

AIRCRAFT MAINTENANCE MANUAL

Document Number: **AS-AMM-01-000**

Date of Issue: **22. 05. 2017**

Aircraft Type: **WT9 Dynamic LSA**

Model: **Club**

Type Certificate Number: **EASA.A.644**

THIS MANUAL INCLUDES THE MAINTENANCE INFORMATION REQUIRED TO BE AVAILABLE BY CS-LSA. THIS AIRPLANE HAS TO BE MAINTAINED IN COMPLIANCE WITH INFORMATION AND LIMITATIONS CONTAINED HEREIN

PAGES MARKED AS “EASA APPROVED” ARE APPROVED BY EUROPEAN AVIATION SAFETY AGENCY.

This page is left blank intentionally

01 INTRODUCTION

CONTENTS

Section	Description	Page
01-00	GENERAL	3
01-10	AIRCRAFT CLASSIFICATION	5
01-20	MANUFACTURERS	7
	1. AIRCRAFT MANUFACTURER	7
	2. ENGINE MANUFACTURER	7
	3. PROPELLER MANUFACTURER	7
	A. EVRA PerformanceLine 175/xxx/805.5	7
	B. KW-31 (EASA.P.177)	7
01-30	MANUAL DESCRIPTION	9
	1. GENERAL	9
	2. ARRANGEMENT OF CHAPTERS	9
	A. Numbering of chapters	9
	B. Numbering of pages, figures and tables	10
	3. WARNINGS, CAUTIONS, AND NOTES	11
	4. GENERAL SAFETY INFORMATION	11
	5. ABBREVIATIONS	13
	6. MANUAL IMPROVEMENT REQUEST FORM	14
	7. SAFETY OF FLIGHT AND SERVICE DIFFICULTY REPORT FORM	15
01-40	LIST OF CHAPTERS	17
01-50	LIST OF EFFECTIVE PAGES	19
01-60	REVISIONS	41
	1. MANUAL REVISIONS	41
	A. Procedure:	41
	2. MARKED OF REVISIONS	41
	3. LOG OF TEMPORARY REVISIONS	42
	4. LOG OF REVISIONS	44

This page is left blank intentionally

01-00 GENERAL

In compliance with requirements of CS-LSA, Subpart G, the aircraft manufacturer provides instructions for continued airworthiness of WT9 Dynamic LSA.

The purpose of this manual is to provide guidance to owners, mechanics, airports, regulatory officials, and aircraft and component manufacturers who may accomplish maintenance, repairs, and alterations on a light sport aircraft. In addition, this practice covers the format and content of maintenance manuals and instructions for the maintenance, repair, and alteration of an LSA.

The instructions are given in the following manuals issued by the aircraft manufacturer and original equipment manufacturers:

- Pilot´s Operating Handbook (Doc. No. AS-POH-01-000)
- Aircraft Maintenance Manual (Doc. No. AS-AMM-01-000)
- Illustrated Parts Catalogue (Doc. No. AS-IPC-01-000)
- Aircraft Wiring Manual (Doc. No. AS-AWM-01-000)
- Operators Manual for Rotax Engine Type 912 Series (Ref. No. OM-912, Part. No. 899700)
- Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191)
- Maintenance Manual (Heavy Maintenance) for Rotax Engine Types 912 and 914 Series (Ref. No. MMH-912 / MMH-914, Part. No. 899603)
- Installation Manual for Rotax Engine Type 912 Series (Ref. No. IM-912, Part. No. 898643)
- Tips, Practices, Mounting and Maintenance for Propeller EVRA (Ed: Amdt 3: - Date 11/00 CMM-10.01.61)
- User Manual for Aircraft Propeller KW-31 (Doc. No. UM-05 EN)
- Manual for Mounting and Use of Rescue Ballistic Parachute Systems Series Magnum (Edition 02-2014/04)
- Maintenance manuals of the installed equipment issued by the original equipment manufacturers.

This page is left blank intentionally

01-10 AIRCRAFT CLASSIFICATION

The aircraft WT9 Dynamic LSA / Club is a single engine, two seats (arranged side by side), cantilever low wing aircraft with a cruciform tail. The primary structures consist of glass and carbon composite. The aircraft is equipped with fixed tricycle undercarriage with steerable nose wheel.

The aircraft is powered by a 4 cylinder, horizontally opposed, air and water cooled, carburettor 4-stroke engine ROTAX 912 ULS2 with maximum power 73.5 kW (100 hp) at 5800 rpm.

The basic version of aircraft is fitted with propeller EVRA PerformanceLine 175/xxx/805.5. It is 3-bladed ground adjustable propeller with diameter 1750 mm (68.9 in). It has wooden core blades covered by glass fabric with stiffened leading edges. Blades are mounted in an aluminum hub. The propeller hub is attached to a flange and base plate and fixed to the engine's propeller flange. Composite spinner is fixed to the base plate.

The tow version is fitted with propeller KW-31 (EASA.P.177) is a 3-blade electrically operated in flight adjustable aircraft propeller with diameter 1.726 m (67.95 in) diameter. The blades are made of combination of lash wood and composite. The propeller can be operated in either manual or with automatic mode as a constant speed propeller. The leading edges are protected by stainless steel stamping.

The aircraft is intended for sporting, recreation and tourist flying and is approved for VFR day operation only.

This page is left blank intentionally

01-20 MANUFACTURERS

1. AIRCRAFT MANUFACTURER

Aerospool, spol. s r. o.
Letisková 10
971 03 Prievidza
Slovak republic
E-mail: dynamic@aerospool.sk
Web: www.aerospool.sk

2. ENGINE MANUFACTURER

BRP-Powertrain GmbH&Co. KG.
Rotaxstrasse 1
A-4623 Gunskirchen
Austria
Web: www.flyrotax.com

3. PROPELLER MANUFACTURER

A. EVRA PerformanceLine 175/xxx/805.5

SARL Production EVRA
4 Avenue de la Forêt d'Halatte
F-60100 Creil
France
Web: www.helices-evra.com

B. KW-31 (EASA.P.177)

Woodcomp Propellers s. r. o.
Vodolská 4
250 70 Odolena Voda
Czech Republic
Web: http://www.woodcomp.cz

This page is left blank intentionally

01-30 MANUAL DESCRIPTION

1. GENERAL

Aircraft Maintenance Manual is prepared in accordance with GAMA No. 2 Specification, which provides instructions for preparation and publication of manuals for general aviation aircraft. GAMA No. 2 Specification is compatible with ATA 100 Specification.

This Maintenance Manual does not reflect part numbers and cannot be used for ordering replacement parts. Spares and replacement parts should be ordered using the Illustrated Parts Catalogue.

2. ARRANGEMENT OF CHAPTERS

Chapters in this manual are arranged and divided in accordance with GAMA No. 2 Specification.

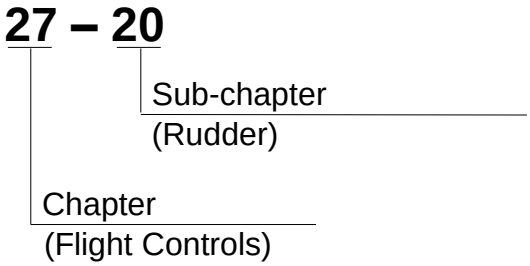
Chapters are arranged in the following groups:

- **INTRODUCTION** (Chapter 01)
- **AIRCRAFT** (Chapters 04 to 12)
- **AIRFRAME SYSTEMS** (Chapters 20 to 39)
- **AIRFRAME** (Chapters 51 to 57)
- **PROPELLER** (Chapter 61)
- **POWER PLANT** (Chapters 71 to 79)
- **SUPPLEMENTS** (Chapter 95)

A. Numbering of chapters

Due of the relative simplicity of the aircraft and its system the numbering of chapter has two levels.

Example:



B. Numbering of pages, figures and tables

(1) Numbering of pages:

Example:

Page 27 – 11

Page No.

Chapter No.

(2) Numbering of figures:

Example:

Fig. 27 – 1

Figure No.

Chapter No.

(3) Numbering of tables:

Example:

Tab. 27 – 1

Table No.

Chapter No.

NOTE

Numbers and names of figures and tables are written in *italic*.

3. WARNINGS, CAUTIONS, AND NOTES

Warnings, cautions and notes are of the following meaning in this manual:

WARNING

AN OPERATING PROCEDURE, INSPECTION, REPAIR OR MAINTENANCE PRACTICE, WHICH IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY, OR LOSS OF LIFE.

CAUTION

AN OPERATING PROCEDURE, INSPECTION, REPAIR OR MAINTENANCE PRACTICE, WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE OR DESTRUCTION OF EQUIPMENT.

NOTE

An operating procedure, inspection, repair or maintenance condition, etc., which is deemed essential to highlight.

4. GENERAL SAFETY INFORMATION

The illustrations in this manual show the typical construction. They may not represent in full detail, or the exact shape of, the parts which have the same or similar function.

Specifications are given in the SI metric system unless otherwise specified.

Before carrying out maintenance work on aircraft, read this Maintenance Manual carefully.

If any passages of the manual are not clearly understood, or if you have questions, please contact an authorized distributor or the manufacturer.

Aerospool company assumes no liability for any damage or injury caused by misunderstanding of the content of the manual.

The manufacturer points out that all maintenance work must be carried out only by a qualified personnel to maintain the aircraft.

Aerospool Company reserves the right at any time to terminate or change specifications, designs, features or versions without obligation to notify.

This manual uses technical terms which may be slightly different from the ones used in the Illustrated Parts Catalogue.

For complete information refer to original manufacturer’s documentation, latest valid revision.

Information contained in the original manufacturer’s documentation is mandatory, unless stated otherwise.

When performing maintenance, the safety must be always considered. Always use proper personal protective equipment, at least but not limited to:

- Wear protective gloves when handling with chemicals and sealants. Do not use protective hand creams as they can contaminate the sealants and surfaces.
- Wear goggles, safety glasses or face shield for eye protection.
- Do not wear loose clothing and secure long hair to prevent them from becoming tangled in power tools.
- Wear ear plugs or muffs to protect your ears.
- Wear suitable protective shoes with non-slip soles.

Prior to performing maintenance or repair consider following general rules:

- Check that emergency parachute system actuator is locked.
- Check that **MASTER SWITCH** and **IGNITION** is set **OFF**.
- Disconnect the negative terminal from the battery.
- Remove all jewellery. It can conduct electricity and may cause a short circuit or can be caught in rotating tools.
- When working with the fuel and fuel system, always work in a well ventilated place. Always ground the airframe during fueling/defueling to avoid risk of fire due to static discharge. Do not manipulate with open flame and keep all ignition sources away.
- When working with a landing gear, properly support the aircraft with jacks. Do not work under aircraft unless it is properly supported.
- While the engine is running, keep away from the propeller.

5. ABBREVIATIONS

ADAHRS	Air Data, Attitude and Heading Reference System
ADS-B	Automatic Dependent Surveillance – broadcast
AOA	Angle of Attack
AMM	Aircraft Maintenance Manual
AR	As Required
ATC	Air Traffic Control
AWM	Aircraft Wiring Manual
COMM	Communication
CHT	Cylinder Head Temperature
CS-LSA	Certification Specifications for Light Sport Aeroplanes
EASA	European Aviation Safety Agency
EFIS	Electronic Flight Instrument System
EGT	Exhaust Gas Temperature
ELT	Emergency Locator Transmitter
EMS	Engine Monitoring System
EPS	Emergency Parachute System
FWD	Forward
GPS	Global Positioning System
IPC	Illustrated Parts Catalogue
ISA	International Standard Atmosphere
LH	Left Hand
MAC	Mean Aerodynamic Chord
MAP	Manifold Pressure
MEMS	Microelectromechanical System
MMH	Maintenance Manual Heavy
MML	Maintenance Manual Line
MKR	Marker
MSL	Mean Sea Level
MTOW	Maximum Take-off Weight
NAV	Navigation
OAT	Outside Air Temperature
OM	Operators Manual
PFD	Primary Flight Display
RH	Right Hand
SV	SkyView
SWR	Standing Wave Ratio
TBO	Time Between Overhaul
TCAS	Traffic Collision Avoidance System
VAT	Value Added Tax
VFR	Visual Flight Rules
VOR	VHF Omnidirectional range
XPDR	Transponder

6. MANUAL IMPROVEMENT REQUEST FORM

Aerospool spol. s r. o. Letisková 10 973 01 Prievidza Slovak republic airworthiness@aerospool.sk www.aerospool.sk	**MANUAL IMPROVEMENT REQUEST**	Aerospool reference No.: Date:

Dear owner / operator / maintainer:
In the case of suggestions for improvement to the content of the manual, or if errors or omissions were found, please submit the proposed changes by means of MANUAL IMPROVEMENT REQUEST form. Fill the form and sent it to the above stated address via post or email.

Your contact information:

Name:	Telephone:	Email:

Manual information:

Document number:	Revision:	Document name:

Data location in the manual (chapter number, page number, figure, table):

Description of change request (attach more sheets if necessary):

Reason of change request:

7. SAFETY OF FLIGHT AND SERVICE DIFFICULTY REPORT FORM

Aerospool spol. s r. o. Letisková 10 973 01 Prievidza Slovak republic airworthiness@aerospool.sk www.aerospool.sk	**SAFETY OF FLIGHT AND SERVICE DIFFICULTY REPORT**	Aerospool reference No.: Date:

Dear owner / operator / maintainer:
For continued increasing reliability of aircraft, we would like to ask you for your assistance in the case of safety of flight or service difficulty. Fill the feedback form and sent it to the above stated address via post or email.

Type of report:

☐ SAFETY OF FLIGHT ISSUE ☐ SERVICE DIFFICULTY

Name:

Contact information (telephone, email, address):

Date of detection:

Aircraft type / model:	S/N:
Engine:	S/N:
Propeller:	S/N:
Flight hours:	Engine operation hours:

Safety of flight / service difficulty description (attach more sheets if necessary):

This page is left blank intentionally

01-40 LIST OF CHAPTERS

INTRODUCTION
01 INTRODUCTION

AIRCRAFT
04 AIRWORTHINESS LIMITATIONS
05 PERIODIC INSPECTIONS
06 DIMENSIONS AND AREAS
07 LIFTING AND SHORING
08 LEVELING AND WEIGHING
09 TOWING AND TAXIING
10 PARKING, MOORING
11 PLACARDS AND MARKINGS
12 SERVICING

AIRFRAME SYSTEMS
20 STANDARD PRACTICES - AIRFRAME
21 AIR CONDITIONING
23 COMMUNICATIONS
24 ELECTRICAL POWER
25 EQUIPMENT / FURNISHING
27 FLIGHT CONTROLS
28 FUEL
31 INDICATING / RECORDING SYSTEMS
32 LANDING GEAR
33 LIGHTS
34 NAVIGATION
39 INSTRUMENT AND CONTROL PANELS

AIRFRAME
51 STANDARD PRACTICES AND STRUCTURES - GENERAL
52 DOORS
53 FUSELAGE
55 STABILIZERS
56 WINDOWS
57 WINGS

PROPELLER
61 PROPELLER

POWER PLANT
71 POWER PLANT - GENERAL
73 ENGINE - FUEL SYSTEMS
74 IGNITION
75 ENGINE COOLING
76 ENGINE CONTROLS
77 ENGINE INDICATING
78 EXHAUST
79 OIL

SUPPLEMENTS
95 OPTIONAL EQUIPMENT

01-50 LIST OF EFFECTIVE PAGES

Page No.	Date of Issue	Effectivity
Title	**22. 05. 2017**	**all**
01-1	29. 01. 2020	all
01-2	22. 05. 2017	all
01-3	04. 07. 2019	all
01-4	22. 05. 2017	all
01-5	04. 07. 2019	all
01-6	22. 05. 2017	all
01-7	04. 07. 2019	all
01-8	22. 05. 2017	all
01-9	29. 01. 2020	all
01-10	29. 01. 2020	all
01-11	22. 05. 2017	all
01-12	22. 05. 2017	all
01-13	29. 01. 2020	all
01-14	04. 07. 2019	all
01-15	04. 07. 2019	all
01-16	22. 05. 2017	all
01-17	22. 05. 2017	all
01-18	22. 05. 2017	all
01-19	29. 01. 2020	all
01-20	29. 01. 2020	all
01-21	04. 07. 2019	all
01-22	04. 07. 2019	all
01-23	29. 01. 2020	all
01-24	04. 07. 2019	all
01-25	29. 01. 2020	all
01-26	29. 01. 2020	all
01-27	29. 01. 2020	all
01-28	29. 01. 2020	all
01-29	29. 01. 2020	all
01-30	29. 01. 2020	all
01-31	29. 01. 2020	all
01-32	29. 01. 2020	all
01-33	29. 01. 2020	all
01-34	04. 07. 2019	all
01-35	04. 07. 2019	all
01-36	04. 07. 2019	all
01-37	04. 07. 2019	all
01-38	29. 01. 2020	all
01-39	04. 07. 2019	all
01-40	04. 07. 2019	all
01-41	22. 05. 2017	all
01-42	22. 05. 2017	all
01-43	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
01-44	29. 01. 2020	all
01-45	29. 01. 2020	all
01-46	22. 05. 2017	all
04-1	22. 05. 2017	all
04-2	22. 05. 2017	all
04-3	04. 07. 2019	all
04-4	04. 07. 2019	all
05-1	22. 05. 2017	all
05-2	22. 05. 2017	all
05-3	04. 07. 2019	all
05-4	22. 05. 2017	all
05-5	22. 05. 2017	all
05-6	22. 05. 2017	all
05-7	22. 05. 2017	all
05-8	22. 05. 2017	all
05-9	22. 05. 2017	all
05-10	22. 05. 2017	all
05-11	29. 01. 2020	all
05-12	22. 05. 2017	all
05-13	04. 07. 2019	all
05-14	22. 05. 2017	all
05-15	22. 05. 2017	all
05-16	22. 05. 2017	all
05-17	29. 01. 2020	all
05-18	22. 05. 2017	all
05-19	04. 07. 2019	all
05-20	04. 07. 2019	all
05-21	04. 07. 2019	all
05-22	22. 05. 2017	all
05-23	22. 05. 2017	all
05-24	22. 05. 2017	all
05-25	04. 07. 2019	all
05-26	22. 05. 2017	all
05-27	04. 07. 2019	all
05-28	04. 07. 2019	all
05-29	04. 07. 2019	all
05-30	22. 05. 2017	all
05-31	22. 05. 2017	all
05-32	04. 07. 2019	all
05-33	04. 07. 2019	all
05-34	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
06-1	04. 07. 2019	all
06-2	04. 07. 2019	all
06-3	04. 07. 2019	all
06-4	04. 07. 2019	all
06-5	04. 07. 2019	all
06-6	04. 07. 2019	all
06-7	04. 07. 2019	all
06-8	04. 07. 2019	all
06-9	04. 07. 2019	all
06-10	04. 07. 2019	all
06-11	04. 07. 2019	all
06-12	04. 07. 2019	all
07-1	22. 05. 2017	all
07-2	04. 07. 2019	all
07-3	22. 05. 2017	all
07-4	04. 07. 2019	all
07-5	22. 05. 2017	all
07-6	04. 07. 2019	all
07-7	22. 05. 2017	all
07-8	04. 07. 2019	all
08-1	22. 05. 2017	all
08-2	22. 05. 2017	all
08-3	22. 05. 2017	all
08-4	22. 05. 2017	all
08-5	22. 05. 2017	all
08-6	22. 05. 2017	all
08-7	22. 05. 2017	all
08-8	22. 05. 2017	all
08-9	22. 05. 2017	all
08-10	22. 05. 2017	all
08-11	22. 05. 2017	all
08-12	22. 05. 2017	all
08-13	22. 05. 2017	all
08-14	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
09-1	22. 05. 2017	all
09-2	22. 05. 2017	all
09-3	22. 05. 2017	all
09-4	22. 05. 2017	all
09-5	22. 05. 2017	all
09-6	22. 05. 2017	all
09-7	22. 05. 2017	all
09-8	22. 05. 2017	all
09-9	22. 05. 2017	all
09-10	22. 05. 2017	all
10-1	04. 07. 2019	all
10-2	22. 05. 2017	all
10-3	22. 05. 2017	all
10-4	22. 05. 2017	all
10-5	04. 07. 2019	all
10-6	04. 07. 2019	all
10-7	04. 07. 2019	all
10-8	04. 07. 2019	all
10-9	04. 07. 2019	all
10-10	04. 07. 2019	all
10-11	04. 07. 2019	all
10-12	04. 07. 2019	all
10-13	22. 05. 2017	all
10-14	22. 05. 2017	all
11-1	22. 05. 2017	all
11-2	22. 05. 2017	all
11-3	04. 07. 2019	all
11-4	04. 07. 2019	all
11-5	04. 07. 2019	all
11-6	04. 07. 2019	all
11-7	04. 07. 2019	all
11-8	04. 07. 2019	all
11-9	04. 07. 2019	all
11-10	04. 07. 2019	all
11-11	04. 07. 2019	all
11-12	04. 07. 2019	all
11-13	04. 07. 2019	all
11-14	04. 07. 2019	all
11-15	04. 07. 2019	all
11-16	04. 07. 2019	all
11-17	04. 07. 2019	all
11-18	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
12-1	04. 07. 2019	all
12-2	04. 07. 2019	all
12-3	04. 07. 2019	all
12-4	04. 07. 2019	all
12-5	04. 07. 2019	all
12-6	04. 07. 2019	all
12-7	04. 07. 2019	all
12-8	04. 07. 2019	all
12-9	04. 07. 2019	all
12-10	04. 07. 2019	all
12-11	04. 07. 2019	all
12-12	04. 07. 2019	all
12-13	04. 07. 2019	all
12-14	04. 07. 2019	all
12-15	04. 07. 2019	all
12-16	04. 07. 2019	all
12-17	04. 07. 2019	all
12-18	04. 07. 2019	all
12-19	04. 07. 2019	all
12-20	29. 01. 2020	all
12-21	29. 01. 2020	all
12-22	29. 01. 2020	all
12-23	04. 07. 2019	all
12-24	04. 07. 2019	all
12-25	04. 07. 2019	all
12-26	04. 07. 2019	all
12-27	04. 07. 2019	all
12-28	04. 07. 2019	all
12-29	04. 07. 2019	all
12-30	04. 07. 2019	all
12-31	04. 07. 2019	all
12-32	04. 07. 2019	all
12-33	04. 07. 2019	all
12-34	04. 07. 2019	all
12-35	04. 07. 2019	all
12-36	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
20-1	22. 05. 2017	all
20-2	22. 05. 2017	all
20-3	22. 05. 2017	all
20-4	22. 05. 2017	all
20-5	22. 05. 2017	all
20-6	22. 05. 2017	all
20-7	22. 05. 2017	all
20-8	22. 05. 2017	all
20-9	22. 05. 2017	all
20-10	04. 07. 2019	all
20-11	22. 05. 2017	all
20-12	22. 05. 2017	all
20-13	22. 05. 2017	all
20-14	22. 05. 2017	all
20-15	22. 05. 2017	all
20-16	22. 05. 2017	all
20-17	22. 05. 2017	all
20-18	22. 05. 2017	all
21-1	22. 05. 2017	all
21-2	22. 05. 2017	all
21-3	04. 07. 2019	all
21-4	04. 07. 2019	all
21-5	04. 07. 2019	all
21-6	04. 07. 2019	all
21-7	04. 07. 2019	all
21-8	04. 07. 2019	all
21-9	04. 07. 2019	all
21-10	04. 07. 2019	all
21-11	04. 07. 2019	all
21-12	04. 07. 2019	all
21-13	04. 07. 2019	all
21-14	04. 07. 2019	all
21-15	04. 07. 2019	all
21-16	04. 07. 2019	all
21-17	04. 07. 2019	all
21-18	04. 07. 2019	all
21-19	04. 07. 2019	all
21-20	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
23-1	22. 05. 2017	all
23-2	22. 05. 2017	all
23-3	04. 07. 2019	all
23-4	22. 05. 2017	all
23-5	22. 05. 2017	all
23-6	22. 05. 2017	all
23-7	29. 01. 2020	all
23-8	04. 07. 2019	all
23-9	22. 05. 2017	all
23-10	22. 05. 2017	all
23-11	22. 05. 2017	all
23-12	22. 05. 2017	all
23-13	22. 05. 2017	all
23-14	22. 05. 2017	all
24-1	04. 07. 2019	all
24-2	22. 05. 2017	all
24-3	29. 01. 2020	all
24-4	04. 07. 2019	all
24-5	29. 01. 2020	all
24-6	04. 07. 2019	all
24-7	04. 07. 2019	all
24-8	04. 07. 2019	all
24-9	04. 07. 2019	all
24-10	04. 07. 2019	all
24-11	04. 07. 2019	all
24-12	22. 05. 2017	all
24-13	04. 07. 2019	all
24-14	04. 07. 2019	all
24-15	04. 07. 2019	all
24-16	29. 01. 2020	all
24-17	04. 07. 2019	all
24-18	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
25-1	29. 01. 2020	all
25-2	22. 05. 2017	all
25-3	22. 05. 2017	all
25-4	22. 05. 2017	all
25-5	22. 05. 2017	all
25-6	22. 05. 2017	all
25-7	04. 07. 2019	all
25-8	04. 07. 2019	all
25-9	04. 07. 2019	all
25-10	22. 05. 2017	all
25-11	29. 01. 2020	all
25-12	29. 01. 2020	all
25-13	29. 01. 2020	all
25-14	29. 01. 2020	all
25-15	29. 01. 2020	all
25-16	29. 01. 2020	all
25-17	29. 01. 2020	all
25-18	29. 01. 2020	all
25-19	29. 01. 2020	all
25-20	29. 01. 2020	all
25-21	29. 01. 2020	all
25-22	29. 01. 2020	all
25-23	29. 01. 2020	all
25-24	29. 01. 2020	all
27-1	22. 05. 2017	all
27-2	22. 05. 2017	all
27-3	22. 05. 2017	all
27-4	22. 05. 2017	all
27-5	22. 05. 2017	all
27-6	22. 05. 2017	all
27-7	04. 07. 2019	all
27-8	04. 07. 2019	all
27-9	04. 07. 2019	all
27-10	04. 07. 2019	all
27-11	04. 07. 2019	all
27-12	04. 07. 2019	all
27-13	04. 07. 2019	all
27-14	04. 07. 2019	all
27-15	04. 07. 2019	all
27-16	04. 07. 2019	all
27-17	04. 07. 2019	all
27-18	04. 07. 2019	all
27-19	22. 05. 2017	all
27-20	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
27-21	22. 05. 2017	all
27-22	04. 07. 2019	all
27-23	04. 07. 2019	all
27-24	04. 07. 2019	all
27-25	04. 07. 2019	all
27-26	04. 07. 2019	all
27-27	04. 07. 2019	all
27-28	04. 07. 2019	all
27-29	04. 07. 2019	all
27-30	04. 07. 2019	all
27-31	04. 07. 2019	all
27-32	04. 07. 2019	all
27-33	04. 07. 2019	all
27-34	04. 07. 2019	all
27-35	04. 07. 2019	all
27-36	04. 07. 2019	all
27-37	22. 05. 2017	all
27-38	22. 05. 2017	all
27-39	04. 07. 2019	all
27-40	04. 07. 2019	all
27-41	04. 07. 2019	all
27-42	04. 07. 2019	all
27-43	04. 07. 2019	all
27-44	04. 07. 2019	all
27-45	04. 07. 2019	all
27-46	04. 07. 2019	all
27-47	04. 07. 2019	all
27-48	04. 07. 2019	all
27-49	04. 07. 2019	all
27-50	04. 07. 2019	all
27-51	22. 05. 2017	all
27-52	22. 05. 2017	all
27-53	04. 07. 2019	all
27-54	04. 07. 2019	all
27-55	04. 07. 2019	all
27-56	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
28-1	22. 05. 2017	all
28-2	22. 05. 2017	all
28-3	04. 07. 2019	all
28-4	22. 05. 2017	all
28-5	22. 05. 2017	all
28-6	22. 05. 2017	all
28-7	04. 07. 2019	all
28-8	04. 07. 2019	all
28-9	22. 05. 2017	all
28-10	04. 07. 2019	all
28-11	04. 07. 2019	all
28-12	04. 07. 2019	all
28-13	04. 07. 2019	all
28-14	04. 07. 2019	all
28-15	04. 07. 2019	all
28-16	04. 07. 2019	all
28-17	04. 07. 2019	all
28-18	04. 07. 2019	all
28-19	04. 07. 2019	all
28-20	04. 07. 2019	all
28-21	22. 05. 2017	all
28-22	04. 07. 2019	all
28-23	04. 07. 2019	all
28-24	04. 07. 2019	all
28-25	04. 07. 2019	all
28-26	04. 07. 2019	all
28-27	04. 07. 2019	all
28-28	22. 05. 2017	all
28-29	22. 05. 2017	all
28-30	04. 07. 2019	all
28-31	29. 01. 2020	all
28-32	29. 01. 2020	all
28-33	04. 07. 2019	all
28-34	04. 07. 2019	all
28-35	22. 05. 2017	all
28-36	22. 05. 2017	all
28-37	29. 01. 2020	all
28-38	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
31-1	22. 05. 2017	all
31-2	22. 05. 2017	all
31-3	22. 05. 2017	all
31-4	22. 05. 2017	all
31-5	04. 07. 2019	all
31-6	22. 05. 2017	all
31-7	29. 01. 2020	all
31-8	29. 01. 2020	all
31-9	29. 01. 2020	all
31-10	22. 05. 2017	all
31-11	22. 05. 2017	all
31-12	04. 07. 2019	all
31-13	04. 07. 2019	all
31-14	04. 07. 2019	all
32-1	04. 07. 2019	all
32-2	04. 07. 2019	all
32-3	04. 07. 2019	all
32-4	04. 07. 2019	all
32-5	04. 07. 2019	all
32-6	04. 07. 2019	all
32-7	04. 07. 2019	all
32-8	04. 07. 2019	all
32-9	04. 07. 2019	all
32-10	04. 07. 2019	all
32-11	04. 07. 2019	all
32-12	04. 07. 2019	all
32-13	04. 07. 2019	all
32-14	04. 07. 2019	all
32-15	04. 07. 2019	all
32-16	04. 07. 2019	all
32-17	04. 07. 2019	all
32-18	04. 07. 2019	all
32-19	04. 07. 2019	all
32-20	04. 07. 2019	all
32-21	04. 07. 2019	all
32-22	04. 07. 2019	all
32-23	04. 07. 2019	all
32-24	04. 07. 2019	all
32-25	04. 07. 2019	all
32-26	04. 07. 2019	all
32-27	04. 07. 2019	all
32-28	04. 07. 2019	all
32-29	04. 07. 2019	all
32-30	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
32-31	04. 07. 2019	all
32-32	04. 07. 2019	all
32-33	04. 07. 2019	all
32-34	04. 07. 2019	all
32-35	04. 07. 2019	all
32-36	04. 07. 2019	all
32-37	04. 07. 2019	all
32-38	04. 07. 2019	all
32-39	04. 07. 2019	all
32-40	04. 07. 2019	all
32-41	04. 07. 2019	all
32-42	04. 07. 2019	all
32-43	29. 01. 2020	all
32-44	04. 07. 2019	all
32-45	04. 07. 2019	all
32-46	29. 01. 2020	all
32-47	04. 07. 2019	all
32-48	29. 01. 2020	all
32-49	29. 01. 2020	all
32-50	29. 01. 2020	all
32-51	04. 07. 2019	all
32-52	04. 07. 2019	all
32-53	04. 07. 2019	all
32-54	04. 07. 2019	all
32-55	04. 07. 2019	all
32-56	04. 07. 2019	all
33-1	22. 05. 2017	all
33-2	22. 05. 2017	all
33-3	22. 05. 2017	all
33-4	29. 01. 2020	all
33-5	29. 01. 2020	all
33-6	29. 01. 2020	all
33-7	29. 01. 2020	all
33-8	04. 07. 2019	all
33-9	04. 07. 2019	all
33-10	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
34-1	29. 01. 2020	all
34-2	29. 01. 2020	all
34-3	22. 05. 2017	all
34-4	22. 05. 2017	all
34-5	04. 07. 2019	all
34-6	29. 01. 2020	all
34-7	22. 05. 2017	all
34-8	22. 05. 2017	all
34-9	22. 05. 2017	all
34-10	04. 07. 2019	all
34-11	04. 07. 2019	all
34-12	04. 07. 2019	all
34-13	04. 07. 2019	all
34-14	29. 01. 2020	all
34-15	29. 01. 2020	all
34-16	29. 01. 2020	all
34-17	29. 01. 2020	all
34-18	29. 01. 2020	all
34-19	29. 01. 2020	all
34-20	29. 01. 2020	all
34-21	29. 01. 2020	all
34-22	29. 01. 2020	all
34-23	29. 01. 2020	all
34-24	29. 01. 2020	all
34-25	29. 01. 2020	all
34-26	29. 01. 2020	all
34-27	29. 01. 2020	all
34-28	29. 01. 2020	all
34-29	29. 01. 2020	all
34-30	29. 01. 2020	all
34-31	29. 01. 2020	all
34-32	29. 01. 2020	all
34-33	29. 01. 2020	all
34-34	29. 01. 2020	all
34-35	29. 01. 2020	all
34-36	29. 01. 2020	all
34-37	29. 01. 2020	all
34-38	29. 01. 2020	all

Page No.	Date of Issue	Effectivity
39-1	29. 01. 2020	all
39-2	29. 01. 2020	all
39-3	04. 07. 2019	all
39-4	04. 07. 2019	all
39-5	04. 07. 2019	all
39-6	04. 07. 2019	all
39-7	29. 01. 2020	all
39-8	04. 07. 2019	all
39-9	04. 07. 2019	all
39-10	29. 01. 2020	all
39-11	04. 07. 2019	all
39-12	04. 07. 2019	all
39-13	04. 07. 2019	all
39-14	04. 07. 2019	all
39-15	04. 07. 2019	all
39-16	04. 07. 2019	all
39-17	04. 07. 2019	all
39-18	04. 07. 2019	all
39-19	04. 07. 2019	all
39-20	04. 07. 2019	all
39-21	04. 07. 2019	all
39-22	04. 07. 2019	all
39-23	04. 07. 2019	all
39-24	04. 07. 2019	all
39-25	04. 07. 2019	all
39-26	04. 07. 2019	all
39-27	29. 01. 2020	all
39-28	29. 01. 2020	all
39-29	04. 07. 2019	all
39-30	04. 07. 2019	all
39-31	04. 07. 2019	all
39-32	04. 07. 2019	all
39-33	04. 07. 2019	all
39-34	04. 07. 2019	all
39-35	04. 07. 2019	all
39-36	04. 07. 2019	all
39-37	04. 07. 2019	all
39-38	04. 07. 2019	all
39-39	04. 07. 2019	all
39-40	04. 07. 2019	all
39-41	04. 07. 2019	all
39-42	29. 01. 2020	all
39-43	04. 07. 2019	all
39-44	04. 07. 2019	all
39-45	04. 07. 2019	all
39-46	29. 01. 2020	all

Page No.	Date of Issue	Effectivity
39-47	29. 01. 2020	all
39-48	29. 01. 2020	all
39-49	29. 01. 2020	all
39-50	04. 07. 2019	all
39-51	29. 01. 2020	all
39-52	04. 07. 2019	all
39-53	04. 07. 2019	all
39-54	04. 07. 2019	all
39-55	04. 07. 2019	all
39-56	04. 07. 2019	all
39-57	04. 07. 2019	all
39-58	29. 01. 2020	all
39-59	29. 01. 2020	all
39-60	04. 07. 2019	all
39-61	04. 07. 2019	all
39-62	04. 07. 2019	all
51-1	04. 07. 2019	all
51-2	04. 07. 2019	all
51-3	22. 05. 2017	all
51-4	22. 05. 2017	all
51-5	22. 05. 2017	all
51-6	04. 07. 2019	all
51-7	22. 05. 2017	all
51-8	22. 05. 2017	all
51-9	22. 05. 2017	all
51-10	04. 07. 2019	all
51-11	04. 07. 2019	all
51-12	22. 05. 2017	all
51-13	22. 05. 2017	all
51-14	22. 05. 2017	all
51-15	22. 05. 2017	all
51-16	22. 05. 2017	all
51-17	04. 07. 2019	all
51-18	04. 07. 2019	all
51-19	22. 05. 2017	all
51-20	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
52-1	04. 07. 2019	all
52-2	22. 05. 2017	all
52-3	04. 07. 2019	all
52-4	22. 05. 2017	all
52-5	04. 07. 2019	all
52-6	04. 07. 2019	all
52-7	22. 05. 2017	all
52-8	04. 07. 2019	all
52-9	22. 05. 2017	all
52-10	04. 07. 2019	all
53-1	22. 05. 2017	all
53-2	22. 05. 2017	all
53-3	22. 05. 2017	all
53-4	22. 05. 2017	all
53-5	22. 05. 2017	all
53-6	22. 05. 2017	all
53-7	22. 05. 2017	all
53-8	22. 05. 2017	all
55-1	22. 05. 2017	all
55-2	22. 05. 2017	all
55-3	22. 05. 2017	all
55-4	22. 05. 2017	all
55-5	22. 05. 2017	all
55-6	22. 05. 2017	all
55-7	22. 05. 2017	all
55-8	22. 05. 2017	all
55-9	22. 05. 2017	all
55-10	22. 05. 2017	all
55-11	22. 05. 2017	all
55-12	04. 07. 2019	all
55-13	22. 05. 2017	all
55-14	22. 05. 2017	all
56-1	22. 05. 2017	all
56-2	22. 05. 2017	all
56-3	22. 05. 2017	all
56-4	22. 05. 2017	all
56-5	22. 05. 2017	all
56-6	22. 05. 2017	all
56-7	22. 05. 2017	all
56-8	22. 05. 2017	all

Page No.	Date of Issue	Effectivity
56-9	22. 05. 2017	all
56-10	22. 05. 2017	all
56-11	04. 07. 2019	all
56-12	04. 07. 2019	all
56-13	22. 05. 2017	all
56-14	22. 05. 2017	all
56-15	22. 05. 2017	all
56-16	04. 07. 2019	all
56-17	22. 05. 2017	all
56-18	22. 05. 2017	all
57-1	22. 05. 2017	all
57-2	22. 05. 2017	all
57-3	22. 05. 2017	all
57-4	22. 05. 2017	all
57-5	22. 05. 2017	all
57-6	22. 05. 2017	all
57-7	04. 07. 2019	all
57-8	04. 07. 2019	all
57-9	04. 07. 2019	all
57-10	04. 07. 2019	all
57-11	22. 05. 2017	all
57-12	22. 05. 2017	all
57-13	22. 05. 2017	all
57-14	22. 05. 2017	all
57-15	22. 05. 2017	all
57-16	22. 05. 2017	all
57-17	22. 05. 2017	all
57-18	22. 05. 2017	all
57-19	04. 07. 2019	all
57-20	04. 07. 2019	all
57-21	04. 07. 2019	all
57-22	04. 07. 2019	all
57-23	04. 07. 2019	all
57-24	04. 07. 2019	all
57-25	04. 07. 2019	all
57-26	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
61-1	04. 07. 2019	all
61-2	04. 07. 2019	all
61-3	04. 07. 2019	all
61-4	04. 07. 2019	all
61-5	04. 07. 2019	all
61-6	04. 07. 2019	all
61-7	04. 07. 2019	all
61-8	04. 07. 2019	all
61-9	04. 07. 2019	all
61-10	04. 07. 2019	all
61-11	04. 07. 2019	all
61-12	04. 07. 2019	all
61-13	04. 07. 2019	all
61-14	04. 07. 2019	all
61-15	04. 07. 2019	all
61-16	04. 07. 2019	all
61-17	04. 07. 2019	all
61-18	04. 07. 2019	all
71-1	22. 05. 2017	all
71-2	22. 05. 2017	all
71-3	22. 05. 2017	all
71-4	22. 05. 2017	all
71-5	04. 07. 2019	all
71-6	22. 05. 2017	all
71-7	22. 05. 2017	all
71-8	22. 05. 2017	all
71-9	04. 07. 2019	all
71-10	04. 07. 2019	all
71-11	04. 07. 2019	all
71-12	04. 07. 2019	all
71-13	04. 07. 2019	all
71-14	04. 07. 2019	all
71-15	04. 07. 2019	all
71-16	04. 07. 2019	all
71-17	04. 07. 2019	all
71-18	04. 07. 2019	all
71-19	04. 07. 2019	all
71-20	04. 07. 2019	all
71-21	04. 07. 2019	all
71-22	04. 07. 2019	all
71-23	22. 05. 2017	all
71-24	22. 05. 2017	all
71-25	04. 07. 2019	all
71-26	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
71-27	04. 07. 2019	all
71-28	04. 07. 2019	all
71-29	04. 07. 2019	all
71-30	04. 07. 2019	all
71-31	04. 07. 2019	all
71-32	04. 07. 2019	all
71-33	04. 07. 2019	all
71-34	04. 07. 2019	all
71-35	04. 07. 2019	all
71-36	04. 07. 2019	all
71-37	04. 07. 2019	all
71-38	04. 07. 2019	all
71-39	04. 07. 2019	all
71-40	04. 07. 2019	all
73-1	22. 05. 2017	all
73-2	22. 05. 2017	all
73-3	22. 05. 2017	all
73-4	04. 07. 2019	all
74-1	22. 05. 2017	all
74-2	22. 05. 2017	all
74-3	22. 05. 2017	all
74-4	22. 05. 2017	all
74-5	22. 05. 2017	all
74-6	22. 05. 2017	all
74-7	22. 05. 2017	all
74-8	22. 05. 2017	all
74-9	22. 05. 2017	all
74-10	22. 05. 2017	all
75-1	04. 07. 2019	all
75-2	22. 05. 2017	all
75-3	22. 05. 2017	all
75-4	22. 05. 2017	all
75-5	04. 07. 2019	all
75-6	04. 07. 2019	all
75-7	04. 07. 2019	all
75-8	04. 07. 2019	all
75-9	04. 07. 2019	all
75-10	04. 07. 2019	all
75-11	04. 07. 2019	all
75-12	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
75-13	04. 07. 2019	all
75-14	04. 07. 2019	all
76-01	22. 05. 2017	all
76-02	22. 05. 2017	all
76-03	22. 05. 2017	all
76-04	22. 05. 2017	all
76-05	04. 07. 2019	all
76-06	04. 07. 2019	all
76-07	04. 07. 2019	all
76-08	04. 07. 2019	all
76-09	04. 07. 2019	all
76-10	04. 07. 2019	all
76-11	04. 07. 2019	all
76-12	04. 07. 2019	all
77-1	04. 07. 2019	all
77-2	22. 05. 2017	all
77-3	04. 07. 2019	all
77-4	22. 05. 2017	all
77-5	22. 05. 2017	all
77-6	22. 05. 2017	all
77-7	04. 07. 2019	all
77-8	04. 07. 2019	all
77-9	04. 07. 2019	all
77-10	04. 07. 2019	all
77-11	04. 07. 2019	all
77-12	04. 07. 2019	all
77-13	04. 07. 2019	all
77-14	04. 07. 2019	all
77-15	04. 07. 2019	all
77-16	04. 07. 2019	all
77-17	04. 07. 2019	all
77-18	04. 07. 2019	all
77-19	04. 07. 2019	all
77-20	04. 07. 2019	all
77-21	04. 07. 2019	all
77-22	04. 07. 2019	all
77-23	29. 01. 2020	all
77-24	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
78-1	22. 05. 2017	all
78-2	22. 05. 2017	all
78-3	22. 05. 2017	all
78-4	22. 05. 2017	all
78-5	22. 05. 2017	all
78-6	04. 07. 2019	all
78-7	04. 07. 2019	all
78-8	04. 07. 2019	all
78-9	04. 07. 2019	all
78-10	04. 07. 2019	all
79-1	22. 05. 2017	all
79-2	22. 05. 2017	all
79-3	22. 05. 2017	all
79-4	22. 05. 2017	all
79-5	04. 07. 2019	all
79-6	04. 07. 2019	all
79-7	04. 07. 2019	all
79-8	04. 07. 2019	all
79-9	04. 07. 2019	all
79-10	04. 07. 2019	all
79-11	04. 07. 2019	all
79-12	04. 07. 2019	all
79-13	22. 05. 2017	all
79-14	22. 05. 2017	all
95-1	04. 07. 2019	all
95-2	04. 07. 2019	all
95-3	04. 07. 2019	all
95-4	04. 07. 2019	all
95-5	04. 07. 2019	all
95-6	04. 07. 2019	all
95-7	04. 07. 2019	all
95-8	04. 07. 2019	all
95-9	04. 07. 2019	all
95-10	04. 07. 2019	all
95-11	04. 07. 2019	all
95-12	04. 07. 2019	all
95-13	04. 07. 2019	all
95-14	04. 07. 2019	all
95-15	04. 07. 2019	all
95-16	04. 07. 2019	all
95-17	04. 07. 2019	all
95-18	04. 07. 2019	all

Page No.	Date of Issue	Effectivity
95-19	04. 07. 2019	all
95-20	04. 07. 2019	all
95-21	04. 07. 2019	all
95-22	04. 07. 2019	all
95-23	04. 07. 2019	all
95-24	04. 07. 2019	all

01-60 REVISIONS

1. MANUAL REVISIONS

CAUTION

THE MANUAL OWNER IS RESPONSIBLE FOR KEEPING IT UP-TO-DATE.

A. Procedure:

All Revisions / Temporary revisions of this Manual are made as follows:

(1) The aircraft manufacturer will send the Revision / Temporary revision with new manual pages:
  (a) Free of charge to the Authority and to all foreign aviation authorities on request.
  (b) For a charge to the other manual holders who ask for sending them

(2) The manual holder is obliged to:
  (a) Carry out revisions according to the text Revision / Temporary revisions (replace old pages of the manual with new ones)
  (b) Confirm revision in the LOG OF REVISION / LOG OF TEMPORARY REVISION (Section 01-60).

2. MARKED OF REVISIONS

Each page that includes a revised or completed material is marked Rev. ... / Temp. Rev. ... at the footer of the page, together with the date of Revision / Temporary revision.

Revisions are marked by a solid revision bar along the outside margin. Simple revisions in a figure are marked with a black arrow in a circle, which indicates that a part of the figure has been changed.

In this way are marked only substantive changes, additions or deletions information. Formal corrections and shifted texts are not marked.

Pages with a Temporary Revision are printed on a yellow paper.

3. LOG OF TEMPORARY REVISIONS

Temp. Rev. No.	Affected Pages	Description / Effectivity	Date of Issue	Incorporated by / Date

Temp. Rev. No.	Affected Pages	Description / Effectivity	Date of Issue	Incorporated by / Date

4. LOG OF REVISIONS

Rev. No.	Affected Pages	Description / Effectivity	Date of Issue	Incorporated by / Date
1	01-19, 01-22, 01-28, 01-32, 01-44, 11-9, 28-18 to 28-20, 39-6	Correction of interior placards. Change of fuel selector.	02. 02. 2018	Aerospool spol. s r. o.
2	01-1, 01-3, 01-5, 01-7, 01-9, 01-14, 01-15, 01-19 to 01-40, 01-44, 04-3, 04-4, 05-3, 05-13, 05-19 to 05-21, 05-25, 05-27 to 05-29, 05-32, 05-33, 06-1 to 06-12, 07-2, 07-4, 07-6, 07-8, 10-1, 10-5 to 10-14, 11-3 to 11-18, 12-1 to 12-36, 20-10, 21-3 to 21-20, 23-3, 23-7, 23-8, 24-1, 24-3, 24-4, 24-6 to 24-11, 24-13 to 24-18, 25-7 to 25-8, 25-11, 25-13 to 25-16, 25-18, 25-20, 27-7 to 27-18, 27-22 to 27-36, 27-39 to 27-50, 27-53 to 27-56, 28-3, 28-7, 28-8, 28-10 to 28-20, 28-22 to 28-27, 28-30 to 28-34, 28-37, 31-5, 31-7, 31-12 to 31-14, 32-1 to 32-56, 33-6 to 33-9, 34-5, 34-10 to 34-14, 34-21, 34-29, 34-32 to 34-35, 39-1 to 39-3, 39-5 to 39-62, 51-1, 51-2, 51-6, 51-10, 51-11, 51-17, 51-18, 52-1, 52-3, 52-5, 52-6, 52-8, 52-10, 55-12, 56-11, 56-12, 56-16, 57-7 to 57-10, 57-19 to 57-26, 61-1 to 61-18, 71-5, 71-9 to 71-22, 71-25 to 71-40, 73-4, 75-1, 75-14, 76-5 to 76-12, 77-1, 77-3, 77-7 to 77-24, 78-6 to 78-10, 79-5 to 79-12, 95-1 to 95-24	Added towing equipment: In flight adjustable propeller KW-31, tow release, rear-view mirror, cooling air distributor and cooling system, placards. Overhaul schedule. Formal changes. Figure improvements. Mistake corrections.	04. 07. 2019	Aerospool spol. s r. o.

Rev. No.	Affected Pages	Description / Effectivity	Date of Issue	Incorporated by / Date
3	01-1, 01-9, 01-10, 01-13, 01-19, 01-20, 01-23, 01-25 to 01-33, 01-38, 01-44, 01-45, 05-11, 05-17, 12-20 to 12-22, 23-7, 24-3, 24-5, 24-16, 25-1, 25-11 to 25-24, 28-31, 28-32, 28-37, 31-7 to 31-9, 32-43, 32-46, 32-48 to 32-43, 32-46, 32-48 to 32-50, 33-4 to 33-7, 34-1, 34-2, 34-6, 34-14 to 34-38, 39-1, 39-2, 39-7, 39-10, 39-27, 39-28, 39-42, 39-46 to 39-49, 39-51, 39-58, 39-59, 77-23	Added ACL/POS/NAV lights AVE-WPSTG/R 20D MOD (2) as equivalent substitution for AVE-WPSTG/R 20D MOD (1). Added ELT Kannad AF INTEGRA as equivalent substitution for ELT Kannad 406 AF-COMPACT. Brake hoses connection change. Supplemented schedule replacement. Improved stall warning system scheme. Supplemented procedures. Administrative corrections.	29. 01. 2020	Aerospool spol. s r. o.

This page is left blank intentionally

04 AIRWORTHINESS LIMITATIONS

CONTENTS

Chapter	Description	Page
04-00	**AIRWORTHINESS LIMITATIONS**	**3**
	1. GENERAL	3
	A. Maintenance Limitations	3
	B. Replacement Limitations	3
	C. Structural Limitations	3
	2. DESCRIPTION	4
	A. Maintenance Limitations	4
	B. Replacement Limitations	4
	C. Structural Limitations	4

This page is left blank intentionally

04-00 AIRWORTHINESS LIMITATIONS

1. GENERAL

The Airworthiness Limitations chapter is approved by European Aviation Safety Agency (EASA) in accordance with the applicable certification procedures and the type certification basis. It specifies the airworthiness limitations required by CS-LSA.

This chapter specifies the maximum intervals for replacement and/or maintenance requirements of aircraft components, systems and structures determined by life limits and/or requiring monitoring during scheduled maintenance.

NOTE

All time limits and requirements listed in this chapter are also included in Chapter 05 PERIODIC INSPECTIONS.

The following airworthiness limitations and requirements are separated into groups as described below:

A. Maintenance limitations

Checks of components and systems that are required to be performed during scheduled maintenance.

B. Replacement limitations

List of time limits at which aircraft manufacturer considers that specific components must be replaced.

C. Structural limitations

Limitations of the aircraft structures based on calculations and tests approved by the EASA.

2. DESCRIPTION

A. Maintenance limitations

The scheduled maintenance requirements are found in Chapter 05-20 SCHEDULED MAINTENANCE CHECKS.

B. Replacement limitations

List of items with time limits for the exchange of the aircraft certain parts are shown in Chapter 05-11 REPLACEMENT SCHEDULE.

List of items with time limits for the overhaul of the aircraft certain parts are shown in Chapter 05-12 OVERHAUL SCHEDULE.

C. Structural limitations

The life of the aircraft structures is established to be on conditions.

05 PERIODIC INSPECTIONS

CONTENTS

Chapter	Description	Page
05-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. SPECIAL CONDITIONS	3
	3. DEFINITIONS	3
05-10	**TIME LIMITS**	**7**
	1. INTRODUCTION	7
	2. INSPECTION INTERVALS	7
	3. INSPECTION TOLERANCES	8
	4. SERVICE BULLETINS	10
	5. PUBLICATIONS, REFERENCES	10
05-11	**REPLACEMENT SCHEDULE**	**11**
05-12	**OVERHAUL SCHEDULE**	**13**
05-20	**SCHEDULED MAINTENANCE CHECKS**	**15**
	1. RESPONSIBILITY OF OWNER	15
	2. AUTHORISATION TO PERFORM	15
	3. INSPECTION GUIDELINES	16
	4. INSPECTION OF ITEMS – GENERAL	16
	5. SCHEDULED INSPECTION PROGRAM	17
05-50	**UNSCHEDULED MAINTENANCE CHECKS**	**31**
	1. GENERAL	31
	2. HARD LANDING CHECKS	32

This page is left blank intentionally

05-00 GENERAL

1. INTRODUCTION

This chapter includes the aircraft manufacturer's recommended time limits, maintenance checks and inspections (both scheduled and unscheduled).

Recommended intervals for items inspection are based on normal usage under average environmental conditions.

2. SPECIAL CONDITIONS

All inspection intervals for scheduled maintenance checks, replacement and overhaul schedule and special inspections schedule noted in this manual are based on average usage and average environmental conditions. Aircraft operated in abnormal environments (i.e. tropic, humid or cold climates, i.e. dusty and salt-water environment, etc.) may be worn, corroded, etc. more. Operation in abnormal environments can influence inspections, overhauls, lubrication, etc. frequency.

In these areas, periodic inspections should be performed in shortened inspection periods based on operator’s experiences.

3. DEFINITIONS

100-HOUR INSPECTION
Same as an annual condition inspection, except the interval of inspection is 100 h of operation instead of 12 calendar months. This inspection is utilized when the LSA is being used for commercial operations such as flight instruction or rental, or both

ANNUAL CONDITION INSPECTION
Detailed inspection accomplished once a year on LSA in accordance with instructions provided in the maintenance manual supplied with the aircraft. The purpose of the inspection is to look for any wear, corrosion, or damage that would cause an aircraft to not be in a condition for safe operation.

CALENDAR TIME
The time from the date on the original airworthiness certificate issued with each new aircraft, to be used as the basis for determination of all maintenance, TBO or replacement intervals.

CONDITION
Inspection for, but not limited to, cleanliness, cracks, deformation, corrosion, wear, and loose or missing fasteners.

CORROSION
Pitting, or a surface breakdown of a material due to chemical or electro-chemical attack by atmosphere, moisture or other agents.

DAMAGED
Rendered unusable for its intended purpose.

FAA
United States Federal Aviation Administration.

FLIGHT TIME / FLIGHT HOURS
The time in service from the moment the aircraft leaves the ground until it touches the ground at the end of the flight.

FUNCTIONAL INSPECTION
It is a quantitative inspection to determine if one or more functions of an item performs within specified limits. The function inspection is a comparative examination of a system or an item against specific standard.

HEAVY MAINTENANCE
Any maintenance, inspection, repair, or alteration a manufacturer has designated that requires specialized training, equipment, or facilities.

INSPECTION
An examination of an item.

ITEM
Any component or its sets of parts (including the components itself) isolated as an entity for inspection.

LINE MAINTENANCE
Any repair, maintenance, scheduled checks, servicing, inspections, or alterations not considered heavy maintenance that is approved by the manufacturer and is specified in the manufacturer's maintenance manual.

LSA REPAIRMAN MAINTENANCE
U.S. FAA-certificated repairman (light sport aircraft) with a maintenance rating as defined by 14 CFR Part 65, authorized to perform line maintenance on aircraft certificated as special LSA aircraft. Authorized to perform the annual condition/100-h inspection on an LSA, or an equivalent rating issued by other civil aviation authorities.

MAINTENANCE MANUAL(S)
Manual provided by an LSA manufacturer or supplier that specifies all maintenance, repairs, and alterations authorized by the manufacturer.

MAINTENANCE
Means inspection, overhaul, repair, preservations and the replacement of parts, but excludes preventive maintenance.

MAJOR REPAIR, ALTERATION, OR MAINTENANCE
Any repair, alteration, or maintenance for which instructions to complete the task excluded from the maintenance manual(s) supplied to the consumer are considered major.

MANUFACTURER
Any entity engaged in the production of an LSA or component used on an LSA.

MINOR REPAIR, ALTERATION, OR MAINTENANCE
Any repair, alteration, or maintenance for which instructions provided for in the maintenance manual(s) supplied to the consumer of the product are considered minor.

ON CONDITION
The necessary inspections and/or checks to determine that a malfunction or failure will not occur prior to the next scheduled inspection.

OPERATING HOURS OF ENGINE
The time in service when the engine is running irrespective of the load factor of the engine, such as idling or takeoff power.

OPERATIONAL INSPECTION
The purpose of operational inspection is to determine that a system or an item is operable. This inspection requires no special equipment. The operational inspection is comparable to the inspection performed out by the flight crew. The purpose of the operational inspection is to determine that an item is fulfilling its intended purpose. It does not require quantitative tolerances. This is a failure finding task.

OVERHAUL
Maintenance, inspection, repair, or alterations that are only to be accomplished by the original manufacturer or a facility approved by the original manufacturer of the product.

SCHEDULED MAINTENANCE
Preventative maintenance tasks scheduled to be accomplished at specified intervals.

SPECIAL INSPECTION
Inspection of components or systems based on calendar time, hours or cycles which does not coincide with the scheduled inspection.

UNSCHEDULED MAINTENANCE
Inspections and checks for damage after operating the aircraft in conditions which could require unscheduled maintenance, i.e. hard landing, etc.

VISUAL INSPECTION
An observation to determine that item is fulfilling its intended purpose. Visual inspection criteria can be accomplished without disassembly or removal of adjacent equipment. It does not require quantitative tolerances. This is a failure finding task.

WEAR
Material or part consumed as a result of exposure to operation or usage.

This page is left blank intentionally

05-10 TIME LIMITS

The inspections described herein constitute what the aircraft manufacturer considers necessary to ensure the continued airworthiness of WT9 Dynamic LSA aircraft.

1. INTRODUCTION

The inspection program is based on the number of flight hours, operating hours of engine and calendar time. The method for recording flight hours and operating hours of engine remains consistent throughout the life of the aircraft.

The owner or operator must record the number of flight hours, operating hours of engine and time of operation used for purpose of complying with inspection intervals.

2. INSPECTION INTERVALS

The aircraft manufacturer's inspection program has been developed to enable an owner to accomplish requested inspections and maintenance with Civil Aviation Authorities regulations.

If two inspection requirements are given for one inspection item, the limit that is reached first must be applied.

The following inspection intervals at which the items are to be inspected on normal usage under average environmental conditions.

A. 25-hour inspection

For the new aircraft, the special inspection must be performed at first 25 flight hours.

B. 100-hour inspection

Complete inspection of aircraft must be performed each 100 flight hours.

At the aircraft with less than 100 flight hours flown per year an annual inspection must be performed.

C. Annual inspection

Complete inspection of aircraft must be performed each 12 calendar months. The inspection items to be covered in the annual inspection are identical to the 100-hour inspection items.

D. Special inspection intervals

For special inspections specified in other intervals than 100-hour or annual, the inspection of aircraft's part or system must be performed each prescribed interval.

E. Unscheduled maintenance checks

Abnormal aircraft operations require special maintenance checks. Definitions and unscheduled inspection procedures are listed in the Chapter 05-50.

3. INSPECTION TOLERANCES

The inspection intervals shall not deviate from the inspection time limits shown in table of inspection tolerances (see Tab. 05-1). The exceeding of scheduled inspection interval shall be used only to finish the flight that started before inspection interval or for a flight with the purpose to reach a place, where the inspection will be carried out.

CAUTION

IF IS THE WORD “max.” IS PRESCRIBED (SEE TABLE 05-4) DO NOT APPLY TOLERANCE.

INSPECTION INTERVAL	MAX. TOLERANCE	INSPECTION ENVELOPE	START	FINISH
25-hour inspection	± 2.5 hours	5 hours	2.5 hours before due date	2.5 hours after due date
100-hour inspection	± 10 hours	20 hours	10 hours before due date	10 hours after due date
Annual inspection (12 calendar months)	± 2 months	4 months	2 months before due date	2 months after due date
Special interval - flight hours	± 10%	20%	10% before due date	10% after due date
Special interval - date	± 10%	20%	10% before due date	10% after due date

Tab. 05-1 Inspection Tolerances

Example: If 100-hour inspection is scheduled, it must be accomplished anytime between 90 and 110 hours. The next 100-hour inspection must be accomplished anytime between 190 and 210 hours, etc.

Each inspection interval can be exceeded by allowed tolerances or can be performed early at any time prior to the regular interval as provided bellow (see Fig. 05-1):

- In the event of compliance of any inspection scheduled, that occurs within inspection tolerances, the next phase due point remains as originally set (see Fig 05-1, EXAMPLES 1 and 2).
- In the event of early compliance of any inspection scheduled, that occurs more ahead than inspection tolerances of schedule, the next phase due point must be rescheduled to establish a new due point from the time of early accomplishment (see Fig 05-1, EXAMPLES 3 and 4).
- In the event of late compliance of any inspection scheduled, the next inspection in sequence retains a due point from the time to the late inspection was originally scheduled (see Fig 05-1, EXAMPLE 5).

NOTE

Inspection intervals and tolerances specified by the original equipment manufacturers, Airworthiness Directives, etc. take precedence over inspection intervals and tolerances authorized by aircraft manufacturer.

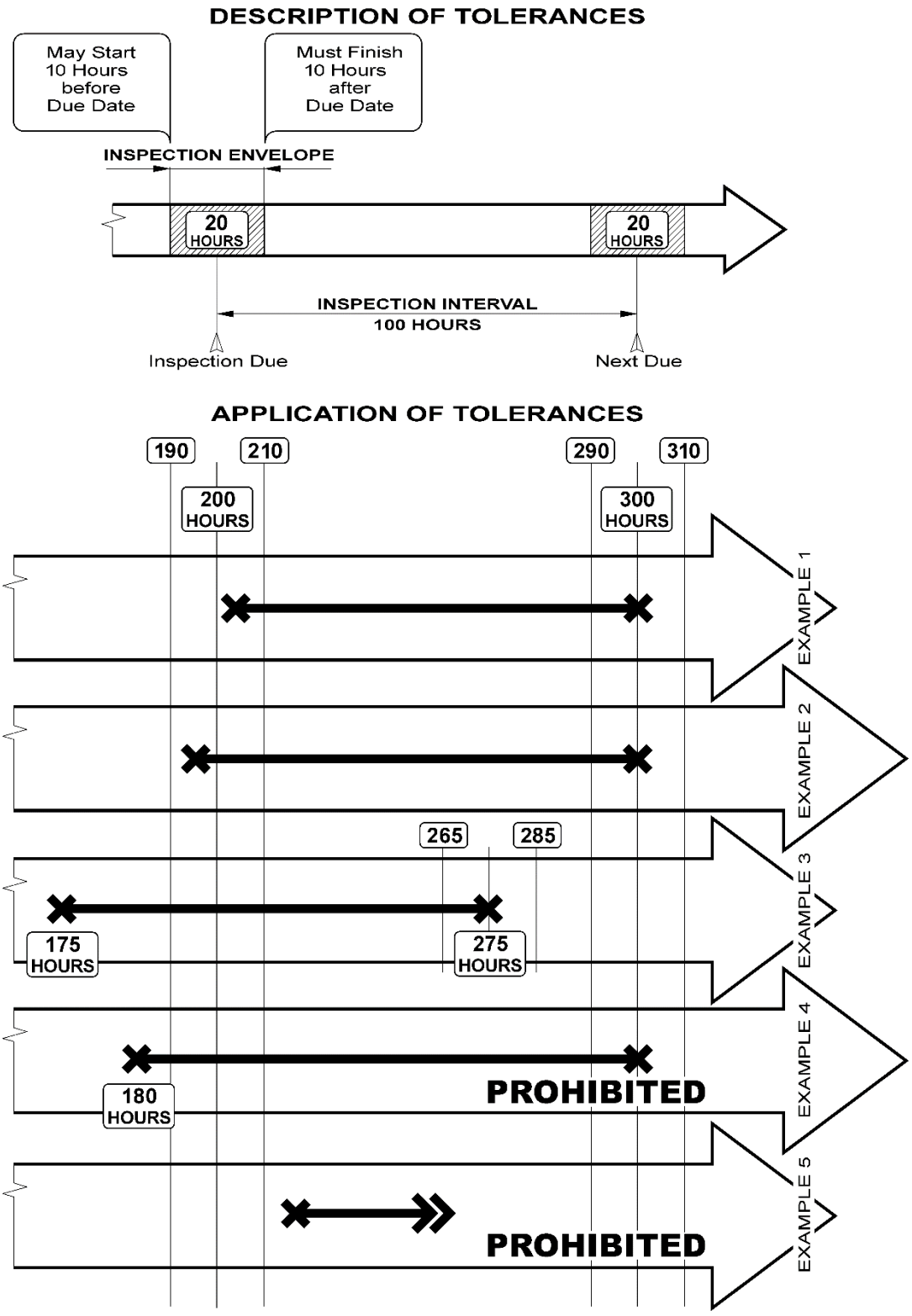


Fig. 05-1 Description and Application of Inspection Tolerances (example)

4. SERVICE BULLETINS

The aircraft manufacturer issues service information for owners in the form of three classes of service bulletins. The service bulletins determine the time limit until the aircraft must comply with.

A. Mandatory Service Bulletin (“Safety Related”)

Mandatory Service Bulletin is issued in such cases:

- Failure to meet airworthiness requirements - for repair of structural deficiencies, the inspection of critical parts, replacement of critical parts of the aircraft's structure and parts used in aircraft assemblies.
- Necessary airworthiness conditions changes concerning actions having a direct impact on the safety, changes in the Pilot´s Operating Handbook (chapters Limitations, Normal Procedures, Emergency Procedures), changes in the time limits and content maintenance tasks that have an impact on safety.

B. Recommended Service Bulletin

Recommended Service Bulletin is issued in such cases:

- Increasing the level of safety concerning aircraft equipment, changes in the time limits and maintenance tasks content, changes in the Pilot´s Operating Handbook (chapters General, Performance).

C. Information Service Bulletin

These bulletins contain information technical-economic nature; the implementation is not required for airworthiness.

The owner should be to ensure that all applicable bulletins are complied with.

5. PUBLICATIONS, REFERENCES

All inspections listed in this chapter, should be accomplished with reference to the WT9 Dynamic LSA Aircraft Maintenance Manual, Airworthiness Directives, Service Bulletins, Service Instructions, Service Letters and applicable vendors publications.

05-11 REPLACEMENT SCHEDULE

The first replacement must be performed no later than the recommended period. The condition of the item at the end of the first period can be used as a criterion for determining subsequent periods.

Items NOT listed in Tab. 05-2 are to be replaced "ON CONDITION". If "ON CONDITIONS" items are worn, inoperative, inaccurate, and intermittent and are not repairable through normal maintenance practices, they must be replaced.

Requirements on replacement of aircraft parts and equipment are given in Tab. 05-2.

CAUTION

ONLY ORIGINAL PARTS PROVIDED WITH EASA FORM 1 PURCHASED FROM THE AIRCRAFT OR ORIGINAL EQUIPMENT MANUFACTURERS SHALL BE INSTALLED ON THE WT9 DYNAMIC LSA AIRCRAFT.

CHPT.	ITEM	REPLACEMENT
24	Battery	5 years or capacity drop bellow 80% whichever comes first
24	SV-BAT-320 battery	When test duration is less than 45 min.
25	EPS Magnum 601 S-LSA	18 years; Every 6 years rocket inspection and parachute repacking
25	Safety harness Schroth	12 years
25	ELT Kannad 406 AF-COMPACT main unit battery	6 years
25	ELT Kannad AF INTEGRA main unit battery	7 years
28	Fuel system rubber hoses	5 years
32	Rubber damper, rubber support and rubber ropes of nose gear leg	5 years
32	Rubber supports of main gear legs	5 years
71	Engine rubber parts	5 years; For more information, refer to Line Maintenance Manual for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191)
71	Engine mount shocks	5 years
73	Engine fuel pump	5 years; For more information, refer to Line Maintenance Manual for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191)
75	Cooling system rubber hoses	5 years
79	Oil system rubber hoses	5 years

Tab. 05-2 Replacement of Aircraft Parts

This page is left blank intentionally

05-12 OVERHAUL SCHEDULE

The first overhaul must be performed no later than the recommended period. The condition of the item at the end of the first period can be used as a criterion for determining subsequent periods.

Items NOT listed in Tab. 05-3 are to be overhauled "ON CONDITION". If "ON CONDITIONS" items are worn, inoperative, inaccurate, and intermittent and are not repairable through normal maintenance practices, they must be overhauled or replaced.

Requirements on overhaul aircraft parts and equipment are given in Tab. 05-3.

CAUTION

ONLY ORIGINAL PARTS PROVIDED WITH EASA FORM 1 PURCHASED FROM THE AIRCRAFT OR ORIGINAL EQUIPMENT MANUFACTURER SHALL BE INSTALLED ON THE WT9 DYNAMIC LSA AIRCRAFT.

CHPT.	ITEM	OVERHAUL
61	Propeller KW-31	Recommended period is 1400 hours or 48 months whichever comes first. For overhaul period refer to the “UM-05 EN - User Manual Aircraft Propeller Type-Model KW-31”, last valid issue.
71	Engine	Recommended period between overhauls is 2000 hours or 15 years, whichever comes first. For more information, refer to Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191) and Service Bulletin No. SB-912-041, last valid issue.
95	Tow release E 85/1-79	2000 starts / 10000 actuations

Tab. 05-3 Overhaul of Aircraft Parts

This page is left blank intentionally

05-20 SCHEDULED MAINTENANCE CHECKS

CAUTION

THE RECOMMENDED PERIODS DO NOT CONSTITUTE A GUARANTEE THE ITEM WILL REACH THE PERIOD WITHOUT MALFUNCTION.

1. RESPONSIBILITY OF OWNER

The owner is responsible for maintaining the aircraft in an airworthy condition, including compliance with all applicable Airworthiness Directives.

The owner must ensure that qualified personnel do the maintenance.

The owner should ensure that the airframe, aircraft systems and power plant mechanic inspecting the aircraft has access to all necessary manuals and service information.

The owner is responsible to obtain specific approval from their local Airworthiness Authority for any alternation to the inspect program.

The owner is responsible to ensure that all service bulletins which are pertinent to his particular operation are complied with.

2. AUTHORISATION TO PERFORM

In the particular chapters of Aircraft Maintenance Manual are established the levels of certification needed to accomplish the task.

A. Heavy maintenance

Heavy maintenance is authorised to be performed by:

- Independent certifying staff qualified in accordance with Part-66
- Maintenance personnel of a Part-M, Section A Subpart F maintenance organisation

B. Line maintenance

Line maintenance is authorised to be performed by:

- Independent certifying staff qualified in accordance with Part-66
- Maintenance personnel of a Part-M, Section A Subpart F maintenance organisation
- Some line maintenance is authorised to be performed by a Pilot/Owner qualified in accordance with M.A.803.

Minimum required authorisation for performing of 25 hr. / 100 hr. / annual / special inspection is independent certifying staff qualified in accordance with Part-66 or higher.

3. INSPECTION GUIDELINES

The List of Inspection Requirements is given in Tab. 05-4.

Detailed inspection procedures of systems and components in the aircraft will be found in various chapters of this Aircraft Maintenance Manual.

4. INSPECTION OF ITEMS – GENERAL

In the text of individual operations, where the check for condition is required, dominant activities carried out at checking for condition can be mentioned in brackets, e.g. "check fuselage skin for condition (damage, deformation, cracks)".

A. Movable parts:

Inspect for lubrication, servicing, security of attachments, binding, excessive wear, safetying, proper operation, proper adjustment, correct travel, cracked fittings, security of hinges, defective bearings, cleanliness, corrosion, deformation, sealing and tension.

B. Fluid lines and hoses:

Inspect for leaks, cracks, collapsing, twisting, dents, kinks, chaffing, proper bend radius, security, discoloration, deterioration, proper routing, rubber hoses for hardness or flexibility loss and metal lines for corrosion, check service life of hoses.

C. Metal parts:

Inspect for attachments, fatigue cracks, broken spot-welds, distortion, deterioration, condition of paints (especially clamps and hose ties at seams and around fasteners for onset of corrosion) and any other apparent damage.

D. Composite parts:

Inspect for cracks, separation of bond, delamination, wear, overheating, fluid saturation, deformation, condition of paint and any other apparent damage.

E. Structural fasteners:

Inspect for wear, damage, stretch, proper torque (when inspection indicates the need for a torque check), and safety wiring.

F. Filters, screens and fluids:

Inspect for cleanliness and replace at specified intervals.

G. Wiring:

Inspect for security, chafing, defective insulation, loose and broken terminals, heat deterioration, terminals corrosion and any other apparent damage.

5. SCHEDULED INSPECTION PROGRAM

AC TYPE: WT9 Dynamic LSA	AC MODEL: Club		
SERIAL NUMBER:	REGISTRATION NUMBER:		
LAST INSPECTION DATE:	LAST INSPECTION HOURS:		
TOTAL F.H.:	CYCLES:		
DATE IN:	DATE OUT:		
INSPECTION INTERVAL (inappropriate scrape):	First 25 hr.	100 hr. / Annual	Special

Preparatory works		**Interval (flight hours)**		**Initials:**
		First 25 hr.	**100 hr./ Annual/ Special**	
1.	Check status of: • Applicable Airworthiness Directives • Applicable Service Bulletins • Log Books (reported problems) • Registration Certificate	X	X	
2.	Inspect life limited parts (replaced, overhauled).	X	X	
3.	Drain the fuel tanks. Inspect drain valves for condition, obstruction and blockage.	X	X	
4.	Clean the aircraft fully (exterior, interior).	X	X	
5.	Visual inspection of interior marking and placards for condition (legibility and intactness).	X	X	
6.	Visual inspection of exterior marking and placards for condition (legibility and intactness).	X	X	
7.	Jack the aircraft.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 1 of 13)

Preparatory works		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	**Engine Inspection.** For engine inspection, refer to Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191), latest issue.			
2.	**Engine Cowlings and Firewall**			
2.1	Remove engine cowlings. Clean and perform visual inspection for cracks, damages, loose or missing fasteners. Inspect the condition of oil inspection door.	X	X	
2.2	Visual inspection of engine cowlings fireproofing for condition and attachment (bottom cowling only).	X	X	
2.3	Visual inspection of firewall and seals for cracks, condition and attachment.	X	X	
2.4	Visual inspection of landing lights for condition, attachment and security.	X	X	
2.5	Visual inspection of all parts installed at firewall for condition, attachment and security.	X	X	
3.	**Battery**			
3.1	Remove battery cover. Visual inspection of terminals and cables corrosion, tightening and condition. Inspection of battery charge condition.	X	X	
3.2	Visual inspection of battery attachment and condition of fireproofing. Install battery cover.	X	X	
4.	**Engine Mount**			
4.1	Visual inspection of engine mounts for weld cracks, bending, corrosion and distortion.	X	X	
4.2	Visual inspection of rubber silentblocks for cracks, excessive deformation and condition.	X	X	
4.3	Visual inspection of engine attachment, bolts and nuts security (engine – engine mount, engine mount - firewall).	X	X	
4.4	Remove the engine mount attaching bolts. Visual inspection of bolts for cracks, deformation and damage. Install the bolts and inspect for proper nut torque.		600 hr.	
5.	**Fuel System**			
5.1	Remove the fuel filter covers.	X	X	
5.2	Visual inspection of fuel hoses and connections for condition, leak and security. Visual inspection of fireproof insulation for conditions, integrity, chafing and security.	X	X	
5.3	Check and clean the strainers. Replace fuel filters.	X	X	
5.4	Check the vent hoses at the bottom of fuselage for damage, obstruction and blockage.	X	X	
5.5	Install the fuel filter covers.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 2 of 13)

Engine Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
6.	**Oil System**			
6.1	Visual inspection of oil tank for condition, attachment and security.	X	X	
6.2	Visual inspection of oil cooler and oil thermostat for condition, leak, attachment and security.	X	X	
6.3	Visual inspection of hoses and connections for condition, leak and security. Visual inspection of fireproof insulation for conditions, integrity, chafing and security.	X	X	
6.4	Check oil level. Add oil if necessary.	X	X	
7.	**Cooling System**			
7.1	Visual inspection of water radiator and water thermostat for condition, leak, attachment and security.	X	X	
7.2	Visual inspection of hoses and tubes for condition, leak, attachment and security.	X	X	
7.3	Visual inspection of overflow bottle for condition, attachment and security.	X	X	
7.4	Check the coolant level in the expansion tank and overflow bottle. Add coolant if necessary.	X	X	
7.5	Check the coolant condition. Change as necessary.		X	
7.6	Towing version only: Visual inspection of cooling air distributor for condition and attachment.	X	X	
8.	**Induction system**			
8.1	Visual inspection of carburettors, drip trays and control cables for condition, attachment and security.	X	X	
8.2	Visual inspection of airbox and airbox-carburettors hoses for condition, attachment and security.	X	X	
8.3	Visual inspection air filter holder for condition, attachment and security. Check the operation of carburettor preheating control.	X	X	
8.4	Visual inspection of air filter for condition, contamination, attachment and security. Clean or replace impure filter.	X	X	
8.5	Visual inspection of intake manifold and air hoses for condition, attachment and security.	X	X	
8.6	Visual inspection of shroud and air hose for condition, attachment and security.	X	X	
9.	**Exhaust System**			
9.1	Visual inspection of muffler for condition, attachment, cracks, corrosion, deformations or damages and security.	X	X	
9.2	Visual inspection of exhaust pipes for condition, attachment, cracks, corrosion, deformations or damages and security	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 3 of 13)

Engine Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
10.	**Heating**			
10.1	Visual inspection of mixing chamber for condition, attachment and sealing.	X	X	
10.2	Check operation of mixing chamber's heating and venting flaps control.	X	X	
10.3	Visual inspection of shroud and intake deflector for conditions, attachment and security.	X	X	
10.4	Visual inspection of air hoses for condition, attachment and security.	X	X	
11.	**Engine Wiring**			
11.1	Visual inspection of wires for damage and security.	X	X	
11.2	Visual inspection of sensors for condition, attachment and security.	X	X	
12.	**Lubrication in Engine Compartment**			
12.1	Lubricate according to lubrication chart (Chapter 12-20).		X	
13.	**Engine Cowlings and Firewall**			
13.1	Install lower engine cowlings.	X	X	

Propeller Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	**Propeller PerformanceLine 175/xxx/805.5**			
1.1	Remove the spinner. Visual inspection of spinner for condition, cracks and damage.	X	X	
1.2	Visual inspection of propeller blades, especially on leading edges for condition, nicks, bends, cracks and damage.	X	X	
1.3	Visual inspection of propeller hub for condition, cracks, attachment and security.	X	X	
1.4	Inspect for proper nut torque.	X	X or 6 months	
1.5	Install spinner.	X	X	
2.	**Propeller KW-31** For propeller inspection, refer to "UM-05 EN - User Manual Aircraft Propeller Type-Model KW-31", last valid issue.			

