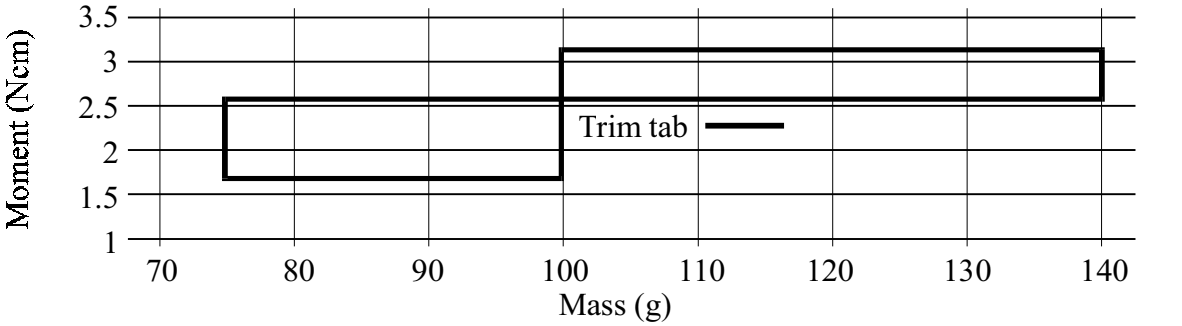
7 Reinstall the control surfaces.



Determination of Control Surface Moments
Figure 3

Permissible Weights and Moments





Weights

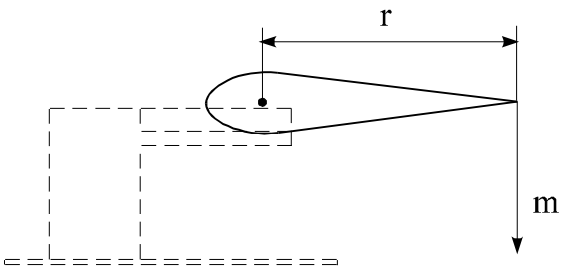
Aileron LH: (W) . . . . . kg

Aileron RH: (W) . . . . . kg

Rudder: (W) . . . . . kg

Elevator: (W) . . . . . kg

Trim Tab: (W) . . . . . kg



$M\ (Ncm) = m\ (kg) \cdot g\ (m/s^2) \cdot r\ (cm)$

Moments

Aileron LH: (m:) . . . . . kg · 9.81 m/s² · (r:) . . . . . cm = (M:) . . . . . Ncm

Aileron RH: (m:) . . . . . kg · 9.81 m/s² · (r:) . . . . . cm = (M:) . . . . . Ncm

Rudder: (m:) . . . . . kg · 9.81 m/s² · (r:) . . . . . cm = (M:) . . . . . Ncm

Elevator: (m:) . . . . . kg · 9.81 m/s² · (r:) . . . . . cm = (M:) . . . . . Ncm

Trim Tab: (m:) . . . . . kg · 9.81 m/s² · (r:) . . . . . cm = (M:) . . . . . Ncm

Control Surface Weights and Moments
Figure 4

51-70-00 REPAIRS

51-70-01 Repair of Reinforced Glass and Carbon Fibre Components

IMPORTANT

Repair of composite parts has to be carried out only by qualified and authorized personnel.

If the aircraft is damaged, proceed as follows. First conduct a careful visual inspection of the surface and the damaged area. Frequently, the damage extends to futher components, sometimes a fracture will continue invisible beneath the surface.

Perform the repair work with utmost care. The external shell of the wing and empannage is stressed; a failure of this bonded structure can lead to an aircraft crash. In order to eliminate dangerous stress concentrations, avoid changes in cross-sectional areas.

IMPORTANT

The resin-hardener mixture ratio must be precisely maintained (+0.5%). Clean cups and tools must be used. The weight ratio of glass fabric to resin mixture should be approximately 50:50.

Immediately prior to applying the wet laminate, sand and vacuum clean the repair area, so that no dirt and dust is involved which could prevent a secure adhesion.

WARNING

Sanding carbon and glass fibre laminates gives off a fine dust that may cause skin and/or respiratory irritation unless suitable skin and resiration protection is used.

WARNING

Carbon-tetracloride or Acetone used for cleaning repair areas are flamable liquids and should be used with proper ventilation and safety equipment.

IMPORTANT

As with plywood grain, the direction of the various fibres (longitudinal or diagonal) is of great importance for the stability.

The number of layers required to restore the stability in the damaged area can be taken from the layer sequence/placement plan.(Refer to the respective Chapters)

It is necessary to know the number and direction of layers in the damaged area, in order to be able to replace them with the original number. In all cases, the thickness of the laminate has to be measured with a vernier calliper for the exact determination of the laminate tickness.

One technique to learn about the number of layers is to burn a small piece taken from the damaged area. The resin will burn off, leaving the glass and/or carbon fabric to be inspected for the number of layers and the type of fabric.

Creating a scarfed overlap takes time. Sand away as much of the old material, that the new fabric patches do not project beyond the contour.

In order to shorten the curing time, a heater can be used to increase the ambient temperature.

CAUTION

Too high temperature will cause large air bubbles in the laminate. Local overtemperature can be prevented by using a foil tent which leads the hot air stream.

The curing cycle must be maintained as stated. Use a thermometer to monitor the temperature.

IMPORTANT

After repair of control surfaces, check for proper balance (refer to chapter 27, Flight Controls).

It is recommended to prepare test specimens at the same time as the actual repair is accomplished. These can then be subject to a material test to establish the quality of the laminate in the repaired part. To make this determination valid, the specimens must be assembled with the same style of fabric and resin mixture. Subsequently the specimens must be subject to the curing pressure, temperature and time identical with those in the actual repair.

51-70-02 Repair of Sandwich Material

Two types of core materials are used for sandwich on the EXTRA 300S:

- PVC hard foam
- Honeycomb

both with glass or carbon fibre shells

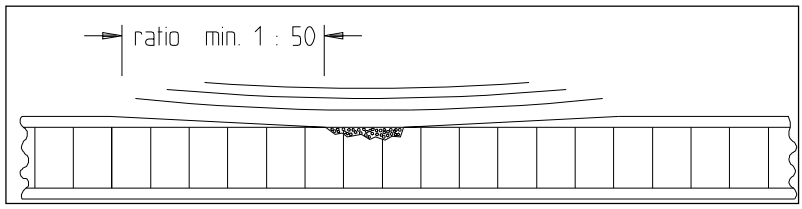
The following section describes the repair of both types of sandwich. Different processing techniques for these materials, if necessary, are also described.

a) Minor surface damage

Around a visible crack, the laminate may be separated from the core material. Determine the extent of this area by coin tapping. Remove the separated laminate carefully using a sanding disk, sanding block or a sharp knife. Prepare a scarfed overlap of the laminate around the damaged area. Overlap lenght per fabric layer min. 20 mm;

IMPORTANT

Ratio (laminate thickness : overlay lenght) min. 1: 50 (refer to Figure 5).



Minor surface damage
Figure 5

After preparing the scarfed overlap, clean the repair area thoroughly as follows:

- Remove the sanding dust with a pneumatic vacuum cleaner
- Clean the scarfed overlaps with carbon-tetrachloride or acetone in case of dirt or grease was introdued during the preparation.

Damaged core material has to refilled with a mixture of resin and microballoons (weight ratio 100:15). Apply resin mixture

to the repair area and lay on fabric in accordance to the layer sequence plans. Ensure to use correct style and direction of fabric.

I M P O R T A N T **Repair area must be clean of dirt, dust and grease!**

Lay out the required number and size of fabric pieces on a piece of colored plastic foil and soak (wet) them with resin mixture, subsequently position them on the repair area.

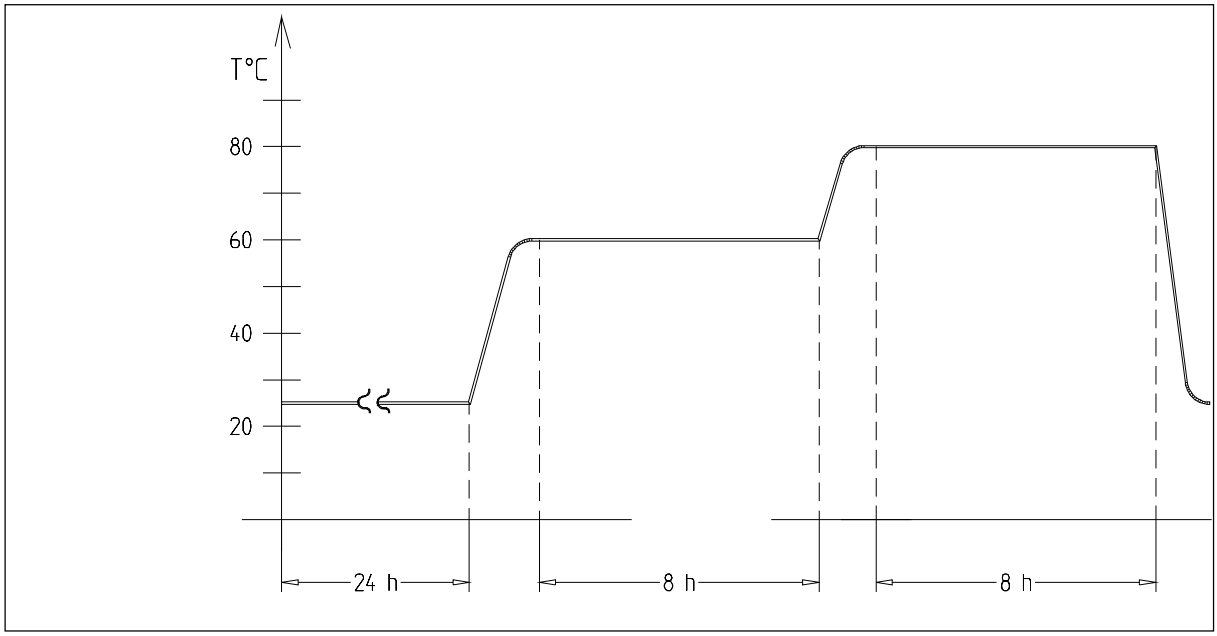
I M P O R T A N T **Remove the plastic foil after each positioning process.**

For a repair of honeycomb sandwich parts you have to observe the following: The repair area has to be cured under condition of vacuum bagging.

For vacuum bagging, proceed as follows:

- Apply peel nylon fabric on the last repair fabric layer
- Perforate a clean, thin plastic foil with a thick needle (max.spacing of holes: 20mm x 20mm) - mainly in the area of the honeycomb - and lay it on the repair area.
- Lay a jute cloth (weave) or equivalent bleeder cloth on this perforated plastic foil.
- Lay an air tight plastic foil upon the jute weave and seal their edges to the surrounding surface using an adhesive tape.
- Apply suction with a vacuum pump (pressure approx. 0.7 bar/ 10 psi)
- Apply the thermal curing cycle.(Refer to Figure 3)
- Following the curing cycle remove vacuum bagging material and peel nylon fabric.

After the pre-curing period at room temperature, the repaired area has to be cured according the temperature cycle as shown on Figure 6.

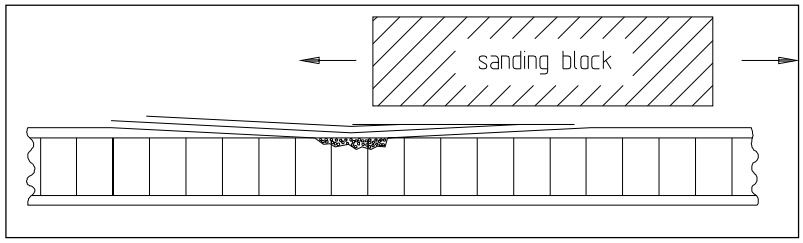


Curing cycle resin L20/SL
Figure 6

After the curing process is completed, the repair area can be sand level to the surrounding area.

C A U T I O N

Sand only the edge thickness of repair laminate (refer to Figure 7)**!**



Level Sanding of Surrounding Area
Figure 7

N O T E

For painting of the repair area refer to Chapter 51-70-06.

b) Damage of complete sandwich

If the inner laminate is also damaged, first remove the upper laminate within the area, where no secure bond connection to the core material is suspected. Trim out the complete damaged portion of core material to a circular or elliptical shape.

The damaged area of the inner laminate has to be taken out as well. Make sure not to increase the disbond area by preparing the hole. Preferably use a hand held milling machine. In case of cutting with a saw, the pulsation stress may peel of the inner laminate (secondary damage). If the extent of the disbonded area on the inner laminate exceeds the prepared cut out, increase the cut out of material and upper laminate.

Prepare a scarfed overlap of laminate around the circular cut out. Overlap lenght of inner laminate should not be less than 20 mm.

I M P O R T A N T

Overlap lenght of the upper laminate should not be less than 1/50; (ratio: laminate thickness / overlap lenght).

Prepare a replacement block of core material (foam or honeycomb) with equivalent diameter and thickness. Cut it to fit snuggly in the trimmed hole. In case of foam core, coat one side with a mixture of resin and microballoons (ratio 100:15). Apply prelaminated fabric layers required for the inner laminate on this side of the core filler block. Ensure correct style and direction of fabric. After precuring the laminate at elevated room temperature (30°C), scarf the overlap and sand the upper overlapping core material down, up to the surrounding core material.

Subsequently clean the repair area thoroughly as follows:

- Remove the sanding dust with a pneumatic vacuum cleaner
- Clean the scarfed overlaps with carbon-tetrachloride or acetone in case of dirt or grease was introdued during the preparation.

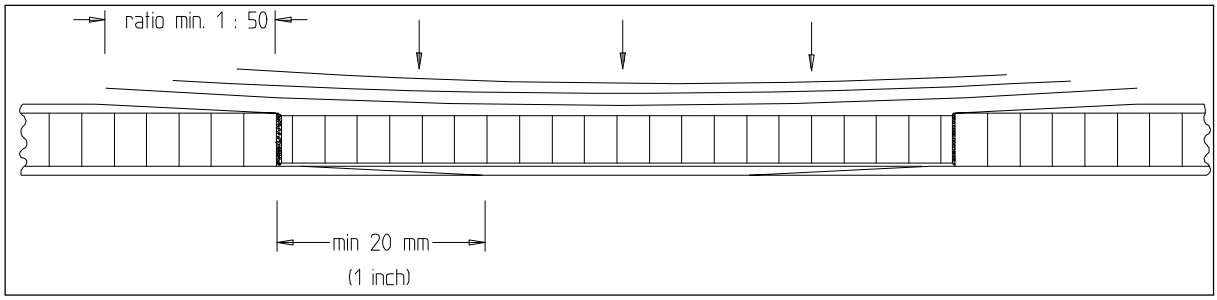
W A R N I N G

Carbon-tetracloride or Acetone used for cleaning repair areas are flamable liquids and should be used with proper ventilation and safety equipment.

I M P O R T A N T

Repair area must be free of dirt and grease.

Wet all surfaces of the backing plate and the scarfed area with resin mixture. Lay on prelaminated fabric layer in accordance to the layer sequence plan. Ensure correct style and direction of fabric.



Damage of Complete Sandwich
Figure 8

Lay out the required number and size of fabric pieces on a piece of plastic foil and wet them with resin mixture. Subsequently position them on the repair area.

I M P O R T A N T

Remove the plastic foil after each positioning process.

The repair area has to be cured under condition of vacuum bagging. Proceed as follows:

- Apply peel nylon fabric on the last repair fabric layer
- Perforate a clean, thin plastic foil with a thick needle (max. spacing of holes: 20mm x 20mm) - mainly in the area of the honeycomb - and lay it on the repair area.
- Lay a jute cloth or equivalent bleeder cloth on this perforated plastic foil
- Lay a second plastic foil uppon the jute weave and seal their edges to the surrounding surface using an adhesive tape.
- Apply suction with a vacuum pump (pressure approx. 0.7bar / 10psi)
- Apply the thermal curing cycle
- Following the curing cycle carefully remove vacuum bagging material and peel nylon fabric.

N O T E

After the pre-curing period at room temperature, the repaired area has to be cured according the temperature cycle as shown on Figure 6.

After the curing process is completed, the repair area can be sand level to the surrounding area.

I M P O R T A N T

Sand only the edge thickness of repair laminate!

For painting of the repair area proceed like mentioned in Chapter 51-70-06.

51-70-03 Repair of Laminates

a) Minor damage

Scarf the edges of the minor damage area with sandpaper. Minimum lenght of scarf per fabric layer approx. 20 mm; ratio **(laminate thickness : scarf lenght) approx. 1: 50.**

Following the scarf procedure, clean the repair area thoroughly:

- Remove the sanding dust with a pneumatic vacuum cleaner
- Clean the scarfed overlaps with carbon-tetrachloride or acetone in case of dirt or grease was introdued during the preparation.

CAUTION **Repair area must be free of dirt, dust and grease.**

Wet the prepared scarfed areas with resin mixture. Lay on prelaminated fabric layer in accordance to the layer sequence plan. Ensure correct style and direction of fabric. Apply peel nylon fabric on the last repair fabric layer.

NOTE **Lay out the required number and size of fabric pieces on a piece of colored plastic foil and wet them with resin mixture. Subsequently position them on the repair area.**

IMPORTANT **Remove the plastic foil after each positioning process.**

After the curing process is completed, remove the peel nylon fabric. The repair area can be sand level with the surrounding area.

CAUTION **Sand only the edge thickness of repair laminate!**

Refinish the surface according chapter 51-70-05 Painting.

If the extent of the damaged area exceed 10 cm (4 inches) a large damage repair is required.

Carefully trim out the damaged portion to a circular or oval shape.

Prelaminate a backing plate from two layers of glass fibre fabric and resin mixture, which must be approx. 20 mm larger than the damaged area. Apply peel nylon fabric as external layer. Sandwich the resin wetted layers between two sheets of plastic foil.

Work the excess resin out and allow the plate to cure at elevated room temperature for 8 hours on a flat surface or a plasticfoil-covered surface of the proper curvature near the damaged area, or the same location on a comparable undamaged part.

Following the curing cycle remove plastic foil and peel nylon fabric. Bond the backing plate to the inside using a mixture of resin and cotton flocks, and adapt to the contour. Cure the bonding at elevated room temperature for 8 hours.

Subsequently scarf the edges of the damaged portion with sandpaper. Minimum lenght of scarf per fabric layer approx. 20 mm;

I M P O R T A N T **Ratio (laminate thickness : scarf lenght) approx. 1: 50.**

Following the scarf procedure, clean the repair area thoroughly:

- Remove the sanding dust with a pneumatic vacuum cleaner
- Clean the scarfed overlaps with carbon-tetrachloride or acetone in case of dirt or grease was introdued during the preparation of the overlap.

I M P O R T A N T **Repair area must be free of dirt, dust and grease.**

Wet all surfaces of the backing plate and the scarfed area with resin mixture. Lay on prelaminated fabric layer in accordance to the layer sequence plan. Ensure correct style and direction of fabric.

N O T E

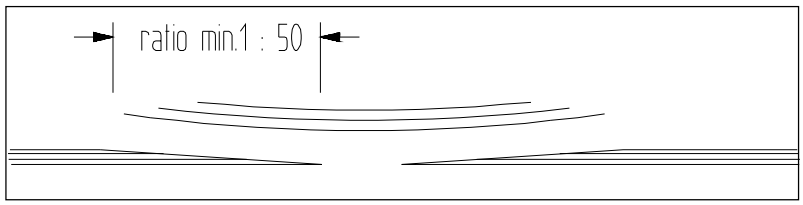
Lay out the required number and size of fabric pieces on a piece of colored plastic foil and wet them with resin mixture. Subsequently position them on the repair area.

I M P O R T A N T

Remove the plastic foil after each positioning process.

The repair area has to be cured under condition of vacuum bagging. Proceed as follows:

- Apply peel nylon fabric on the last repair fabric layer
- Perforate a clean, thin plastic foil with a thick needle (max. spacing of holes: 20mm x 20mm) - mainly in the area of the honeycomb - and lay it on the repair area.



Repair of minor damage
Figure 9

b) Large damage

If the extent of the damaged area exceed 10 cm (4 inches) a large damage repair is required.

Carefully trimm out the damaged portion to a circular or oval shape.

Prelaminate a backing plate from two layers of glass fibre fabric and resin mixture, which must be approx. 20 mm larger than the damaged area. Apply peel nylon fabric as external layer. Sandwich the resin wetted layers between two sheets of plastic foil. Work the excess resin out and allow the plate to cure at elevated room temperature for 8 hours on a flat surface or a plasticfoil-covered surface of the proper curvature near the damaged area, or the same location on a comparable undamaged part.

Following the curing cycle remove plastic foil and peel nylon fabric. Bond the backing plate to the inside using a mixture of resin and cotton flocks, and adapt to the contour. Cure the bonding at elevated room temperature for 8 hours.

Subsequently scarf the edges of the damaged portion with sandpaper. Minimum lenght of scarf per fabric layer approx. 20 mm;

I M P O R T A N T

ratio (laminate thickness : scarf lenght) approx. 1: 50.

Following the scarf procedure, clean the repair area thoroughly:

- Remove the sanding dust with a pneumatic vacuum cleaner
- Clean the scarfed overlaps with carbon-tetrachloride or acetone in case of dirt or grease was introdued during the preparation of the overlap.

I M P O R T A N T

Repair area must be free of dirt, dust and grease.

Wet all surfaces of the backing plate and the scarfed area with resin mixture. Lay on prelaminated fabric layer in accordance to the layer sequence plan. Ensure correct style and direction of fabric.

N O T E

Lay out the required number and size of fabric pieces on a piece of colored plastic foil and wet them with resin mixture. Subsequently position them on the repair area.

I M P O R T A N T

Remove the plastic foil after each positioning process.

The repair area has to be cured under condition of vacuum bagging. Proceed as follows:

- Apply peel nylon fabric on the last repair fabric layer.

- Perforate a clean, thin plastic foil with a coarse needle (max. spacing of holes: 20mm x 20mm) - mainly in the area of the honeycomb - and lay it on to the repair area.
- Lay a jute cloth or equivalent bleeder cloth on this perforated plastic foil.
- Lay an air tight plastic foil upon the jute weave and seal their edges to the surrounding surface using an adhesive tape.
- Apply suction with a vacuum pump (pressure difference approx. 0.7bar / 10psi)
- Curing cycle
- Following the curing cycle carefully remove vacuum bagging material and peel nylon fabric.