Tab. 05-4 Scheduled Maintenance Tasks (page 4 of 13)

Landing Gear and Brake System Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	**Nose Landing Gear**			
1.1	Remove nose wheel fairing. Clean and perform visual inspection for condition, crack, rubbing and damage.	X	X	
1.2	Visual inspection of tire for cuts, uneven or excessive wear and slippage.	X	X	
1.3	Inspect proper tire pressure.	X	X	
1.4	Inspection wheel discs for damage and the condition of bearings by rotating wheel.	X	X	
1.5	Visual inspection of carbon fork for condition, attachment, delamination and damages.	X	X	
1.6	Visual inspection of nose gear leg condition, attachment, bushings, cracking, condition and security.	X	X	
1.7	Visual inspection of lower and upper supports for condition, deformations and cracks.	X	X	
1.8	Visual inspection of bolt connections in the lower and upper supports for condition and security.	X	X	
1.9	Visual inspection of center mechanism for wear, condition, attachment and security. Operational inspection of center mechanism (turn the nose wheel from side to side).	X	X	
1.10	Visual inspection connection of steering push-pull rods for condition, attachment and security.	X	X	
1.11	Visual inspection of the rubber ropes for chafing and excessive wear. Replace if necessary.	X	X	
1.12	Lubricate according to lubrication chart (Chapter 12-20).		X	
2.	**Main Landing Gear**			
2.1	Remove the main wheel fairings and main leg fairings. Clean and perform visual inspection for condition, crack, rubbing and damage.	X	X	
2.2	Visual inspection of tire for cuts, uneven or excessive wear and slippage.	X	X	
2.3	Inspect proper tires pressure.	X	X	
2.4	Inspection wheel discs for damage and the condition of bearings by rotating wheel.	X	X	
2.5	Visual inspection of landing gear legs for condition, cracks or damage.	X	X	
2.6	Visual inspection of fuselage structure at the entry points of landing gear legs for delaminations.	X	X	
2.7	Visual inspection of main gear legs for attachment and securing. Inspect for proper nut torque.	X	X	
2.8	Lubricate according to lubrication chart (Chapter 12-20).		X	

Tab. 05-4 Scheduled Maintenance Tasks (page 5 of 13)

Landing Gear and Brake System Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
3.	**Brake System**			
3.1	Visual inspection of callipers, brake discs and brake pads for condition, attachment, wear, evidence of overheating and securing.	X	X	
3.2	Remove upholstery, both seats and pedestal panel.	X	X	
3.3	Visual inspection of brake hoses for condition, attachment and leak.	X	X	
3.4	Visual inspection of master cylinder and pressure limiter for condition, attachment and leak. Operation inspection of master cylinder. Adjust if necessary.	X	X	
3.5	Inspect the brake fluid level in reservoir. Add brake fluid if necessary.	X	X	
3.6	Inspect the brake fluid condition. Change as necessary.		X	
3.7	Lubricate according to lubrication chart (Chapter 12-20).		X	
3.8	Install nose wheel fairing, main wheel fairings and main leg fairings.	X	X	

Wing Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	**Wing**			
1.1	Visual inspection of wings for condition, delaminations, deterioration, distortion, cracks, paint condition and other damages.	X	X	
1.2	Visual inspection of stall strips and ACI stall warner for condition and attachment.	X	X	
1.3	Visual inspection of pitot probe for condition, attachment and obstruction.	X	X	
1.4	Visual inspection of anti-collision/strobe lights for condition and attachment.	X	X	
1.5	Inspection of wing attachment plays by moving of wing tip up-down and forward-backward.	X	X	
1.6	Remove the wings. Visual inspection of bushings and wing root ribs for cracks, delaminations and splintering. Lubricate bushings and install wings.		X or 200 hr.	
1.7	Knock thoroughly the skin in order to detect delamination of shells.		X	

Tab. 05-4 Scheduled Maintenance Tasks (page 6 of 13)

Wing Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
2.	**Ailerons and Trim Tab**			
2.1	Visual inspection of ailerons and trim tab for condition, delaminations, deterioration, distortion, cracks, paint condition and other damages.	X	X	
2.2	Visual inspection of aileron's mass balance weight for condition, cracks and attachment.	X	X	
2.3	Visual inspection of ailerons and trim tab for attachment and security.	X	X	
2.4	Visual inspection of aileron and trim tab hinges for condition, wear, play and freedom of movement.	X	X	
2.5	Lubricate according to lubrication chart (Chapter 12-20).		X	
2.6	Visual inspection of aileron sealing tapes for conditions and attachment.	X	X	
3.	**Wing Flaps**			
3.1	Visual inspection of wing flaps for condition, delaminations, deterioration, distortion, cracks, paint condition and other damages.	X	X	
3.2	Visual inspection of wing flaps for attachment and security.	X	X	
3.3	Visual inspection of wing flap hinges for condition, wear, play and freedom of movement.	X	X	
3.4	Visual inspection of wing flaps stops for condition when the wing flaps are retracted.	X	X	
3.5	Lubricate according to lubrication chart (Chapter 12-20).		X	

Fuselage Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Visual inspection of fuselage for condition, delaminations, deterioration, distortion, cracks, paint condition and other damages. Pay special attention to the bottom of wing central section and walkway areas.	X	X	
2.	Visual inspection of landing gear legs attachment in the fuselage for cracks, delamination and other damages.	X	X	
3.	Visual inspection of lower fin for attachment, cracks and damage.	X	X	
4.	Visual inspection of antennas for condition and security.	X	X	
5.	Knock thoroughly the skin in order to detect delamination of shells.		X	

Tab. 05-4 Scheduled Maintenance Tasks (page 7 of 13)

Canopy Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Visual inspection of canopy for condition, operation, delaminations, deterioration, distortion, cracks, scratches, paint condition and other damages.	X	X	
2.	Visual inspection of canopy hinges for operation and security.	X	X	
3.	Check operation of gas struts, their attachment and security.	X	X	
4.	Check operation of canopy latch mechanism. Check the condition of canopy guide pins and sliding slots in fuselage.	X	X	
5.	Visual inspection of air outlets for condition, obstruction or blockage.	X	X	
6.	Lubricate according to lubrication chart (Chapter 12-20).		X	
7.	Clean the windshield and venting windows. Visual inspection of venting windows for condition and function.	X	X	

Empennage Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	**Horizontal Stabilizer and Elevator**			
1.1	Visual inspection of horizontal stabilizer and elevator for condition, delaminations, deterioration, distortion, cracks, paint condition and other damages. Pay special attention to the connection with the fuselage.	X	X	
1.2	Visual inspection of elevator's mass balance weight for condition and cracks.	X	X	
1.3	Visual inspection of elevator for attachment and security.	X	X	
1.4	Visual inspection of elevator hinges for condition, wear, play and freedom of movement.	X	X	
1.5	Lubricate according to lubrication chart (Chapter 12-20).		X	
1.6	Visual inspection of elevator sealing tapes for conditions and attachment.	X	X	
2.	**Vertical Stabilizer and Rudder**			
2.1	Visual inspection of vertical stabilizer and rudder for condition, delaminations, deterioration, distortion, cracks, paint condition and other damages.	X	X	
2.2	Visual inspection of rudder's mass balance weight for condition and cracks.	X	X	
2.3	Visual inspection of rudder for attachment and security.	X	X	
2.4	Visual inspection of rudder hinges for condition, wear, play and freedom of movement.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 8 of 13)

Empennage Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
2.5	Lubricate according to lubrication chart (Chapter 12-20).		X	
2.6	Visual inspection of rudder sealing tapes for conditions and attachment.	X	X	

Control Systems Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	**Elevator and Aileron Control**			
1.1	Visual inspection of control yoke for excessive play, smooth operation and security.	X	X	
1.2	Inspect of elevator control system push-pull rods, joints and attachment in the fuselage for condition, excessive play and security.	X	X	
1.3	Inspect of aileron control system push-pull rods, joints and attachment in the wing and fuselage for condition, excessive play and security.	X	X	
1.4	Lubricate according to lubrication chart (Chapter 12-20).		X	
1.5	Operational inspection of elevator control system for travel and freedom of movement.	X	X	
1.6	Operational inspection of aileron control system for travel and freedom of movement.	X	X	
2.	**Rudder Control System, Nose Wheel Steering**			
2.1	Visual inspection of rudder pedals for excessive play, smooth operation and security.	X	X	
2.2	Inspect the control cables for condition, attachment, wear, and security.	X	X	
2.3	Inspect of rudder control system joints and attachment for condition, excessive play and security.	X	X	
2.4	Inspect connection of push-pull rods to nose landing gear leg for condition, free play and security.	X	X	
2.5	Operational inspection of remote control adjustment of pedals.	X	X	
2.6	Inspect the cable tension.	X	X	
2.7	Lubricate according to lubrication chart (Chapter 12-20).		X	
2.8	Operational inspection of rudder control system for travel and freedom of movement.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 9 of 13)

Control Systems Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
3.	**Pitch and Roll Trim Systems**			
3.1	Operational inspection of pitch trim system springs, support lever and actuator for condition, attachment, free play and security.	X	X	
3.2	Operational inspection of roll trim system and actuator for condition, attachment, free play and security.	X	X	
3.3	Lubricate according to lubrication chart (Chapter 12-20).		X	
3.4	Operational inspection of pitch trim system for travel and freedom of movement.	X	X	
3.5	Operational inspection of roll trim system for travel and freedom of movement.	X	X	

Wing Flap Control System Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Remove the flap torsion tube covers and booster cover in the baggage compartment.	X	X	
2.	Visual and operational inspection of stotted link for condition, wear, proper function, free play and security.	X	X	
3.	Visual inspect the flap control system joints, booster and flap torsion tube condition, attachment and security.	X	X	
4.	Lubricate according to lubrication chart (Chapter 12-20).		X	
5.	Install the pedestal panel.	X	X	
6.	Set the flap control lever gradually to all positions and check free play of control system.	X	X	
7.	Operational inspection of wing flaps control system for smooth motion and safe locking in all positions.	X	X	
8.	Install the flap torsion tube covers and booster cover in the baggage compartment.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 10 of 13)

Emergency Parachute System Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Lock the EPS actuator.	X	X	
2.	Visual inspection of actuator and actuator protector for condition, attachment, twine and seal condition.	X	X	
3.	Remove emergency parachute system cover.	X	X	
4.	Visual inspection of rocket for condition, attachment and security.	X	X	
5.	Visual inspection of parachute container for condition, attachment and security.	X	X	
6.	Visual inspection of straps for security.	X	X	
7.	Install emergency parachute system cover.	X	X	

CAUTION

IF INSTRUCTIONS FOR CONTINUED AIRWORTHINESS OF EMERGENCY PARACHUTE SYSTEM ARE NOT MET, THE PARACHUTE SYSTEM MUST BE MARKED “INOPERATIVE”.

Cockpit Group		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Visual inspection of safety belts for condition, attachment, wear and locking.	X	X	
2.	Visual inspection of upholstery for condition and wear.	X	X	
3.	Visual inspection of seats for delamination, cracks and damages.	X	X	
4.	Remove the instrument panel cover.	X	X	
5.	Drain and perform visual inspection of pitot-static system for condition.	X	X	
6.	Functional inspection of pitot-static system for tightness.		Max. 2 years	
7.	Visual and functional inspection of altimeters and altitude encoder for condition and calibrations.		Max. 2 years	
8.	Visual and functional inspection of airspeed indicators for condition and calibration.		Max. 2 years	
9.	Functional inspection of ELT (self-test).	X	X	
10.	Visual inspection of ELT for condition, attachment, battery corrosion and security.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 11 of 13)

Cockpit Group (Continued)		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
11.	Visual inspection of instrument panel for condition, attachment and security.	X	X	
12.	Visual inspection of instruments for conditions and attachment.	X	X	
13.	Visual inspection of wires and connectors for condition, attachment and security.	X	X	
14.	Check operation of throttle control and choke control. Check for condition, movement and locking of controller in selected position.	X	X	
15.	Lubricate according to lubrication chart (Chapter 12-20).		X	
16.	Install the instrument panel cover	X	X	
17.	Install seats and upholstery.	X	X	
18.	Lower the aircraft.	X	X	

Towing equipment		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Visual inspection of tow release for condition, attachment and security.	X	X	
2.	Visual inspection of rear-view camera for condition, attachment and security. Check function of rear-view camera.	X	X	
3.	Inspect the tow release control handle and levers for condition, attachment, wear and security.	X	X	
4.	Inspect the tow release control cable and joints for condition, attachment, wear and security.	X	X	
5.	Visual inspection of rear-view mirror for condition, attachment and security.	X	X	

Tab. 05-4 Scheduled Maintenance Tasks (page 12 of 13)

Operational and Functional Check		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Check aileron, elevator and rudder controls for full range of travel, excessive friction and obstructions.	X	X	
2.	Check the roll and pitch trim for full range of travel and indication.	X	X	
3.	Check extension, retraction and locking of wing flaps at all positions.	X	X	
4.	Check the full range of engine controls for motion, obstruction and excessive friction.	X	X	
5.	Set the altimeters to correct barometric pressure setting and check if indicate within 50 feet of field elevation.	X	X	
6.	Check the vertical speed indicators to indicate zero.	X	X	
7.	Check the radio communication capability.	X	X	
8.	Check the landing and anti-collision/strobe lights operation.	X	X	
9.	Start and warm the engine according to POH (Chapter 4).	X	X	
10.	Move the fuel selector to the LEFT and RIGHT positions to verify fuel flow.	X	X	
11.	Perform the brake test.	X	X	
12.	Perform ignition and engine ground test according to POH (Chapter 4).	X	X	
13.	Shut down the engine according to POH (Chapter 4).	X	X	
14.	Perform a walk around to detect any fluid leaks or other abnormalities. Check the fuel leak in the cockpit.	X	X	

Finishing Works		Interval (flight hours)		Initials:
		First 25 hr.	100 hr./ Annual/ Special	
1.	Install upper engine cowling. Close and check all covers are on their place.	X	X	
2.	Check the removal of all detected defects.	X	X	
3.	Fill out the required logbook entries.	X	X	
The end				

Tab. 05-4 Scheduled Maintenance Tasks (page 13 of 13)

Signature of Mechanic or Inspector: _____

Certificate Number: _____

This page is left blank intentionally

05-50 UNSCHEDULED MAINTENANCE CHECKS

1. GENERAL

During operation, the aircraft may be subjected to any incidents that could damage the aircraft and therefore unscheduled maintenance checks are required.

The following procedures may be in the details amended or supplemented according to the extent of damage. If necessary, please consult the aircraft manufacturer.

2. HARD LANDING CHECKS

AC TYPE: WT9 Dynamic LSA	AC MODEL: Club
SERIAL NUMBER:	REGISTRATION NUMBER:
LAST INSPECTION DATE:	LAST INSPECTION HOURS:
TOTAL F.H.:	CYCLES:
DATE IN:	DATE OUT:
INSPECTION INTERVAL:	UNSCHEDULED

Hard Landing		**Inspection Result:**	**Initials:**
1.	**Preparatory works**		
1.1	Visual inspection of aircraft's lateral and longitudinal position.		
2.	**Nose Landing Gear**		
2.1	Remove the nose wheel fairing. Visual inspection for damage.		
2.2	Visual inspection of nose leg for damage, deformation and cracks.		
2.3	Visual inspection of critical area of nose leg under lower support for cracks. If any doubts, use an available non-destructive testing method.		
2.4	Visual inspection of critical area of lid of upper support for cracks and deformations. If any doubts, use an available non-destructive testing method.		
2.5	Visual inspection of lower support for damage and deformation.		
2.6	Visual inspection of rubber ropes for damage.		
2.7	Functional inspection of steering and centring mechanism. Turn the nose leg from side to side to check abnormal resistance.		
2.8	Visual inspection of carbon fork for damage, delaminations and cracks.		
2.9	Visual inspection of tire for wear and damage.		
2.10	Visual inspection of wheel disc for damage and condition of bearings by rotating of wheel.		
2.11	Inspect proper tire pressure.		
2.12	Install the nose wheel fairings.		

Tab. 05-5 Unscheduled Maintenance Tasks – Hard Landing (page 1 of 2)

Hard Landing (Continued)		Inspection Result:	Initials:
3.	**Main Landing Gear**		
3.1	Remove the main wheel fairings and main leg fairings. Visual inspection for damage.		
3.2	Visual inspection of main legs for damage, deformation and cracks. Pay attention to entry point of landing legs to fuselage.		
3.3	Remove the upholstery, seats and inspection covers. Visual inspection of fuselage inner rib for damage, cracks and main leg attachment. Perform the inspection from interior side and through the gap around main leg's entry point.		
3.4	Visual inspection of fuselage outer rib for damage, cracks and main leg attachment.		
3.5	Visual inspection of tires for wear and damage.		
3.6	Visual inspection of wheel discs for damage and condition of bearings by rotating of wheels.		
3.7	Visual inspection of brake discs, brake pads and callipers for condition and damage. Visual inspection of brake system for leak.		
3.8	Inspect proper tire pressure.		
3.9	Install the inspection cover, seats and upholstery.		
3.10	Install the main wheel fairings and main leg fairings.		

Tab. 05-5 Unscheduled Maintenance Tasks – Hard Landing (page 1 of 2)

Signature of Mechanic or Inspector: _____

Certificate Number: _____

This page is left blank intentionally

06 DIMENSIONS AND AREAS

CONTENTS

Chapter	Description	Page
06-00	**DIMENSIONS AND AREAS**	**3**
	1. DESCRIPTION	3
	2. THREE-VIEW DRAWINGS	4
	A. General	6
	B. Wing	6
	C. Wing flaps	6
	D. Ailerons	6
	E. Vertical tail	6
	F. Horizontal tail	6
	G. Landing gear	6
	3. CONTROL SURFACES DEFLECTIONS AND CABLE TENSION SETTINGS	7
	A. Aileron	7
	B. Elevator	7
	C. Rudder	7
	D. Wing flaps	7
	4. HATCHES AND COVERS	8
	A. External hatches and covers	8
	B. Internal hatches and covers	10

This page is left blank intentionally

06-00 DIMENSIONS AND AREAS

1. DESCRIPTION

This chapter shows three-view drawing of aircraft, describes dimensions, hatches and covers. In the hatches and covers section the legends to the above figures specify what components are accessible after opened / removed and how hatches / covers are attached.

2. THREE-VIEW DRAWINGS

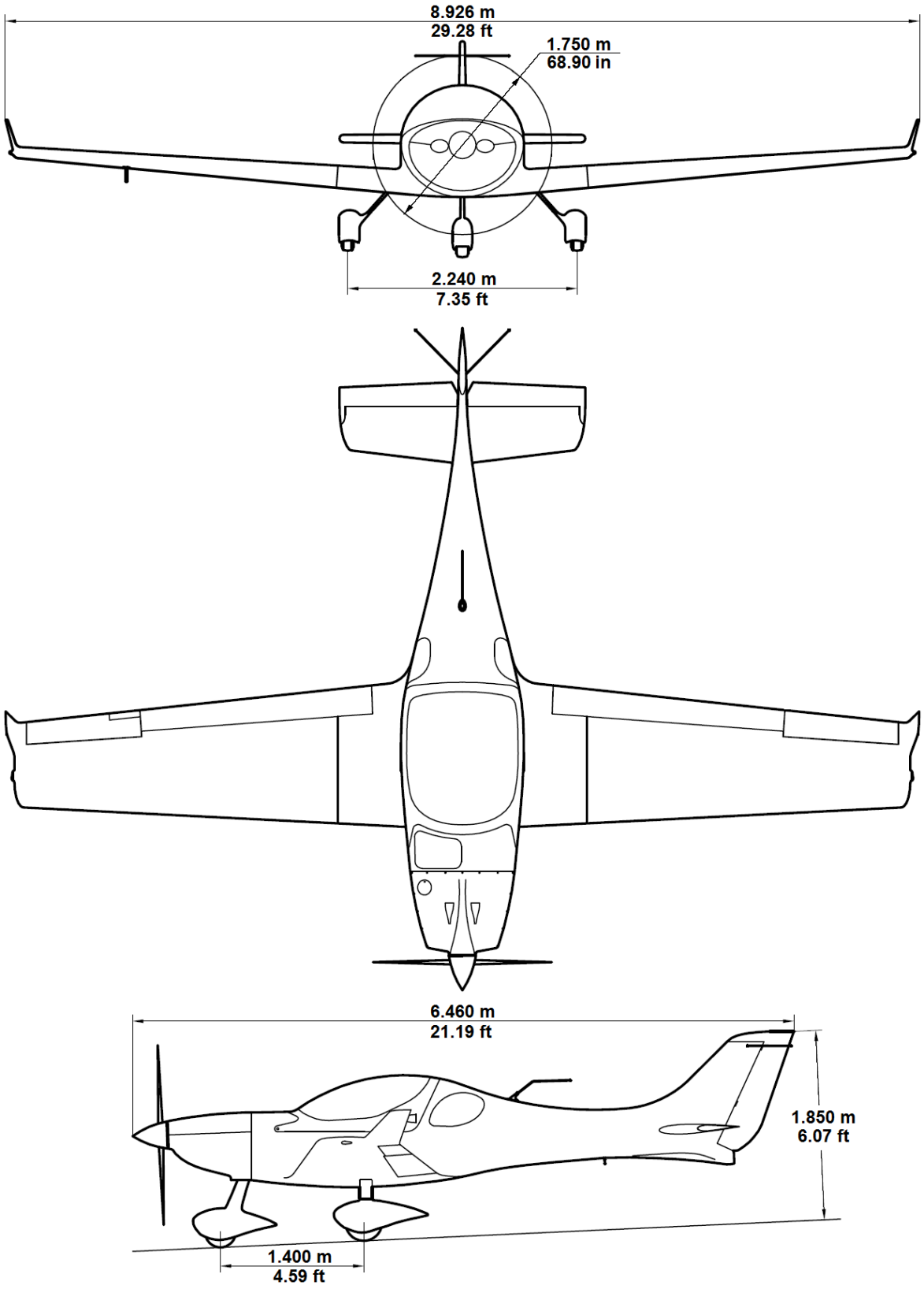


Fig. 06-1 Dynamic WT9 LSA / Club

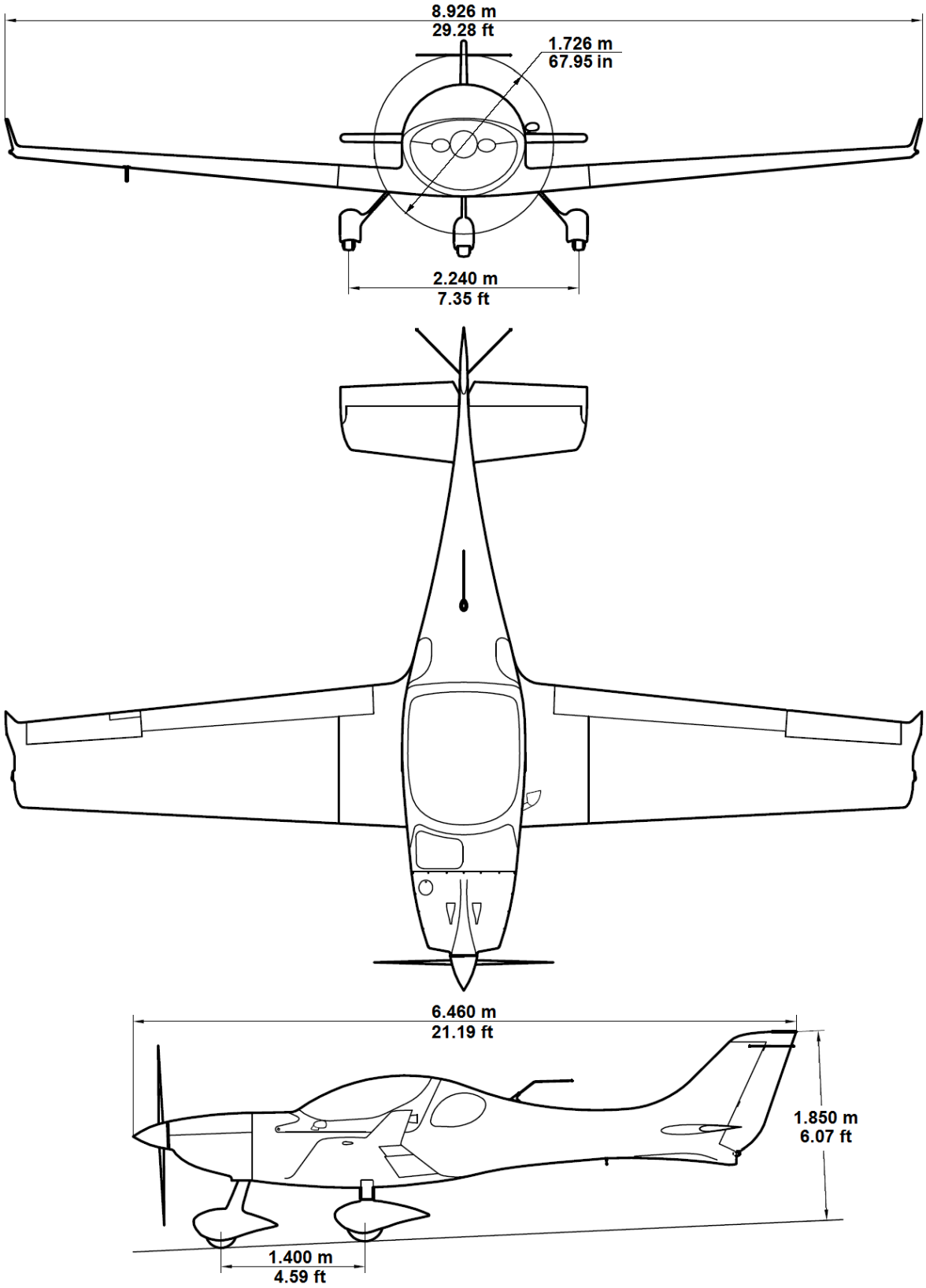


Fig. 06-2 Dynamic WT9 LSA / Club (Towing Version)

A. General

Wing span (Overall)	8.926 m	29.28 ft
Length (Overall)	6.460 m	21.19 ft
Height (Maximum)	1.850 m	6.07 ft
Propeller diameters:		
EVRA PerformanceLine 175/xxx/805.5	1.750 m	68.90 in
KW-31 (towing version)	1.726 m	67.95 in

B. Wing

Span	8.926 m	29.28 ft
Area	10.500 m^2	112.98 ft^2
Wing loading	57.14 kg/m^2	11.71 lb/ft^2
MAC length	1.172 m	3.84 ft

C. Wing flaps

Span	2.275 m	7.46 ft
Area	0.750 m^2	8.07 ft^2

D. Ailerons

Span	1.133 m	3.72 ft
Area	0.270 m^2	2.91 ft^2

E. Vertical tail

Span	1.208 m	3.96 ft
Vertical tail area	0.902 m^2	9.71 ft^2
Rudder area	0.333 m^2	3.58 ft^2

F. Horizontal tail

Span	2.400 m	3.96 ft
Horizontal tail area	1.680 m^2	18.08 ft^2
Elevator area	0.496 m^2	5.34 ft^2

G. Landing gear

Wheel track (main to main)	2.240 m	7.35 ft
Wheel base (main to nose)	1.400 m	4.59 ft
Main wheel tire size	15x6.00	
Nose wheel tire size	13x5.00	

3. CONTROL SURFACES DEFLECTIONS AND CABLE TENSION SETTINGS

A. Aileron

Aileron up deflection .....25° ±2°
Aileron down deflection.....15° ±2°
Trim tab up deflection .....18° ±1°
Trim tab down deflection.....20° ±1°

B. Elevator

Elevator up deflection .....28° ±2°
Elevator down deflection.....18° ±2°

C. Rudder

Rudder left deflection.....25° ±2°
Rudder right deflection.....25° ±2°
Rudder cable tension.....61-65 N

D. Wing flaps

Flaps 0 (retracted) .....0° ±2°
Flaps 1 (takeoff).....15° ±2°
Flaps 2 (landing).....24° ±2°
Flaps 3 (emergency landing) .....35° ±2°

4. HATCHES AND COVERS

A. External hatches and covers

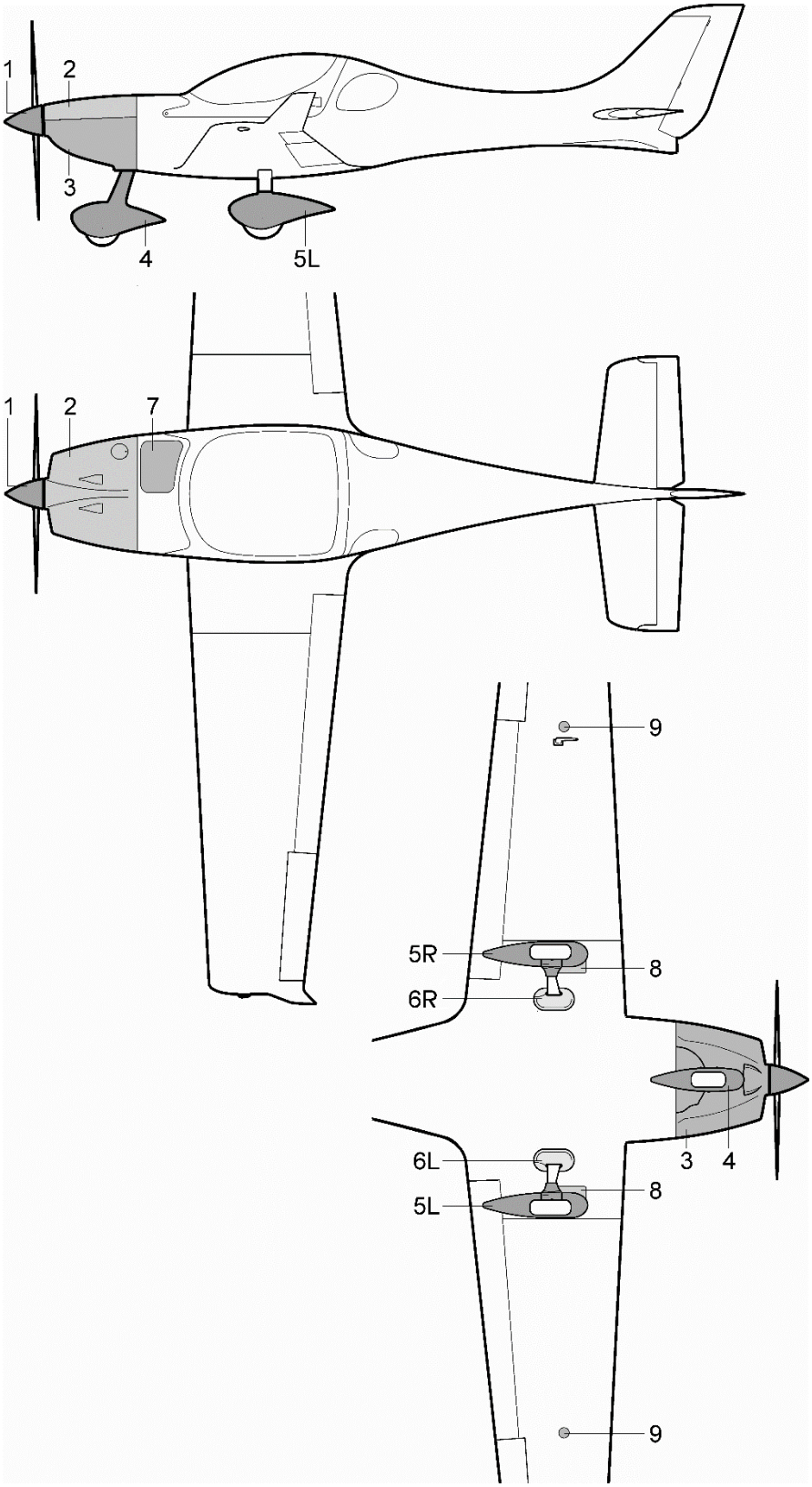


Fig. 06-3 External Hatches and Covers (page 1 of 2)

1 Propeller spinner – screwed on

2 Upper engine cowling – quick lock fasteners

3 Lower engine cowling –quick lock fasteners to upper engine cowling and screwed on fuselage

4 Nose wheel cover – screwed on

5L Main wheel fairing, left – screwed on

5R Main wheel fairing, right– screwed on

6L Main leg cover, left – screwed on

6R Main leg cover, right – screwed on

7 Emergency parachute system cover (separate the cover's contact surface to avoid of its bonding to the silicone seal) – screwed on.

8 Cover of installation hole (access to outer main pin) – screwed on

9 Installation hole cover (access to aileron control lever and push-pull rods) –silicone

Fig. 06-3 External Hatches and Covers (page 2 of 2)

CAUTION

DO NOT BOND THE EMERGENCY PARACHUTE SYSTEM COVER WITH A SILICONE. THE COVER MUST BE SEPARATED FROM THE SILICONE SEAL TO ENSURE EXTRACTION DEVICE TO REMOVE THE COVER.

B. Internal hatches and covers

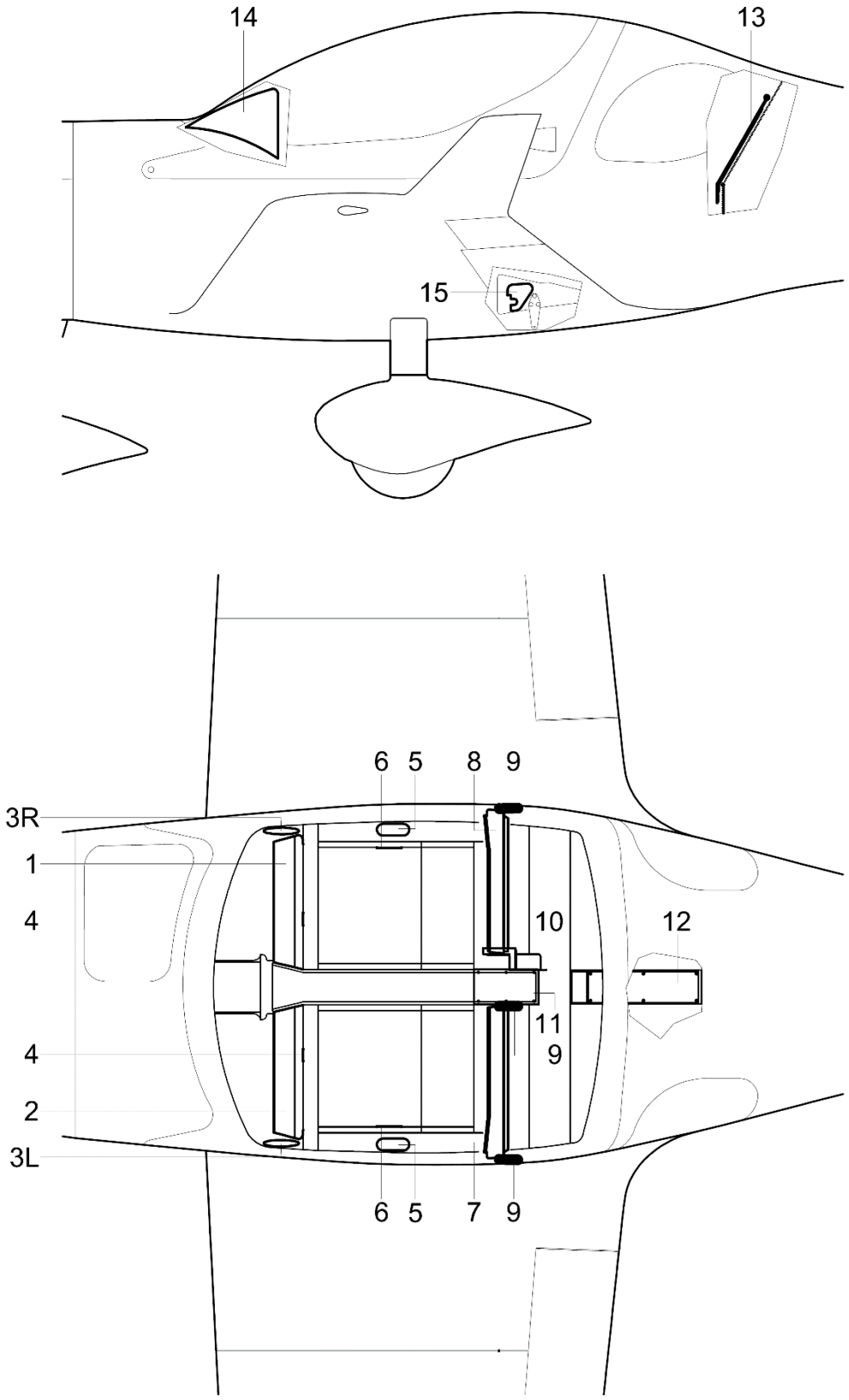
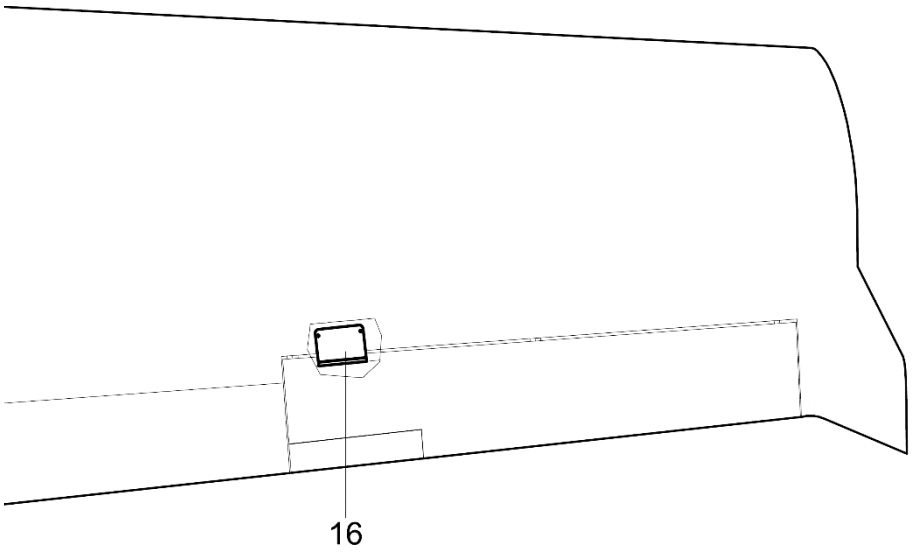


Fig. 06-4 Internal Hatches and Covers (page 1 of 2)



1 Fuel filter cover RH (access to RH fuel filter) – snapped on

2 Fuel filter cover LH (access to LH fuel filter) – snapped on

3R Inner fuel tank rib cover RH (access to RH fuel level sensor) – Velcro tape

3L Inner fuel tank rib cover LH (access to LH fuel level sensor) – Velcro tape

4 Main spar cover (access to bolts of yoke bearing clamps) – double-sided adhesive tape

5 Elliptical interior sidewall cover (access to main gear leg bolts) – silicone

6 Circular interior sidewall cover (access to main gear leg bolts) – silicone

7 Torsion tube cover 1 (access to flap torsion tube) – Velcro tape

8 Torsion tube cover 2 (access to flap torsion tube) – Velcro tape

9 Torsion tube cover 3 (access to flap torsion tube) – silicone

10 Cover of wing flap booster (access to flap booster) – screwed on

11 Cover behind slotted link (access to pitch trim actuator and elevator control) – screwed on

12 Central tunnel cover - aft (access to elevator control) – screwed on

13 Baggage bulkhead cover – Velcro tape

14 Instrument panel cover – screwed on

15 Torsion tube cover 4 (access to flap torsion tube) – silicone

16 Servo cover (access to roll trim servo) – silicone, screwed on

Fig. 06-4 External Hatches and Covers (page 2 of 2)

This page is left blank intentionally

07 LIFTING AND SHORING

CONTENTS

Chapter	Description	Page
07-00	**GENERAL**	**3**
	1. INTRODUCTION	3
07-10	**JACKING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Jacking	5
07-10	**SHORING**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	7
	A. Shoring	7

This page is left blank intentionally

07-00 GENERAL

1. INTRODUCTION

The aircraft is jacked and shored for maintenance, replacement of components, overhaul, and repair etc.

When possible, the aircraft should be located on a level surface. The jacking site should be protected from wind (preferably inside a hangar).

The aircraft may be jacked with the full fuel tanks.

When possible, the jacks should be used together with shoring.

This page is left blank intentionally

07-10 JACKING

1. DESCRIPTION

The aircraft has three jacking points (see Fig. 07-1). They are located under the fuselage and wing central section. The front jack is installed under the jacking point located on the right front lower side of the fuselage (under firewall). The two rear jacks are installed under jacking points, located symmetrically in wing central section (under auxiliary spar). Jacking points are identified on the fuselage by the placards "**LIFT HERE"**.

2. MAINTENANCE PRACTICES

A. Jacking

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Lift jack	3 pcs
Stand	1 pc
Persons	1

Tab. 07-1 Recommended tools, materials, persons and documentation

(1) Aircraft jacking:

(a) Place the aircraft on paved, level surface.

(b) Put 3 pcs lift jacks to appropriate jacking points.

(c) Extend the jacks until the wheels are clear of the ground. Operate the jacks together to keep the aircraft levelled as much as possible.

(d) Put stand under the tail and secure tail.

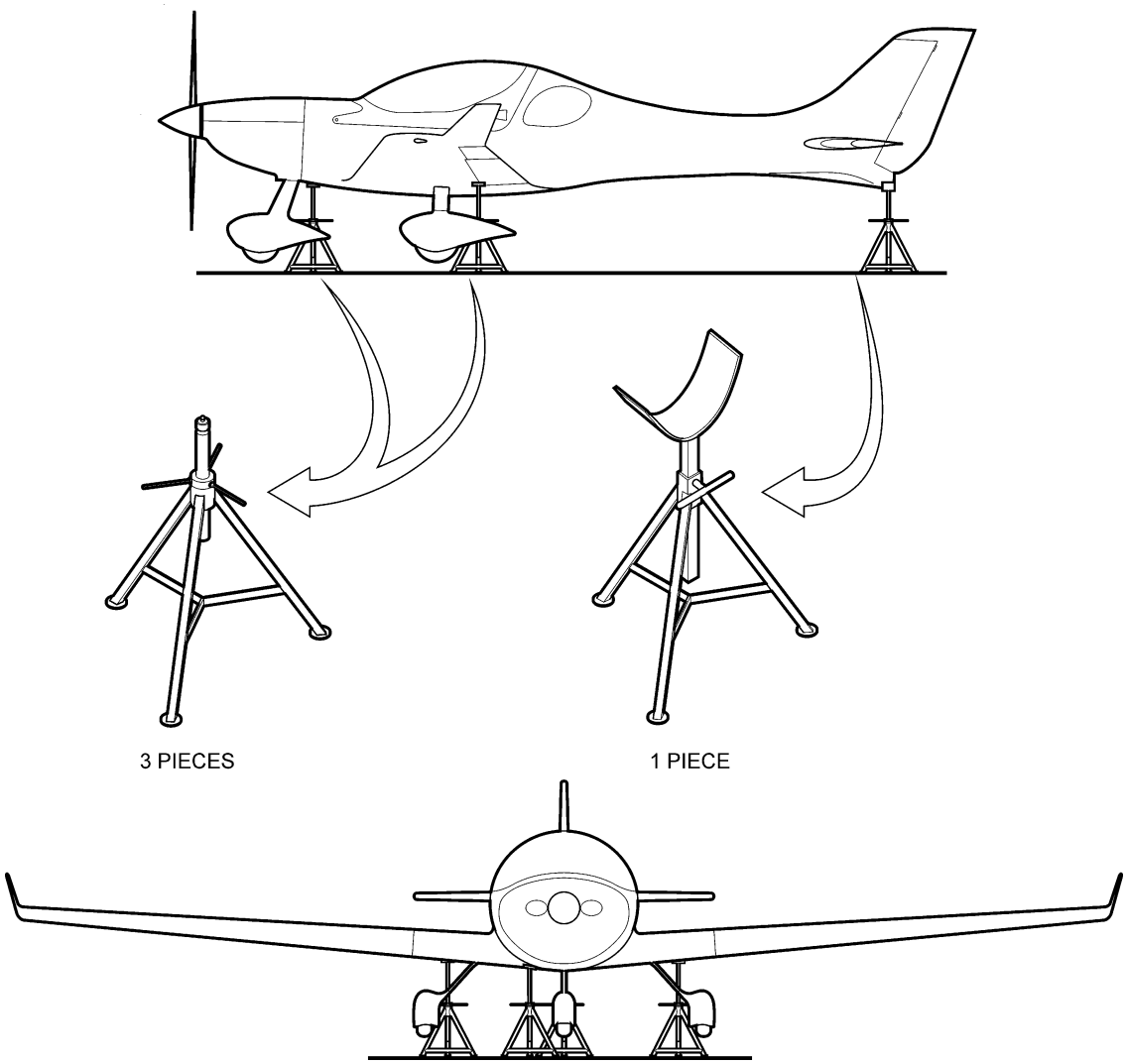


Fig. 07-1 Aircraft Jacking

(2) Aircraft lowering:

CAUTION

MAKE SURE THAT THE AREA UNDER THE AIRCRAFT IS CLEAR BEFORE YOU LOWER THE AIRCRAFT OFF JACKS.

(a) Remove stand under the tail.

(b) Retract the jacks until the wheels are on the ground. Operate the jacks together to keep the aircraft leveled as much as possible.

(c) Remove the jacks clear of the aircraft.

07-10 SHORING

1. DESCRIPTION

Before carrying out any maintenance in the rear section of aircraft, shore the aircraft to avoid upset (see Fig. 07-2).

The aircraft is shored by the front jack installed under the jacking point located on the right front lower side of the fuselage and the stand under the tail. Jacking point is identified on the fuselage by the placards "**LIFT HERE"**.

2. MAINTENANCE PRACTICES

A. Shoring

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Lift jack	1 pc
Stand	1 pc
Persons	1

Tab. 07-2 Recommended tools, materials, persons and documentation

(1) Aircraft shoring:

(a) Place the aircraft on paved, level surface.

(b) Put lift jack to front jacking point.

(c) Put stand under the tail and secure tail.

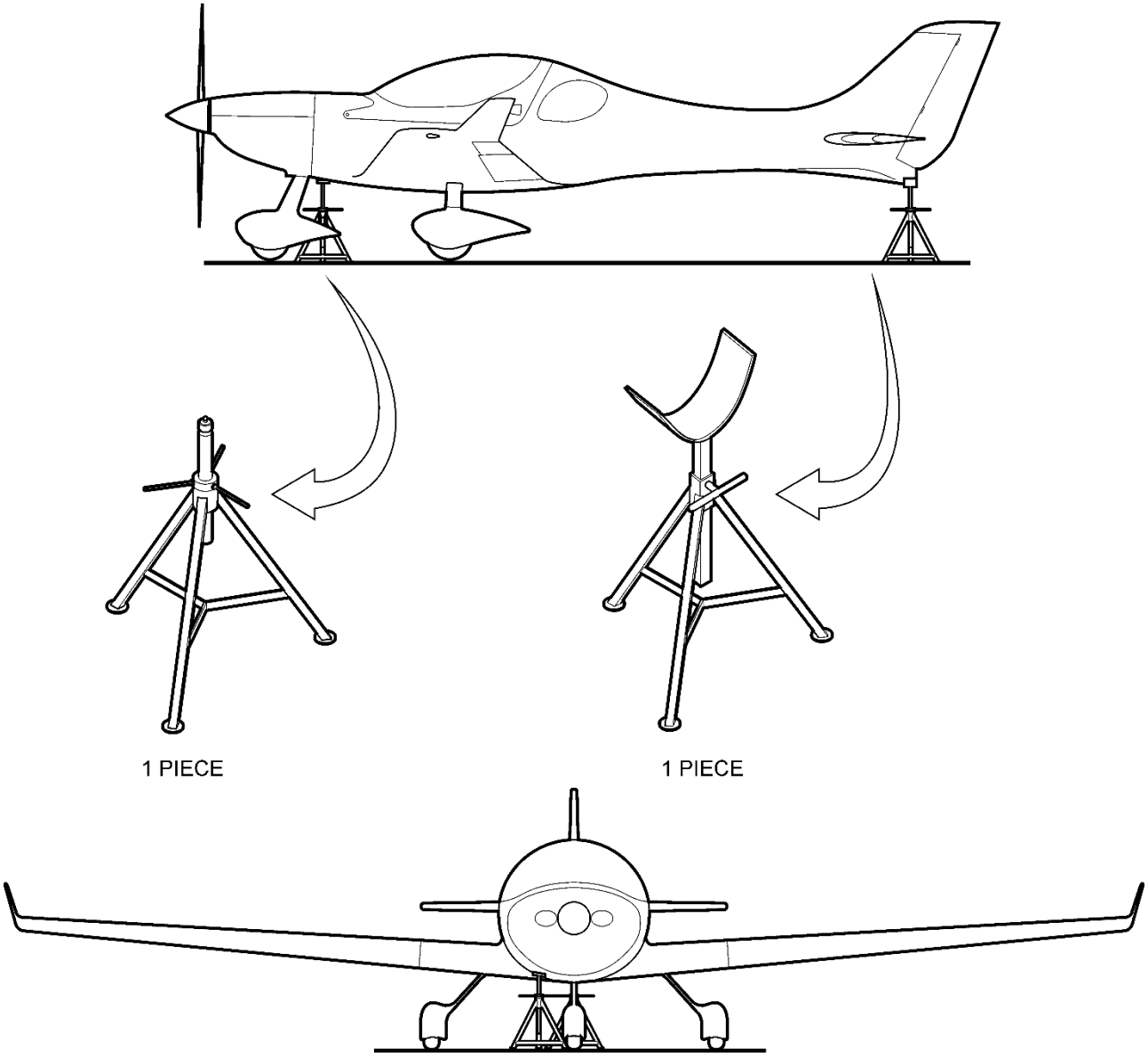


Fig. 07-2 Aircraft Shoring

08 LEVELING AND WEIGHING

CONTENTS

Chapter	Description	Page
08-00	**GENERAL**	**3**
	1. INTRODUCTION	3
08-10	**LEVELING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Aircraft on jacks	5
	B. Aircraft on wheels	6
08-20	**WEIGHING**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	10
	A. Aircraft weighing	10
	B. Calculation method	13

This page is left blank intentionally

08-00 GENERAL

1. INTRODUCTION

This chapter describes how to level and weigh the aircraft.

Use the procedures in Chapter 08-10 to level the aircraft. Use the procedures in Chapter 08-20 to weigh the aircraft and to calculate the aircraft CG position.

This page is left blank intentionally

08-10 LEVELING

1. DESCRIPTION

Some operations related to maintenance or repairs require the aircraft to be leveled.

The aircraft may be leveled with jacks or by changing the tire inflation. To level the aircraft, the cabin sills above main spar and canopy frame are used (Fig. 08−1). Lateral and longitudinal leveling is checked using a spirit level. The aircraft should be placed on a level surface, and should be protected from a wind (preferably inside a hangar).

2. MAINTENANCE PRACTICES

A. Aircraft on jacks

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Lift jack	3 pcs
Stand	1 pc
Spirit level	1 pc
Persons	1

Tab. 08-1 Recommended tools, materials, persons and documentation

(1) Leveling:

(a) Lift the aircraft on jacks (Chapter 07-10).

(b) Open the canopy.

(c) Adjust the aircraft laterally leveled position by extending or retracting of appropriate jacks. Check the lateral leveling by a spirit level placed across the cabin sills above the main spar with the canopy opened (Fig. 08-1). If the spirit level is not long enough, a suitable extension (e.g. even wooden plank) may be used with the spirit level placed on top. Be careful not to damage the cabin sills when leveling.

(d) Adjust the aircraft longitudinally leveled position by extending or retracting of appropriate jacks. Check the longitudinal leveling by a spirit level on the canopy frame (Fig. 08-1).

(e) Remove the spirit level and close the canopy.

B. Aircraft on wheels

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pads (various thickness)	AR
Spirit level	1 pc
Persons	1

Tab. 08-2 Recommended tools, materials, persons and documentation

(1) Leveling:

(a) Open the canopy.

(b) Adjust the aircraft laterally leveled position by deflating the appropriate main wheels' tire or install under main wheels suitable pads. Check the lateral leveling by a spirit level placed across the cabin sills above the main spar with the canopy opened (Fig. 08-1). If the spirit level is not long enough, a suitable extension (e.g. even wooden plank) may be used with the spirit level placed on top. Be careful not to damage the cabin sills when leveling.

(c) Adjust the aircraft longitudinally leveled position by deflating the nose wheel's tire or install under nose wheel suitable pad. Check the longitudinal leveling by a spirit level on the canopy frame (Fig. 08-1).

(d) Remove the spirit level and close the canopy.

CAUTION

AFTER THE OPERATION ON THE LEVELED AIRCRAFT IS FINISHED, INFLATE THE LANDING GEAR TIRES WITH PRESCRIBED PRESSURE (Chapter 12-10).

NOTE

Deflate the tires slowly and in small steps - note with inertia of the system. When deflating the tire, take care to avoid excessive deformation of the tire. If the deflation of the nose wheel's tire is not sufficient, install under the main wheel the suitable pads.

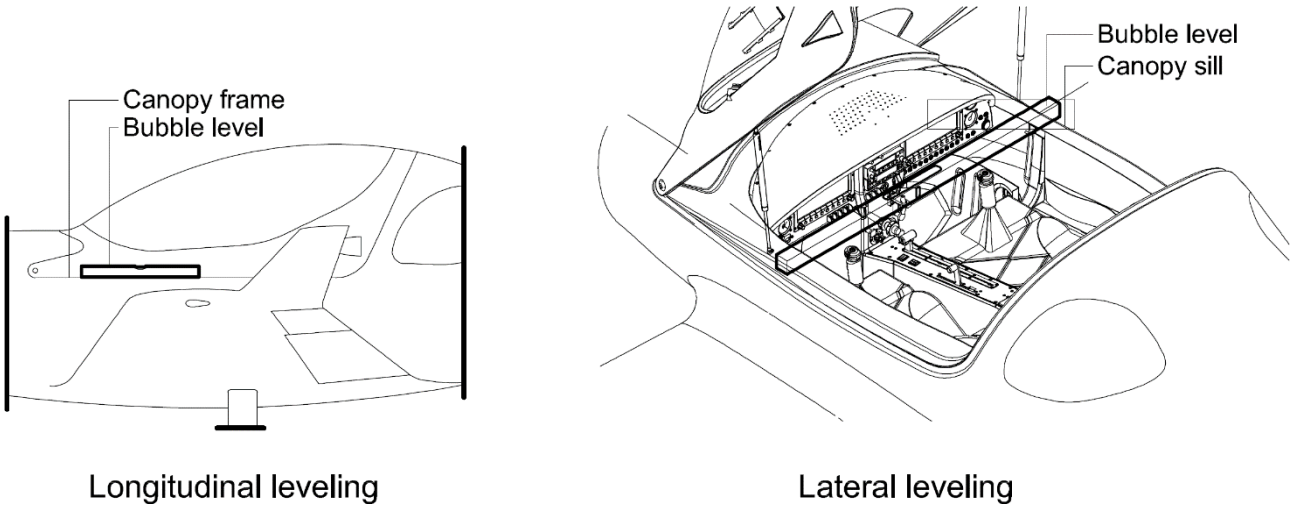


Fig. 08-1 Aircraft Leveling

This page is left blank intentionally

08-20 WEIGHING

1. DESCRIPTION

The aircraft must be operated within the permitted limits of load and center of gravity to obtain the expected flight performance, flight characteristics and flight safety.

After more complex modification, more extended repair, repainting, etc., of the aircraft, etc., the weight and center of gravity may be influenced, the new basic empty weight / moment and CG position must be determined by weighing.

When a compact piece of equipment is installed on (or removed from) the aircraft and an accurate weight and center of gravity arm (distance from the aircraft's reference datum to the installed equipment's center of gravity) can be accurately specified, the new basic empty weight / moment and CG position can be calculated using the aircraft's weight and balance record.

Reference datum is an imaginary vertical plane from which all horizontal distances for the center of gravity calculations are measured. The reference datum is located 1.975 mm forward direction from inner surface of the firewall, perpendicular to the longitudinal axis of the aircraft.

Permitted limits of empty aircraft weight and CG are given in the POH (Chapter 6).

2. MAINTENANCE PRACTICES

A. Aircraft weighing

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Scales	1 pc
Spirit level	1 pc
Plumb line (or optical level)	1 pc
Persons	2

Tab. 08-3 Recommended tools, materials, persons and documentation

(1) Preparation for weighing:

(a) Defuel the aircraft's fuel system (Chapter 12-10).

(b) Weigh the aircraft in a closed building to prevent errors due to wind gusts.

(c) Remove all snow, ice, dirt and water from the aircraft's surfaces.

(d) Remove all snow, ice and dirt from the wheel fairings.

(e) Remove all objects not included in the aircraft's Equipment List.

(f) Remove all objects not included in the aircraft's Weight and Balance Record.

(g) Verify all items in the Equipment List are installed in their correct location.

(h) Inflate the aircraft's tires to their recommended operating pressures (Chapter 12-10).

(i) Verify oil, brake fluid and coolant are at their prescribed maximum levels (Chapter 12-10).

(j) Close covers and other lids.

(k) Place scales under each wheel (minimum scale capacity 300 kg / 660 lb).

(l) Brake lever to PARK position.

(m) Remove the external control locks and place all controls to their neutral position. Retract the wing flaps

(2) Aircraft leveling:

(a) Level the aircraft on wheels (Chapter 08-10).

(3) Weighing:

(a) With the aircraft leveled and canopy closed, obtain and record the aircraft data into a photocopy of the Aircraft Weighing Form.

(b) Obtain and record the value “X” by measuring horizontally and parallel to the aircraft center line, from a line stretched between main wheel centers to a plumb line dropped from the Reference Point (RP).

(c) Obtain and record the value “Y” by measuring horizontally and parallel to the aircraft center line, from a line stretched between main wheel centers to a plumb line dropped from the center of nose wheel axle.

(d) Obtain and record the weights shown on each scale, deduct the tare (if any) and calculate the net weights.

(e) Determine and record the arms “A” and “B”.

(f) Determine and record the moment for each weighting point using following formula:

$$Moment = Net\ weight\ x\ Arm$$

(g) Calculate and record the Empty Weight / Moment by totaling the appropriate columns. Calculate and record the Empty Weight CG using formula given in the form.

(h) Calculate the correction for unusable fuel and record the Basic Empty Weight / Moment. Calculate and record the Basic Empty Weight CG using formula given in the form.

(i) Compare the calculated values with the permitted limits given in the POH (Chapter 6).

(j) Record the new Basic Empty Weight / Moment into the Weight and Balance Record of POH (Chapter 6).

CAUTION

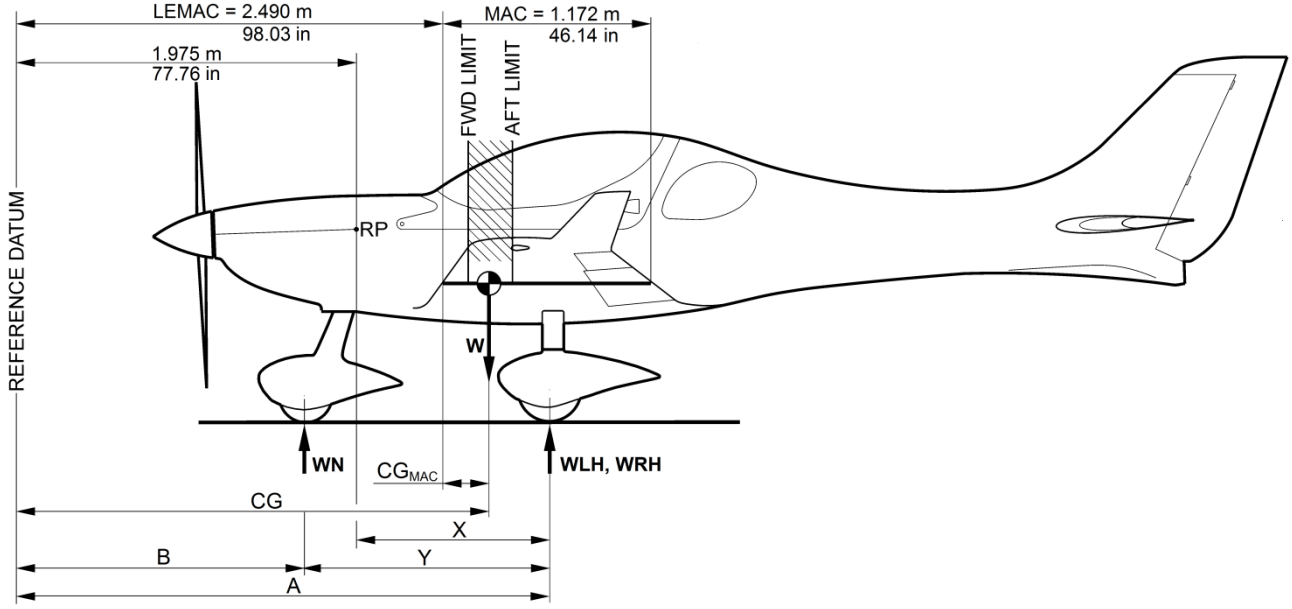
WHEN PERMITTED TOLERANCE OF AIRCRAFT EMPTY WEIGHT AND CG POSITION IS EXCEEDED, CONTACT THE AIRCRAFT MANUFACTURER.

(4) After weighing:

(a) Ensure all air is removed from the fuel system.

(b) Inflate the nose and main landing gear tires to their prescribed operating pressures (Chapter 12-10).

Type:	Model:	Serial Number:	Reg. Number:	Date:
WT9 Dynamic LSA	Club			



Measured:	Calculated:
X =..... m (in)	A = X + 1.975 m (77.76 in)
Y =..... m (in)	B = A – Y

AIRCRAFT EMPTY WEIGHT / MOMENT AND CG AS WEIGHED (Including operating fluids without unusable fuel)					
Weighing point	**Scale reading** (kg / lb)	**- Tare** (kg / lb)	**= Net weight** (kg / lb)	**x Arm** (m / in)	**= Moment** (kg.m / lb.in/100)
Main LH				A =	
Main RH				A =	
Nose				B =	
Empty Weight / Moment				**CG =**	
$$CG = \frac{Total\ Moment}{Total\ Weight}$$					

BASIC EMPTY WEIGHT / MOMENT AND CG (Including operating fluids with unusable fuel)			
Unusable fuel (Add to empty aircraft weight and moment)	5.0 kg / 11 lb	2.580 m / 101.57 in	12.90 kg.m / 11.17 lb.in/100
Basic Empty Weight / Moment		**CG =**	

Fig. 08-2 Aircraft Weighing Form

B. Calculation method

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Calculator	1 pc
Persons	1

Tab. 08-3 Recommended tools, materials, persons and documentation

(1) Calculation:

(a) Record the date the item was installed on (or removed from) to the aircraft in the “Date“ column.

(b) Mark an “X“ into the “Item No. In” column if the equipment was installed.

(c) Mark an “X“ into the “Item No. Out ” column if the equipment was removed.

(d) Record a brief description of the item or modification into the “Description of Article or Modification“ column.

(e) Record the item’s weight into the “Weight Change“ column’s “Weight“ column. “Added (+)“ column for installed items, “Removed (–)“ column for removed items.

(f) Record the item’s CG arm into the “Weight Change“ column’s “Arm“ column. “Added (+)“ column for installed items, “Removed (–)“ column for removed items.

(g) Calculate the moment by multiplying the item’s weight and arm together and enter the resulting value into the “Weight Change“ column’s “Moment“ column. “Added (+)“ column for installed items, “Removed (–)“ column for removed items.

(h) Calculate the aircraft’s new Basic Empty Weight and enter the value into the “Basic Empty – Weight“ column. For added items, calculate the aircraft’s new Basic Empty Weight by adding the item’s weight to the aircraft’s previous Basic Empty Weight. For removed items, calculate the aircraft’s new Basic Empty Weight by subtracting the item’s weight from the aircraft’s previous Basic Empty Weight.

(i) Calculate the aircraft’s new Basic Empty Moment and enter the value into the “Basic Empty – Moment“ column. For added items, calculate the aircraft’s new Basic Empty Moment by adding the item’s moment to the aircraft’s previous Basic Empty Moment. For removed items, calculate the aircraft’s new Basic Empty Moment by subtracting the item’s moment from the aircraft’s previous Basic Empty Moment.

Type: WT9 Dynamic LSA	Model: Club	Serial Number:	Reg. Number:	Page: of:

Date	Item No.		Description of Article or Modification	Weight Change						Basic Empty	
				Added (+)			Removed (-)			Weight	Moment
	In	Out		Weight	Arm	Moment	Weight	Arm	Moment		
				kg/lb	m/in	kg.m/ lb.in/100	kg/lb	m/in	kg.m/ lb.in/100	kg/lb	kg.m/ lb.in/100
	-	-	As delivered.	-	-	-	-	-	-		

Fig. 08-3 Weighing and Balance Record

09 TOWING AND TAXIING

CONTENTS

Chapter	Description	Page
09-00	**GENERAL**	**3**
	1. INTRODUCTION	3
09-10	**TOWING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Aircraft towing	6
09-20	**TAXIING**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	9
	A. Aircraft taxiing	9

This page is left blank intentionally

09-00 GENERAL

1. INTRODUCTION

You can move the aircraft on the ground with:

- pushing / pulling
- the tow bar
- taxiing

When towing or handling the aircraft close to obstacles (buildings, other aircraft) a wing walker should follow the aircraft and inform about a danger of the aircraft collision with the obstacles.

This page is left blank intentionally

09-10 TOWING

1. DESCRIPTION

The aircraft can be moved for a short distance by means of towing by holding the blade roots. Handle the propeller by holding the blade root – never blade tip.

There is also possibility of using tow bar that attaches to the nose landing gear.

CAUTION

AVOID EXCESSIVE PRESSURE AT THE AIRCRAFT CONTROL SURFACES AND THE WING TIPS. THE PERPENDICULAR PRESSURE ON THE SURFACE OF THE AIRFRAME SANDWICH SHELL THIN SKIN LAYERS CAN PRODUCE A CREATION OF PRINTS. THESE PRINTS CAN WEAKEN A SANDWICH SHELL. DURING THE AIRCRAFT TOWING HOLD THE PROPELLER BLADE ROOT, NEVER THE BLADE TIP!

WHEN TOWING THE AIRCRAFT AS WELL AS DURING MANUAL HANDLING PAY INCREASED ATTENTION NOT TO DAMAGE WINGS, TAIL SURFACES OR OTHER PARTS OF THE AIRCRAFT.

WARNING

MAKE SURE THAT THE PINS OF THE TOW BAR ARE CORRECTLY ENGAGED IN THE NOSE LEG. IF THE PINS ARE NOT CORRECTLY ENGAGED, THE TOW BAR CAN DETACH. THE AIRCRAFT CAN CAUSE INJURY TO PERSONS.

CAUTION

WHEN TOWING THE AIRCRAFT AS WELL AS DURING MANUAL HANDLING PAY INCREASED ATTENTION NOT TO DAMAGE WINGS, TAIL SURFACES OR OTHER PARTS OF THE AIRCRAFT.

MAKE SURE THAT THE AIRCRAFT IS ON LEVEL GROUND. IF YOU TRY TO MOVE THE AIRCRAFT ON GROUND THAT IS NOT LEVEL, YOU CAN LOSE CONTROL OF THE AIRCRAFT.

THE NOSE WHEEL STEERING IS COUPLED WITH THE RUDDER CONTROL. WHEN TOW BAR IS ATTACHED, THE NOSE WHEEL MAY NOT BE ROTATED THROUGH FULL MOVEMENT RANGE TO PREVENT DAMAGE OF NOSE GEAR.

2. MAINTENANCE PRACTICES

A. Aircraft towing

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Tow bar	1 pc
Wheel chocks	1 pc
Persons	1

Tab. 09-1 Recommended tools, materials, persons and documentation

(1) Aircraft towing:

(a) Attach the tow bar to the nose wheel leg (1, Fig. 09-1).

(b) Remove the wheel chocks.

(c) Release the brake lever.

(d) Move the aircraft to its new position.

(e) Put wheel chocks in front and behind the main wheels.

(f) Remove the tow bar (1).

(g) Set the brake lever to **PARK** position.

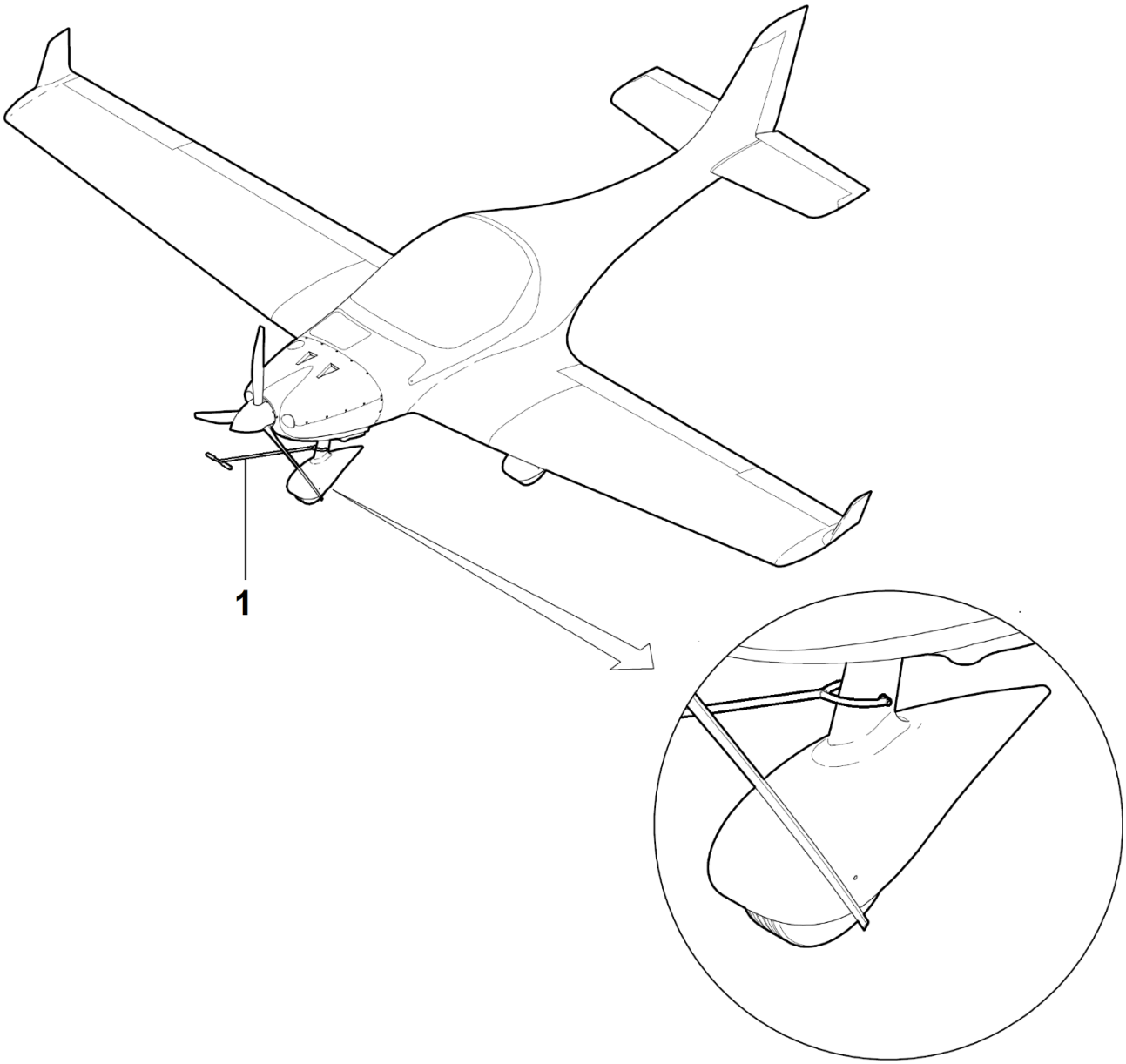


Fig. 09-1 Tow Bar

This page is left blank intentionally

09-20 TAXIING

1. DESCRIPTION

Taxiing is a way of aircraft moving, using the aircraft power plant thrust. For taxiing procedures refer to Pilot´s Operating Handbook (Chapter 4).

WARNING

DO NOT TAXI THE AIRCRAFT UNLESS YOU HAVE BEEN TRAINED TO TAXI AND YOU HAVE BEEN AUTHORIZED.

MAKE SURE THAT THERE ARE NO PERSONS OR OBJECTS NEAR THE AIRCRAFT. THE AIRCRAFT CAN INJURE PERSONS AND OBJECTS CAN DAMAGE THE AIRCRAFT.

CAUTION

ADAPT THE TAXIING SPEED TO THE TERRAIN CONDITIONS, OBSTACLES AND TRAFFIC AT THE AIRPORT AND TO WIND SPEED AND DIRECTION.

2. MAINTENANCE PRACTICES

A. Aircraft taxiing

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Persons	1

Tab. 09-1 Recommended tools, materials, persons and documentation

(1) Aircraft taxiing:

(a) Perform according to Pilot´s Operating Handbook (Chapter 4).

This page is left blank intentionally

10 PARKING, MOORING, STORAGE AND RETURN TO SERVICE

CONTENTS

Chapter	Description	Page
10-00	**GENERAL**	**3**
	1. INTRODUCTION	3
10-10	**PARKING / STORAGE**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Parking	5
	B. Temporary storage (30 to 90 days)	7
	C. Long term storage (over 91 days)	9
10-20	**MOORING**	**11**
	1. GENERAL	11
	2. MAINTENANCE PRACTICES	11
	A. Mooring	11
10-30	**RETURN TO SERVICE**	**13**
	1. GENERAL	13
	2. MAINTENANCE PRACTICES	13
	A. Return to service after temp. storage (30 to 90 days)	13
	B. Return to service after long term storage (over 91 days)	14

This page is left blank intentionally

10-00 GENERAL

1. INTRODUCTION

This chapter determines instructions needed for parking and mooring of the aircraft at all expected weather conditions. A procedure for anchoring the aircraft must always be realized if strong wind or long term parking of aircraft is expected. This chapter also contains instructions that should be executed during storage of the aircraft.

This page is left blank intentionally

10-10 PARKING / STORAGE

1. DESCRIPTION

Parking procedure depends on parking time (or on expected weather conditions). If adverse weather conditions are expected (very strong wind, downpours, sand storm etc.), the aircraft should be parked inside a hangar. When parking inside the hangar, carry out the same operations as during a short-time parking.

When parking on a surface without sufficient loading capacity, e.g. asphalt surface at high temperatures or wet soft surface, there is a danger that wheels will sink into the surface. Park the aircraft on a hard surface of the apron where mooring equipment is built in. Do not park on a surface with insufficient loading capacity.

Storage procedure is intended to protect the aircraft, if removal from service is assumed. The main aim is to prevent from corrosion and damage of aircraft parts exposed to weather.

Depending on the time after which the aircraft will remain inactive, the storage is divided on:

- temporary storage (30 to 90 days)
- long term storage (over 91 days).

If possible, park the aircraft in a hangar.

2. MAINTENANCE PRACTICES

A. Parking

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pitot-static tubes canvas cover	1 pc
Cabin canvas cover	1 pc
VOR antenna cover	2 pcs
Persons	1

Tab. 07-1 Recommended tools, materials, persons and documentation

(1) Parking procedure:

(a) Position the aircraft on levelled surface, headed towards wind (if possible).

(b) Check wing flaps if retracted.

(c) Set the parking brake to **PARK** position.

(d) Close vent windows, close and lock the canopy.

(e) Install canopy cover (1, Fig. 10-1).

(f) Install pitot-static probe canvas cover (2).

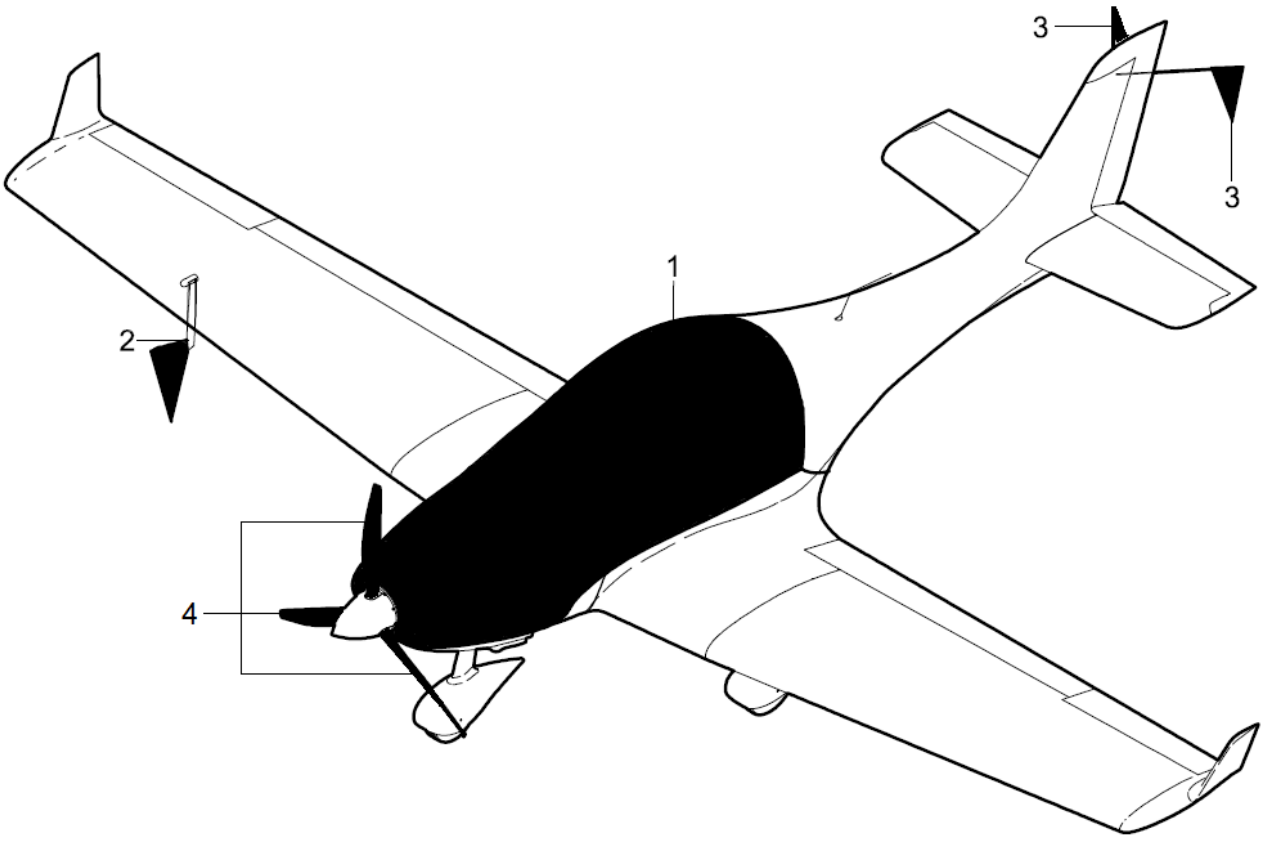
(g) Install VOR antenna cover (3)

NOTE

In the case of parking under bad weather conditions, moor the aircraft to avoid of its damage (Chapter 10-20).

NOTE

Under snow or arctic conditions, or when icing or snowing is expected, cover the aircraft with suitable covers.



1 – Canopy cover
2 – Pitot-static probe canvas cover
3 – VOR antenna cover
4 – Propeller blade covers

Fig. 10-1 Aircraft Parking

B. Temporary storage (30 to 90 days)

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Persons	1

Tab. 07-2 Recommended tools, materials, persons and documentation

(1) Parking and mooring:
  (a) Park and moor the aircraft (see 2.A. and Chapter 10-20).

(2) Aircraft exterior:
  (a) Clean the aircraft (Chapter 12-20).
  (b) Lubricate the aircraft according to lubrication schedule (Chapter 12-20).
  (c) Clean the canopy (Chapter 12-20).
  (d) Install canopy cover (1, Fig. 10-1).
  (e) Install pitot-static probe canvas cover (2).
  (f) Install VOR antenna cover (3)
  (g) Install propeller blade covers (4)

(3) Aircraft interior:
  (a) Clean and cover the instruments and panel.
  (b) Clean the pilot compartment.

(4) Electrical system:
  (a) Remove the battery (Chapter 24-30) and store it in a suitable place outside of the aircraft.

(5) Fuel system:
  (a) Fill the fuel tanks completely (Chapter 12-10).
  (b) Every month carry out a test for water contamination of the fuel tanks (Chapter 12-10).

(6) Landing gear:
  (a) Inflate tires to the correct pressure (Chapter 12-10).
  (b) Rotate wheels regularly - three to four revolutions every 30 days.

(7) Powerplant:

(a) Carry out the procedure for engine preservation according to the Operators Manual for Rotax Engine Type 912 Series (Ref. No. OM-912, Part. No. 899649), latest edition.

(b) Propeller EVRA PerformanceLine 175/xxx/805.5:
To prevent oxidation, lightly coat the metal shields of propeller leading edges with liquid paraffin. This is recommended before parking in highly humid and rainy, especially in marine environment.

Propeller WOODCOMP KW-31-A-E-3-0-0-F/R-173-033:
For storage instruction refer to (UM-05 EN, ISSUE 21.01.2014)", or latest issue.

(c) Install propeller blade covers (4) Fig. 10-1).

C. Long term storage (over 91 days)

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Protective foil	AR
Lithium grease NLGI 3 MOL Liton LTA 3EP	AR
Persons	1

Tab. 07-3 Recommended tools, materials, persons and documentation

(1) Parking and mooring:
  (a) Park and moor the aircraft (see 2.A. and Chapter 10-20).

(2) Aircraft exterior:
  (b) Clean the aircraft (Chapter 12-20).
  (c) Lubricate the aircraft according to lubrication schedule (Chapter 12-20).
  (d) Clean the canopy (Chapter 12-20).
  (e) Install canopy cover (1, Fig. 10-1).
  (f) Install pitot-static probe canvas cover (2).
  (g) Install VOR antenna cover (3)
  (h) Protect the exterior lights with foil.

(3) Aircraft interior:
  (a) Clean and cover the instruments and panel.
  (b) Clean the pilot compartment.

(4) Electrical system:
  (a) Remove the battery (Chapter 24-30), ELT battery (Chapter 25-60) and store it in a suitable place outside of the aircraft.

(5) Fuel system:
  (a) Drain fuel tanks (Chapter 12-10).

(6) Landing gear
  (a) Inflate tires to the correct pressure (Chapter 12-10).
  (b) Clean and use Vaseline to preserve the brake system.
  (c) Rotate wheels regularly - three to four revolutions every 30 days.

(7) Powerplant:

(a) Carry out the procedure for engine preservation according to the Operators Manual for Rotax Engine Type 912 Series (Ref. No. OM-912, Part. No. 899649), latest edition.

(b) Propeller EVRA PerformanceLine 175/xxx/805.5:
To prevent oxidation, lightly coat the metal shields of propeller leading edges with liquid paraffin. This is recommended before parking in highly humid and rainy, especially in marine environment.

Propeller WOODCOMP KW-31-A-E-3-0-0-F/R-173-033:
For storage instruction refer to (UM-05 EN, ISSUE 21.01.2014)", or latest issue.

(c) Install propeller blade covers (4, Fig. 10-1).

10-20 MOORING

1. GENERAL

The aircraft is moored when parked outside (on apron). A correct mooring is highly important if strong wind is expected, or during long-time parking. When a strong wind affects the aircraft (e.g. storm), the aircraft structure could be damaged. When strong wind is expected, park the aircraft inside a hangar. If this is not possible, the aircraft has to be moored.

2. MAINTENANCE PRACTICES

A. Mooring

The following tie-down points are provided on the aircraft:

- On the wings – install tie-down screws into hole located in the left and right lower wing surface (near inspection hole).
- On the nose landing gear

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wheel chocks	4 pcs
Nylon or polypropylene rope Ø10 mm	AR
Anchor	6 pcs
Tie-down screw	2 pcs
Propeller blade covers	3 pcs
Adhesive tape	AR
Persons	1

Tab. 07-4 Recommended tools, materials, persons and documentation

CAUTION

NEVER ATTACH MOORING ROPES DIRECTLY TO THE AIRCRAFT STRUCTURE - USE ALWAYS THE SPECIFIED TIE-DOWN POINTS.

NOTE

Nylon or polypropylene ropes with the minimum diameter of 10 mm (3/8 in) are recommended for mooring. Do not use hemp ropes.

NOTE

Steel ropes, or steel chains provided with suitable shortening mechanisms can be used for mooring as well.

(1) Aircraft mooring:

(a) Park the aircraft (Chapter 10-10, 2.A.)

(b) Put the chocks (1, Fig. 10-2) in front of and behind main landing gear wheels.

(c) Put the control surfaces into neutral position and fix them using an adhesive tape.

(d) Protect the fuel tank caps from water accumulation around the caps using adhesive tape.

(e) Install propeller blades covers (2).

(f) Screw the tie-down screws (3) into the wing tie-down points (lower surface).

(g) Fix the anchor (4) to the ground or use available built in equipment at the parking place.

(h) Moor the tie-down screws (3) to the ground using suitable ropes (5).

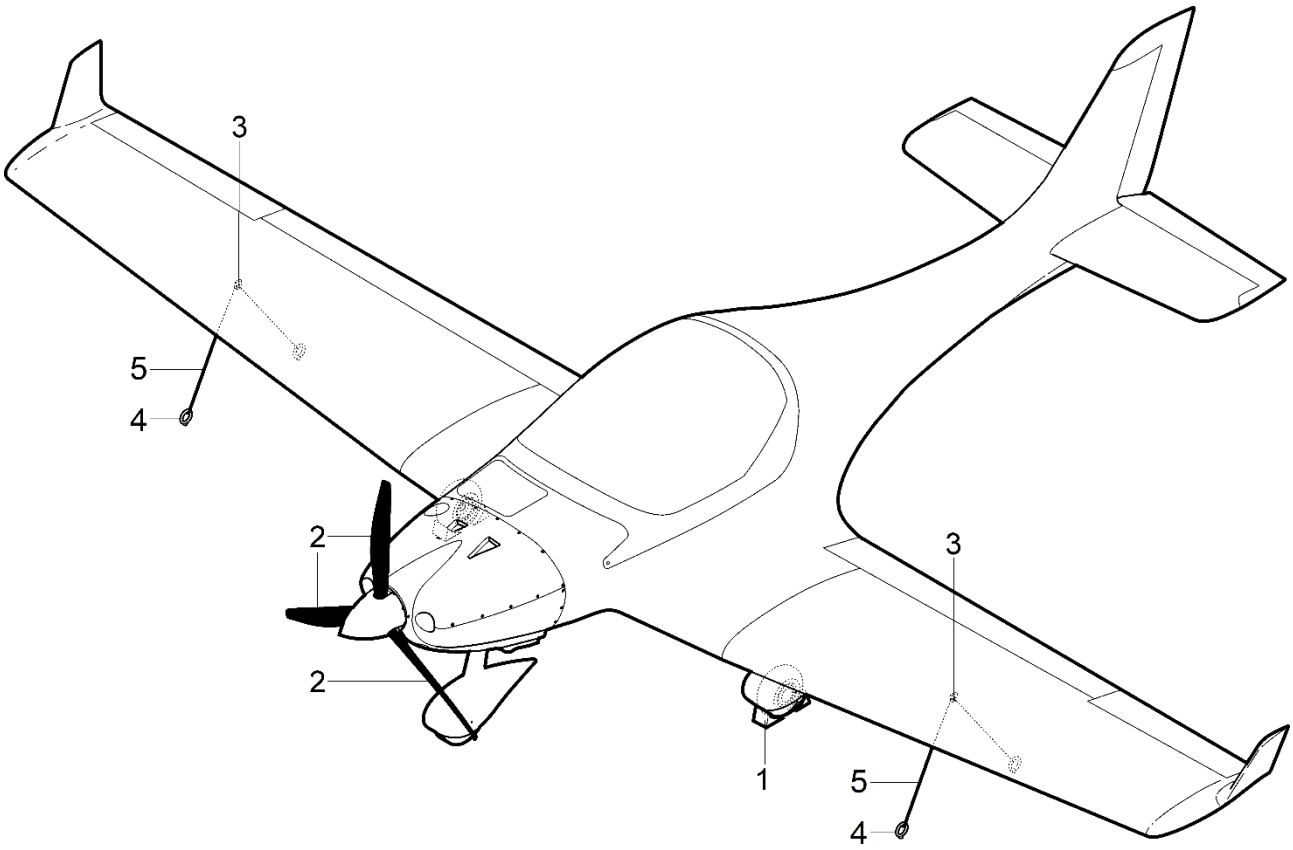


Fig. 10-2 Aircraft Mooring

10-30 RETURN TO SERVICE

1. GENERAL

Depending on the time the aircraft was inactive, the aircraft must be prepared for the return to service after temporary or long term storage.

2. MAINTENANCE PRACTICES

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Persons	1

Tab. 07-5 Recommended tools, materials, persons and documentation

A. Return to service after temp. storage (30 to 90 days)

(1) Parking and mooring:
- (a) Remove all covers and adhesive tapes.
- (b) Unmoor the aircraft.

(2) Aircraft exterior:
- (a) Remove the canopy cover.
- (b) Clean the aircraft (Chapter 12-20).
- (c) Clean the canopy (Chapter 12-20).
- (d) Lubricate the aircraft according to lubrication schedule (Chapter 12-20).

(3) Aircraft interior:
- (a) Remove the cover of the instrument panel.

(4) Electrical system:
- (a) Check the condition of the battery; install the battery (Chapter 24-30).

(5) Fuel system:
- (a) Carry out a test for water contamination of the fuel tanks (Chapter 12-10).

(6) Powerplant:
- (a) Carry out the procedure for engine back to operation according to the Operators Manual for Rotax Engine Type 912 Series (Ref. No. OM-912, Part. No. 899649), latest edition.

(7) Pre-flight inspection:
  (a) Carry out the pre-flight inspection (POH, Chapter 4).

(8) Instructions for continued airworthiness:
  (a) Verify all airworthiness directives complied with.
  (b) Verify all service letters, bulletins, and instructions complied with.

B. Return to service after long term storage (over 91 days)

(1) Parking:
  (a) Remove all covers and adhesive tapes.
  (b) Unmoor the aircraft.

(2) Aircraft exterior:
  (a) Remove the canopy cover.
  (b) Remove foils from exterior lights.
  (c) Clean the aircraft (Chapter 12-20).
  (d) Clean the canopy (Chapter 12-20).
  (e) Lubricate the aircraft according to lubrication schedule (Chapter 12-20).

(3) Aircraft interior:
  (a) Remove cover from the instrument panel.

(4) Electrical system:
  (a) Check condition of batteries; reinstall the battery (Chapter 24-30) and the ELT battery (Chapter 25-60).

(5) Fuel system:
  (a) Fill the fuel tanks (Chapter 12-10).

(6) Landing gear
  (a) Clean the brakes.

(7) Powerplant:
  (a) Carry out the procedure for engine back to operation according to the Operators Manual for Rotax Engine Type 912 Series (Ref. No. OM-912, Part. No. 899649), latest edition.

(8) Annual inspection:
  (a) Carry out the annual inspection prior to flying the aircraft (Chapter 05-20).

11 PLACARDS AND MARKINGS

CONTENTS

Chapter	Description	Page
11-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. MAINTENANCE PRACTICES	3
	A. Replacing damaged placards	3
11-20	**EXTERIOR PLACARDS AND MARKINGS**	**5**
11-30	**INTERIOR PLACARDS AND MARKINGS**	**9**

This page is left blank intentionally

11-00 GENERAL

1. INTRODUCTION

Placards are used for identification and indication purposes. They show the function, directional movements, position identifications, operating instructions, operating limitations of systems and equipment.

Self-adhesive plastic foils are used for all placards except for the metal aircraft manufacturer's placard.

Missing, or placards with poor readability must be replaced.

2. MAINTENANCE PRACTICES

A. Replacing damaged placards

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hot air gun	1 pc
Putty knife (plastic or wooden)	1 pc
Clean cloth	AR
Technical benzine	AR
Persons	1

Tab. 11-1 Recommended tools, materials, persons and documentation

CAUTION

USE THE HOT AIR GUN CAREFULLY AND SET TO LOW TEMPERATURE. DO NOT ALLOW THE STRUCTURE TEMPERATURE TO EXCEED 55 °C WHEN USING HOT AIR GUN. OVERHEATING MAY RESULT IN LOSS OF STRUCTURAL INTEGRITY.

(1) Removing old placard:
  (a) Heat the placard with a hot air gun if necessary.
  (b) Lift one corner of the placard.
  (c) Tear off the placard.

(2) Installation new placard:
  (a) Clean the surface to remove residual adhesive and dirt from the surface.
  (b) Remove the protective backing from the new placard.
  (c) Put the new placard in the correct position and ensure that the placard is firmly adhered.

This page is left blank intentionally

11-20 EXTERIOR PLACARDS AND MARKINGS

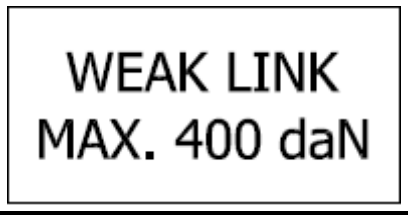
Exterior placards and markings are listed in the Tab. 11-3.

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
1.	AEROSPOOL SINCE 1991 AIRPORT 97103 PRIEVIDZA SLOVAK REPUBLIC www.aerospool.sk	White / blue	Fuselage LH / RH front part	11-1
2.	WARNING This aircraft is equipped with a ballistically-deployed emergency parachute system	Black / orange	Fuselage LH / RH center part	11-1
3.	ELT LOCATED HERE	Yellow / black	Fuselage LH / RH center part	11-1
4.		Red	Fuselage / wing bottom part, horizontal stabilizer bottom part, pitot-static probe	11-1

Tab. 11-3 List of Exterior Placards (page 1 of 3)

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
5.	S/N: XXXXX	Acc. to color design	Fuselage LH / RH rear part below rudder	11-1
6.	250 kPa	White / black	Outer part of the main landing gear legs	11-1
7.	200 kPa	White / black	Right part of the nose wheel cover	11-1
8.	MAX 3.0 l / 0.79 U. S. gal AEROSHELL SPORT PLUS 4 API SL / SAE-10W-40	White / black	Upper engine cowling near oil inspection door	11-1
9.		Red / black	Emergency parachute system cover	11-1
10.	NO STEP	White / red	Wing center section, wing flaps	11-1
11.	FUEL CAPACITY: MAX. 63.0 l / 16.64 U. S. gal MOGAS RON 95 / AKI 91 AVGAS 100 LL	White / black	Near fuel tank caps	11-1

Tab. 11-3 List of Exterior Placards (page 2 of 3)

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
12.		Red	Near jack points and drain valves on the fuselage / wing center section bottom part; symmetrically next to canopy opening lever	11-1
13.		White / red	Trailing edge of the control surfaces and trim tab	11-1
14.		White / red	Near jack points on the fuselage / wing center section bottom part	11-1
15.		White / red	Near drain valves on the fuselage / wing bottom part	11-1
16.		White / red	Wing center section	11-1
17.		White / black	Fuselage LH / RH rear part below rudder (towing version only)	11-1

Tab. 11-3 List of Exterior Placards (page 3 of 3)

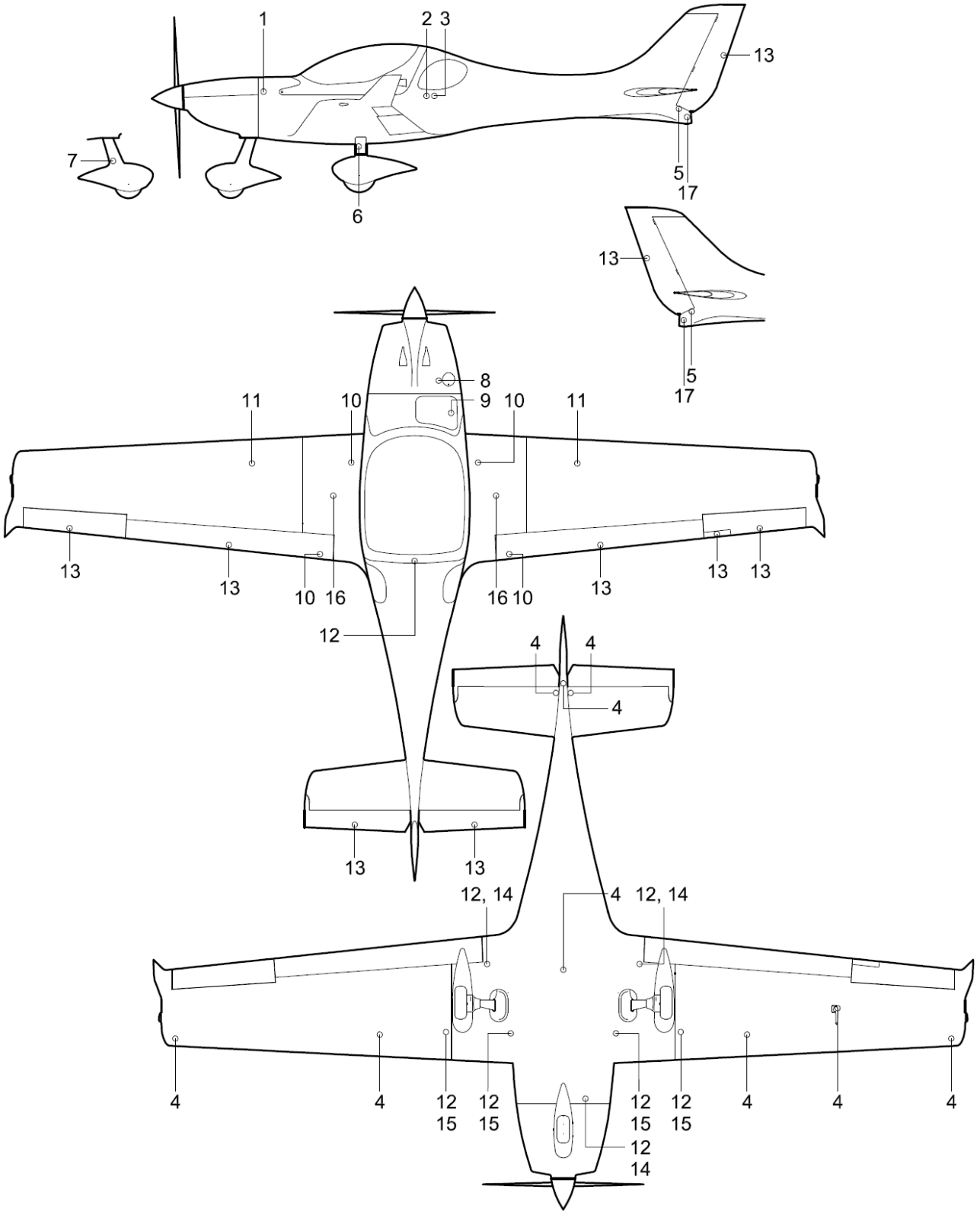


Fig. 11-1 Exterior Placards Location

11-30 INTERIOR PLACARDS AND MARKINGS

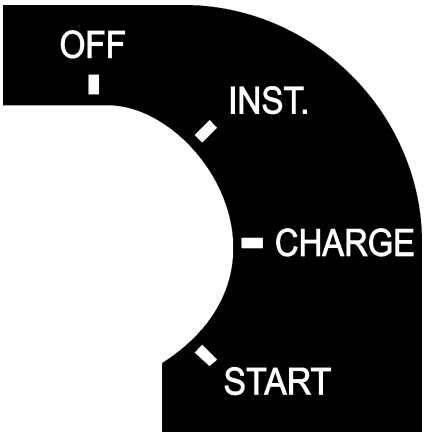
Interior placards and markings are listed in the Tab. 11-4.

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
INSTRUMENT PANEL				
1a.	AIRSPEEDS: V_{NE} 148 kts V_A 97 kts V_{FE} 76 kts V_{S0} 33 kts	Black / white	Instrument panel LH - near airspeed indicator	11-2 11-3
1b.	AIRSPEEDS: V_{NE} 275 km/h V_A 180 km/h V_{FE} 140 km/h V_{S0} 61 km/h			
2.	LH D1000	Black / white	LH Dynon SkyView USB port	11-2 11-3
3.		Black / white	Instrument panel LH – below signalizing lights	11-2 11-3
FUEL PUMP | STALL | LH FUEL RES. | RH FUEL RES. | EMS | OIL PRESS. | CHARGE				
4.	TEST	Black / white	Instrument panel LH – below test button	11-2 11-3
5.	For N 30 60 E 120 150 Steer For S 210 240 W 300 330 Steer DATE AIRPATH LZPE	White / black	Magnetic compass	11-2 11-3
6.	XX-XXX	Black / white	Instrument panel center part	11-2 11-3
7.	ELT REMOTE CONTROL	Black / white	Instrument panel RH - above ELT remote control	11-2 11-3

Tab. 11-4 List of Interior Placards (page 1 of 6)

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
8.	RH D1000	Black / white	RH Dynon SkyView USB port	11-2 11-3
9.	SPARE	Black / white	Instrument panel RH - bellow the circuit breakers	11-2
10.	CAMERA	Black / white	Instrument panel RH - bellow the circuit breaker and instrument panel LH - above the switch	11-3
11.	FUEL PUMP | SVI	Black / white	Instrument panel RH - bellow the circuit breakers	11-3
12.	NAV / ACL | LAND	Black / white	Instrument panel RH - bellow the circuit breakers	11-2 11-3
13.	NAV | INTERCOM	Black / white	Instrument panel RH - bellow the circuit breakers	11-2 11-3
14a.	PITCH | ROLL | STALL | AVIONICS | FUEL PUMP | COMM | XPDR | LH D1000 | RH D1000 | OIL PRESS. | FUEL RES. | SOC. 12V | SVI | TIS	Black / white	Instrument panel RH, bellow the circuit breakers	11-2
14b.	PITCH | ROLL | STALL | PROPELLER | SPARE | SPARE | COMM | XPDR | LH D1000 | RH D1000 | OIL PRESS. | FUEL RESS. | SOC. 12V | TIS | AVIONICS	Black / white	Instrument panel RH, bellow the circuit breakers	11-3
15.		Black / white	LH / RH rudder control pedal adjustment handle	11-2 11-3

Tab. 11-4 List of Interior Placards (page 2 of 6)

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
16a.	AVIONICS | NAV / ACL | LAND | FUEL PUMP	Black / white	Instrument panel LH - above the switches	11-2
16b.	AVIONICS | NAV / ACL | LAND	Black / white	Instrument panel LH - above the switches	11-3
17.	FUEL PUMP	Black / white	Instrument panel LH - above the switch	11-3
18.	IGNITION	Black / white	Instrument panel center part	11-2 11-3
19.	THROTTLE	Black / white	Central console	11-2 11-3
20.	TOW RELEASE	Yellow	Tow release handle, left side of central tunnel near throttle	11-3
21.	CARBUR. PREHEATING PULL TO OPEN	Black / white	Central console	11-2 11-3
22.	MASTER SWITCH	Black / white	Instrument panel center part	11-2 11-3
23.		Black / white	Instrument panel center part	11-2 11-3
24.	RESCUE SYSTEM	Black / white	Central console	11-2 11-3
25.	CABIN HEATING PULL TO OPEN	Black / white	Central console	11-2 11-3

Tab. 11-4 List of Interior Placards (page 3 of 6)

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
26.	CABIN VENTILATION PULL TO OPEN	Black / white	Central console	11-2 11-3
27.	CHOKE PULL TO OPEN	Black / white	Central console	11-2 11-3
REAR AND FRONT BAGGAGE COMPARTMENTS				
28.	AEROSPOOL spol. s r. o. Slovak Republic Type: WT9 Dynamic LSA Model: Club S/N: XXYYY	Metal	LH side of the baggage compartment bulkhead	11-4
29.	XX-XXX	Metal	LH side of the baggage compartment bulkhead	11-4
30.	BAGGAGE COMPARTMENT MAXIMUM BAGGAGE WEIGHT: 20 kg / 44 lbs	Black / white	LH / RH side of the rear baggage compartment bulkhead	11-4
31.	SEE FOR BAGGAGE TIE-DOWN AND WEIGHT AND BALANCE INFORMATION	Black / white	LH / RH side of the rear baggage compartment – baggage bulkhead LH / RH side of the front baggage compartment – central tunnel	11-4
32.	BAGGAGE COMPARTMENT MAXIMUM BAGGAGE WEIGHT: 10 kg / 22 lbs	Black / white	LH / RH side of the front baggage compartment – central tunnel	11-4
33.	DO NOT LOAD	Black / white	LH / RH side of: rear baggage compartment – flap torsion tube's cover front baggage compartment – fuel filter's cover	11-4
34.	PILOTS HEADSET	Black / white	Central tunnel near headset connectors	11-4

Tab. 11-4 List of Interior Placards (page 4 of 6)

ITEM.	PLACARD	COLOUR	LOCATION	FIG.
PEDESTAL PANEL				
35.	FLAPS 0	Black / white	Flap control slotted link	11-4
36.	FLAPS 1	Black / white	Flap control slotted link	11-4
37.	FLAPS 2	Black / white	Flap control slotted link	11-4
38.	FLAPS 3	Black / white	Flap control slotted link	11-4
39.	ROLL	Black / white	Roll trim switch	11-4
40.	PITCH	Black / white	Pitch trim switch	11-4
41.	BRAKE	Black / white	Brake control slotted link	11-4
42.	PARK	Black / white	Brake control slotted link	11-4
43.	MAX	Black / white	Brake control slotted link	11-4
44.		Red	Brake control slotted link; Ventilation control knob	11-4
CANOPY FRAME / FUSELAGE				
45.	CANOPY PULL TO OPEN	Black / white	Right side of the canopy frame, near the canopy opening lever	11-4
46.	VENTILATION	Black / white	LH / RH side of canopy frame, near the ventilation control knob	11-4
47.	OPEN	Black / white	LH / RH side of canopy frame, near the ventilation control knob	11-4
48.	CLOSE	Black / white	LH / RH side of canopy frame, near the ventilation control knob	11-4

Tab. 11-4 List of Interior Placards (page 5 of 6)

<table>
<tr><th>ITEM.</th><th>PLACARD</th><th>COLOUR</th><th>LOCATION</th><th>FIG.</th></tr>
<tr><td>49.</td><td></td><td>Red / white</td><td>Left side of the cockpit</td><td>11-4</td></tr>
<tr><td></td><td colspan="3"><table>
<tr><td>WARNING
IFR flights and flights in icing conditions are prohibited!</td><td rowspan="2">WARNING
Aerobatic manoeuvres and intentional spins are prohibited!

WARNING
Do not exceed maximum take-off weight: 600 kg / 1323 lb</td></tr>
<tr><td>APPROVED FOR: DAY - VFR

NO SMOKING</td></tr>
</table></td><td></td></tr>
<tr><td>50.</td><td></td><td>Red / white</td><td>Left side of the cockpit (towing version only)</td><td>11-4</td></tr>
<tr><td></td><td colspan="3"><table>
<tr><td colspan="3">WARNING</td></tr>
<tr><td>Tow aircraft crew</td><td>1</td><td>2, Training only</td></tr>
<tr><td>Max. tow aircraft weight</td><td>490 kg / 1080 lb</td><td>580 kg / 1278 lb</td></tr>
<tr><td>Max. glider weight</td><td>545 kg / 1202 lb</td><td>380 kg / 838 lb</td></tr>
<tr><td colspan="3">Max. towing speed 180 IAS / 97 KIAS
Min. towing speed 110 IAS / 59 KIAS
Max. weak link strength 400 daN</td></tr>
</table></td><td></td></tr>
<tr><td colspan="5">ENGINE COMPARTMENT</td></tr>
<tr><td>51.</td><td>FUEL : MOGAS RON 95 / AKI 91
AVGAS 100LL
OIL : AEROSHELL SPORT PLUS 4
COOLING FLUID : MOBIL ANTIFREEZE EXTRA
BRAKE FLUID : RAVENOL DOT 4</td><td>Black / white</td><td>Firewall in the engine compartment, near the overflow bottle</td><td>11-5</td></tr>
<tr><td>52.</td><td>AEROSPOOL SINCE 1991
AIRBOX</td><td>White / blue</td><td>Airbox</td><td>11-5</td></tr>
</table>

Tab. 11-4 List of Interior Placards (page 6 of 6)

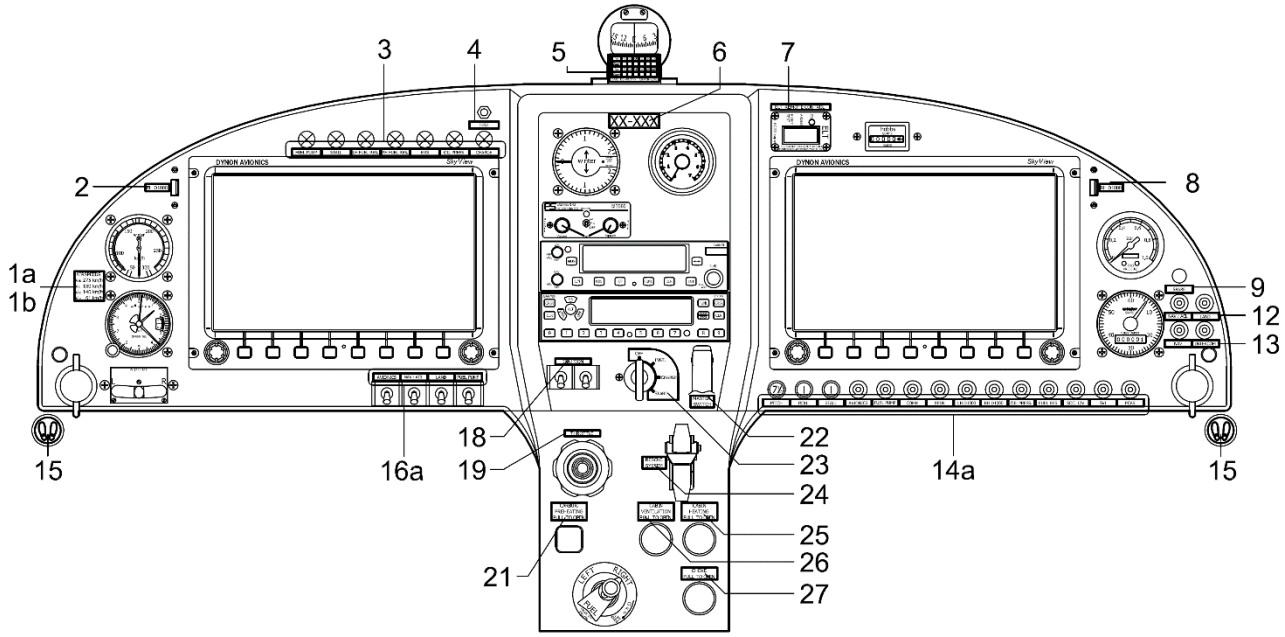


Fig. 11-2 Instrument Panel Placards

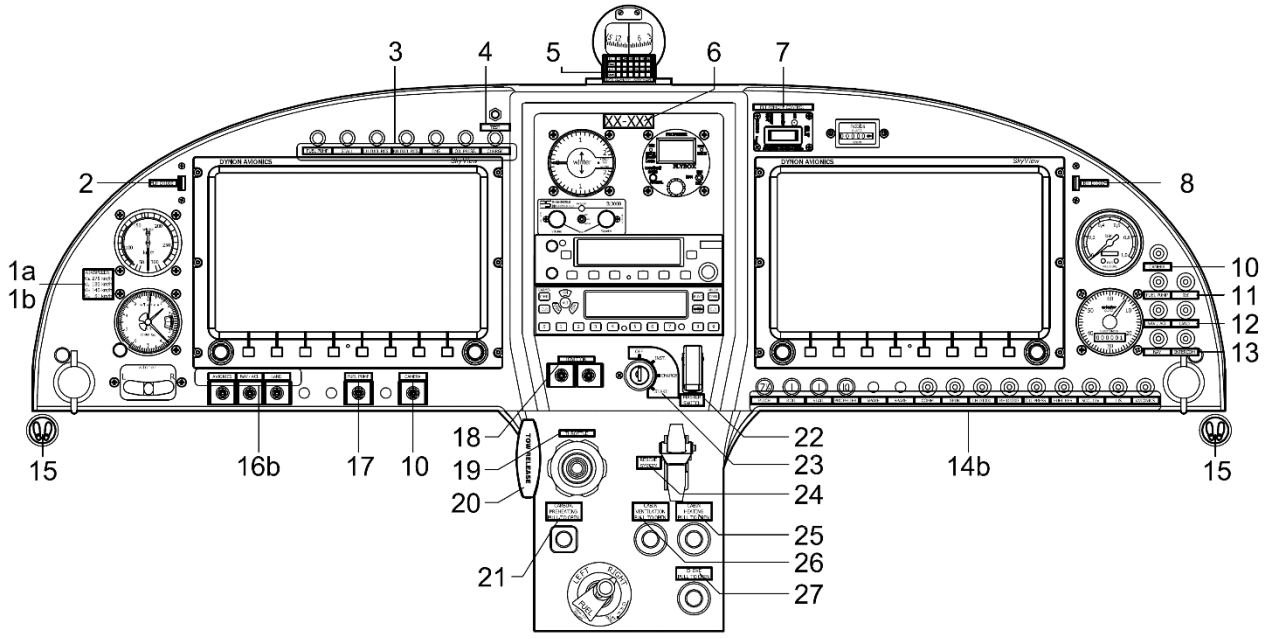


Fig. 11-3 Instrument Panel Placards (Towing Version)

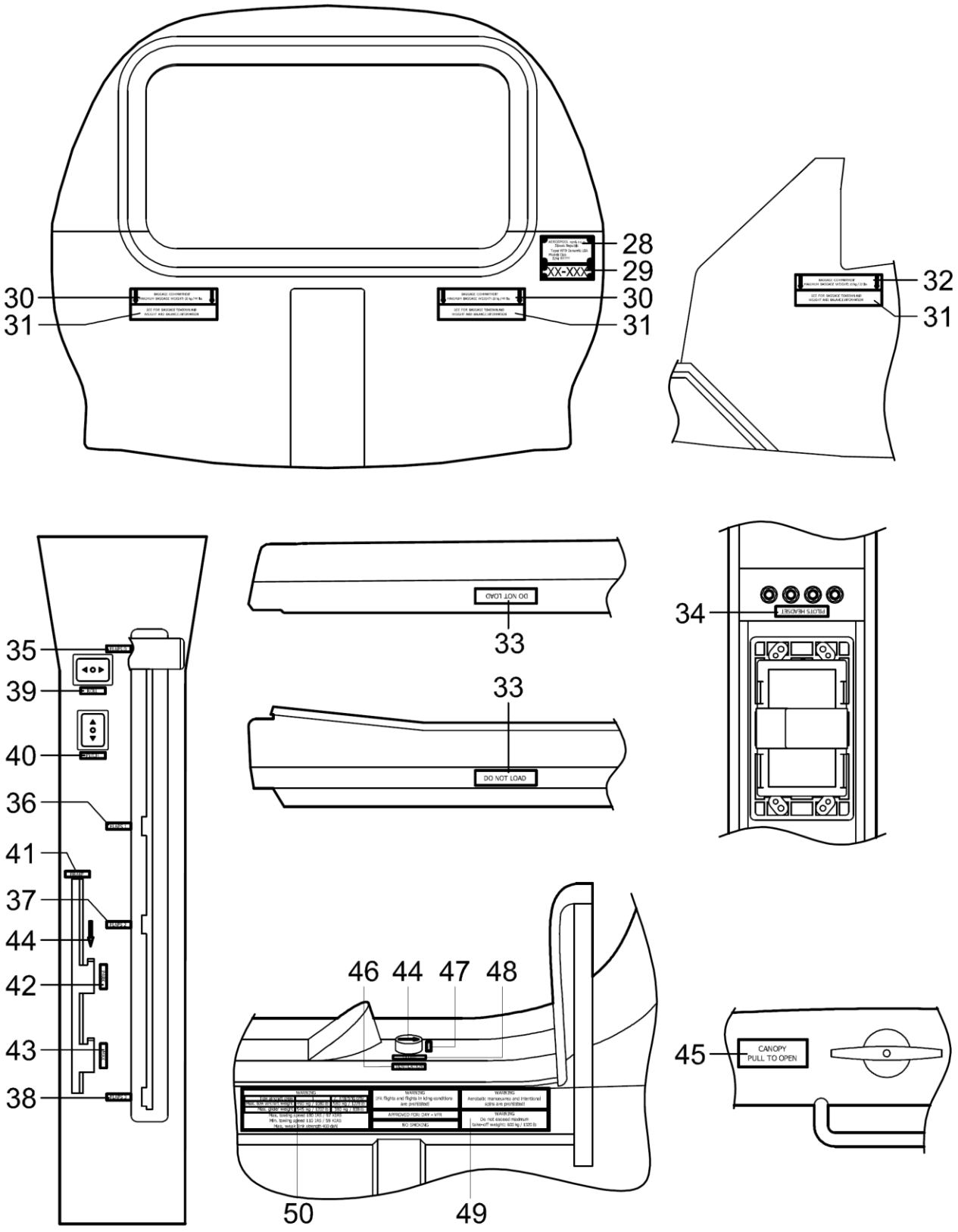


Fig. 11-4 General Interior Placards

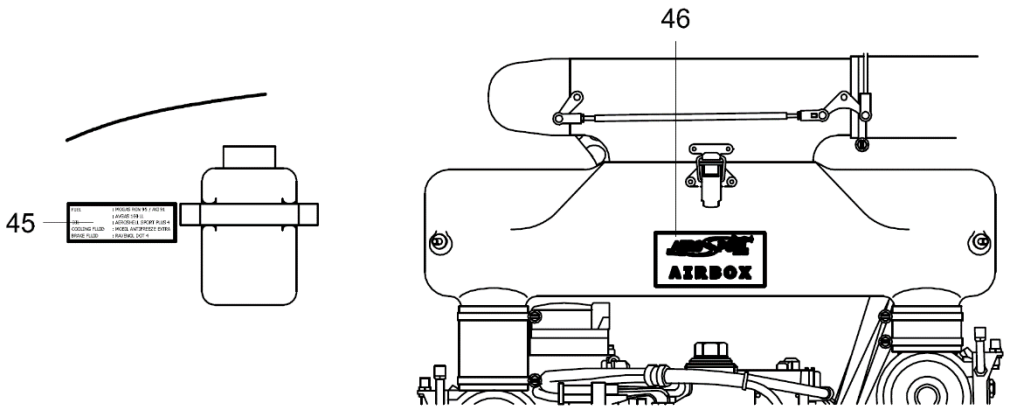


Fig. 11-5 Engine Compartment Placards

This page is left blank intentionally

12 SERVICING

CONTENTS

Chapter	Description	Page
12-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. RECOMMENDED MATERIALS	3
	3. DISPOSABLE REPLACEMENT PARTS	4
12-10	**REPLENISHING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	7
	A. Fuel system	7
	B. Oil system	10
	C. Engine cooling system	16
	D. Tires	19
	E. Brake system	20
12-20	**SCHEDULED SERVICING**	**23**
	1. INTRODUCTION	23
	2. SPECIAL TOOLS, MATERIALS	23
	3. LUBRICATION CHART	24
	4. AIRCRAFT CLEANING	31
	A. Aircraft painted surfaces cleaning	31
	B. Cabin cleaning	32
	C. Interior cleaning	33
	D. Avionics care	33
	E. Engine cleaning	34
	F. Propeller cleaning	34

12-30 UNSCHEDULED SERVICING 35

1. DESCRIPTION 35
2. MAINTENANCE PRACTICES 35
   A. Winter maintenance 35

12-00 GENERAL

1. INTRODUCTION

This chapter provides instructions on how to replenish operating fluids.

In addition, this chapter provides instructions for scheduled servicing, unscheduled servicing and recommended materials.

2. RECOMMENDED MATERIALS

Tab. 12-1 shows recommended materials, including required specifications, recommended by the aircraft manufacturer or the engine manufacturer. Any products with identical specifications can be used. Products given in Tab. 12-1 have been tested and approved for usage on aircraft.

MATERIAL	DESIGNATION	SPECIFICATION	NOTE
Fuel	MOGAS	NATURAL 95 EN 228 Super	For more specific information about usable fuel refer to Rotax Service Instruction No. SI-912-016 – the latest issue.
	AVGAS	AVGAS 100 LL ASTM-D910	
Engine oil	AeroShell Sport Plus 4	API – SL SAE 10W-40	For more specific information about usable oils refer to Rotax Service Instruction No. SI-912-016 – the latest issue.
Coolant	Conventional coolant	Mobil Antifreeze Extra	For more specific information about usable coolant refer to Rotax Service Instruction No. SI-912-016 – the latest issue.
Hydraulic fluid	Conventional hydraulic fluid	DOT-4 Classification J1703c	Brake system

Tab. 12-1 Recommended Materials

3. DISPOSABLE REPLACEMENT PARTS

Tab. 12-2 shows disposable replacement parts. Components given in Tab. 12-2 have been approved for usage on aircraft WT9 Dynamic LSA.

COMPONENT	SOURCE	SPECIFICATION
Air filter	Sprint Filter	P102
Fuel filter	MEFILTER	DF12
Oil filter	BRP-Powertrain	825016
Spark plugs	BRP-Powertrain	297656
Main wheel tire	Any source	15x6.00-6
Nose wheel tire	Any source	13x5.00-6
Accumulator 17 h	CSB BATTERY CO., LTD.	GP 12170 (12 V / 17 Ah)
Accumulator 20 Ah		GP 12220 (12 V / 20 Ah)
Primary weak link (round hole)	TOST GmbH	110107 (300 ±30 daN)
		110106 (400 ±40 daN)
Reserve weak link (oval hole)	TOST GmbH	110127 (300 ±30 daN)
		110126 (400 ±40 daN)
Tow rope RED STAR	TOST GmbH	185400 (40 m, 1100 daN)
		185500 (50 m, 1100 daN)
		185600 (60 m, 1100 daN)
Connecting ring pair	TOST GmbH	102000 (LN 65091)
Brake pads	Beringer	Part No. ZEA01

Tab. 12-2 List of Disposable Replacement Parts

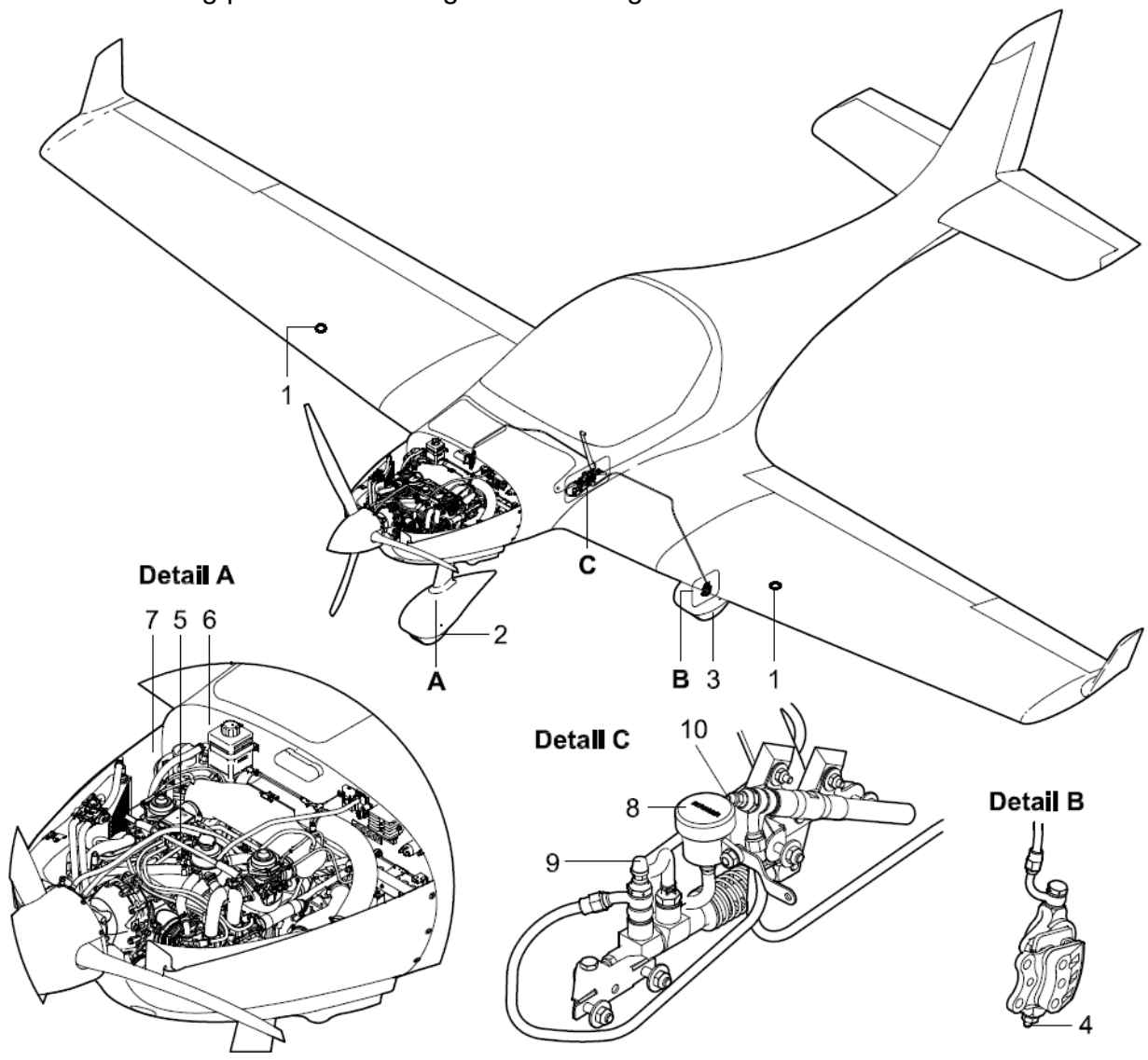
12-10 REPLENISHING

1. DESCRIPTION

This chapter provides replenishing information of all operating fluids of aircraft:

- Fuel system
- Oil system
- Engine cooling system
- Brake system

For servicing points refer to Fig. 12-1 and Fig. 12-2.



1 – Fuel tank caps
2 – Nose tire inflation valve
3 – Main tire inflation valve
4 – Brake caliper bleeding screw
5 – Expansion tank cap
6 – Overflow bottle cap
7 – Oil tank cap
8 – Brake fluid reservoir cap
9 – Master cylinder bleeding screw
10 – Pressure limiter bleeding screw

Fig. 12-1 Servicing Points

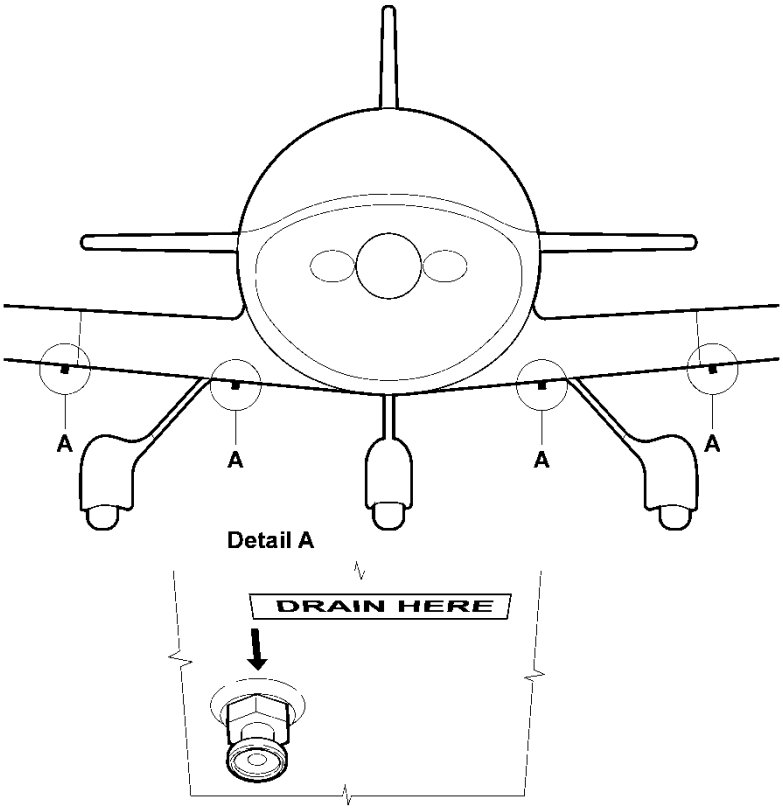


Fig. 12-2 Drain Valves

2. MAINTENANCE PRACTICES

A. Fuel system

Integral fuel tanks are located in both wings and wing central section in front of main spar. Wing and wing central section tanks are interconnected with hose. Fuel tank cap is located on the top surface of the wing. Drain valves are placed in the lowest point of each tank on the bottom surface of wings and fuselage (Fig. 12-2).
Fuel tanks capacities are shown in Tab. 12-3.

ITEM	LEFT TANK		RIGHT TANK		TOTAL	
	l	U. S. gal	l	U. S. gal	l	U. S. gal
Total fuel	63.0	16.65	63.0	16.65	126.0	33.29
Usable fuel	59.5	15.72	59.5	15.72	119.0	31.44
Unusable fuel	3.5	0.93	3.5	0.93	7.0	1.85

Tab. 12-3 Fuel Quantity

The fuels with min. RON 95 (min. AKI 91) can be used. The fuel specifications that can be used are listed in Tab. 12-4.

FUEL	DESCRIPTION
MOGAS	EN 228 super
	EN 228 super plus
AVGAS	AVGAS 100 LL

Tab. 12-4 Fuel Specifications

The fuels can contain dissolved and suspended water. The quantity of water in the fuel depends upon the temperature and type of fuel. The suspended water is settled on the bottom of fuel tanks. Dissolved water dispersed in fuel cannot be filtered from the fuel by a fuel filter, which is able to catch only microscopic solid particles.

The risk of operation with a contaminated fuel can be reduced by:

- Keeping the fuel servicing equipment and filters of such equipment clean
- Proper storage of the fuel
- Regular drainage (prior to drainage, let the fuel in calm position for a sufficient period of time for impurities and suspended water to settle down)
- Regular watching for signs of fuel contamination e.g. fuel filter element condition, fuel drain sample, visual check of the tank inside etc.

The following safety information should be followed at refueling/defueling, drainage, and another fuel handling:

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELING/DEFUELING!

MAKE SURE THAT A SUITABLE FIRE EXTINGUISHER IS AVAILABLE AT ALL TIMES DURING AIRCRAFT REFUELING/DEFUELING!

SMOKING OR MANIPULATING WITH OPEN FIRE DURING REFUELING/DEFUELING AND DRAINING IS PROHIBITED!

MASTER SWITCH AND IGNITION MUST BE SWITCHED OFF! NO PERSONS ALLOWED TO BE IN THE COCKPIT!

DO NOT USE THE MATERIALS WHICH CAN CAUSE STATIC ELECTRICITY DURING REFUELING/DEFUELING AND DRAINING!

DO NOT OPERATE ANY ELECTRICAL SWITCHES IN THE AIRCRAFT DURING REFUELING/DEFUELING OR DRAINING!

IT IS PROHIBITED TO REFUEL TANKS IN RAIN, STORM, CLOSED AND INSUFFICIENTLY AIRED AREAS (E. G. HANGAR), AT ENGINE RUN, AT ELECTRICAL INSTALLATION ON.

CAUTION

USE ONLY FUEL SUITABLE FOR THE RESPECTIVE CLIMATIC ZONE. RISK OF VAPOUR FORMATION IF USING WINTER FUEL FOR SUMMER OPERATION.

(1) Tanks refueling:

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Fire extinguisher	1 pc
Cotton cloth	AR
Persons	1

Tab. 12-5 Recommended tools, materials, persons and documentation

(a) Shut down the engine.

(b) Set the brake lever to **PARK** position or install wheel chocks.

(c) Prior to refueling the tank make sure that the corresponding kind of fuel is used (Tab. 12-4).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(e) Remove the fuel tank cap (1, Fig. 12-1) on wing's upper skin.

(f) Refuel the tank from the fuel servicing equipment.

(g) Install the fuel tank cap and make sure that opening arm directs rearward.

(h) Make sure that no spilled fuel is on the aircraft; clean if necessary.

NOTE

If refueling only one fuel tank, fill such fuel quantity that in both tanks will be same amount of fuel.

(i) Remove the ground cable from the aircraft.

(j) Remove wheel chocks.

(2) Tanks defueling:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Fire extinguisher	1 pc
Fuel container	1 pc
Defueling tool	1 pc
Cotton cloth	AR
Loctite 577	AR
Persons	1

Tab. 12-6 Recommended tools, materials, persons and documentation

Fuel tanks are defueled by means of fuel drain valves, located in the lowest point of each tank on a wings bottom surface (Fig. 12-2).

(a) Shut down the engine.

(b) Set the brake lever to **PARK** position or install wheel chocks.

(c) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(d) Place a fuel container bellow the drain valve.

(e) Unscrew the drain valve from wing central section tank (A, Fig. 12-2), install the defueling tool and set it to open.

(f) Open the fuel tank cap (1, Fig. 12-1) on the wing upper side to accelerate defueling.

(g) When the fuel stops draining, remove defueling fixture.

(h) Drain the residual fuel from the wing tank (A, Fig. 12-2).

(i) Clean the drain valves. Apply Loctite 577 on threads and screw the drain valves.

(j) Remove the ground cable from the aircraft.

(k) Release **PARK** lever or remove wheel chocks.

B. Oil system

The engine Rotax 912 ULS2 uses a wet sump lubrication system with total oil system capacity 3.5 l. A filler cap and dipstick is provided for determining the amount of oil in the system.

WARNING

ALWAYS ALLOW ENGINE TO COOL DOWN TO AMBIENT TEMPERATURE BEFORE START OF ANY WORK, OTHERWISE YOU RISK BURNING FROM HOT PARTS.

ENGINE IGNITION MUST BE SWITCHED OFF.

(1) Oil level check:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Cotton cloth	AR
Persons	1

Tab. 12-7 Recommended tools, materials, persons and documentation

(a) Level the aircraft (Chapter 08-10).

(b) Set the brake lever to **PARK** position or install wheel chocks.

(c) Open inspection door located in engine upper cowling.

(d) Unscrew the cap (2, Fig. 12-3) on oil tank (1), pull out dipstick (3) and clean it.

(e) Turn the propeller several times by hand in direction of engine rotation to pump all the oil from the engine to the oil tank. This process is completed when air flows back to the oil tank. This flow can be perceived as a murmur.

(f) Put dipstick back in oil tank and check oil level.

(g) The oil level in the oil tank should be between the two marks (min. / max.) on the oil dipstick, but must never fall below the min. mark.

(h) If oil is below minimum level, replenish as required.

(i) Fit the oil dipstick and tighten the oil tank cap by hand.

(j) Close inspection door at upper engine cowling.

(k) Release **PARK** lever or remove wheel chocks.

(2) Oil replenish:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
New oil	AR
Cotton cloth	AR
Persons	1

Tab. 12-8 Recommended tools, materials, persons and documentation

NOTE

For longer flights replenish oil to max. mark to warrant more reserve. Difference between min. and max. level marks is 0.5 l.

(a) Put the aircraft on leveled surface.

(b) Set the brake lever to **PARK** position or install wheel chocks.

(c) Open inspection door located on engine upper cowling.

(d) Unscrew the cap (2, Fig. 12-3) on oil tank (1), pull out dipstick (3) and clean it.

(e) Turn the propeller several times by hand in direction of engine rotation to pump all the oil from the engine to the oil tank. This process is completed when air flows back to the oil tank. This flow can be perceived as a murmur.

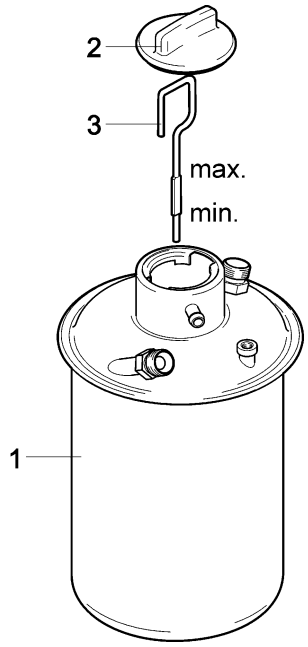
(f) Replenish oil to the correct level. Make sure that the corresponding kind of oil is used (Tab. 12-1).

(g) Put dipstick back in oil tank and check oil level. The oil level in the oil tank should be between the two marks (min. / max.) on the oil dipstick, but must never fall below the min. mark.

(h) Fit the oil dipstick and tighten the oil tank cap by hand.

(i) Close inspection door at upper engine cowling.

(j) Release **PARK** lever or remove wheel chocks.



1 Oil tank
2 Oil tank cap
3 Dipstick

Fig. 12-3 Oil Level Check

(3) Oil change:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 17	1 pc
Wrench 19	1 pc
Wrench 22	1 pc
Ignition wrench 16	1 pc
Oil filter wrench	1 pc
Jig	1 pc
Rags	2 pcs
Syringe	1 pc
New oil	4 l
New oil filter	1 pc
Cooper gasket ring Ø14 mm	3 pcs
Safety wire Ø0.8 mm	AR
Persons	1
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191)	-

Tab. 12-8 Recommended tools, materials, persons and documentation

WARNING

CARELESS DRAINING OF HOT ENGINE OIL MAY CAUSE SCALDS. DISPOSE OF USED OIL AND FILTERS RESPECTING THE ENVIRONMENTAL AND SAFETY REGULATIONS.

CAUTION

FAILURE TO FOLLOW INSTRUCTIONS BELOW COULD LEAD TO AIR ENTERING THE OIL SYSTEM AND DEFECTS ON VALVE TRAIN.

NOTE

Run engine to warm oil before beginning oil change procedure.

Do not drain the oil suction line, oil radiator and return line to avoid of air entering the oil system.

Carry out the oil and filter change quickly and without interruption to prevent draining of the oil system from hydraulic tappets.

(a) Put the aircraft on leveled surface.

(b) Set the brake lever to **PARK** position or install wheel chocks.

(c) Check oil level (see 2.B.(1)).

(d) Remove engine cowlings (Chapter 71-10).

(e) Place a suitable container under the oil tank, remove the drain plug (9, Fig. 12-5) (quick drain valve if fitted) and drain oil out.

(f) Turn the propeller several times by hand in direction of engine rotation to pump all the oil from the engine to the oil tank. This process is completed when air flows back to the oil tank. This flow can be perceived as a murmur.

(g) On oil cooler (2), remove safety wire and disconnect hoses (4; 5). Suck oil from oil cooler (2).

(h) Unscrew oil filter.

(i) Install new oil filter:
- clean the contact surface of the oil pump housing with a clean cloth
- apply a thin film of engine oil on the gasket of a new oil filter
- screw on oil filter until oil filter gasket is seated solidly
- tighten oil filter with 3/4 turn (270°).

(j) Cut old oil filter without producing any metal debris and inspect filter material for foreign objects.

(k) Remove safety wire, unscrew magnetic plug (Fig. 12-4), check for metal contamination and refit, torque to 25 Nm. Secure magnetic plug using safety wire.

WARNING

IF METAL CONTAMINATION IS FOUND ON PLUG (FIG. 12-4), CONTACT AIRCRAFT MANUFACTURER!

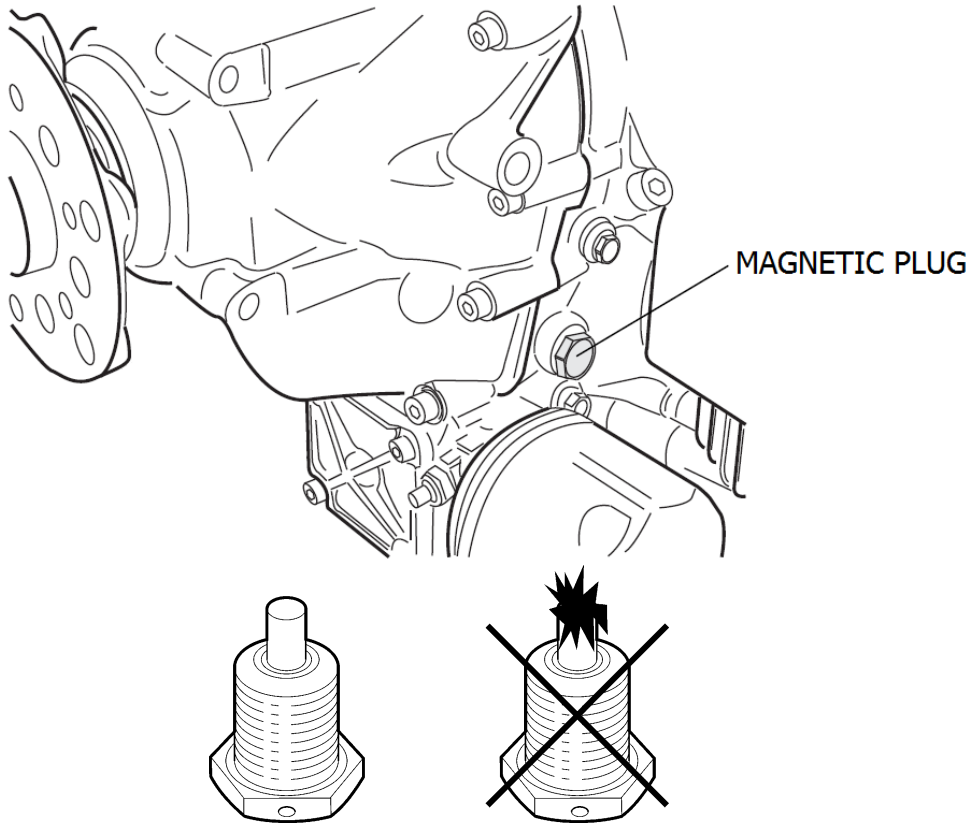


Fig. 12-4 Magnetic Plug

(l) Fill the oil cooler with new oil. Make sure that the corresponding kind of oil is used (Tab. 12-1).

(m) Connect hoses (4; 5, Fig. 12-5) on the oil cooler (2); secure them with safety wire.

(n) On bottom of oil tank screw the drain plug (9) with new gasket ring (10) torque to 25 Nm. Secure drain plug (9) with safety wire.

NOTE

During tightening of drain plug, hold upper nut with second wrench.

(o) Remove cap (3), pour approximately 3 l of new oil into oil tank. Make sure to use corresponding kind of oil (Tab. 12-1); close the oil tank cap (3).

(p) On oil tank (1) disconnect hose (7); route disconnected hose under engine and put to suitable container.

(q) Seal up hose socket (10).

(r) Remove upper spark plugs from every cylinder head on the engine (refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for spark plugs removal information).

(s) On vent hose (8) put on jig making pressure at 0.45 bar.

CAUTION

PRESSURE SHOULD NEVERRISE OVER 1 BAR.

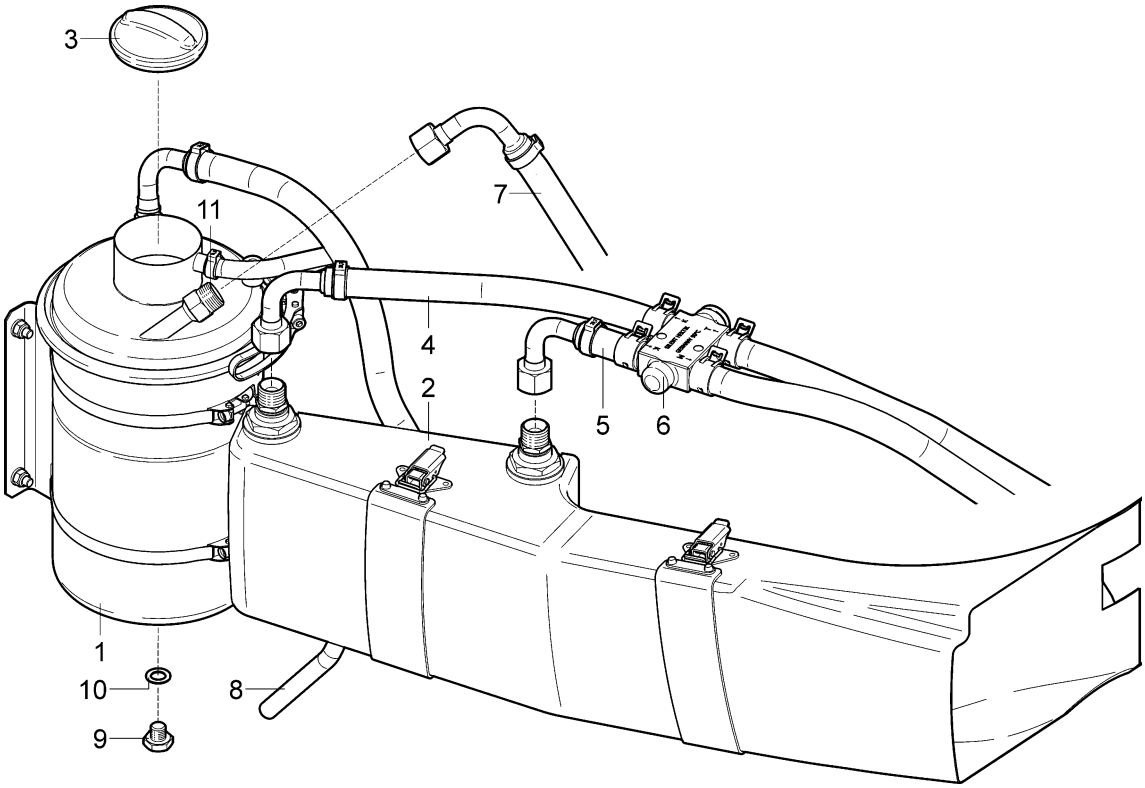
(t) Rotate the propeller while beginning a continual flow of oil from hose (7). Add more oil if necessary.

(u) Disconnect jig, connect back hose (7) on oil tank and reinstall spark plugs; tighten spark plugs on recommended torque moment (refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for spark plugs removal information).

(v) Check oil level (see 2.B.(1)).

(w) Install engine cowlings (Chapter 71-10).

(x) Release **PARK** lever or remove wheel chocks



1 – Oil tank
2 – Oil cooler
3 – Oil tank cap
4 – Oil hose
5 – Oil hose
6 – Oil thermostat
7 – Oil hose
8 – Venting hose
9 – Drain plug
10 – Cooper gasket ring ø14 mm
11 – Hose socket

Fig. 12-5 Oil Change

C. Engine cooling system

Aircraft has combined water and air cooling system. Coolant capacity is approximately 2.5 l (cooling system + overflow bottle).

WARNING

ALWAYS ALLOW ENGINE TO COOL DOWN TO AMBIENT TEMPERATURE BEFORE START OF ANY WORK.

ENGINE IGNITION MUST BE SWITCHED OFF.

NEVER OPEN THE EXPANSION TANK CAP WHEN THE COOLING SYSTEM IS HOT. FOR SAFETY´S SAKE, COVER CAP WITH A RAG AND OPEN SLOWLY. SUDDEN OPENING OF THE CAP COULD PROVOKE THE ESCAPE OF BOILING COOLANT AND RESULT IN SCALDING.

(1) Coolant level and condition check:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Densimeter	1 pc
Glycol tester	1 pc
New coolant	AR
Persons	1

Tab. 12-9 Recommended tools, materials, persons and documentation

NOTE

It is only possible to check correct level of cooling fluid when the engine is cold.

(a) Put the aircraft on leveled surface.
(b) Set the brake lever to **PARK** position or install wheel chocks.
(c) Remove engine cowlings (Chapter 71-10).
(d) Open the cap on the expansion tank (5, Fig. 12-1).
(e) Check the coolant level in the expansion tank. The coolant level must be filled up to the top.
(f) Check the coolant level in the overflow bottle. The coolant level must be between min. and max. level marks.
(g) Inspect coolant with densimeter or glycol tester. Strongly discolored or thickened coolant has to be changed.
(h) Replenish or change if required.
(i) Release **PARK** lever or remove wheel chocks.

(2) Coolant replenishing:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
New coolant	AR
Persons	1

Tab. 12-10 Recommended tools, materials, persons and documentation

NOTE

If necessary, replenish with coolant of same specification. Make sure that the corresponding kind of coolant is used (Tab. 12-1) or according to the specification stated at the label in the engine compartment.

(a) Put the aircraft on leveled surface.
(b) Set the brake lever to **PARK** position or install wheel chocks.
(c) Remove engine cowlings (Chapter 71-10).
(d) Open the cap on the expansion tank (5, Fig. 12-1).
(e) Check the coolant level and replenish if necessary. The coolant level must be filled up to the top.
(f) Tighten the cap; cap has to be tightened until the stop lug is touched.
(g) Open the cap on the overflow bottle (6, Fig. 12-1).
(h) Check the coolant level and replenish. The coolant level has to be between min. and max marks.
(i) Tighten the cap.
(j) Install engine cowlings (Chapter 71-10).
(k) Release **PARK** lever or remove wheel chocks.

(3) Coolant change:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 10	1 pc
Rag	1 pc
Syringe	1 pc
Suitable container	1 pc
New coolant	AR
Persons	1
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191)	-

Tab. 12-11 Recommended tools, materials, persons and documentation

(a) Put the aircraft on leveled surface.

(b) Set the brake lever to **PARK** position or install wheel chocks.

(c) Place a suitable container under the water radiator and release the cap on expansion tank (5, Fig. 12-1).

(d) Disconnect hose (11/12, Fig. 75-2) on water radiator and drain the radiator.

(e) Remove the caps from expansion tank and overflow bottle and suck the coolant.

(f) Connect the hose (11/12, Fig. 75-2) and tighten hose clamp (9, Fig. 75-2).

(g) Refill newly mixed coolant into the expansion tank and overflow bottle.

(h) Tighten the caps; cap of expansion tank must be tightened until the stop lug is touched.

(i) Run the engine for a short period and then check the level of coolant.

(j) If necessary, add concentrated coolant.

(k) Check if hoses are tight and secured.

(l) Check the coolant level.

(m) Install engine cowlings (Chapter 71-10).

(n) Release **PARK** lever or remove wheel chocks.

D. Tires

The aircraft uses following tires:

- Nose landing gear wheel 13x5 with tire 13x5.00-6.
- Main landing gear wheels 15x6 with tires 15x6.00-6.

During aircraft operation, keep the landing wheels tires inflated to recommended pressure (see Table 12-12) to ensure maximum service life and reduced damage resulting from the landing on gravel with sharp edges. When filling or checking tire pressure, inspect tires for signs of abnormal wear, cuts, or abraded surfaces.

ITEM	RECOMMENDED PRESSURE
	kPa
Nose landing gear wheel	200
Main landing gear wheel	250

Tab. 12-12 Tires Pressure

(1) Checking and inflation of tires:

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pressure gauge	1 pc
Inflation pump	1 pc
Cotton cloth	AR
Soap water	AR
Persons	1

Tab. 12-13 Recommended tools, materials, persons and documentation

(a) Set the brake lever to **PARK** position or install wheel chocks.

(b) Remove the adhesive sticker from the wheel fairing to get access to the tire inflation valve.

(c) Clean tire inflation valve surroundings (2; 3, Fig. 12-1).

(d) Screw out the valve cap of the tire inflation valve.

(e) Using a dial type gauge check the pressure in the tire:
- at low pressure, inflate the tire to prescribed pressure
- at higher pressure, deflate the tire to prescribed pressure by pressing the valve core.

(f) Check the tire inflation valve for leakage. Spread soap water on the valve hole and check if bubbles appear or not. Tighten the tire inflation valve core or replace it as necessary.

(g) Screw in the valve cap.

(h) Remove wheel chocks.

(i) Install the adhesive sticker on the wheel fairing.

E. Brake system

WARNING

DO NOT GET BRAKE FLUID ON YOUR SKIN OR IN YOUR MOUTH. BRAKE FLUID CAN CAUSE DISEASE.

CAUTION

REMOVE SPILLED BRAKE FLUID IMMEDIATELY. BRAKE FLUID CAN CAUSE DAMAGE TO PAINT AND OTHER MATERIALS.

(1) Brake fluid level check and replenish:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Cotton cloth	AR
Persons	1

Tab. 12-14 Recommended tools, materials, persons and documentation

(a) Put the aircraft on leveled surface.

(b) Install wheel chocks.

(c) Release the brake lever.

(d) Remove the pilot seat (Chapter 25-10).

(e) Open the cap (8, Fig. 12-1) on the brake fluid reservoir.

(f) Check if brake fluid level is between min. and max. level marks.

(g) If necessary, replenish with suitable brake fluid of same specification. Make sure that the corresponding kind of brake fluid is used (Tab. 12-1) or according to the specification stated at label in the engine compartment as follows.

(h) Install the cap (8, Fig. 12-1) on the brake fluid reservoir.

(i) Install pilot seat (Chapter 25-10).

(j) Remove wheel chocks.

(2) Brake fluid change and system bleeding:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Beringer jig	1 pc
Rags	2 pcs
Hose ø6 x 300	3 pcs
Container	2 pcs
Brake fluid	AR
Loctite 243	AR
Persons	2
Beringer documentation - Brake system bleeding procedure	-

Tab. 12-15 Recommended tools, materials, persons and documentation

WARNING

DO NOT GET BRAKE FLUID ON YOUR SKIN OR IN YOUR MOUTH. BRAKE FLUID CAN CAUSE DISEASE.

CAUTION

REMOVE SPILLED BRAKE FLUID IMMEDIATELY. BRAKE FLUID CAN CAUSE DAMAGE TO PAINT AND OTHER MATERIALS.

(a) Put the aircraft on leveled surface.
(b) Release the brake lever.
(c) Remove main landing gear fairings (Chapter 32-10).
(d) Install wheel chocks.
(e) Remove the pilot seat (Chapter 25-10).
(f) On both calipers, put draining hoses on the vent valve (4, Fig. 12-01) and put them into containers. Release both vent valves.
(g) Unscrew the cap (8) on the brake fluid reservoir and remove membrane. Screw Beringer jig on brake fluid reservoir.
(h) Pump on the Beringer jig until all brake fluid has been drained into the containers.
(i) Remove Beringer jig from brake fluid reservoir.
(j) Screw the bleeding container on the brake fluid reservoir.
(k) Install the Beringer jigs on both caliper's vent valves (4, Fig. 12-01).
(l) Pour the new brake fluid into the smaller tank of Beringer jigs.

(m) Release both vent valves (4) on brake calipers.

(n) Pump on both jigs and fill the brake system with brake fluid.

(o) Connect drain hose on pressure limiter and put the free end into the container. Release the vent valve of pressure limiter. Pump on the jigs until a clear brake fluid begins to flow out without air bubbles. Tighten vent valve of pressure limiter.

(p) Remove the drain hose.

NOTE

Push the brake lever forward and backwards to speed up the bubble release.