After the pre-curing period at room temperature, the repaired area has to be cured according the temperature cycle as shown on ***Figure 3***.

After the curing process is completed, the repair area can be sand level to the surrounding area.

CAUTION

Sand only the edge thickness of repair laminate!

Refinish the surface according chapter: 51-10-09 Painting.

51-70-04 Repair of Spars

The spars consists of carbon roving caps, glass or carbon fibre webs and PVC foam cores.

IMPORTANT

The spars are higly stessed; a failure of this bonded structure can result in loss of the aircraft! In all cases, the repair of a spar must be considered as a large-scale repair with a Damage Class 1 (Refer to Chapter 51-10-01 Damage Classification"). EXTRA-FLUGZEUGBAU GmbH has to be contacted prior to repair!

51-70-05 Structural Repair of Steel Components

Restoration of a damaged fuselage to its original design strength, shape and alignment involves careful evaluation of the damage, followed by exacting workmenship in performing the repairs.

I M P O R T A N T

Should structural repairs practicable on the aircraft be necessary, refer to "Aircraft Inspection and Repair FAA AC 43.13-1A" and "Aircraft Alterations Acceptable Methods, Techniques and Practices FAA AC 43.13-2A".

I M P O R T A N T

Alterations or repair of the airplane must be accomplished by *licensed* personnel. Consult EXTRA-FLUGZEUGBAU GmbH in case of doubt about a repair not specifically mentioned there.

N O T E

If welding work must be performed, use only the TIG procedure (Tungsten Inert Gas). Use steal welding wire 1.7734.2 for welding additive.

51-70-06 Painting of Composite Parts

WARNING

Coating materials may cause sensitization by inhalation and skin contact. Hardeners and coating materials ready for use can have an irritant and sensitizing effect upon the skin and respiratory tracts and cause allergic reactions.

WARNING

Provide for a continuous supply of fresh air during and also after the application, do not inhale the vapours and wear a breathing mask during the spray application of these materials. Persons suffering from an allergy or being prone to diseases of the respiratory tracts must not get in contact with coating materials.
Refer to the manufacturer technical information sheet!!

After curing cycle the surface of repared area can be sanded with sandpaper (80 grade). Indentations are filled with white polyester filler. Subsequently achieve a surface as uniformly rough as possible using a finer dry sandpaper (150 or 320 grade). Prior to paint application, the surface of the repair area must be cleaned thoroughly of all sanding dust, separation compounds and other foreign materials. Subsequently apply Glassodur Rapid Filler with a spray gun.

NOTE

The Rapid Filler must be completely dry before the covering paint can be applied.

For the final sanding, use 400 grade wet sandpaper to achieve a smooth clean surface. Allow surface to dry. Paint application of Glassodur-Pur-Acryl-Lack AD/AE 21 two component acryl paint is performed with a spray gun.

Paint can be mixed with small quantities of reducer. After completion of the painting, polish the repair area.

51-70-07 Aluminium and Steel Components Refinishing

Complete procedure necessary to remove existing paint from aluminium and steel components and then to repaint them as described in the following paragraphs.

Degreasing

WARNING

Cleaning solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

CAUTION

Before stripping parts, remove all fittings, O-rings, nuts, bolts, washers, pistons, bearingcups, etc.

1 Clean all metal parts by immersing in a clean degreasing solution. An alkaline based solution is recommended for aluminium and magnesium parts.

2 Hardened dirt or grease may be removed with soft bristle brush, or by soaking in cleaning solution.

3 Where necessary clean bearing cones carefully in a separate container of clean solvent.

CAUTION

Do not spin bearing cones with compressed air.

4 After cleaning, thoroughly dry all metal parts with filtered, dry compressed air.

5 It is recommended that all O-rings, backup rings, and wipers be replaced at each overhaul. However, if necessary, O-rings may be reused, but should be put back into position from which removed.

6 Wipe down O-rings, backup rings, wipers, or other rubber parts with a clean dry cloth. Lubricate with a suitable O-ring lubricant prior to installation.

Paint Removal

Disassemble components to the level required for repainting, then proceed as follows.

WARNING

Stripping solvents can be toxic and volatile. Use only in well ventilated areas. Avoid physical contact with solvent and do not inhale vapors. Keep solvent containers covered when not in use.

CAUTION

Before stripping parts, remove all fittings, O-rings, nuts, bolts, washers, pistons, bearingcups, etc. Parts must be totally immersed in solvent, to maximize cleaning.

1 Degrease part per degreasing paragraph.

2 Totally immerse part in paint removing solvent. Portions not totally covered by solvent will begin to corrode.

NOTE

Stripping agents are commercially available for removing topcoat and primer. Follow manufacturer's recommendations for use and disposal of stripping solutions.

3 Remove part from solvent and rinse thoroughly with water heated to 160° to 180°F (71° to 82° C). Flush solvent from all cavities and threaded holes where entrapment might occur

4 Thoroughly dry part with filtered, dry compressed air.

5 Where applicable refer to inspections procedures given in the respective chapters for specific parts to locate possible defects.

NOTE

Refinishing should be completed as soon as possible; unprotected parts will begin to corrode.

Repainting

Paint all surfaces exept those which are subjected to friction (bearing surfaces, anchor bolt bores, etc.). Proceed as follows:

1 Parts to be repainted should be cleaned and stripped per instruction in degreasing and paint removal paragraphs.

2 Aluminium parts should have a protective barrier between the topcoat and base metal. It is recommended they be treated with solutions listed in Chapter 51-30.

3 Apply solution liberally and evenly. Allows it to set from 1 to 5 minutes. The solution must completely wet the surface and overlap onto the adjoining anodize.

4 Remove excess coating by flushing with clean water.

5 Paints parts with one coat of wash primer. Allow to dry thoroughly.

6 Paint parts with one coat of lacquer listed in Chapter 51-30. Allow to dry thoroughly before reassembly.

Chapter 53

Fuselage

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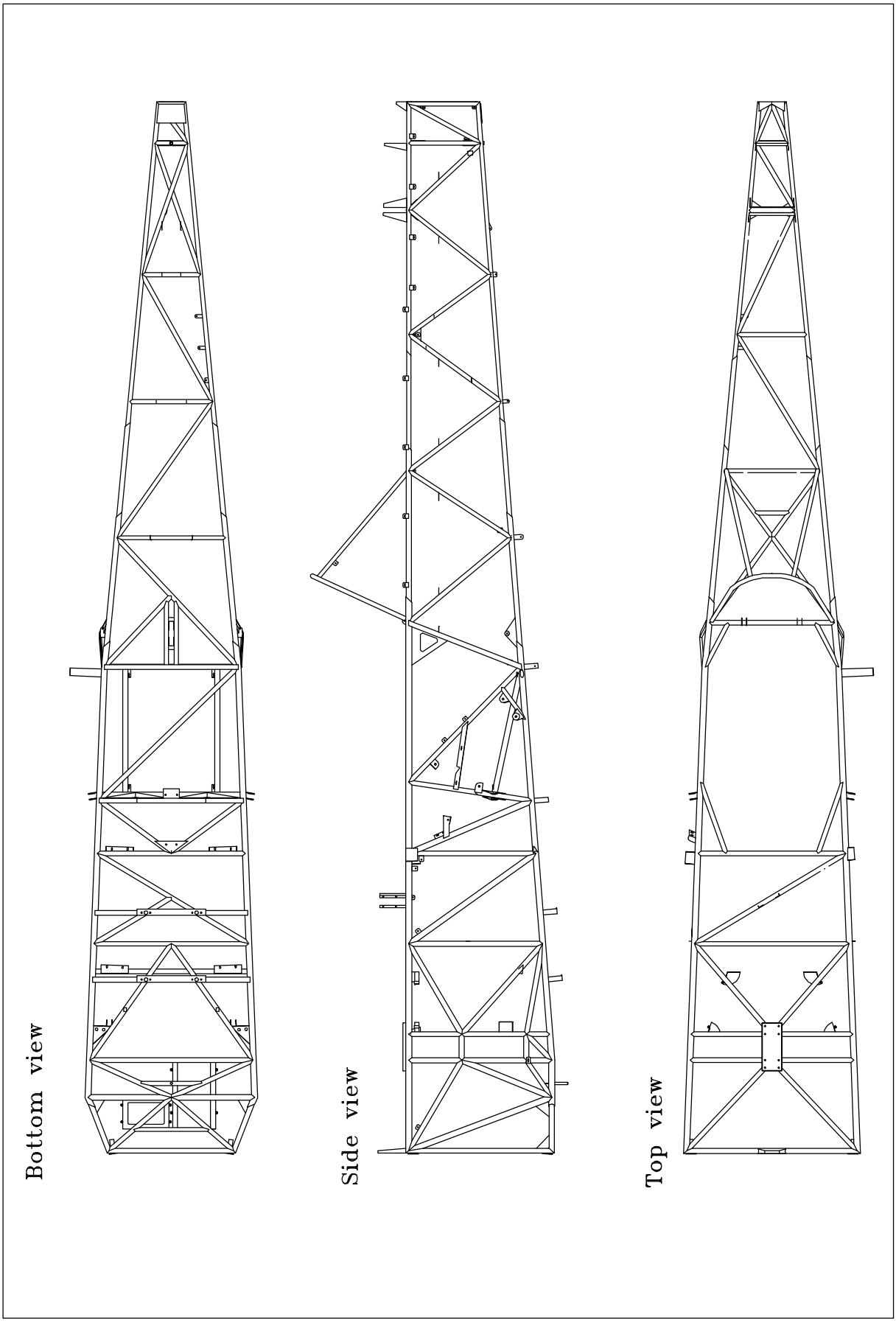
53-00-00 GENERAL

The fuselage structure consists of a TIG-welded steel tube construction integrating the wing and empennage connections as well as the seat (refer to Figure 1).

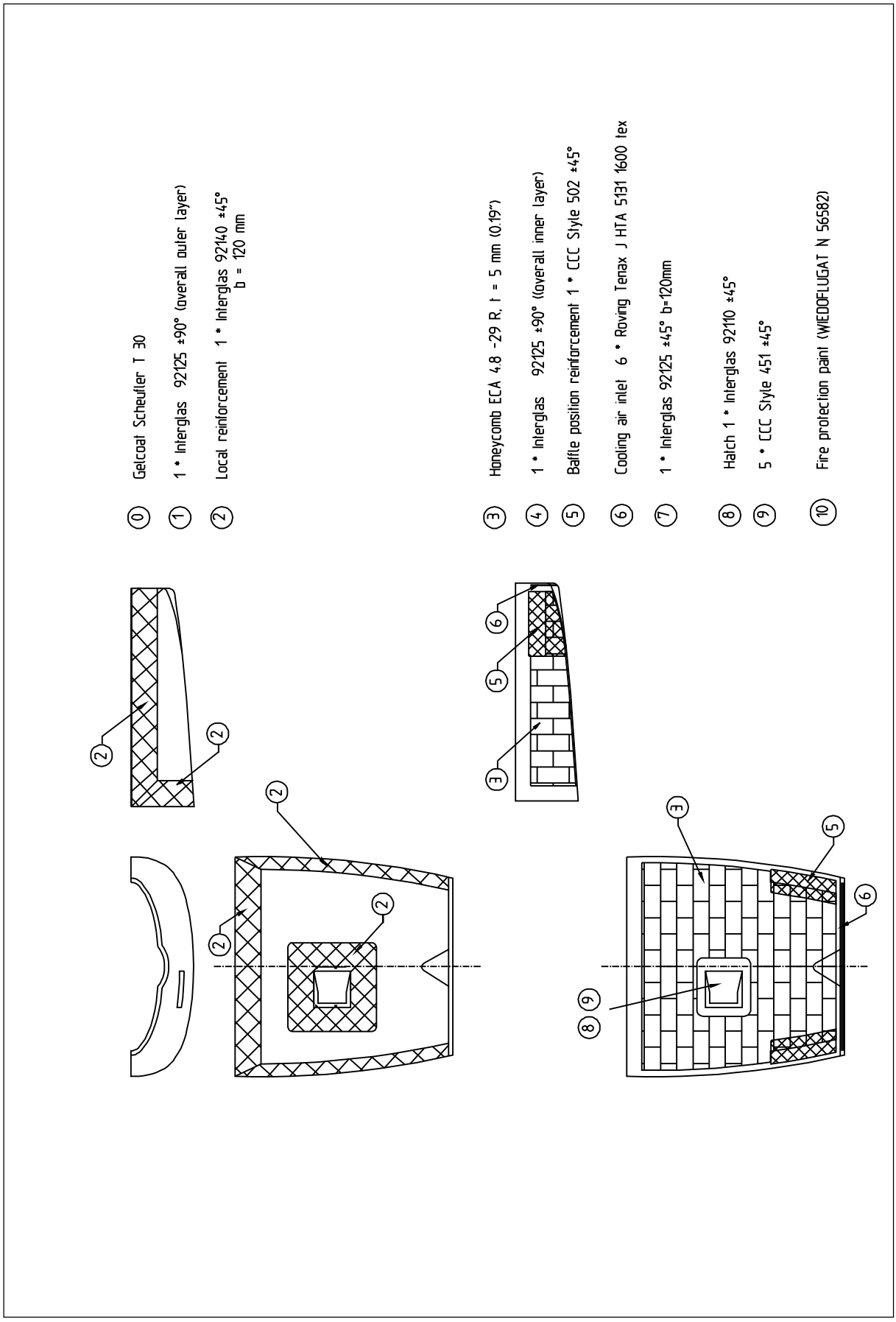
The particular areas of the fuselage are covered with different materials (also refer to Chapter 51-00-01 "Access Panel Identification"): Both halves of the engine cowling consist of glass fibre laminate and honeycomb. The upper part of the fuselage (main fuselage cover) consists of an aramid laminate. The lower front part of the fuselage behind the fire wall and the sides below the wing are faired with aluminium panels. The lower rear part of the fuselage is covered with fabric. The one-piece canopy frame is built of carbon fibre laminate and rovings. The window portion is made of acrylic glass. The layer sequences of the engine cowlings, the main fuselage cover and the tail fairing are shown in Figures 2-5 (Figure 2, Position 5 is added from Serial No. 14; Figure 4, Position 12 is added from Serial No. 29).

All composite parts, as protection against moisture and UV radiation, are coated with an unsaturated polyester gelcoat, an acrylic filler and finally with an acrylic paint.

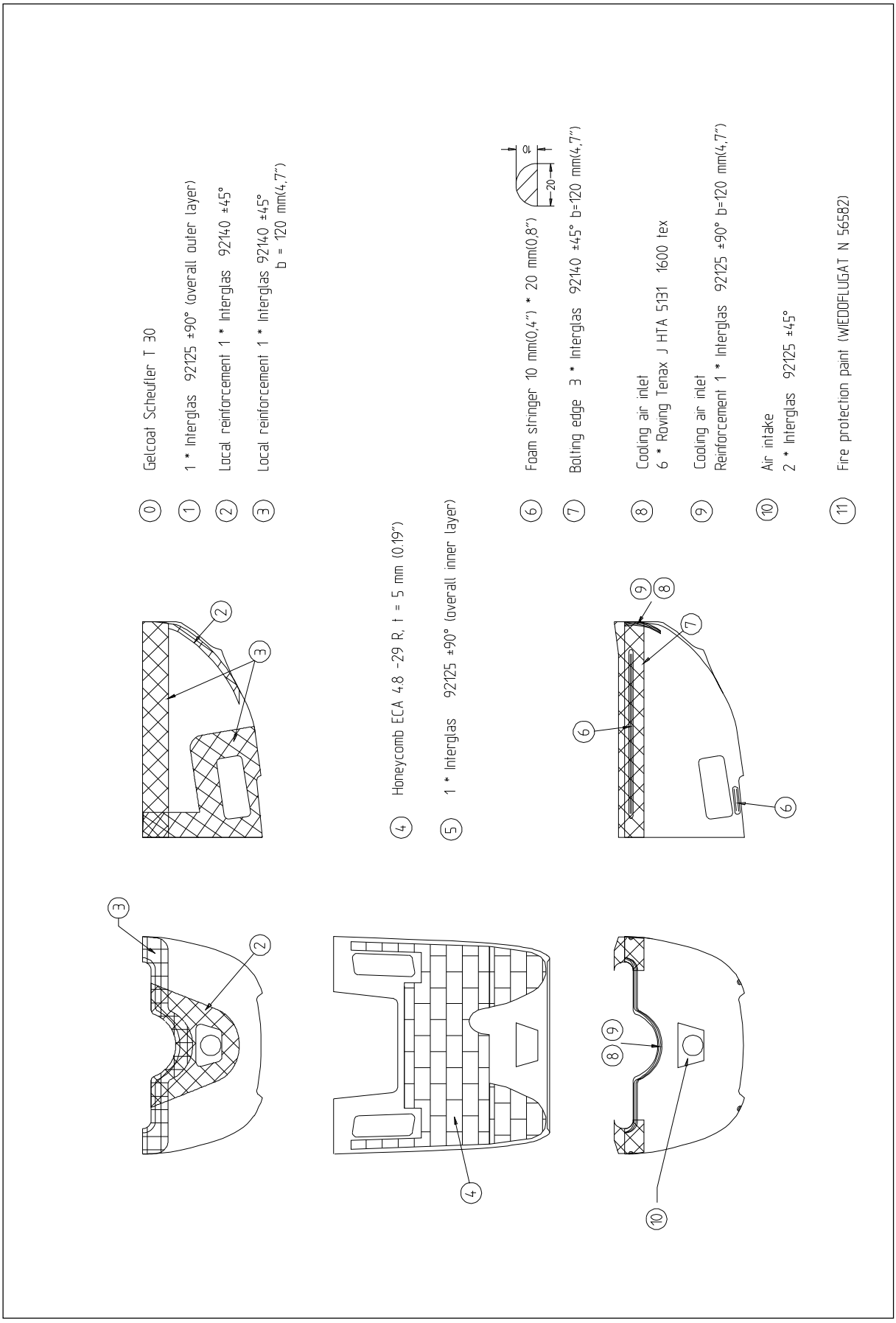
For repair of composite parts, aluminium and steel components refer to Chapter 51. The repair of fabric has to be executed in accordance to the FAA AC 43.13-1A.



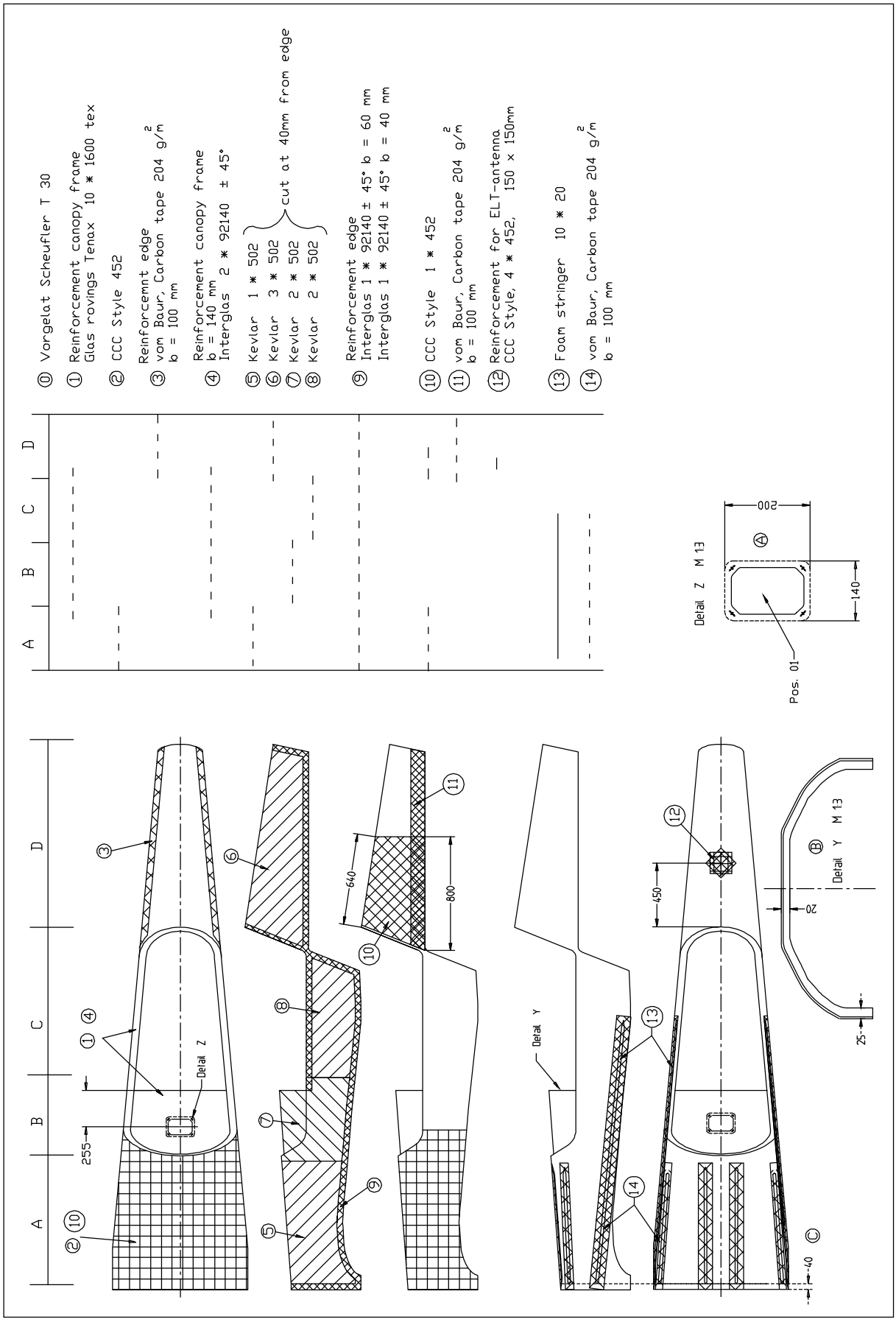
Fuselage Steel Tube Design
Figure 1



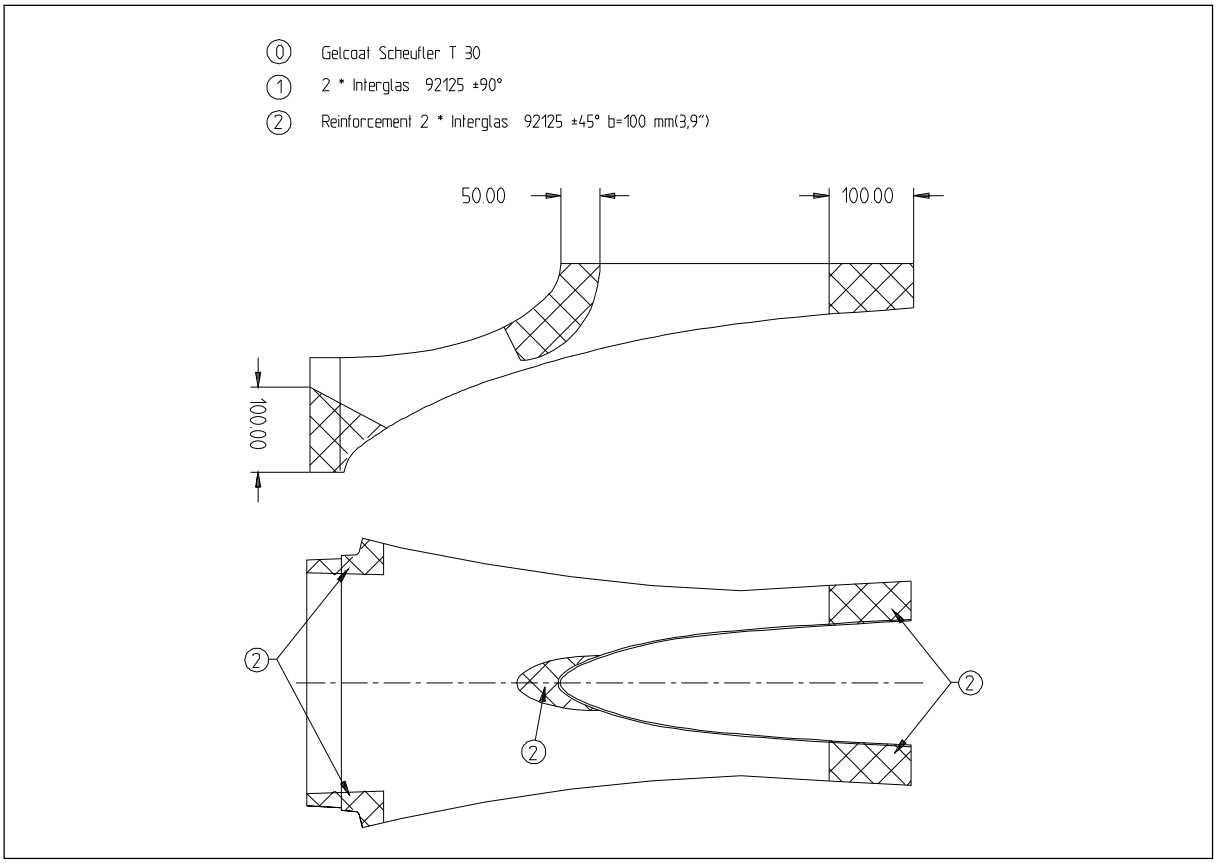
Layer Sequence Top Half of the Engine Cowling
Figure 2