(q) Connect hose on master cylinder vent valve and put the free end into the container. Release the vent valve of master cylinder. Pump on the Beringer jigs until a clear brake fluid begins to flow out without air bubbles. Tighten vent valve of master cylinder.

(r) Remove the draining hose.

NOTE

Push the brake lever forward and backwards to speed up the bubble release.

(s) Pump on the Beringer jigs until a clear brake fluid begins to flow out from brake fluid reservoir.

(t) Decompress and disconnect the Beringer jig.

(u) Put a cloth under the brake fluid reservoir and disconnect the bleeding container from the fluid tank.

CAUTION

CHECK THE LEVEL OF THE BRAKE FLUID IN THE BRAKE FLUID RESERVOIR.

(v) Clean spilled brake fluid and replenish the brake fluid to the max level in the brake fluid reservoir. Install the membrane and cap of brake fluid reservoir.

(w) Check and tighten all the vent valves.

(x) Install the pilot seat (Chapter 25-10).

(y) Remove wheel chocks.

(z) Install main landing gear fairings (Chapter 32-10).

12-20 SCHEDULED SERVICING

1. INTRODUCTION

This chapter contains the information necessary to perform scheduled service of the aircraft. In this chapter is presented lubrication chart and instructions for cleaning the exterior and interior of the aircraft including the required materials.

2. SPECIAL TOOLS, MATERIALS

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Vacuum cleaner	1 pc
Lithium grease NLGI 3 MOL Liton LTA 3EP	AR
Oil WD40	AR
Mild-cleaning agent	AR
Automotive polish	AR
Plexiglass cleaner	AR
Technical benzine	AR
Cotton cloth	AR
Sponge	1 pc
Chamois	1 pc
Brush	1 pc
Protective foil	AR
Adhesive tape	AR
Persons	1

Tab. 12-16 Recommended tools, materials, persons and documentation

3. LUBRICATION CHART

Lubricate movable or rotary places on the aircraft in scheduled intervals (Tab. 12-17). Regular lubrication decreases frictional forces in movable joints and protects lubricated places against corrosion. Use recommended lubricants for lubrication (see below). The lubricants shall not be contaminated with water or foreign matters and their storage period or usability shall not be expired. After lubrication is finished, clean the lubricated places from lubricants excess.

The area in which lubrication is done must be dust-free. Thoroughly clean lubricated points before lubrication.

After cleaning the aircraft with pressure water, lubricate again places which got into contact with the water stream (hinges of control surfaces and flaps, the nose and main landing gear etc.).

Use the manufacturer's recommended greases or equivalent greases that meet the following properties:

- **Vaseline:** Lithium grease, suitable for bearing applications in mobile technology and industry. Temperature range of use from -30 °C to +120 °C. Consistency NLGI 3 (NLGI classification). The manufacturer recommends MOL Liton LTA 3EP.
- **Lubrication oil:** Semi-synthetic oil, resistant to high pressure. Suitable for lubrication of points with high pressure loads, e.g. push rods, Bowden cables, joint connections. Temperature range of use from -35 °C to +180 °C. The manufacturer recommends the use of WD40.

Location	Lubrication point	100 hr. / Annual / Special	Lubricant
Engine installation (Fig. 12-6)	Engine	Refer to Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191), the latest issue	
	Throttle control cables at the entry to bowdens.	X	
	Attachment of the throttle control cables at carburetors.	X	
	Throttle control	X	
	Choke control cables at the entry to bowdens	X	
	Attachment of the choke control cables at carburetors.	X	
	Choke shaft components at carburetors.	X	
Heating and venting system (Fig. 12-6)	Axles of heating and venting flap.	X	
	Pull-push control cables of heating and venting flap at the entrance to bowdens.	X	
Air induction system (Fig. 12-6)	Axles of the air filter holder with pre-heating.	X	
Brake system	Revolving points of brake lever.	X	
Canopy	Canopy hinges.	X	
	Canopy closing mechanism latch.	X	
	Ball joints of gas struts.	X	
Nose landing gear (Fig. 12-6)	Bushings of nose landing gear upper and lower supports.	X	
	Axle of guide wheels.	X	
	Pins of beams and stirrup	X	
Elevator control system (Fig. 12-6)	Movable connecting points of elevator control system.	X	
	Sliding bearings on the control stick's torsion tube.	X	
	Movable connecting points of trim system.	X	

Tab. 12-17 Lubrication Chart (page 1 of 2)

Location	Lubrication point	100 hr. / Annual / Special	Lubricant
Rudder control system (Fig. 12-6)	Movable connecting points of control push rods of nose landing gear.	X	●◆
	Sliding bearings of foot control.	X	●◆
	Bayonet sockets.	X	●◆
	Movable connecting points of rudder pedals.	X	●◆
	Movable connecting points from foot control up to the rudder.	X	●◆
Wing flaps control system (Fig. 12-6)	Movable connecting points of wing flaps control system.	X	●◆
	Ball joints of gas struts.	X	◆
	Sliding bearings of the torsion tube.	X	●◆
Wing	Wing bushings and pins.	Every 200h or annually	●
	Sliding casings of push rods in wing root ribs.	Every 200h or annually	●
Elevator	Hinges.	X	●◆
Rudder	Hinges.	X	●◆
Ailerons	Hinges.	X	●◆
Wing flaps	Hinges.	X	●◆
Tow release control system (towing version only)	Movable points of tow release control system.	X	●◆
	Tow release control handle cable at the entry to bowden.	X	◆

Tab. 12-17 Lubrication Chart (page 2 of 2)

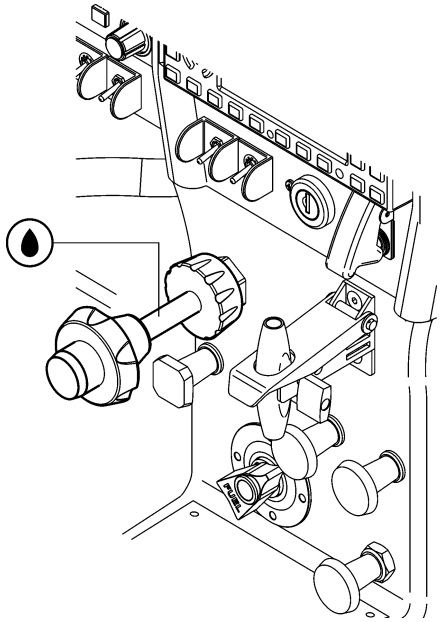


Fig. 12-6 Lubrication Chart (page 1 of 6)

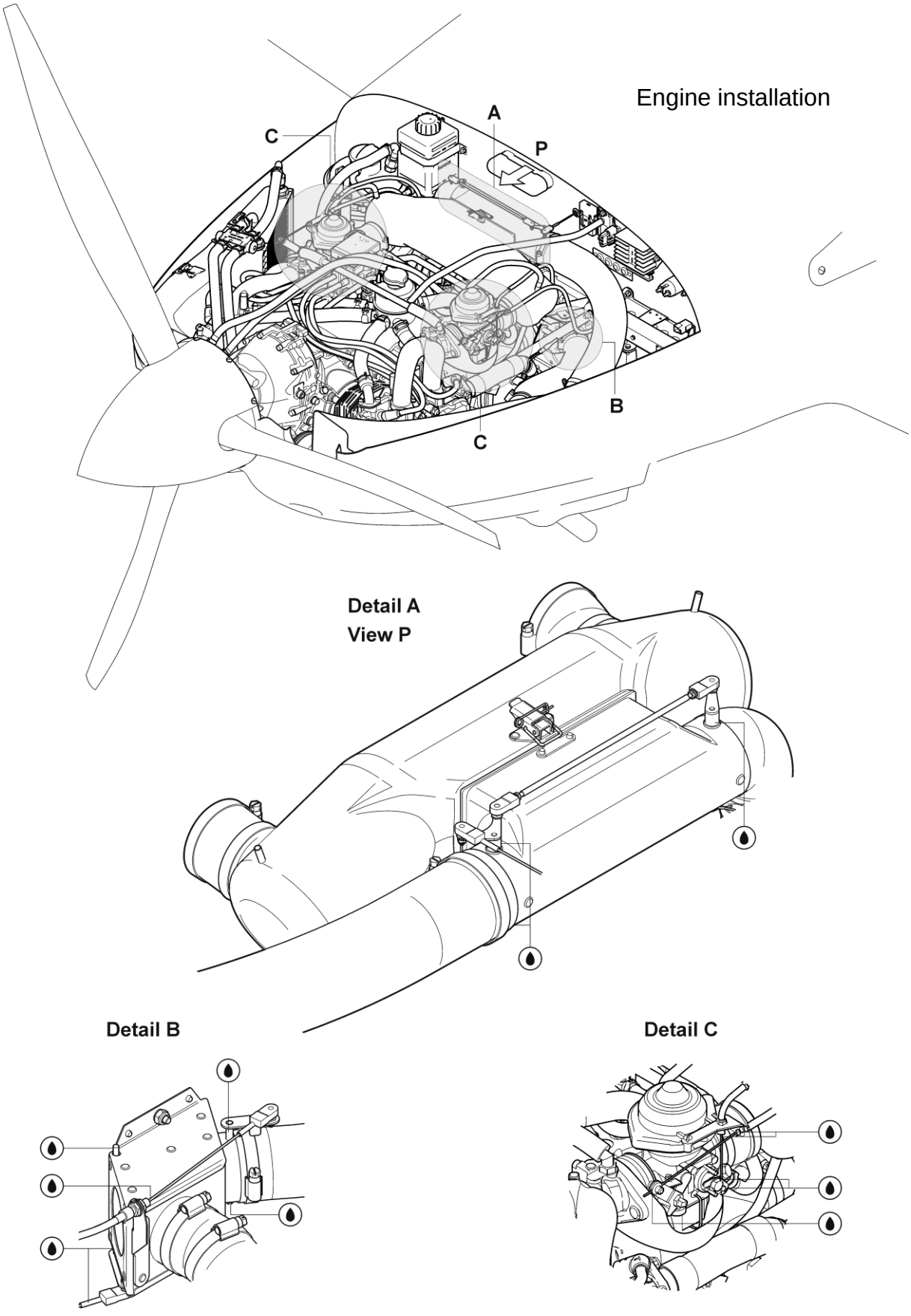


Fig. 12-6 Lubrication Chart (page 2 of 6)

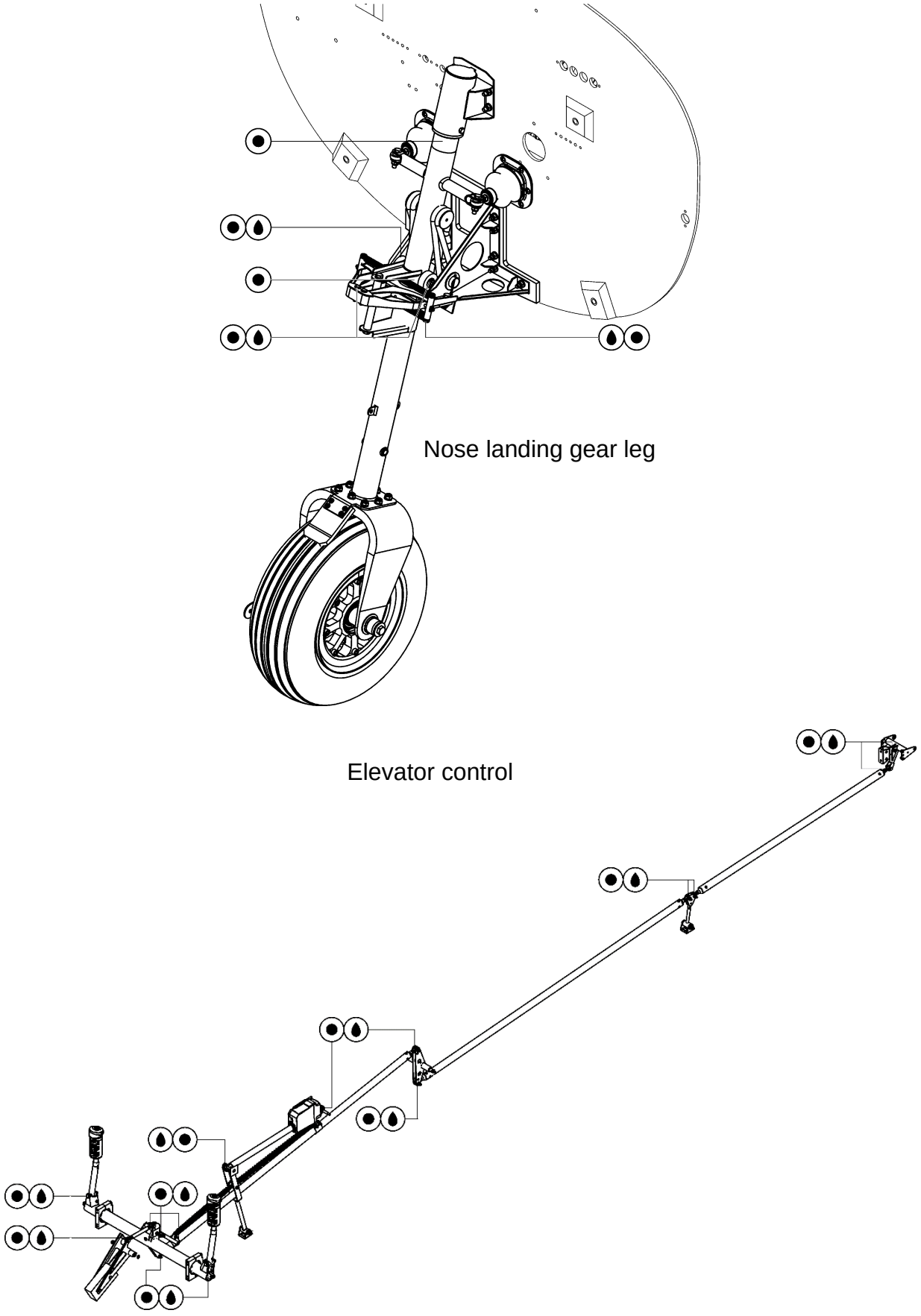


Fig. 12-6 Lubrication Chart (page 3 of 6)

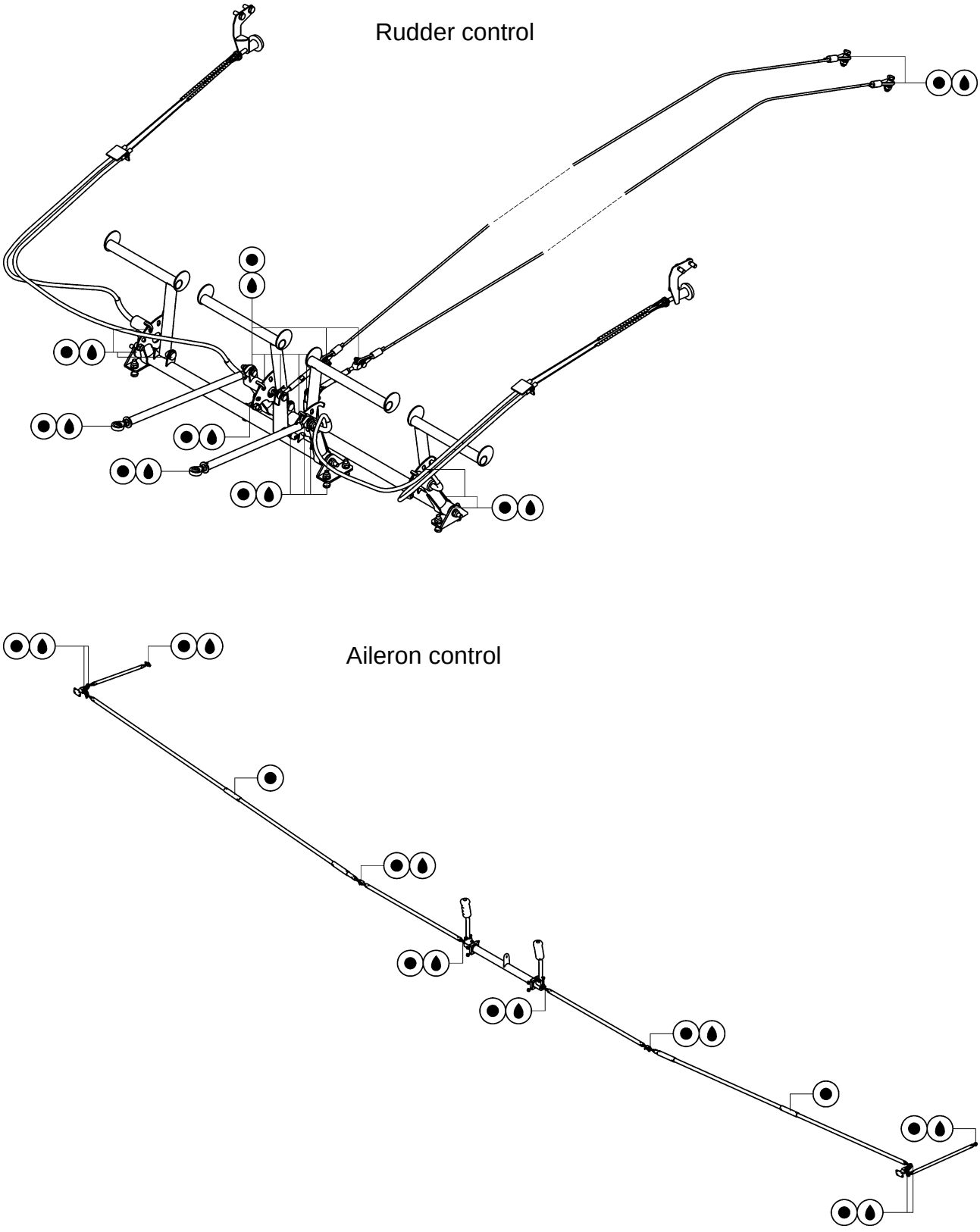


Fig. 12-6 Lubrication Chart (page 4 of 6)

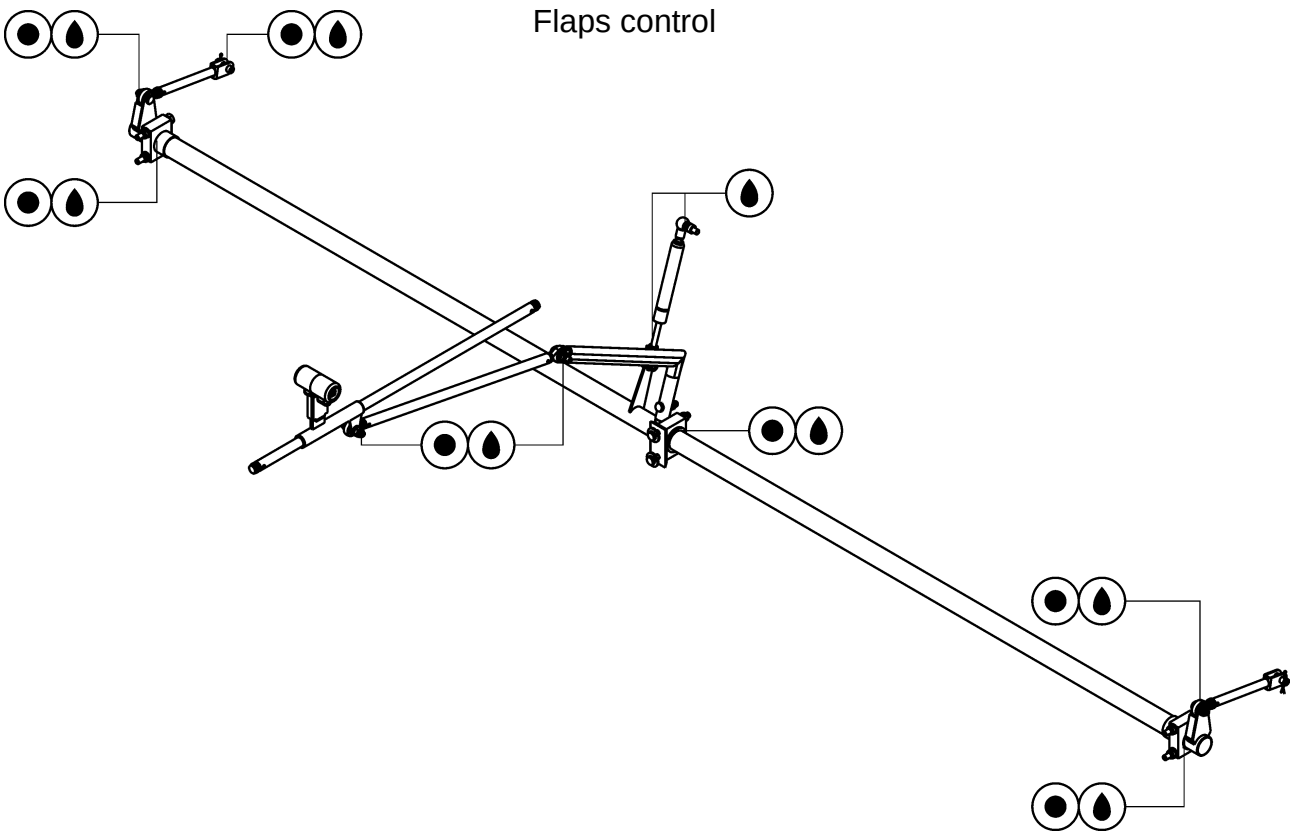


Fig. 12-6 Lubrication Chart (page 5 of 6)

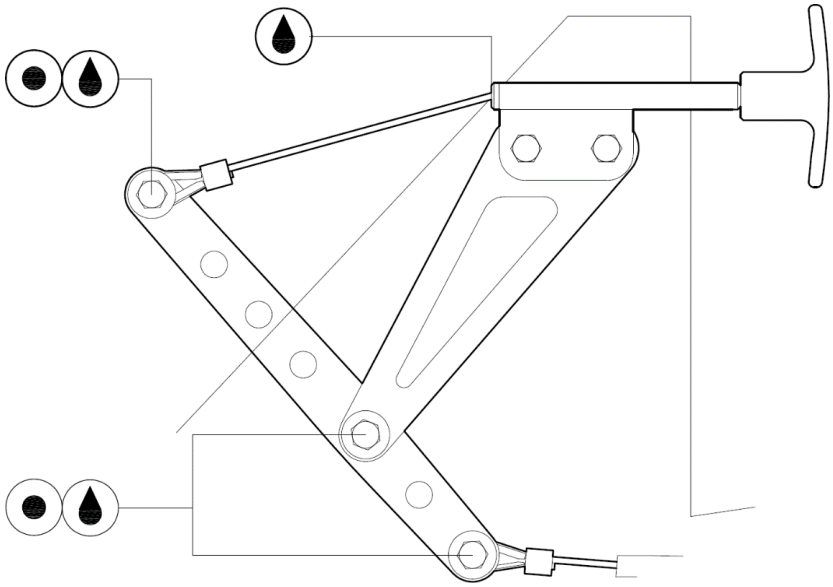


Fig. 12-6 Lubrication Chart (page 6 of 6) (Towing Version Only)

4. AIRCRAFT CLEANING

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 except of engine cleaning where minimum authorization independent certifying staff qualified in accordance with Part-66 or higher is required.

Recommended tools, materials, persons and documentation:

List of special tools and materials for the cleaning of the aircraft is shown in Tab. 12-16.

A. Aircraft painted surfaces cleaning

To maintain the flight characteristics of the aircraft shall be the outer surface of the aircraft (especially the leading edge of the wings) and the propeller kept clean.

The outer surface of the aircraft is covered with a durable coat which keeps good gloss under normal conditions and does not require to be polished often. At normal operation, e.g. after a flight day, wash the dirty surface of the aircraft with water and detergent or with non-active soap. After washing the aircraft with clean water, dry the aircraft.

It is recommended to renew the painted surface preservation at least twice a year, e.g. prior to winter operation and after it. A good preservative coating will protect the aircraft finish from the UV rays and protect the surface against oxidation. Any good automotive polish or wax may be used.

CAUTION

DO NOT USE CLEANING OR POLISHING AGENTS WHICH CONTAIN SILICONE. IF THE AIRCRAFT NEEDS REPAIR, SILICONE CAN PREVENT REPAIR MATERIALS FROM BONDING CORRECTLY.

(1) Procedure:

(a) Close all covers and cabin.

(b) Cover tires. Do not allow tires to stand in pools of cleaning solution any longer than required for the washing operation.

(c) Cover Pitot-static tube to prevent water and cleaning solution from entering.

(d) Protect all control surface bearings and other lubricated components before cleaning the aircraft.

CAUTION

DO NOT DRY-CLEAN THE DUST - QUALITY OF THE AIRCRAFT PAINTED SURFACE IS DE-CREASED BY THIS.

(e) Use large quantities of water to clean the aircraft. If necessary, add a mild-cleaning agent to the water and remove dust and dirt from painted surfaces with a sponge

CAUTION

WHEN WASHING THE AIRCRAFT WITH WATER AND CLEANING AGENT, USE SPECIAL CARE TO AVOID WASHING AWAY GREASE FROM ANY LUBRICATED AREA. PREMATURE WEAR OF LUBRICATED SURFACES MAY RESULT IF THESE PRECAUTIONS ARE NOT OBSERVED.

(f) Remove oil and grease using a cloth dampened with benzine.

(g) Remove insects with a sponge and water with mild-cleaning agent.

(h) Carefully rinse the surface to remove all cleaning agent.

(i) Dry the cleaned surface thoroughly with a chamois to prevent watermarks.

(j) Apply suitable wax or polish on washed and dry surface of the aircraft, spread it over and polish it with soft flannel cloth.

NOTE

When using preservation preparations follow instructions given on the preparations packaging.

(k) Remove Pitot-static tube cover and protecting of control surface bearings and other lubricated components.

WARNING

LOOK, IF THE HOLES OF PITOT STATIC TUBE ARE FREE; IN CASE OF DETECTION OBSTACLES IMMEDIATELY REMOVE THEM.

B. Cabin cleaning

The cabin may only be cleaned by washing it with a sufficient quantity of water and an adequate quantity of detergents. Use either a soft, clean cloth sponge or chamois. Then use suitable polishers to clean the cabin.

(1) Procedure:

(a) To avoid scratching the glass surface, take off watches and rings before cleaning.

(b) Remove excess amounts of dirt and other foreign matter from the glass surface with clean water. The preferred method is to spray or flood the surface to flush away foreign materials. If spraying or flooding is impractical, thoroughly wet a clean sponge or soft cloth and carefully wipe the surface.

CAUTION

NEVER USE GASOLINE, BENZENE, ALCOHOL, ACETONE, FIRE EXTINGUISHER, ANTI-ICE FLUID, LACQUER THINNER OR GLASS CLEANER TO CLEAN THE PLEXIGLASS. THESE MATERIALS WILL CORRODE THE PLEXIGLASS.

DO NOT RUB THE CANOPY WHILE IT IS DRY. DO NOT USE DIRTY CLOTHS OR SPONGES. THE PLEXIGLASS CANOPY SCRATCHES VERY EASILY WITH EVEN THE SMALLEST PARTICLES OF DUST.

(c) Wash gently using sponge or soft cloth and a solution of water with a mild liquid soap.

(d) Carefully rinse the surface to remove all cleaning agent.

(e) Dry the cleaned surface thoroughly with a chamois to prevent watermarks.

(f) Polish glass using a special plexiglass cleaner.

NOTE

When using plexiglass cleaner follow instructions given on the preparations packaging.

C. Interior cleaning

Aircraft interior should be vacuumed at regular intervals to remove surface dirt and dust. While vacuuming, use a fine bristle nylon brush to help loosen particles.

(1) Procedure:

(a) Clean upholstery with a soft bristle brush, and vacuum where necessary.

(b) Spots on the upholstery clean with detergent. Use suitable upholstery cleaning agent for spots not cleanable with detergent.

(c) Use clean cloth dampened with a mild detergent to clean interior panels, covers, handles and buttons.

D. Avionics care

Avionics displays have an anti-reflective coating that is very sensitive to skin oils, waxes, ammonia, and abrasive cleaners. Clean the displays screens with LCD Screen Cleaning Solution according instructions given on the preparations packaging.

E. Engine cleaning

CAUTION

DO NOT USE EASILY FLAMMABLE LIQUIDS OR CAUSTIC CLEANING AGENT FOR CLEANING THE ENGINE!

Repair leaks if required before cleaning. Always clean engine in cold state.

Usage of commercially available cold cleaning agent for the engine is recommended - see Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series (Ref. No. MML-912, Part. No. 899191), Chapter 05-00-00, Chapter 1.5).

Never clean the engine with cleaner under high pressure. This is damaging to electrical installations and shaft seals. Oxidation of the various components and their failure may follow.

Before cleaning, all openings through which cleaning agents and/or dirty water could enter to the engine have to be closed.

After each cleaning procedure, dry all electrical components such as battery, ignition unit, spark plug connector, clamp connection etc. with compressed air to prevent short circuits.

CAUTION

WHEN CLEANING THE ENGINE, THE DISSOLVES RESIDUES OF FUEL, OIL AND OTHER ENVIRONMENT-CONTAMINATING AGENTS ARE RINSED OFF. COLLECT THE RESIDUAL LIQUIDS AND DISPOSE THEM IN ENVIRONMENT FRIENDLY WAY.

F. Propeller cleaning

Propeller EVRA PerformanceLine 175/xxx/805.5:

Clean the propeller with water mixed with soap or detergent using a sponge and finish with the chamois.

The metal shields on leading edge may be re-polished using fine sandpaper, taking care not to alter the surface of the coating. Lightly coat the metal shields with liquid paraffin to prevent oxidation. Repeat periodically to keep this protective oily film.

Propeller KW-31:

For cleaning instruction refer to “UM-05 EN - User Manual Aircraft Propeller Type-Model KW-31”, last valid issue.

12-30 UNSCHEDULED SERVICING

1. DESCRIPTION

This chapter contains information regarding unscheduled service which includes removal of ice and snow from the aircraft.

2. MAINTENANCE PRACTICES

A. Winter maintenance

Type of maintenance: Line

Personnel qualification: Pilot/Owner qualified in accordance with M.A.803 or higher

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Soft brush	1 pc
De-icing fluid	AR
Soft cloth	AR
Persons	1

Tab. 12-18 Recommended tools, materials, persons and documentation

Contamination of aircraft surface by ice or snow degrades the aerodynamic characteristics of the aircraft and increases its weight. It is therefore important to get rid of any deposit of ice or snow before flight. If possible, put the aircraft in a heated hangar to remove ice.

WARNING

ICE OR SNOW MUST BE COMPLETELY REMOVED FROM THE UPPER AND LOWER SURFACES OF THE AIRCRAFT.

CAUTION

DO NOT USE SHARP OBJECTS TO REMOVE SNOW OR ICE. YOU CAN DAMAGE THE AIRCRAFT STRUCTURE.

(1) Ice and snow removal:
  (a) Use a soft brush and remove snow from the aircraft.
  (b) Spray an approved de-icing fluid on ice covered surfaces with a suitable spray bottle.
  (c) Use a soft cloth to dry the aircraft after the snow and ice has been removed.

This page is left blank intentionally

20 STANDARD PRACTICES - AIRFRAME

CONTENTS

Chapter	Description	Page
20-00	**GENERAL**	**3**
	1. INTRODUCTION	3
20-10	**TORQUE DATA**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Fasteners installation	5
	B. Torque wrenches	6
	C. Torque values	8
20-20	**SAFETYING**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	10
	A. Lockwire	10
	B. Cotter pins	14
	C. Self-locking nuts	16
	D. Lock washers	16
	E. Loctite	17

This page is left blank intentionally

20-00 GENERAL

1. INTRODUCTION

This chapter describes the standard maintenance practices for maintaining items of the airframe and systems that are typical to more than one area or system, in an airworthy condition.

Maintenance practices that are unique to a particular system or subject are described in the appropriate chapter in the maintenance manual.

Maintenance practices in a particular chapter supersede the general information in this chapter.

The information is broken down into several sections. The following is a list of the information contained in each chapter.

20-10 Torque Data

This chapter contains general information and provides maintenance practices for torque of fasteners.

20-20 Safetying

This chapter contains general information and provides maintenance practices for the installation of lock wire, cotter pins, self-locking nuts, lock washers, and Loctite.

This page is left blank intentionally

20-10 TORQUE DATA

1. DESCRIPTION

This chapter deals with general torque used to ensure security of installation and prevent overstressing components.

The torque value tables, listed in this chapter, are standard torque values for the nut and bolt combinations shown. Special torque values for specific installations are given in maintenance practices and installation instructions applicable to the various components.

Torqueing is not required for bolts, nuts, and screws installed in the control systems or other installations where torque would interfere with proper operation of parts. On such applications, the assembly shall be firm, but not tight enough to cause binding.

2. MAINTENANCE PRACTICES

A. Fasteners installation

(1) Bolts:

(a) When installing bolts, ensure that the threads are free of foreign material.

(b) Do not use anti-seize compounds or lubricant unless specified in the specific instructions.

(2) Nuts:

(a) When installing castellated nuts for use with safety wire or cotter pin, align holes by tightening nut to low torque range and continue to tighten until holes align. If holes cannot be aligned without exceeding the maximum torque value, a washer of different thickness may be used or another washer added.

(b) When installing self-locking nuts, always use the same type nut as removed. Self-locking nuts are for one-time use only and must not be reused. Self-locking nuts should not be substituted for castellated nuts secured by safety wire or cotter pin. Fiber or nylon self-locking nuts should not be used in areas subject to high temperature. Do not use self-locking nuts at joints which are subject to rotation by either the nut or bolt.

(3) Washers:

(a) When installing a lock washer against aluminum alloy, a cadmium plated flat washer should be installed between lock washer and aluminum alloy.

(b) Use of the wrong type or number of washers can result in improper preloading of the bolts when torqued.

(c) When bolts are used which have a radius under bolt head, a countersunk washer must be used with the countersink next to the bolt radius, under the bolt head. Reversing a counter- sunk washer or installing a standard washer can result in bolt failure (Fig. 20-1).

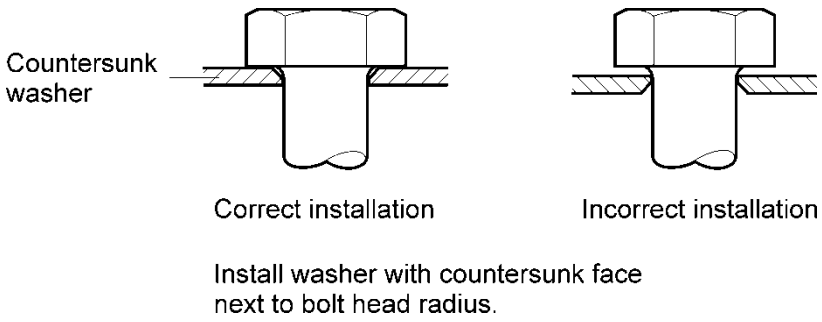


Fig. 20-1 Washer Installation – Close Tolerance Bolts

B. Torque wrenches

Whenever possible, use the torque wrench when tightening of threaded fasteners.

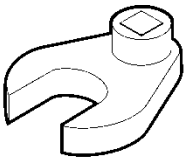
(1) Use of a torque wrench:

(a) Whenever possible, the nut shall be torqued. When is necessary to torque the bolt head, the bolt shall be torqued to the high torque value plus shank friction, if any.

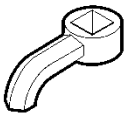
(b) Calibrate torque wrenches periodically to ensure accuracy.

(c) Take final torque reading while nut is rotating. If highest torque value is reached without rotating the nut, the nut must be backed off and re-torqued.

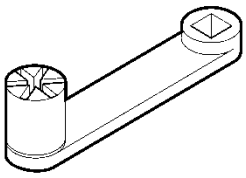
(d) When torqueing requires the use of an adapter, the torque value must be computed using Fig. 20-2.



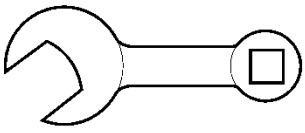
Short open end adapter



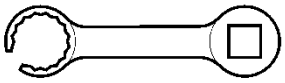
Setscrew adapter



Hose clamp adapter



Open-end wrench adapter

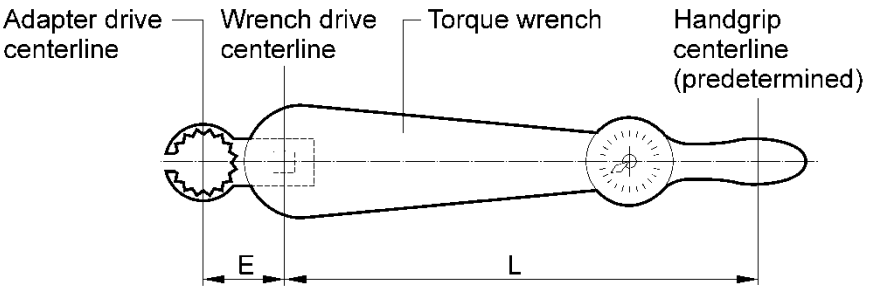


Flare nut wrench adapter



Spanner wrench adapter

NOTE: When using a torque wrench adapter which changes the distance from the torque wrench drive to the adapter drive, apply the following formulas to obtain the corrected torque reading.



Formula $\frac{T \times L}{L + E} = Y$

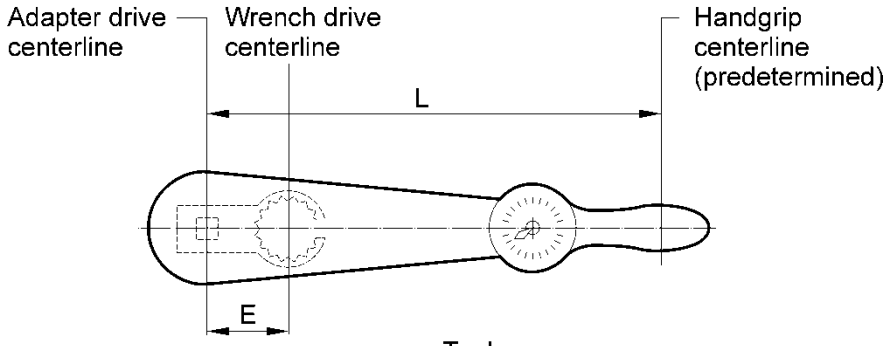
Example (with "E" as plus dimension)

T = 15,3 Nm (135 lb in)
Y = Unknown
L = 254 mm (10 in)
E = 38 mm (1,5 in)

$Y = \frac{15,3 \times 254}{254 + 38}$

Y = 13,3 Nm (117 lb in)

Legend:
T = Actual (desired) torque
Y = Apparent (indicated) torque
L = Effective length lever
E = Effective length of extension



Formula $\frac{T \times L}{L - E} = Y$

Example (with "E" as minus dimension)

T = 15,3 Nm (135 lb in)
Y = Unknown
L = 254 mm (10 in)
E = 38 mm (1,5 in)

$Y = \frac{15,3 \times 254}{254 - 38}$

Y = 18 Nm (159 lb in)

Fig. 20-2 Torque Wrench and Adapter Formulas

C. Torque values

The torque values have been calculated on the assumption that no lubrication is used on the bolted joints and that cadmium plating is a standard surface finish.

METRIC THREAD		STRENGTH CLASS									
		4D	5D	4S	6E	5S	5R	6S	8G	10K	12K
		MAXIMAL TORQUE VALUE									
M4	N.m kg.m					1.67 0.17					
M5	N.m kg.m					3.45 0.35					
M6	N.m kg.m	4.31 0.44	4.90 0.50	5.39 0.55	5.88 0.60	6.86 0.70	7.84 0.80	8.33 0.85	9.80 1.00	13.72 1.40	16.67 1.70
M7	N.m kg.m	5.88 0.60	7.84 0.30	8.82 0.90	9.80 1.00	10.78 1.10	11.76 1.20	12.74 1.30	14.70 1.50	20.59 2.10	25.49 2.60
M8	N.m kg.m	8.33 0.85	10.78 1.10	12.74 1.30	13.72 1.40	15.69 1.60	17.65 1.80	19.61 2.00	22.55 2.30	32.36 3.30	38.24 3.90
M10	N.m kg.m	16.18 1.65	21.57 2.20	24.51 2.50	27.45 2.80	31.38 3.20	34.32 3.50	37.26 3.80	44.12 4.50	61.78 6.30	73.54 7.50
M12	N.m kg.m	27.45 2.80	36.28 3.70	42.16 4.30	47.07 4.80	52.95 5.40	58.83 6.00	63.74 6.50	74.53 7.60	104.93 10.70	125.52 12.80
M14	N.m kg.m	43.14 4.4	58.83 6.00	66.68 6.80	73.54 7.50	78.54 8.00	93.16 9.50	98.06 10.00	117.67 12.00	164.75 16.80	196.13 20.00
M16	N.m kg.m	60.80 6.20	78.45 8.00	93.13 9.5	98.06 10.00	107.87 11.50	127.48 13.00	131.29 14.00	164.75 16.80	225.55 23.00	274.58 28.00
M18	N.m kg.m	88.25 9.00	117.67 12.0	137.29 14.00	156.90 16.00	171.61 17.50	196.13 20.00	205.93 21.00	245.16 25.00	343.23 35.00	411.87 42.00
M20	N.m kg.m	117.67 12.00	156.90 16.00	176.51 18.00	196.13 20.00	225.55 23.00	245.16 25.00	274.58 28.00	313.81 32.00	441.29 45.00	539.36 55.00
M22	N.m kg.m	147.09 15.00	196.13 20.00	225.55 23.00	245.16 25.00	284.39 29.00	313.81 32.00	33.42 34.00	392.26 40.00	558.97 57.00	676.65 69.00
M24	N.m kg.m	205.93 21.00	274.58 28.00	313.81 32.00	353.03 36.00	392.26 40.00	441.29 45.00	470.71 48.00	549.17 56.00	755.11 77.00	970.85 99.00
Ultimate strength		37	50	37	-	50	-	60	80	100	120
In %		25	22	14	-	7	-	8	12	8	8
Yield point		21	28	32	36	40	45	48	64	90	108

Tab. 20-1 Recommended Fastener Torque Value

20-20 SAFETYING

1. DESCRIPTION

The use of safety wire, cotter pins, lock washers, self-locking nuts, and Loctite is to prevent relative movement of critical components subject to vibration, torque, tension, etc., which could cause attaching parts to be broken, loosened and or detached.

All attachment points for rotating surfaces should be attached with castellated nuts, cotter pins or lock wire and drilled bolt shanks. The use of self-locking nuts is not permitted on rotating joints.

If the locking effect of a component is limited, always replace it with a new component.

Every non-locked nut or bolt (without cotter pin, self-locking nut, serrated locking washer…), must be locked using some kind of Loctite.

During assembling, always use the following new parts:

- Cotter pin
- Roll pin
- Tab washer
- Serrated locking washer
- Rivets
- Safety clamps
- Cable ties
- Sealing adhesive tape
- Gasket ring
- Lock wire
- Pyrosil tape
- Shrink cable
- Sealing ring

2. MAINTENANCE PRACTICES

A. Lockwire

Lock wire comes in two types, which are identified by size:

- Zinc plated and Tin-plated steel wire. Used for general lock wiring procedures.
- Corrosion resistant steel wire. This wire is to be used in areas with high temperature and chemical corrosion.

For general-purpose lock wiring, 0.5 mm diameter wire is used on treads from M4 to M10, and 0.8 mm diameter wire is used on threads M12 and up.

(1) Method:

The double-twist method of lock wiring should be used as the common method of lock wiring (Fig. 20-3; 20-4). The single wire method of lock wiring may be used in closely spaced, closed geometrical pattern (triangle, square, circle, etc.), on parts in electrical systems, and in places that would make the single wire method more advisable. Closely spaced should be considered a maximum of 50 mm between centers.

CAUTION

SCREWS IN CLOSELY SPACED GEOMETRIC PATTERNS WHICH SECURE HYDRAULLC OR AIR SEALS, HOLD HYDRAULIC PRESSURE, OR WHERE USED IN CRITICAL AREAS, SHOULD USE THE DOUBLE-TWIST METHOD OF LOCK WIRING.

(2) Spacing:

(a) When lock wiring is widely spaced in multiple groups using the double-twist method, three units should be the maximum number in series.

(b) When lock wiring is closely spaced in multiple groups, the number of units that can be lock wired by 600 mm length of wire should be the maximum number in series.

(c) Widely spaced multiple groups should mean those in which the fastenings are from 100 to 150 mm apart. Lock wiring should not be used to secure fasteners or fittings which are spaced more than 150 mm apart, unless tie points are provided on adjacent parts to shorten the span of the lock wire to less than 150 mm.

(3) Tension:

(a) Parts should be lock wired in such a manner that the lock wire should be put in tension when the parts tend to loosen. The lock wire should always be installed and twisted so the loop around the head stays down and does not tend to come up over the bolt head and leave a stacked loop.

NOTE

This does not necessarily apply to the castellated nuts when the slot is close to the top of the nut, the wire will be more secure if it is made to pass along the side of the stud.

(b) Care should be exercised when installing lock wire to ensure it is tight but not overstressed.

(4) Use of a lock wire:

(a) When removing lock wire ensure that all pieces are removed.

(b) Use only new lock wire of the same type and diameter as that which was removed. Never reuse lock wire.

(c) A pigtail 12 mm or six twist should be made at end of the wiring. This pigtail should be bent back or under to prevent it from becoming a snag.

(d) When castellated nuts are to be secured with lock wire, tighten the nut to the low side of the selected torque range otherwise specified, and, if necessary, continue tightening until a slot aligns with the hole. In no case should you exceed the high side torque range.

(e) Drain plugs and cocks may be safetied to a bolt, nut or other part having a free lock hole in accordance with the instruction described in this chapter.

(f) When locking is required on electrical connectors (Fig. 20-5) which use threaded couplings, or on plugs which employ screws or rings to fasten the individual parts of the plug together, they should be lock wired with 0,5 mm diameter wire in accordance with the locking principles as describes and illustrated. It is preferable to lock wire all electrical connectors individually. Do not lock wire one connector to another unless it is necessary to do so.

(g) Lock wire shall not be used on emergency devices that would depend on fracture of lock wire for operation. However, where existing structural equipment or safety-of-flight emergency devices require shear wire to secure equipment while not in use, but which are dependent upon shearing or breaking the lock wire for successful emergency operation of equipment, particular care should be exercised to assure that wiring under these circumstances will not prevent emergency operations of these devices.

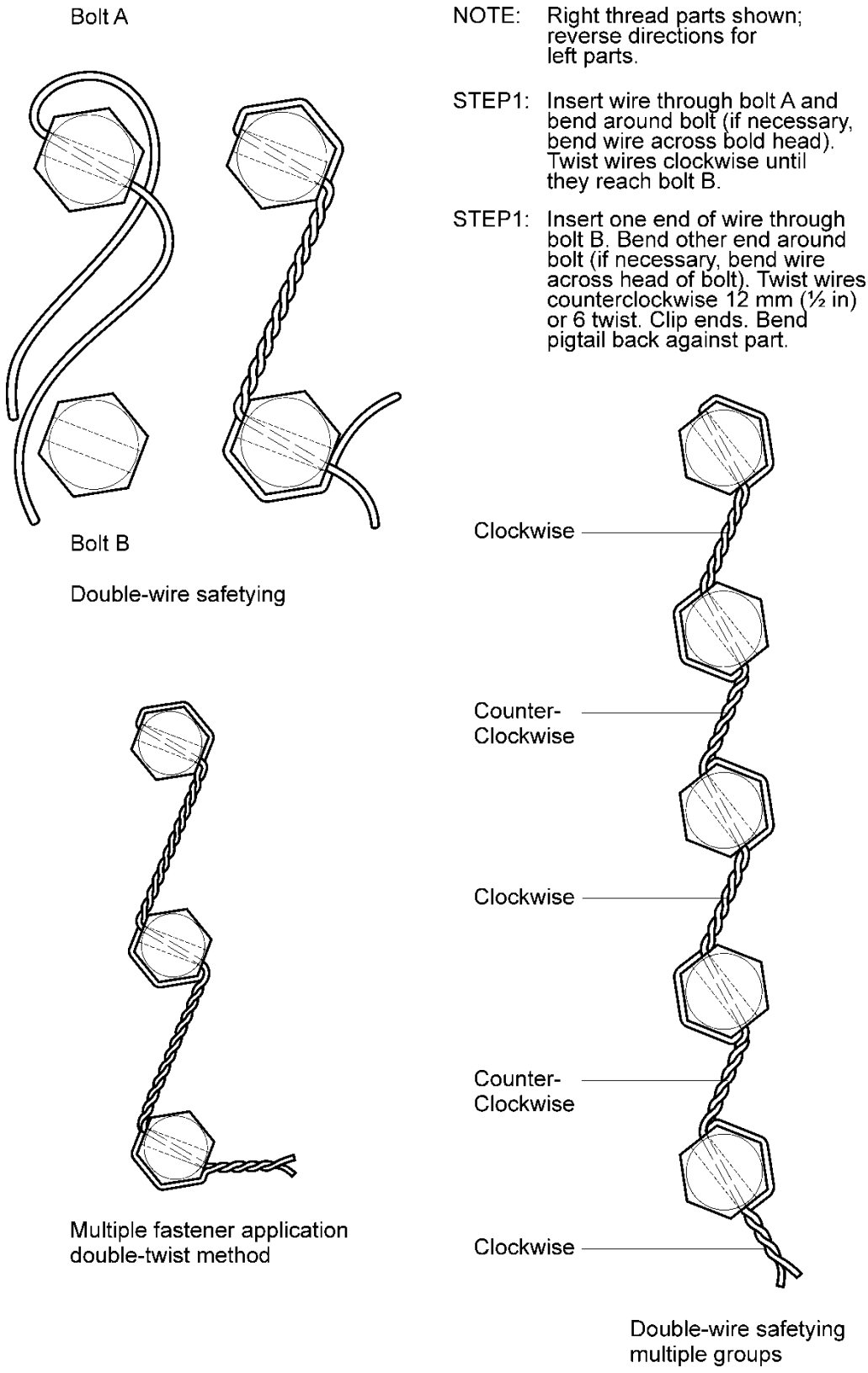
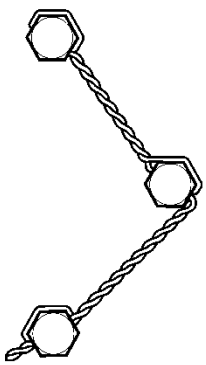
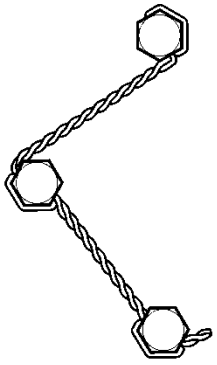


Fig. 20-3 Lockwire Safetying



Example 1



Example 2

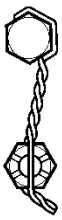


Example 3

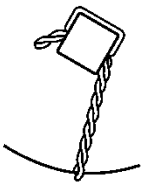
Bolts, fillister head screws, square head plugs, and other similar parts are wired so that the loosening tendency of either part is counteracted by the tightening of the other part.
The direction of twist from the second to the third unit is counter-clockwise to keep the loop lower wire and by making a counter-clockwise twist after it leaves the hole. The loop will be secured in place arount the head of that bolt.



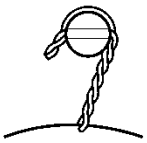
Example 4



Example 5

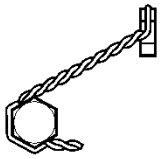


Example 6



Example 7

Methods for wiring various standard items. Wire may wrapped over the unit rather than around it when wiring castellated nuts or on other items when there is clearance problem.



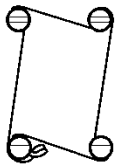
Example 8

The method for wiring bolts in different planes.
Note than wire should always be applied so that tension is in the tightening direction.



Example 9

Hollow head plugs wired with the tab bent inside the hole to avoid snags and possible injury to personnel.



Example 10

Correct application of single wire to closely spaced multiple group.

Fig. 20-4 RH Thread Lockwiring Examples

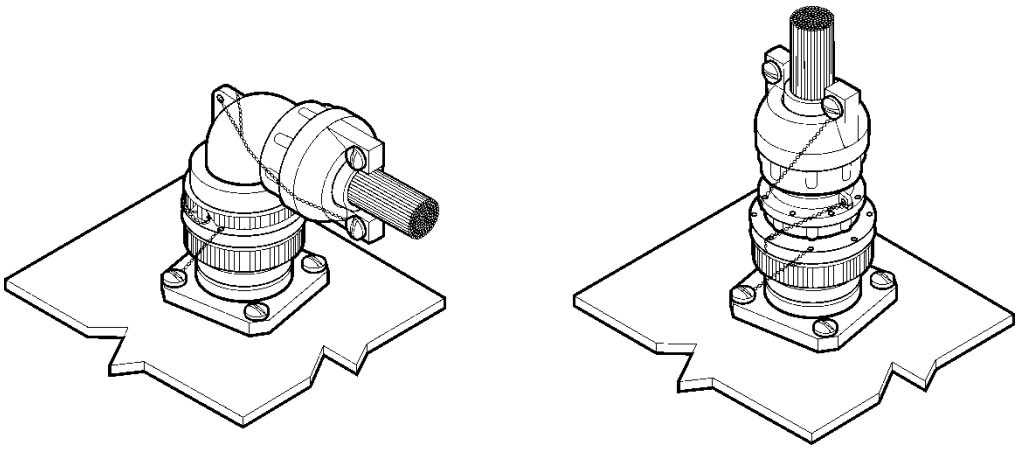


Fig. 20-5 Electrical Connectors Lockwiring Examples

B. Cotter pins

(1) Use of cotter pins:

(a) Select cotter pins in accordance with atmosphere and service limitations.

(b) Use only a new cotter pin of the same type as the one removed. Never reuse cotter pins.

(c) When nuts are to be secured to the fastener with cotter pins, tighten the nut to the low side of applicable specified or selected torque range, unless otherwise specified, and if necessary, continue tightening until the slot aligns with the hole. In no case should you exceed the high side torque range.

(d) Castellated nuts mounted on bolts may be safetied with cotter pins or lock wire. The preferred method is with a cotter pin, bent parallel to the axis of the bolt (Fig. 20-6). The alternate method, where the cotter pin is mounted normal to the axis of the bolt, may be used when the cotter pin in the preferred method may become a snag.

(e) In the event than the cotter pin diameter is above the nut castellation, a washer should be used under the nut or a shorter fastener should be used. A maximum of two washers is per- mitted under the nut.

(f) Use the largest nominal diameter cotter pin that the hole and slots will accommodate. No application of cotter pin to any nut or fastener is permitted if the fastener hole size is less than the required hole and slot size for the cotter pin.

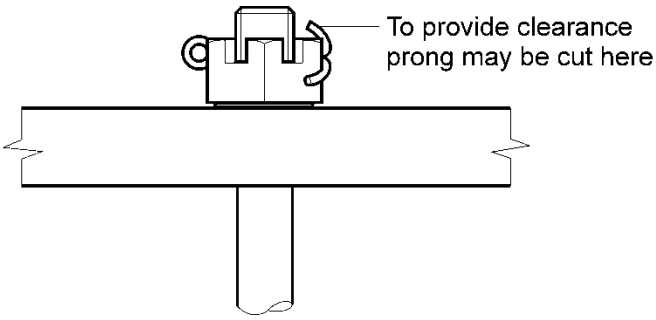
(g) Install the cotter pin with the head firmly in the slot of the nut with the axis of eye at right angles to the bolt shank. Bend prongs so the head and upper prong are firmly seated against the bolt.

(h) In pin applications, install the cotter pin with the axis of eye parallel to the shank of pin. Bend prongs around the shank of the pin.

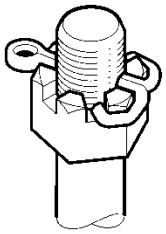
(i) Install the cotter pins (if it is possible):
- from above-downwards
- from the front-backwards.

(j) Cadmium plated cotter pins should not be used in applications bringing them in contact with fuel, hydraulic fluid or synthetic lubricant.

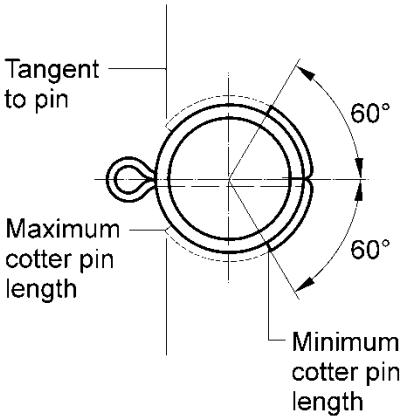
(k) If using a castellated nut and new bolt, screw the castellated nut to operating position and use diameter 1,6 mm drill to drill a hole for the cotter pin.



Castellated nut on
preffered method



Castellated nut on
alternate method



Pin application

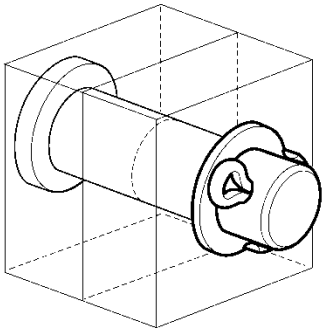


Fig. 20-6 Cotter Pin Safetying

C. Self-locking nuts

Self-locking nuts may be used in some applications. The following guidelines must be followed when using self-locking nuts:

(1) Use of self-locking nuts:

(a) Self-locking nuts must be installed so at least two threads of bolt, stud or screw are visible.

(b) Self-locking nuts, which are attached to the structure, will be attached in a positive manner to eliminate the possibility of their rotation or misalignment when tightening the bolt and screw.

(c) Self-locking nuts are for one-time use only and must not be reused.

(d) Use only a new self-locking nut of the same type as the one removed.

D. Lock washers

Lock washers may be used provided the following conditions are met:

(1) Use of lock washers:

(a) When self-locking feature cannot be provided in externally or internally threaded parts.

(b) When a cotter pin cannot be used to prevent rotation of internal threads with respect to external threads.

(c) When lock wire cannot be used to prevent loosening of threaded parts.

(d) When loosening of threaded parts will not endanger the safety of the aircraft or occupants.

(e) When corrosion is encouraged by the gouging of aluminum by edges of teeth on tooth locked washers, this will cause malfunction of parts being fastened together.

(2) The following guidelines must be followed when using lock washers:

(a) Use only new washer for each assembly.

(b) When bending or setting the washer tabs, do not use sharp pointed tools. Use of such tools can lead to subsequent failure of the locking tabs that, upon becoming detached, can cause extensive damage.

E. Loctite

NOTE

Loctite type and suitable cleaner is listed in the relevant chapter in the Materials table.

(1) Use of Loctite:
- (a) Loctite is used on the aircraft when it is impossible to cotter pins/lock wire a fastener or if cotter pins/lock wire is impractical.
- (b) Use only Loctite of the same type as that which was originally used.
- (c) Application of Loctite should be accomplished at temperature above 15°C to ensure proper curing.

(2) Prepare surface:
- (a) Clean all parts to which Loctite is to be applied.
- (b) Surfaces must be clean and free of dust, oil, grease, condensation, moisture, and other contaminations.

(3) Apply Loctite to threaded fasteners:
- (a) Select correct type of Loctite.
- (b) Clean threaded surfaces with suitable degreaser.
- (c) Apply Loctite to threads by brushing, dipping, or running applicator over threads.

NOTE

Loctite may be applied to either the nut or bolt; however, for blind hole applications, coat the sides of the blind hole and first two threads of the male fastener.

- (d) Assemble parts and torque using normal torque (Chapter 20-10).
- (e) Excessive Loctite may be removed using a cotton cloth dampened with cleaner.

This page is left blank intentionally

21 AIR CONDITIONING

CONTENTS

Chapter	Description	Page
21-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	3
21-20	**DISTRIBUTION**	**5**
	1. DESCRIPTION	5
	A. Cockpit ventilation	5
	2. MAINTENANCE PRACTICES	7
	A. Control box	7
	B. Ventilation control	7
21-40	**HEATING**	**11**
	1. DESCRIPTION	11
	A. Cockpit heating	11
	2. MAINTENANCE PRACTICES	12
	A. Control box	12
	B. Heat exchanger	15
	C. Heating deflector	15
	D. Heating control	17

This page is left blank intentionally

21-00 GENERAL

1. INTRODUCTION

The WT9 Dynamic LSA Club aircraft is equipped with heating and ventilation system that ensures delivery fresh ambient air and cockpit heating.

The heating and ventilation system consists of hot and cold air running through a control box on the firewall. Cold air is received from the induction ram air tunnel. Hot air is received from air via the water radiator through the heat exchanger on the muffler box. Cold and hot air are selected by the controls on the lower central instrument panel.

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Burning smell in the cockpit.	Exhaust heat-exchanger cracked.	Replace or repair the heat exchanger.
Ventilating system supplies cold air when set to OFF.	Control cable out of adjustment.	Adjust the venting control cable.
Heating system supplies warm air when set to OFF.	Control cable out of adjustment.	Adjust the heating control cable.

This page is left blank intentionally

21-20 DISTRIBUTION

1. DESCRIPTION

A. Cockpit ventilation

Venting air comes from the ram air tunnel (1, Fig. 21-1) installed on the left side of lower engine cowling and directs through the air hose (2) to the control box (3). Amount of venting air entering the cockpit is controlled by the **CABIN VENTILATION** controller (4).

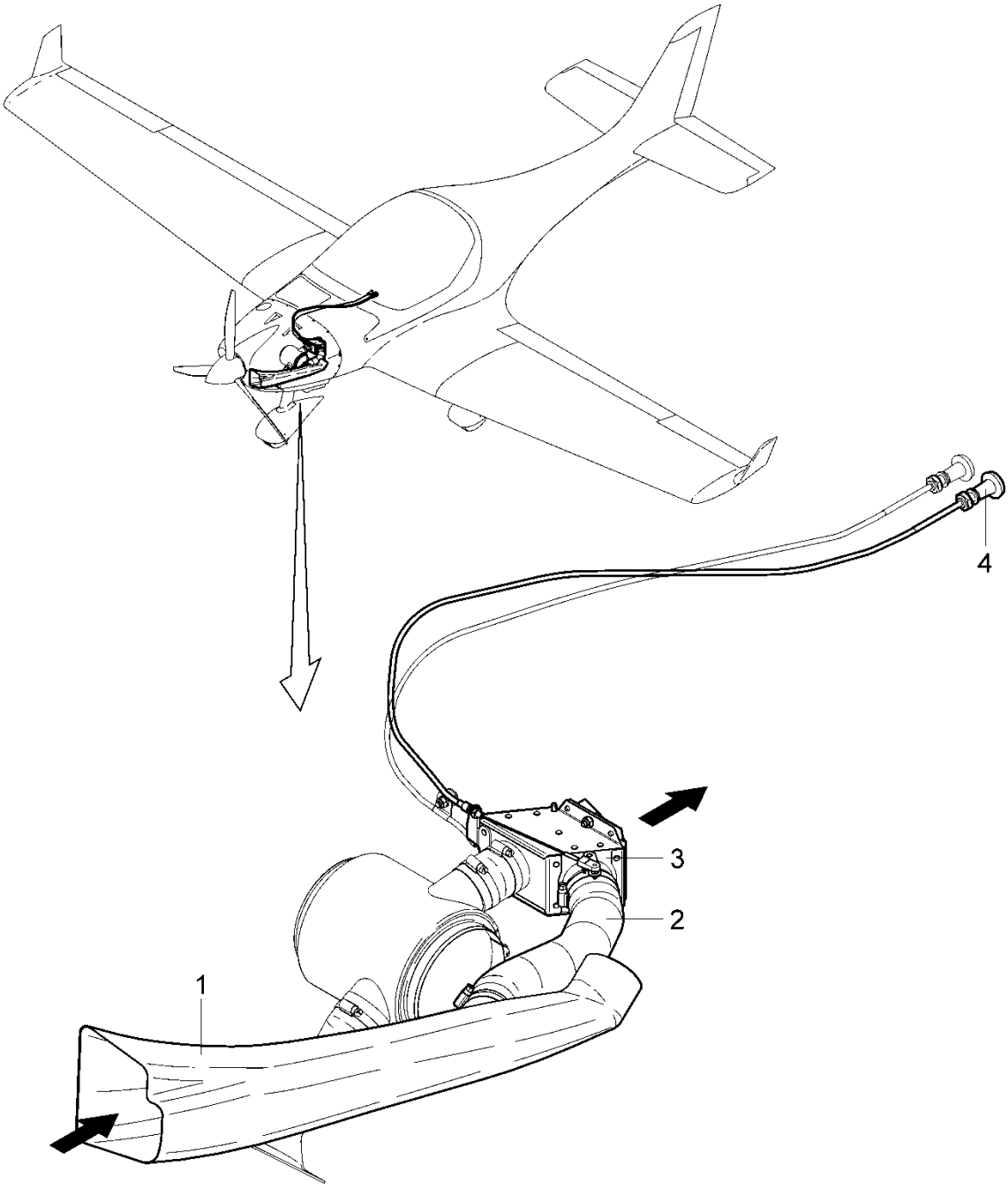
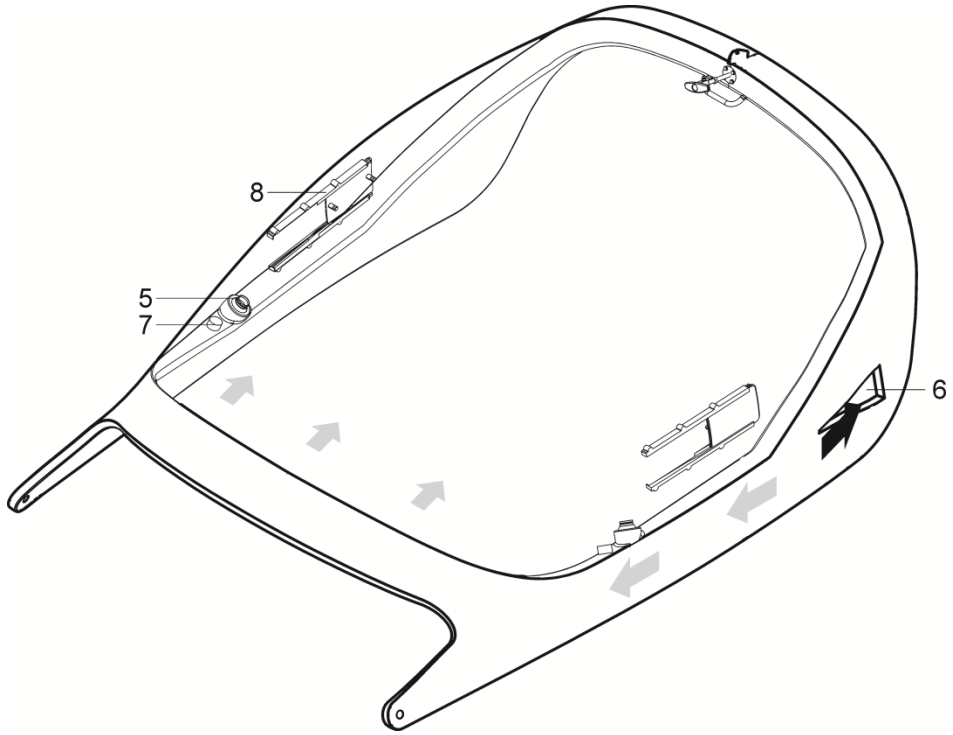


Fig. 21-1 Cockpit Ventilation (page 1 of 2)



1 –	Ram air tunnel	5 –	Eyeball vents
2 –	Air hose	6 -	NACA intake
3 –	Control box	7 -	**VENTILATION** knob
4 –	**CABIN VENTILATION** controller	8 -	Sliding window

Fig. 21-1 Cockpit Ventilation (page 2 of 2)

Additional venting air supply the eyeball vents (5). The eyeball vents receive the venting air from the NACA intakes (6) located on the both sides of canopy. Venting air from NACA intakes is also distributed through the canopy frame to the small holes blowing the windshield. This air is regulated by **VENTILATION** knobs (7) located on the both sides of canopy in front of eyeball vents. For ventilation also may be used sliding windows on the canopy.

2. MAINTENANCE PRACTICES

A. Control box

For maintenance practices see Chapter 21-40.

B. Ventilation control

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Special wrench 14	1 pc
Screwdriver 5	1 pc
Hex key 4	1 pc
Hex key 5	1 pc
Solder set	1 pc
Knife	1 pc
Pliers	1 pc
Cable tie 2.6	7 pcs
Cable tie 3.6	5 pcs
Shrink tube Ø4.8 x 2.4 mm	AR
Adhesive sealing tape TESA FIX 20 mm	AR
Lockwire Ø0.8 mm	AR
Loctite 243	AR
Persons	1

Tab. 21-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Ventilation control removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(a) Remove the engine cowlings (Chapter 71-10).

(b) Unscrew cable end fitting (1, Fig. 21-3), remove shrink tube, and unsolder thread rod (2).

(c) From the cockpit, remove the inner cable by pulling handle (12).

(d) Remove cable tie (13), unstick adhesive tape (14), pull green sleeve (11).

NOTE

The ball can drop from green sleeve (11).

(e) Unscrew the nut (15), remove washer (16) and pull out control cable (9) from central console.

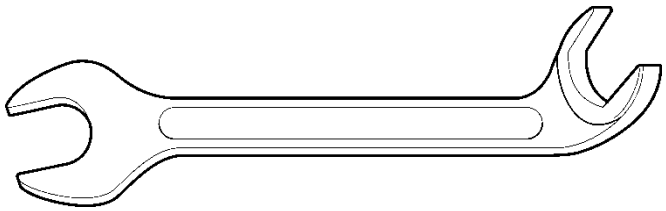


Fig. 21-2 Special Wrench Size 14

NOTE

For easier removal use special tool (Fig. 21-2) and hex key inserted on control cable end from cockpit side.

(f) At engine side of firewall, remove screw shackle (4, Fig. 21-3), by removing lockwire (8), unscrew nuts (5) and remove washers (6; 7).

(2) Ventilation control installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Thoroughly clean and lubricate all movable parts of the ventilation system with oil before each assembling. Refer to lubrication chart (Chapter 12-20).

(c) Control cable (9, Fig. 21-3) passes through central console (17).

(d) Rotate the control cable (9) so the ball is at the top.

(e) Slide washer (16) and tighten the nut (15) secure by using Loctite 243.

NOTE

For better performance use special wrench (Fig. 21-2) and hex key inserted in control cable end from cockpit side.

(f) Insert the ball and simultaneously slide on the green sleeve (11, Fig. 21-3):
- Push the green sleeve (11) just to first indication of minimal resistance.
- Check for correct operation by pulling and pushing handle; the ball must engage with ratchet, movement must not be free.

(g) Apply two layers of textile adhesive tape (14) and lock it with cable tie (13).

(h) Insert the cable through hole on firewall.

(i) Assemble screw shackle (4) with nuts (5) and washers (6; 7) and bowden end (3); put them on control cable (9) and secure them with lockwire (8).

(j) Secure control cable (9) with cable ties (3.6 mm) along the length as required.

(k) Push handle (14) in, leaving a gap of 2 mm and set selector lever (20) to position flap fully open.

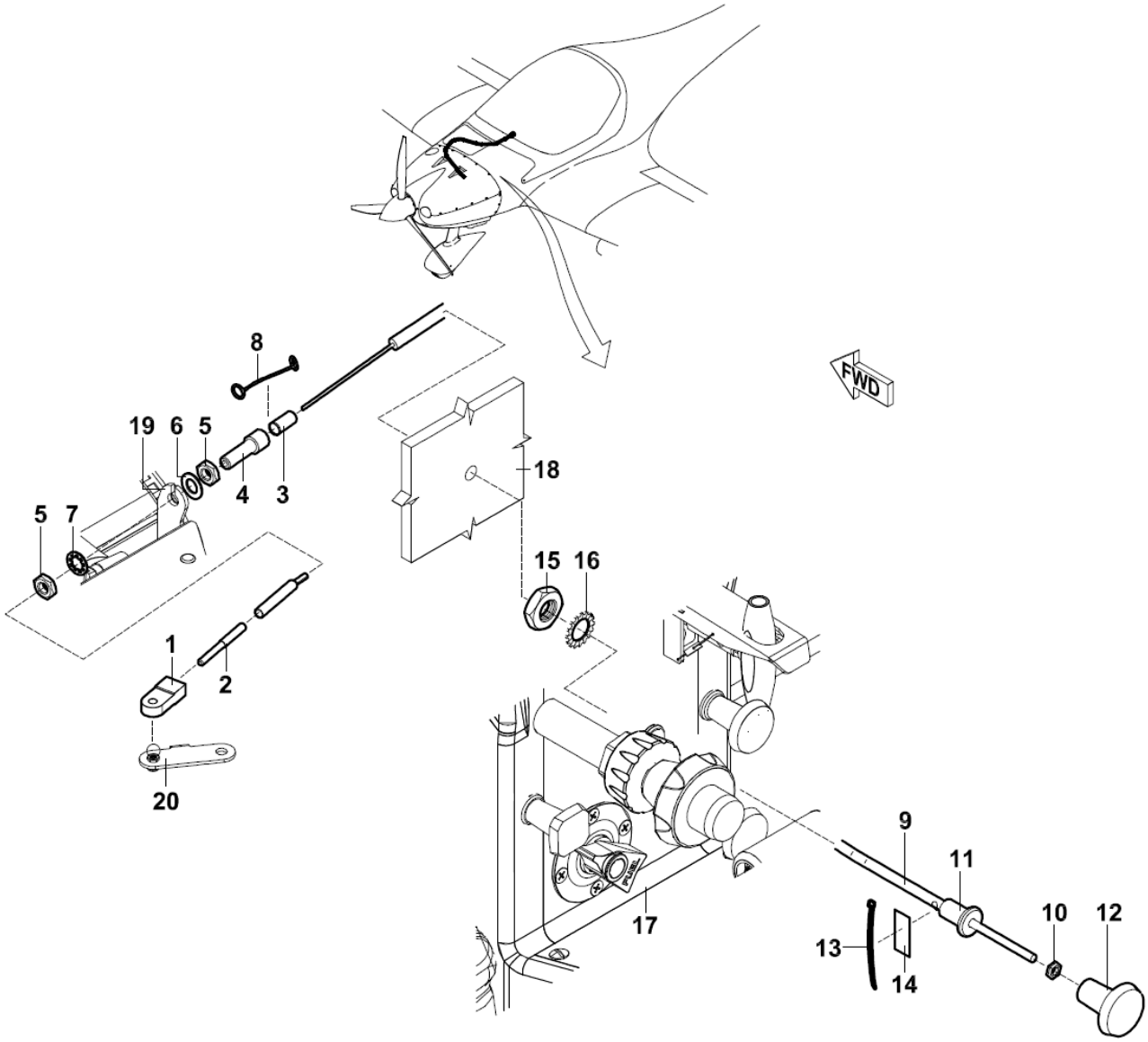
(l) Cut inner wire to correct length, solder thread rod (2), slide shrink tube and screw on cable end fitting (1), and adjust end fitting to connect with nipple on bellcrank.

(m) Shrink the shrink tube on thread rod (2).

(n) Connect cable end fitting (1) to the lever (20).

(o) Carry out test and check:
- If all screws connections are tight.
- Operation of control flap (fully open and fully close).
- That no foreign objects remain in the aircraft or engine compartment.

(p) Install the engine cowlings (Chapter 71-10).



1 – Cable end fitting
2 – Thread rod
3 – Bowden end
4 – Screw shackle
5 – Low nut M6
6 – Washer Ø6.4 x 12 x 0.5
7 – Serrated locking washer Ø6.4
8 – Lockwire Ø0.8 mm
9 – Control cable
10 – Low nut M4
11 – Green sleeve
12 – Handle
13 – Cable tie 2.6
14 – Textile adhesive tape
15 – Low nut M10
16 – Serrated locking washer Ø10.5

For information:

17 – Central console
18 – Firewall
19 – Selector
20 – Selector lever

Fig. 21-3 Ventilation Control Removal / Installation

21-40 HEATING

1. DESCRIPTION

A. Cockpit heating

The preheat air is received from the deflector (1, Fig. 21-4) installed behind the water radiator and directs through the air hose (2) to the exchanger (3) on the muffler to be heated. Hot air from the exchanger directs through the air hose (4) to the control box (5). Amount of warm air entering the cockpit is controlled by the **CABIN HEATING** controller (6).