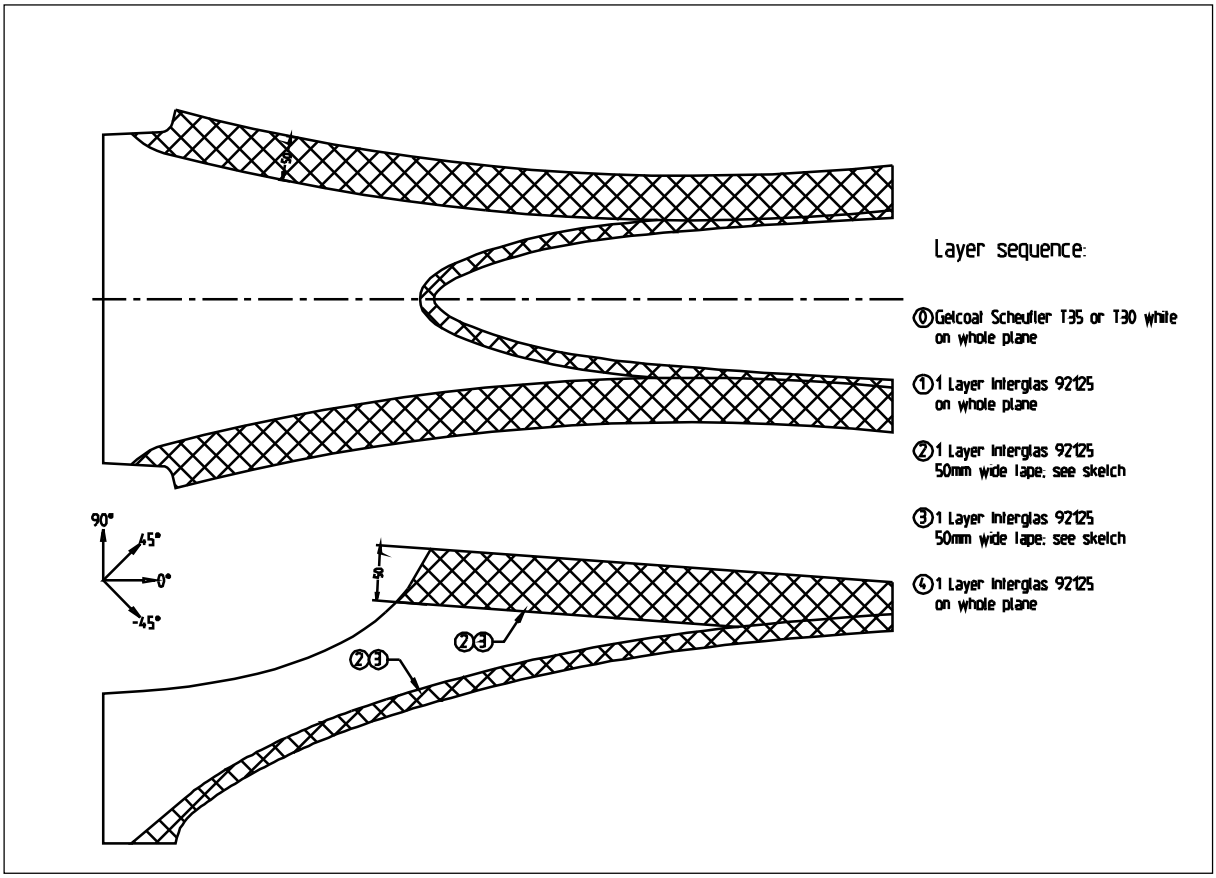
Layer Sequence Bottom Half of the Engine Cowling
Figure 3



Layer Sequence Main Fuselage Cover
Figure 4



Layer Sequence Tail Fairing up to Ser. No. 29
Figure 5, Sheet 1



Layer Sequence Tail Fairing from Ser. No. 30
Figure 5, Sheet 2

53-01-00 MAINTENANCE PRACTICES

53-01-01 Canopy

Removal/Installation

1 Open canopy.

C A U T I O N

Support the canopy by hand before disconnecting the opening limiter strap.

2 Remove the attachment bolt of the opening limiter strap.

3 Push canopy to front and remove.

4 Install in reverse sequence of removal.

Chapter 55

Stabilizers

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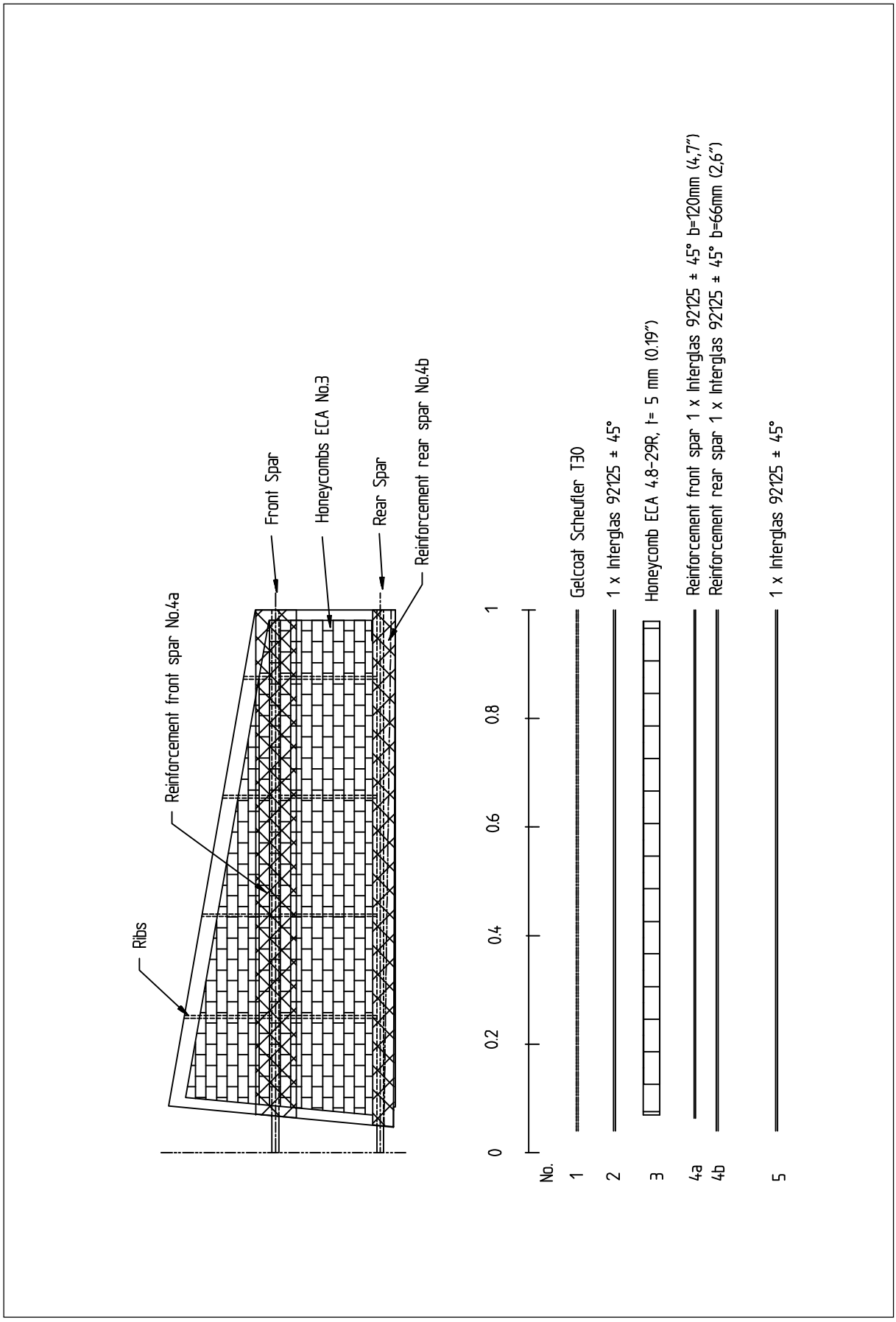
55-00-00 GENERAL

The EXTRA 300S has a conventional empennage with stabilizers and moveable control surfaces. The spars consist of carbon roving caps, glass fibre webs and PVC foam cores. The shells are built of honeycomb sandwich with glass fibre laminate. Also buckling is prevented by plywood ribs. Deviating from this, the elevator is constructed in the same manner as the ailerons (refer to Chapter 57). On the R/H elevator half a trim tab is fitted with two hinges.

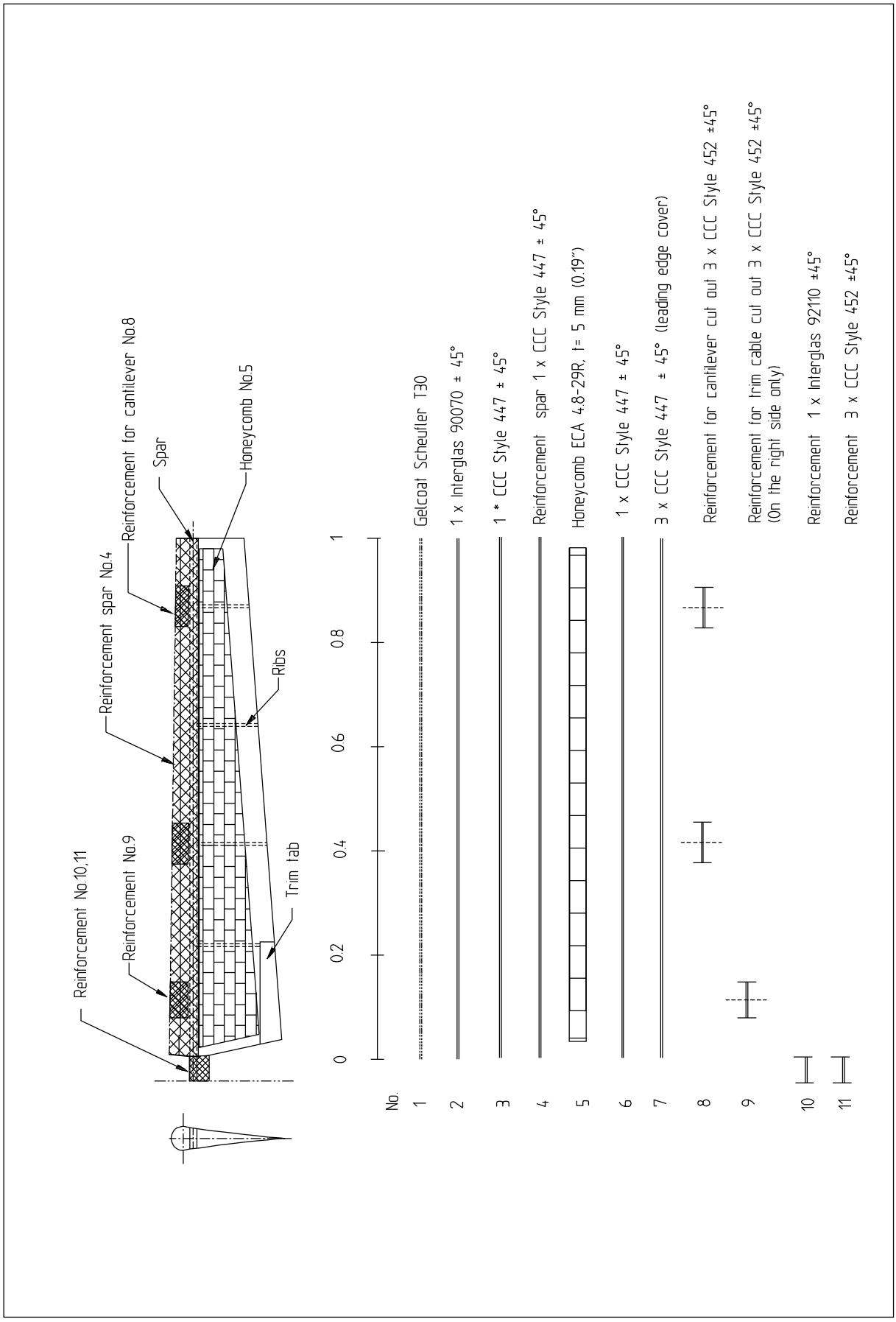
The layer sequences of the stabilizers, the elevator and the rudder are shown in Figures 1-4.

All composite parts, as protection against moisture and UV radiation, are coated with an unsaturated polyester gelcoat, an acrylic filler and finally with an acrylic paint.

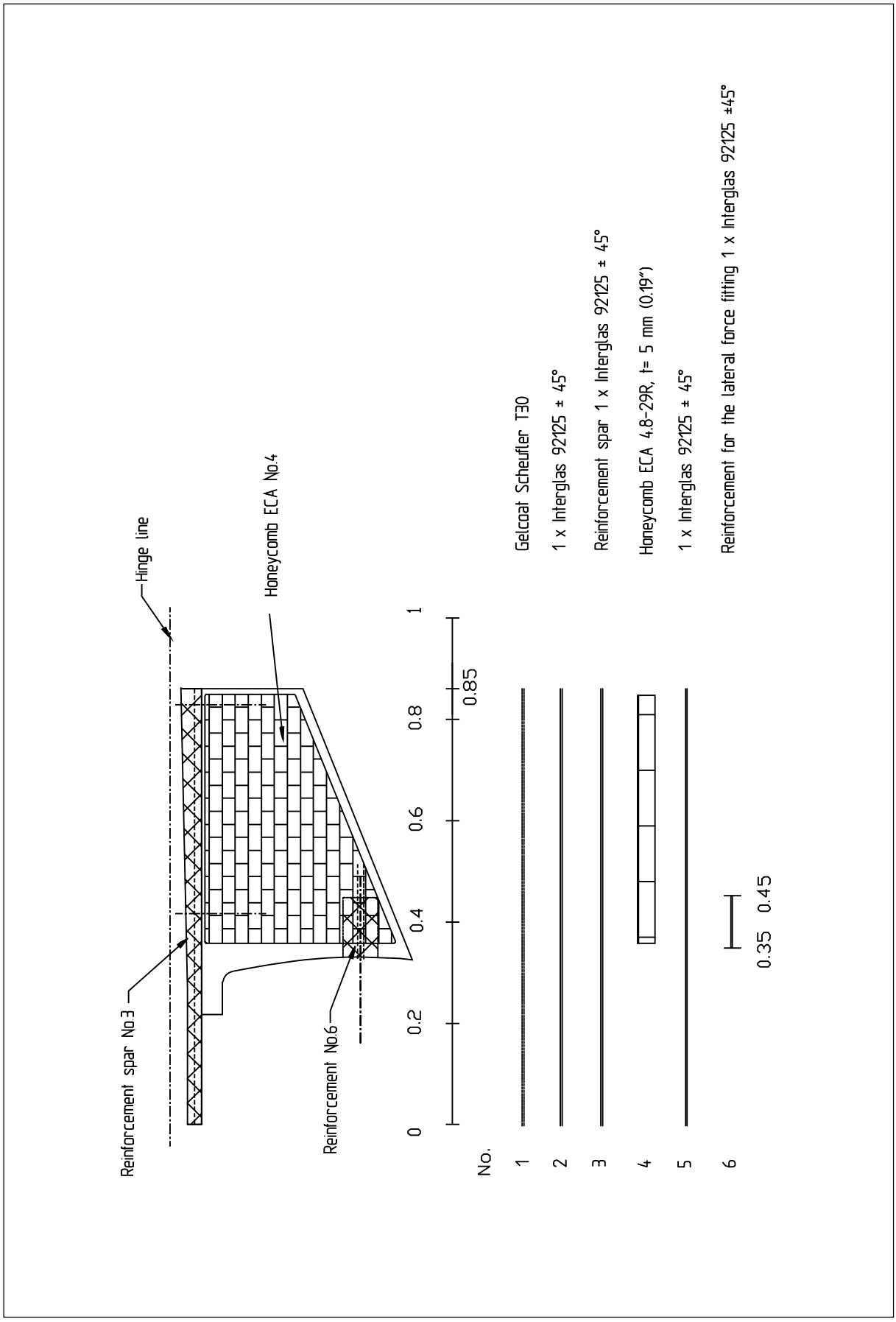
For repair of composite parts refer to Chapter 51.



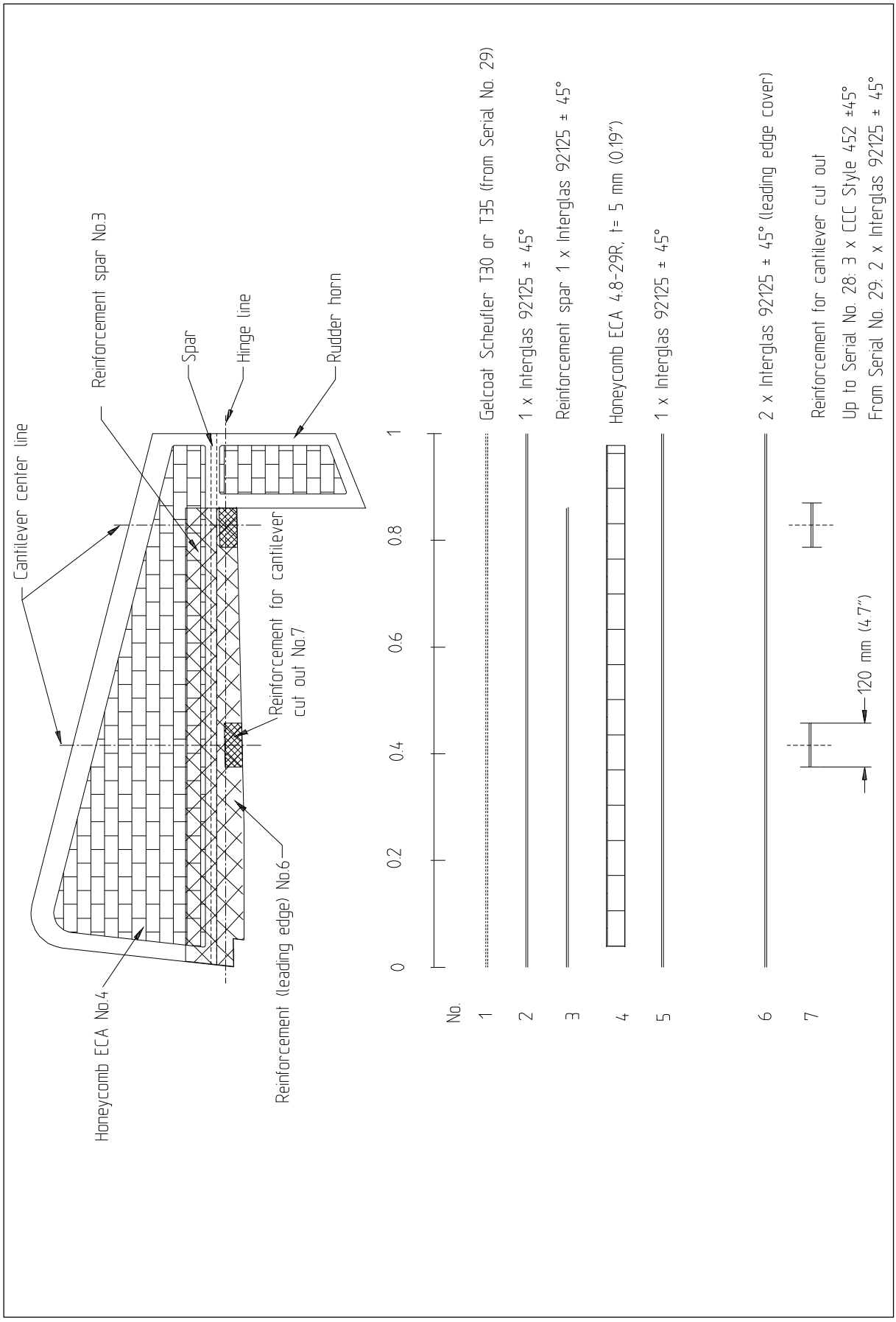
Layer Sequence Horizontal Stabilizer
Figure 1



Layer Sequence Elevator
Figure 2



Layer Sequence Vertical Stabilizer
Figure 3



Layer Sequence Rudder
Figure 4

55-21-00 MAINTENANCE PRACTICES

55-21-01 Horizontal Stabilizer

Removal

Remove elevator and rudder per Chapter 27-31-01, remove the vertical stabilizer per Chapter 55-21-02 and then reverse procedure of installation.