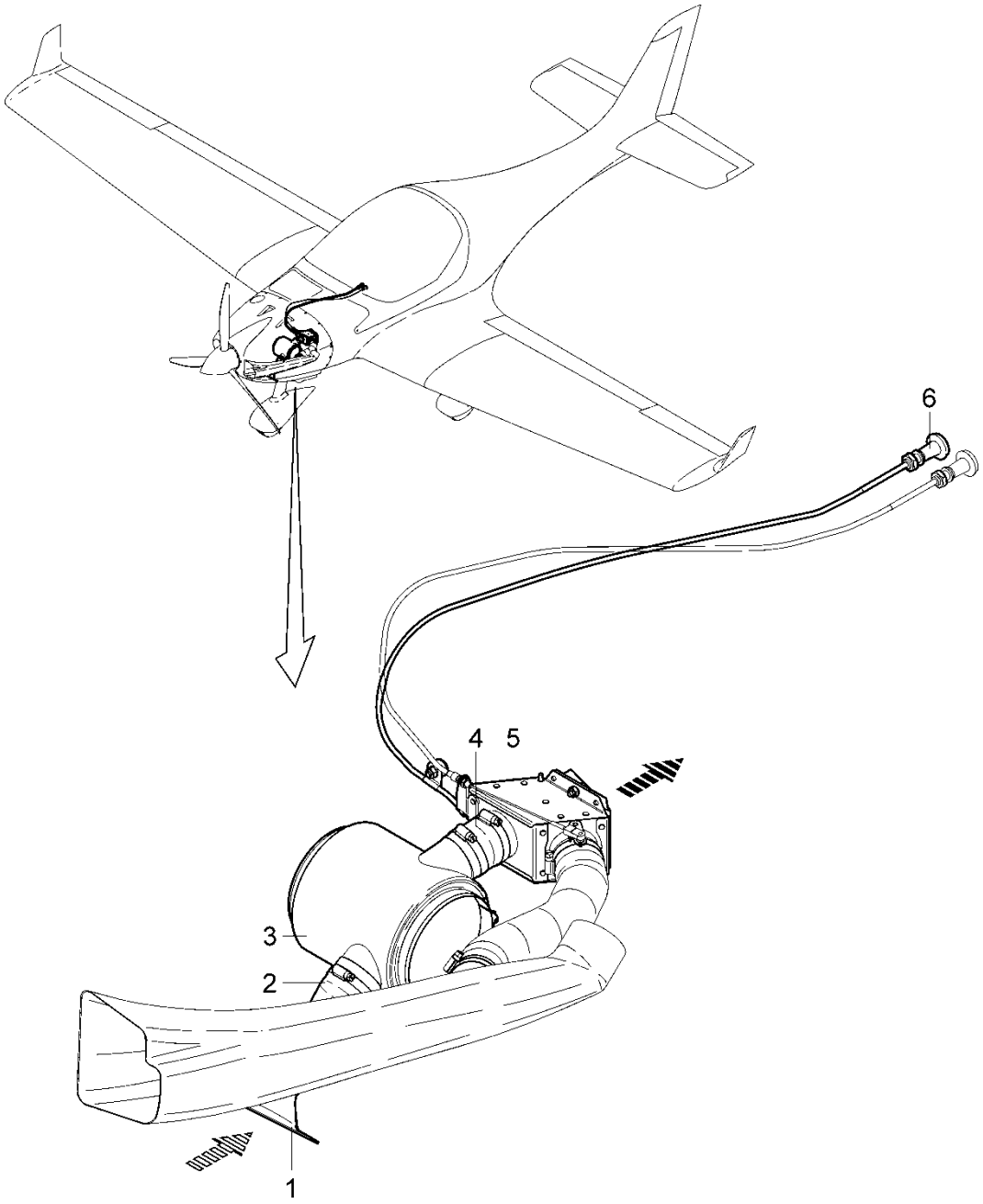


Fig. 21-4 Cockpit Heating

2. MAINTENANCE PRACTICES

A. Control box

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 5	1 pc
Special wrench 14	1 pc
Wrench 10	1 pc
Wrench 8	1 pc
Hex key 4	1 pc
Soldering gun	1 pc
Pliers	1 pc
Knife	1 pc
Cable tie 3.6	3 pcs
Cable tie 8	2 pcs
Shrink tube Ø4.8 x 2.4 mm	AR
Lockwire Ø0.8 mm	AR
Sealing adhesive tape TESA FIX 20 mm	AR
Gasket sealant-silicone 300°C	AR
Persons	2

Tab. 23-2 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Control box removal:

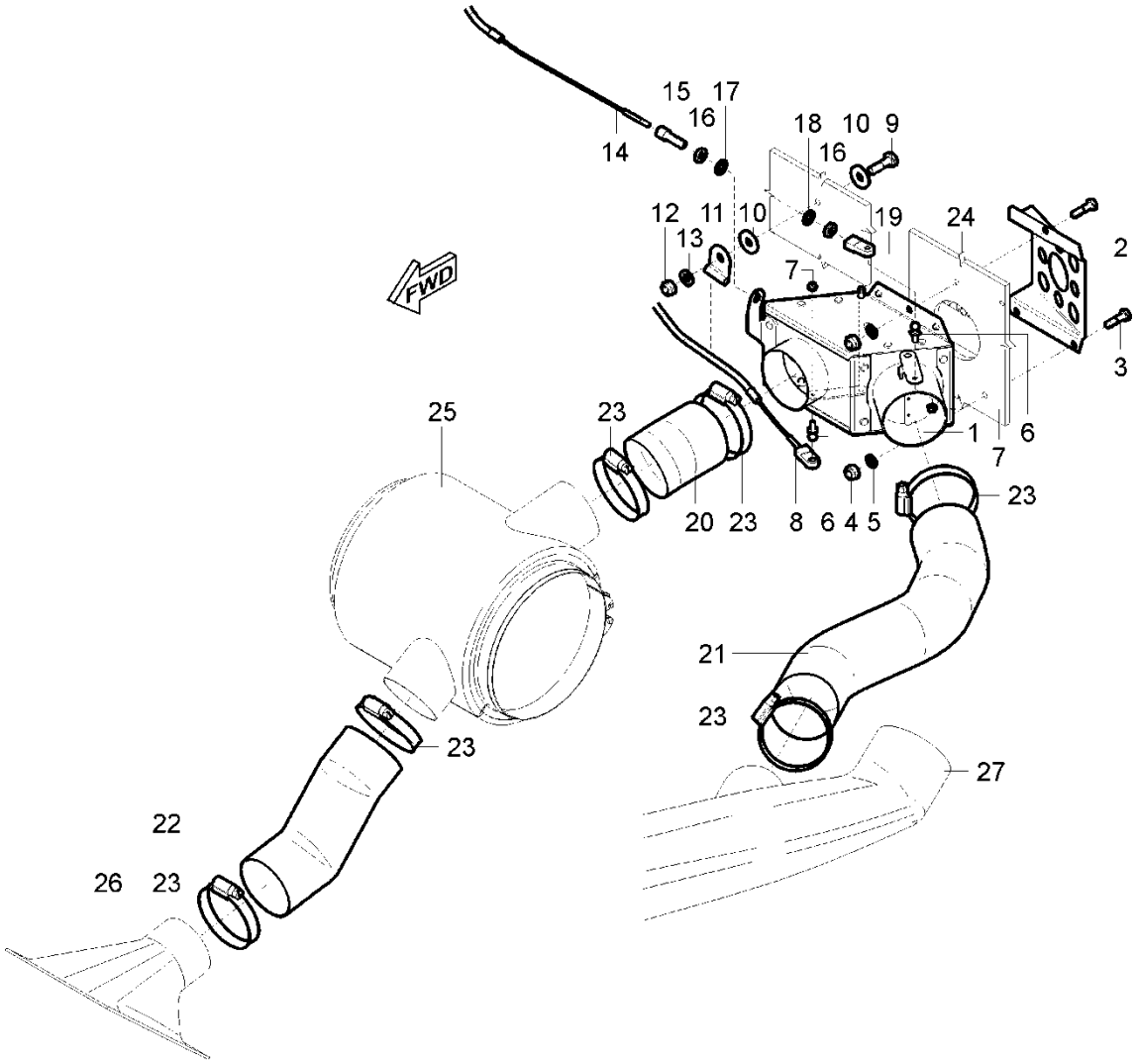
(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Remove airbox (Chapter 71-60).

(d) Remove air hose (21, Fig. 21-5), by loosening clamp (23), and removing cable tie.

(e) Remove air hose (22), by loosening hose clamps (23).



1 – Control box
2 – Rectifier warm air
3 – Bolt M5 x 18 (3 pcs)
4 – Self-locking nut M5 (3 pcs)
5 – Washer Ø5.3 x 10 x 1 (3 pcs)
6 – Ball joint M3
7 – Self-locking nut M3
8 – Control cable of heating
9 – Bolt M6x20
10 – Washer Ø6.4 x 18 x 1.6
11 – P clamp
12 – Self-locking nut M6
13 - Washer Ø6.4 x 12 x 1.6
14 - Control cable of vent
15 - Screw shackle
16 - Low nut M6
17 - Washer Ø6.4 x 12 x 0.5
18 - Serrated locking washer Ø6.4
19 - Cable end fitting
20 – Air hose Ø51 x 75
21 - Air hose Ø51 x 370
22 - Air hose Ø51 x 160
23 - Hose clamp Ø40 x 60
For information:
24 - Firewall
25 - Heat exchanger
26 - Heating deflector
27 - Ram air tunnel

Fig. 21-5 Control Box Removal / Installation

(f) Remove the heating deflector (26) (see Chapter 21-40, 2.C.(1)).

(g) Remove the heat exchanger (25) (Chapter 78-10).

(h) Remove air hose (20), by loosening hose clamp (23).

(i) Disconnect control cables (8; 14) from selector box (1).

(j) Remove cable end fitting (19) from cable (14).

(k) Remove screw shackle (15), by removing lockwire, unscrew nut (16) and remove washers (17; 18).

(l) Remove the selector box (1) with rectifier warm air (2), by unscrewing the nuts (4), removing the washers (5) and bolts (3).

(m) As necessary, unscrew the nut (12), remove the washers (13; 10), bolt (9) and disconnect control cable (8) with P clamp (11) from firewall.

(2) Control box installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Before installation of the heating and ventilation system parts, check free operating of selector box (1, Fig. 21-5), check the air hoses (20; 21; 22) for cracks.

(c) If cracked use new air hoses. Apply two layers of sealing adhesive tape on each end.

(d) Thoroughly clean and lubricate all movable parts of heating and ventilation system with oil before each assembling (Chapter 12-20).

(e) From cockpit side, put the rectifier warm air (2) on firewall (24) and push the bolts (3); from engine side of firewall put the selector box (1), washers (5) and tighten the nuts (4).

NOTE

If using a new selector box (1) push ball joints (6) on flap levers and tighten the nuts (7).

(f) Slide air hose (20) at selector box (1) and secure with hose clamp (23).

(g) Install the heat exchanger (25) (Chapter 78-10).

(h) Slide air hose (20) on heat exchanger (25) and secure it with hose clamp (23).

(i) Slide heating deflector (26) on air hose (22) and secure with hose clamp (23).

(j) Install the heating deflector (26) (see 2.C.(2)).

(k) Slide air hose (21) on selector box (1) and secure with hose clamp (23) and cable tie (8 mm) to engine mount (under cable tie must be banded hose with sealing adhesive tape).

(l) Install heating control cable (8) (see 2.D.(2)) and ventilation control cable (14) (see Chapter 21-20, 2.B.(2)).

NOTE

Control cable for heating (8), instead of screw shackle, has a P clamp (11) installed on firewall with bolt (9), washers (10; 13) and nut (12).

(m) Seal the control cables in the firewall around the bowdens with gasket sealant.

(n) Install Airbox (Chapter 71-60).

(o) Check if hoses are firmly secured and sealed and check operation of heating and ventilation flaps (fully open and fully close).

(p) Install the engine cowlings (Chapter 71-10).

B. Heat exchanger

For removal / installation, see the Chapter 78-10.

C. Heating deflector

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 5	1 pc
Hex key 5	1 pc
Pliers	1 pc
Persons	1

Tab. 21-3 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Heating deflector removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Remove air hose (2, Fig. 21-6) from the heating deflector (1), by loosening hose clamp (3).

(d) Remove heating deflector (1), by unscrewing bolts (4) and removing washers (5; 6).

(2) Heating deflector installation:

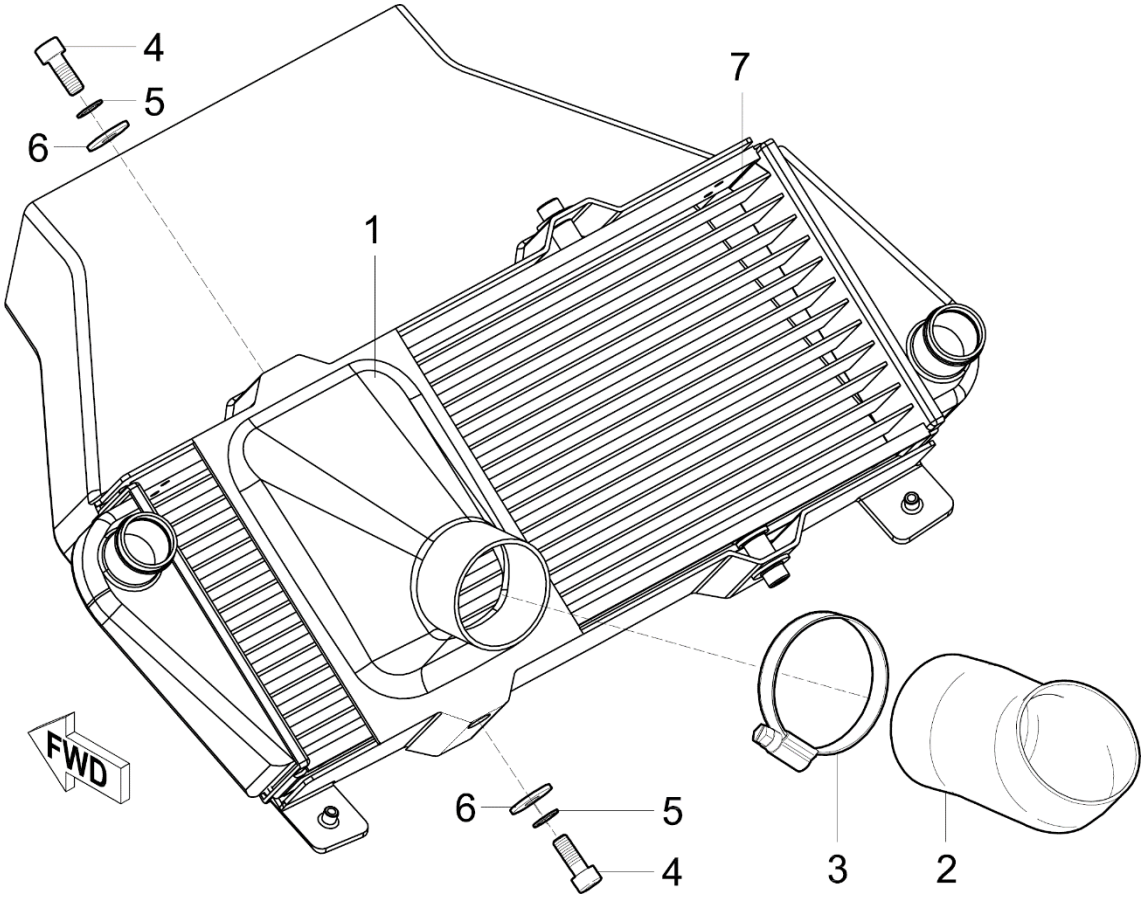
(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Slide heating deflector (1, Fig. 21-6) on air hose (2) and secure with hose clamp (3).

(c) Install heating deflector (1) on water cooler (7) with washers (5; 6) and bolts (4).

(d) Check if hose is firmly secured and sealed.

(e) Install the engine cowlings (Chapter 71-10).



1 – Heating deflector
2 – Air hose Ø51 x 160
3 – Hose clamp Ø40 x 60
4 – Allen bolt M6x16
5 – Serrated locking washer Ø6.4
6 – Washer Ø6.4 x 18 x 1.6

For information:

7 - Water cooler

Fig. 21-6 Heating Deflector Removal / Installation

D. Heating control

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Special wrench 14	1 pc
Screwdriver 5	1 pc
Hex key 4	1 pc
Hex key 5	1 pc
Solder set	1 pc
Knife	1 pc
Pliers	1 pc
Cable tie 2.6	7 pcs
Cable tie 3.6	5 pcs
Shrink tube Ø4.8 x 2.4	AR
Adhesive sealing tape TESA FIX 20 mm	AR
Lockwire Ø 0.8	AR
Loctite 243	AR
Persons	1

Tab. 21-4 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Heating control removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Unscrew cable end fitting (1, Fig. 21-7), remove shrink tube, and unsolder thread rod (2).

(d) From the cockpit, remove the inner cable by pulling handle (7).

(e) Remove cable tie (8), unstick adhesive tape (9), pull green sleeve (6).

NOTE

The ball can drop from green sleeve (6).

(f) Unscrew the nut (13), remove the washers (15; 16), bolt (12) and disconnect control cable (4) with P clamp (14) from firewall.

(g) Unscrew the nut (10), remove washer (11) and pull out control cable (4) from central console.

NOTE

For easier removal use special tool (Fig. 21-2) and hex key inserted on control cable end from cockpit side.

(2) Heating control installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Thoroughly clean and lubricate all movable parts of the ventilation system with oil before each assembling. Refer to lubrication chart (Chapter 12-20).

(c) Control cable (4, Fig. 21-7) passes through central console (17).

(d) Rotate the control cable (4) so the ball is at the top.

(e) Slide washer (11) and tighten the nut (10) secure by using Loctite 243.

NOTE

For better performance use special wrench (Fig. 21-2) and hex key inserted in control cable end from cockpit side.

(f) Insert the ball and simultaneously slide on the green sleeve (6, Fig. 21-7):

- Push the green sleeve (6) just to first indication of minimal resistance.
- Check for correct operation by pulling and pushing handle; the ball must engage with ratchet, movement must not be free.

(g) Apply two layers of textile adhesive tape (9) and lock it with cable tie (8).

(h) Insert the cable through hole on firewall.

(i) Attach the control cable (4) to the firewall (18) by means of the P clamp (14), bolt (12), washers (15; 16) and nut (13).

(j) Secure control cable (4) with cable ties (3.6 mm) along the length as required.

(k) Push handle (7) in, leaving a gap of 2 mm and set selector lever (19) to position flap fully open.

(l) Cut inner wire to correct length, solder thread rod (2), slide shrink tube and screw on cable end fitting (1), and adjust end fitting to connect with nipple on lever.

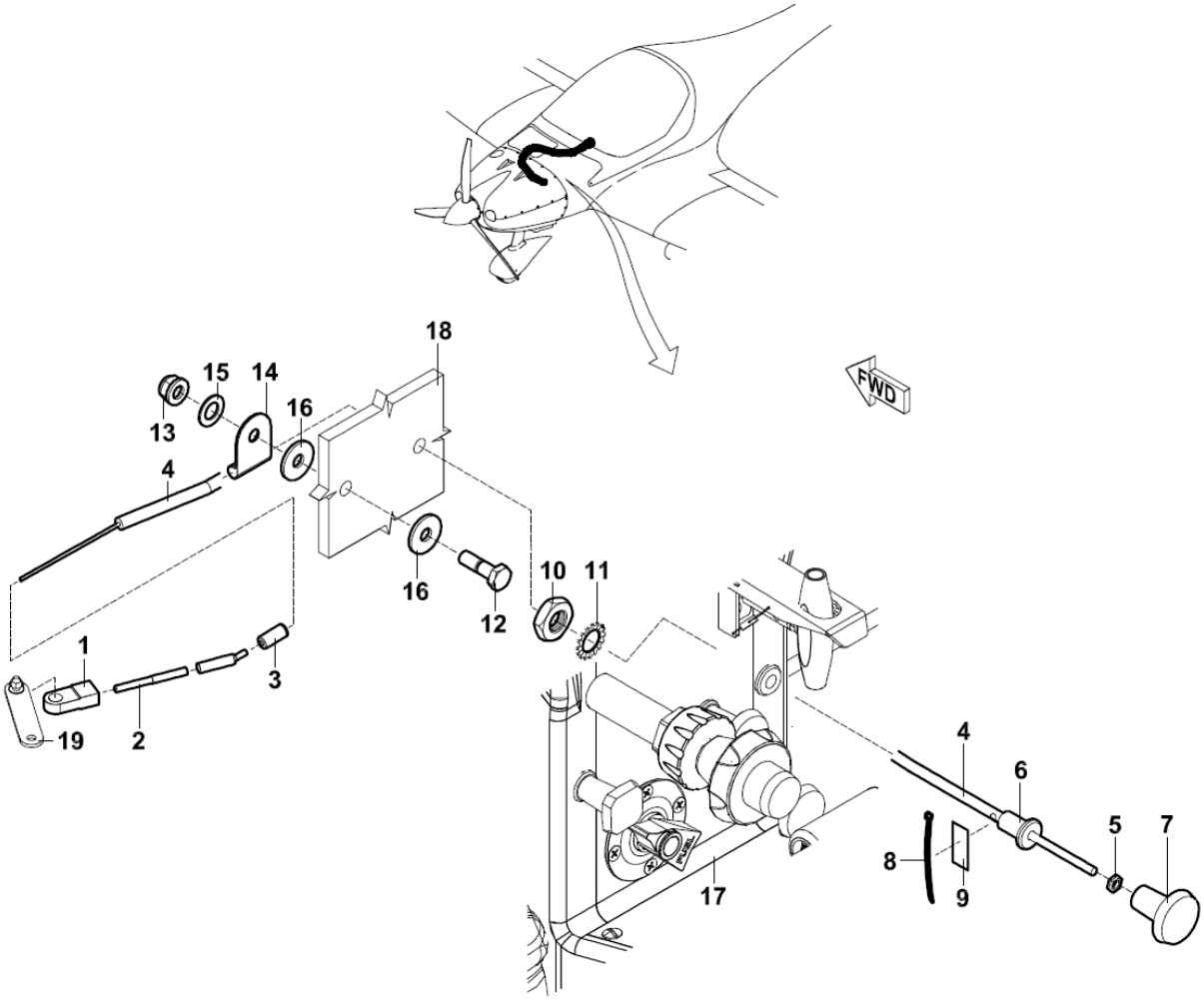
(m) Shrink the shrink tube on thread rod (2).

(n) Connect cable end fitting (1) to the lever (19).

(o) Carry out test and check:

- If all screws connections are tight.
- Operation of control flap (fully open and fully close).
- That no foreign objects remain in the aircraft or engine compartment.

(p) Install the engine cowlings (Chapter 71-10).



1 – Cable end fitting
2 – Thread rod
3 – Bowden end
4 – Control cable
5 – Low nut M4
6 – Green sleeve
7 – Handle
8 – Cable tie 2.6
9 – Textile adhesive tape
10 – Low nut M10
11 – Serrated locking washer Ø10.5
12 – Bolt M6 x 20
13 – Self-locking nut M6
14 – P clamp
13 Washer Ø6.4 x 12 x 1.6
16 – Washer Ø6.4 x 18 x 1.6

For information:

17 – Central console
18 – Firewall
19 - Selector lever

Fig. 21-7 Heating Control Removal / Installation

This page is left blank intentionally

23 COMMUNICATIONS

CONTENTS

Chapter	Description	Page
23-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	4
23-10	**SPEECH COMMUNICATIONS**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTISES	7
	A. Garmin GNC 255A NAV/COMM	7
	B. VHF COMM antenna	7
23-50	**AUDIO INTEGRATING**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTISES	10
	A. PM3000 intercom	10
	B. Push-To-Talk button	10
	C. Audio socket	12

This page is left blank intentionally

23-00 GENERAL

1. INTRODUCTION

This chapter describes the system, individual equipment and components that provide communications inside the aircraft, mutually between aircraft or between aircraft and ground stations.

This chapter describes only the on-aircraft data about the system and components. Refer to the appropriate manufacturer's manuals for data about the equipment.

Wiring diagram of communication equipment is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
GNC 255A does not power on	No power to the GNC 255A	Check power connections, breakers, and main avionic switch
	Faulty electrical wiring or connection	Contact your dealer to perform electrical system test
No Nav audio	Output disabled or set to a low level	Contact dealer
No audio in Com	Mixed with Com feature	Contact dealer
GNC 255A does not transmit	No power to Com	Check power connections
	Mic key connection	Check Mic key input connection
Intercom does not work	It can be enabled or disabled via a remote mounted switch or via the menu.	Check connections
	No voice activation, or must talk too loud	Check ICS page, Intercom ON/OFF, Adjust Intercom
Cannot change active frequency	Com Radio not communicating. The radio may also be in lockout mode. In this case the radio would be tuned to 121.50 and the active freq. would not be able to be changed.	If in Lock Out mode, press the external Com FLIP/FLOP key for two seconds to return to normal operation or cycle the avionics power. If the condition persists, contact dealer.
OBS readout display “---“	Resolver failure	Contact dealer
	Calibration error	Recalibrate resolver
Display shows “Incorrect Calibration Checksum” at start-up	Corrupted system calibration parameters	Contact dealer

23-10 SPEECH COMMUNICATIONS

1. DESCRIPTION

The aircraft is equipped with Garmin GNC 255A NAV / COMM device. Garmin GNC 255A NAV / COMM (Fig. 23-1) consists of transmitter / receiver for VHF communication (COM) and receiver for navigation information (NAV). These are combined with operating controls in one unit. The COM section of the GNC 255A NAV / COMM operates in the aviation voice band, from 118.000 to 136.975 MHz, in 25 kHz and 8.33 kHz steps. The NAV section operates from 108 MHz to 117.95 MHz decoding both the VHF Omni Range and Localizer navigation signals. The built-in Glideslope receiver will automatically tune the corresponding glideslope paired frequencies (328 MHz to 335 MHz) when the localizer is tuned (Chapter 34-50).

Garmin GNC 255A NAV / COMM device is located on the centre section of the instrument panel (Chapter 39-10) and is connected with the COMM and NAV antenna and PM3000 intercom.

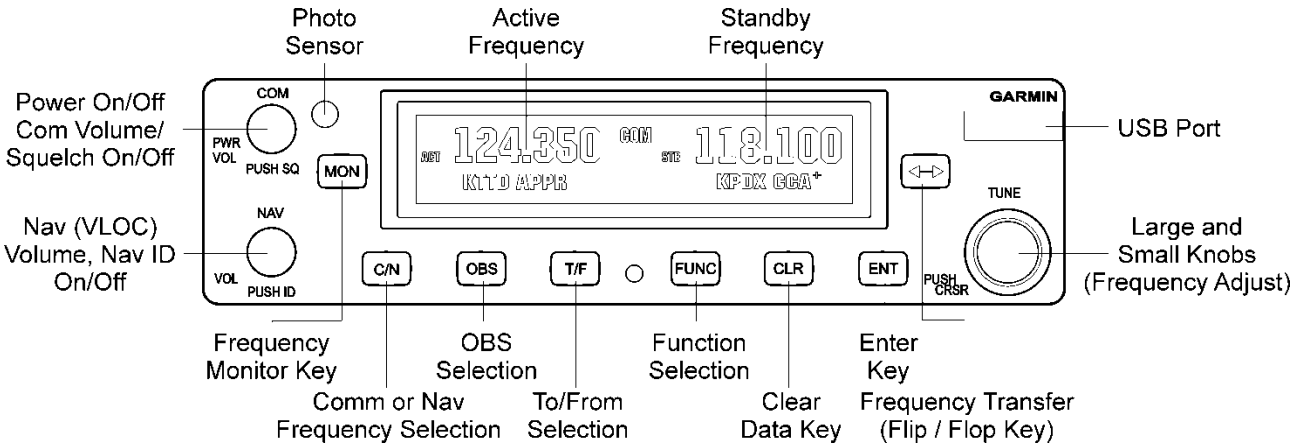
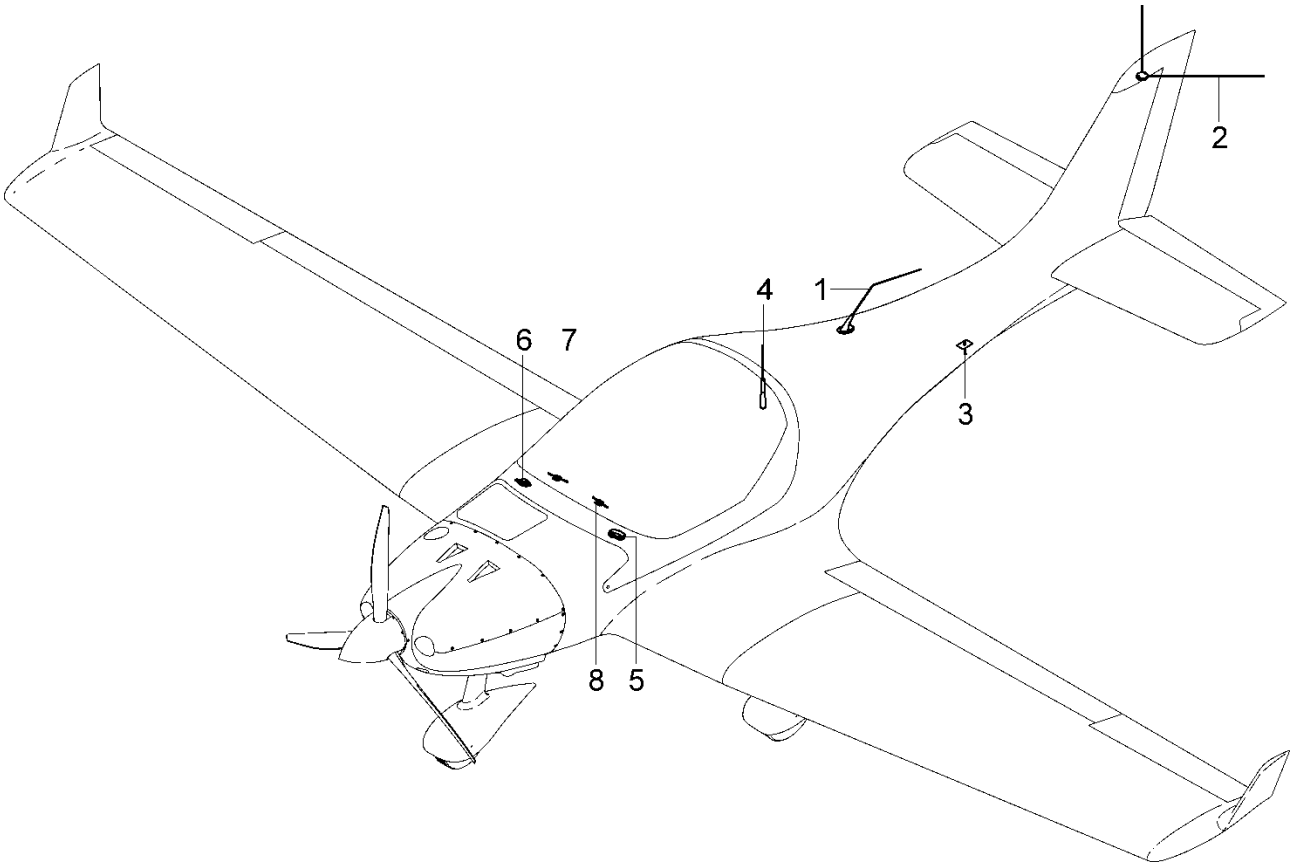


Fig. 23-1 Garmin GNC 255A NAV/COMM

NOTE

Refer to the Garmin GNC 255A/255B Pilot's Guide, P/N 190-01182-01 (revision A or later) for complete descriptions of the Garmin GNC 255A NAV/COM.

Figure 23-2 shows the antenna locations. The VHF COMM antenna a 1/4 wave whip. It is installed above the upper skin of the fuselage. The antenna ground plane is copper adhesive tape.



1 – VHF COMM antenna
2 – VOR / LOC antenna
3 – XPDR antenna
4 – ELT antenna
5 – GPS antenna
6 – TRX GPS antenna
7 – FLARM antenna
8 – ADSB antenna

Fig. 23-2 Antenna Locations

2. MAINTENANCE PRACTISES

A. Garmin GNC 255A NAV/COMM

For removal / installation procedures refer to Chapter 39-10.

B. VHF COMM antenna

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

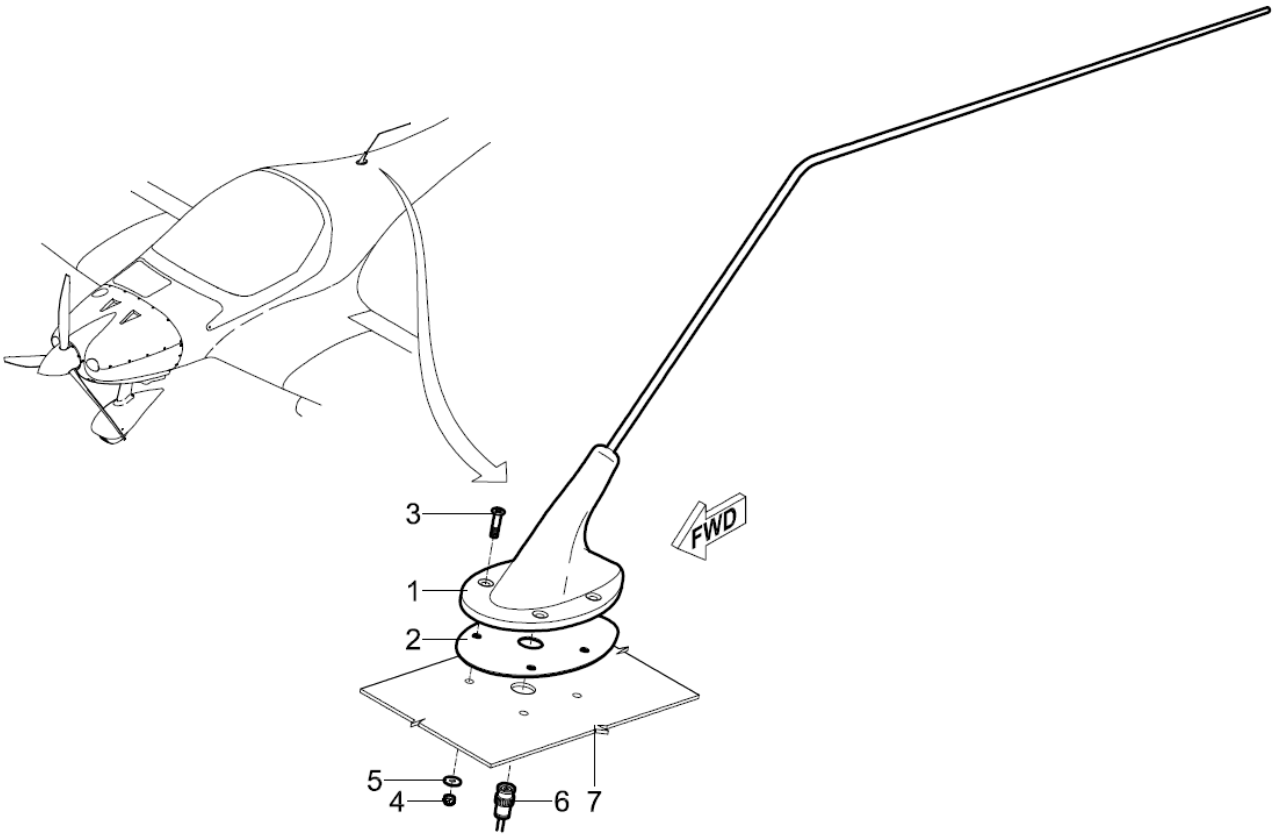
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Wrench 1/4"	1 pc
Persons	2

Tab. 23-1 Recommended tools, materials, persons and documentation

(1) VHF COMM antenna removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Remove the baggage bulkhead cover (13, Chapter 06-00, Fig. 06-7).
- (c) Disconnect the connector (6, Fig. 23-3) from the antenna.
- (d) Remove nuts (4) with washers (5).
- (e) Remove the antenna (1) with the rubber pad (2) and screws (3).
- (f) Install the protective cover on the antenna connector.

(2) VHF COMM antenna installation:
- (a) Remove the protective cover from the antenna connector.
- (b) Place the antenna (1, Fig. 23-3) with the rubber pad (2) on the fuselage (7).
- (c) Insert screws (3) to the holes in the antenna body (1); install washers (5), screw and tighten nuts (4).
- (d) Connect the connector (6) to the antenna (1).
- (e) Perform the measurement of SWR and check that coax cable is not short circuited.
- (f) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – VHF COMM antenna
2 – Rubber pad
3 – Screw M4 x 20 (4 pcs)
4 – Nut M4 self-locking (4 pcs)
5 – Washer 4.3 x 12 x 1
6 – BNC connector
For information:
7 – Fuselage upper part

Fig. 23-3 VHF COMM Antenna Removal / Installation

23-50 AUDIO INTEGRATING

1. DESCRIPTION

The PM3000 is a voice-activated intercom that enables to interconnect up to 4 headsets. It is equipped with setting volume and level of switching the intercom.

For transmitting via VHF transceiver it is necessary to press down and hold the button on the control stick.

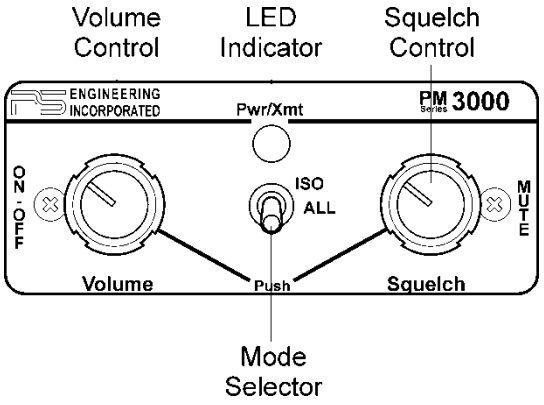


Fig. 23-4 PM3000 Intercom

NOTE

Refer to the PM3000 High-fidelity Stereo Intercom System Part Number 11931A: 4-Place Standard and Part Number 11932: 6-Place with CREW Mode Operation and Installation Manual, P/N 200-193-0005 (revision 9 or later) for complete descriptions of the PM3000.

2. MAINTENANCE PRACTISES

A. PM3000 intercom

For removal / installation procedures refer to Chapter 39-10.

B. Push-To-Talk button

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

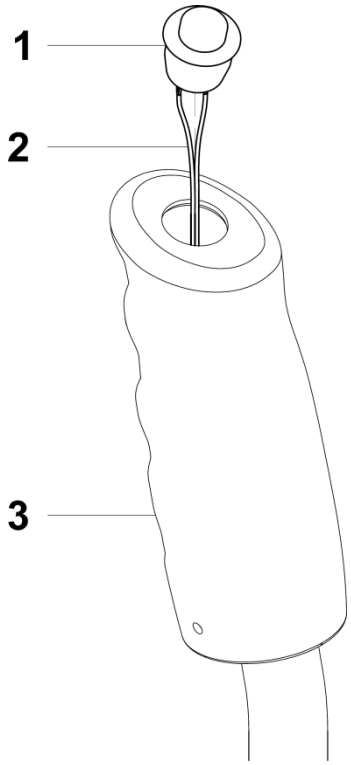
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Flat screwdriver	1 pc
Shrink tube	2 pcs
Persons	1

Tab. 23-2 Recommended tools, materials, persons and documentation

(1) PTT button removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Using small flat screwdriver, hook edge of PTT button (1, Fig. 23-5) and pull it from stick handle (3).
- (c) Desolder wires (2).

(2) PTT button installation:
- (a) Insert shrink tubes on wires.
- (b) Solder wires (2, Fig. 23-5) on PTT button terminals (1). For wires numbering see Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
- (c) Move shrink tubes to cover soldered joint. Apply heat to shrink both tubes.
- (d) Plug the PTT button into stick handle as far as the flange of button touches the edge of opening in the handle (3).
- (e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Push-To-Talk (PTT) button
2 – Wires
3 – Control stick handle

Fig. 23-5 Push-To-Talk button Removal / Installation

C. Audio socket

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Flat screwdriver	1 pc
Wrench 13	1 pc
Shrink tube	3 pcs
Persons	1

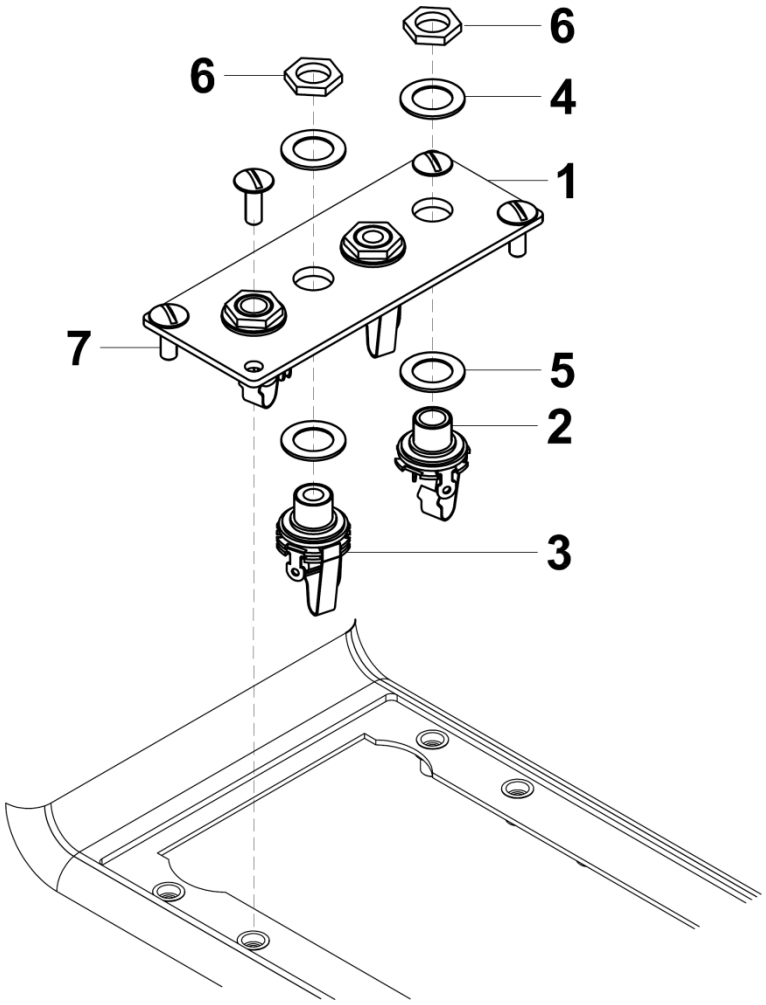
Tab. 23-3 Recommended tools, materials, persons and documentation

(1) Headphone, or microphone socket removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Remove screws (7, Fig 23-6). Lift socket holder (1) with mounted sockets (2, 3).
- (c) Remove nut (6) on top side of the socket (2 or 3), remove insulating front washer (4). Detach the socket from the socket holder (1), remove insulating back washer (5).
- (d) Desolder appropriate wires.

(2) Headphone, or microphone socket installation:
- (a) Insert shrink tubes on wires
- (b) Solder wires on appropriate connector terminals (2 or 3, Fig. 23-6). For wires numbering see Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
- (c) Move shrink tubes to cover soldered joint. Apply heat to shrink tubes.
- (d) Insert insulating back washer (5) on socket (2 or 3), plug the socket into socket holder (1) from bottom side of the holder, insert insulating front washer (4), tight the nut (6).
- (e) Attach assembled audio socket to central tunnel with 4 screws (7).
- (f) Set **MASTER SWITCH** to **ON** position and carry out an operational test.

NOTE

HEADPHONE SOCKETS HAVE LARGER HOLE DIAMETER THAN MICROPHONE SOCKETS AND ARE LOCATED ON OUTER SIDE OF SOCKET HOLDER.



1 – Socket holder
2 – Headphone socket
3 – Microphone socket
4 – Insulating front washer
5 – Insulating back washer
6 – Nut
7 – Screw M4

Fig. 23-6 Push-To-Talk button Removal / Installation

This page is left blank intentionally

24 ELECTRICAL POWER

CONTENTS

Chapter	Description	Page
24-00	**GENERAL**	**3**
	1. INTRODUCTION	3
24-30	**DC GENERATION**	**5**
	1. DESCRIPTION	5
	A. Generator system	5
	B. Battery	5
	C. SV-BAT-320 backup battery	5
	2. MAINTENANCE PRACTICES	6
	A. Generator	6
	B. Voltage regulator	6
	C. Battery	8
	D. SV-BAT-320 backup battery	10
24-40	**EXTERNAL POWER**	**13**
	1. DESCRIPTION	13
	2. MAINTENANCE PRACTICES	13
	A. External power socket	13
24-60	**DC ELECTRICAL LOAD DISTRIBUTION**	**15**
	1. DESCRIPTION	15
	2. MAINTENANCE PRACTICES	17
	A. 12 V socket	17
	B. ETA 106-P10 circuit breakers	17
	C. KLIXON 7277-2 circuit breakers	17
	D. Switches	17
	E. Propeller regulator	17
	F. Trim switches	17

This page is left blank intentionally

24-00 GENERAL

1. INTRODUCTION

The information in this chapter covers DC generation, external power, and electrical load distribution.

This aircraft is equipped with a dual-wire type electrical system. The system has two sources of electrical power - generator and 12 volt battery. A generator integrated into the engine and connected to a rectifier/voltage regulator supplies power to the electrical system. 12 V / 17 Ah or 12V / 20 Ah battery is charged by the generator and supplies power for starting the engine and for equipment while the engine is not running.

Two SV-BAT-320 backup batteries provide of backup power to SkyView system displays and modules.

The electrical circuits of the system are, with the exception of the engine start circuit, protected by automatic circuit breakers. Figure 24-1 and 24-2, shows a simplified schematic diagram of the electrical system. For detailed wiring diagrams refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

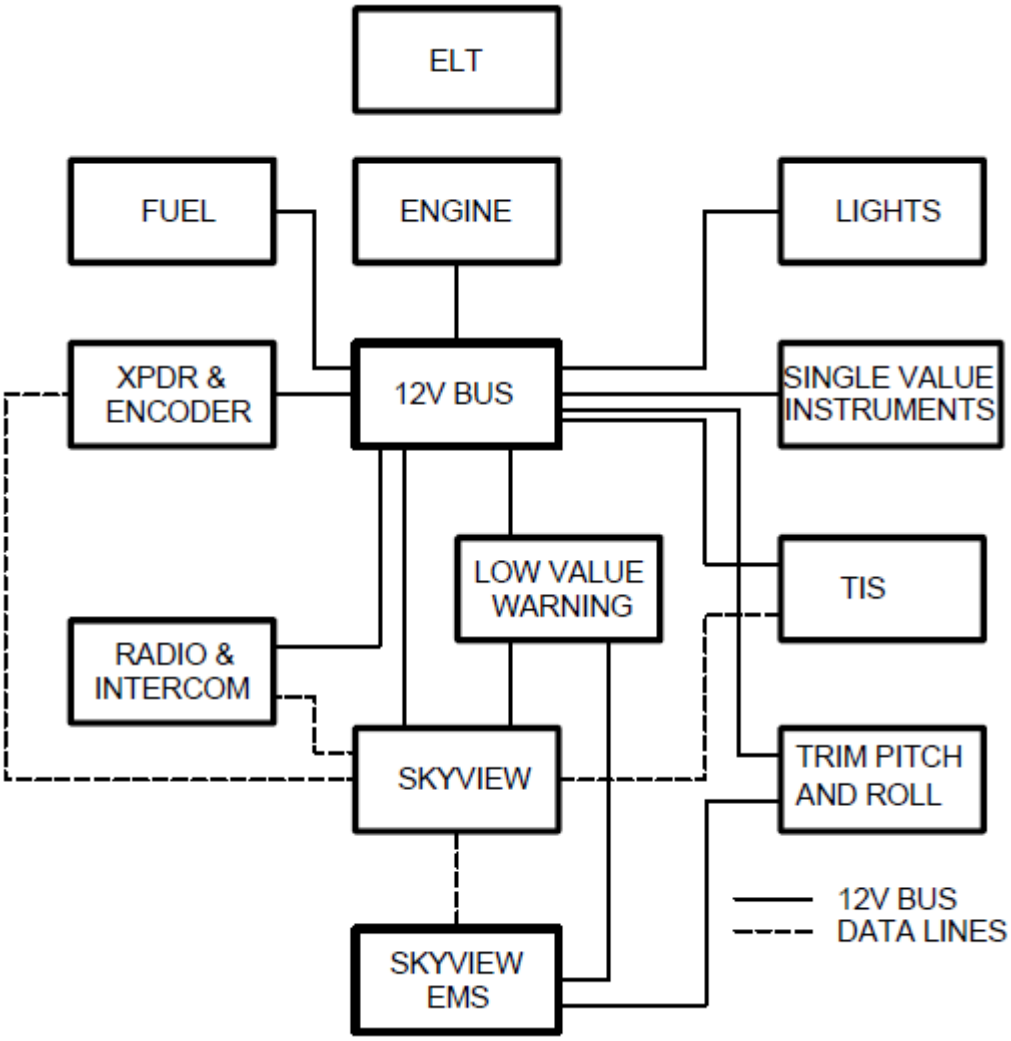


Fig. 24-1 Simplified Schematic Diagram

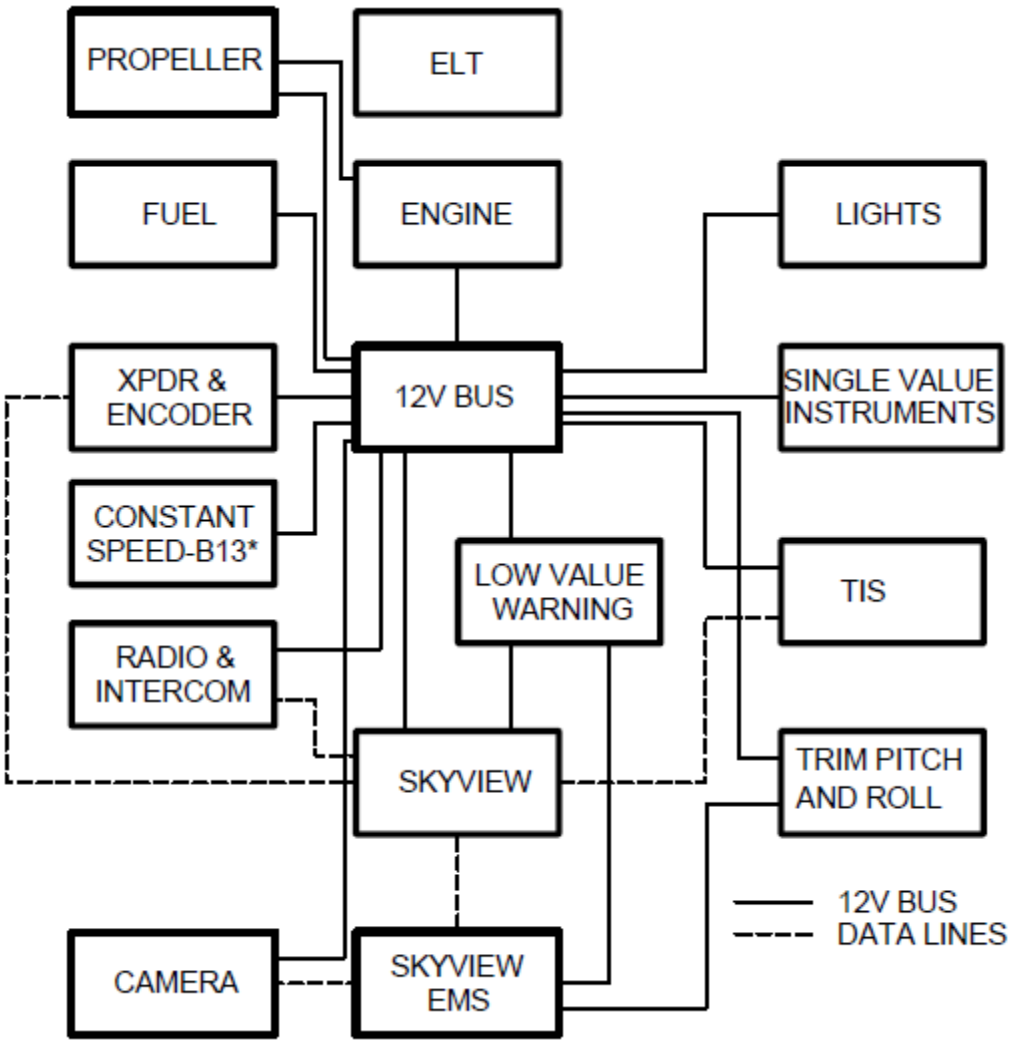


Fig. 24-2 Simplified Schematic Diagram (Towing Version)

24-30 DC GENERATION

1. DESCRIPTION

A. Generator system

The generator system consists of the following components:

- Generator
- Voltage regulator
- Charging fuse
- Low voltage warning light

The maintenance free AC generator is integrated into the engine and supplies power to the equipment during normal operation.

The generated AC voltage is rectified and regulated by the voltage regulator. The voltage regulator and charging fuse are installed on the firewall in the engine compartment.

The low voltage warning light **CHARGE** is located on the left instrument panel (Chapter 39-10).

B. Battery

The lead acid maintenance free battery 12 V / 17 Ah or 12V / 20 Ah battery is installed in the engine compartment at the firewall; supplies power to the starter and is also used as an emergency power supply when the engine has stopped.

C. SV-BAT-320 backup battery

SkyView displays have the SV-BAT-320 external backup batteries. In the event of an electrical failure that causes SkyView to run on the SV-BAT-320, the SV-BAT-320 supplies power to the SkyView display it is connected to, along with any connected SV-ADAHRS-200, SV-EMS-220, and SV-GPS-250 module. A fully charged SV-BAT-320 can keep most SkyView systems operating for at least 45 minutes.

NOTE

Refer to “Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q” or later for additional information.

2. MAINTENANCE PRACTICES

A. Generator

Refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for maintenance practices information.

B. Voltage regulator

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 13	2 pcs
Persons	1

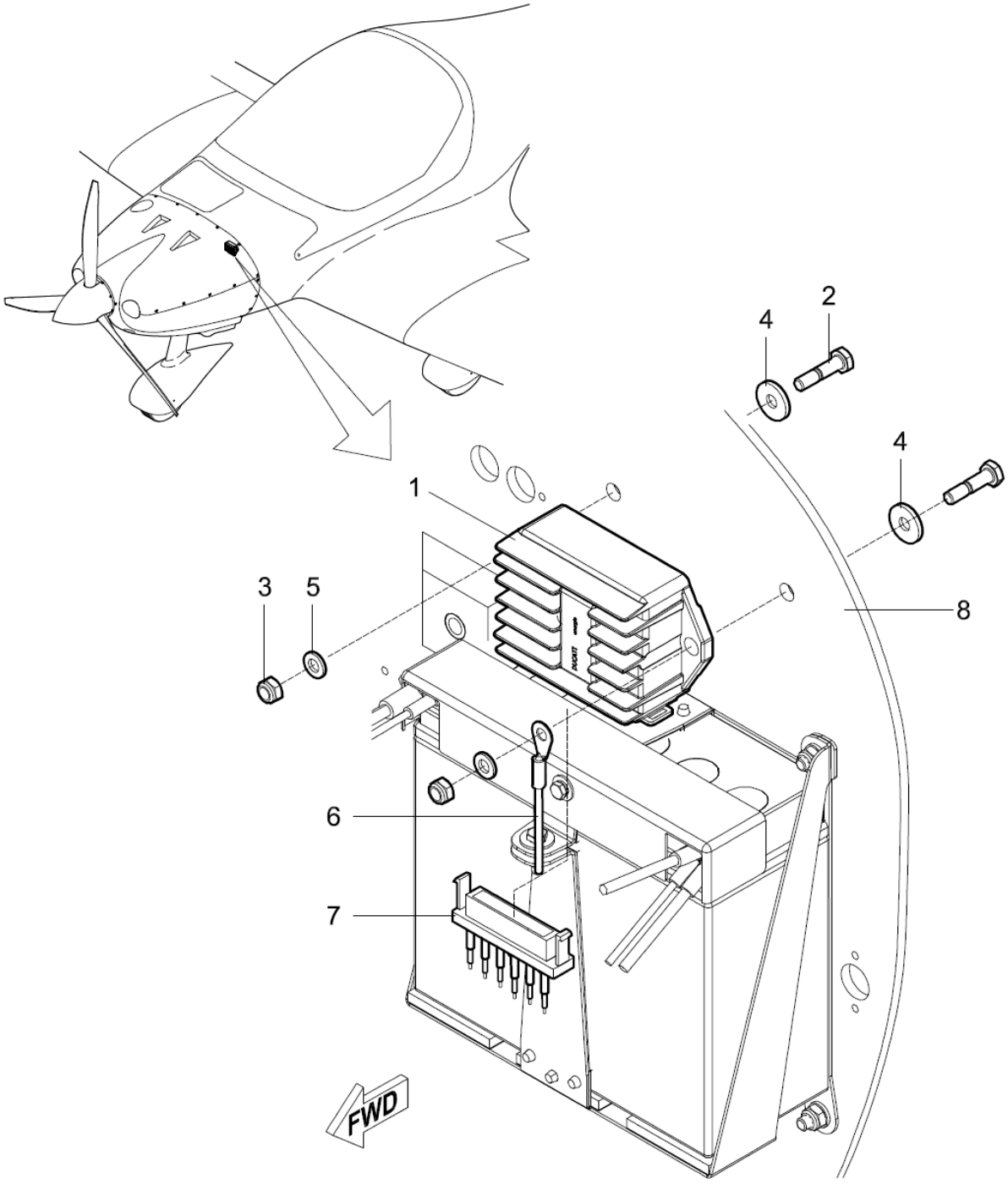
Tab. 24-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Voltage regulator removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the engine cowlings (Chapter 71-10).
- (c) Disconnect the battery.
- (d) Disconnect the connector (7, Fig. 24-3) from the regulator (1).
- (e) Remove the mounting nuts (3), washers (4, 5), ground wire (6) and bolts (2).
- (f) Remove the regulator (1).

(2) Voltage regulator installation
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Put the regulator (1, Fig. 24-3) in position on the firewall (8).
- (c) Hold the regulator and attach it with bolts (2), washers (4, 5), ground wire (6) and nuts (3).
- (d) Connect the connector (7) to the regulator (1).
- (e) Check if regulator is firmly secured.
- (f) Connect the battery.
- (g) Install the engine cowlings (Chapter 71-10).
- (h) Carry out an operational test; check function.



1 – Voltage regulator
2 – Bolt M6 x 25
3 – Self-locking nut M6
4 – Washer Ø6.4 x 18 x 1.6
5 – Washer Ø6.4 x 12 x 1.6
6 – Ground wire
7 - Connector
8 – Firewall

Fig. 24-3 Voltage Regulator Removal / Installation

C. Battery

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	1 pc
Wrench 8	1 pc
Persons	1

Tab. 24-2 Recommended tools, materials, persons and documentation

(1) Battery removal:

(a) Remove the engine cowlings (Chapter 71-10).

(b) Unscrew the bolt (6, Fig. 24-4), remove washers (8; 9) and cover (3).

(c) First disconnect wires (12) from negative terminal (13), by unscrewing the nut (11), removing the washers (7) and the bolt (4).

(d) Perform same procedure with wires (15) on positive terminal (14).

(e) Unscrew the nut (11) and remove the washers (7; 10) and the bolt (5), open holder (16) and remove the battery (1).

(f) Pull out the battery from Econet casing (2).

(2) Battery installation:

(a) Put the battery (1, Fig. 24-4) to the Econet casing (2).

(b) Open holder (16), insert battery (1) and attach it by means of the bolt (5), washers (7; 10) and nut (11).

(c) First connect wires (15) with positive terminal (14) by means of the bolt (4), washers (7) and nut (11).

(d) Perform same procedure with wires (12) on negative terminal (13).

(e) Install cover (3) and attach it by means of the bolt (6) and washers (8; 9).

(f) Install the engine cowlings (Chapter 71-10).

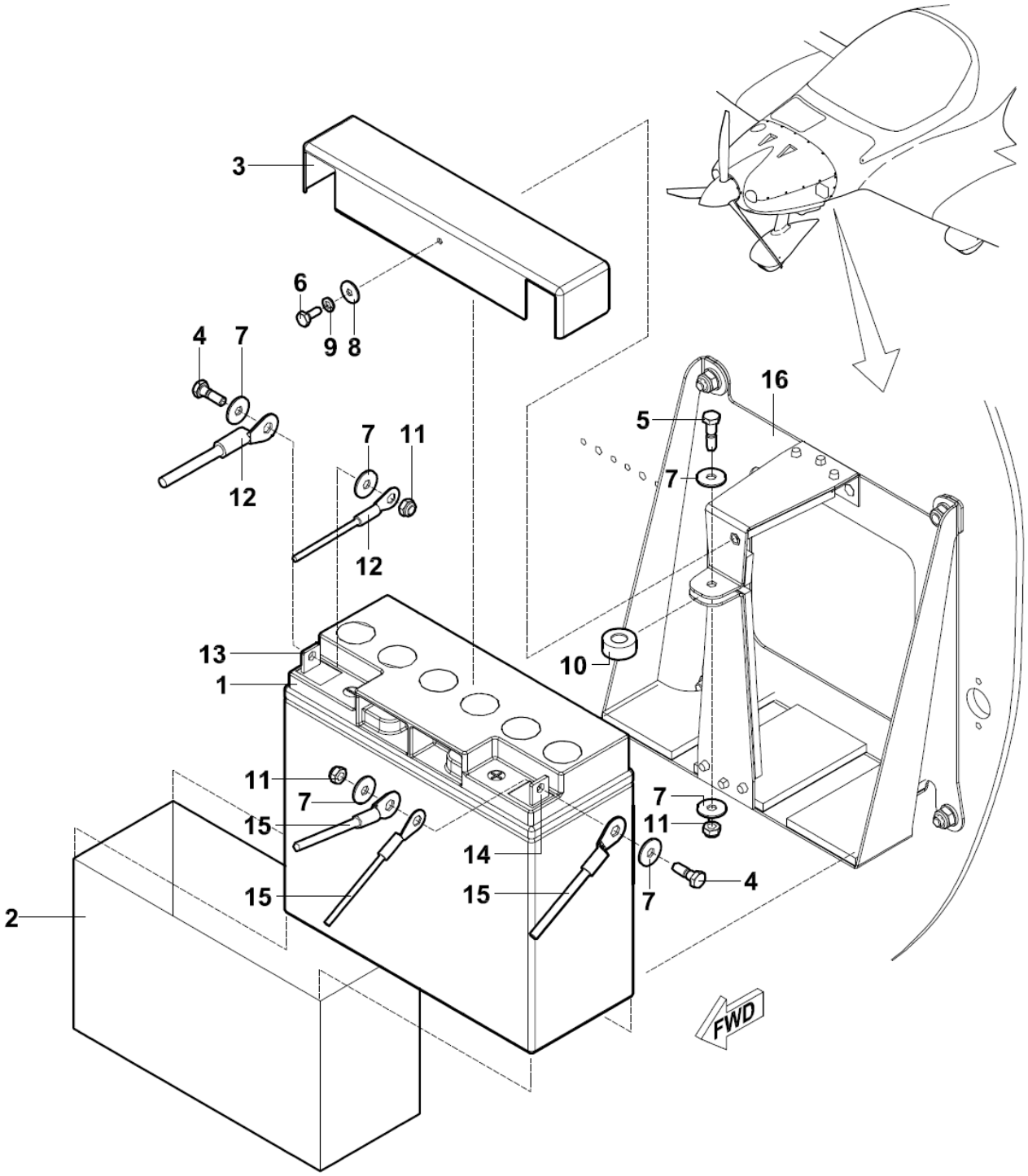


Fig. 24-4 Battery Removal / Installation (page 1 of 2)

1 – Battery
2 – Econet casing
3 – Cover
4 – Bolt M5x15
5 – Bolt M5x18
6 – Bolt M4x10
7 – Washer Ø5.3 x 15 x 1.2
8 – Washer Ø4.3 x 12 x 1
9 – Spring locking washer Ø4.3
10 – Washer Ø6.4 x 20 x 6
11 – Self-locking nut M5
12 – Wires (-)
13 – Negative terminal
14 – Positive terminal
15 – Wires (+)
For information:
16 – Battery holder

Fig. 24-4 Battery Removal / Installation (page 2 of 2)

D. SV-BAT-320 backup battery

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	1 pc
Screwdriver	1 pc
Philips screwdriver	1 pc
Persons	1

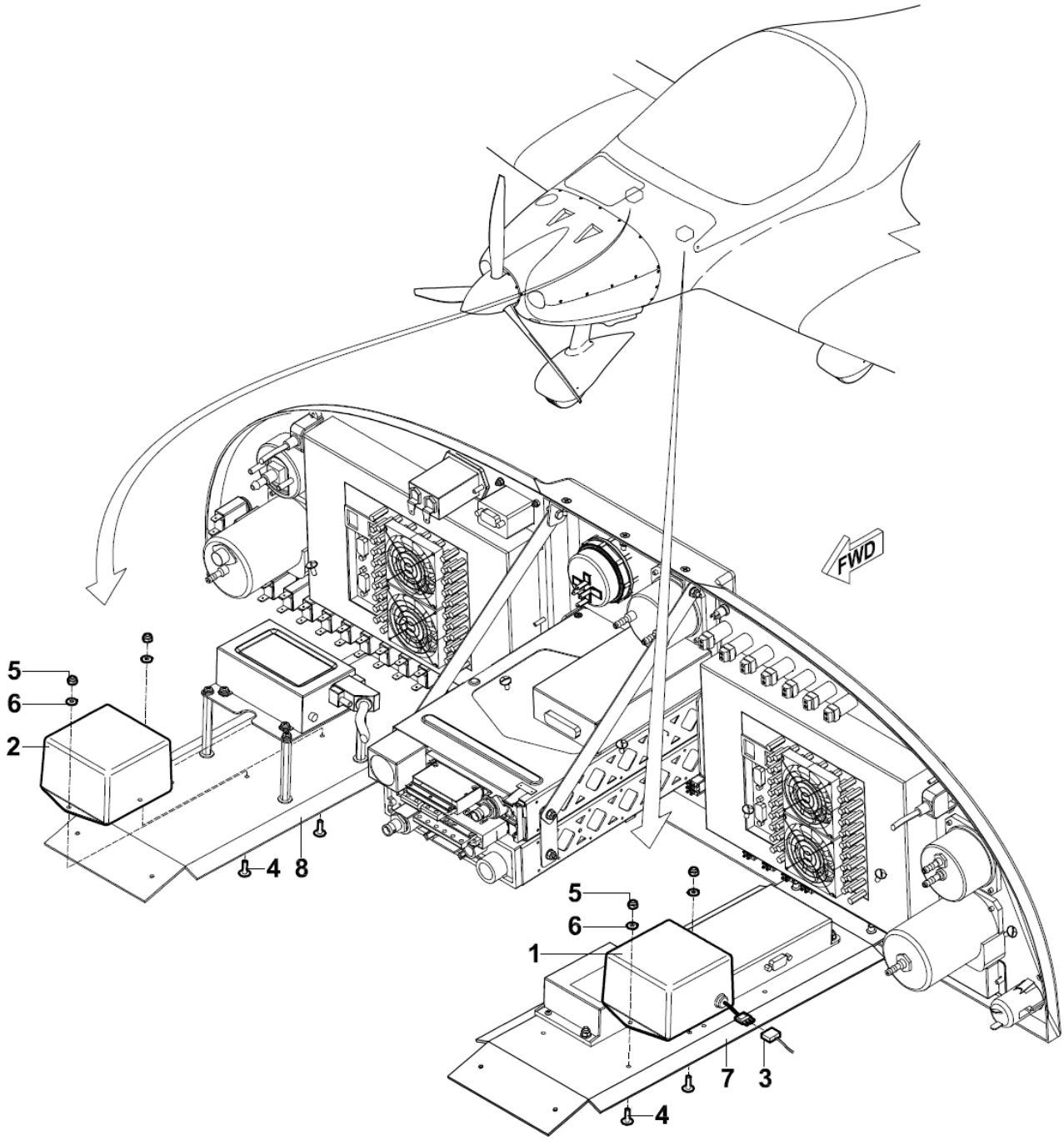
Tab. 24-3 Recommended tools, materials, persons and documentation

NOTE

Described is procedure for removal/installation of backup battery on the left instrument floor. The procedure for backup battery on the right instrument floor is analogous.

(1) Backup battery removal:
  (a) Remove the instrument panel cover (Chapter 39-10).
  (b) Disconnect the connector (3, Fig. 24-5) from the backup battery (1; 2).
  (c) Remove the mounting nuts (5), washers (6) and bolts (4).
  (d) Remove the backup battery (1; 2) from the instrument floor (7, 8).

(2) Backup battery installation:
  (a) Put the backup battery (1; 2, Fig. 24-5) in position on the instrument floor (7; 8).
  (b) Hold the battery and attach it with bolts (4), washers (6) and nuts (5).
  (c) Connect the connector (3) to the backup battery (1, 2).
  (d) Install the instrument panel cover (Chapter 39-10).
  (e) Carry out an operational test (see Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q" or later).



1 – Left backup battery
2 – Right backup battery
3 – Connector
4 – Bolt M4 x 12
5 – Self-locking nut M4
6 – Washer Ø4.3 x 12 x 1

For information:

7 – Left instrument floor
8 – Right instrument floor

Fig. 24-5 SV-BAT-320 Backup Battery Removal / Installation

This page is left blank intentionally

24-40 EXTERNAL POWER

1. DESCRIPTION

The aircraft is equipped with the external power source socket, which is located in the left side of the cabin, bellow the instrument panel. External power source is intended for engine starting, maintenance procedures requiring reliable power for an extended period and for battery charging.

Recommended power source output is:

Shortly for engine start: Max. 12 V / 90 A DC

For maintenance purposes: Max. 12 V / 25 A DC

2. MAINTENANCE PRACTICES

A. External power socket

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

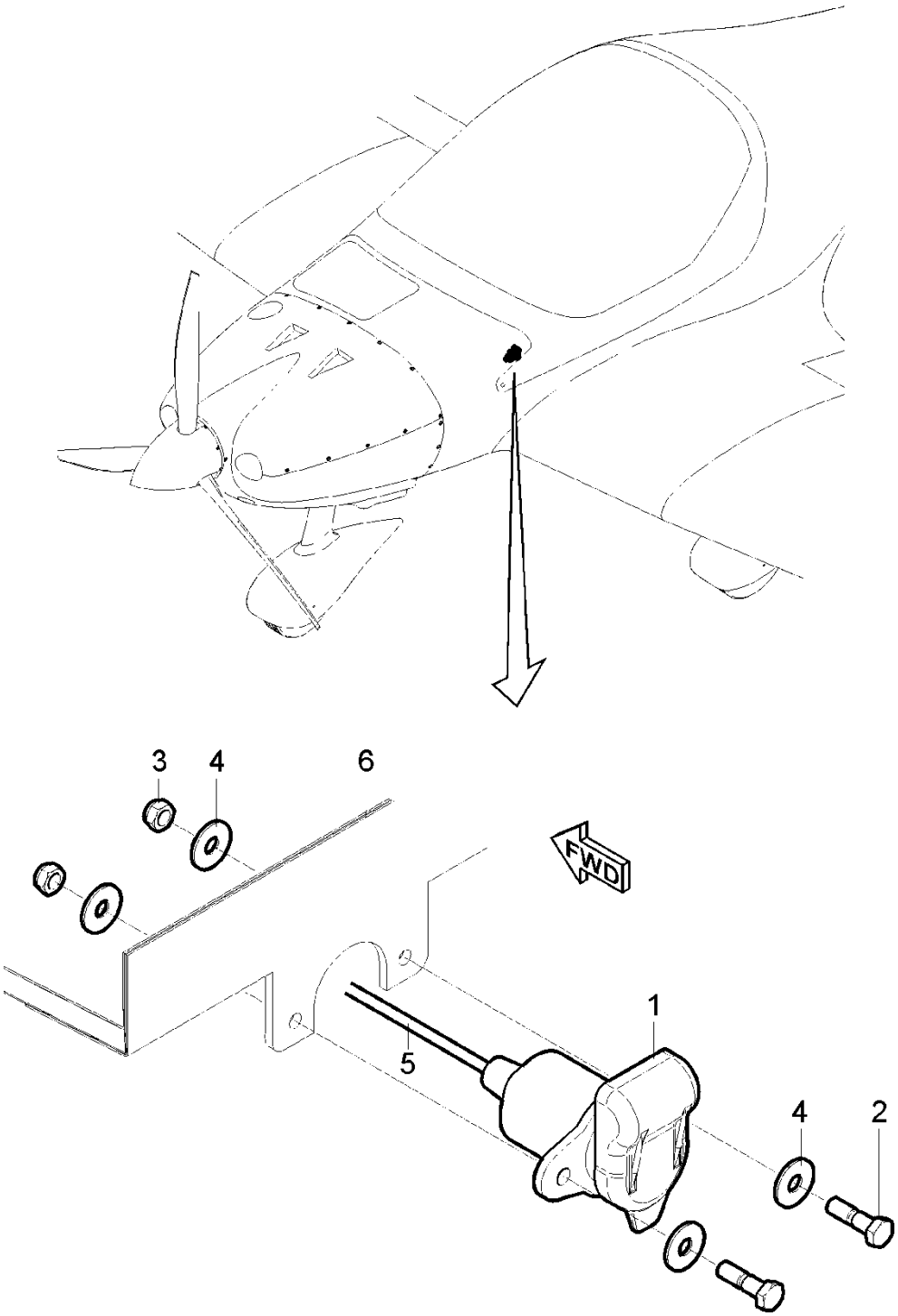
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pads (various thickness)	AR
Spirit level	1 pc
Persons	1

Tab. 24-4 Recommended tools, materials, persons and documentation

(1) External power socket removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery and cables (5, Fig. 24-6).
- (c) Pull out the cables (5) through the firewall from engine compartment.
- (d) Unscrew the nuts (3), remove washers (4), bolts (2) and remove the external power socket (1) with cables (5).

(2) External power socket installation:
- (a) Put the external power socket (1, Fig. 24-6) in position on the bracket (6).
- (b) Attach the socket (1) with bolts (2), washers (4), and nuts (3).
- (c) Pull the cables (5) through the firewall to engine compartment.
- (d) Connect the cables (5) and battery.
- (e) Install the engine cowlings (Chapter 71-10).
- (f) Carry out an operational test; check function.



1 – External power socket
2 – Bolt M5 x 18
3 – Self-locking nut M5
4 – Washer Ø5.3 x 15 x 1.2
5 – Cable

For information:

6 – Bracket

Fig. 24-6 External Power Socket Removal / Installation

24-60 DC ELECTRICAL LOAD DISTRIBUTION

1. DESCRIPTION

The electrical power from the generator and the battery is supplied via 12 V bus, switches and circuit breakers to the individual electrical equipment.

Switches are installed at the lower edge of instrument panel's left side.

Circuit breakers are located at the lower and right side of instrument panel's right side. Circuit breaker's marking and values are listed in the Table 24-5.

Dual contactless ignition of the engine it is a separate part of electrical installation. Each ignition circuit can be switched off independently using corresponding **IGNITION** switch (see Chapter 74-30). Keyed ignition switch is connected to the battery through a **MASTER SWITCH**. It has positions **OFF** - **INST.** - **CHARGE** - **START**. In the **OFF** position, the starter is electrically isolated. In the **INST.** position are energized single value instruments (engine hours and flight hours) and fuel pump. In the **CHARGE** position also a warning lamp **CHARGE** is energized and indicates the charging status. In the **START** position, the starter is energized and will automatically return to the position **CHARGE** when released.

PFD and MFD displays Dynon SkyView SV-D1000 are connected through **LH D1000** and **LH D1000** circuit breakers directly to the **MASTER SWITCH**.

Avionics (RDST, XPDR, intercom and traffic sensor) are connected through separate **COMM**, **NAV**, **XPDR, INTERCOM** and **TIS** circuit breakers to the avionic relay. Avionic relay is activated by separate **AVIONICS** switch and is protected by **AVIONICS** circuit breaker that is connected to the **MASTER SWITCH**.

Navigation and anti-collision lights are activated by **NAV / ACL** switch and are connected through **NAV / ACL** circuit breaker to the **MASTER SWITCH**. Landing lights are activated by **LAND** switch and are connected through **LAND** circuit breaker to the **MASTER SWITCH**.

Fuel pump is activated by separate **FUEL PUMP** switch and is connected through a **FUEL PUMP** circuit breaker to the **INST.** position of keyed ignition switch.

Stall warning system consists of stick shaker handle, buzzer and warning lamp that are triggered by ACI Stall Warner (AoA flap) and Stall Warning Transducer (buzzer and warning lamp only). Stall warning system is connected through **STALL** circuit breaker to the **MASTER SWITCH**.
Function of warning lamps, control lamps, stick shaker and stall warning horn can be verified by pressing button labelled **TEST**.

Pitch and roll trim actuators are activated by separate switches and are connected through **PITCH** and **ROLL** circuit breakers to the **MASTER SWITCH**.

Low oil pressure warning circuit and low fuel level warning circuit have a separate **OIL PRESS.** and **FUEL RES.** circuit breakers.

12 V sockets of an automotive type are installed at the both lower corners of instrument panel and are connected through **SOC. 12V** circuit breaker to the **MASTER SWITCH**.

Engine hours and flight hours are supplied through **SVI** circuit breaker from the **INST.** position of keyed ignition switch.

ELT has its own battery for power supply.

Towing version:

Camera is activated by **CAMERA** switch and is connected through **CAMERA** circuit breaker to the **MASTER SWITCH**.

Propeller is regulated by a propeller governor and is connected through **PROPELLER** circuit breaker to the **MASTER SWITCH**.

NO.	MARKING	PROTECTED INSTRUMENT	VALUE (A)
1.	**PITCH***	Pitch trim actuator	7.5
2.	**ROLL***	Roll trim actuator	1
3.	**STALL***	Stall warning system	1
4.	**AVIONICS**	Avionics relay	1
5.	**FUEL PUMP**	Fuel pump	5
6.	**COMM**	GNC 255A (COMM)	10
7.	**XPDR**	GTX 328	5
8.	**LH D1000**	LH Dynon SkyView SV-D1000	8
9.	**RH D1000**	RH Dynon SkyView SV-D1000	8
10.	**OIL PRESS.**	Low oil pressure warning	1
11.	**FUEL RES.**	Low fuel level warning	1
12.	**SOC. 12V**	LH and RH socket 12V	10
13.	**SVI**	Engine hours counter Hobbs Flight hours counter Winter FSMZ RPM indicator ROAD IF61.2B35.2301	1
14.	**TIS**	TRX-1500	1
15.	**SPARE**	-	-
16.	**NAV / ACL**	Anti-collision lights	5
17.	**LAND**	Landing lights	1
18.	**NAV**	GNC 255A (NAV)	4
19.	**INTERCOM**	PM3000	1
20.	**CAMERA**	Camera (towing version)	1
21.	**PROPELLER***	Propeller regulator (towing version)	1

Tab. 24-5 Circuit breakers rating

NOTE

*KLIXON 7277-2 circuit breakers are used in pitch trim, roll trim, stall warning system and propeller circuits. Remaining circuits are protected by ETA 106-P10 circuit breakers.

2. MAINTENANCE PRACTICES

A. 12 V socket

For removal / installation, see the Chapter 39-10.

B. ETA 106-P10 circuit breakers

For removal / installation, see the Chapter 39-10.

C. KLIXON 7277-2 circuit breakers

For removal / installation, see the Chapter 39-10.

D. Switches

For removal / installation, see the Chapter 39-10.

E. Propeller regulator

For removal / installation, see the Chapter 39-10.

F. Trim switches

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pliers	1 pc
Persons	1

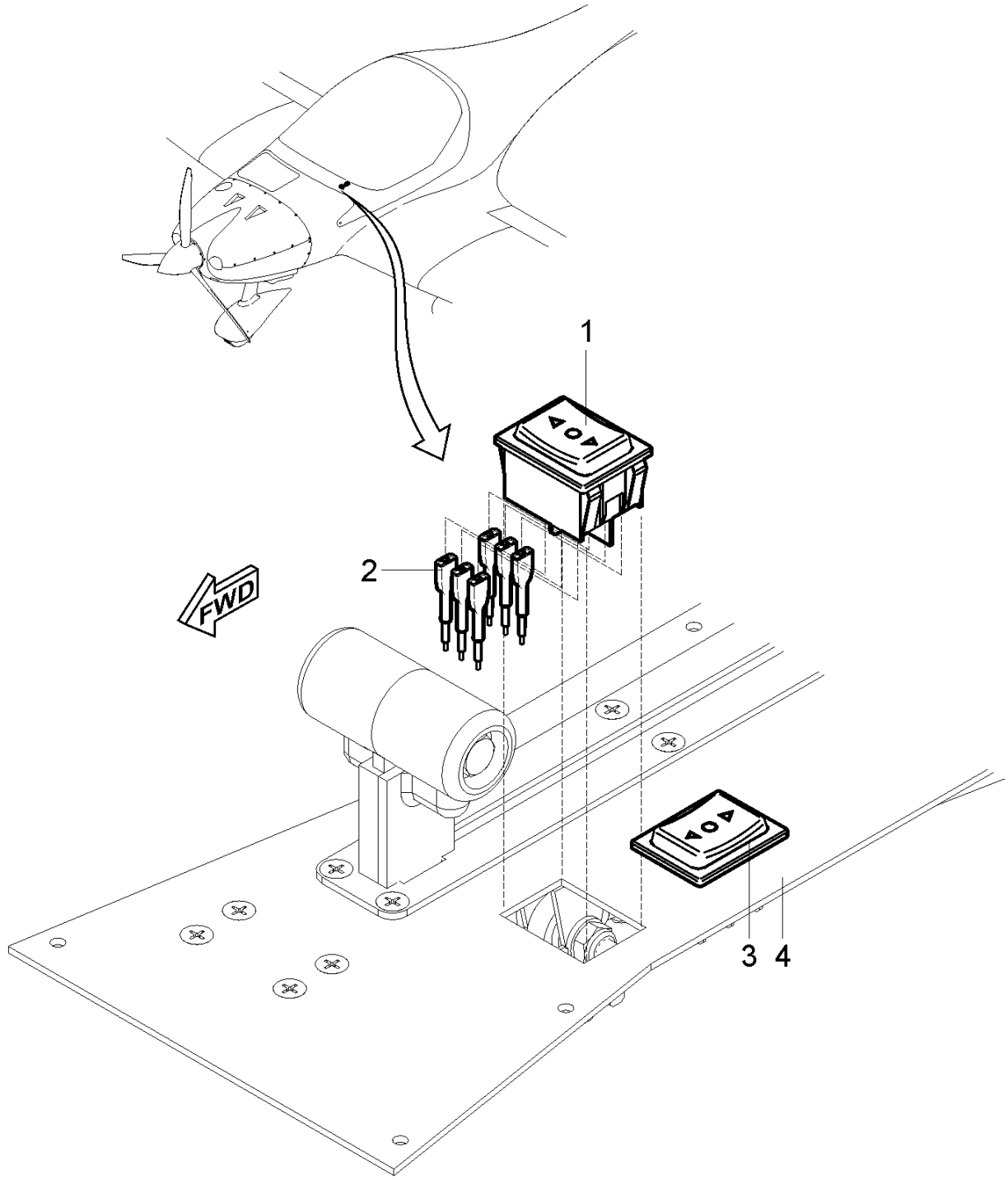
Tab. 24-10 Recommended tools, materials, persons and documentation

NOTE

Removal / installation is same for both switches.

(1) Trim switch removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Set the **MASTER SWITCH** to **OFF** position.
- (c) Remove the pedestal panel (Chapter 27-50) to gain access to the underside of the switch.
- (d) Disconnect all wires (2, Fig. 24-7) from the switch.
- (e) Compress the retainers on the switch (1) and push up to remove.

(2) Trim switch installation:
- (a) Compress the retainers on the switch (1, Fig. 24-7) and push down into position.
- (b) Identify and connect all wires (2) to the switch.
- (c) Install the pedestal panel (4, Fig. 24-7) (Chapter 27-50).
- (d) Set the **MASTER SWITCH** to **ON** position.
- (e) Install the engine cowlings (Chapter 71-10).
- (f) Carry out an operational test.



1 – Roll trim switch
2 – Wires
3 – Pitch trim switch

For information:
4 – Pedestal panel

Fig. 24-7 Trim Switches Removal / Installation

25 EQUIPMENT / FURNISHING

CONTENTS

Chapter	Description	Page
25-00	**GENERAL**	**3**
	1. INTRODUCTION	3
25-10	**FLIGHT COMPARTMENT**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Seats	6
	B. Safety harnesses	7
25-50	**CARGO COMPARTMENTS**	**9**
	1. DESCRIPTION	9
25-60	**EMERGENCY**	**11**
	1. DESCRIPTION	11
	2. MAINTENANCE PRACTICES	14
	A. Emergency parachute system	14
	B. Emergency locator transmitter (ELT)	20

This page is left blank intentionally

25-00 GENERAL

1. INTRODUCTION

This chapter describes equipment and furnishing in the flight compartment. Chapter 25-10 includes the pilot and co-pilot seats, safety harnesses and safety belts.

Chapter 25-60 gives the data for the Emergency Parachute System (EPS) and Emergency Locator Transmitter (ELT).

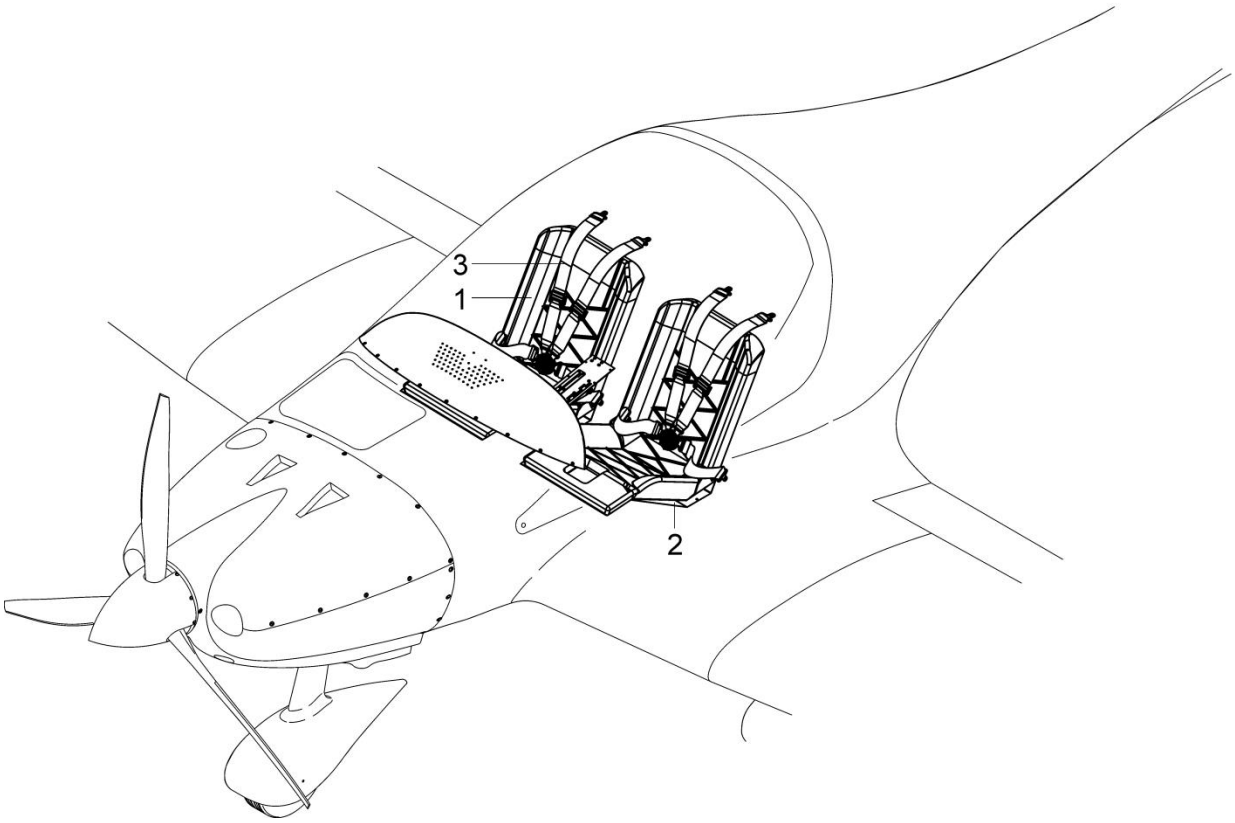
This page is left blank intentionally

25-10 FLIGHT COMPARTMENT

1. DESCRIPTION

Pilot and co-pilot's seats are integral part of interior arranged side-by-side and consist of removable laminate seats (2, Fig. 25-1) and backrest, which is bonded with central tunnel and fuselage. Seats are covered with upholstery seats (1).

Seats are equipped with 4-point safety harnesses (3). Safety harnesses consist of two lap belts, two shoulder belts and a safety harness lock. Lap belts are attached to the central tunnel and interior sidewalls and shoulder belts are attached to the top of backrest. Length of each belt is adjustable.



1 – Upholstery seat
2 – Laminated seat
3 – Safety harness

Fig. 25-1 Flight Compartment Furnishing Locations

2. MAINTENANCE PRACTICES

A. Seats

Described is procedure for removal of left laminated seat.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

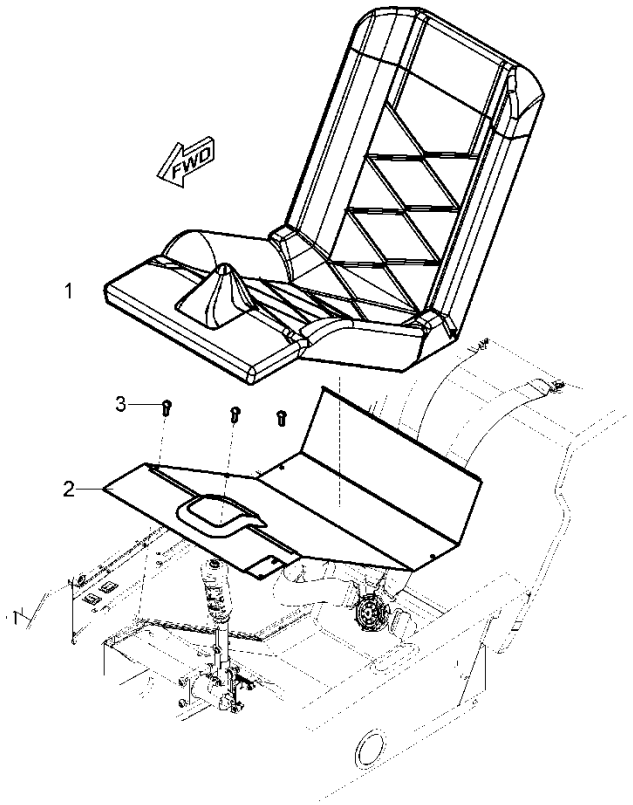
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 10	1 pc
Persons	1

Tab. 25-1 Recommended tools, materials, persons and documentation

(1) Seat removal:
  (a) Remove the upholstery seat (1, Fig. 25-2).
  (b) Remove bolts (3) and take out the laminated seat (2).

(2) Seat installation:
  (a) Place the seat (2, Fig. 25-2) into the fuselage and install bolts (3).
  (b) Install the upholstery seat (1).



1 – Upholstery seat
2 – Laminated seat
3 – Bolt M5 x 12

Fig. 25-2 Seat Removal / Installation

B. Safety harnesses

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 13	2 pcs
Persons	1

Tab. 25-2 Recommended tools, materials, persons and documentation

(1) Safety harness removal:

(a) Remove the seat upholstery (see par. 2.A.(1)).

(b) From the attachment bracket in the backrest, unscrew the nut (4, Fig. 25-3), remove the washers (3), shoulder belt bracket (2) and bolt (1).

(c) From the attachment bracket on sides of the seat, unscrew the bolt (1), remove the lap belt bracket (5) and washer (6).

(d) Remove other safety belts.

(2) Safety harness installation:

(a) Check safety harnesses for wear, cracks and damage; check operation of the safety harness lock.

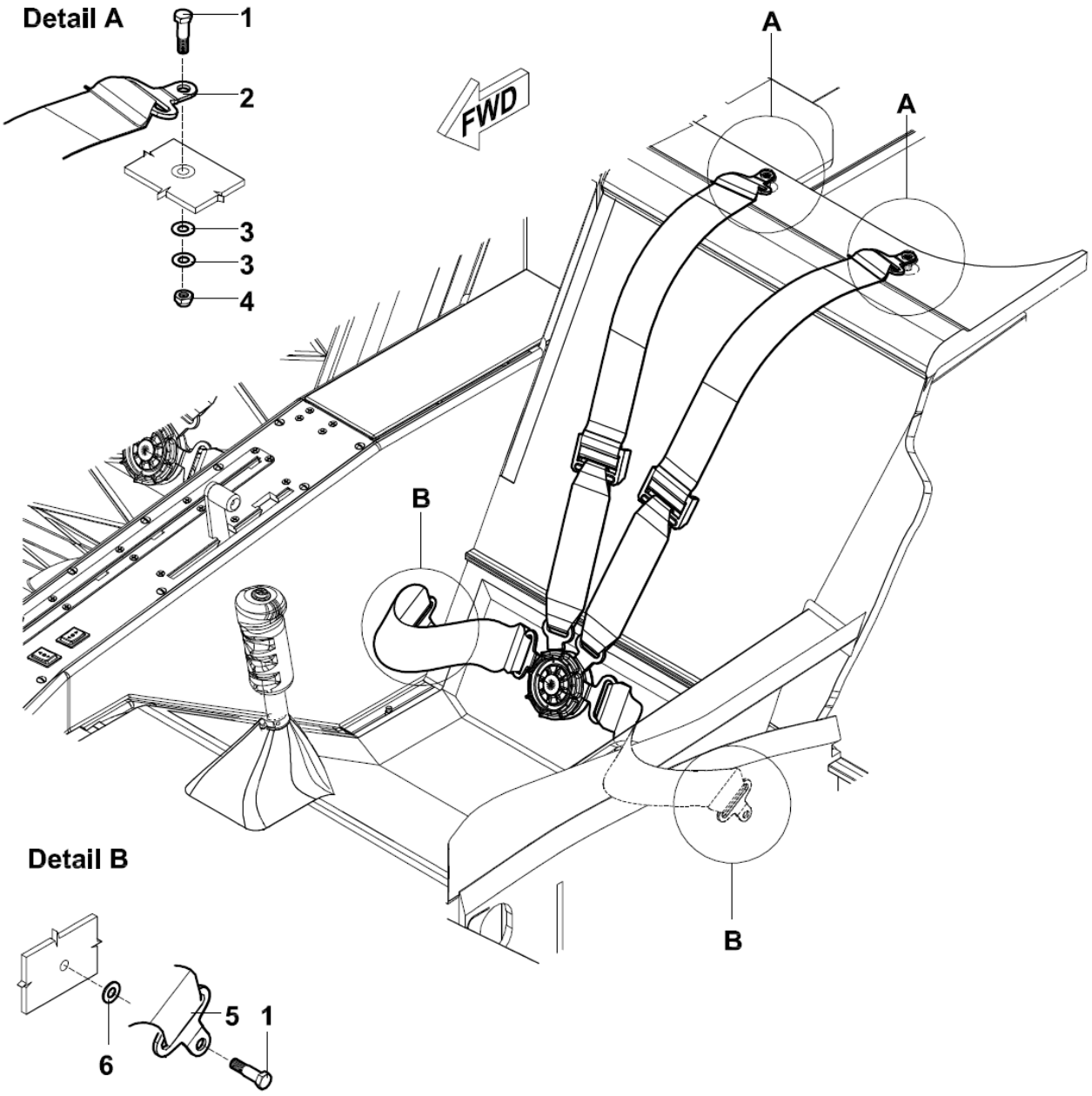
NOTE

Tighten bolts (1, Fig. 25-3) so that it is only possible to rotate belt brackets with force.

(a) Put the lap belt bracket (5) on the bolt (1), insert the washer (6) and install into the attachment bracket on side of the seat.

(b) Put the shoulder belt bracket (2) on the bolt (1), insert the bolt into the attachment bracket in the backrest, insert the washers (3), screw and tighten the nut (4).

(c) Install the seat upholstery (see par. 2.A.(2)).



1 – Bolt M8 x 32
2 – Shoulder belt bracket
3 – Washer ø8.4 x 24 x 2
4 – Self-locking nut M8
5 – Lap belt bracket
6 – Washer ø20 x 8 x 4

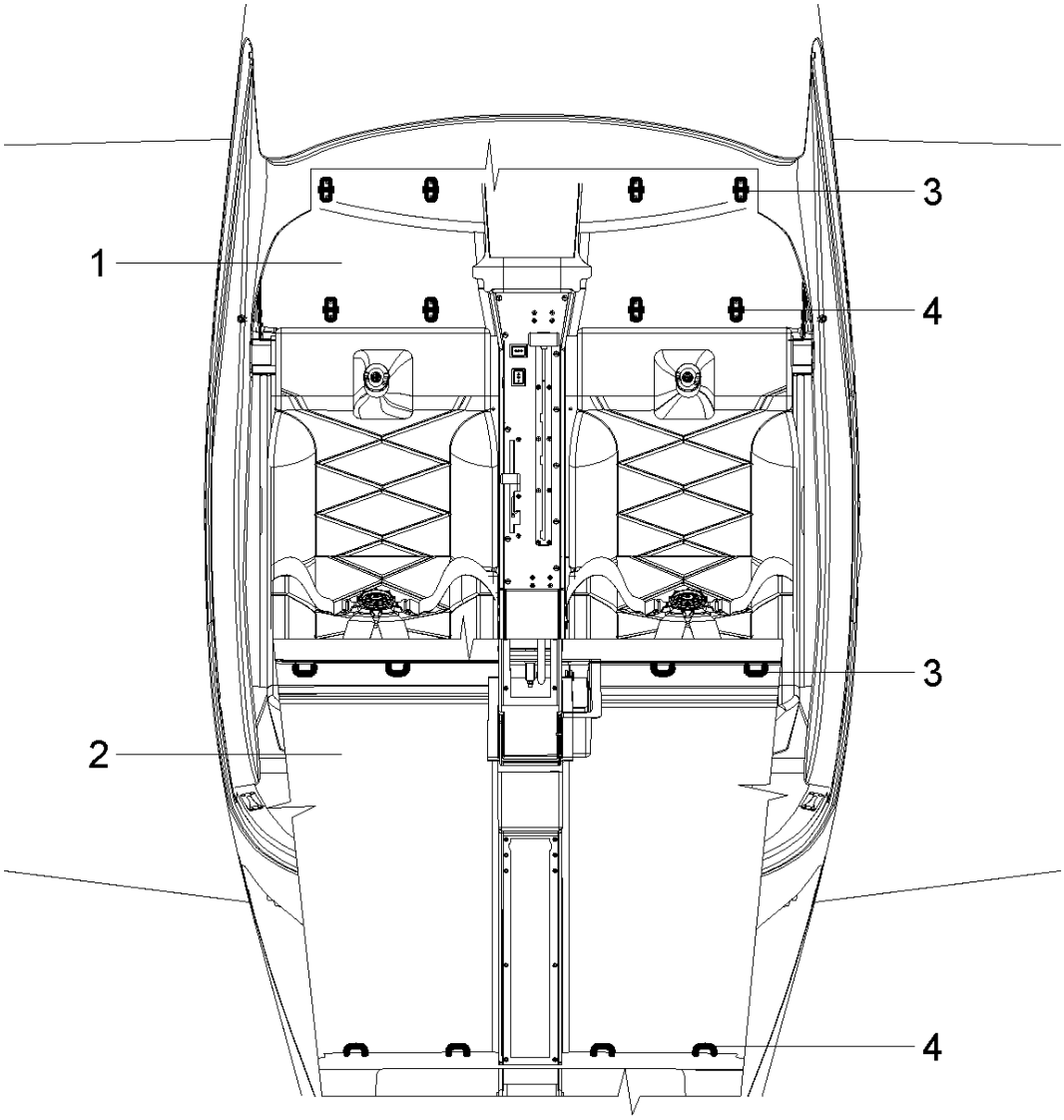
Fig. 25-3 Safety Harness Removal / Installation

25-50 CARGO COMPARTMENTS

1. DESCRIPTION

Front baggage compartment (1, Fig. 25-4) is located in front of main spar. Rear baggage compartment (2) is situated between backrest and baggage bulkhead. Central tunnel passes through the baggage compartment and divides it in two sections. Each section of baggage compartment has two front (3) and two rear (4) attaching points to which the baggage can be fixed with fastening straps and baggage net.

In the rear baggage compartment is located flap torsion tube equipped with a laminate cover (7; 8, Chapter 06-00, Fig. 06-4).



1 – Front baggage compartment
2 – Rear baggage compartment
3 – Front attaching points
4 – Rear attaching points

Fig. 25-4 Baggage Compartments

This page is left blank intentionally

25-60 EMERGENCY

1. DESCRIPTION

The aircraft is equipped with emergency parachute system (EPS) MAGNUM 601 S-LSA from the company STRATOS 07 spol. s r. o.

Parachute container (1, Fig. 25-5) is located behind instrument panel and is attached to the board. Two main straps (3) are attached to the stiffened areas at firewall and stabilizing strap is attached to the steel cable (5) (bonded in the structure of right fuselage shell). Main and stabilizing straps are through a carabine attached to the parachute strap.

Extraction device (rocket) (2) is attached in the laminate holders that are bonded to the firewall. It is connected with the parachute extraction cable. Rocket is connected to an actuator (4) installed at the central console by a Bowden cable. Actuator is secured by protector of EPS actuator from unintentional activation of rocket.

NOTE

For more details refer to “MANUAL FOR MOUNTING AND USE OF RESCUE BALLISTIC PARACHUTE SYSTEMS SERIES MAGNUM”, latest issue.

The aircraft is equipped with ELT KANNAD 406 AF-COMPACT / KANNAD AF INTEGRA.

The KANNAD 406 AF-COMPACT is a FAA TSO’d approved, EASA ETSO’d approved, 406 MHz, Automatic Fixed (AF) Emergency Locator Transmitter. The ELT KANNAD 406 AF-COMPACT can be activated either automatically when the crash occurs (by a shock sensor) or manually (by a switch on the transmitter itself or on a remote control unit on the instrument panel). The ELT transmits emergency signals on two frequencies:

- 406 MHz (Cospas-Sarsat frequency) for precise pinpointing and identification of the aircraft,
- 121.5 MHz used for homing in the final stages of the rescue operations.

The energy to the units is provided by a battery pack composed of a $LiMnO_2$ two-element battery. Until the battery expiry date, the duration of the 121.5 MHz transmission is over 48 hours at -20°C. As it is therefore preferable to keep the battery power for 121.5 MHz homing frequency transmission for the rescue operations, in compliance with Cospas-Sarsat specifications, the 406 MHz transmission is deliberately stopped after 24 hours to extend the 121.5 MHz transmission for as long as possible.

The ELT KANNAD 406 AF-COMPACT consists of the unit (6, Fig. 25-5) which is installed in the baggage compartment and the remote control unit which is installed on the right side of the instrument panel. The external antenna (7) is installed on the bracket on the right part of the fuselage behind the baggage compartment and is accessible through a baggage bulkhead cover access panel at the base of the baggage compartment bulkhead.

The KANNAD AF INTEGRA is a FAA TSO'd approved, EASA ETSO'd approved, 406 MHz, Automatic Fixed (AF) Emergency Locator Transmitter with G-Switch sensor. This ELT Transmitter has internal back-up antenna inside. Integra's internal antenna provide the unique ability to transmit and send both aircraft identification data and GPS position even when the crew remove it from the aircraft. The ELT KANNAD AF INTEGRA can be activated either automatically when the crash occurs (by a shock sensor) or manually (by a switch on the transmitter itself or on a remote control unit on the instrument panel). The ELT transmits emergency signals on two frequencies:

- 406 MHz (Cospas-Sarsat frequency) for precise pinpointing and identification of the aircraft,
- 121.5 MHz used for homing in the final stages of the rescue operations.

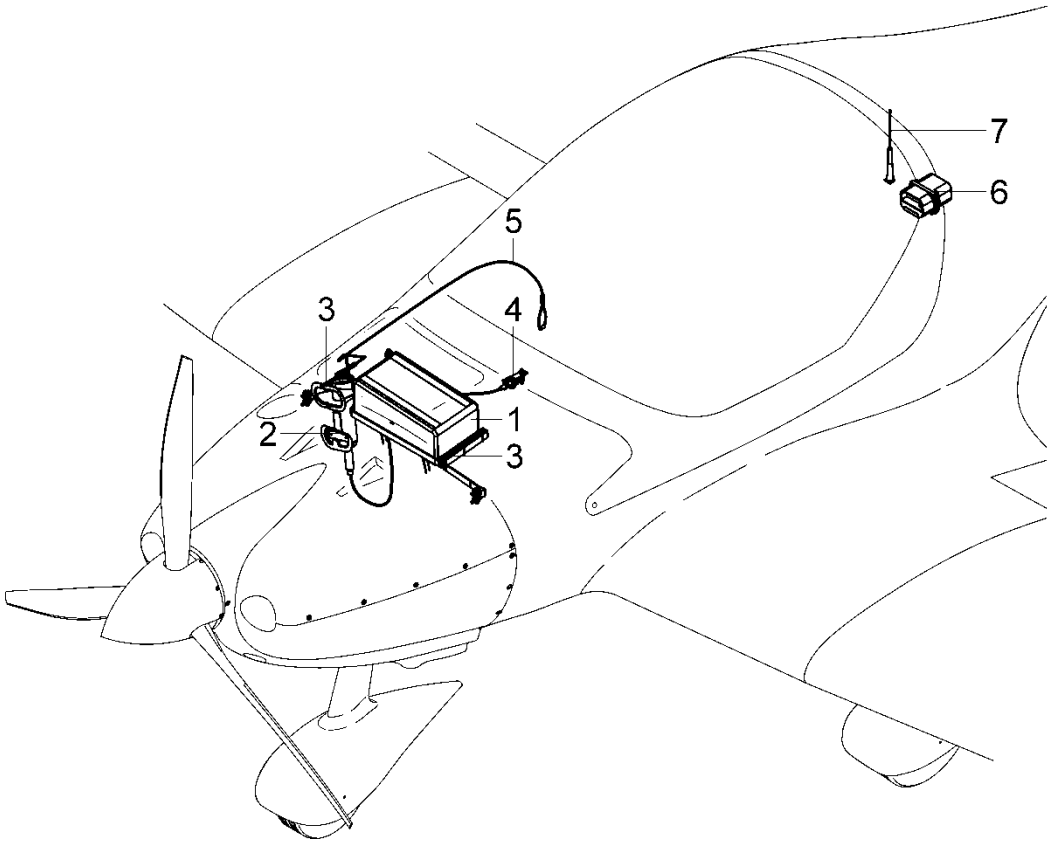
The energy to the units is provided by a battery pack composed of a $LiMnO_2$ two-element battery. Until the battery expiry date, the duration of the 121.5 MHz transmission is over 48 hours at -20°C. As it is therefore preferable to keep the battery power for 121.5 MHz homing frequency transmission for the rescue operations, in compliance with Cospas-Sarsat specifications, the 406 MHz transmission is deliberately stopped after 24 hours to extend the 121.5 MHz transmission for as long as possible.

The ELT KANNAD AF INTEGRA consists of the unit (6, Fig. 25-5) which is installed in the baggage compartment and the remote control unit which is installed on the right side of the instrument panel. The external antenna (7) is installed on the bracket on the right part of the fuselage behind the baggage compartment and is accessible through a baggage bulkhead cover access panel at the base of the baggage compartment bulkhead.

Wiring diagram of ELT´s are described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

NOTE

Refer to the Installation and Operation Manual ELT KANNAD 406 AF-COMPACT, Doc. No. DOC08038F (Revision 05 or later) / Initial Installation Manual KANNAD AF INTEGRA, Doc. No DOC09081E (Revision 04 or later) and Operation Manual KANNAD AF INTEGRA Doc. No DOC09078E (Revision 04 or later).



1 – Parachute
2 – Rocket
3 – Main strap
4 – Actuator
5 – Steel cable
6 – ELT unit
7 – ELT antenna

Fig. 25-5 Emergency Equipment

2. MAINTENANCE PRACTICES

A. Emergency parachute system

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 22	1 pc
Wrench 8	1 pc
Socket set 10, 17	1 pc
Hex key 3	1 pc
Screwdriver 10	1 pc
Knife	1 pc
Cooper wire ø0.5 mm with sealing	1 pc
Loctite 243	AR
Persons	1
Manual for Mounting and Use of Rescue Ballistic Parachute Systems Series Magnum	-

Tab. 25-3 Recommended tools, materials, persons and documentation

WARNING

DURING SERVICE AND REPAIR WORK BEWARE OF ACTIVATING THE BALLISTIC RECOVERY SYSTEM!

ENGINE IGNITION MUST BE SWITCHED OFF!

(1) Emergency parachute system removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove upper engine cowling (Chapter 71-10).

(c) Remove the bolts and the cover (7, Chapter 06-00, Fig. 06-3).

(d) Open parachute container (1, Fig. 25-7) and unscrew nuts on snap hooks (3; 4); disconnect parachute cable (15) from snap hook (4) and parachute strap (17) from snap hook (3).

NOTE

Be careful not to break the seal (16) when undoing small snap hook (4).

(e) Under rescue system board cut all ropes (18) and remove parachute container (1) from the aircraft.

(f) From engine compartment unscrew the nuts (26), remove washers (25) and pull out the U bolts (10) from interior.

(g) Cut cable ties (28) fixing the main straps (5; 7) and stabilizing strap (6) and remove the straps (5; 6; 7) from the aircraft.

(h) Remove cable ties (27) securing the bowden from actuator to rocket.

WARNING

DURING INCORRECT MANIPULATION WITH UNLOCKED ACTUATOR THERE IS A DANGER OF ROCKET ACTIVATION! AVOID OF ROUGH MANIPULATION IF ACTUATOR OR BOWDEN HAS JAMMED DURING REMOVING!

(i) Cut seal and open actuator protector (13).

(j) Unscrew bolts (21), and pull out lateral actuator handle (12).

(k) Unscrew bolts (20), remove actuator protector (13), Velcro strap and unlock actuator (11) by removing of lock (19).

(l) Very carefully remove actuator (11) from the rear of central instrument panel, simultaneously carefully pull out the bowden; after the actuator is removed, immediately lock the actuator using lock (19).

(m) Put the lateral actuator handle (12) back on and secure with bolts (21).

(n) Unscrew nuts (24), remove washers (22; 23), holder (9) and pull out rocket (2) with actuator (11).

(o) If necessary, disassemble the safety guard:

- Remove the cotter pin (31) and washer (33).
- Remove the pin (29), spring (30) and safety guard holder (32).

(2) Emergency parachute system installation:

(a) Before installation ensure, that the emergency parachute system actuator (11, Fig. 25-7) is locked!

(b) Insert the rocket (2) with bowden, from cockpit through opening of rescue system board; put washers (23), rocket (2), holder (9), washers (22) and tight nuts (24).

(c) Thread the bowden under right push rod of nose steering.

NOTE

Min. radius of bowden has to be 140 mm.

(d) Use cable ties (27) to attach bowden to fuel hose and to bowden harness.

WARNING

DURING INCORRECT MANIPULATION WITH UNLOCKED ACTUATOR THERE IS A DANGER OF ROCKET ACTIVATION! AVOID OF ROUGH MANIPULATION IF ACTUATOR OR BOWDEN HAS JAMMED DURING INSTALLATION!

(e) Unscrew bolts (21) and unscrew lateral actuator handle (12).

(f) Unlock actuator (11) by removing of lock (19) and carefully insert handle to central instrument panel from the rear side; immediately lock the actuator using lock (19). Stick on Velcro fastener.

(g) If necessary, assemble the safety guard:

- Place the actuator protector (13) and spring (30) to the holder (32).
- Install pin (29), washer (33) and cotter pin (31).

(h) Place the assembled safety guard (13) and screw on bolts (20); secure with Loctite 243.

(i) Put lateral handle (12) and tighten the bolts (21); secure with Loctite 243.

(j) Close actuator protector (13) and secure it with copper lockwire and seal.

(k) Pass strap (6) through cable (8) and pull tight (Fig. 25-6).

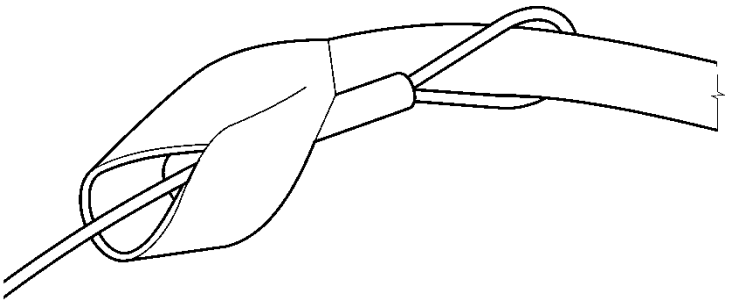


Fig. 25-6 Strap Pass through Cable

(l) Properly loop straps (5; 6; 7, Fig. 25-7) and secure them with cable ties (28); do not secure straps to aircraft yet.

NOTE

If the straps are still looped, it is not necessary repack again.

(m) Connect U bolt (10) to strap loop (5); secure loop with cable tie (28).

(n) Attach U bolt with strap to left side of firewall, put washers (25) and tighten the nuts (26).

(o) Route strap (5) **over all cables and bowdens** to right side of aircraft.

(p) Secure looped strap (5) to rescue system board with one cable tie (28).

(q) Connect second U bolt (10) to second strap loop (7); secure loop with cable tie (28).

(r) Attach U bolt with strap to right side of firewall, put washers (25) and tighten nuts (26).

(s) Pass ropes (18) through loops on the parachute container (1) and place parachute container (1) on rescue system board. Strap (5) must be routed between parachute container (1) and firewall. Securing ropes (18) pass through holes in rescue system board, tie and cut off the surplus.

(t) Connect strap loops (5; 6; 7) with big snap hook (3); secure snap hook with Loctite 243.

(u) Connect parachute cable (15) and cable of rocket (14) with small snap hook (3); secure snap hook with Loctite 243. Close the flap on the parachute container (1).

(v) Secure straps (6; 7) to rescue system board with one cable tie (28).

(w) If is needed, secure all straps and wires with necessary amount of cable ties (28).

(x) Install cover (7, Chapter 06-00, Fig. 06-3) and tighten bolts.

(y) Install upper engine cowling (Chapter 71-10).

(z) Carry out test and check:

- If all bolt connections are tight.
- That all nuts are tight.
- If straps are properly aligned.
- If handle is properly locked.
- If components of ballistic rescue system are secured.
- Equal division of the threads on the push rods.
- That no foreign objects remain in the aircraft.

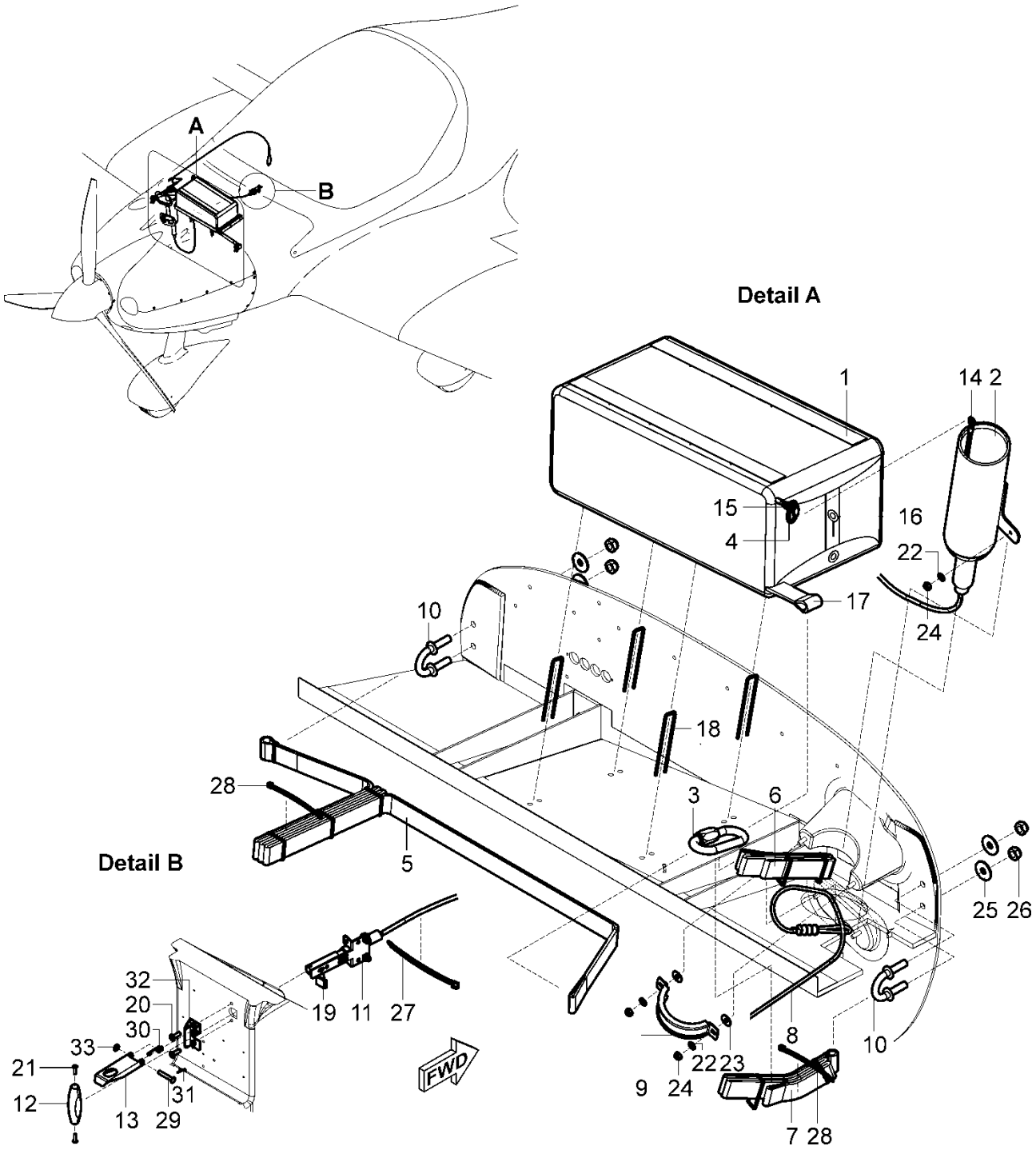


Fig. 25-7 Emergency Parachute System Removal / Installation (page 1 of 2)

1 – Parachute container	12 – Lateral actuator handle	23 – Washer ø6.4 x 18 x 0.6
2 – Rocket	13 – Actuator protector	24 – Self-locking nut M6
3 – Big snap hook	14 – Cable of rocket	25 – Washer ø10.5 x 30 x 2.4
4 – Small snap hook	15 – Parachute cable	26 – Self-locking nut M10
5 – Left strap 2.4 m	16 – Seal	27 – Cable tie 3.2
6 – Stabilizing strap 1 m	17 – Parachute strap	28 – Cable tie 2.6
7 – Right strap 2.4 m	18 – Rope ø3 x 400 guaranteed strength 180 daN (kg)	29 – Pin ø 5
8 – Cable	19 – Lock	30 – Spring
9 – Holder	20 – Hex bolt M5 x 16	31 – Cotter pin 1.2 x 10
10 – U bolt	21 – Allen bolt M4 x 10	32 – Safety guard holder
11 – Actuator	22 – Washer ø6.4 x 12 x 0.6	33 – Washer ø5.3 x 10 x 1

Fig. 25-7 Emergency Parachute System Removal / Installation (page 2 of 2)

B. Emergency locator transmitter (ELT)

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 3/4 in	1 pc
Wrench 5.4	1 pc
Philips screwdriver	1 pc
Persons	1

Tab. 25-4 Recommended tools, materials, persons and documentation

(1) ELT unit removal:

(a) Set switch on the unit to **OFF** position.

(b) Disconnect connectors (4, Fig. 25-8) from the unit.

(c) Unfasten the self-stripping strap (3).

(d) Remove the unit (1) from the bracket (2).

(2) ELT unit installation:

(a) Install the unit (1, Fig. 25-8) on the bracket (2) with "Flight direction" arrow pointed towards the front of the aircraft.

(b) Slide the self-stripping strap (3) through the buckle. Ensure the buckle is correctly positioned (indifferently on right or left side of ELT) regarding the horizontal center line of ELT.

(c) Fasten the self-stripping strap (3) tightly.

CAUTION

INCORRECT TIGHTENING OF THE HOOK AND LOOP FASTENER COULD LEAD TO AN UNSAFE SITUATION BY THE ELT PREVENTING THE TRANSMISSION OF THE DISTRESS MESSAGE. ONCE INSTALLED IN THE MOUNTING BRACKET, THE INSTALLER MUST BE SURE THAT THE TRANSMITTER IS FIRMLY ATTACHED IN ITS BRACKET BY TRYING TO EXTRACT IT MANUALLY, THEREBY VERIFYING THERE IS NO PLAY AND THAT IT REMAINS ATTACHED WHEN EXTRACTION FROM THE BRACKET IS ATTEMPTED.

(d) Connect connectors (4) to the unit.

(e) Carry out a first power up - refer to the Installation and Operation Manual ELT KANNAD 406 AF-COMPACT, Doc. No. DOC08038F (Revision 05 or later) / Initial Installation Manual KANNAD AF INTEGRA, Doc. No DOC09081E (Revision 04 or later) and Operation Manual KANNAD AF INTEGRA Doc. No DOC09078E (Revision 04 or later).

(3) ELT antenna removal:

(a) Set switch on the unit to **OFF** position.

(b) Remove the baggage bulkhead cover (13, Chapter 06-00, Fig. 06-4).

(c) Disconnect the connector (2, Fig. 25-9) from the antenna.

(d) Unscrew the nut (3), remove the washer (4) and the antenna (1).

(e) Install the protective cover on the antenna connector.

(4) ELT antenna installation:

(a) Perform ELT programming (as required) and check battery expiration.

(b) Remove the protective cover from the antenna connector.

(c) Insert the top of the antenna (1, Fig. 25-9) to the hole of the foam block (6) and its bottom in the bracket.

(d) Insert the washer (4), screw and tighten the nut (3) to torque from 2.8 to 3.4 Nm.

(e) Connect the connector (2) to the antenna (4).

(f) Perform the measurement of SWR and check that coax cable is not short circuited.

(g) Install the baggage bulkhead cover (Chapter 06-00).

(h) Carry out an operational test - refer to the Installation and Operation Manual ELT KANNAD 406 AF-COMPACT, Doc. No. DOC08038F (Revision 05 or later) / Initial Installation Manual KANNAD AF INTEGRA, Doc. No DOC09081E (Revision 04 or later) and Operation Manual KANNAD AF INTEGRA Doc. No DOC09078E (Revision 04 or later).

(5) ELT battery replacement:

ELT KANNAD 406 AF COMPACT: The transmitter battery expiration date is fixed at 6 years after manufacturing. If no activation of the ELT occurs during the battery lifetime, it shall be replaced 6 years after date of manufacture.

ELT KANNAD AF INTEGRA: The transmitter battery expiration date is fixed at 7 years after manufacturing. If no activation of the ELT occurs during the battery lifetime, it shall be replaced 7 years after date of manufacture.

Battery replacement is mandatory:

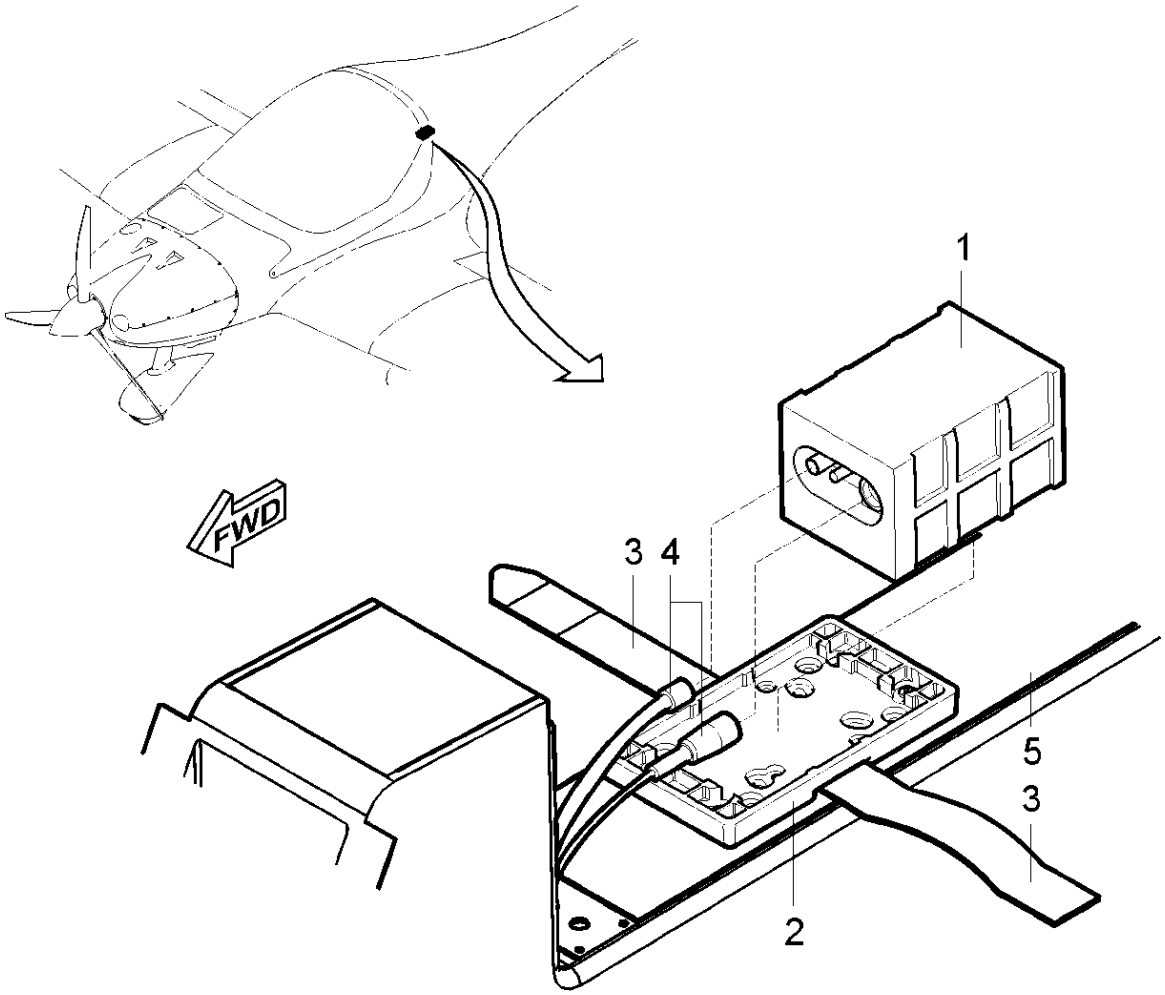
- after more than 1 hour of real transmission (cumulated duration);
- before or on the battery expiration date;
- after activation in emergency;
- after an accidental activation with unknown time duration;

CAUTION

ONLY ORIGINAL AND APPROVED BATTERY PACK INCLUDED IN BATTERY KIT BAT200 (P/N S1840510-01) SUPPLIED BY OROLIA S.A.S. CAN BE INSTALLED [SAFT-FRIWO, LITHIUM MANGANESE DIOXIDE, 2 x M20 (D-TYPE) CELLS].

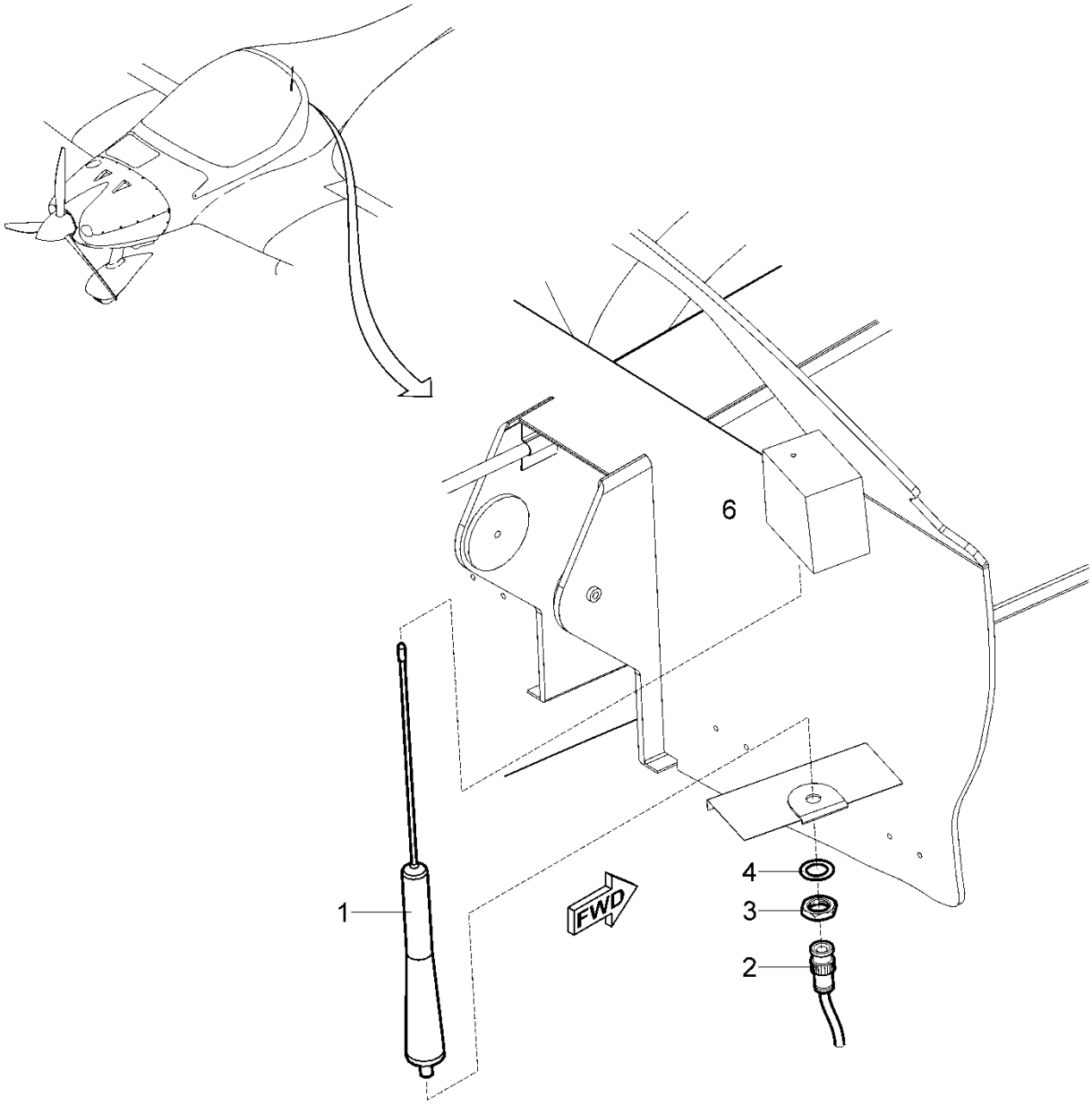
NOTE

For battery replacement – refer to the Installation and Operation Manual ELT KANNAD 406 AF-COMPACT, Doc. No. DOC08038F (Revision 05 or later) / Initial Installation Manual KANNAD AF INTEGRA, Doc. No DOC09081E (Revision 04 or later) and Operation Manual KANNAD AF INTEGRA Doc. No DOC09078E (Revision 04 or later).



1 – ELT unit
2 – Mounting bracket
3 – Self-stripping strap
4 – Connectors
5 – Central tunnel

Fig. 25-8 ELT Transmitter Removal / Installation



1 – ELT antenna
2 – Connector
3 – Nut
4 – Serrated washer

For information:
5 – Bracket
6 – Foam block

Fig. 25-9 ELT Antenna Removal / Installation

This page is left blank intentionally

27 FLIGHT CONTROLS

CONTENTS

Chapter	Description	Page
27-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. MAINTENANCE PRACTICES	3
	A. General principles	3
	3. ADJUSTMENT / TEST	4
	A. Values for deflection adjustment	4
	4. INSPECTION / CHECK	5
	A. Check of plays in flight controls	5
27-10	**AILERON AND ROLL TRIM**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	9
	A. Aileron control	9
	B. Torsion tube with control sticks	14
	C. Roll trim system	18
27-20	**RUDDER**	**19**
	1. DESCRIPTION	19
	2. MAINTENANCE PRACTICES	21
	A. Control cables	22
	B. Remote control of pedals	26
	C. Foot control	28
27-30	**ELEVATOR AND PITCH TRIM**	**33**
	1. DESCRIPTION	33
	2. MAINTENANCE PRACTICES	35
	A. Push rods and levers	35
	B. Pitch trim system	41
	C. Bob weight	45

27-50 FLAPS 47

1. DESCRIPTION 47
2. MAINTENANCE PRACTICES 49
   - A. Flap control system 49
   - B. Pedestal panel 54

27-00 GENERAL

1. INTRODUCTION

This chapter describes operation and the adjustment of the flight controls. It also describes the assembly of the flight controls. Refer to the related chapter for the data on a specified system.

The aircraft is equipped with dual control systems for elevator, ailerons and rudder.

2. MAINTENANCE PRACTICES

A. General principles

WARNING

FOR CONNECTING THE ROTARY-MOVABLE PARTS OF THE FLIGHT CONTROLS, THE SELF-LOCKING NUTS ARE PROHIBITED TO BE USED.

AT INSTALLATION USE ALWAYS NEW AND UNDAMAGED LOCKING ELEMENTS (COTTER PINS, LOCK WASHERS, SELF-LOCKING NUTS, etc.).

At removals / installations adhere to general principles which are applicable to all flight controls:

All bearings, ground surfaces of bolts and other moving parts of the flight controls have to be greased (Chapter 12–20).
Friction surfaces of the ball joint bearings and sliding bearings have to be lubricated before installation (Chapter 12–20).

Threaded parts of adjustable bearing ends and forks of all control push-pull rods have to be screwed-in so that they cover the check holes in control pull rods ends. So the minimum length of bearing end or fork threaded parts screwing in the control pull rods, i.e. min. 10 mm (0.39 in), is ensured.

The ball join bearings and the ball bearings must rotate freely without any jamming or excessive resistance.

Bolted joints, serving for connection of two each other movable parts of the aircraft flight controls, should be tightened carefully with the wrench or only with hand. The bolted joint is tightened only to eliminate axial plays of the connection.

Immediately after tightening of each bolted joint, secure it with the castellated nut, the cotter pin or the locking pin and check the joint for movability and its axial play.

After removal and installation of the flight control parts and prior to returning the aircraft to operation, check always all the flight control parts, which were subject of your handling, for proper safety.

Orientation of bolts, locking pins and cotter pins:
Mount the bolts into joints according to the rule – from above downwards or from the front backwards (considering the flight direction). If this principle is observed, spontaneous dropping out the bolt from the joint is so precluded in

case of unlocking, unscrewing and dropping out the nut during operation. Use the same principle also when securing the nuts with locking pins or cotter pins.

After installing control elements, always check them for free motion without any jamming and verify proper safety of all nuts and bolts.

Prior to installing new push-pull rods, adjust their lengths to correspond to their nominal sizes.

In the whole operating range of the flight controls there must be kept the specified play between the structure and those movable parts of the control, at which their motion could be blocked.

3. ADJUSTMENT / TEST

A. Values for deflection adjustment

WARNING

NON-OBSERVANCE OF CONTROL SURFACES, WING FLAPS OR TRIM TABS SPECIFIED DEFLECTIONS CAN NEGATIVELY INFLUENCE THE FLIGHT CHARACTERISTICS OF THE AIRCRAFT.

The control systems have specified deflections that must be always kept in the course of the aircraft operation. After replacing the control system parts, after adjusting the cable tension and in other necessary cases, the deflections of control surfaces and wing flaps must be checked and adjusted as required. The procedures for adjusting the control surfaces and wing flaps are provided in the appropriate sections, which describe the individual flight control systems. The values for checks and adjusting of control surfaces and wing flaps deflections are given in appropriate chapters.

4. INSPECTION / CHECK

A. Check of plays in flight controls

At the aircraft operation the flight control and elements become worn-out under the influence of loading, vibrations etc. This wear is shown by increase of plays. When the maximum allowable operating play is reached, the worn-out parts (bearings, bolts, pins, guides etc.) must be replaced.

SYSTEM	PROCEDURE TO FIND A PLAY	PROCEDURE TO REMEDY A PLAY	MAX. PRODUCT PLAY	MAX. OPERATION PLAY
Ailerons control system	Fix ailerons in neutral position. Move the control stick to the left and right to find possible plays. Move the control stick to the end stops. Move the ailerons to find possible plays.	Check condition of bearings and replace if necessary.	2 mm / 0.078 in	5 mm / 0.197 in
Elevator control system	Fix elevator in neutral position. Move the control stick forward and backward to find possible plays. Move the control stick to the end stops. Move the elevator to find possible plays	Check condition of bearings and replace if necessary.	2 mm / 0.078 in	5 mm / 0.197 in
Flaps control system	Extend the flaps and move the flap trailing edge in the root section up and down to find possible plays. Perform for each position of flaps.	Check condition of slots at the top of central tunnel. Check the condition of bearings and replace if necessary.	2 mm / 0.078 in	5 mm / 0.197 in
Ruder control system	Fix the nose wheel and move the pedals. Fix the pedals and move with rudder left/right) and forward/backward.	Check the rudder hinges play. Check the conditions of bearing eyes of push-pull rods. and tension of control cables.	1 mm / 0.039 in	2 mm / 0.078 in

Tab. 27-1 Maximum Permissible Plays

This page is left blank intentionally

27-10 AILERON AND ROLL TRIM

1. DESCRIPTION

Ailerons are controlled through the control sticks, attached to the control stick's torsion tube (7, Fig. 27-1). Movement from control sticks is transferred to the ailerons through the push-pull rod 1 (1), push-pull rod 2 (2), bellcrank (3) and push-pull rod 3 (4).

Push-pull rods 1 are equipped with adjustable bearing eye at one and revolving fork at the other. Push-pull rods 2 are equipped with adjustable bearing eyes on both ends and are guided in two guide bearings (6) in the wing (in the root rib and support rib). Bellcranks are fitted with bearings and fixed in the consoles that are attached to the main wing spar. Bellcranks provide necessary differentiation of the ailerons deflections. The deflections of the ailerons are differentiated 1:1.6.

Push-pull rods 3 are equipped with adjustable bearing eyes on both ends and are connected to the lever (6) on the aileron root ribs.

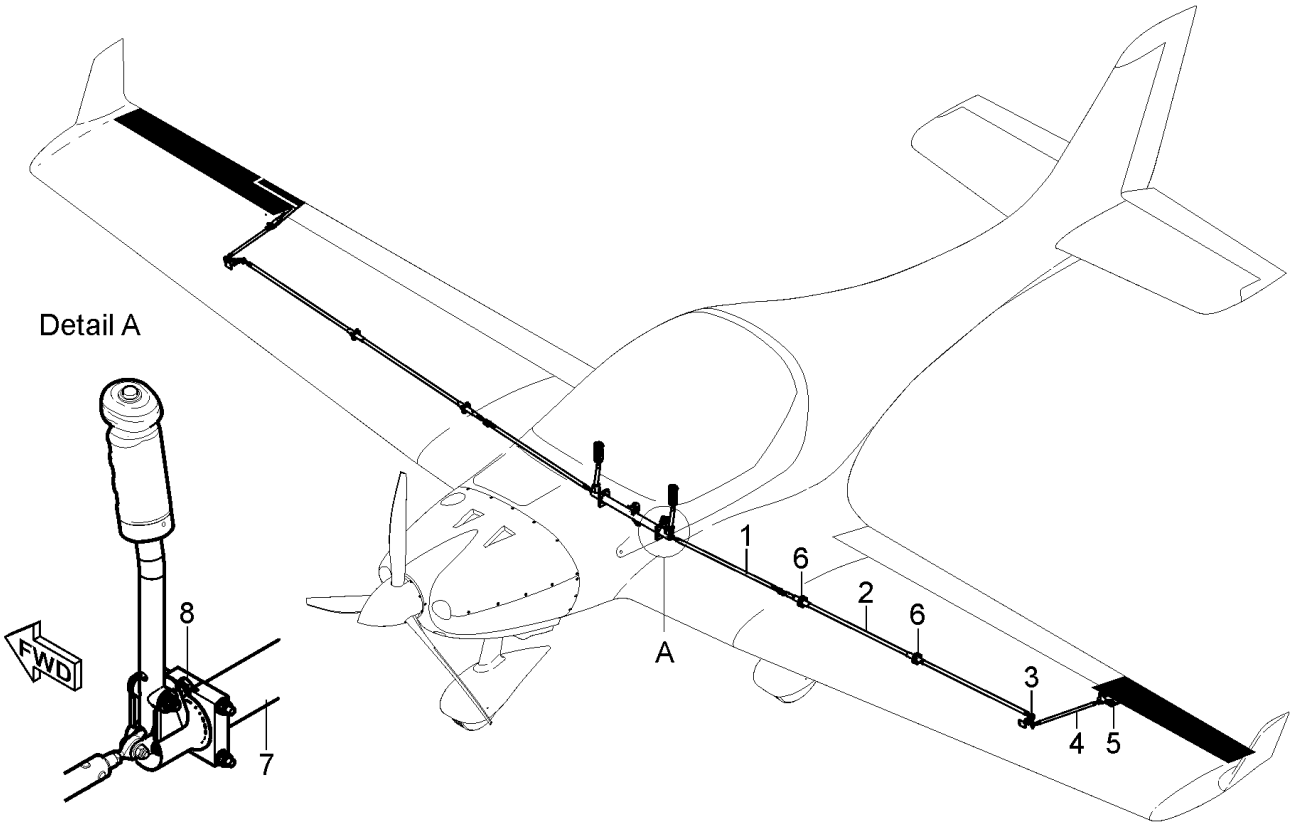
Range of aileron control movement is limited by stops (8) on the control stick’s torsion tube (7).

Roll trim tab is located only on the right aileron. The tab is operated through actuator installed in the aileron and controlled with rocker switch installed on the pedestal panel. Actuator and tab are interconnected with push-pull rod.

Trim tab position is displayed on the EFIS.

The only left handle is equipped with a control stick shaker that is part of stall warning system (Chapter 31-50).

Wiring diagram of aileron trim is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).



1 – Push-pull rod 1
2 – Push-pull rod 2
3 – Bellcrank
4 – Push-pull rod 3
5 – Lever
6 – Guide bearing
7 – Torsion tube
8 – Stop

Fig. 27-1 Aileron Control System

2. MAINTENANCE PRACTICES

A. Aileron control

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Special wrench 10 (see Fig. 27-2)	1 pc
Wrench 9	1 pc
Socket set 10	1 pc
Ruler 20 cm	1 pc
Protractor with deflecting pointer	1 pc
Vaseline	1 pc
Serrated locking washer ø6.4	AR
Persons	2

Tab. 27-2 Recommended tools, materials, persons and documentation

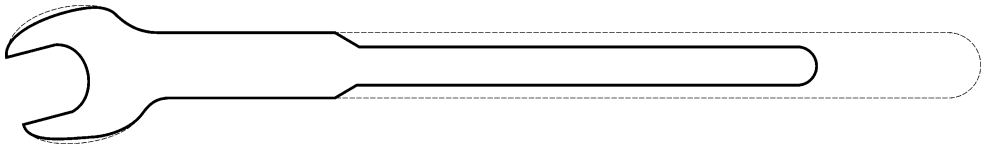


Fig. 27-2 Special Wrench

(1) Aileron control removal:

(a) Remove transparent cover (9, Chapter 06-00, Fig. 06-3) located on wing's bottom surface.

(b) Disconnect the push rod (3, Fig. 27-3) from the bellcrank (4), by removing nut (13), washers (15; 5) and bolt (10).

(c) Disconnect the push rod (3) from the aileron root rib (20) by removing nut (13), washers (15; 17) and bolt (11).

NOTE

Use special wrench (Fig. 27-2) for disconnecting push rod (3) from aileron.

(d) Remove wing (Chapter 57-10).

(e) Disconnect the push rod (2, Fig. 27-3) from the bellcrank (4), by removing nut (13), washers (15; 5) and bolt (10); disconnect ground wires (28, 29).

(f) Disconnect the push rod (1) from the control stick (21), by removing nut (13), washer (15), ground wire (30) and bolt (8).

(g) Remove the bellcrank (4) from bracket (26), by removing nut (13), washer (17) and bolt (11).

(2) Aileron control installation:

(a) Thoroughly clean and lubricate all the aileron movable points and other movable parts with Vaseline before each assembling (Chapter 12-20).

(b) Before assembling check push rods for cracks and condition of rivets. Check parallel alignment of swivel bearings (19, Fig. 27-3); on new push rods, release locking nuts (12) and use new washers (16).

(c) In maintenance hole on wing, attach bellcrank (4) to bracket (26), using bolt (11), washer (17) and nut (13); check free movement.

(d) Connect push rod (3) to bellcrank (4), using bolt (10), washers (5; 15) and nut (13).

(e) Connect ground wire (28) to ground wire (29).

(f) Connect push rod (3) to aileron using bolt (11), washers (15; 17) and nut (13); if using a new push rod (3):

- Adjust length of push rod (3) so that the lower deflection of the aileron at the tip is 65 mm; at this point the aileron bellcrank (4) must be touching the spar web.

NOTE

Use special wrench (Fig. 27-2) to attach push rod (3) to aileron.

(g) Slide the push rod (2) through the hole in the wing root. Connect push rod (2) to bellcrank (4) using bolt (10), washers (15; 5) and nut (13).

(h) Slide the push rod (1) through centre wing root hole. Connect push rod (1) to control stick using bolt (8), ground wire (30), washer (17) and nut (13).

(i) Attach the wing (Chapter 57-10); if using new push rod(s) (1; 2):

- Align aileron trailing edge with wing trailing edge and fix them.
- Set control sticks vertical.
- Adjust lengths of push rods (1; 2) so it is possible to connect them with bolt (9).
- Loosen aileron, leave control stick fixed.

(j) Connect push rod (1) with push rod (2) using bolt (9), washer (15), nut (14) and safety pin (18); connect ground wire (32) to wire (27).

(k) Set control sticks vertical.

(l) Adjust length of push rod (3), to align aileron upper trailing edge with wing bottom trailing edge.

(m) Screw new push rods to distribute equal lengths of threads. Tighten every lock nut (12). Check parallel alignment of swivel bearings (19).

(n) Install transparent cover (9, Chapter 06-00, Fig. 06-3) using silicone glue and white adhesive tape.

(o) Carry out test and check:
- That the castle nuts are secured with cotter pins.
- If all bolt connections are tight.
- That all lock nuts are tight.
- Free movement of aileron control system.
- Alignment of the trailing edge of aileron and wing.
- Neutral position and max. deflections.
- Equal division of the threads on the push rods.
- That no foreign objects remained in the aircraft.

(3) Adjustment / test - aileron deflections:

Both ailerons must be adjusted simultaneously. Described is adjusting of one side.

CONTROL SURFACE DEFLECTIONS			
Control surface	Up	Down	Distance measurement point from the point of rotation
Aileron	25 ±2°	15 ±2°	252 mm
	106 ±4 mm	65 ±4 mm	

Tab. 27-2 Aileron Deflections

(a) Remove laminated seats (Chapter 25-10).

(b) Put protractor on trailing edge of aileron root.

(c) Set the aileron to neutral position.

(d) Set the protractor to 0°- starting value for measuring.

(e) Deflect aileron to the lower (possibly upper) extreme position and read the deflection value.

(f) Check deflection values in accordance with Tab. 27-2.

(g) If deflections are not within range listed in Tab. 27-2, screw stop bolts (7, Fig. 27-3) at torsion tube of control stick to adjust correct deflections.

(h) Carry out test and check:
- Deflections of ailerons.
- If all lock nuts are tight.
- That no foreign objects remain in the aircraft.

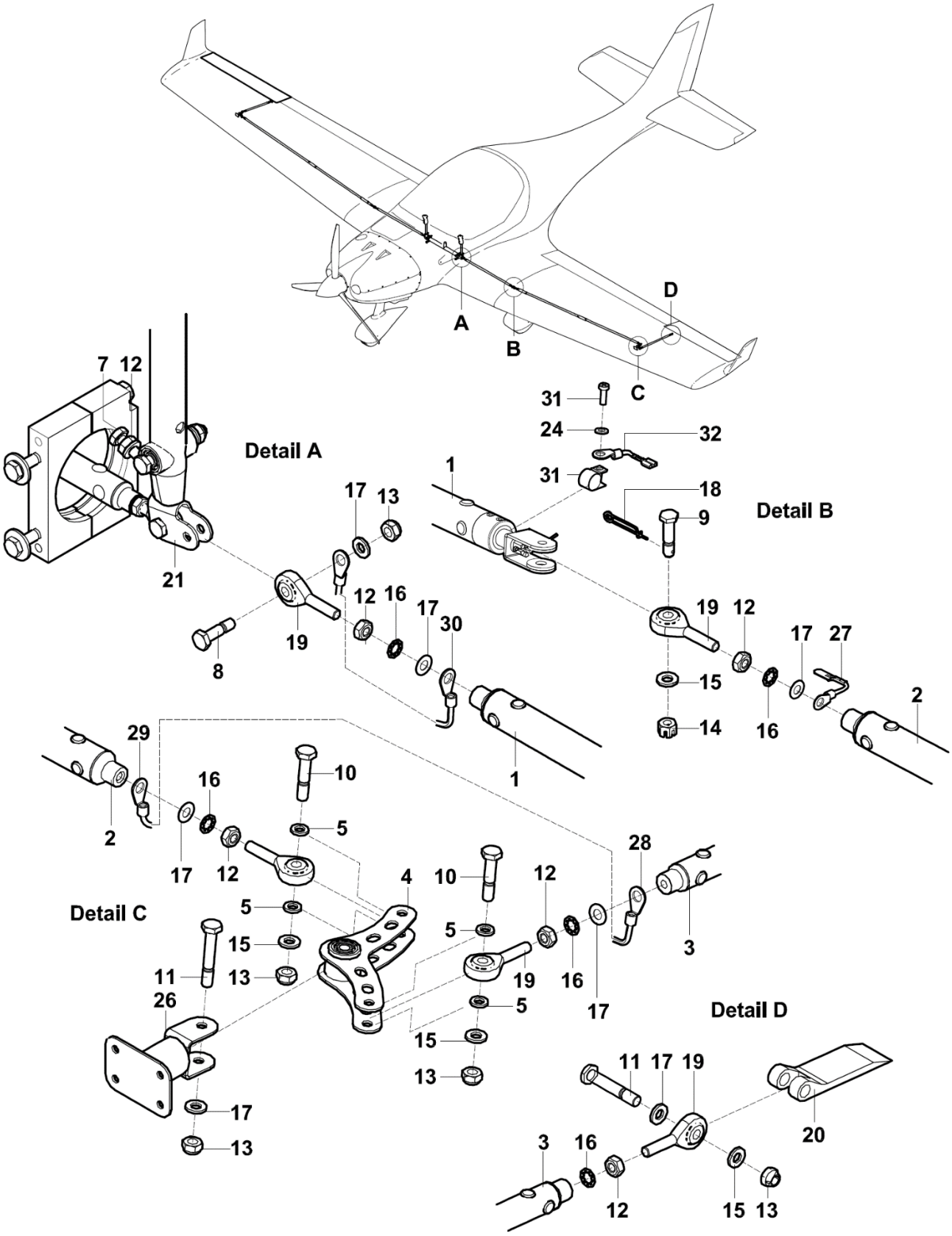


Fig. 27-3 Aileron Control Removal / Installation (page 1 of 2)

1 – Push-rod 1
2 – Push-rod 2
3 – Push-rod 3
4 – Bellcrank
5 – Washer ø6.4 x 10 x 1.6
6 – Washer ø6.4 x 10 x 0.5
7 – Bolt M6x16
8 – Bolt M6x22
9 – Bolt M6x25
10 – Bolt M6x28
11 – Bolt M6x36
12 – Nut M6
13 – Self-locking nut M6
14 – Castle nut M6
15 – Washer ø6.4 x 12 x 1.6
16 – Serrated locking washer ø6.4
17 – Washer ø6.4 x 12 x 0.5
18 – Safety-pin ø1.4 x 20
19 – Swivel bearing
20 – Aileron root rib
21 – Control stick
22 – Fork
23 – Castle nut M6
24 – Washer ø4.3 x 9 x 0.8
25 – Cotter pin 1.6 x 25
26 – Bracket
27 – Ground wire
28 – Ground wire
29 – Ground wire
30 – Ground wire
31 – Clamp
32 – Ground wire

Fig. 27-3 Aileron Control Removal / Installation (page 2 of 2)

B. Torsion tube with control sticks

(1) Torsion tube with control sticks removal:

(a) Remove laminated seats (Chapter 25-10).

(b) Remove pedestal panel (Chapter 27-50, 2.B.(1)).

(c) Disconnect ailerons push-pull rods (1, Fig. 27-3) from both control sticks (21) by removing nut (13), washer (17), ground wire (30) and bolt (8).

(d) Disconnect elevator control push-pull rod 1 (1, Fig. 27-11) from torsion tube (21), by removing nut (16), washer (12) and bolt (11) (Chapter 27-30, 2.A.(1)).

(e) Disconnect bob weight push-pull (3, Fig. 27-15) from torsion tube (11), by removing nut (5), washer (8) and bolt (9) (Chapter 27-30, 2.C.(1))

(f) On control sticks, pull out and unsolder wires from left handle with control stick shaker (4) (Chapter 31-50) and from PTT buttons (25) (Chapter 23-50).

(g) Remove aft part of bushing (8, Fig. 27-4) from left and right side of torsion tube (6), by unscrewing bolts (16) and removing washers (21; 23) and ground wire (12) from right part of bushing.

(h) If necessary, remove front part of bushing (7) from left and right side of main beam by unscrewing bolts (15) and removing washers (22; 23).

(i) Pull and remove torsion tube (6) with control sticks through opening in central tunnel.

NOTE

Control stick assembly is composed from items No. 2; 4; 13; 25 for left stick and No. 3; 5; 13; 25 for right stick. Left handle (4) is equipped with a stick shaker.

(j) Remove left handle with stick shaker (4) and right handle (5), by unscrewing hexagon head bolt (13).

NOTE

It may be necessary to use bigger force.

(k) Disconnect connecting push rod (1) from a control sticks (2; 3), by removing nuts (19), washers (20), ground wire (10) and bolts (9).

(l) Disconnect left control stick (2) from torsion tube (6) by unscrewing nut (19), washer (20) and bolt (17).

(m) Disconnect right control stick (3) from torsion tube (6) by unscrewing nut (19), washer (21), ground wire (12) and bolt (17).

(n) If necessary, remove stop bolts by releasing nut (18) and unscrew bolt (14).

(2) Torsion tube with control sticks installation:

(a) Before assembling check push rods for cracks and condition of rivets. Check parallel alignment of swivel bearings; on new push rods, release lock nuts.

(b) Assemble connecting push rod (1, Fig. 27-4) with control sticks (2; 3) and torsion tube (6), using bolts (9; 17), washers (20, 21), ground wires (10) and nuts (19). Check free movement of control sticks. If using new connecting push rod:

- Adjust the length by screwing bearings ending (24) so that the distance between tops of control sticks (2; 3), is the same as the distance between bolts (15) connecting control sticks (2; 3) with torsion tube (6) (575 mm).
- Use new washers (23) and tighten nuts (18).
- If using new torsion tube (6):
- Screw aileron stop bolts (14) with nuts (18).

(c) Put torsion tube (6) through the hole on the central tunnel.

(d) If previously removed, install front part of bushing (7) on left and right side of main beam using washers (22; 23) and screwing bolts (15).

(e) Insert torsion tube (6) into front bushings, put aft part of bushing (8) using washers (21, 23) and screwing bolts (16). Put ground wire (12) under washers (21, 23) and bolt (16) in bottom part of right aft bushing (8).

(f) Put the PTT buttons (25) on the top of left handle with stick shaker (4) and right handle (5). Route wires through the control sticks and solder the wires to left handle with control stick shaker (4) (Chapter 31-50) and to PTT buttons (25) (Chapter 23-50).

(g) Put the left (4) and right (5) handles on the control sticks and screw hexagon head bolt (13).

(h) If necessary, install stop bolts:

- Screw front stop bolt (29, Fig. 27-11) with nut (28).
- Slide the rear stop of elevator (25) into central tunnel, put bolt (30), washer (31) and screw the nut (32).
- Screw the rear stop bolt (26) on rear stop of elevator (25) with washer (12) and nut (17).
- Adjust stop bolts (14, Fig. 27-4).
- Install the pedestal panel (Chapter 27-50, 2.B.(2)).

(i) Carry out test and check:

- That the castle nuts and pins are secured with cotter pins.
- If all bolt connections are tight.
- Plays.
- Free movement of elevator control system.
- Neutral position and max displacements.
- Equal division of threads on push rods.
- Operation of push button on stick.
- No foreign objects remain in the aircraft.