Installation

1 Remove the main fuselage cover per Chapter 51-00-01.

C A U T I O N

Make shure that the trim bowden cable will not be damaged when installing the horizontal stabilizer.

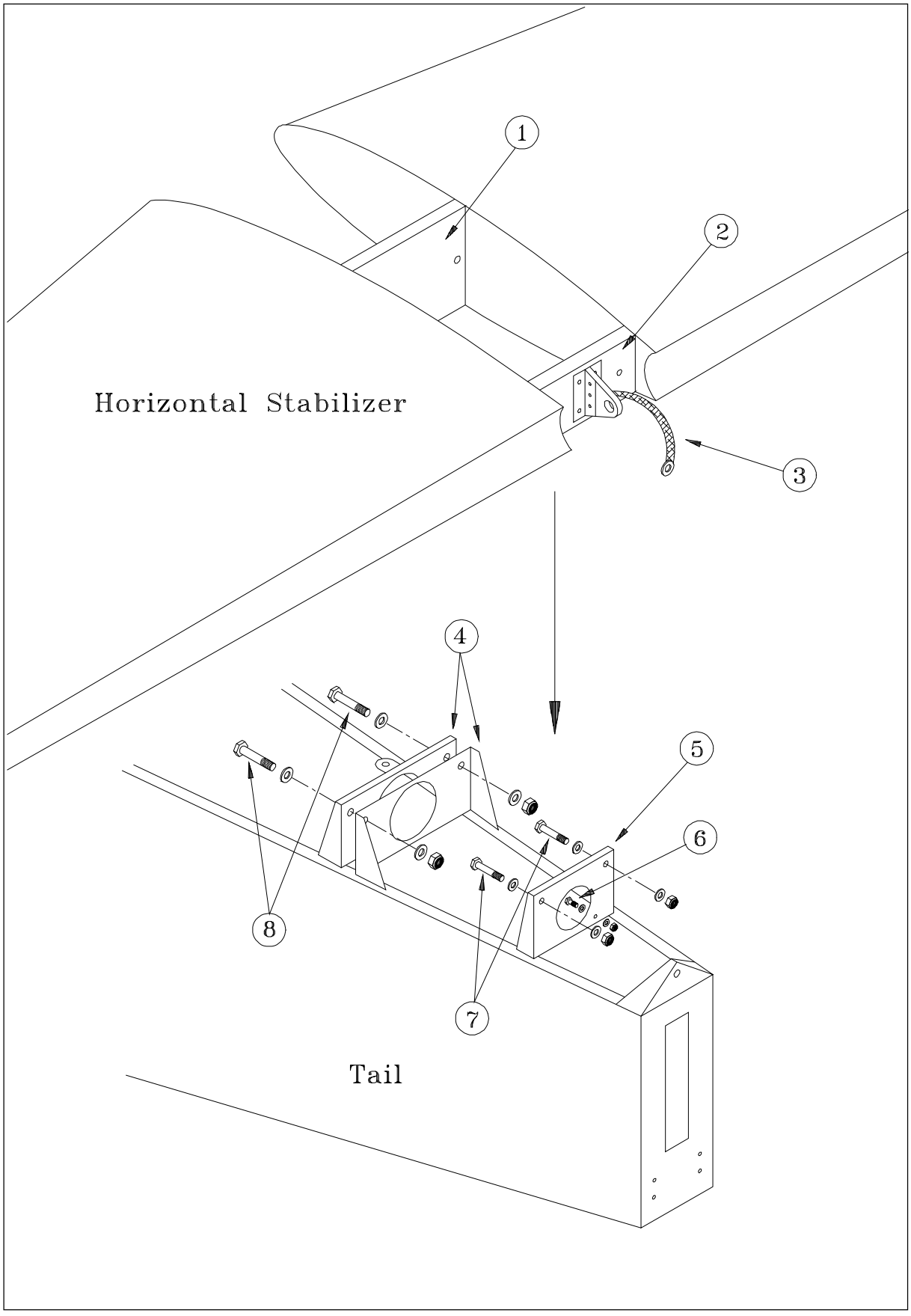
2 Slide the horizontal stabilizer with its front spar (1, Figure 5) into the attach brackets (4) on fuselage. The rear spar (2) is situated behind the rear attachment bracket (5). (Trim tab is on the right side.)

3 Slide in LN 9037-10054 front spar attachment bolts (8) with an additional DIN 125 M10 washer under bolt head from the front to the rear. These bolts are also used for the vertical stabilizer attachment. So do not apply stop nuts before the vertical stabilizer is fitted to the fuselage.

4 Slide in the rear spar attachment bolts (7) from front to rear. Use LN 9037-08042 bolts in connection with LN 9348-08 stop nuts and DIN 125 M8 washers. Torque nuts for fastening.

5 Fasten the ground bonding lead (3) by means of the DIN 933 M5x12 bolt (6), the DIN 125 M5 washers and the LN 9348-05 stop nuts.

6 Reinstall the main fuselage cover.



Horizontal Stabilizer Removal/Installation
Figure 5

55-21-02 Vertical Stabilizer

Removal

1 Remove the main fuselage cover, the tail fairing and the tail cone access panel per Chapter 51-00-01.

2 Remove the rudder per Chapter 27-21-01.

3 Remove the bottom hinge bracket assembly per Chapter 27-21-02.

4 Remove the two LN 9348-10 stop nuts (2, Figure 6) and DIN 125 M10 washers of the front main bolts.

5 Remove the rear LN 9037-10054 main bolt (3) with the DIN 125 M10 washers and the LN 9348-10 stop nut.

C A U T I O N

Do not put the fin too far backward, the antenna could be damaged.

6 Put the fin backward and lift the fin over the antenna.

Installation

1 Put the vertical stabilizer leading edge over the antenna.

C A U T I O N

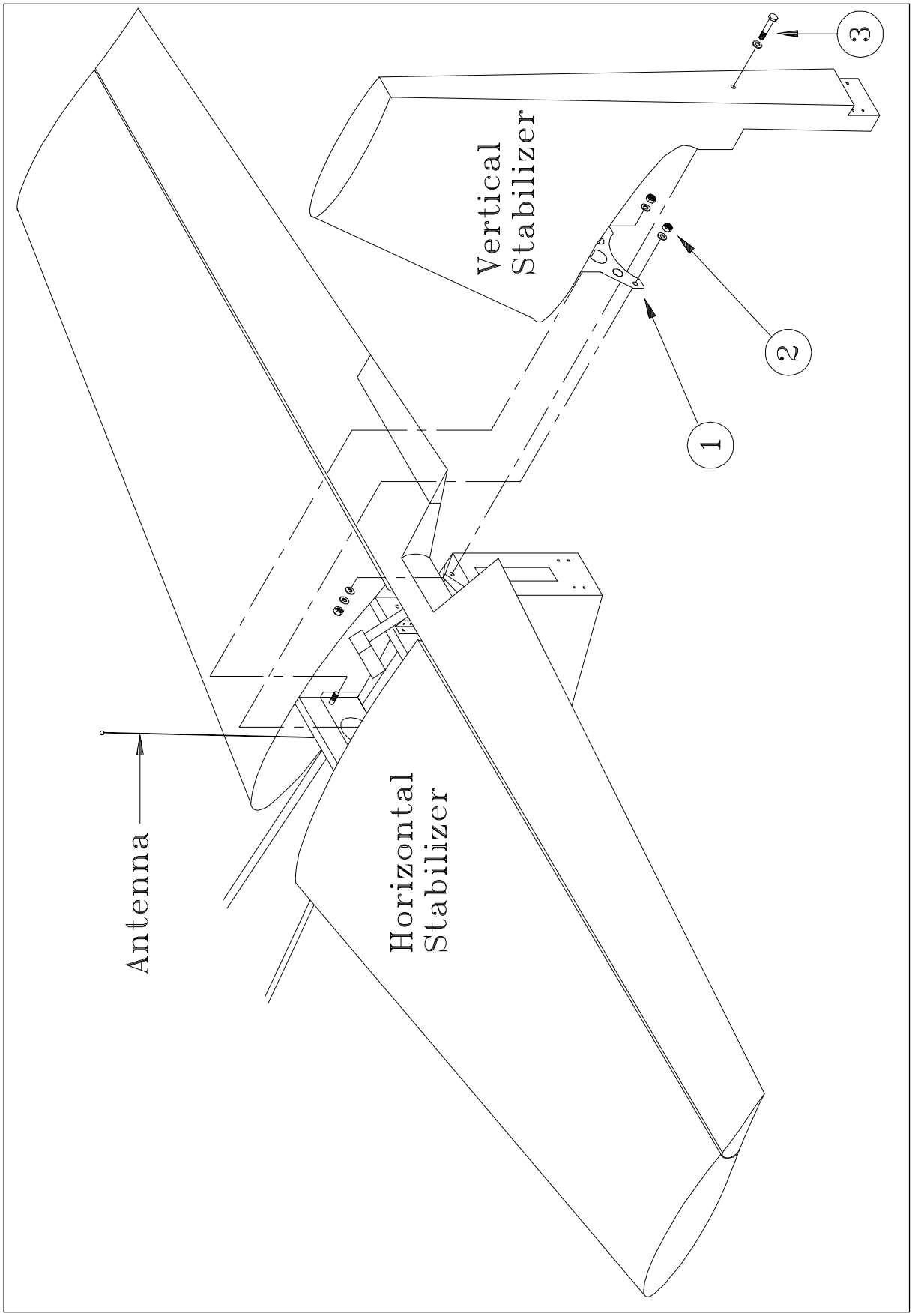
Do not put the fin to vertical stabilizer backward, the antenna could be damaged.

2 Slide the auxiliary spar attachment sheet (1, Figure 6) of the vertical stabilizer from the rear over the preinstalled horizontal stabilizer front spar bolts and install the DIN 125 M10 washers and LN 9348-10 stop nuts (2).

3 Insert the LN 9037-10054 bolt (3) to the main spar from rear to front. Use LN 9348-10 stop nuts and DIN 125 M10 washers.

4 Install the bottom hinge bracket to the tail per Chapter 27-21-02.

5 Reinstall the main fuslage cover, the tail fairings and the tail cone access panel per Chapter 51-00-01.



Vertical Stabilizer Removal/Installation
Figure 6

Chapter 57

Wings

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57-35-00	**MAINTENANCE PRACTICES**	**10**
57-35-01	Wing Tip Panel	10
57-60-00	**AILERONS**	**11**

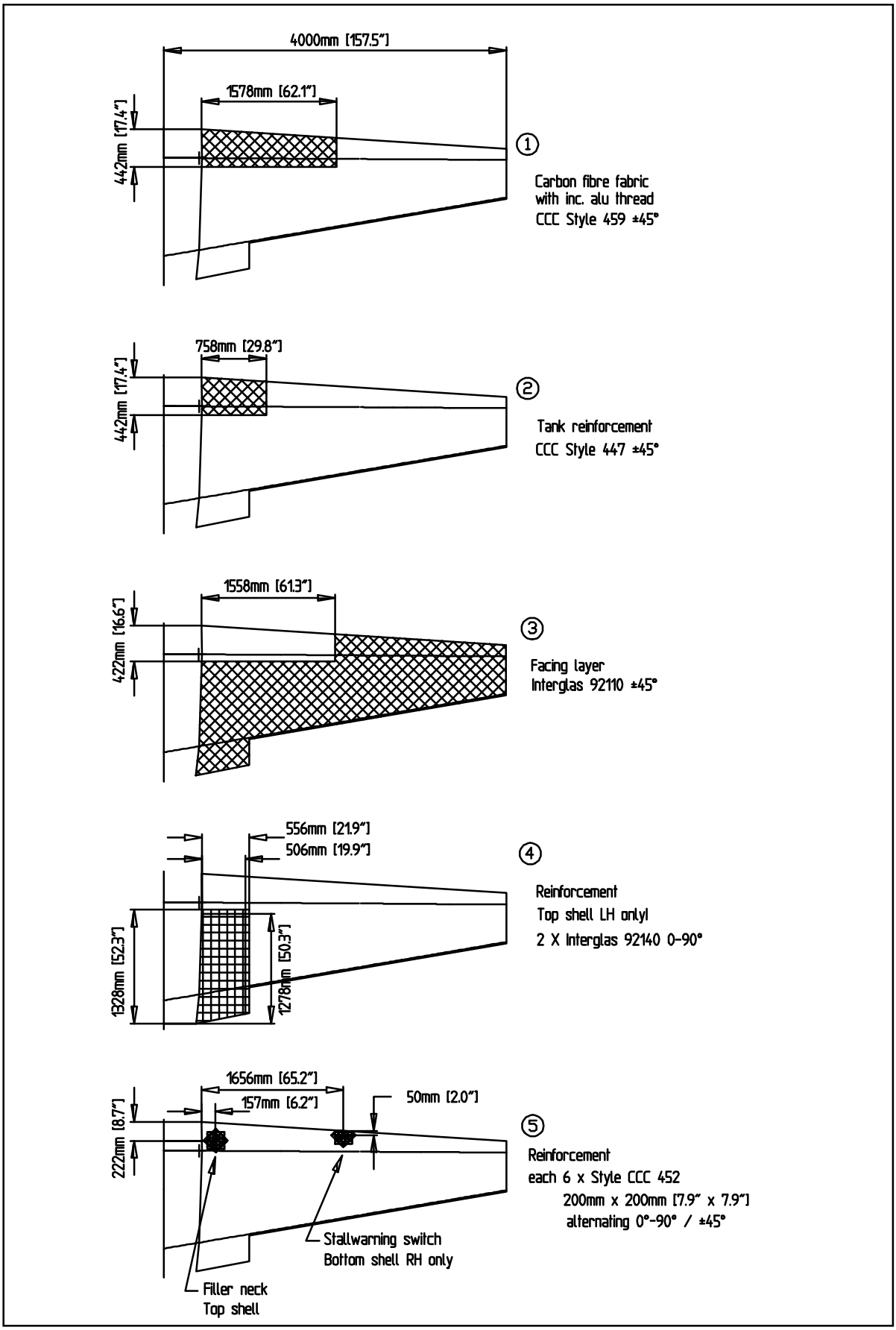
57-00-00 GENERAL

The wing consists of a one-piece, dual chamber main spar with carbon fibre roving caps and carbon fibre webs. For the spar core PVC foam is used. The wing shells are a honeycomb sandwich construction with carbon fibre laminates. To prevent buckling of the shells, plywood ribs are used.

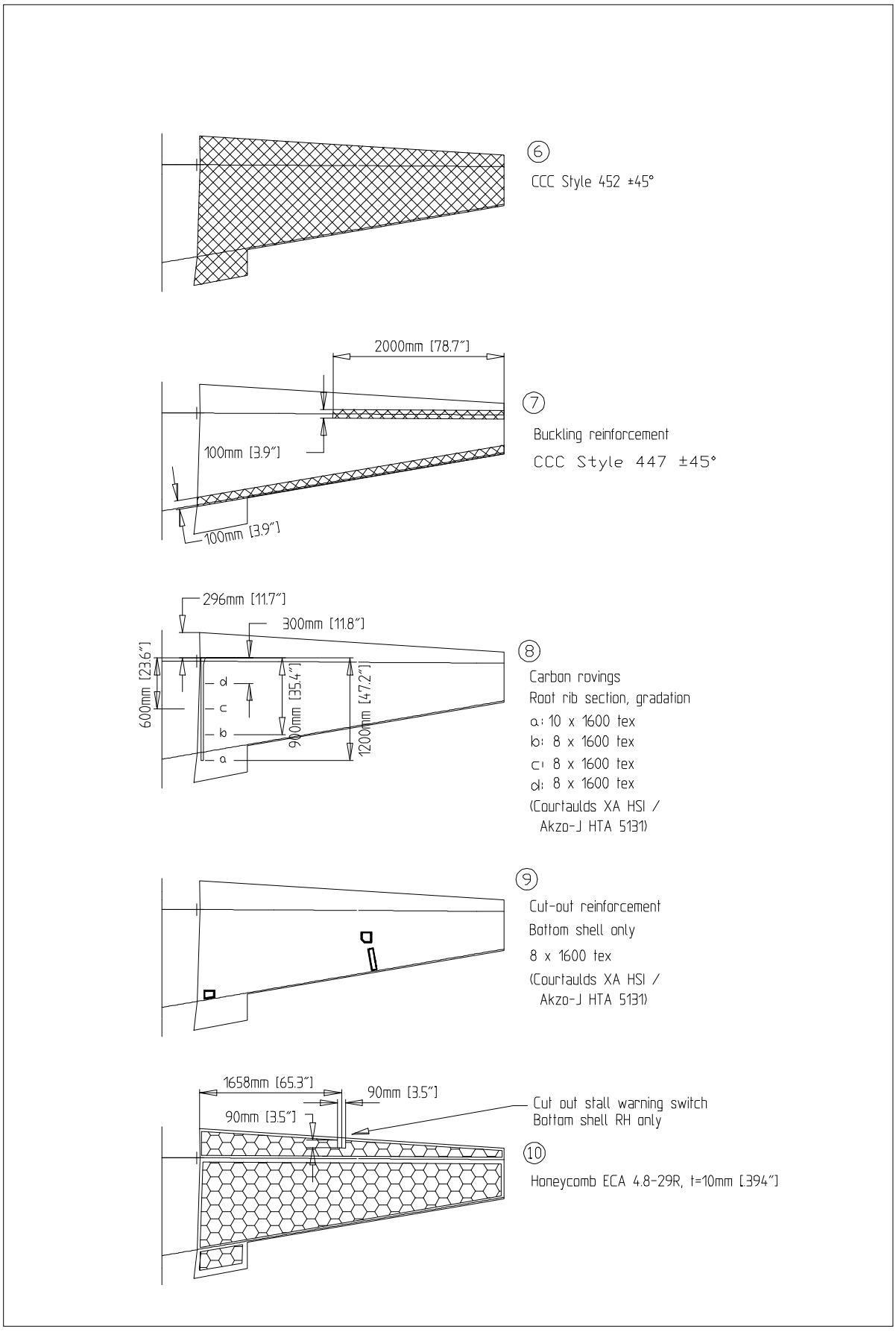
The layer sequence of the wing is shown in Figure 1.

All composite parts, as protection against moisture and UV radiation, are coated with an unsaturated polyester gelcoat, an acrylic filler and finally with an acrylic paint.

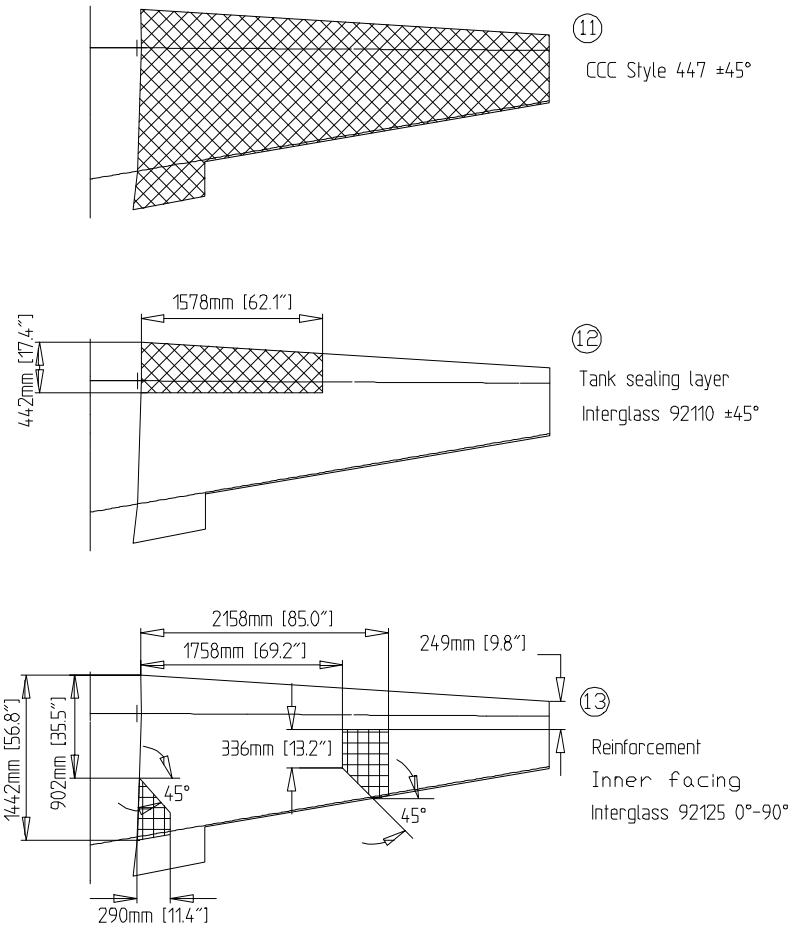
For repair of composite parts refer to Chapter 51.



Layer Sequence Wing
Figure 1, Sheet 1



Layer Sequence Wing
Figure 1, Sheet 2



Layer Sequence Wing
Figure 1, Sheet 3

57-05-00 MAINTENANCE PRACTICES

57-05-01 Wing

Removal

Reverse procedure of installation omitting step 12.

Installation

1 Remove the canopy per Chapter 53, the engine cowlings and the main fuselage cover per Chapter 51.

2 Remove the right front canopy hinge.

3 Loosen the breather line clamps located at the engine side of the firewall and in the main spar area, push the front part of the breather line some centimeters to the front until it is disconnected from the connecting hose (10, Figure 3) and remove the breather line (5) by pulling it to the rear.

C A U T I O N **Ensure that areas in which the wing shall be slided are clear of obstructions.**

C A U T I O N **Prevent cables and pitot/static lines for damage. Keep them at the rear of the main spar and outside of the upper longerons.**

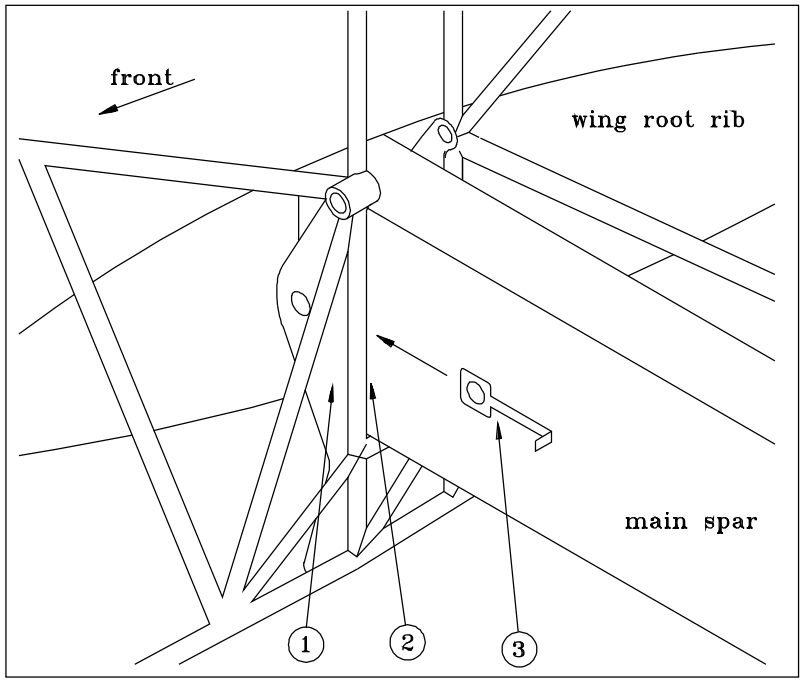
C A U T I O N **Attend to the left front canopy hinge, when sliding down the wing. The wing could be damaged.**

W A R N I N G **Beware not to get jammed between wing and fuselage.**

4 Slide wing down into fuselage attachment brackets (3).

5 Install LN 9037-08042 auxiliary spar attach bolts (1) from front to rear. Use two DIN 125-M8 washers and LN 9348-08 nuts at each side for fastening.

I M P O R T A N T **If there is clearance between the main spar and the attachment brackets (1, Figure 2), use shims (3) like shown below which are to be slided in the front gaps (2).**



Shims Installation
Figure 2

6 Slide in shims if necessary and install the main spar tubular bolts (4, Figure 3) from front to rear.

7 Secure main spar tubular bolts with LN 9038-08020K bolts (2), DIN912 M8 and aluminum 30x11x4 washers. Torque security bolts for fastening and subsequently safety wire.

8 Install upper longeron cutout bridges (7) using at each side 3x DIN912 M8 x 180, 3x DIN125 M8 washers and 3x LN9348-08 stop nuts at the top and 1x DIN912 M10 x 230 bolt, DIN125 M10 washer and LN9348-10 stop nut at the bottom (6). Check cutout bridges for RH and LH marking. Install the bolts from front (firewall) to rear (aircraft tail). Torque stop nuts for fastening.

9 Install shear bridge (8). Use two LN 9037-06066 and six LN 9037-06038 bolts (9) with DIN 125-M6 washers and LN 9348-06 stop nuts.

10 Reinstall the front canopy hinge.

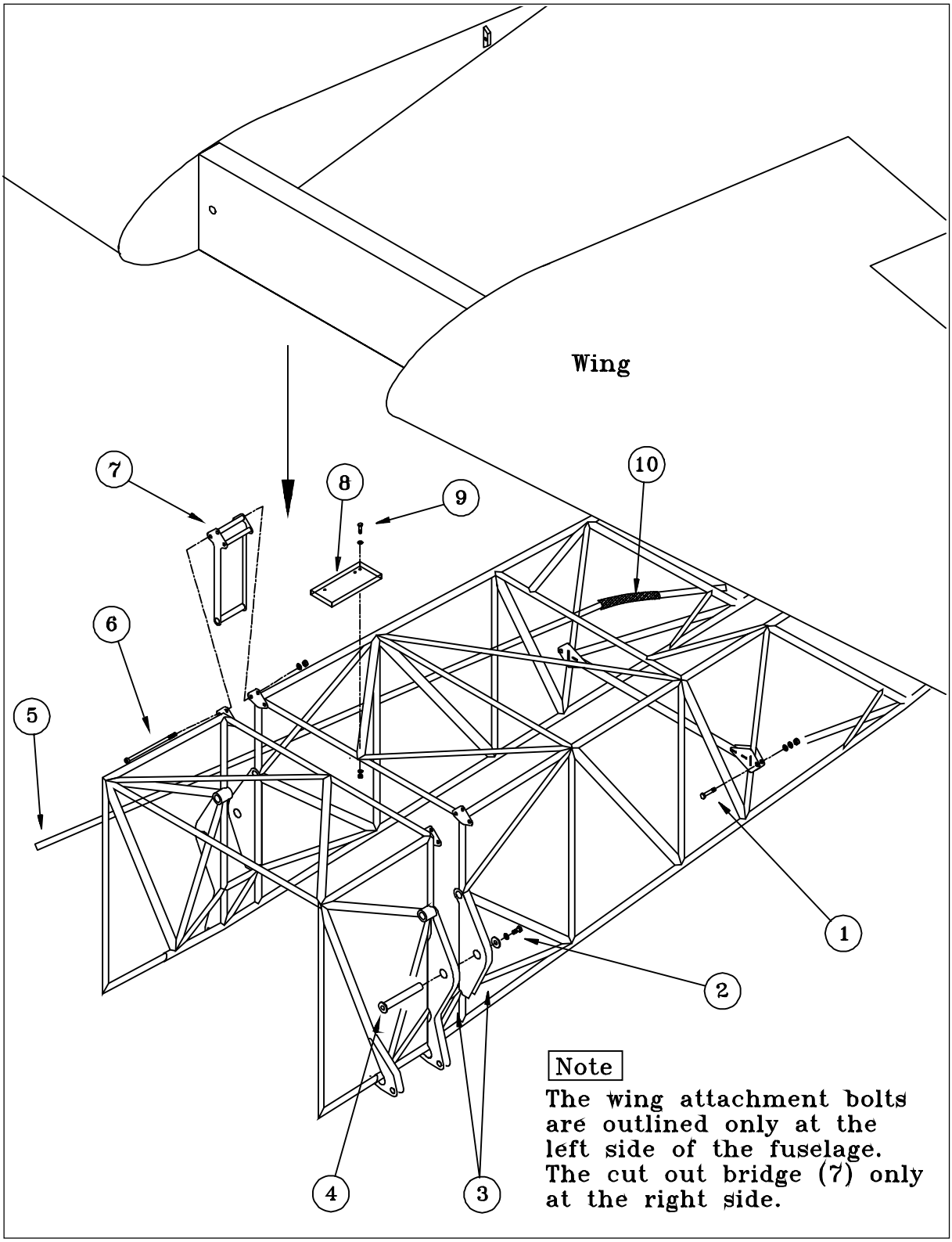
11 Install short aileron push pull rods per Ch. 27-01-01.

12 Perform an aileron rigging per Chapter 27-11-02.

13 Connect fuel system (tubes and vent lines), pitot/static system, stall warner, navigation/strobe light wires,

ground bonding leads and fuel indicator wires with prefitted plugs per respective Chapters.

14 Reinstall breather line, canopy, engine cowlings and main fuselage cover.



Wing Removal/Installation
Figure 3

57-35-00 MAINTENANCE PRACTICES

57-35-01 Wing Tip Panel

Removal/Installation

Refer to Figure 1 of Chapter 33.

W A R N I N G

High Voltage! Wait 5 minutes after shutting off before starting any work on the strobe light system.

1 Disconnect the battery and wait 5 minutes.

2 Remove the DIN 933 M6x20 bolt, the metal sheet screws, the AN 526 C 1032 R8 bolts and the washers.

3 Tie out the wing tip panel with the lighting unit some centimetres (Consider that the panel is sealed to the wing tip with silicone).

4 Disconnect the electrical wiring and the ground bonding lead by loosening the central M4 nut of the lighting unit attachment.

5 Remove the wing tip panel.

6 Clean sealing surfaces mechanically and with Acetone.

7 Install in reverse sequence of removal after applying Silicone to the sealing surfaces.

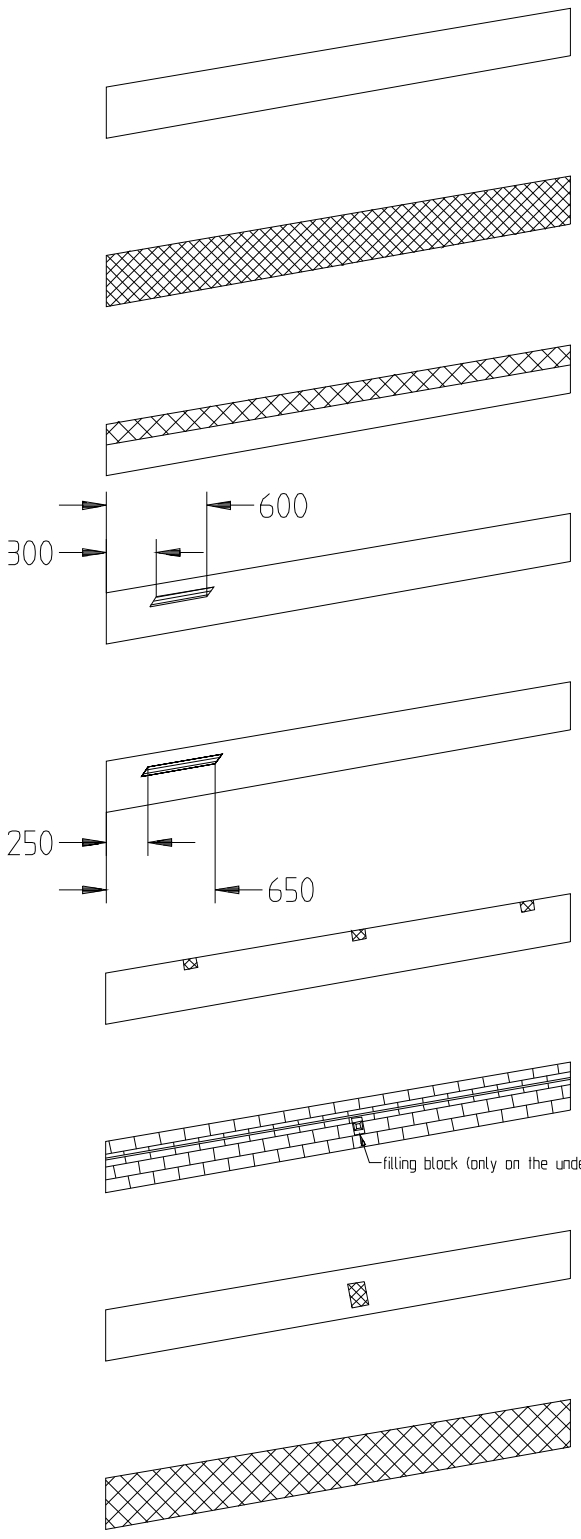
57-60-00 AILERONS

The ailerons are constructed in the same manner as the wing but with single chamber spar. They are supported at three points in spherical bearings pressed into aluminium brackets. Furthermore the ailerons are equipped with "glass fibre laminate spades" to decrease pilots forces.

The layer sequence of the ailerons is shown in Figure 4.

All composite parts, as protection against moisture and UV radiation, are coated with an unsaturated polyester gelcoat, an acrylic filler and finally with an acrylic paint.

For repair of composite parts refer to Chapter 51.



1.) Vorgelat SCHEUFLER T30 or T35
on the whole plane

2.) 1 Layer Carbonfabric CCC447/GF49 ±45° (From Serial No. 29)
on the whole plane (Glasfabric outside)

Up to Serial No. 28:
1 Layer Interglas 90070 (outside)
1 Layer Carbonfabric CCC447

3.) 1 Layer Carbonfabric CCC 447 ±45°
Reinforcement of leading edge
up to 20mm aft of spar

4.) From Serial No 29 only:
1 Layer Carbontape Vom Baur EA-05803.1 50mm wide
Length (mm) as shown on the sketch
Aft edge of tape at the same position as aft edge of Layer 3.)
Ends cut with 45°

5.) From Serial No 29 only:
1 Layer Carbontape Vom Baur EA-05803.1 50mm wide
Length (mm) as shown on the sketch
Aft edge of tape at the same position as aft edge of Layer 3.)
Ends cut with 45°

6.) Carbonfabric CCC 452 ±45°
3 Layer; 100x100mm
Reinforcemnt of cantilever cutout

7.) Honeycomb ECA 4.8-29R, t=5
On the underside filling block (birch plywood)

8.) Carbonfabric CCC 452 ±45°
2 Layers; 100x140mm
Reinforcement of pivot point
only on the underside

9.) 1 Lage Carbonfabric CCC 447 ±45°
on the whole plane

Layer Sequence Ailerons
Figure 4

Chapter 61

Propeller

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61-00-00 GENERAL

The EXTRA 300S can be equipped with either a MTV-9-B-C/C 200-15 (3-blade) or MTV-14-B-C/C 190-17 (4-blade) propeller. Maintenance work or overhaul of the propeller requires consultation of the propeller manufacturer MT-Propeller.

Proper control,operation and maintenance of the propeller is described in the Operation- and Installation Overhaul Manual E-124 of the manufacturer.

61-10-00 PROPELLER

The MTV-Propellers are made of laminated wood encased in glass-fiber reinforced plastic, which is painted to make it waterproof.

The pitch change is conducted by a propeller governor. Once an engine rotational speed is selected it will be held constant at variations of airspeed and power.

Mechanical stops for low pitch and high pich limit the pitch change level. In case of the oil pressure of the govenor to be lost, the blades automatically return to high pitch, if the counterweights are installed. The oil pressure is single acting.

N O T E

For more information about the propeller refer to MT-Propeller Operation- and Installation Manual E-124.

I M P O R T A N T

If replacement of the propeller govenor control cable is necessary, renew the sealing of the bushing grooves and gaps at the engine side of the firewall. Use PRC-812 (Products Research & Chemical Corporation, USA) firewall sealant.

Chapter 72

Engine

TABLE OF CONTENTS

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72-00-00 GENERAL

This chapter describes the engine installed in the EXTRA 300S aircraft, together with its fitted assemblies. Operation and maintenance work of the engine requires consultation of the Lycoming Operator`s Manual (P/N 60297-21).

Proper control, operation and troubleshooting of the engine is also decsribed in the Lycoming Operator´s Manual (P/N 60297-21) of the manufacturer.

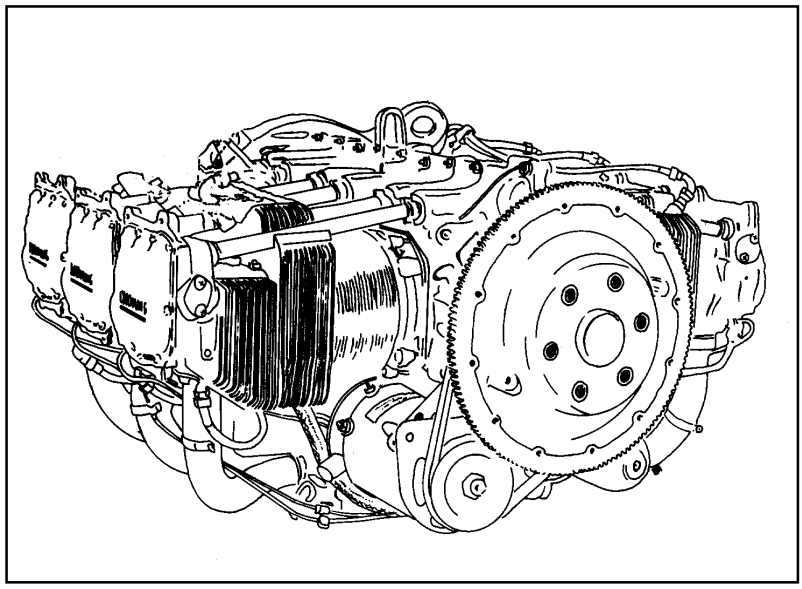
72-10-00 ENGINE

The engine installed is a TEXTRON Lycoming 6-cylinder direct drive, horizontally opposed, air cooled engine. Engine type

a) AEIO-540-L1B5

b) AEIO-540-L1B5D

normal rated 2700 RPM, 300 HP. The following Figures 1 show the Lycoming engine of the EXTRA 300S:



Lycoming engine
Figure 1

The induction system is equipped with a BENDIX RSA-10 fuel injection system which is attitude independent.

The fuel is injected into the intake ports of each cylinder. The mixture control is proportional to the intake air flow. A manual mixture adjustment as an overriding system is provided. The power setting is done manually by means of a butterfly valve in the air induction tube.

The engine is air cooled. Baffles are provided to build up a pressure and force the air through the cylinder fins. The cooling air flow is dependent on engine speed and dynamic air pressure.

The engine is lubricated by means of an engine driven oil pump. The system uses an oil sump as reservoir. For

acrobatic maneuvers, lubrication is assured via an inverted flight oil system (refer to CHRISTEN 801 Inverted Oil Sytem and Chapter 79).

Oil temperature is limited by installation of 2 oil coolers.

Ignition is a magneto type with 2 independent systems.

N O T E

For more information about the engine refer to Lycoming Operator´s Manual.

The complete power plant is attached to the fuselage structure using 4 mounting points and rubber vibration absorbers.

I M P O R T A N T

If replacement of the engine control cables is necessary, renew the sealing of the bushing grooves and gaps at the engine side of the firewall. Use PRC-812 (Products Research & Chemical Corporation, USA) firewall sealant. Cover the control cables with AEROQUIP AE102-6 Fire sleeves inside the engine department.

Chapter 79

Oil System

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79-20-01	Principles of Operation	6
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79-00-00 GENERAL

The EXTRA 300S is equipped with a modification of a Christen Inverted Oil System (CHRISTEN 801 series). Maintenance work or overhaul of the this system requires consultation to the manufacturer. (Refer to Christen Product Manual (P/N: Christen 70047-001) and Lycoming Operator`s Manual (P/N:60297-21). Additionally the lubrication system of the EXTRA 300S has two oil coolers which are connected to the engine by flexible tubing.

79-10-00 INVERTED OIL SYSTEM

The standard Christen 801 Inverted Oil System is a kit-form accessory for Lycoming aircraft engines which permits normal engine lubrication, with minimal oil loss, during aerobatic flight. When installed, it becomes a self-contained extension of the normal aircraft engine oil and breather systems. As the system control valves are gravity-operated, no connection to aircraft power sources is required (Refer to Figure 1 and 2).

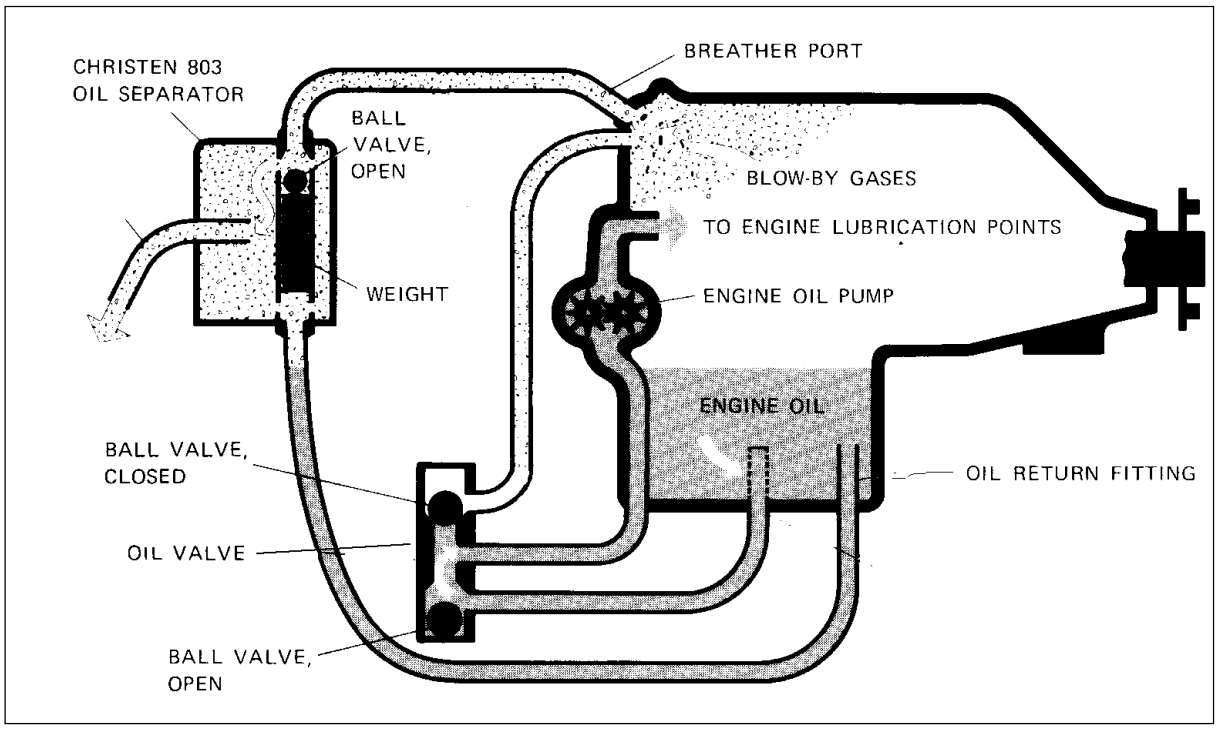
The system works in all inverted and negative-g flight conditions and is particular suited to high-performance aircraft used for unlimited-class aerobatic competitions.

The need for modification of the standard Christen 801 Inverted Oil System results from installation requirements for different system components of the Lycoming AEIO 540 engine.

79-10-01 Principles of Operation

Normal flight

During normal flight, the weighted ball valve at the top of the oil separator is open, allowing blow-by gases from the engine crankcase to be vented from the breather port to the top of the oil separator and out through the overboard breather line. The top ball valve of the oil valve is closed and the bottom ball valve is open, allowing oil to flow from the sump fitting to the oil pump and out to the engine lubrication points.