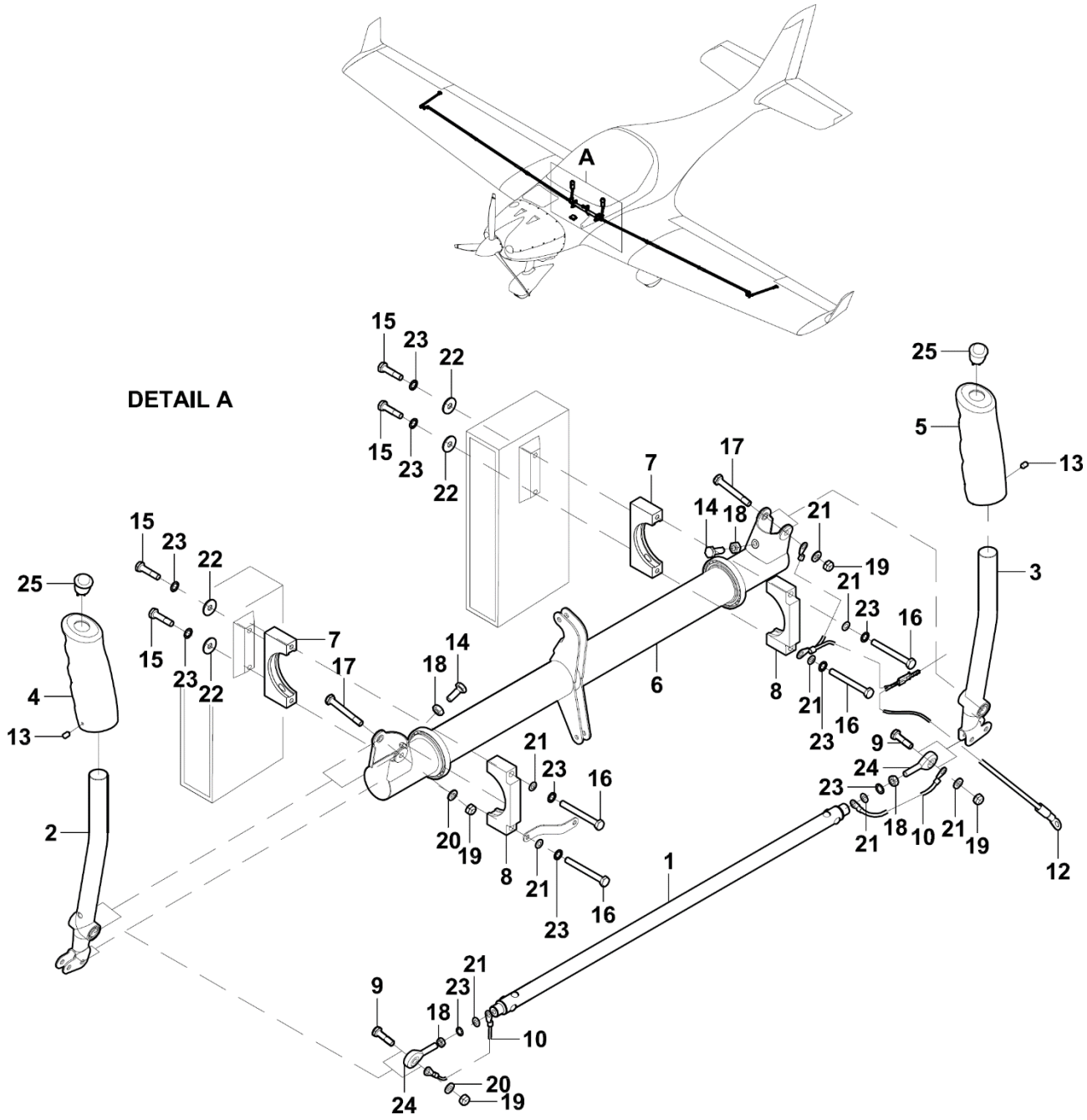


Fig. 27-4 Torsion Tube with Control Sticks Removal / Installation (page 1 of 2)

1 – Connecting push rod
2 – Left control stick
3 – Right control stick
4 – Left handle with stick shaker
5 – Right handle
6 – Torsion tube
7 – Front part of bushing
8 – Aft part of bushing
9 – Bolt M6 x 22
10 – Ground wire
12 – Ground wire
13 – Bolt M4x10
14 – Bolt M6x16
15 – Bolt M6x26
16 – Bolt M6x45
17 – Bolt M6x46
18 – Nut M6
19 – Self-locking nut M6
20 – Washer ø6.4x12x1.6
21 – Washer ø6x12x0.5
22 – Washer ø6.4x18x1.6
23 – Serrated locking washer ø6.4
24 – Bearing ending
25 – Push-To-Talk (PTT) Button

Fig. 27-4 Torsion Tube with Control Sticks Removal / Installation (page 1 of 2)

C. Roll trim system

For removal / installation, see the Chapter 57-60.

27-20 RUDDER

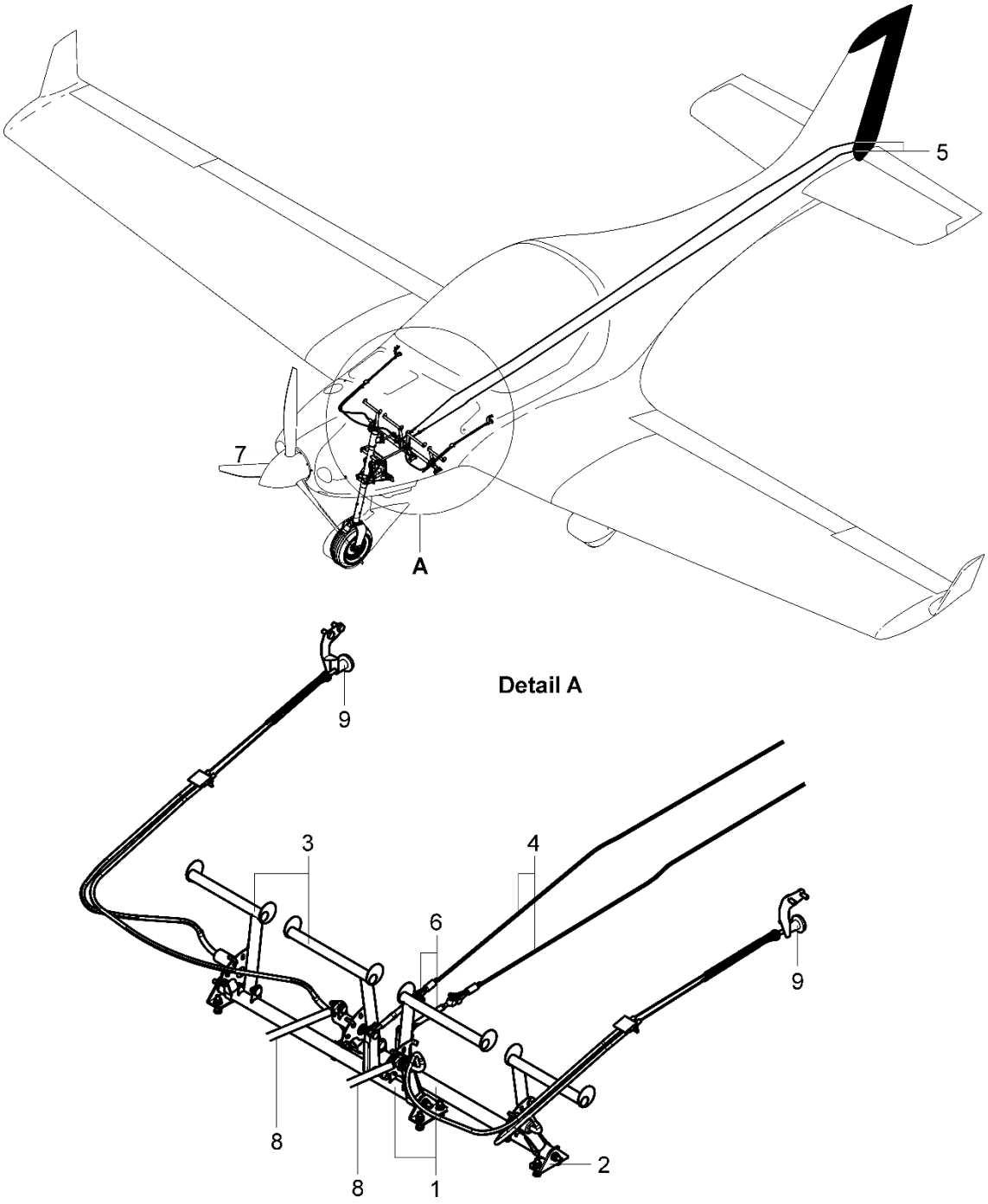
1. DESCRIPTION

The rudder is controlled by foot control pedals. The position of pedals for pilot and co-pilot is remotely adjustable. The rudder is controlled through steel cables. Nose gear steering is controlled through push-pull rods. The range of rudder deflections is limited by stops glued to the fin root.

The rudder pedal's torsion tubes (1, Fig. 27-5) are attached to the floor in four holders (2). The motion of pedals (3) is transferred through torsion tubes arms and control cables (4) to the rudder root rib (5). The polyurethane casings are attached to the fuselage structure to guide the control cables. There are turnbuckles (6) for adjusting tension in control cables.

The rudder control pedals are connected to the nose landing gear leg (7) through two push-pull rods (8).

Pedal positions can be adjusted with control handles (9) that release locking pins. Three possible positions are available. Pedals are fitted with springs to return to the rearward position during adjusting.



1 – Torsion tube
2 – Holder
3 – Pedal
4 – Control cable
5 – Rudder root lever
6 - Turnbuckle
7 - Nose landing gear leg
8 - Push-pull rod
9 - Control handle

Fig. 27-5 Rudder Control System

2. MAINTENANCE PRACTICES

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 9	1 pc
Hex key 5	1 pc
Nicopress tool	1 pc
Steel wire cutter	1 pc
Solder set	1 pc
Heat gun	1 pc
Pliers	1 pc
Combination pliers	2 pcs
Screwdriver	1 pc
Tensiometer	1 pc
Sleeve 3.0 - 3.2	4 pcs
Steel cable ø3.2	AR
Cotter pin ø1.6 x 25	2 pcs
Serrated locking washer ø6.4	6 pcs
Cable tie 3.2	4 pcs
Vaseline	AR
Lubrication oil	AR
Adhesive tape	AR
Loctite 243	AR
Loctite 270	AR
Contact adhesive	AR
Solder	AR
Safety wire ø0.8 mm	AR
Shrink tube ø12.4 mm	AR
Persons	2

Tab. 27-3 Recommended tools, materials, persons and documentation

A. Control cables

(1) Control cables removal:

(a) On both ends of steel cable (1, Fig. 27-7), remove nuts (11; 12), washers (9; 10) bolts (6; 7) and distance tubes (15; 16); cut steel cable (1) and pull it out.

(b) Remove second steel cable (1).

(c) Remove turnbuckle assembly (4), by removing cotter pin (14), washers (8; 9) and bolt (5).

(d) Remove second turnbuckle assembly (4).

(2) Control cables installation:

(a) Connect turnbuckle assembly (4, Fig. 27-7) with foot control using bolt (5), washers (8; 9) and cotter pin (14).

- Remove safety wire if it is present.
- Connect turnbuckle barrel to turnbuckle fork and turnbuckle eye bolt with half a turn of thread.

(b) Connect second turnbuckle assembly (4).

(c) Make an eye on one end of new steel cable (1) with thimble (3), sleeve (2) and shrink tube. Press sleeve (2) closely to thimble (3) with Nicopress tool **at 3 points** and shrink the shrink tube on sleeve (2).

(d) Connect steel cable eye (1) with turnbuckle fork (4), by using distance tube (15), bolt (6), washer (10) and nut (11); tighten nut (11) so that the turnbuckle (4) assembly rotates easily.

(e) Lubricate steel cable (1) with oil on entire length.

(f) Slide free end of steel cable (1) through plastic tube to tail end.

NOTE

Plastic tube is located in central tunnel.

(g) Install second steel cable (1).

(h) Put aircraft on lift jacks (Chapter 07-10), align foot control and set nose wheel and rudder to neutral position.

(i) On rudder operating levers, put a temporary thimble (3), bolt (7) and screw a nut.

(j) On free end of steel cable (1), slide shrink tube and sleeve (2).

(k) Fold steel cable (1) around thimble (3) and strain cable to approx. 160-180 N. Move sleeve (2) closely to the thimble (3) and fix them with combination pliers (Fig. 27-6).



Fig. 27-6 Straighten of Steel Cable

(l) Disconnect steel cable (1, Fig. 27-7) with sleeve (2) and thimble (3) from rudder operating lever by removing bolt (7).

NOTE

Take care to not move positions of items (1; 2; 3) during removal of bolt.

(m) Press sleeve (2) with Nicopress tool **at 3 points**, cut unnecessary end of steel cable (1) and shrink the shrink tube on sleeve (2).

(n) Make eye on second steel cable (1).

(o) Connect control cable eye with rudder operating lever, using distance tube (16), bolt (7), washer (9) and nut (12).

(p) Connect second control cable eye.

(q) Strain the control cable at value 70 N with turnbuckle barrel (4).

(r) Swing the rudder few times.

(s) Adjust the tension force in the steel cable (1), by turnbuckle barrel (4) at value 61-65 N.

(t) Secure turnbuckle assembly (4) with safety wire.

(u) Carry out test and check:

- That the bolts (5) are secured with cotter pins.
- If all bolt connections are tight.
- Plays.
- Alignment of rudder with nose gear
- Equal division of threads on push rods and turnbuckle.
- Tension of control cables.
- That no foreign objects remain in the aircraft.

(3) Adjustment / test - rudder deflections:

Deflections of rudder are mentioned in Tab. 27-6. These deflections are not adjustable. The neutral position of the rudder can be adjusted.

CONTROL SURFACE DEFLECTIONS			
Control surface	Left	Right	Distance measurement point from the point of rotation
Rudder	25 ±2°	25 ±2°	320 mm
	135 ±10 mm	135 ±10 mm	

Tab. 27-6 Rudder Deflections

(a) Lift the aircraft on jacks (Chapter 07-10).

(b) Set the pedals to middle position.

(c) Align pedals and check if nose wheel and rudder is in neutral position.

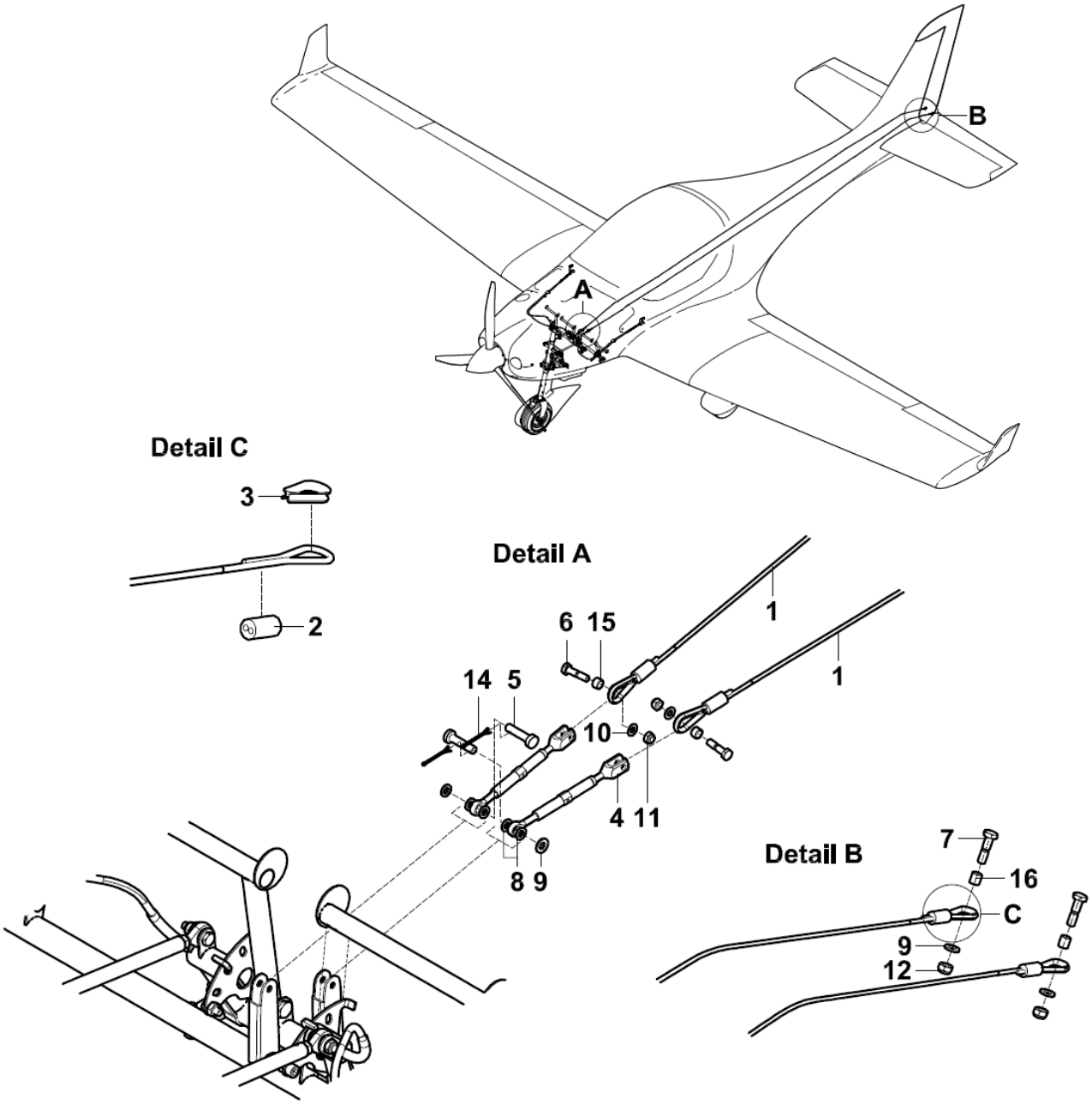
(d) If it isn´t, align rudder screwing one turnbuckle barrel (4, Fig. 27-7) and simultaneously unscrewing second turnbuckle barrel (4).

(e) Check if tension on steel cables (1) is between 61-65 N. If it's not, screw turnbuckle barrel(s) (4) to adjust to correct tension.

(f) Secure turnbuckle assembly (4) with safety wire.

(g) Carry out test and check:

- Alignment of rudder with nose wheel and pedals in neutral positions.
- Tension on control cables.
- That no foreign objects remain in the aircraft.



1 –	Control cable ø3.2	9 -	Washer ø6.4 x 12 x 1.6
2 –	Sleeve 3.0-3.2	10 -	Washer ø5.3 x 10 x 1
3 –	Thimble 3.1-4.0	11 -	Self-locking nut M5
4 –	Turnbuckle assembly	12 -	Self-locking nut M6
5 –	Pin ø6x18	13 -	N/A
6 –	Bolt M5 x 20	14 -	Cotter pin ø1.6 x 25
7 –	Bolt M6 x 22	15 -	Distance tube ø8 x 1 - 4.5
8 –	Washer ø6.4 x 10 x 1.6	16 -	Distance tube ø8 x 1 - 8.5

Fig. 27-7 Control Cable Removal / Installation

B. Remote control of pedals

(1) Remote control of pedals removal:

(a) Remove spiral hoses (14, Fig. 27-8) and cable ties.

(b) Remove control handle (9), by unscrewing nuts (8; 10), removing washers (6; 7) and remove ground wire (18).

(c) Pull out bowdens (1) and inner cables (2).

(d) Remove screw shackles (3), nuts (4), washers (5), by unscrewing nuts (4).

(2) Remote control of pedals installations:

(a) Install screw shackles (3, Fig. 27-8), washers (5) nuts (4) on holder (17) under instrument panel.

(b) Slide bowdens (1) and inner cables (2) through bayonets (15) and screw shackles (3).

NOTE

Install correct length of bowdens (1) on correct positions:

LENGTHS OF BOWDENS			
Left side, left pedal	500 mm	Right side, left pedal	500 mm
Left side, right pedal	660 mm	Right side, right pedal	650 mm

(c) Put control handle (9) to control anchor (16) and screw the nut (12). If using new control handle:

- Assemble control handle (9; 10; 11; 12) leaving a free end of thread on rod of 12 mm (see Fig. 27-8).
- Unscrew the nut (12).
- Secure handle (10) with Loctite 270.

(d) Insert the pair of inner cables (2) through holes in washer (7) and connect to control handle (9). Connect the ground wire (18). Tighten the nut (12).

NOTE

Control handle must have 3 mm backslash.

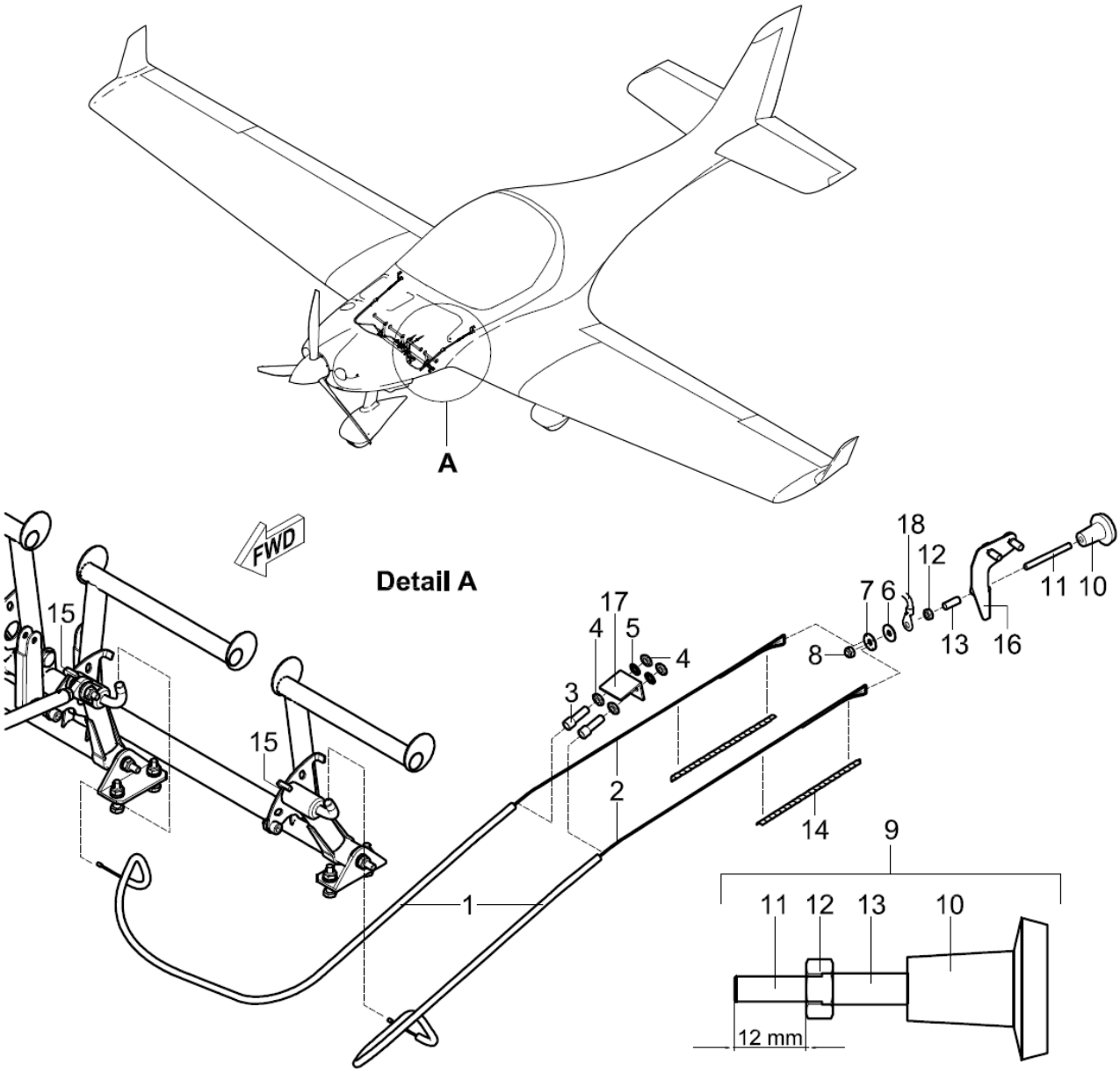
(e) Cut ends of inner cables (2) to 150 mm length from washer (7) and solder cable ends.

(f) Wrap spiral hoses (14) and secure bowdens (1) with 2 cable ties (3.2 mm) to parachute board.

(g) Check operating of pedals remote control.

(h) Carry out test and check:

- If all bolt connections are tight.
- That pedals lock in all three positions.
- That no foreign objects remain in the aircraft.



1 – Bowden
2 – Inner cable ø1.2
3 – Screw shackle
4 – Nut M6 Low
5 – Serrated locking washer ø6.4
6 – Washer ø5.3 x 15 x 1
7 – Plain washer ø5.3 x 15 x 1
8 - Self-locking nut M6
9 - Control handle
10 - Black handle
11 - Thread rod M5 x 42
12 - Nut M5
13 - Distance tube
14 - Spiral hose ø1
15 - Bayonet socket
16 - Control anchor
17 - Holder
18 - Ground wire

Fig. 27-8 Control of Pedals Removal / Installation

C. Foot control

(1) Foot control removal:

(a) Remove control cables (see 2.A.(1)).

(b) Remove remote control of pedals (see 2.B.(1)).

(c) Remove steering push rods (Chapter 32-50).

(d) Remove foot control, by unscrewing the nuts (13, Fig. 27-9) and removing the washers (15).

(e) Pull out consoles (3; 4) with bronze bushings (5).

(f) Disassemble bronze bushing (5), by unscrewing the nut (13), removing washer (15) and bolt (11).

(g) Disassemble pedal, by removing cotter pin (14), washer (16) and pin (10).

(h) Unscrew the bolt (12) from pedal.

(2) Foot control installation:

(a) Before assembling check foot controls for cracks and deformations. Check bolts laminated in floor.

NOTE

Described is installation of one pedal (6; 7; 8; 9, Fig. 27-9) to a torsion tube (1; 2). Take care to install correct pedals to correct positions on torsion tubes (1; 2).

(b) Before assembling clean holes in torsion tubes (1; 2, Fig. 27-9) and pedals (6; 7; 8; 9).

(c) Attach lever spring (17 or 18) to pedal and connect to torsion tube, by using pin (10), washer (16) and cotter pin (14).

(d) Put spring (19) and bayonet (20) into socket on torsion tube.

(e) Push down bayonet (20) and turn pedal to fit bayonet (20) into pedal´s groove.

(f) Check operation of adjustment in all three positions.

(g) Screw bolt (12) on pedal and secure with Loctite 243.

(h) Assemble other pedal.

(i) Slide bronze bushings (5) with consoles (3; 4) on ends of torsion tubes (1; 2).

NOTE

The inner consoles (4) have elliptical holes and have direction out. Outer consoles (3) have direction in.

(j) Connect bronze bushing (5) with console (4), by using bolt (11), washer (15) and nut (13).

(k) Put foot control on screws laminated in floor; put washers (15) and tighten nuts (13).

(l) Install steering push rods (Chapter 32-50).

(m) Install remote control of pedals (see 2.B.(2)).

(n) Install control cables (see 2.A.(2)).

(o) Carry out test and check:

- If all bolt connections are tight.
- Alignment of rudder with nose gear.
- Plays.
- Free movement of rudder control system (nose wheel must be off the ground).
- That no foreign objects remain in the aircraft.

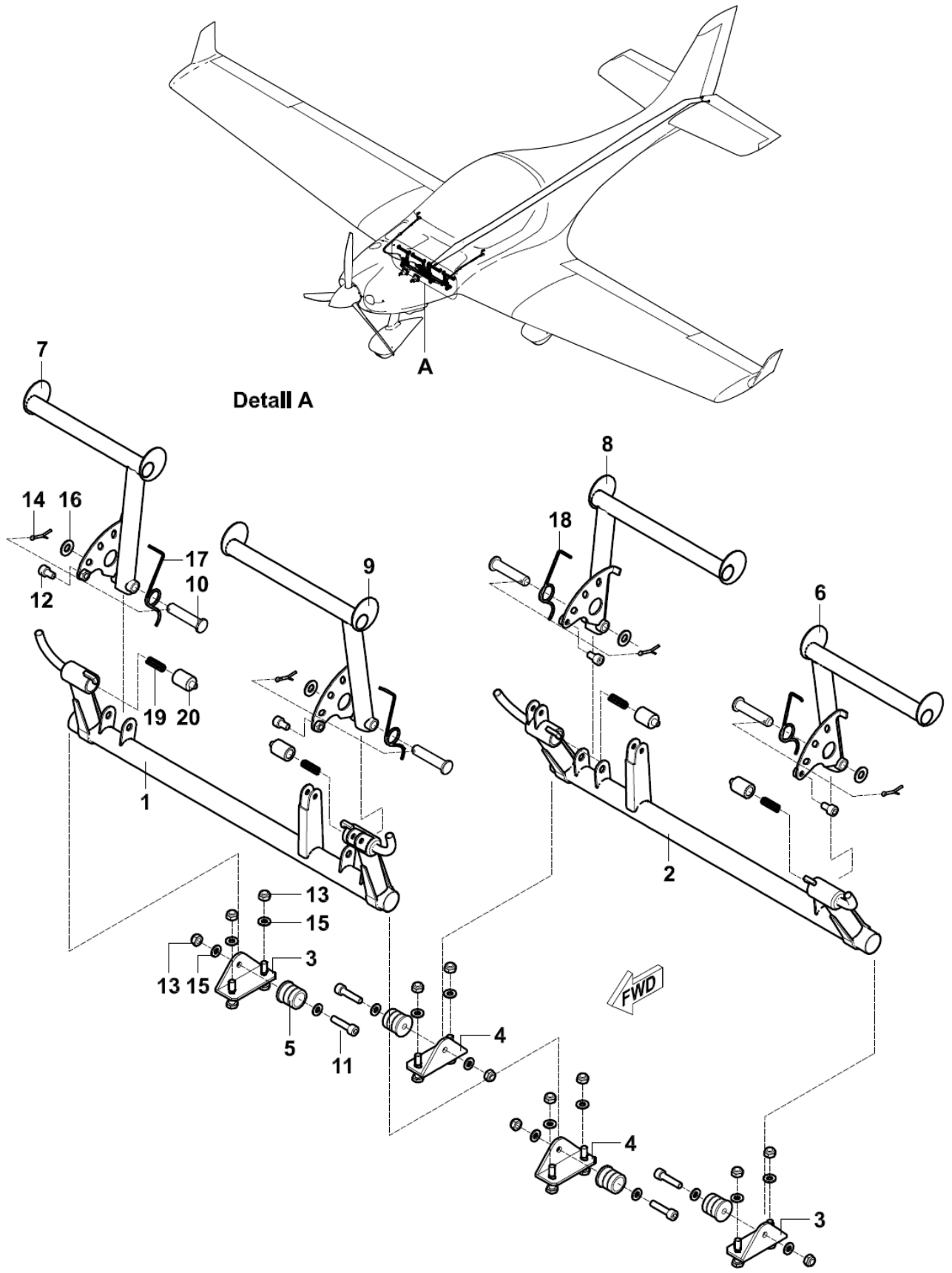


Fig. 27-9 Foot Control Removal / Installation (page 1 of 2)

1 – Torsion tube R
2 – Torsion tube L
3 – Outer console
4 – Inner console
5 – Bronze bushing
6 – Pedal LL
7 – Pedal RR
8 - Pedal LR
9 - Pedal RL
10 - Pin ø8 x 36
11 - Allen bolt M6 x 20
12 - Allen bolt M6 x 10
13 - Self-locking nut M6
14 - Cotter pin 1.6 x 25
15 - Washer ø6.4 x 12 x 1.6
16 - Washer ø8.4 x 16 x 1.6
17 - Left lever spring
18 - Right lever spring
19 - Spring
20 - Bayonet

Fig. 27-9 Foot Control Removal / Installation (page 2 of 2)

This page is left blank intentionally

27-30 ELEVATOR AND PITCH TRIM

1. DESCRIPTION

Both control sticks (1, Fig. 27-10) are fitted with bearings, attached to the control stick's torsion tube (2) and linked inside of torsion tube with connecting push-pull rod (3). Torsion tube turns in ball bearings (4) which are attached to the central section main spar.

Elevator is controlled through 3 push-pull rods that are equipped with adjustable bearing eyes. Push-pull rods are located in the central tunnel. Movement from control sticks is transferred to the elevator through the push-pull rod 1 (5), two-armed lever (6), push-pull rod 2 (7), support lever (8) and push-pull rod 3 (9) to the elevator lever (10). Elevator lever is fixed to the both halves of elevator and hinged through the bearing to the elevator root hinge (11). Elevator root hinge is attached to the horizontal stabilizer aft web.

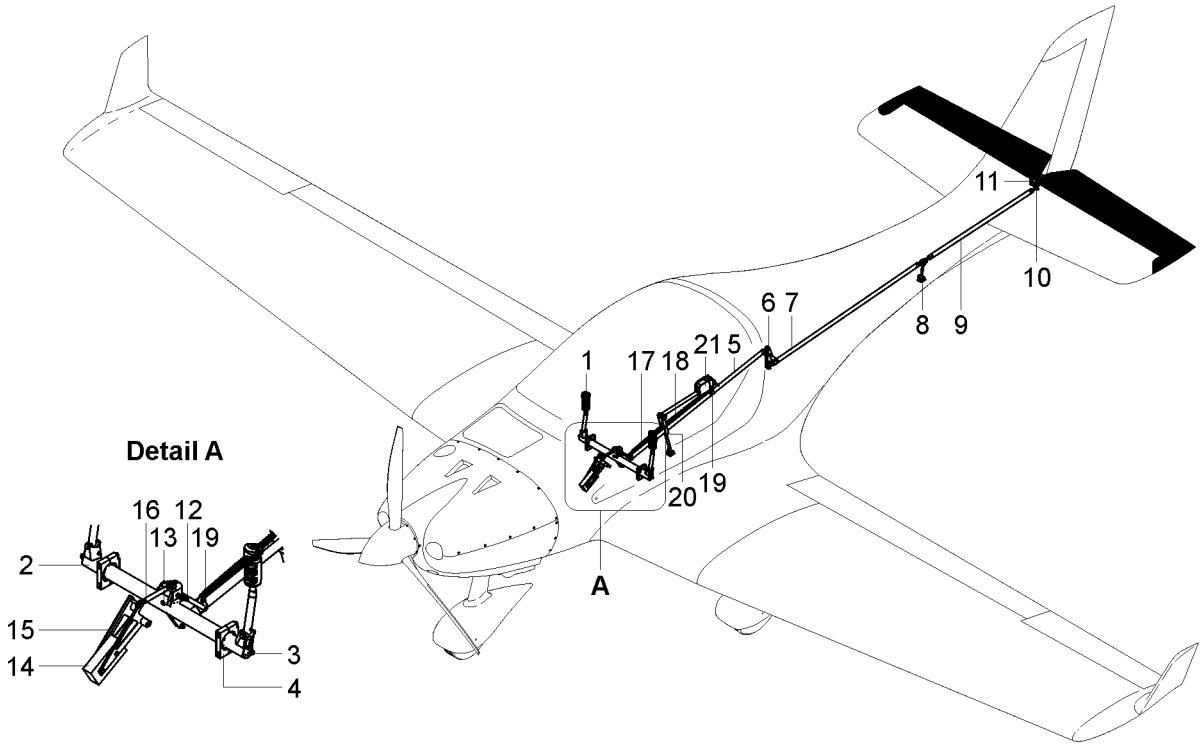
Range of elevator control movement is limited by the front stop (13) installed on the central section main spar and the aft stop (12) (tube with a bolt installed inside of the central tunnel).

There is a bob weight (14) installed at lever (15) and connected to the control stick's torsion tube by push-pull rod (16).

Pitch trim system is connected to the push-pull rod 1 (5). Pitch trim consists of two tension springs (18; 19). The springs are attached to the push-pull rod 1 (5) by means of sleeves (19) and support lever (20). Support lever is operated through actuator (21) and controlled by a rocker switch installed on the pedestal panel.

Position of the elevator trim is displayed on the EFIS.

Wiring diagram of elevator trim is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).



1 – Control stick
2 – Torsion tube
3 – Push-pull rod
4 – Ball bearing
5 – Push-pull rod 1
6 – Two-armed lever
7 – Push-pull rod 2
8 - Support lever
9 - Push-pull rod 3
10 - Elevator lever
11 - Elevator root hinge
12 - Aft stop
13 - Front stop
14 - Bob weight
15 - Lever
16 - Push-pull rod
17 - Spring
18 - Spring
19 - Sleeve
20 - Support lever
21 - Actuator

Fig. 27-10 Elevator Control System

2. MAINTENANCE PRACTICES

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 9	1 pc
Wrench 8	2 pcs
Wrench 7	2 pcs
Hex key 5	1 pc
Hex key 2.5	1 pc
Solder set	1 pc
Heat gun	1 pc
Shrink tube ø3.2 x 1.6 mm	AR
Serrated locking washer ø6.4	AR
Cotter pin ø1.6 x 25	AR
Cotter pin ø1.6 x 16	1 pc
Protractor with deflecting pointer	1 pc
Ruler	2 pcs
Adhesive tape	AR
Persons	2

Tab. 27-4 Recommended tools, materials, persons and documentation

A. Push rods and levers

(1) Push rods and levers removal:

(a) Remove rudder (Chapter 55-40).

(b) Remove elevators (Chapter 55-20).

(c) Disconnect push rod (3, Fig. 27-11) from root hinge (4), by removing nut (16), washer (12) and bolt (9).

(d) Remove cover on baggage bulkhead (13, Chapter 06-00, Fig. 06-4).

(e) Disconnect push rod (3) from support lever (5), by removing nut (16), washer (12) and bolt (11). Disconnect ground wire (38).

(f) Disconnect push rod (2) from support lever (5), by removing nut (16), washer (12) and bolt (11). Disconnect ground wire (39).

(g) Disconnect push rod (2) from bellcrank (6), by removing nut (16), washer (12) and bolt (9). Disconnect ground wire (36) from socket (33).

(h) Remove the pedestal panel (Chapter 27-50, 2.B.(1)).

(i) Disconnect spring connector (19, Fig. 27-14) by unscrewing nut (16) and removing washer (17), bolt (15) and spacer (18).

(j) Disconnect push rod (1, Fig. 27-11) from bellcrank (6), by removing nut (16), washer (12) and bolt (9). Disconnect ground wire (34) from socket (33).

(k) Disconnect push rod (1) from torsion tube (21), by removing nut (16), washer (12) and bolt (11).

(l) Remove the root hinge (4), by removing nut (16), washers (12; 13) and bolt (11).

(m) Remove support lever (5), by removing nut (16), washer (12) and bolt (8).

(n) Remove bellcrank (6), by removing nut (16), washers (18) and pin (7).

(o) If necessary, remove front elevator stop by releasing nut (28) and removing bolt (29). Rear elevator stop could be removed similar way, by releasing nut (17) and removing bolt (26) and washer (12).

(2) Push rods and levers installation:

(a) Before assembling check push rods for cracks and condition of rivets. Check parallel alignment of bearing ends; on new push rods, release lock nuts.

(b) Install bellcrank (6, Fig. 27-11) behind baggage bulkhead, by using pin (7), washers (18) and nut (16).

WARNING

ENSURE BELLCRANK (6) IS PUT IN CORRECT ORIENTATION!

(c) In tail, install support lever (5), by using bolt (8), washers (12) and nut (16).

(d) Install root hinge (4) to bracket, by using bolt (11), washers (12, 13) and nut (16).

(e) Connect push rod (3) to root hinge (4), by using bolt (9), washer (12) and nut (16).

(f) Connect push rod (3) to support lever (5), by using bolt (11), washer (12) and nut (16). Connect ground wire (38) to ground wire (39).
If using a new push rod (3):

- Replace washer (14) and fully screw bearing end (20) and tighten locking nuts (17).
- Pay attention to parallel alignment of bearing ends (20).

(g) Connect push rod (2) to support lever (5), by using bolt (11), washer (12) and nut (16). Connect ground wire (39) to ground wire (38).

(h) Connect push rod (2) to bellcrank (6), by using bolt (9), washer (12) and nut (16). Connect ground wire (36) to socket (33).
If using new push rod (2):

- Replace washer (14) and fully screw bearing ends (20) and tighten locking nuts (17).
- Pay attention to parallel alignment of bearing ends (20).

(i) Connect push rod (1) to bellcrank (6), using bolt (9), washer (12) and nut (16). Connect ground wire (34) to socket (33).

(j) Connect push rod (1) to torsion tube (21), using bolt (11), washer (12) and nut (16). If using new push rod (1):

- Replace washer (14) and fully screw bearing ends (20) and tighten locking nuts (17).
- Pay attention to parallel alignment of bearing ends (20).
- Install sleeves (20, Fig. 27-14) on push rod (see 2.B.(2)).
- Perform adjustment of elevator control system (see par. D) (elevators have to be installed).

(k) Connect spring connector (19, Fig. 27-14) with spacer (18) to lever (3) using nut (16), washer (17) and bolt (15).

(l) Carry out test and check:

- That the castle nuts and pins are secured with cotter pins.
- If all bolt connections are tight.
- Plays.
- Free movement of elevator control system.
- Neutral position and max displacements.
- Equal division of threads on push rods.
- That no foreign objects remain in the aircraft.

(3) Adjustment / Test – elevator deflections

CONTROL SURFACE DEFLECTIONS			
Control surface	Up	Down	Distance measurement point from the point of rotation
Elevator	28 ±2°	18 ±2°	240 mm
	112 ±8 mm	74 ±8 mm	

Tab. 27-5 Elevator Deflections

(a) Fix the elevator in neutral position.

(b) Check if distance between PTT button and instrument panel is 245 mm; if it isn't, adjust length of push rod (1, Fig. 27-11) so that the distance between PTT button and instrument panel is correct.

NOTE

If it is not possible reach correct distance, screw swivel bearings (20) at push rod (1). It is necessary to adjust the length of push rod (2) too.

(c) Unfix elevator and keep in neutral position.

(d) Put protractor on the trailing edge of elevator.

(e) Set the protractor to 0° - starting value of measuring.

(f) Check deflection values according to the Tab. 27-5.

(g) If deflections are not within range listed in Tab. 27-5, screw stop bolts (26; 29) to adjust to correct deflections.

(h) Carry out test and check:

- If all lock nuts are tight.
- Free plays.
- Free movement of elevator control system.
- Neutral position and max. deflections.
- Equal division of threads on push rods.
- If trim control operates in all positions
- That no foreign objects remain in the aircraft.

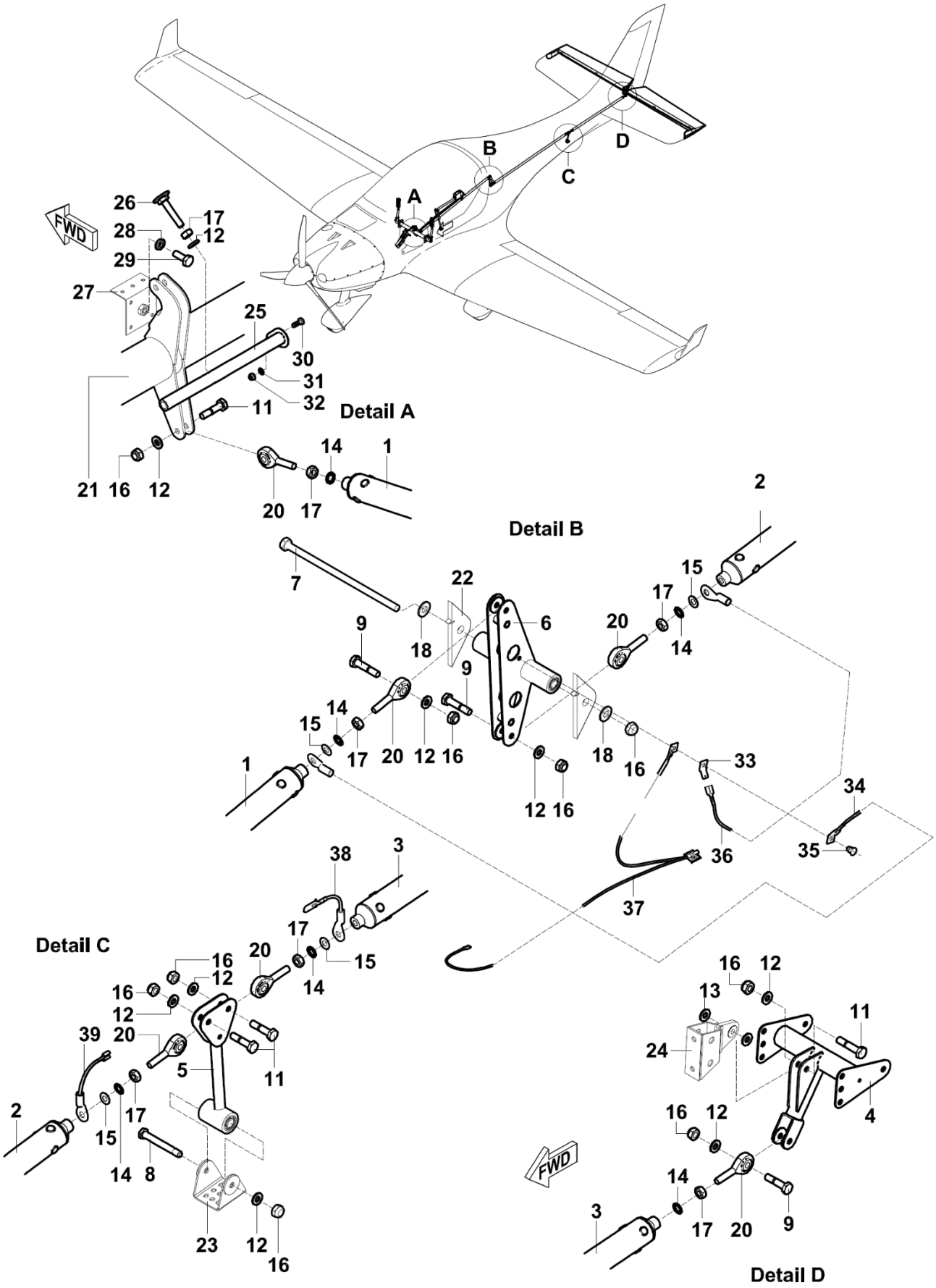


Fig. 27-11 Push Rods and Levers Removal / Installation (page 1 of 2)

1 – Push rod
2 – Push rod
3 – Push rod
4 – Root hinge
5 – Support lever
6 – Bellcrank
7 – Pin
8 – Bolt M6 x 48
9 – Bolt M6 x 28
10 – N/A
11 – Bolt M6 x 25
12 – Washer ø6.4 x 12 x 1.6
13 – Washer ø6.4 x 10 x 1.6
14 – Serrated locking washer ø6.4
15 – Tab washer ø6.4
16 – Self-locking nut M6
17 – Nut M6
18 – Washer ø6.4 x 18 x 1.6
19 – N/A
20 – Bearing end
21 – Torsion tube
22 – Hinge
23 – Bracket
24 – Elevator root hinge
25 – Elevator rear stop
26 – Bolt
27 – Elevator front stop
28 – Nut
29 – Bolt M6 x 16
30 – Bolt M4 x 20
31 – Washer ø4.3 x 12 x 1
32 – Nut M4
33 – Flat terminal
34 – Ground wire
35 – Rivet 4 x 8
36 – Ground wire
37 – Ground wire
38 – Ground wire
39 – Ground wire

Fig. 27-11 Push Rods and Levers Removal / Installation (page 2 of 2)

B. Pitch trim system

(1) Pitch trim system removal:

(a) Open the **PITCH** circuit-breaker.

(b) Remove pedestal panel (Chapter 27-50, 2.B.(1)).

(c) Remove plate behind slotted link (11, Chapter 06-00, Fig. 06-4) and central tunnel cover (12).

(d) Remove shrink tube and unsolder the cable (2, Fig. 27-14).

(e) Disconnect actuator (1) piston rod from lever (3), by removing nut (16), washer (17), spacer (14) and bolt (24).

(f) Hold the actuator (1), remove cotter pin (13), spacers (10; 11), bushings (12) and pin (9); remove actuator (1) from central tunnel.

(g) Disconnect spring connector (19) by unscrewing the nut (16) and removing washer (17), bolt (15) and spacer (18).

(h) Remove lever (3), by removing nut (7), washer (8) and bolt (6).

(i) In case of exchange of springs (4, 5) or sleeve couplings (20), remove the push rod (25) by unscrewing nuts (16, Fig. 27-11) from torsion tube (21) and bellcrank (6) and removing washers (12) and bolts (9, 11). Couplings (20, Fig. 27-14) can be removed from push rod (24) by drilling out the rivets (located on bottom side of couplings), removing nuts (22), washers (23) and bolts (21).

(2) Pitch trim system installation:

(a) Clean and lubricate all the movable points and other movable parts with vaseline before each assembling (Chapter 12-20).

(b) Install the lever (3, Fig. 27-14) into bracket on the central tunnel floor, by using the bolt (6), washer (8) and nut (7).

In the case of installation of original push rod:

(c) Install the connector (19) to the lever (3), by using the bolt (15), spacer (18), washer (17) and nut (16).

(d) Connect springs (4; 5) to the lever (3) and sleeves (20).

(e) Install actuator (1) into the central tunnel, by using pin (9), spacers (10; 11), bushings (12) and secure with cotter pin (13).

(f) Attach actuator piston rod to the lever (3), by using bolt (24), spacer (14), nut (16) and washer (17).

(g) Put on the cable (2) shrink tube, using soldering gun connect wires; pull the shrink tube over join.

In the case of installation of new push rod:

(h) Install actuator (1) into the central tunnel, by using pin (9), spacers (10; 11), bushings (12) and secure with cotter pin (13).

(i) Put on the cable (2) shrink tube, using soldering gun connect wires; pull the shrink tube over join.

(j) Attach actuator piston rod to the lever (3), by using bolt (24), spacer (14), nut (16) and washer (17).

(k) Open the **PITCH** circuit-breaker.

(l) Put the couplings (20) on the push rod (25) and attach by using the bolts (21), washers (23) and nuts (22); do not tighten the nuts.

(m) Perform adjustment of elevator control system (see 2.A.(3)).

(n) Move control stick full forward (to the stop) and actuator rod extend to the max. (150 mm) (Fig. 27-12).

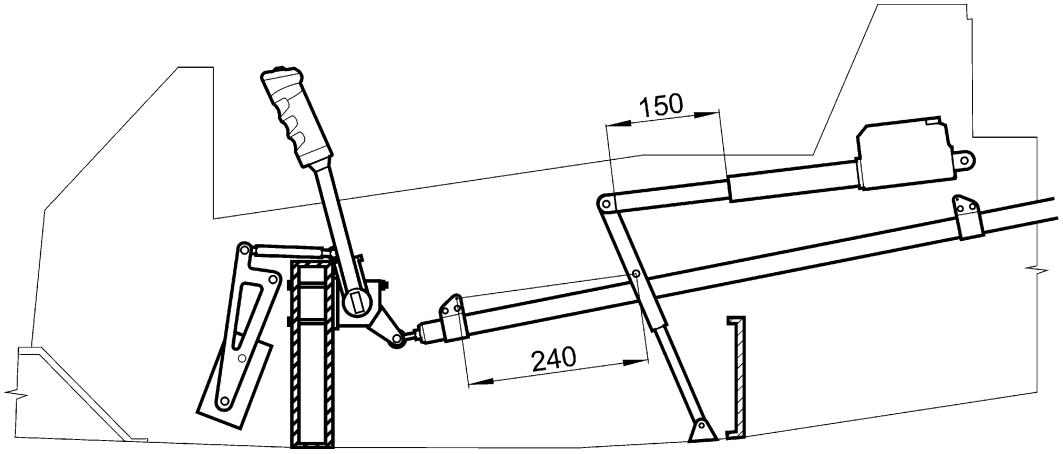


Fig. 27-12 Trim System Adjustment

(o) Set the front sleeve (20, Fig. 27-14) so that between the axis of the hole on the socket and the axis of the hole on the lever (3) was length 240 ±1 mm (Fig. 27-12); tighten the nuts (22, Fig. 27-14).

(p) Move control stick full rearward (to the stop) and actuator rod full retract.

(q) Set the rear sleeve (20) so that between the axis of the hole on the socket and the axis of the hole on the lever (3) was length 272 ±1 mm (Fig. 27-13); tighten the nuts (22, Fig. 27-14).

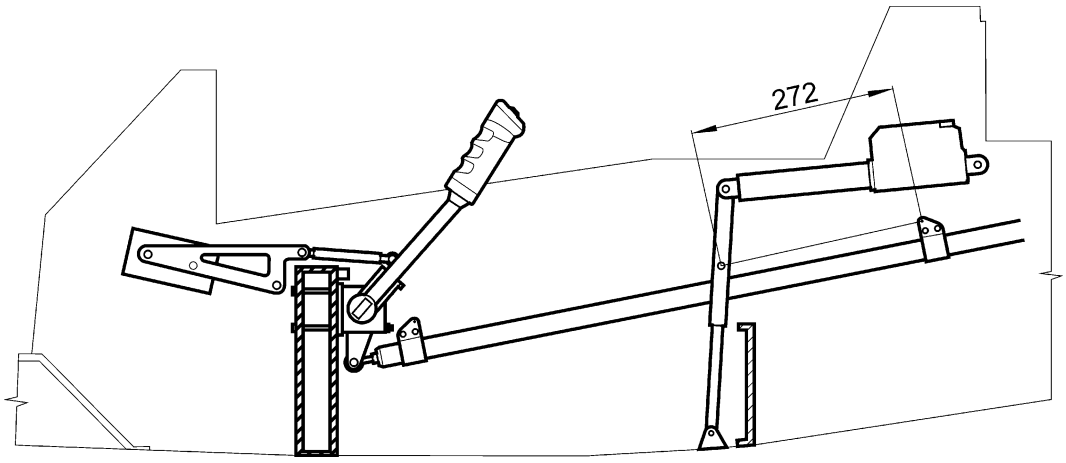


Fig. 27-13 Trim System Adjustment

(r) Remove push rod (25) (see 2.A.(1)).

(s) As necessary carefully rotate the front and rear sleeve, so that holes in the sleeve are aligned with the side face of the ball bearing; do not move sleeves. Tighten the nuts (22).

(t) Drill hole diameter 3.2 mm through bottom parts of sleeves and one side of the push rod; then using riveting tools to rivet parts together.

(u) Connect springs (4; 5) and connector (19) to push rod (25); install push rod (see par. 2.A.(2)).

(v) Connect connector (19) with springs (4; 5) to the lever (3), by bolt (15), nut (16), washer (17) and spacer (18).

(w) Check free movement of trim and elevator control system; lever (3) must not touch the push rod (25).

In both cases:

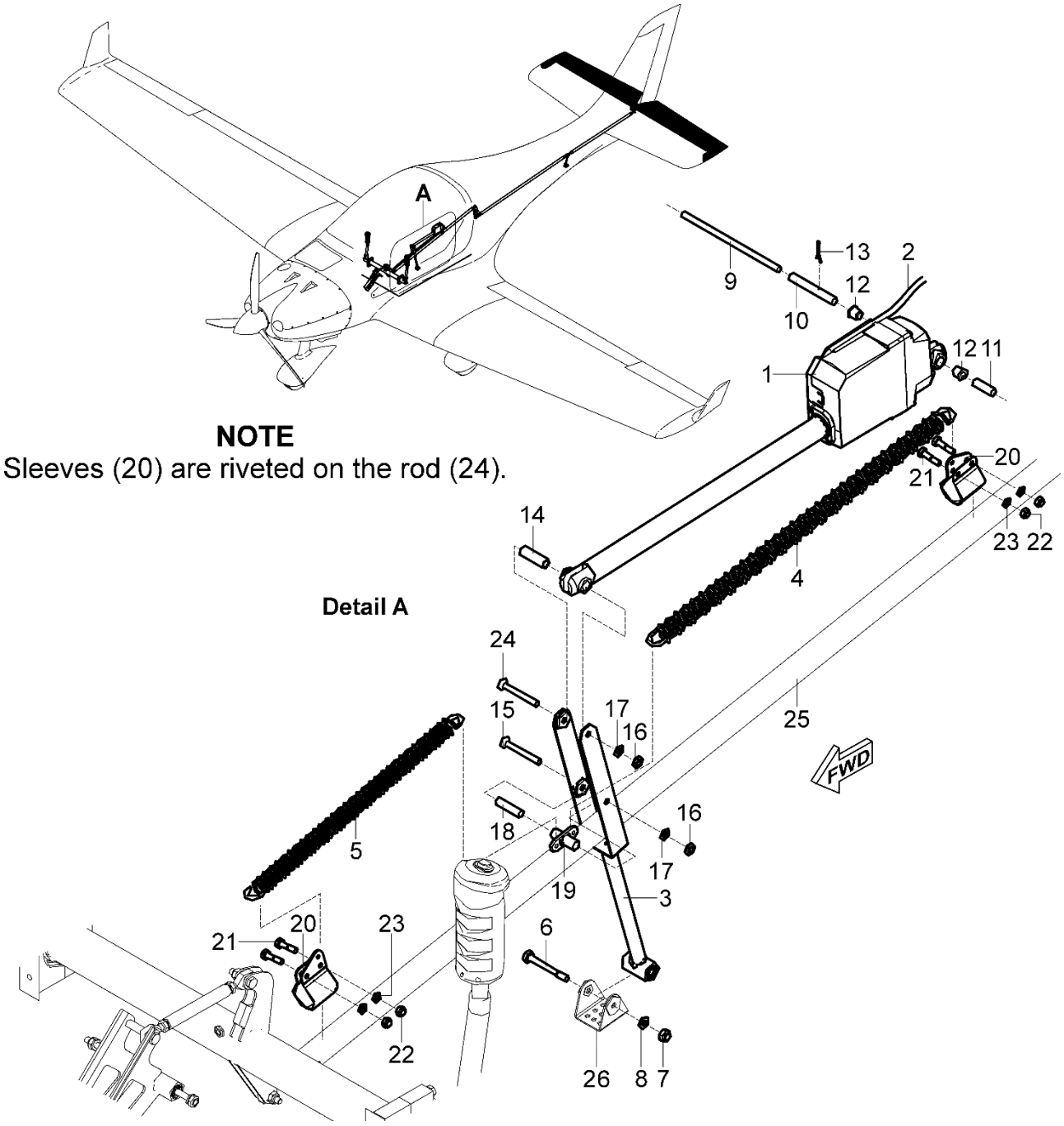
(x) Check:

- That the pin is secured with cotter pin.
- If all bolt connections are tight.
- That no foreign objects remain in the aircraft.

(y) Install plate behind slotted link (11, Chapter 06-00, Fig. 06-4) and central tunnel cover (12).

(z) Install pedestal panel (Chapter 27-50, 2.B.(2)).

(aa) Close the **PITCH** circuit-breaker and carry out an operational test; check trim indication.



NOTE
Sleeves (20) are riveted on the rod (24).

1 –	Pitch trim actuator	10 -	Spacer	19 -	Spring connector
2 –	Cable	11 -	Spacer	20 -	Sleeve coupling
3 –	Lever	12 -	Bushing	21 -	Bolt M5x20
4 –	Spring 20/1/4	13 -	Cotter pin 1.6 x 16	22 -	Self-locking nut M5
5 –	Spring 19/1/4	14 -	Spacer	23 –	Washer ø5.3 x 10 x 1
6 –	Bolt M6 x 48	15 -	Bolt M6x45	24 -	Bolt M6x32
7 –	Self-locking nut M6	16 -	Nut M6	For information:	
8 -	Washer ø6.4x12x1.6	17 -	Washer ø6 x 12 x 0.5	25 -	Push rod
9 -	Pin	18 -	Spacer	26 -	Bracket

Fig. 27-14 Trim System Removal / Installation

C. Bob weight

(1) Bob weight removal:

(a) Remove pedestal panel (Chapter 27-50, 2.B.(1)).

(b) Disconnect push-pull rod (3, Fig. 27-15) from torsion tube (11), by removing nut (5), washer (8) and bolt (9).

(c) Hold the lever (1), remove nuts (5), washers (6, 8) and bolt (9); remove lever (1) from central tunnel.

(d) Disconnect push-pull rod (3) from lever (1), by removing nut (5), washer (8), spacer (10) and bolt (7).

(e) As necessary, remove weight (2) from lever (1), by removing nuts (5), washers (8) and bolts (7).

(2) Bob weight installation:

(a) Thoroughly clean and lubricate all the movable points and other movable parts with Vaseline before each assembling (Chapter 12-20).

(b) Before assembling check lever for cracks.

(c) If necessary, put the weight (2, Fig. 27-15) on the lever (1) and attach by using the bolts (7), washers (8) and nuts (5).

(d) Attach push-pull rod (3) to the lever (1), by using bolt (7), spacer (10), nut (5) and washer (8).

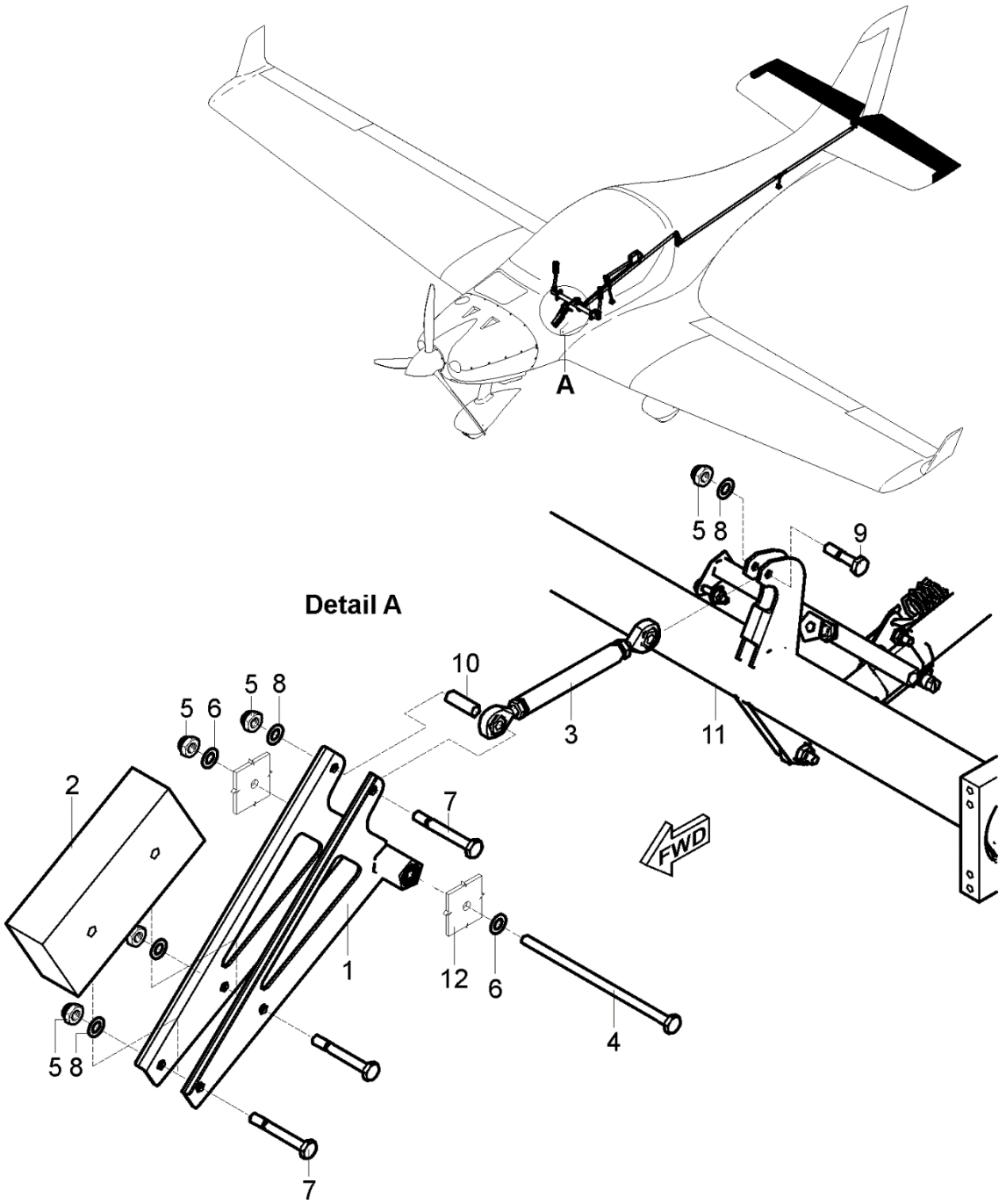
(e) Install the lever (1) into the central tunnel, by using the bolt (4), washers (6) and nut (5).

(f) Attach push-pull rod (3) to the torsion tube (11), by using bolt (9), nut (5) and washer (8).

(g) Check:

- If all bolt connections are tight.
- That no foreign objects remain in the aircraft.

(h) Install pedestal panel (Chapter 27-50, 2.B.(2)).



1 – Lever
2 – Bob weight
3 – Push-pull rod
4 – Bolt M6 x 128
5 – Nut M6
6 – Washer ø6.4 x 12 x 0.5
7 - Bolt M6 x 48
8 - Washer ø6.4 x 12 x 1.6
9 - Bolt M6 x 25
10 - Spacer
11 Torsion tube

For information:

12 - Central tunnel side

Fig. 27-15 Bob Weight Removal / Installation

27-50 FLAPS

1. DESCRIPTION

The wing flaps are operated manually by a lever (1, Fig. 27-16) on the pedestal panel between pilot and co-pilot. Wing flaps lever moves in the slotted link (2) that determinates four positions:

FLAPS 0 - Retracted (0°),

FLAPS 1 - Takeoff position (15°),

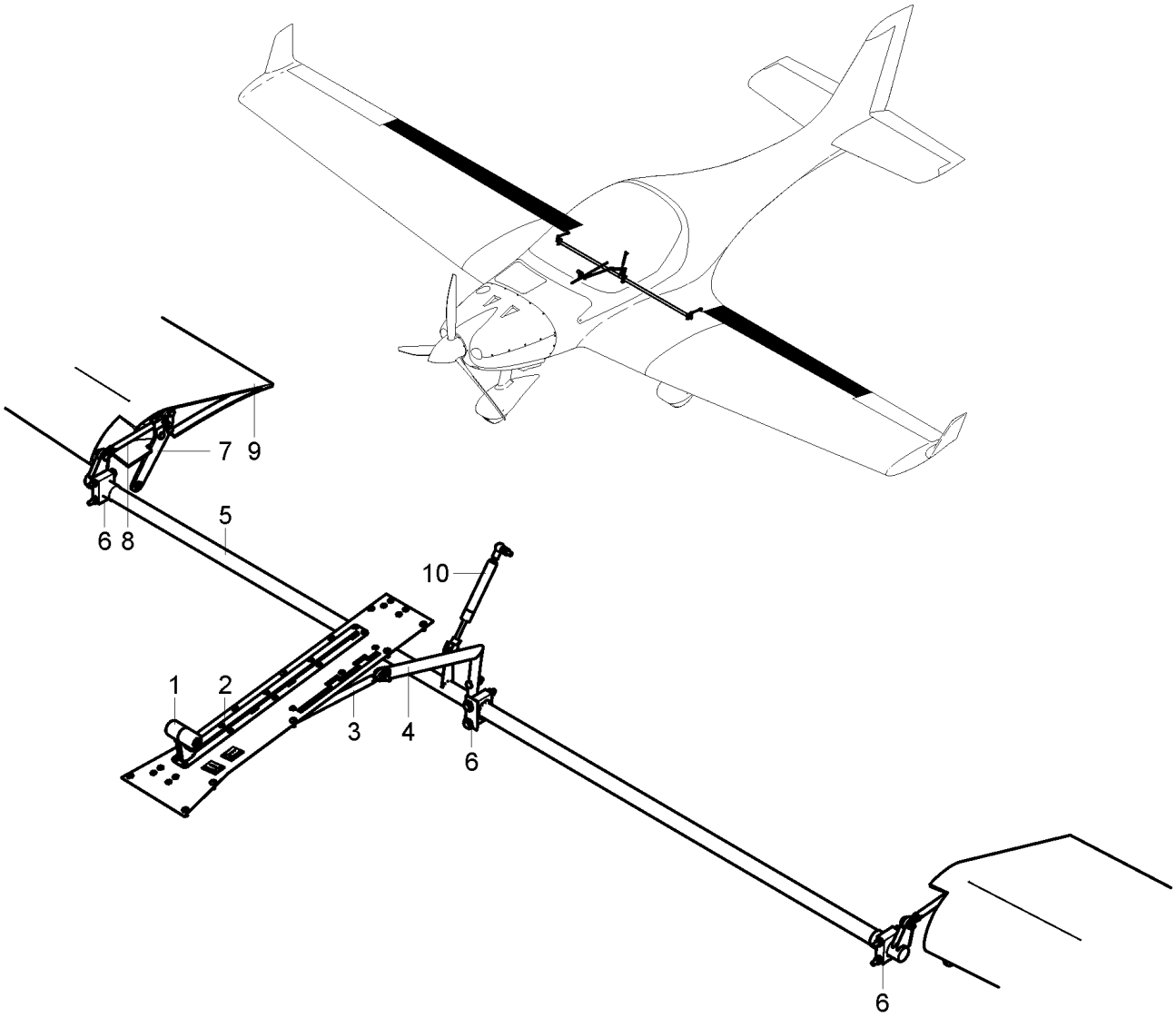
FLAPS 2 - Mid-position (24°),

FLAPS 3 - Fully extended position (35°).

Movements from wing flap lever are transferred through the push-pull rod 1 (3) and bellcrank (4) to the flap's torsion tube (5). Flap's torsion tube is fixed in three sliding bearings (6) which are attached to the central section auxiliary spar (middle bearing) and outer ribs (left and right bearing). It makes mechanical interconnection between left and right wing flap. Torsion tube is connected with the wing flap lever (7) by means of push-pull rods (8) with fork at the one and adjustable bearing end at the other one. Wing flap lever is fixed at the wing flap (9).

Gas strut (10) installed in the flap control system reduces pilot's operating force during extending/retracting of wing flaps. The gas strut is located in the baggage compartment and attached to the central tunnel and flap's torsion tube. It is protected by laminate cover (Chapter 06-00, Fig. 06-4).

The pedestal panel (2, Fig. 27-16) is attached on top of central tunnel between seats. On the pedestal panel are located: brake lever, wing flap lever and trim switches. Under the cover in the central tunnel are the elevator and wing flap push rods, rudder control cables, brake system, electrical wires, etc.



1 –	Lever	6 -	Bearing
2 –	Pedestal panel	7 -	Wing flap lever
3 –	Push-pull rod 1	8 -	Push-pull rod
4 –	Bellcrank	9 -	Wing flap
5 –	Torsion tube	10 -	Gas strut

Fig. 27-16 Wing Flap Control System

2. MAINTENANCE PRACTICES

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 8	1 pc
Screwdriver	1 pc
Puller on small pins M4	1 pc
Pliers	1 pc
Serrated locking washer ø6.4	2 pcs
Cotter pin ø1.6 x 25	2 pcs
Knife	1 pc
Vaseline	AR
Silicone	AR
Protractor with deflecting pointer	1 pc
Adhesive tape	AR
Ruler 50 cm	1 pc
Persons	2

Tab. 27-6 Recommended tools, materials, persons and documentation

A. Flap control system

(1) Flap control system removal:

(a) Remove wings (Chapter 57-10)

(b) Disconnect push rod (3, Fig. 27-18) from torsion tube (1), by removing nut (12), washer (13) and bolt (7).

(c) Remove second push rod (3).

(d) Remove pedestal panel (Chapter 27-50, 2.B.(1)).

(e) Disconnect bellcrank (2) from torsion tube (1), by removing nut (11), washer (13), bolt (8) and remove ground wire (20).

(f) In baggage compartments, remove covers of torsion stick (with knife, Velcro attachment) and gas strut cover.

(g) Remove gas strut (18).

(h) Remove cover on wing root central section with knife.

(i) Disassemble all sliding bearings (6), by removing nuts (11), washers (13; 14; 15) and bolts (5; 9).

(j) On right side of centre section, carefully pull out torsion tube (1) through access hole.

(2) Flap control system installation:

(a) Before installation check main parts for cracks and condition of rivets on push rod.

(b) Carefully rotate and slide torsion tube (1, Fig. 27-18) from right side of centre section wing root through all holes to other side (wings have to be removed).

(c) Put all sliding bearings (6) on torsion tube (1) and attach them (1; 6) on middle insert and sides carbon holders, by using bolts (5; 9), washers (13; 14; 15) and nuts (11).

NOTE

Tighten nuts (11) so that the torsion tube (1) rotates easily.

(d) Stick cover on centre section roots with silicone (remove old silicone).

(e) Connect bellcrank (2) to torsion tube (1), by using bolt (8), washer (13) nut (11) and ground wire (20).

(f) Install push rod and pedestal panel (Chapter 27-50, 2.B.(2)).

(g) In right baggage compartment attach gas strut (18) to torsion tube lever and ball joint.

CAUTION

GAS STRUT HAS TO BE ORIENTED WITH VALVE SIDE UP AND PISTON ROD DOWN.

(h) Install gas strut cover.

(i) Attach covers of torsion tube.

(j) Install wings (Chapter 57-10).

(k) Connect push rod (3) to torsion tube (1), by using bolt (7), washer (13) and nut (12).

(l) Connect push rod (3) to wing flap hinge, by using pin (4) and cotter pin (17). If using new push rod(s) (3):

- Set wing flap lever to position 0 (flaps retracted).
- Flap trailing edges must be aligned with centre section trailing edge (a preload is created in the wing flap control system).
- If previous point isn´t not fulfilled, disconnect pin (4), release lock nut (10) and screw push rod (3) to adjust to correct length. Replace washer (16) and tighten lock nut (10); check rod end in safety.
- Secure pin (4) with cotter pin (17).

(m) Connect second push rod (3).

(n) Carry out test and check:

- That the pins are secured with cotter pins.
- If all bolt connections are tight.
- Free plays.
- Free movement of flap control system.
- If deflections of wing flaps are symmetrical.
- Deflections (Tab. 27-8).
- Push rod swivel motion in both wing flap positions for binding (retracted and fully extended) (Fig. 27-17); if binding occurs, realign rod end bearing.
- That no foreign objects remain in the aircraft.

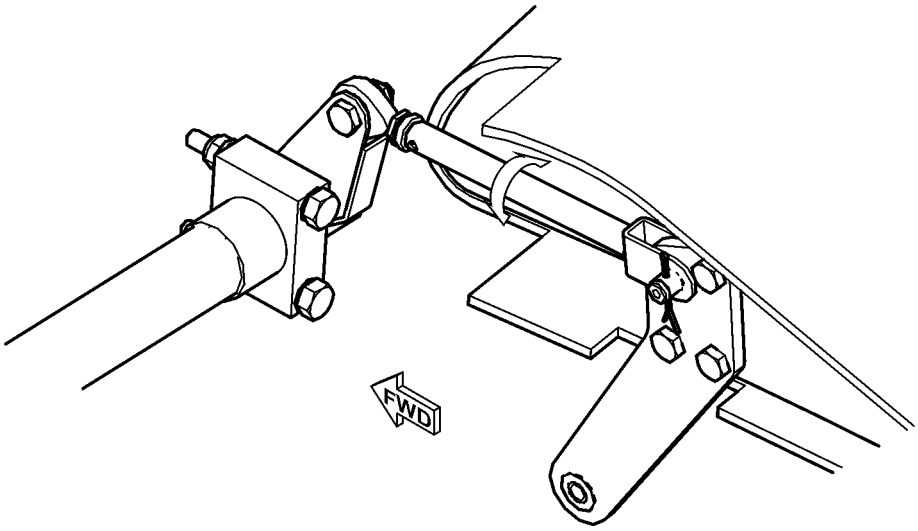


Fig. 27-17 Swivel Motion of Push Rod

(3) Adjustment / test - flaps deflections:

Both wing flaps have to be adjusted simultaneously. Described is adjusting of the right side. The process for the left side is mirrored.

CONTROL SURFACE DEFLECTIONS			
Control surface	Up	Deflection	Distance measurement point from the point of rotation
Wing flaps	FLAPS 1	15 ±2° 76 ±6 mm	295 mm (Root rib of the outer wing)
	FLAPS 2	24 ±2° 120 ±6 mm	
	FLAPS 3	35 ±2° 181 ±6 mm	
Maximum deflection difference between both flaps: ±2°/±6 mm			

Tab. 27-8 Wing Flap Deflections

(a) Set protractor on trailing edge of wing flap root.

(b) Set wing flaps to fully retracted position.

(c) Set the protractor to 0°- starting value for measurement.

(d) Check deflections at first position 15°, second position 24° and third position 35°, see Tab. 27-8.

(e) Check if deflections are symmetrical on both wing flaps.

(f) If deflections are not within range listed in Tab. 27-8, remove cotter pin (17, Fig. 27-18) and pin (4), release lock nut (10), use new washer (16) and screw push rod (3) to set correct length.