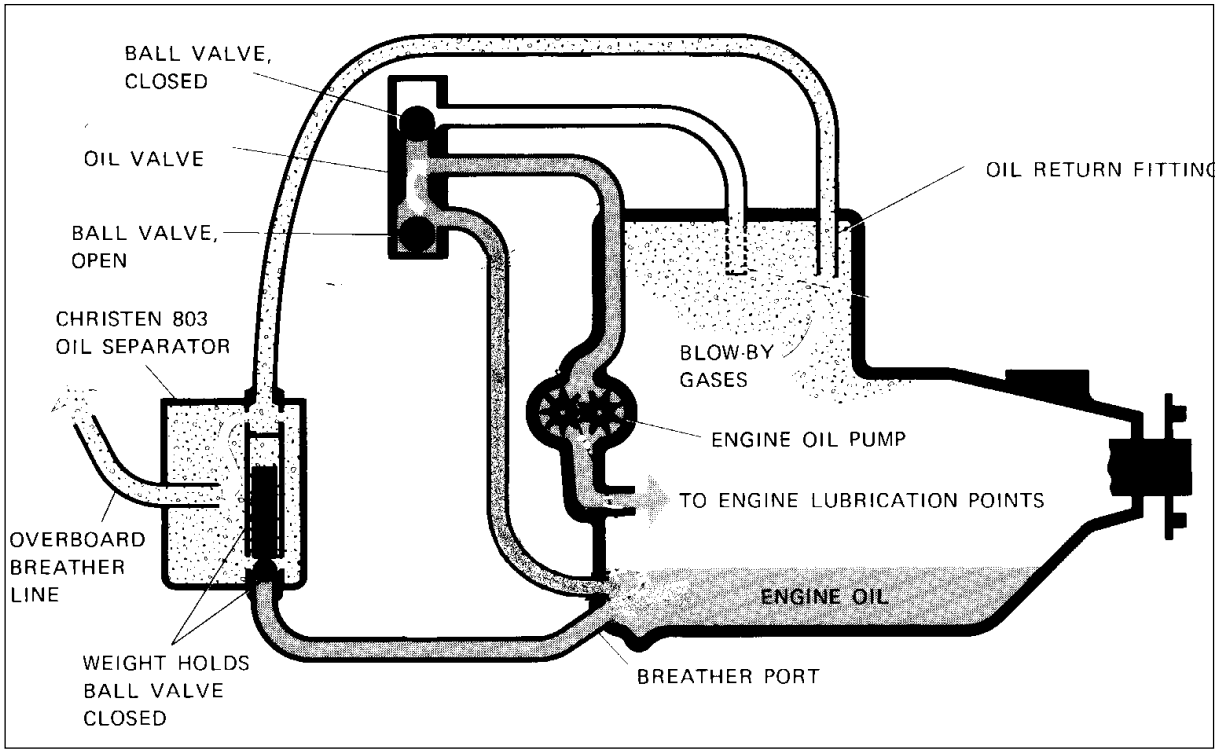


Inverted Oil System, Normal Flight
Figure 1

Inverted flight

When the aircraft is inverted, engine oil falls to the top of the crankcase. the weighted ball valve in the oil seperator closes, preventing overboard loss of oil though the top of the oil separator. Blow-by gasses from the engine crankcase are vented from the sump to the bottom of the oil separator and out through the overboard breather line. The top ball valve of the oil valve is open, and the bottom valve is closed, allowing oil to flow out from the breather port to the oil valve, through the sump fitting and the sump screen, to the oil pump and out to the engine lubrication points.

Any oil in the lines which fails to return to the sump during the transition between normal and inverted flight drains into the oil separator. This oil then returns to the sump from the bottom of the oil separator during periods of normal flight.



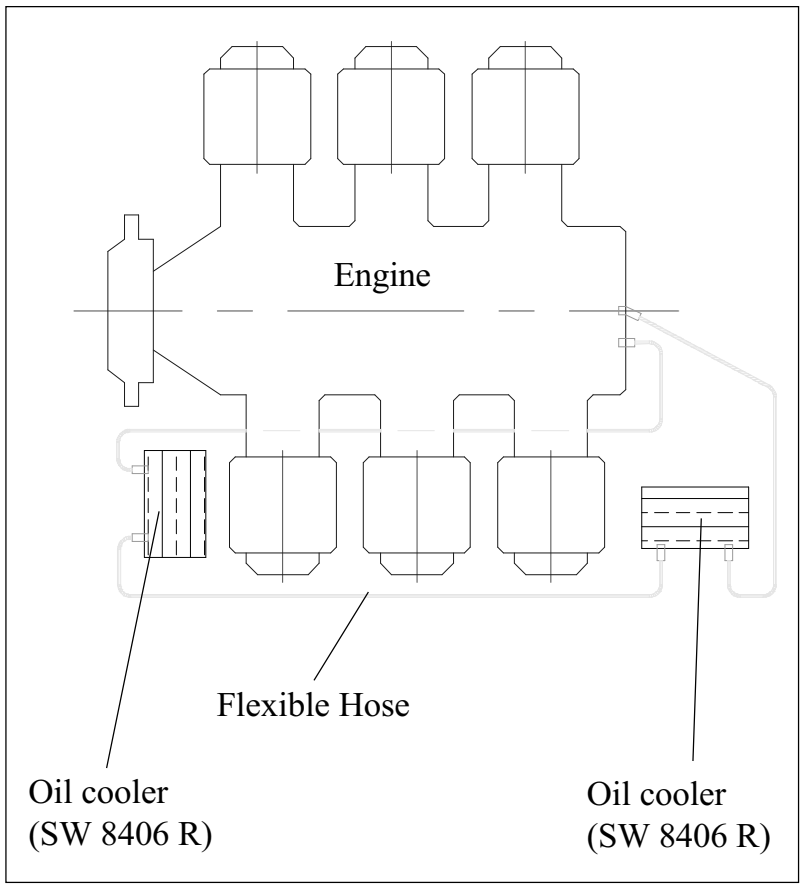
Inverted Oil System, Inverted Flight
Figure 2

79-20-00 OIL COOLER

The lubrication system of the EXTRA 300S has two oil cooler which are mounted on the left front and left rear engine baffles and connected to the engine by flexible hose. The two oil coolers (SW 8406 R) are produced by the STEWART WARNER SOUTH WIND Corporation.

79-20-01 Principles of Operation

In operation the hot lubricating oil leaving the engine is pumped by an engine-driven pump to a hose connector on the engine mount which directs the oil to the oil coolers. The oil is cooled in passing through the oil cooler and returned to the engine lubricating circuit through the return hose tubing connecting the engine mount connector.



Oil Cooling System
Figure 3

79-30-00 INSTALLATION

Before making installations and repairs to the aircraft plumping, it is important to make accurate identification of plumping materials.

79-30-01 Fittings

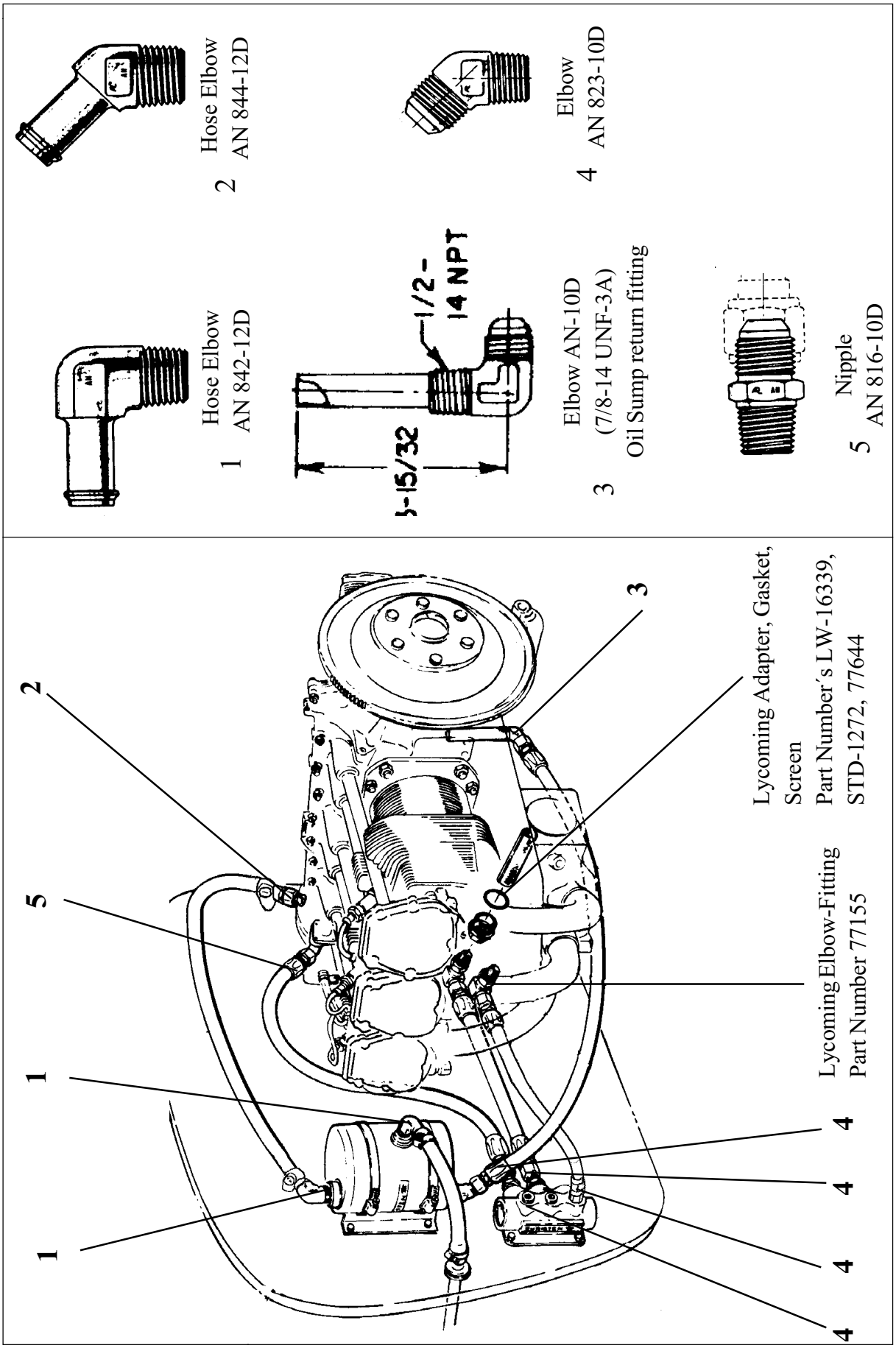
General information concerning fittings used in the Extra 300S you find in Chapter 20-10-08.

Inverted Oil System

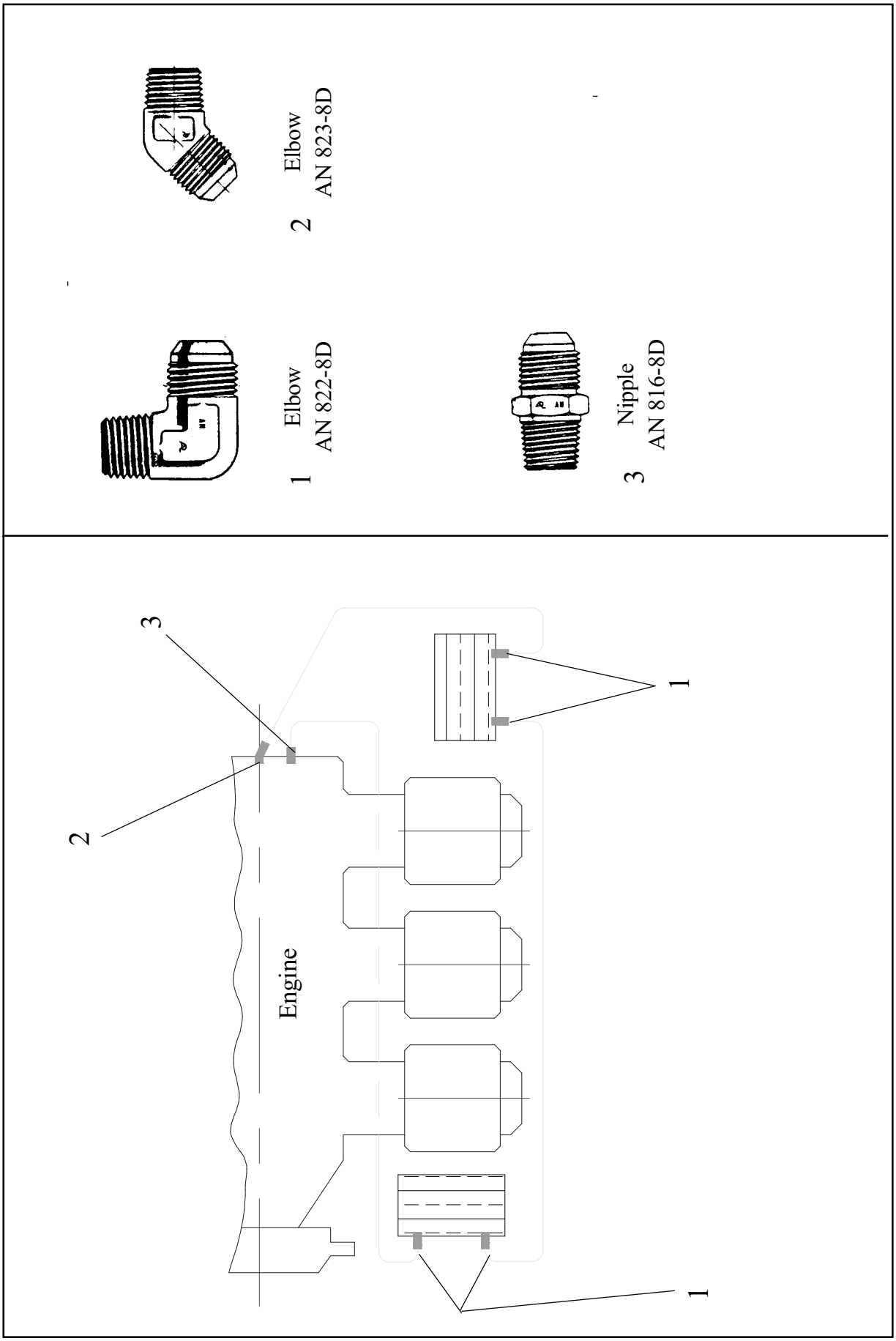
The hose and fitting installation is modified to the standard Christen Inverted Oil System. The connections of the Inverted Oil System still consist of AN (Army/Navy) Standard fittings. The position of this AN-fittings at the engine is shown in the figure 4 on following page 8.

Oil Cooling System

The flexible tubing of the oil cooling system are connected by AN Standard fittings with equal size (8D), but different connection angle. The position of this AN-fittings at the engine is shown in the figure 5 on page 9.



Positions of AN-Fittings in the Inverted Oil System
Figure 4



Positions of AN-Fittings in the Oil Cooling System
Figure 5

79-30-02 Flexible Hoses

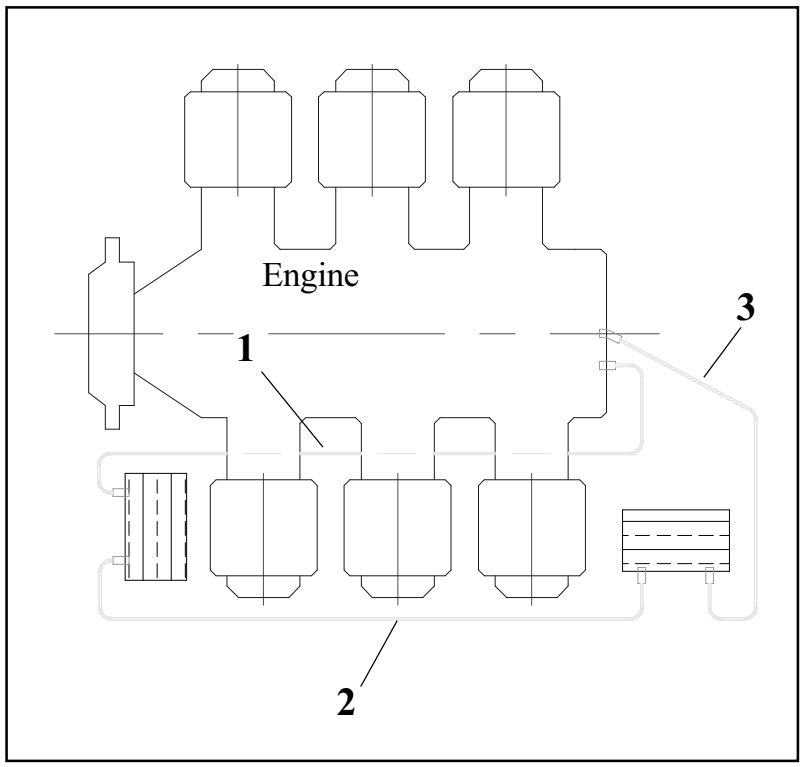
General information concerning flexible hoses you find in Chapter 20-10-07.

I M P O R T A N T

If replacement of oil lines is necessary, cover the oil lines of the engine department with AEROQUIP AE102 fire sleeves as per Chapter 20-10-07 except the AEROQUIP 637/MIL-H 6000 hoses.

Oil Cooling System

The position and identification of the flexible hose at the engine and the oil cooling system is shown in Figure 6:

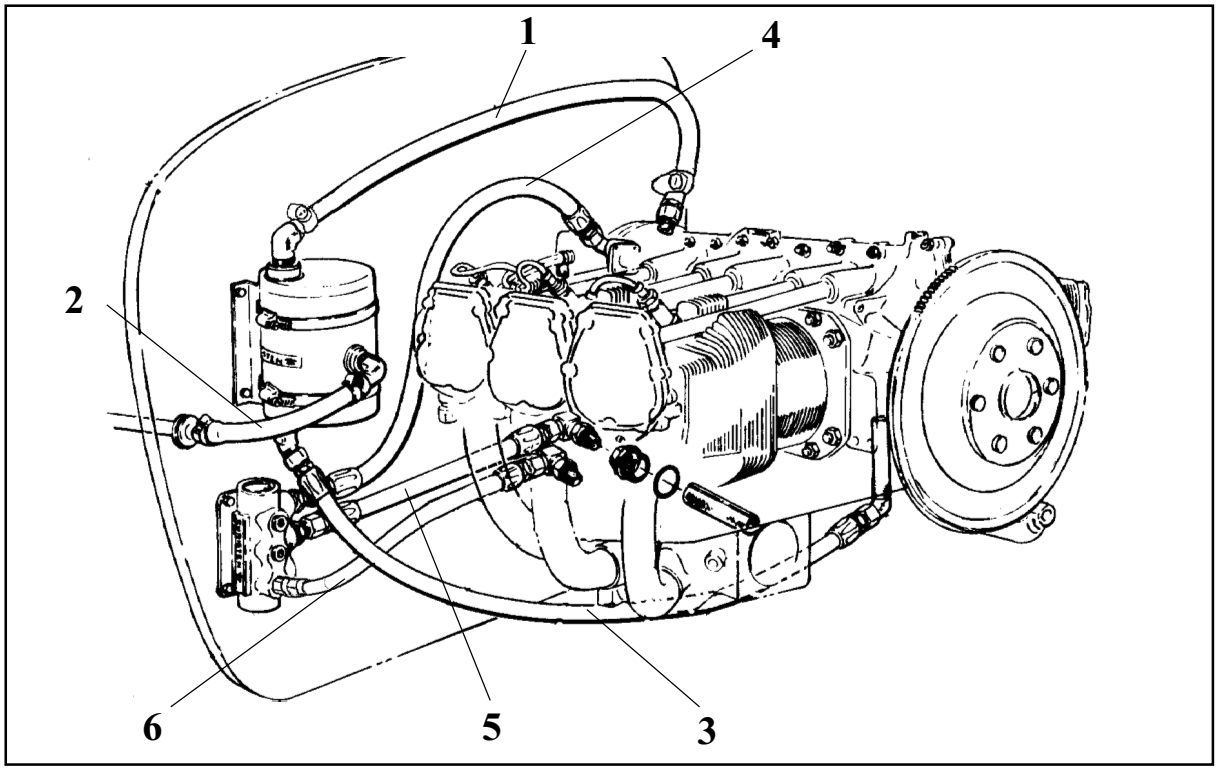


Positions of AEROQUIP-Hose in the Oil Cooling System
Figure 6

1	AEROQUIP 303-8 PN: PC-63601A21	+	Hose Fittings 491-8D hose lenght: 1210 mm
2	AEROQUIP 303-8 PN: PC-63601A22	+	Hose Fittings 491-8D hose lenght: 1030 mm
3	AEROQUIP 303-8 PN: PC-63601A23	+	Hose Fittings 491-8D hose lenght: 600 mm

Inverted Oil System

The position and identification of the flexible hose at the engine and the inverted oil system is shown in Figure 7:



Positions of AEROQUIP-Hose in the Inverted Oil System
Figure 7

1 AEROQUIP 637/ MIL-H 6000 + Hose clips
PN: PC-63601A27 hose lenght: 580mm
2 AEROQUIP 637/ MIL-H 6000 + Hose clips
PN: PC-63601A28 hose lenght: 350mm
3 AEROQUIP 303-10 + Hose Fittings 491-10D
PN: PC-63601A29 hose lenght: 830mm
4 AEROQUIP 303-10 + Hose Fittings 491-10D
PN: PC-63601A25 hose lenght: 400mm
5 AEROQUIP 303-10 + Hose Fittings 491-10D
PN: PC-63601A24 hose lenght: 220mm
6 AEROQUIP 303-10 + Hose Fittings 491-10D
PN: PC-63601A26 hose lenght: 200mm

79-40-00 MAINTENANCE

The inverted oil system normally requires no maintenance. During major overhauls or when repairs require sump removal, inspect sump for excessive deposits of sludge, varnish, or foreign material. If sump is dirty, remove and thoroughly clean all hoses and components; then use compressed air blast for drying and cleanout before reassembly.

79-40-01 Reseating Valve Balls

Marginal oil loss of valve may result from nicks in the valve seats which cause leakage when the valve should be closed. Such nicks can be caused by mishandling or by small chips of metal being caught between the ball and the seat as the valve operates during initial run-in of a new or overhauled engine. For more information of the valve leakage test refer to Lycoming Operator`s Manual.

79-40-02 Cleaning Inverted Oil System

The inverted oil system must be flushed with a suitable petroleum solvent, such as varsol, every 300 (three hundred) hours of engine operation or when there is evidence of the loss of oil through the breather line after normal flight.

Chapter 91

Charts

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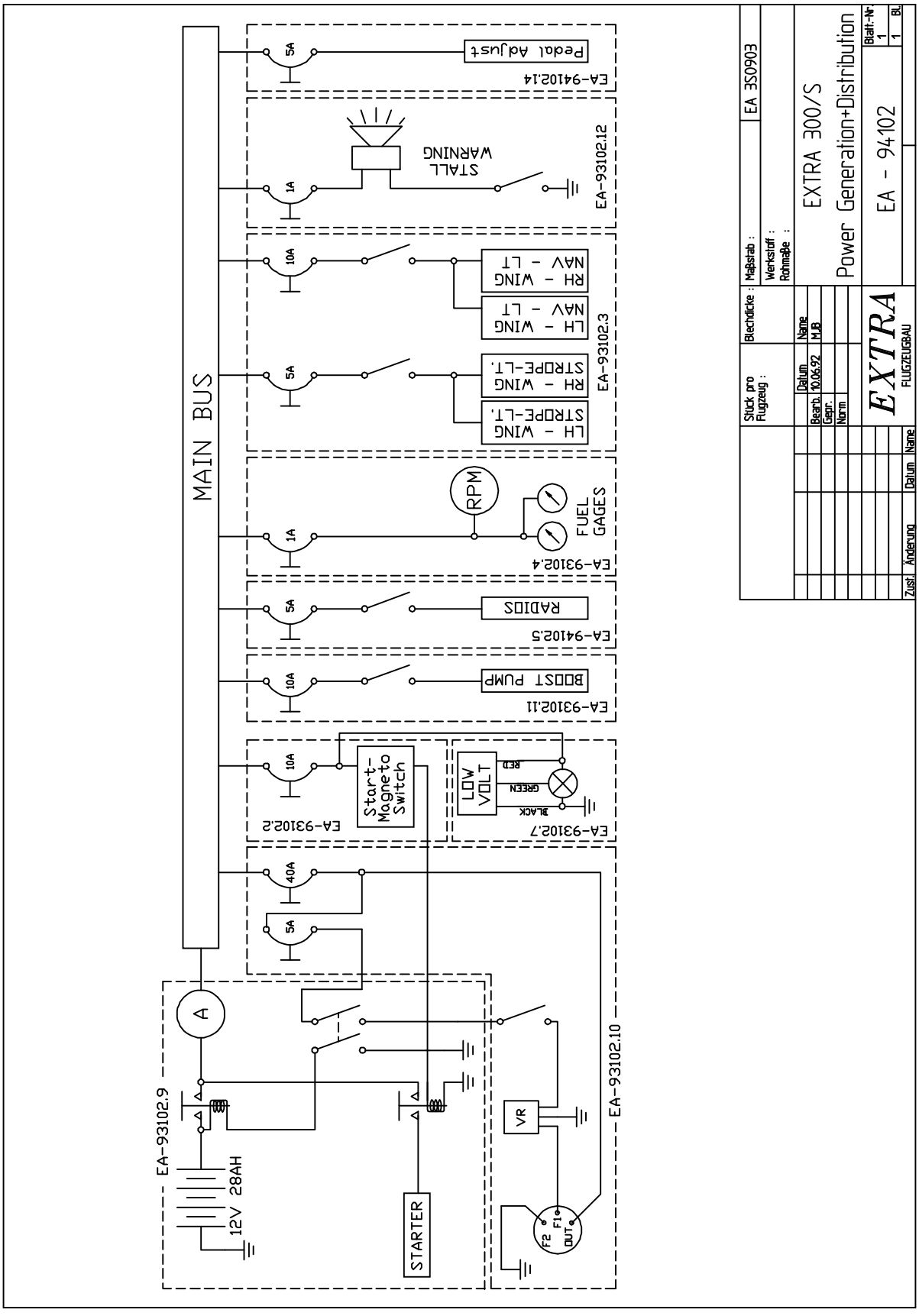
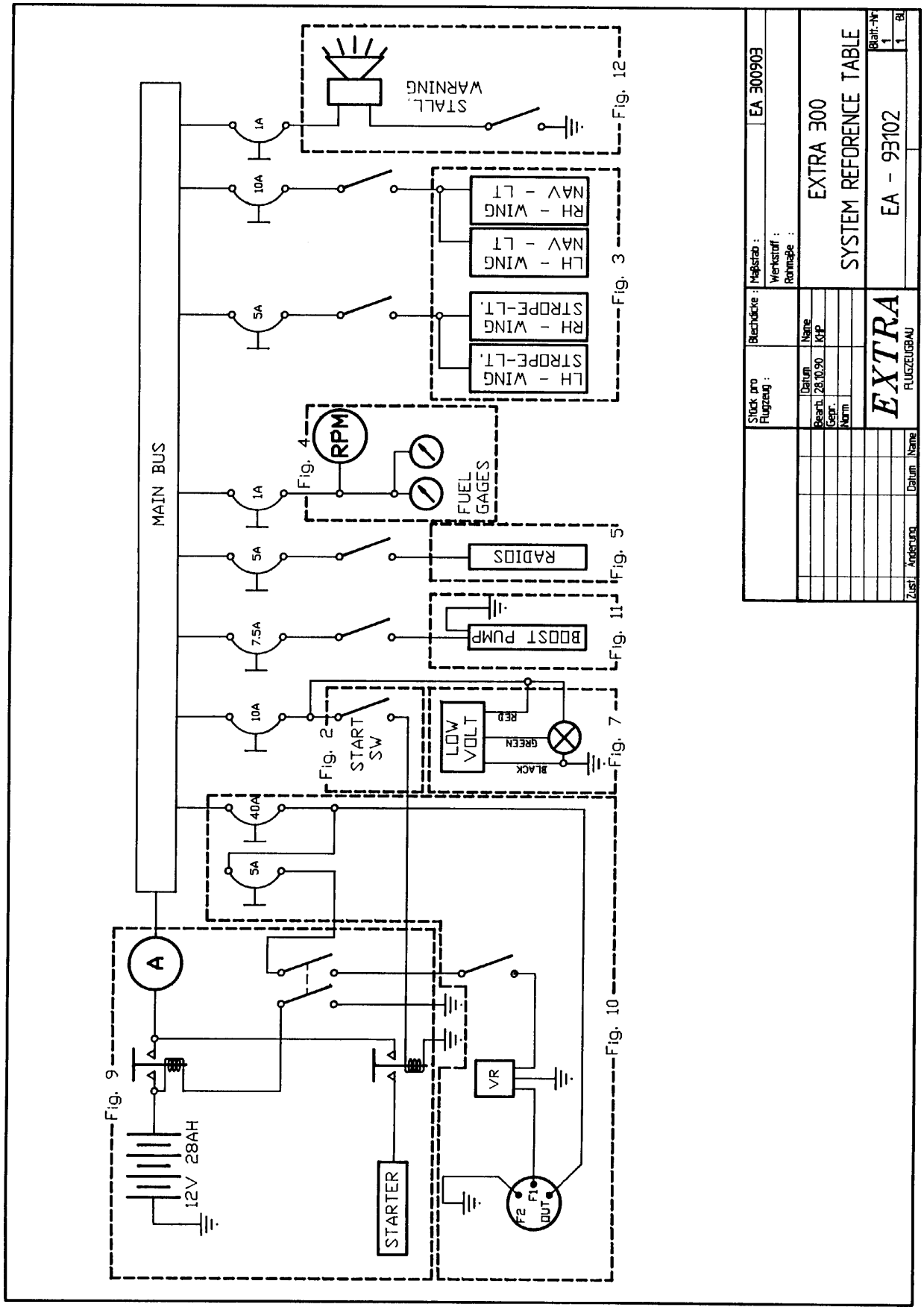
91-00-00 GENERAL

This chapter contains information about the electrical wiring diagrams necessary to maintain the aircraft electrical power sytem.

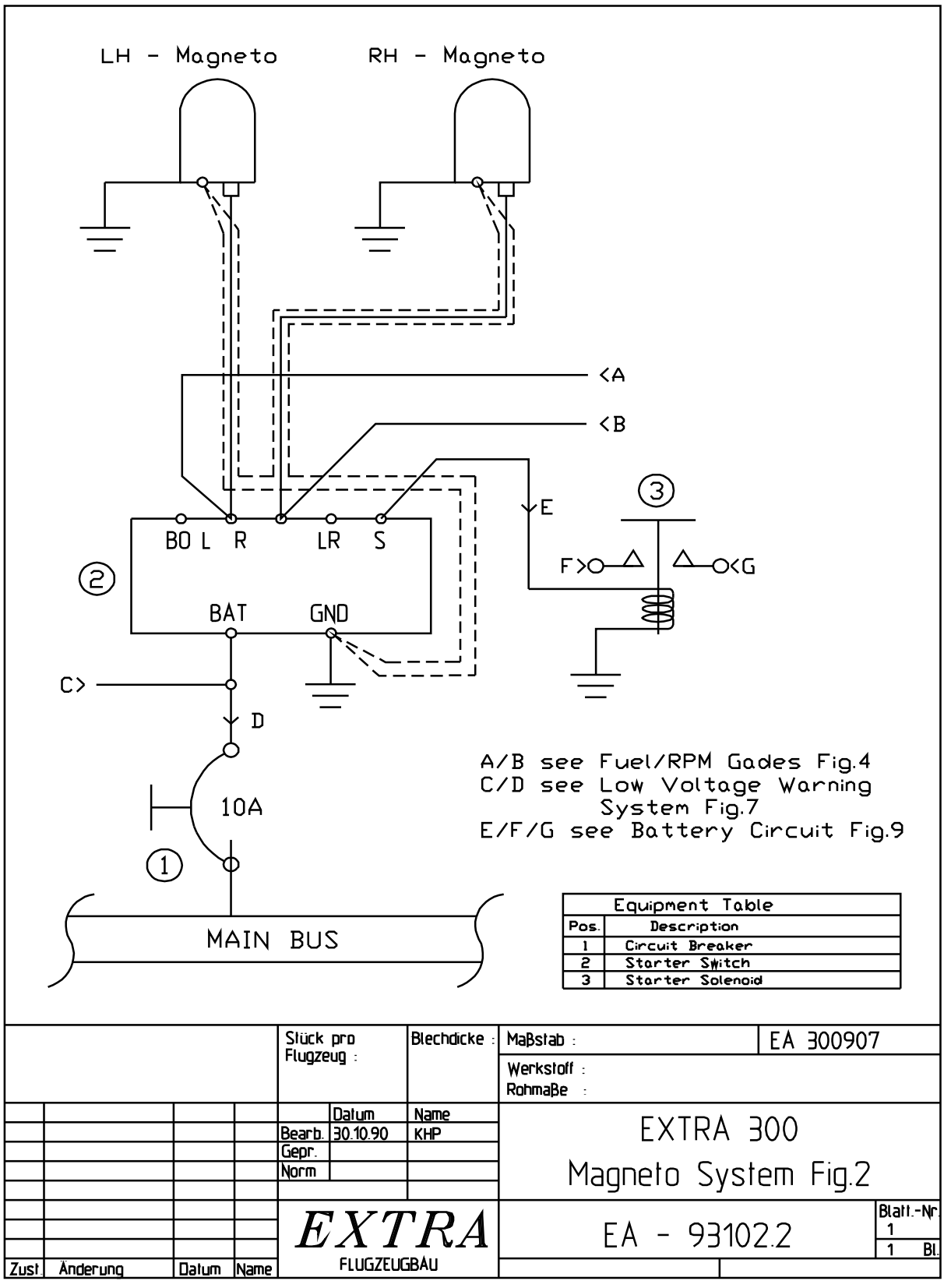
91-10-00 ELECTRICAL WIRING DIAGRAMS



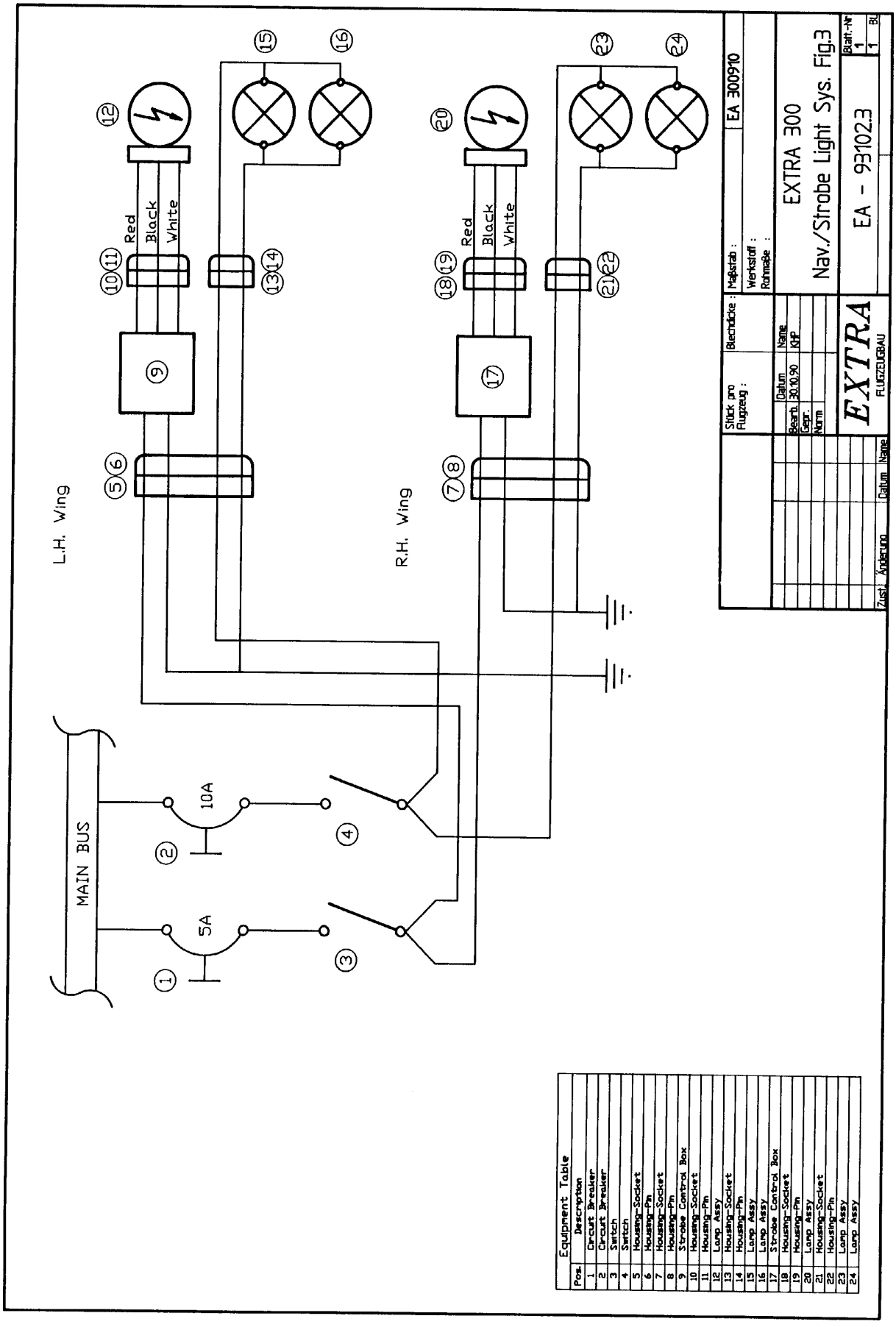
Wire Table
Figure 0



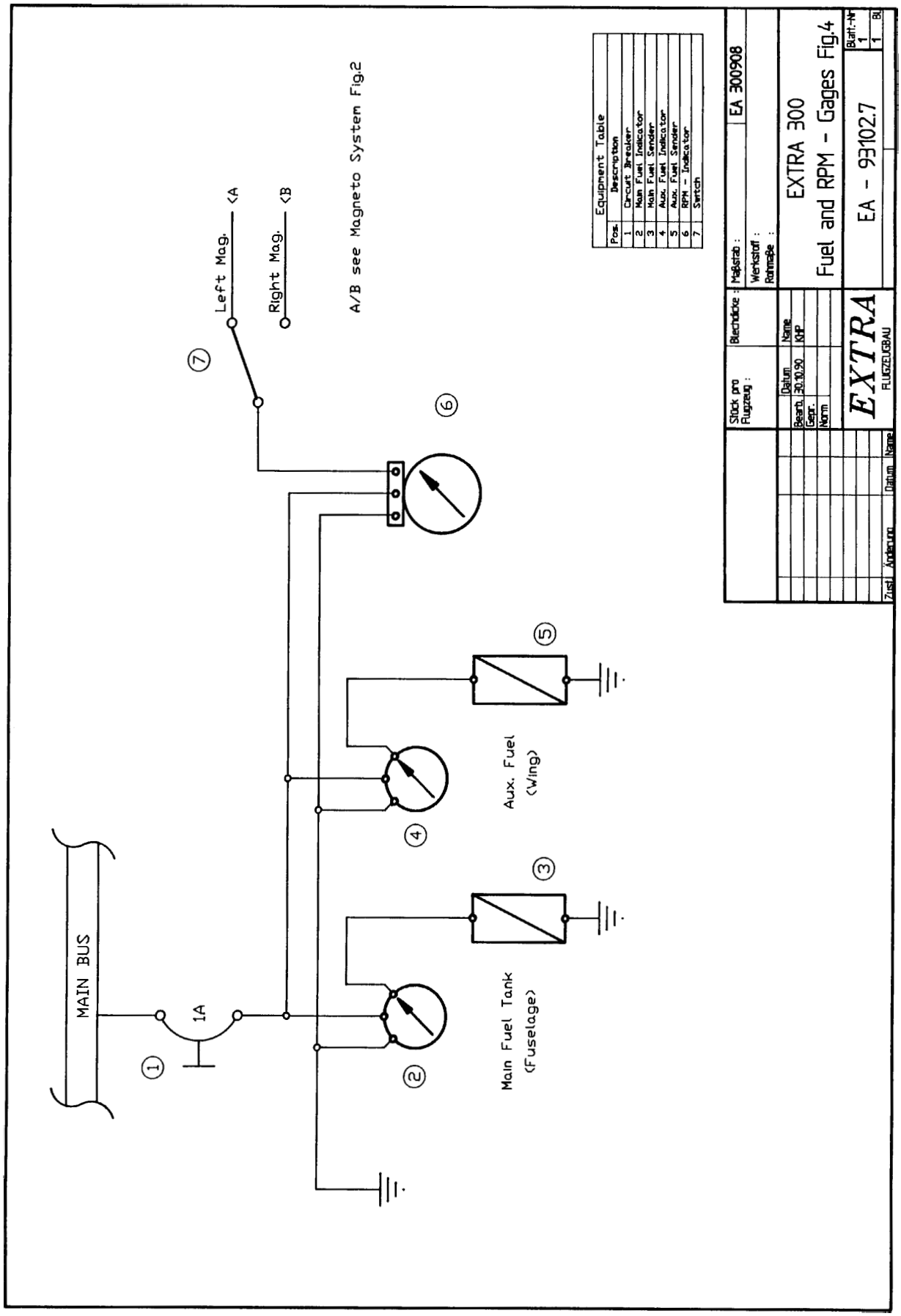
System Reference Table
Figure 1



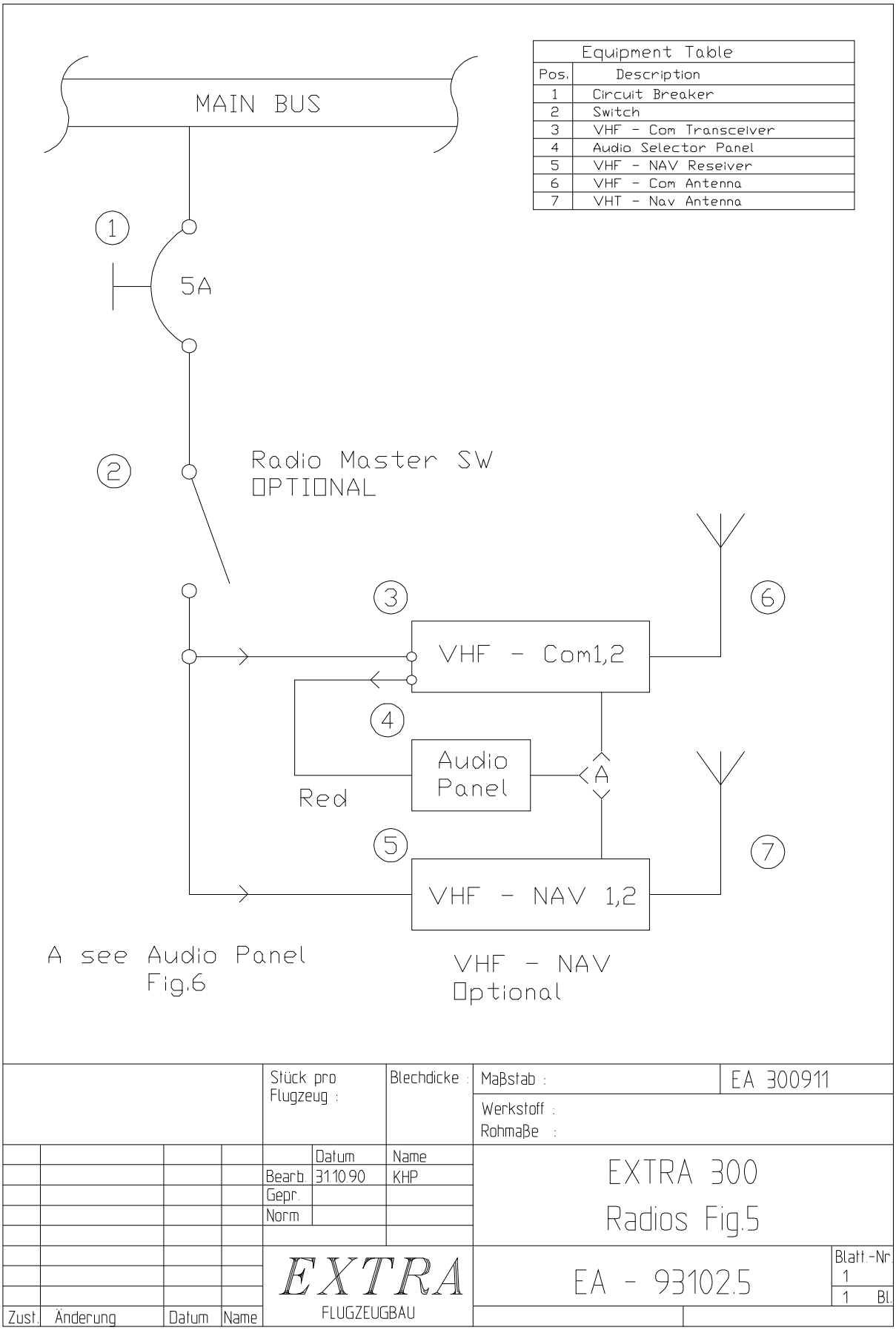
Magneto System
Figure 2



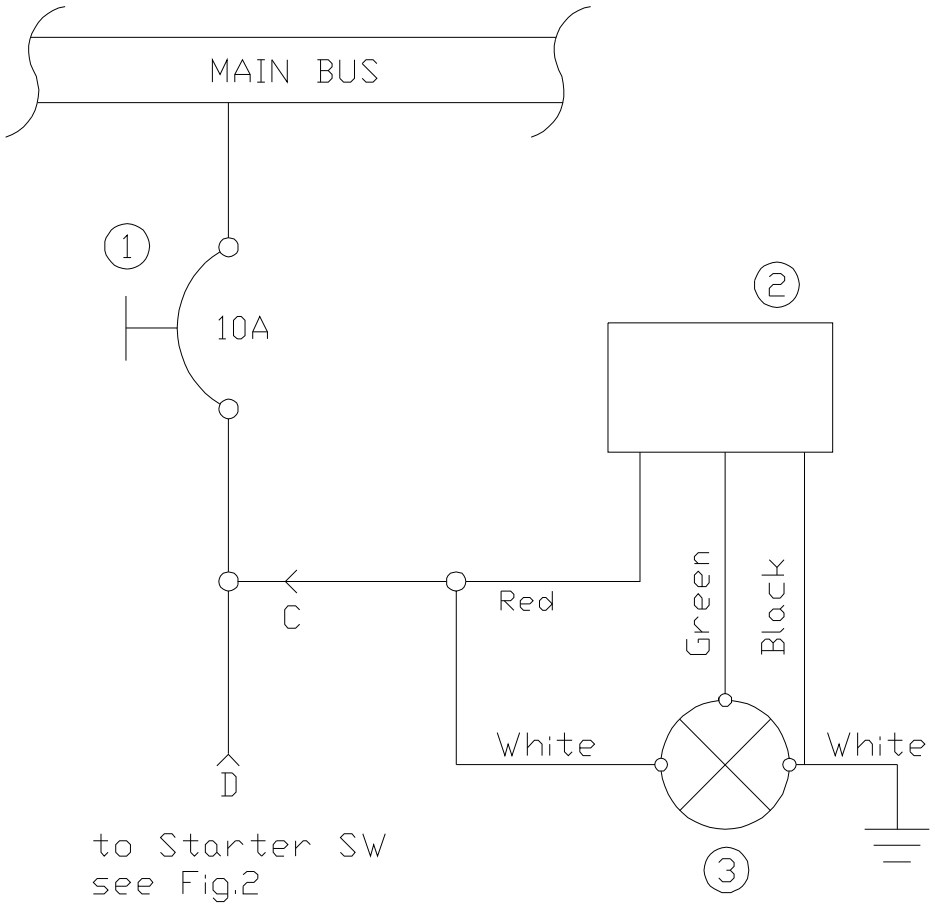
Navigation/Strobe Light System
Figure 3



Fuel and RPM-Gages
Figure 4



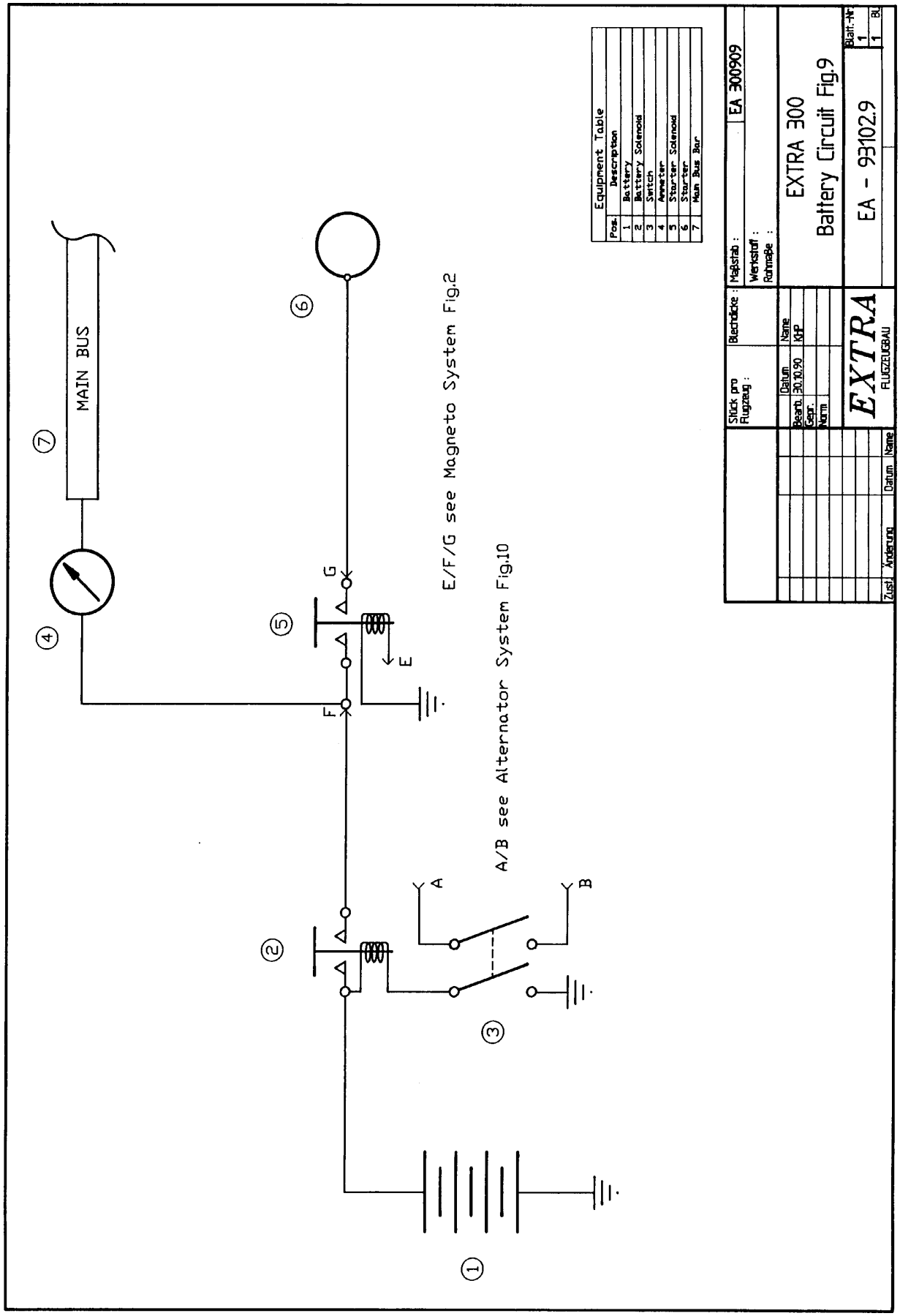
Radios
Figure 5



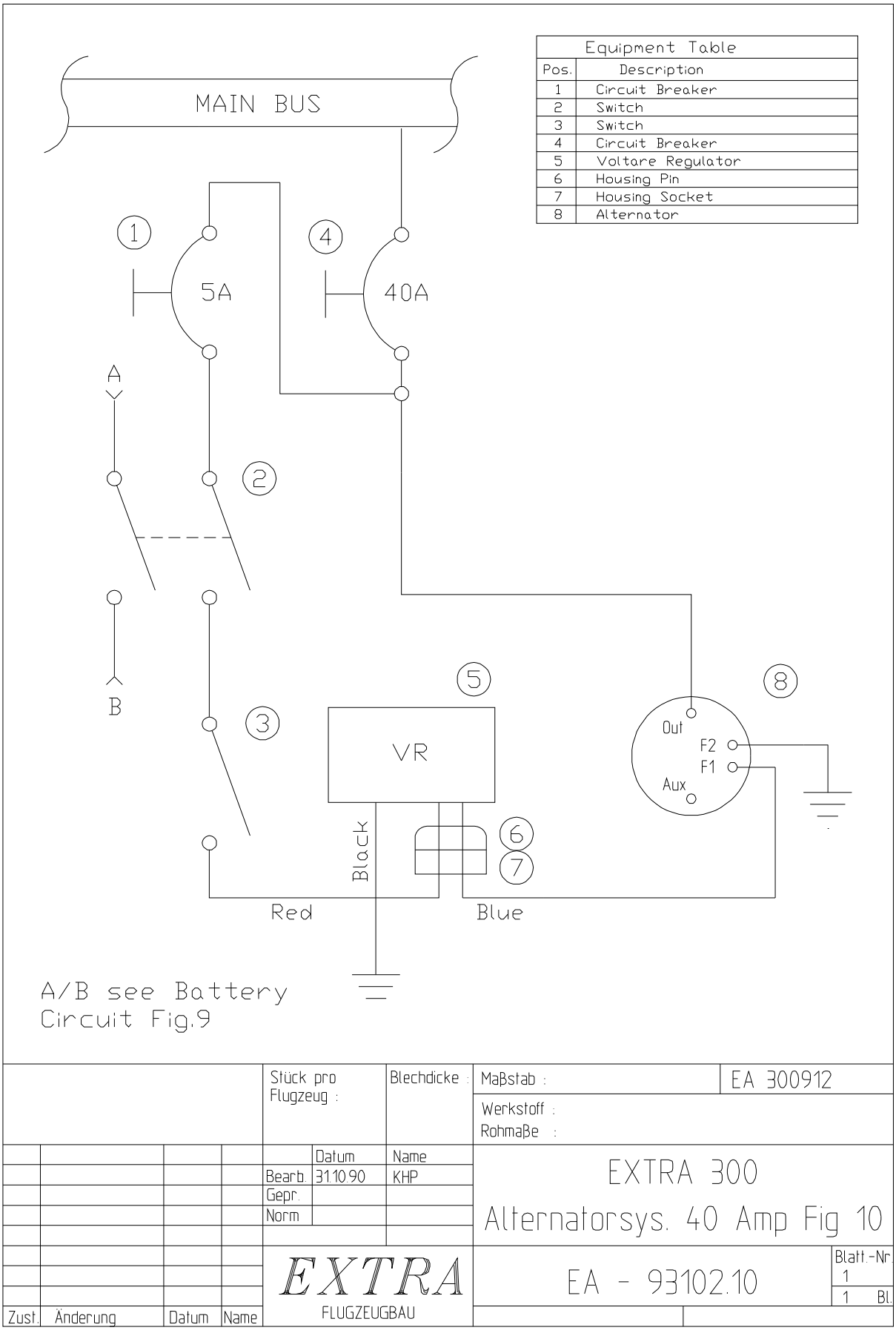
Equipment Table	
Pos.	Description
1	Circuit Breaker
2	Low Voltage Monitor
3	Lamp Assy

				Stück pro Flugzeug :		Blechdicke :	Maßstab : EA 300913
							Werkstoff : Rohmaße :
					Datum	Name	EXTRA 300
				Bearb.	31.10.90	KHP	
				Gepr.			Low Voltagewarningsys Fig7
				Norm			
				EXTRA			EA - 93102.7 Blatt.-Nr. 1
Zust.	Änderung	Datum	Name	FLUGZEUGBAU			1 Bl.

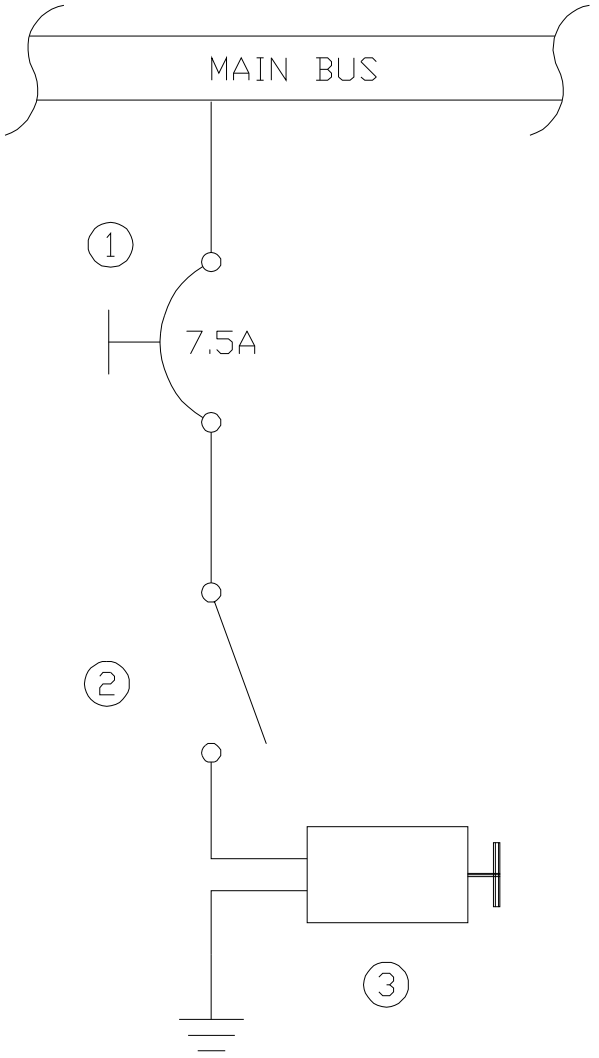
Low Voltage Warning System
Figure 7



Battery Circuit
Figure 9



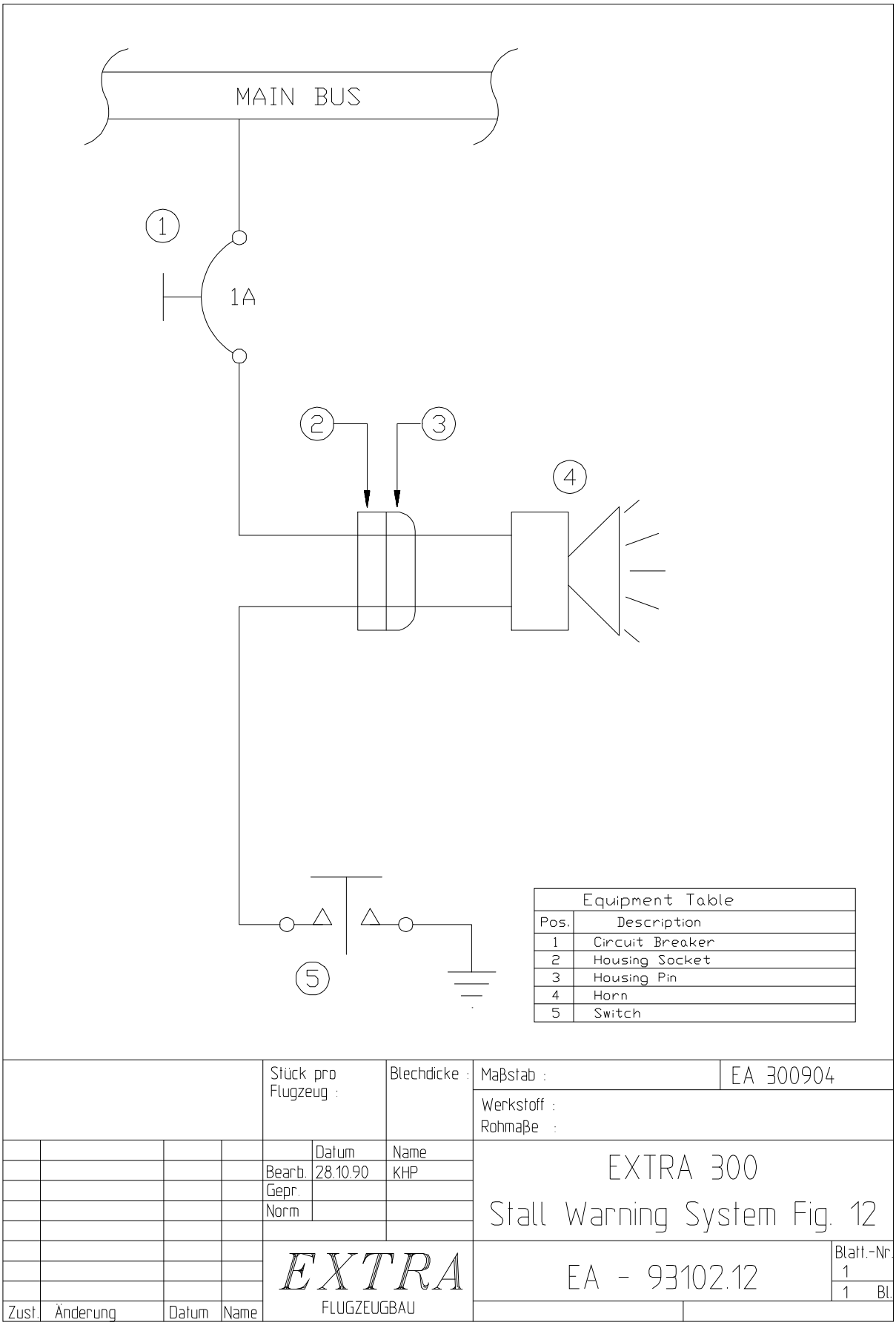
Alternator System
Figure 10



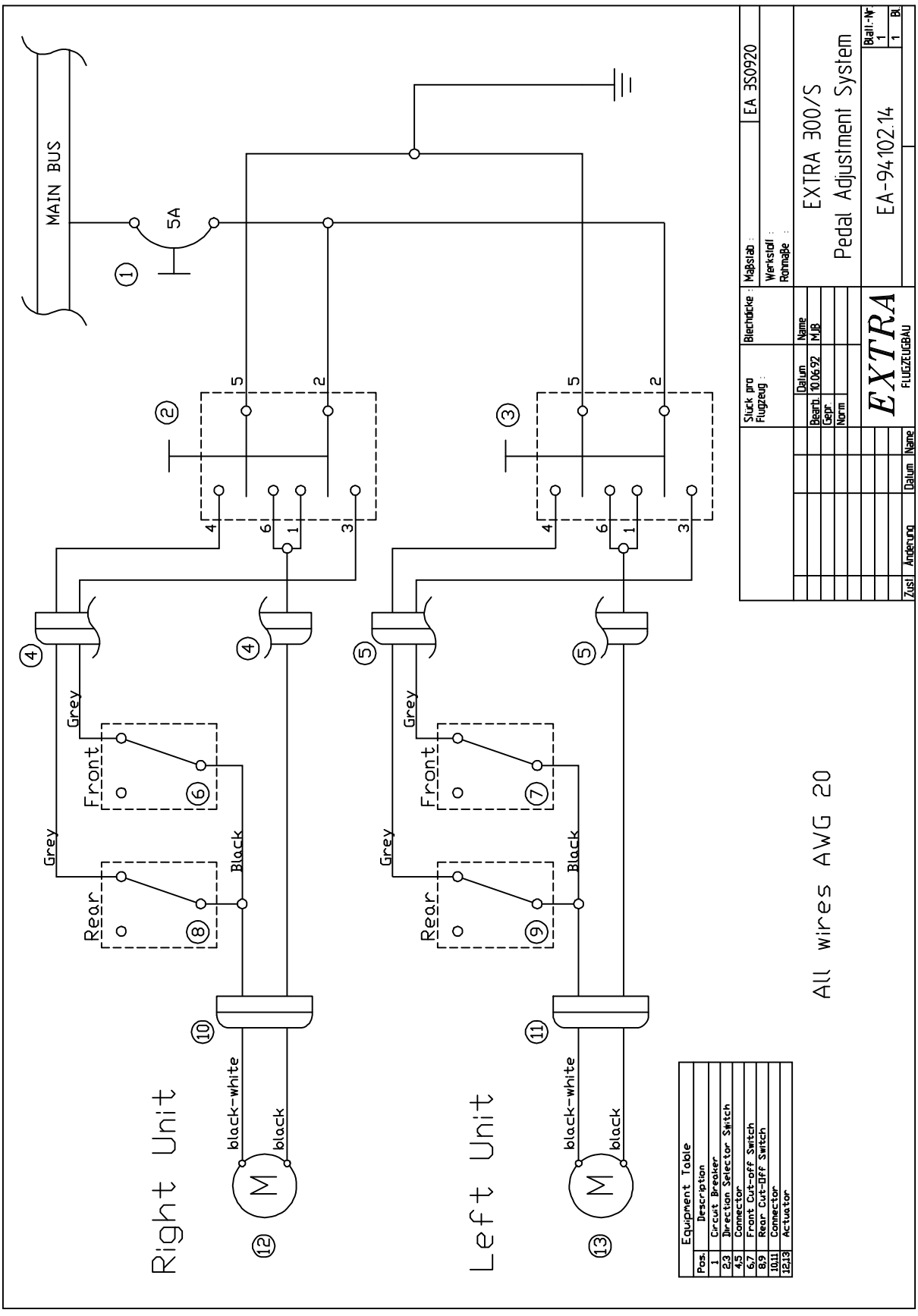
Equipment Table	
Pos.	Description
1	Circuit Breaker
2	Switch
3	Fuelpump

				Stück pro Flugzeug :		Blechdicke :	Maßstab : EA 300905
							Werkstoff :
							Rohmaße :
					Datum	Name	EXTRA 300
				Bearb.	28.10.90	KHP	
				Gepr.			Fuel Boost Pump Fig. 11
				Norm			
				EXTRA FLUGZEUGBAU			EA - 93102.11
Zust.	Änderung	Datum	Name				Blatt.-Nr. 1 / 1 Bl.

Fuel Boost Pump
Figure 11



Stall Warning System
Figure 12



Pedal Adjustment System
Figure 13

Chapter 95

Special Equipment

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Existing	Title
O	**GOMOLZIG EXHAUST SILENCER**
O	**STEERABLE TAIL WHEEL**
O	**ELECTRICAL ACTUATED RUDDER PEDAL ADJUSTMENT**
O	**ELT POINTER 3000**
O	**P-1000 DIGITAL RPM INDICATOR**
O	**EXTERNAL POWER SUPPLY**
O	**HEATING SYSTEM**