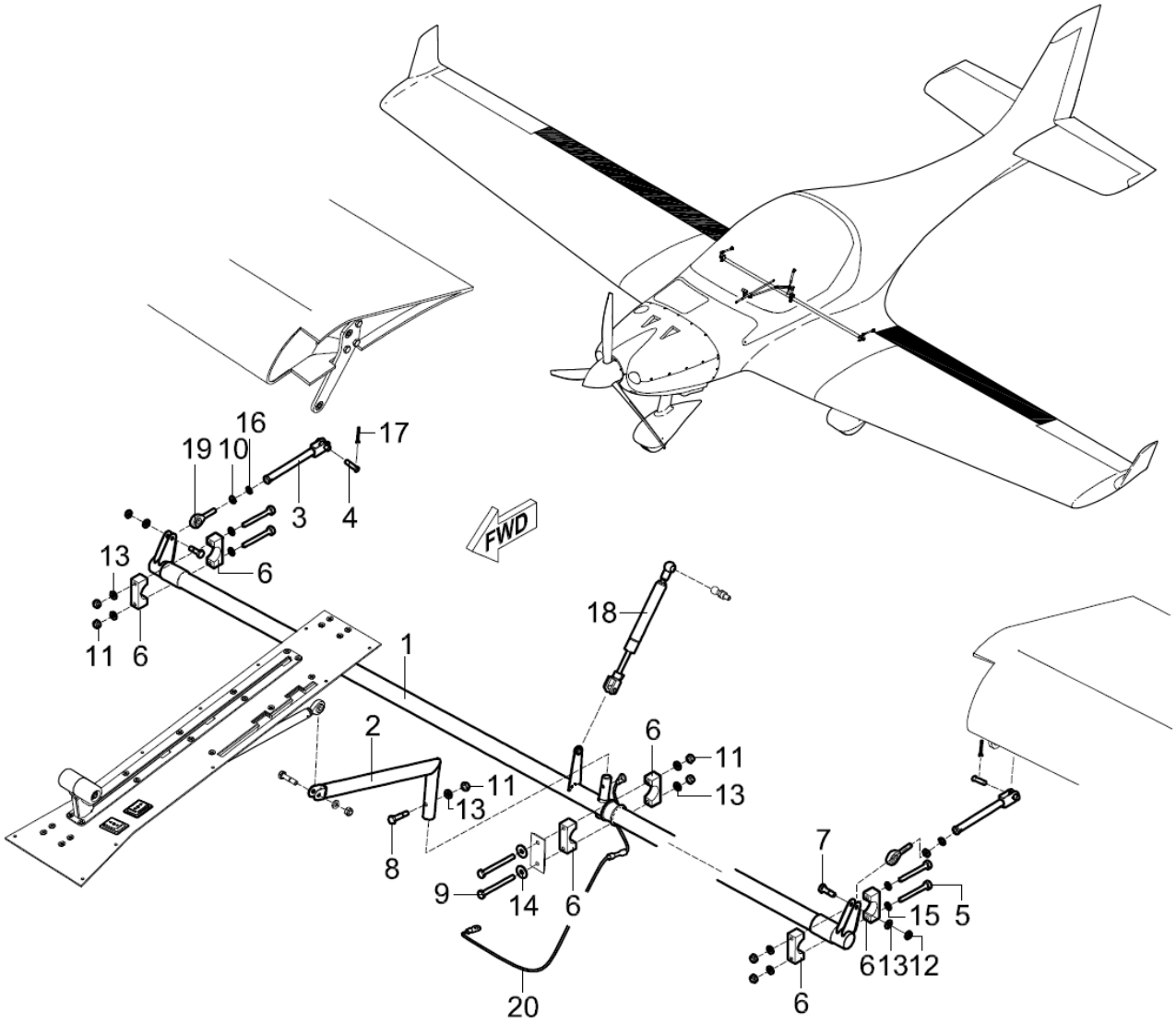
(g) Check if push rod fork (3) is parallel with swivel bearing (19).

(h) Tighten lock nut (10).

(i) Connect push rod (3) to wing flap with pin (4) and secure with cotter pin (17).

(j) Carry out test and check:

- That the pins are secured with cotter pins.
- Free movement of flap control system.
- Deflections.
- Push rod swivel motion in both wing flap positions for binding (retracted and fully extended) (Fig. 27-17); if binding occurs, realign rod end bearing.
- That no foreign objects remained in the aircraft.



1 – Torsion tube
2 – Bellcrank
3 – Push-pull rod
4 – Pin
5 – Bolt M6 x 52
6 – Sliding bearing
7 – Bolt M6 x 19
8 – Bolt M6 x 28
9 – Bolt M6 x 60
10 - Nut M6
11 - Self-locking nut M6
12 - Nut M6
13 - Washer ø6.4 x 12 x 1.6
14 - Washer ø6.4 x 18 x 1.6
15 – Washer ø6.4 x 12 x 0.5
16 – Serrated locking washer ø6.4
17 – Cotter pin ø1.6 x 25
18 – Booster
19 – Swivel bearing
20 – Ground wire

Fig. 27-18 Flap Control System Removal / Installation

B. Pedestal panel

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 8	1 pc
Screwdriver 10	1 pc
Philips screwdriver	1 pc
Vaseline	AR
Persons	1

Tab. 27-7 Recommended tools, materials, persons and documentation

(1) Pedestal panel removal:

(a) Remove upholstery (3, Fig. 27-19).

(b) Remove arm rest (2) by unscrewing the bolts (7).

(c) Unscrew the nut (16), remove washer (14), bolt (9) and the brake handle (5).

(d) Disconnect the push rod (4) from bellcrank (17) by unscrewing nut (15) and removing bolt (11) with washer (12).

(e) Unscrew the bolts (7) and carefully lift the pedestal panel (1).

(f) Disconnect the connector (18).

(g) Disconnect push rod (4) from main cover (1), by unscrewing nut (15) and removing washers (12; 13) with bolt (10).

(h) Remove pedestal panel (1).

(2) Pedestal panel installation:

(a) Thoroughly clean and lubricate bearings on push rods with Vaseline before each assembling (Chapter 12-20).

NOTE

If using new push rod (4, Fig. 27-19), fully screw swivel bearings and tighten counter nuts. Check parallelism of swivel bearings.

(b) Connect push rod (4) to pedestal panel (1), using bolt (10), washers (12; 13) and nut (15).

(c) Connect push rod (4) to bellcrank (17), using bolt (11), washer (12) and nut (15).

WARNING

CHECK CONTROL TUNNEL VERY CAREFULLY FOR FOREIGN OBJECTS AND TOOLS AFTER REASSEMBLY!

(d) Connect the connector (18).

(e) Place the pedestal panel (1) to the tunnel and install attaching bolts (7).

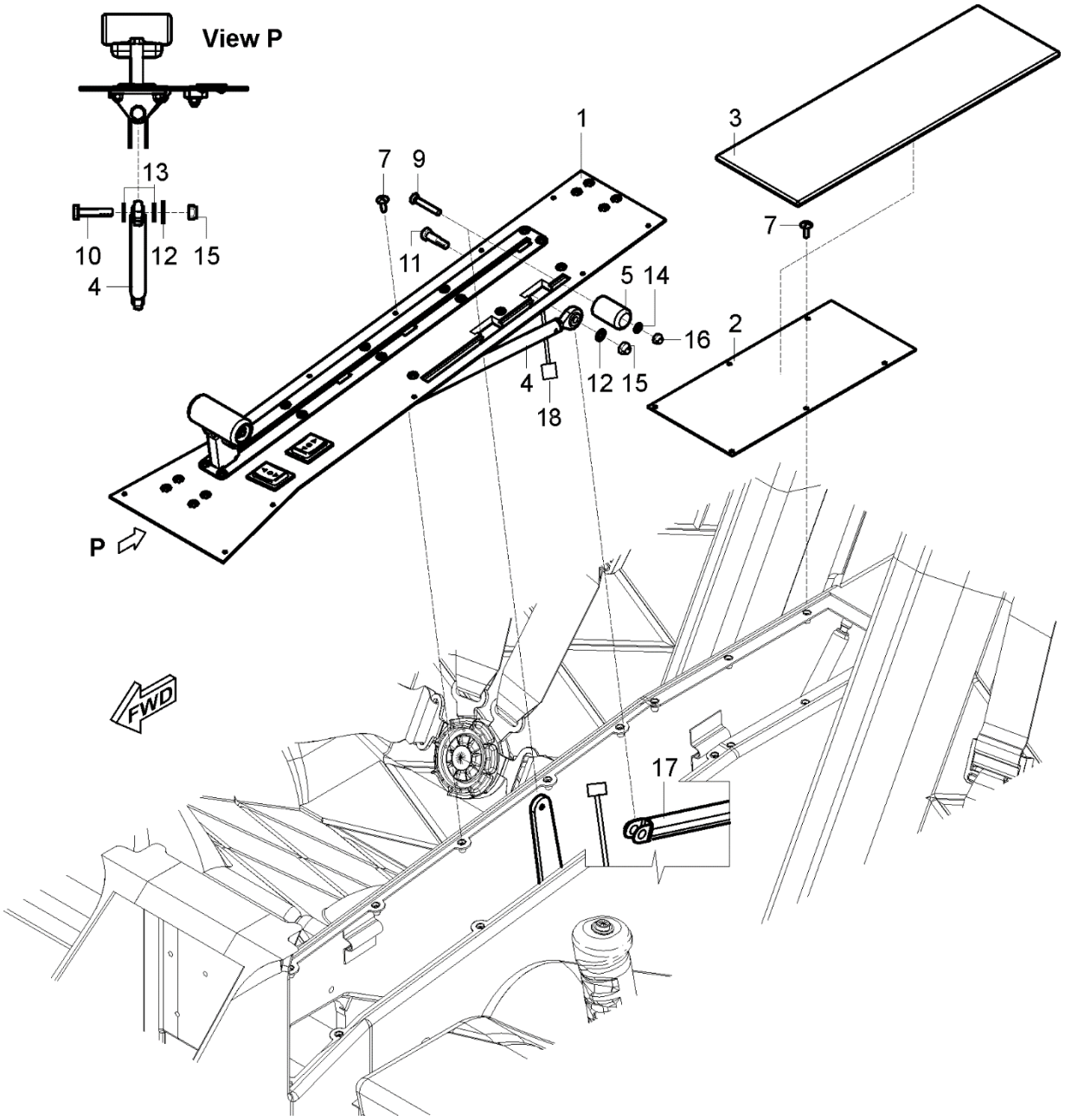
(f) Install the brake handle (5) by using bolt (9), nut (16) and washer (14),

(g) Place the arm rest (2) to the tunnel and install attaching bolts (7).

(h) Install upholstery (3).

(i) Carry out test and check:

- If all bolt connections are tight.
- Free movement of control levers.
- That no foreign objects remain in the aircraft.



1 – Slotted link
2 – Arm rest
3 – Upholstery
4 – Push rod
5 – Brake handle
6 – Intentionally left blank
7 – Bolt M4 x 12
8 – Intentionally left blank
9 – Bolt M5 x 30
10 – Bolt M6 x 28
11 – Bolt M6 x 19
12 – Washer ø6.4 x 12 x 1.6
13 – Washer ø6.4 x 10 x 1.6
14 – Washer ø5.3 x 10 x 1
15 – Self-locking nut M6
16 – Self-locking nut M5
17 – Bellcrank
18 – Connector

Fig. 27-19 Pedestal panel Removal / Installation

28 FUEL

CONTENTS

Chapter	Description	Page
28-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	5
28-10	**STORAGE**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	7
	A. Drain valve	7
28-20	**DISTRIBUTION**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	10
	A. Electric fuel pump	10
	B. One-way valve	12
	C. Fuel filter	13
	D. Fuel strainer	16
	E. Fuel selector	18
	F. Fuel lines	21
	G. Ventilation line	26
28-40	**INDICATING**	**29**
	1. DESCRIPTION	29
	2. MAINTENANCE PRACTICES	29
	A. SV-D1000 display	29
	D. Standby fuel pressure indicator	29
	E. Fuel level sensor	30
	F. Fuel pressure sensor	34
	G. Fuel flow transducer	36

This page is left blank intentionally

28-00 GENERAL

1. INTRODUCTION

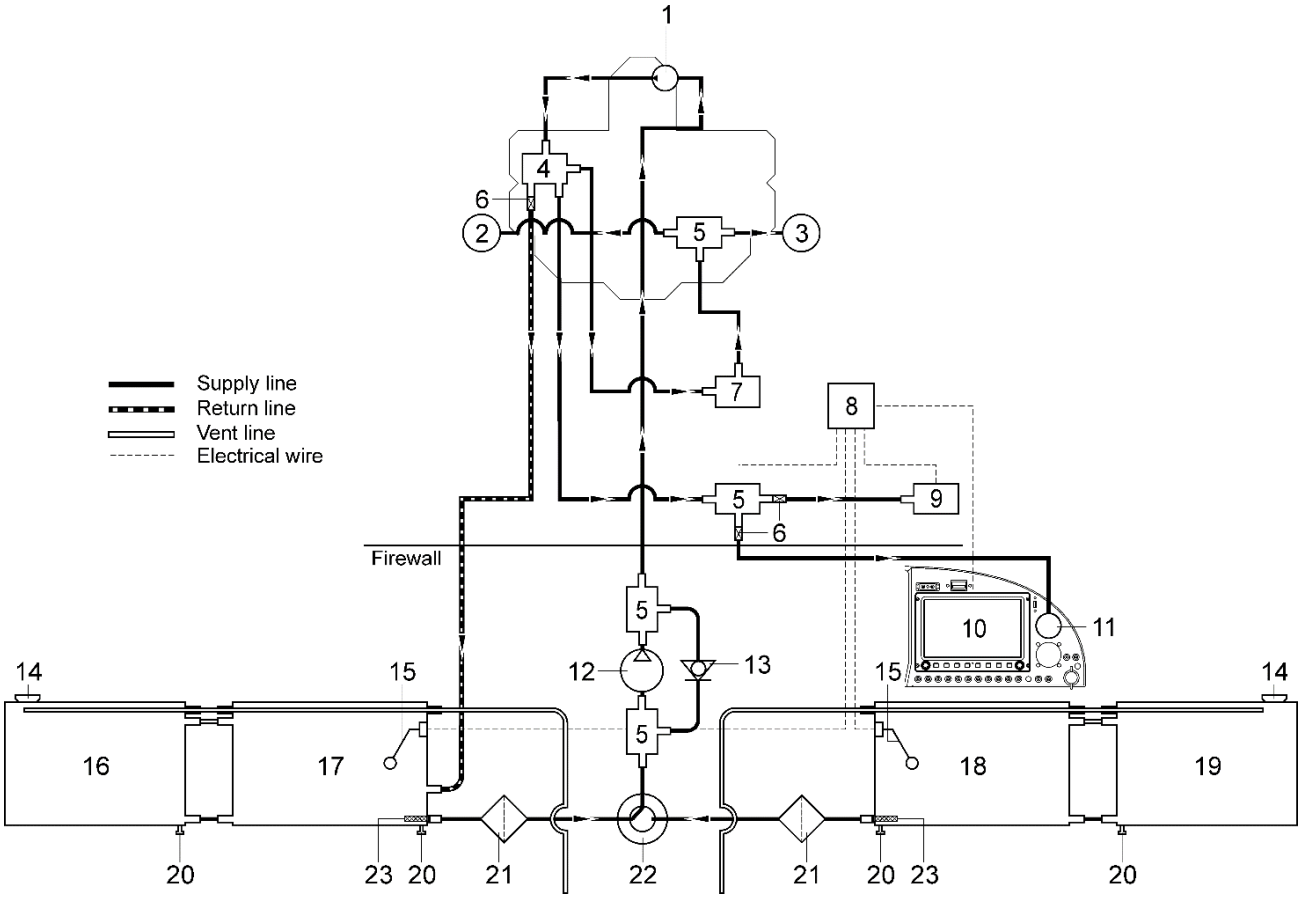
Fuel is supplied to the engine in dependence from fuel selector position (**LEFT** - **RIGHT** - **OFF**) (22, Fig. 28-1). From fuel tanks (16; 17; 18; 19) the fuel flows through the fuel strainers (23) and fuel filters (21) to the fuel selector (22) inlets. From the fuel selector the fuel flows through the electric fuel pump (12) with the by-pass check valve (13) to engine driven fuel pump (1) and then to distributor inlet (4). One of distributor's outlets is connected to carburettors (2; 3) through the fuel flow transducer (7) and 3-way distributor (5). Fuel flow transducer is installed the way to measure only the fuel consumed by engine. Second one is fitted with restrictor jet (6) to which return line is connected. Return line leads back to the left fuel tank (17).

Wing fuel tanks (16; 19) are connected with the fuselage tanks (17; 18) using simple hose connection with clamps. Fuel tanks are vented from the highest point and discharge through the hoses protruding under aircraft through the fuselage skin inside of central tunnel.

There is fuel level sensor (15) in the both left and right fuel tank. Fuel level sensor is installed in the root rib of fuselage fuel tanks. Signal from the fuel level sensor is carried to the engine monitoring system unit Dynon SV-EMS 220 (8) and from there to the Dynon SkyView SV-D1000 (10).

Fuel pressure sensor (9) and standby fuel pressure indicator (11) are installed in the fuel system and connected through the 3-way distributor (5) with restrictor jets in its outlets to the 4-way distributor (4). Both check the actual pressure in the fuel supply line. Signal from the fuel pressure sensor is carried to the engine monitoring system unit Dynon EMS 220 (8) and from there to the Dynon SkyView SV-D1000 (10). Exceeding of fuel pressure limit value is signalized by red warning lamp **EMS** on the instrument panel (Chapter 39).

Wiring diagram of fuel system components is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).



1 – Engine fuel pump
2 – LH carburetor
3 – RH carburetor
4 – 4-way distributor
5 – 3-way distributor
6 – Restrictor jet
7 – Fuel flow transducer
8 – SV-EMS 220
9 – Fuel pressure sensor
10 – SkyView SV-D1000
11 – Standby fuel pressure indicator
12 – Electric fuel pump
13 – One-way valve
14 – Filler cap
15 – Fuel level sensor
16 – LH wing fuel tank
17 – LH center section fuel tank
18 – RH centre section fuel tank
19 – RH wing fuel tank
20 – Drain valve
21 – Fuel filter
22 – Fuel selector
23 – Fuel strainer

Fig. 28-1 Fuel System Scheme

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Filler cap leaks.	Filler cap improperly installed.	Install filler cap properly.
	Seal improperly installed.	Replace fuel cap seal.
	Deteriorated seal.	Replace fuel cap seal.
Fuel connector(s) leak.	Loose connector(s).	Inspect and tighten connector(s).
	Defective seals.	Replace seals.
	Defective thread.	Replace threaded component.
Insufficient fuel flow.	Restricted fuel filter.	Replace filter.
	Defective engine fuel pump.	Replace pump.
	Defective fuel pressure sensor.	Replace pressure sensor.
	Cracked fuel line.	Replace line.
Fuel quantity indicator reading incorrect.	Defective fuel sensor.	Replace sensor.
	Defective fuel quantity indicator.	Replace indicator.
	Incorrectly adjusted fuel sensor.	Adjust sensor.
	Faulty fuel system wiring.	Repair/Replace wire(s).
No fuel flow to the engine fuel pump.	Fuel selector valve not in the **ON** position.	Turn selector valve **ON**.
	Fuel tanks empty.	Fill tanks.
	Fuel line disconnected or broken.	Repair or replace line.
	Defective fuel selector valve.	Replace selector valve.
	Fuel line plugged.	Remove obstruction.
Fuel starvation after start up.	Partial fuel flow from proceeding causes.	See remedies from above
	Malfunction of engine-driven fuel pump or fuel system.	Replace pump.

TROUBLE	POSSIBLE CAUSE	REMEDY
Fuel starvation after start up (cont.).	Fuel vents plugged.	Remove obstruction.
	Water in fuel.	Remove water.
Erratic fuel quantity indicator readings.	Defective fuel quantity indicator	Replace indicator
	Defective fuel sensor	Replace fuel sensor
Fuel quantity indicator indicates inaccurate fuel level.	Fuel system calibration.	Calibrate fuel system.
	Defective fuel quantity indicator or sensor.	Replace indicator or sensor.
No fuel quantity indication	Fuel tanks empty	Fill with approved fuel
	Loose connections.	Tighten connections.
	Defective fuel quantity indicator or sensor	Replace indicator or sensor.

28-10 STORAGE

1. DESCRIPTION

The aircraft has integral fuel tanks with a total capacity of approximately 126 liters.

The integral fuel tanks are located in the forward box of the fuselage central section and both halves of wing. The wing and central section tanks are connected by a simple hose connection with clamps. There is one large diameter hose between tanks, which serves the fuel from the wing tanks to central section tanks. There are two small diameter hoses, one of them is venting line of wing tank and second one connects the both tanks (air connection).

The integral fuel tanks are covered by a special paint resistive to fuel with a less electrical resistance. There is a rib in each tank for preclusion of a rapid fuel flowage during the flight manoeuvres.

The fuel tank filler caps are located on a wing upper surface. The drain valves are located the lowest point of each tank.

2. MAINTENANCE PRACTICES

A. Drain valve

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Socket 16	1 pc
O-ring ø18.9 x 1.8	1 pc
Loctite 243	AR
Persons	1

Tab. 28-1 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM!

(1) Drain valve removal:

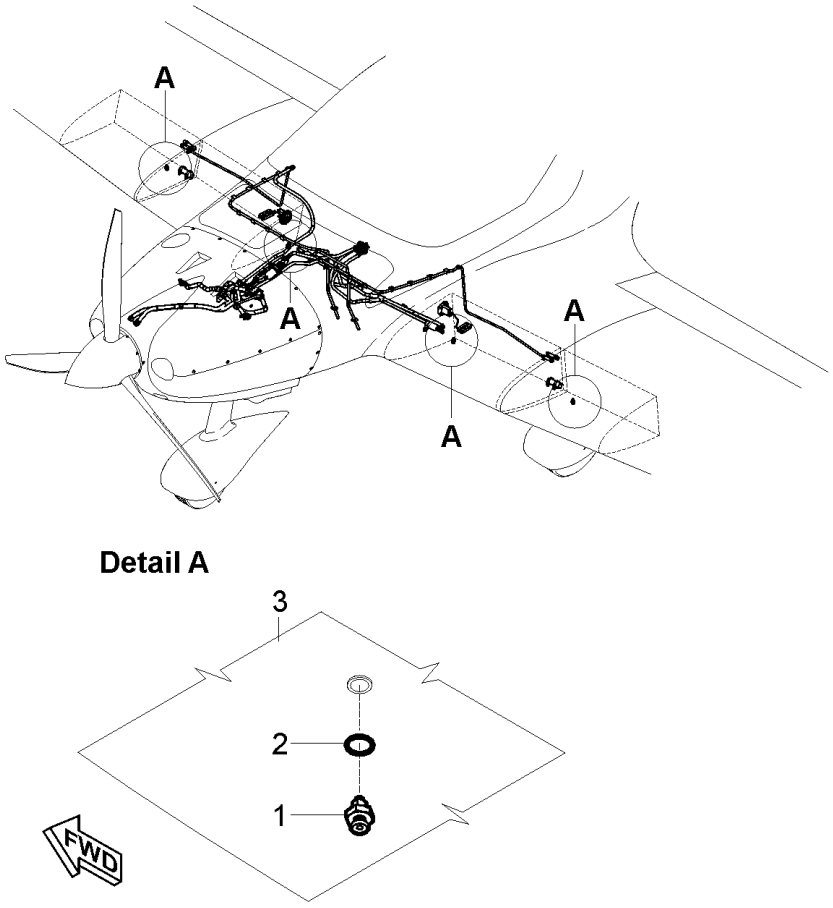
(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.
(e) Drain fuel tanks (Chapter 12-10).
(f) Unscrew and remove the drain valve (1, Fig. 28-2) from wing.
(g) Discard O-ring (2).

(2) Drain valve installation:
(a) Make sure that the **IGNITION** switches are set to **OFF**.
(b) Inspect drain valve for contaminates; remove contaminates as necessary.
(c) Apply Loctite 243 and screw the drain valve (1, Fig. 28-2) with a new O-ring (2).
(d) Check if drain valve is firmly secured and sealed.
(e) Connect negative terminal of the battery (Chapter 24-30).
(f) Replenish the fuel system (Chapter 12-10).
(g) Remove the ground cable from the aircraft.
(h) Carry out engine ground test; check the drain valve function and fuel system for leaks.



1 – Drain valve
2 – O-ring ø7.66 x 1.78

For information:
3 – Wing bottom surface

Fig. 28-2 Drain Valve Removal / Installation

28-20 DISTRIBUTION

1. DESCRIPTION

Fuel is supplied to the engine in dependence from **FUEL** selector valve position (**LEFT** - **RIGHT** - **OFF**). From both fuel tanks, the fuel flows through the fuel strainers and fuel filters to the **FUEL** selector valve inlets.

From the **FUEL** selector valve the fuel flows through the electric fuel pump (by-passed with check valve) to engine driven fuel pump and then to distributor inlet.

One of distributor's outlets is connected to carburettors through the fuel flow meter sensor and 3-way distributor. Fuel flow transducer is installed the way to measure only the fuel consumed by engine. Second one is fitted with restrictor jet to which return line is connected. Return line leads back to the left fuel tank.

Fuel pressure sensor and standby fuel pressure indicator are installed in the fuel system and connected through the 3-way distributor with restrictor jets in its outlets to the 4-way distributor. Both check the actual pressure in the fuel supply line.

Wing fuel tanks are ventilated from the highest point through the pipe inside of fuselage wing tanks and discharge through the hoses which exit through the lower fuselage skin in the central tunnel in front of main spar.

Scheme of fuel system is shown at Fig. 28-1.

Fuel lines in the engine compartment are protected with a fire pyro jacket covering. Fuel lines are fixed to avoid wear from vibrations.

2. MAINTENANCE PRACTICES

A. Electric fuel pump

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	1 pc
Wrench 10	1 pc
Screwdriver	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Persons	1

Tab. 28-2 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM!

(1) Electric fuel pump removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(e) Drain fuel tanks (Chapter 12-10).

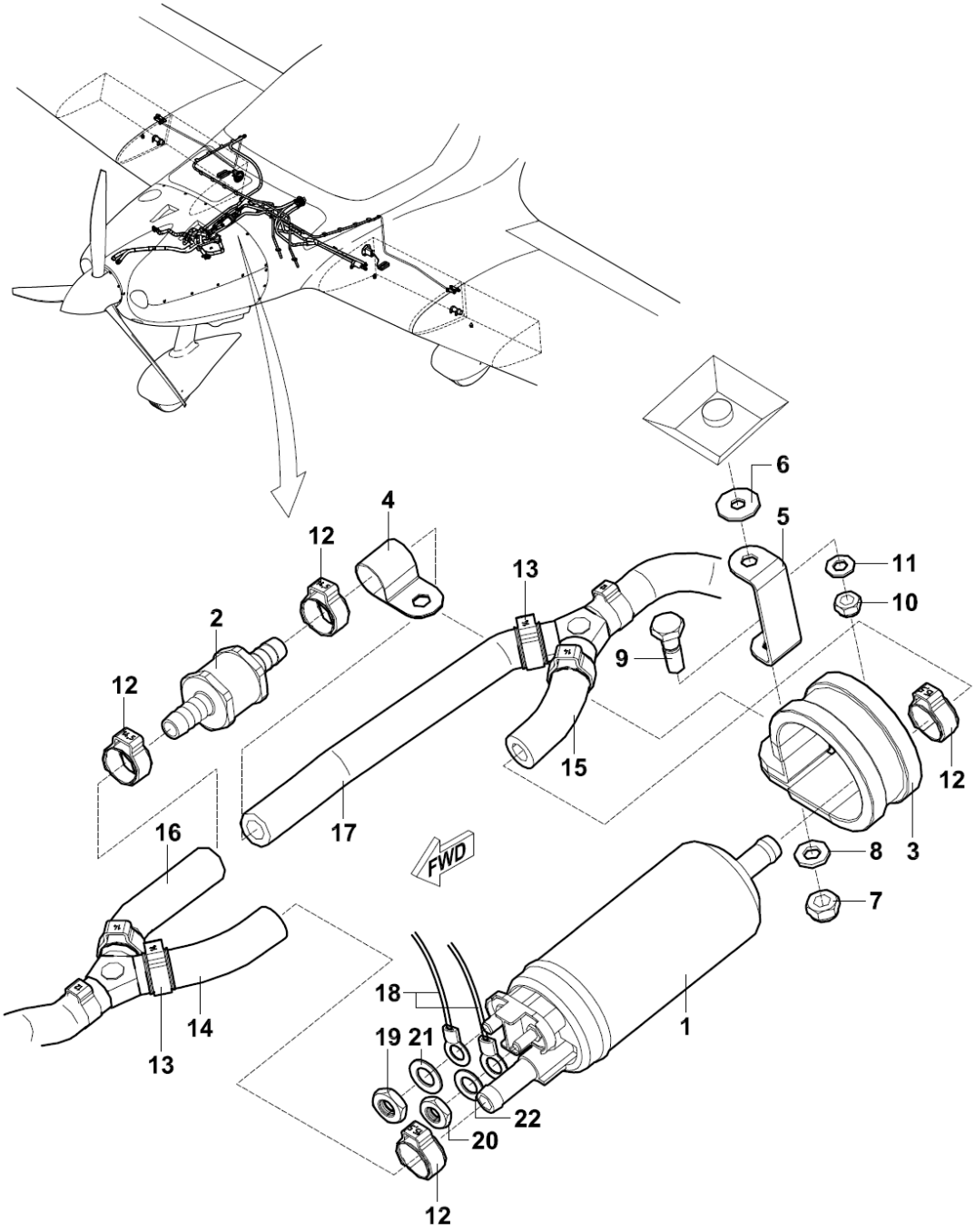
(f) Unscrew the nuts (19; 20, Fig. 28-3) and remove the washers (21; 22) and disconnect the wires (18).

(g) Unscrew the nut (7), remove the washer (8) and the bolt (9).

(h) Remove the hose clamps (12) on both sides of el. fuel pump (1).

(i) Disconnect the el. fuel pump (1) from hoses (14; 15) and remove it.

(j) Remove the clamp (3).



1 – El. fuel pump	9 – Bolt M6 x 18	17 – Fuel hose
2 – One-way valve	10 – Self-locking nut M5	18 – El. wires
3 – Clamp	11 – Washer ø5.3 x 10 x 1	19 – Nut M5
4 – Clamp	12 – Hose clamp 15.5	20 – Nut M4
5 – Bracket	13 – Hose clamp 14.0	21 – Washer 5
6 – Washer ø5.3 x 15 x 1.2	14 – Fuel hose	22 – Washer 4
7 – Self-locking nut M6	15 – Fuel hose	
8 – Washer ø6.4 x 12 x 1.6	16 – Fuel hose	

Fig. 28-3 Electric Fuel Pump Removal / Installation

(2) Electric fuel pump installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

WARNING

BEWARE TO ENSURE CORRECT DIRECTION OF FLOW!

(b) Put clamp (3, Fig. 28-3) on the fuel pump body. Put the hose clamps (12) on the fuel hoses (14, 15) and connect to the el. fuel pump (1).

(c) Check correct orientation of el. fuel pump.

(d) Secure the hose clamps (12).

(e) Align clamp (3) with bracket (5) and attach the el. fuel pump (1) using bolt (9), nut (7) and the washer (8).

(f) By means of the nuts (19; 20) and the washers (21; 22) connect the wires (18).

(g) Check if fuel pump is firmly secured and sealed.

(h) Connect negative terminal of the battery (Chapter 24-30).

(i) Replenish the fuel system (Chapter 12-10).

(j) Remove the ground cable from the aircraft.

(k) Carry out engine ground test; check the fuel pump function and fuel system for leaks.

B. One-way valve

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Persons	1

Tab. 28-3 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM.

(1) One-way valve removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(e) Drain fuel tanks (Chapter 12-10).

(f) Remove hose clamps (12, Fig. 28-3) and disconnect one-way valve (2) from hoses (16; 17).

(2) One-way valve installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

WARNING

BEWARE TO ENSURE CORRECT DIRECTION OF FLOW!

(b) Put the hose clamps (12, Fig. 28-3) on the fuel hoses (16; 17) and connect to the one-way valve (2).

(c) Check correct orientation of one-way valve.

(d) Secure the hose clamps (12).

(e) Check if one-way valve is firmly secured and sealed.

(f) Connect negative terminal of the battery (Chapter 24-30).

(g) Replenish the fuel system (Chapter 12-10).

(h) Remove the ground cable from the aircraft.

(i) Carry out engine ground test; check fuel system for leaks.

C. Fuel filter

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Wrench 13	1 pc
Screwdriver	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Persons	1

Tab. 28-4 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM.

NOTE

Described is removal and installation one side.

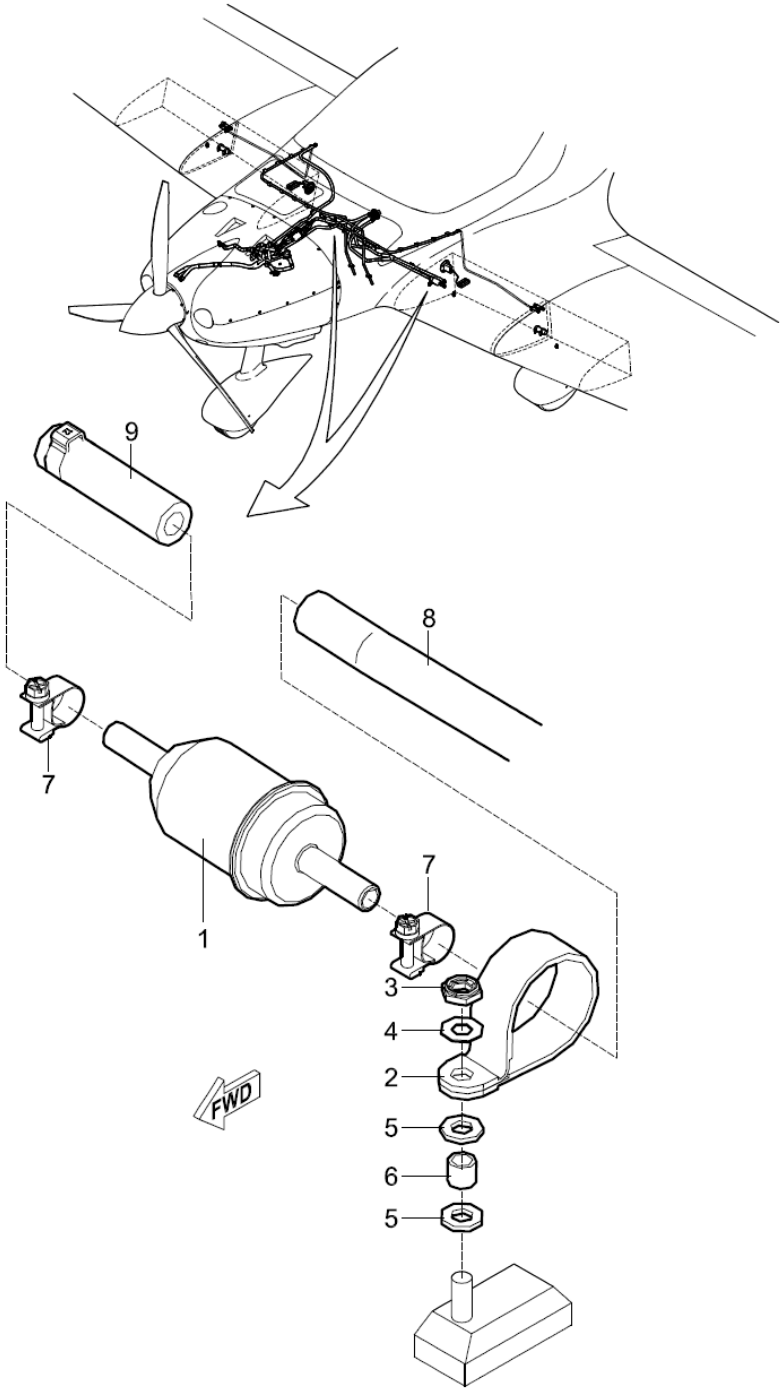
(1) Fuel filter removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove engine cowlings (Chapter 71-10).
- (c) Disconnect negative terminal of battery (Chapter 24-30).
- (d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.
- (e) Drain fuel tanks (Chapter 12-10).
- (f) In front of seats remove the cover (1; 2, Fig. 06-4, Chapter 06-00).
- (g) Remove the hose clamps (7, Fig. 28-4).
- (h) Unscrew the nut (3), remove the washers (4; 5) and distance tube (6).
- (i) Disconnect the fuel filter (1) from hoses (8; 9).
- (j) Remove fuel filter (1) from fuel filter clamp (2).

(2) Fuel filter installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.

WARNING

BEWARE TO ENSURE CORRECT DIRECTION OF FLOW!

- (b) Put the fuel filter clamp (2, Fig. 28-4) on the fuel filter (1) and hose clamps (7) on the fuel hoses (8; 9).
- (c) Connect fuel hoses (8; 9) to the fuel filter (1)
- (d) Check correct orientation of fuel filter.
- (e) Secure the hose clamps (7).
- (f) Attach fuel filter clamp (2) on laminated bolt using distance tube (6), washers (4; 5) and tighten the nut (3).
- (g) Check if fuel filter is firmly secured and sealed.
- (h) Connect negative terminal of the battery (Chapter 24-30).
- (i) Replenish the fuel system (Chapter 12-10).
- (j) Remove the ground cable from the aircraft.
- (k) Carry out engine ground test; check fuel system for leaks.



1 – Fuel filter
2 – Filter clamp
3 – Self-locking nut M6
4 – Washer ø6.4 x 12 x 0.5
5 – Washer ø6.4 x 12 x 1.6
6 – Distance tube
7 – Hose clamp 12
8 – Fuel hose
9 – Fuel hose

Fig. 28-4 Fuel Filter Removal / Installation

D. Fuel strainer

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 17	2 pcs
Pliers	1 pc
Oetiker pliers	1 pc
Hose clamps (as appropriate)	AR
Loctite 577	AR
Persons	1

Tab. 28-5 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM.

NOTE

Described is removal and installation of strainer on right side. The process is the same for left side.

(1) Fuel strainer removal and cleaning:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove engine cowlings (Chapter 71-10).
- (c) Disconnect negative terminal of battery (Chapter 24-30).
- (d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.
- (e) Drain fuel tanks (Chapter 12-10).
- (f) Remove hose clamp (3, Fig. 28-5); Disconnect hose (4) from socket (2).
- (g) Remove fuel strainer (1) together with socket (2) from flange (5).
- (h) If necessary, disassemble socket (2) and fuel strainer (1).
- (i) Clean fuel strainer with compressed air.

(2) Fuel strainer installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) If necessary, assemble fuel strainer (1, Fig. 28-5) and socket (2). Apply Loctite 577 on threads to secure and seal the joint.

(c) Screw assembled fuel strainer (1) into flange (5). Apply Loctite 577 on threads to secure and seal the joint.

WARNING

BEWARE TO ENSURE THE FUEL STRAINER IS CLEAN!

(d) Insert new hose clamp (3) on hose (4); Plug hose (4) on socket (2).

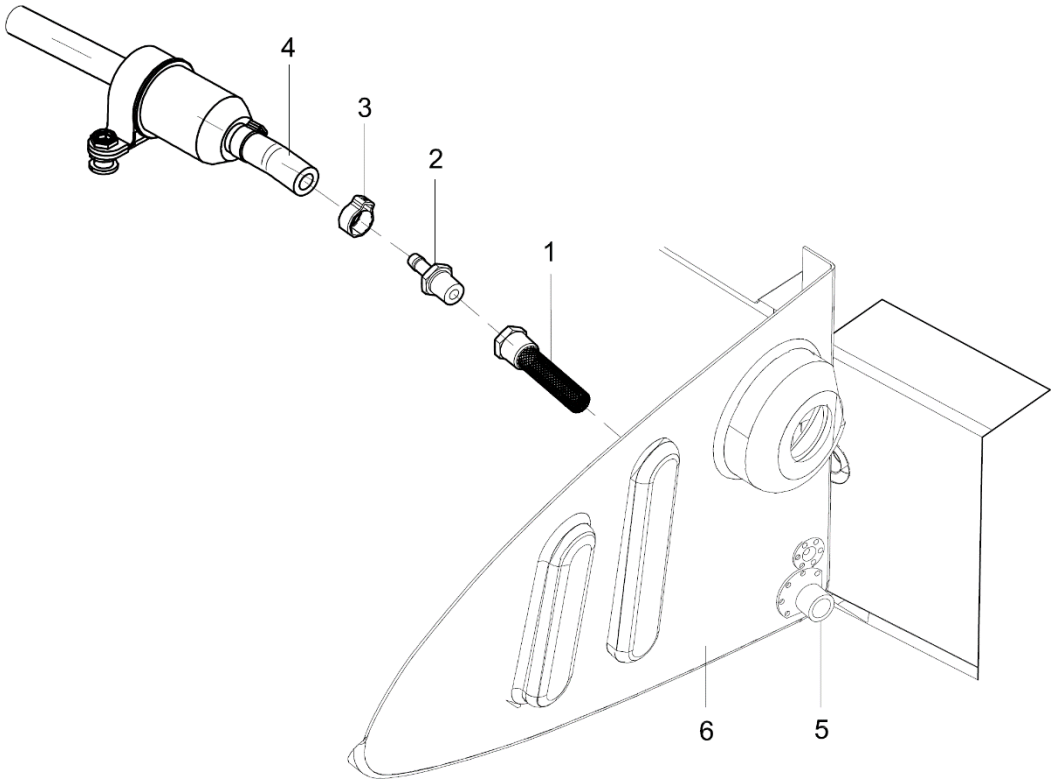
(e) Secure the hose clamp (3) using oetiker pliers.

(f) Connect negative terminal of the battery (Chapter 24-30).

(g) Replenish the fuel system (Chapter 12-10).

(h) Remove the ground cable from the aircraft.

(i) Carry out engine ground test; check fuel system for leaks.



1 – Fuel strainer
2 – Socket
3 – Hose clamp
4 – Hose to fuel filter
5 – Strainer flange
6 – Rib

Fig. 28-5 Fuel Filter Removal / Installation

E. Fuel selector

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 9	2 pcs
Screwdriver	1 pc
Hex key 2	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Serrated locking washer ø6.4	6 pcs
Loctite 542	AR
Lockwire ø0.8 mm	AR
Persons	1

Tab. 28-6 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM.

(1) Fuel selector removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

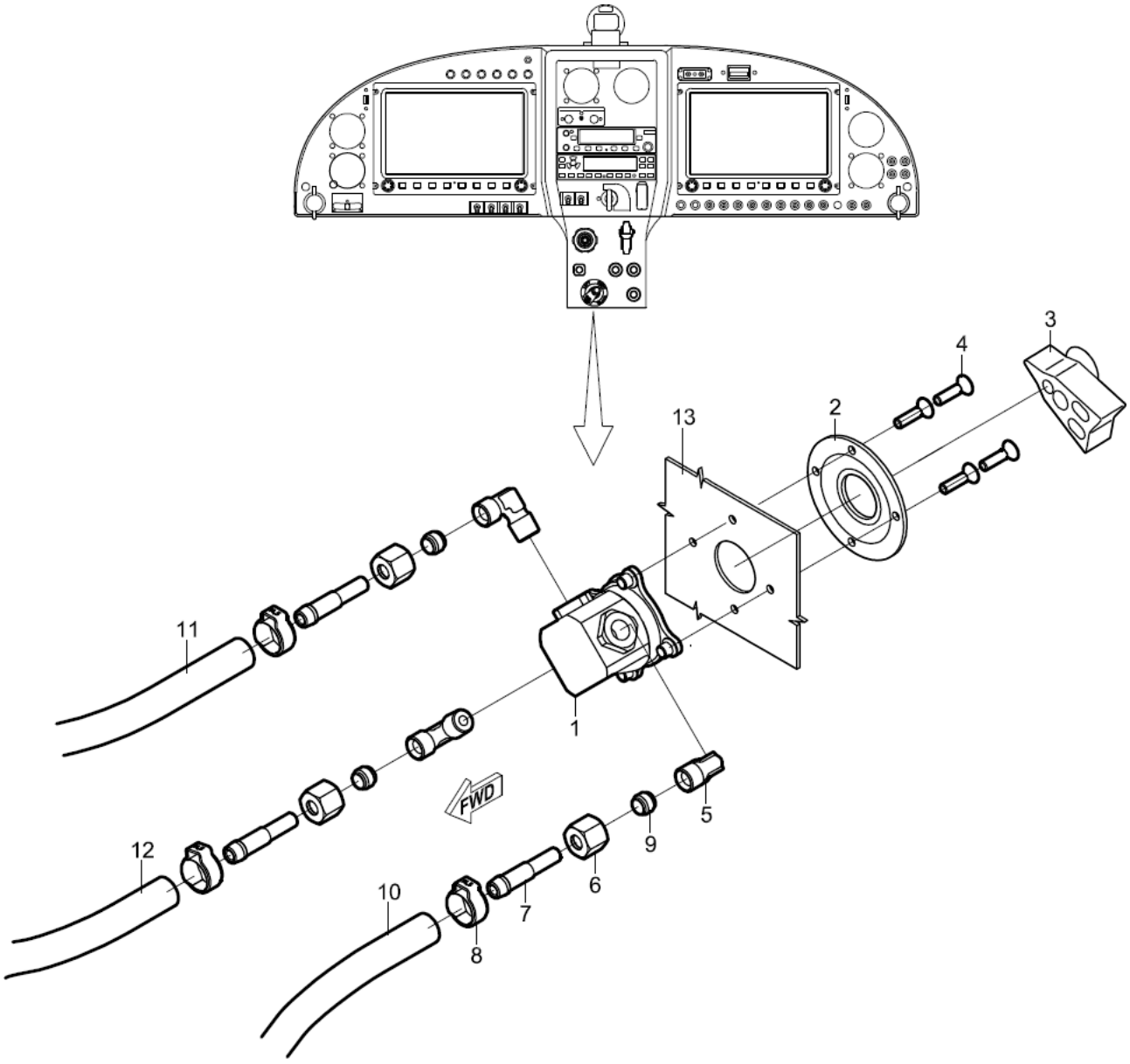
(e) Drain fuel tanks (Chapter 12-10).

(f) On fuel selector handle (3, Fig. 28-6), unscrew the hex bolt and remove fuel selector handle.

(g) Unscrew the screws (4) and remove the flange (2).

(h) Pull fuel selector (1) into central instrument panel. From the left side of central instrument panel, remove hose clamps (8) and disconnect fuel selector (1) from hoses (10; 11; 12).

(i) Disassemble fuel valve (1), by unscrewing hose fitting nuts (6), elbow fittings (5), removing hose sockets (7) and olives (9).



1 – Fuel selector body
2 – Flange
3 – Fuel selector handle
4 – Screw M4 x 16
5 – Elbow fitting
6 – Hose fitting nut
7 – Hose socket
8 – Hose clamp 14.5
9 – Olive
10 – Fuel hose (from LH fuel tank)
11 – Fuel hose (to engine)
12 – Fuel hose (from RH fuel tank)

For information:

13 – Central console

Fig. 28-6 Fuel Selector Removal / Installation

(2) Fuel selector installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Prepare fuel selector:

- Screw hose fitting elbows (5, Fig. 28-6) to fuel selector (1) secured with Loctite 542.
- Screw hose fitting nuts (6) with hose sockets (7) and olives (9).
- Release hex head bolt and remove fuel selector handle (3).

WARNING

BEWARE TO ENSURE CORRECT DIRECTION OF FLOW!

(c) Connect fuel hoses (10; 11; 12) to the fuel valve hose sockets (7) and secure them with hose clamps (8).

(d) Put fuel selector (1) into middle instrument panel, put on flange (2) and screw the screws (4).

(e) Put fuel selector handle on (3) and tighten hex head bolt.

(f) Check if selector is firmly secured and sealed.

(g) Connect negative terminal of the battery (Chapter 24-30).

(h) Replenish the fuel system (Chapter 12-10).

(i) Remove the ground cable from the aircraft.

(j) Carry out engine ground test; check fuel system for leaks.

F. Fuel lines

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Socket 12	1 pc
Screwdriver 5	1 pc
Phillips screwdriver	1 pc
Cable tie 2.6	AR
Cable tie 4.8	AR
Restrictor jet	3 pcs
Pliers	1 pc
Oetiker pliers	1 pc
Hose clamps (as appropriate)	AR
Silicone	AR
Pyrosil tape (fire resistant end sealing tape)	AR
Pyro jacket covering (fire sleeve)	AR
Rags	AR
Aircraft Wiring Manual (Doc. No. AS-AWM-01-000)	-
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 28-7 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM.

(1) Fuel lines removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(e) Remove airbox and air filter holder (Chapter 71-60).

(f) Remove cable ties along of length of fuel hoses.

(g) On engine fuel pump unstick end sealing tapes, remove hose clamps (20; 22, Fig. 28-7) and disconnect fuel hoses (1; 2).

(h) On both carburettors unscrew and remove banjo bolt (30), gasket rings (33) and distance tube (32) and disconnect fuel hoses (3; 5).

(i) In engine compartment, on 4-way distributor (28), unstick end sealing tapes, remove hose clamps (23) and disconnect the hoses (1; 16; 17; 19).

(j) On 3-way distributor (27) connecting carburettors with fuel flow transducer, unstick end sealing tapes, remove hose clamps (23) and disconnect hoses (3; 4; 5).

(k) On 3-way distributor (27) connecting the fuel pressure sensor with the fuel pressure indicator, unstick end sealing tapes, remove hose clamps (23) and disconnect hoses (15; 18; 19).

(l) On 3-way distributors (27) connecting el. fuel pump, one-way valve, fuel filter and fuel selector, remove hose clamps (23) and disconnect hoses (2; 11).

(m) Disconnect fuel flow transducer (Chapter 28-40, 2.G.).

(n) Disconnect fuel pressure sensor (Chapter 28-40, 2.F.).

(o) Disconnect the fuel hoses from fuel selector (2.E.).

(p) Disconnect the fuel hoses from fuel filters (2.C.).

(q) Disconnect the fuel hoses from fuel strainers (2.D.).

(r) Remove wing (Chapter 57-20) and remove hoses (12; 13; 14) by removing hose clamps (25; 26).

(2) Fuel lines installation:

(a) Put the pyro jacket (fire sleeve) coverings along the length of fuel hoses in engine compartment.

(b) On engine fuel pump, slide fuel hoses (1; 2, Fig. 28-7) and secure them with hose clamps (20; 22).

(c) On carburettor fittings, connect hoses (3; 5) by means of the banjo bolt (30), gasket rings (33) and distance tube (32).

WARNING

DO NOT FORGET TO PUT RESTRICTOR JETS TO 3 WAY DISTRIBUTOR AND 4 WAY DISTRIBUTOR!

(d) Put restrictor jets (29) to 3-way distributor (27) and connect fuel hoses (15; 18; 19) secure them with hose clamps (23) and stick end sealing tapes.

NOTE

Restrictor jets serve to compensate pressure shocks.

(e) Put restrictor jet (29) to 4-way distributor (28) and connect fuel hoses (1; 16; 17; 19) secure them with hose clamps (23) and stick end sealing tapes.

(f) Connect fuel hoses (3; 4; 5) to the 3-way distributors (27) connecting carburettors with fuel flow transducer and secure them with hose clamps (23).

(g) Connect fuel hoses (2; 11) to the 3-way distributors (27) connecting el. fuel pump, one-way valve and fuel selector and secure them with hose clamps (23).

(h) Connect fuel flow transducer (Chapter 28-40, 2.G.).

(i) Connect fuel pressure sensor (Chapter 28-40, 2.F.).

(j) Connect the fuel hoses to fuel selector (2.E.).

(k) Connect the fuel hoses to fuel filters (2.C.).

(l) Connect the fuel hoses to fuel strainers (2.D.).

(m) Seal ends of pyrojacket (fire sleeve) coverings with pyrosil end sealing tape.

(n) Install cable ties along of length of fuel hoses.

(o) Install airbox and air filter holder (Chapter 71-60).

(p) Connect fuel hoses (12; 13; 14) to wing hose sockets and secure with hose clamps (24; 26). Install wing (Chapter 57-20), connect fuel hoses (12; 13; 14) to fuselage hose sockets and secure with hose clamps (25; 26).

NOTE

Hose (12) belongs to ventilation line and hose (13) connecting wing and fuselage fuel tanks.

Installing fuel hoses between right side fuel tanks are same.

(q) Check if all hoses are well secured.
(r) Check if all bolts are tight.
(s) Check correct orientation of fuel filters, el. fuel pump and one-way valve.
(t) Check sealing of fuel system (2.F.(3)).
(u) Remove the ground cable from the aircraft.
(v) Check that no foreign objects remain in aircraft.

(3) Check sealing of fuel system:

NOTE

Fuel system must be fully empty.

(a) Make sure that the **IGNITION** switches are set to **OFF**.
(b) Remove the engine cowlings (Chapter 71-10).
(c) Disconnect negative terminal of battery (Chapter 24-30).
(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.
(e) Disconnect hoses connected to carburettors and seal them.
(f) Seal fuel tank caps.
(g) Put air pump with air gauge under fuselage and connect to both ends of ventilation hoses.
(h) Pressurize fuel system with air on 10 kPa. Switch the fuel selector during pressurization.
(i) During first 15 min. switch fuel selector 3 times.
(j) After 30 min. no pressure drop is allowed.
(k) Depressurize the fuel system and assemble fuel hoses on carburettors.
(l) Install the engine cowlings (Chapter 71-10).

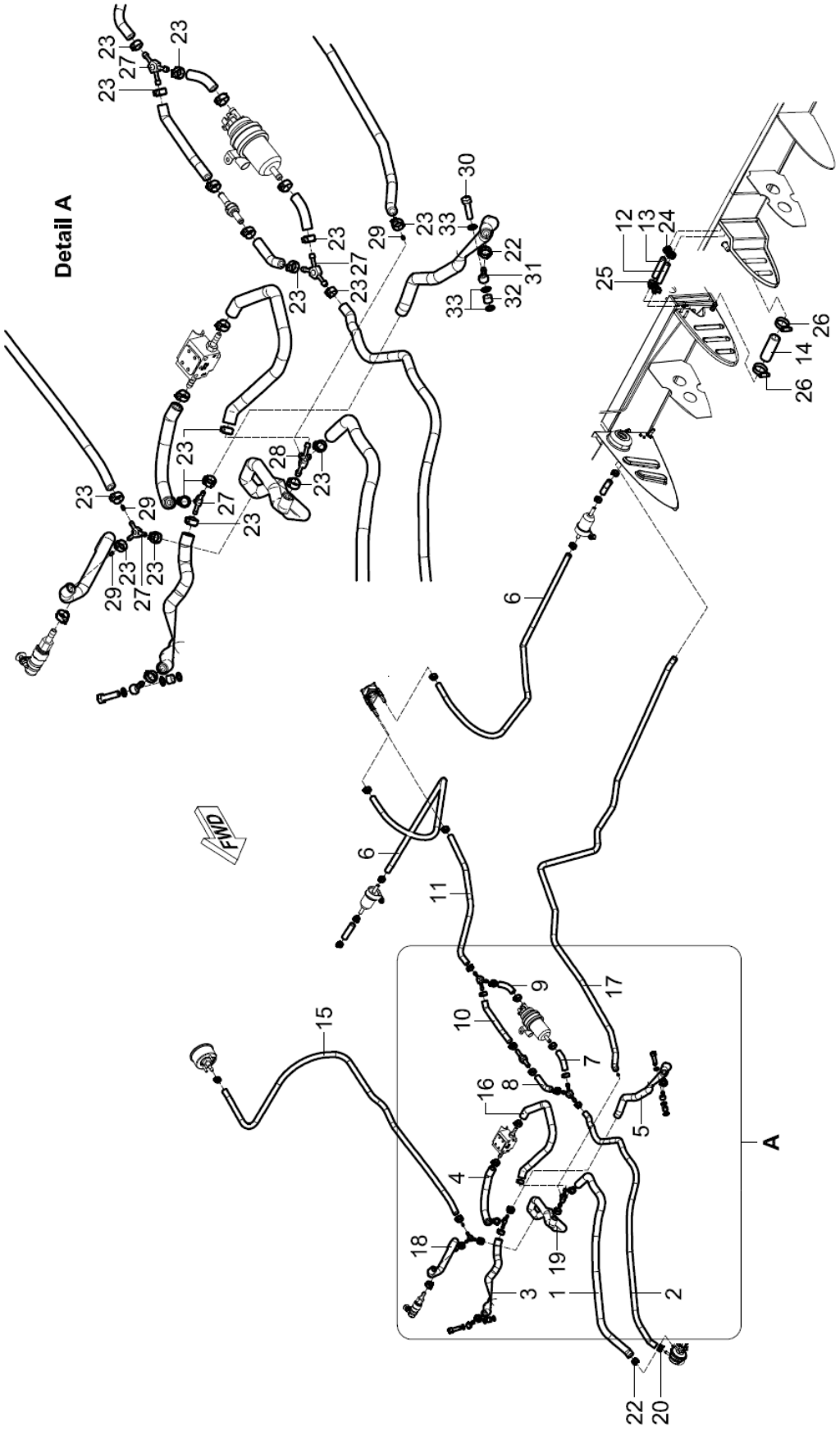


Fig. 28-7 Fuel Line Removal / Installation (page 1 of 2)

1 – Fuel hose
2 – Fuel hose
3 – Fuel hose
4 – Fuel hose
5 – Fuel hose
6 – Fuel hose
7 – Fuel hose
8 – Fuel hose
9 – Fuel hose
10 – Fuel hose
11 – Fuel hose
12 – Fuel hose
13 – Fuel hose
14 – Fuel hose
15 – Fuel hose
16 – Fuel hose
17 – Fuel hose
18 – Fuel hose
19 – Fuel hose
20 – Hose clamp 14.5
21 – Hose clamp 13.3
22 – Hose clamp 13.8
23 – Hose clamp 14
24 – Hose clamp 15.5
25 – Hose clamp ø8 - 12
26 – Hose clamp ø20 - 32
27 – 3-way distributor
28 – 4-way distributor
29 – Restrictor jet
30 – Banjo bolt
31 – Banjo eye
32 – Distance tube
33 – Cooper gasket ring ø8 x 12 x 1
34 – Socket
35 – Fuel strainer

Fig. 28-7 Fuel Line Removal / Installation (page 2 of 2)

G. Ventilation line

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 5	1 pc
Phillips screwdriver	1 pc
Pliers	1 pc
Oetiker Pliers	1 pc
Cable tie 2.6	AR
Hose clamps (as appropriate)	AR
Persons	1

Tab. 28-8 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF!

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM!

(1) Ventilation line removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(e) In cockpit on left and right side under canopy remove hose clamps (2, Fig. 28-8), disconnect ventilation hoses (1).

(f) Remove cable ties (3) on length of ventilation hoses. Pull out ventilation hoses.

(2) Ventilation line installation:

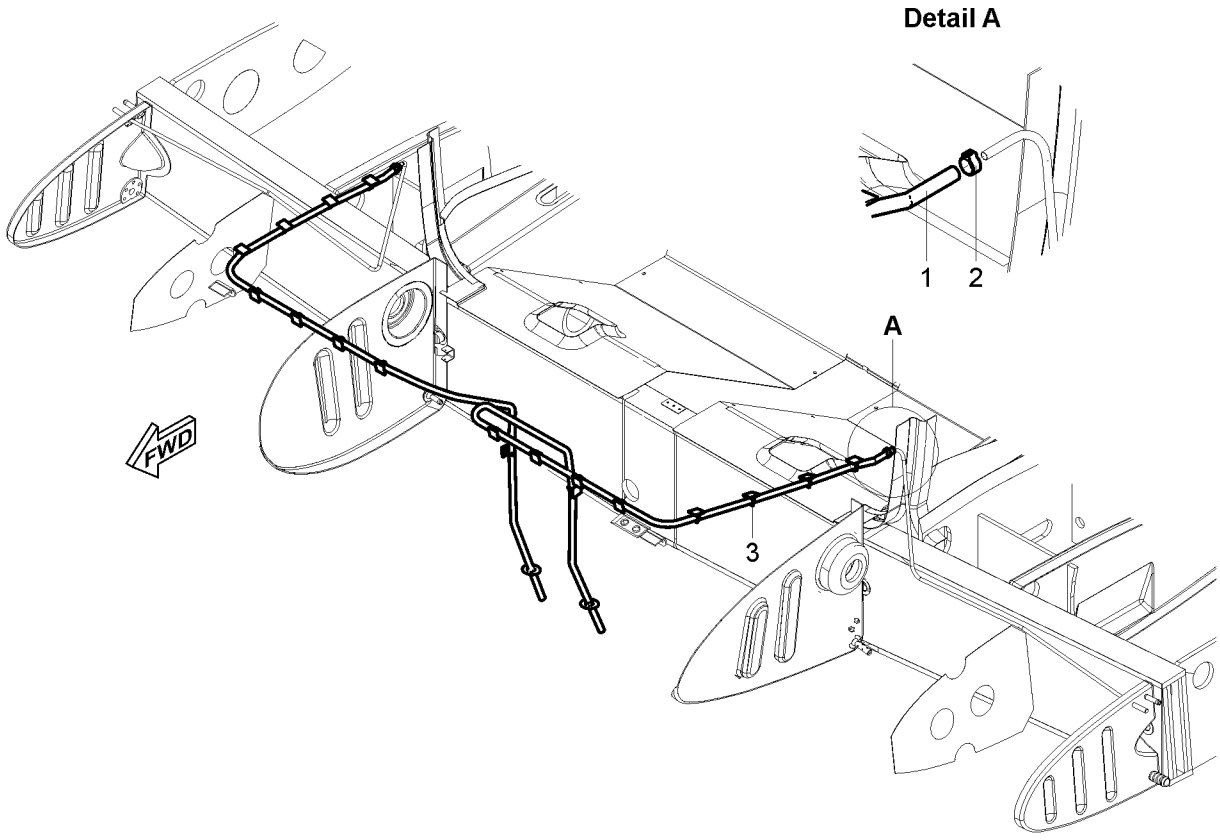
(a) In cockpit on left and right side under canopy, slide ventilation hoses (1, Fig. 28-8) on hose sockets and secure them with hose clamps (2).

(b) Route the ventilation hoses (1) and secure them with cable ties (3).

(c) Seal grommet in floor with silicone sealant.

(d) Cut slant end of ventilation hoses 6 cm under fuselage. Taper to the rear.

(e) Remove the ground cable from the aircraft.



1 – Ventilation hose

2 – Hose clamp 11.3

3 – Cable tie 2.6

Fig. 28-8 Ventilation Line Removal / Installation

This page is left blank intentionally

28-40 INDICATING

1. DESCRIPTION

The fuel level sensor is installed in the both left and right fuel tank on the root rib of fuselage fuel tank. Signal from the fuel level sensor is carried via low value warning unit and from there to the engine monitoring system unit Dynon SV-EMS 220 and from there to the Dynon SkyView SV-D1000. Low fuel quantity (less than 16 litres) is signalized with the **LH FUEL RES / RH FUEL RES** red warning lamps (Chapter 39-10).

Fuel pressure sensor and standby fuel pressure indicator are installed in the fuel system and connected through the 3-way distributor with restrictor jets in its outlets to the 4-way distributor. Both check the actual pressure in the fuel supply line. Signal from the sensor is carried to the engine monitoring system unit Dynon SV-EMS 220 and from there to the Dynon SkyView SV-D1000.

Exceeding of fuel pressure limit value is signalized by red warning lamp **EMS** on the instrument panel (Chapter 39-10).

The fuel flow transducer is located on the engine mount top. The electrically operated fuel flow transducer transmits fuel flow rate data to the engine monitoring system unit Dynon EMS 220 and from there to the Dynon SkyView SV-D1000.

2. MAINTENANCE PRACTICES

A. SV-D1000 display

For removal / installation procedures refer to Chapter 39-10.

B. SV-EMS-220 module

For removal / installation procedures refer to Chapter 77-40.

C. Low value warning unit

For removal / installation procedures refer to Chapter 31-50.

D. Standby fuel pressure indicator

For removal / installation procedures refer to Chapter 39-10.

E. Fuel level sensor

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 8	1 pc
Screwdriver	1 pc
Pliers	1 pc
Oetiker Pliers	1 pc
Loctite 577	AR
Persons	1

Tab. 28-9 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE, BE CAREFUL DURING DISASSEMBLING THE FUEL SYSTEM.

NOTE

Described is left side. The right side is mirrored.

(1) Fuel level sensor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove engine cowlings (Chapter 71-10).
- (c) Disconnect negative terminal of battery (Chapter 24-30).
- (d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.
- (e) Drain fuel tanks (Chapter 12-10).
- (f) Inside of the cockpit to the left and right of the wing pin remove round cover (3, Fig. 06-4, Chapter 06-00).
- (g) Disconnect connectors (5, Fig. 28-9).
- (h) Unscrew the bolts (3) with washers (4).
- (i) Pull out fuel float LH/RH (1) with seal (2).

(2) Fuel level sensor installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) In cockpit on side, put fuel float (1, Fig. 28-9) with seal (2).

(c) Put washers (4), tighten the bolts (3) secured with Loctite 577.

(d) Connect connectors (5).

(e) Check if sensor is firmly secured and sealed.

(f) Install round cover (3, Fig. 06-4) from inner side of the cockpit to the left and right side near main wing pin.

(g) Connect negative terminal of the battery (Chapter 24-30).

(h) Install engine cowlings (Chapter 71-10).

(i) Remove the ground cable from the aircraft.

(j) Replenish the fuel system (Chapter 12-10).

(k) Carry out engine ground test; check fuel system for leaks and fuel system indication.

(3) Adjustment / Test – calibration and check of a correct function of the measurement system and indication of fuel quantity

Carry out this procedure on the aircraft with completely finished fuel installation.

Perform the procedure in a suitable and exactly defined space. In this space and in its vicinity don´t carry out, in the course of the calibration, any other work than the work necessary for performing the calibration.

As working and procedure medium for this calibration, use gasoline Natural 95 or aviation gasoline Avgas 100LL.

During this procedure, perform the tank filling with fuel by means of the calibration device or the calibration vessel so that it is possible to determine a precise quantity of added fuel. For the same reason, use the calibration device or the calibration vessel also when draining fuel from the tank. When handling fuel, use the clothing that doesn´t contain artificial clothes.

WARNING

UNAUTHORIZED ENTRY TO THE SYSTEM SETTINGS AND NON-OBSERVANCE OF THE DEFINED CALIBRATION PROCEDURES MAY CAUSE AN INCORRECT FUNCTIONALITY OR A TOTAL FAILURE OF THE WHOLE SKYVIEW SYSTEM!

NOTE

Refer to “Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q” or later for additional information.

(a) Level the aircraft (Chapter 08-10).

(b) Electrically ground the aircraft (use the exhaust pipe of the aircraft) to the grounding point.

(c) Check whether appropriate wing tank is empty; otherwise, drain the fuel (Chapter 12-10).

(d) Connect the aircraft to the external power source.

(e) Check whether the appropriate drain valve is closed and remove the tank filler cap.

(f) Enter the SETUP MENU of the appropriate SV-D1000 Display.

(g) By turning the rotary switch, select HARDWARE CALIBRATION.

(h) Move the rotary switch to the right and select EMS CALIBRATION.

(i) By turning the rotary switch, select the calibrated tank – FUEL TANK 1 or 2 (LEFT or RIGHT) and then move the rotary switch to the right.

(j) If you want to edit the calibration, select EDIT; if you want to do a recalibration, select RECAL.

EDIT editing of the calibrated values in the table – for fine tuning.

(k) In "POINT 1" for empty tank "VALUE (LTR) = 0.0" set the value of "VOLTS" according to the actual value VOLTAGE SENSOR (top right corner of the screen). Save the set value using the SAVE DONE buttons.

(l) Add to the tank exactly 5 liters of the fuel. Wave with the fuselage and wait for spill and stabilization of fuel level in the tank– the aircraft must be at rest.

(m) Reselect by the cursor value in "POINT 2" and press ADJUST.

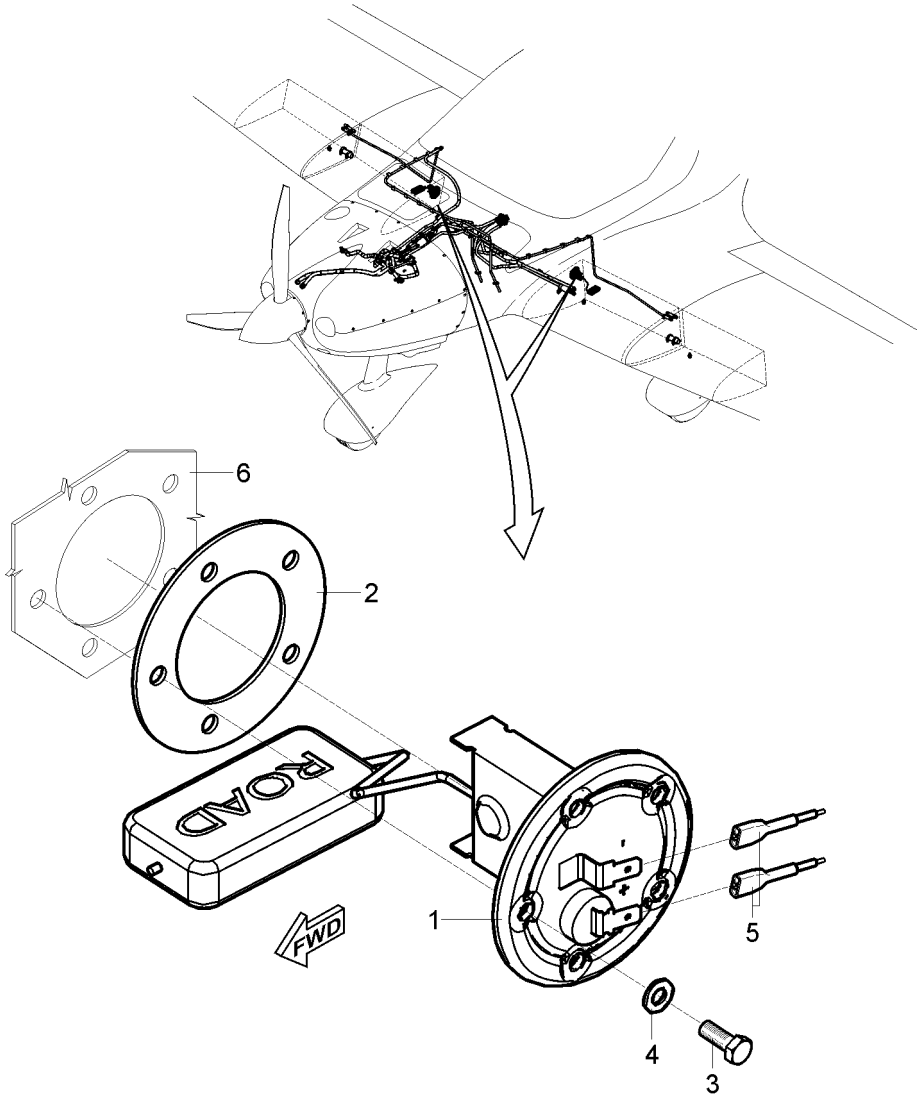
(n) In "POINT 2" for tank "VALUE (LTR) = 5.0" set the value of "VOLTS" according to the actual value VOLTAGE SENSOR (top right corner of the screen). Save the set value using the SAVE DONE buttons.

(o) Repeat procedure in accordance with points (l), (m) and (n) up to 45 liters.

(p) To calibrate opposite fuel tank, repeat steps (i) to (o).

(q) Finish and save the calibration by the DONE button. Exit menu by the EXIT button.

(r) Disconnect external power source and grounding from the exhaust pipe.



1 – Fuel float LH/RH
2 – Rubber seal
3 – Bolt M5 x 16
4 – Washer ø5.3 x 10 x 1
5 – Electrical connector

For information:

6 – Wing rib

Fig. 28-9 Fuel Level Sensor Removal / Installation

F. Fuel pressure sensor

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 8	2 pcs
Wrench 14	1 pc
Pliers	1 pc
Oetiker Pliers	1 pc
Philips screwdriver 2	1 pc
Loctite 542	AR
Persons	1

Tab. 28-10 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Fuel pressure sensor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the engine cowlings (Chapter 71-10).
- (c) Disconnect negative terminal of battery (Chapter 24-30).
- (d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.
- (e) Remove the instrument panel cover (Chapter 39-10).
- (f) Disconnect connector (11, Fig. 28-10).
- (g) Remove hose clamp (9) and disconnect the hose socket (7) from hose (10).
- (h) Unscrew the nut (6), remove washers (4; 5), bracket (2), bolt (3) and sensor (1).
- (i) Disassemble the fuel pressure sensor (1) by unscrewing the fuel socket (7) and remove sealing ring (8).
- (j) Put the caps on the hose and sensor port.

(2) Fuel pressure sensor installation:
- (a) Make sure that the battery is disconnected.
- (b) Remove the caps from the sensor port and hose.
- (c) If pyrojacket (fire sleeve) is not already in place, fit it on.

(d) Assemble pressure sensor (1, Fig. 28-10), by screwing hose socket (7) with sealing ring (8) secured with Loctite 542.
(e) Connect fuel hose (10) at pressure sensor (1) and secure with hose clamp (9).
(f) Apply the Pyrosil end sealing tape.
(g) Slide bracket (2) on pressure sensor (1).
(h) Put the bolt (3), washers (4; 5), bracket (2) and tighten the nut (6).
(i) Connect connectors (11) (polarity does not matter).
(j) Remove the ground cable from the aircraft.
(k) Connect negative terminal of the battery (Chapter 24-30).
(l) Install the engine cowlings (Chapter 71-10).
(m) Install the instrument panel cover (Chapter 39-10).
(n) Carry out an operational test.

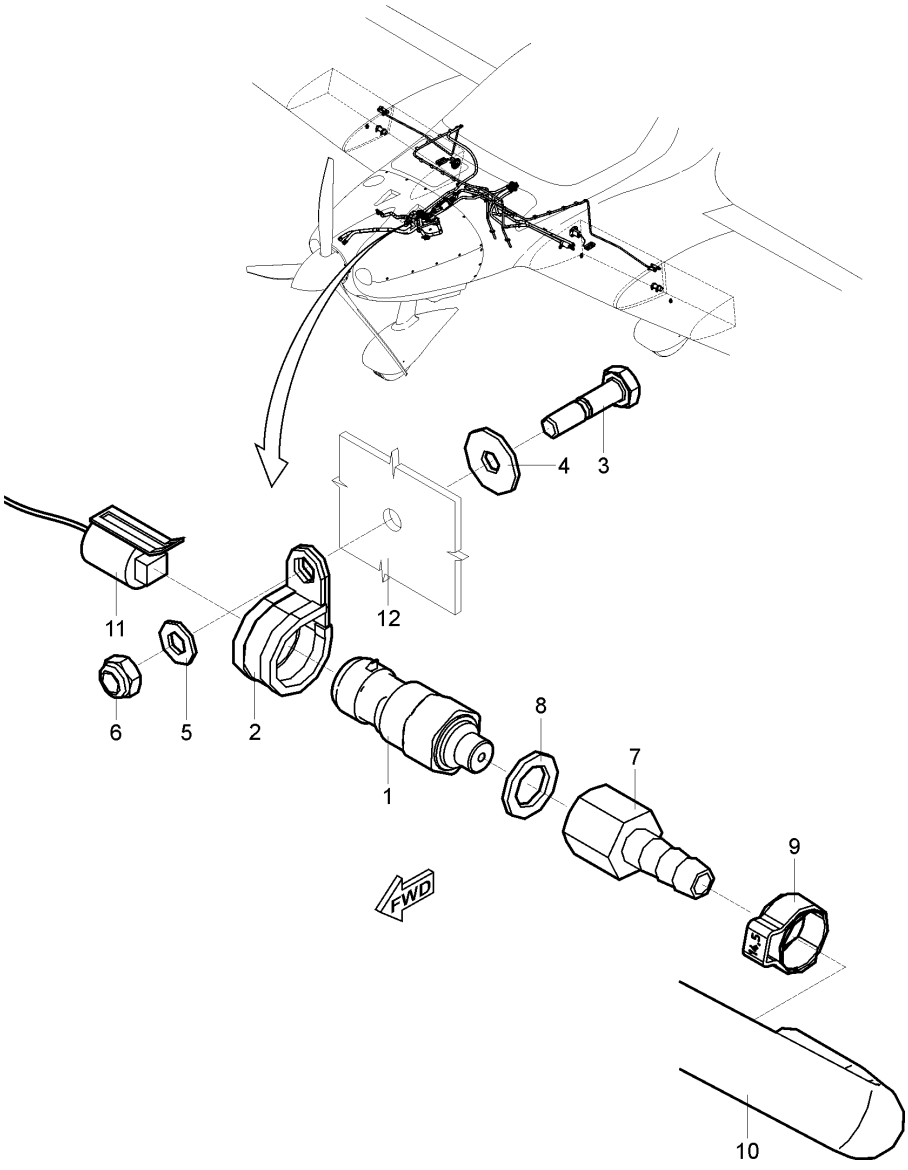


Fig. 28-10 Fuel Pressure Sensor Removal / Installation (page 1 of 2)

1 – Fuel pressure sensor
2 – Bracket
3 – Bolt M5 x 20
4 – Washer ø5.3 x 15 x 1.2
5 – Washer ø5.3 x 10 x 1
6 – Nut M6
7 – Hose socket
8 – Sealing ring ø10 x 15 x 1.5
9 – Hose clamp ø14.5
10 – Hose
11 – Electrical connector

For information:

12 – Firewall

Fig. 28-10 Fuel Pressure Sensor Removal / Installation (page 2 of 2)

G. Fuel flow transducer

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 14	1 pc
Pliers	1 pc
Oetiker Pliers	1 pc
Cable tie 4.8	5 pcs
Cable tie 2.6	1 pc
Loctite 542	AR
Persons	1

Tab. 28-11 Recommended tools, materials, persons and documentation

WARNING

GROUND THE EXHAUST PIPE OUTLET AND FUEL SERVICE EQUIPMENT PRIOR TO AIRCRAFT REFUELLING/DEFUELING!

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

ENGINE IGNITION MUST BE SWITCHED OFF!

(1) Fuel flow transducer removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Electrically ground the aircraft (use the exhaust pipe outlet) to the grounding point.

(e) Remove cable ties (9; 10, Fig. 28-11) and disconnect electrical connector (8).

(f) Remove the end sealing tapes, hose clamps (5) and disconnect fuel flow transducer (1) from hoses (6; 7).

(g) Disassemble the fuel flow transducer, by unscrewing the fuel sockets (4).

(h) Put the caps on the fuel hose and transducer ports.

(2) Fuel flow transducer installation:

(a) Make sure that the battery is disconnected.

(b) Remove the caps from the transducer ports and hose.

(c) Assemble fuel flow transducer, by screwing the hose sockets (4, Fig. 28-11) secured with Loctite 542.

(d) If pyrojacket (fire sleeve) is not already in place, fit it on.

WARNING

BEWARE TO ENSURE CORRECT DIRECTION OF FLOW!

(e) Connect the fuel hoses (6; 7) at fuel transducer (1) and secure them with hose clamps (5).

(f) Apply the Pyrosil sealing tape.

(g) Attach fuel flow transducer (1) to engine mount using plate (2), two pieces distant hoses (3) and cable ties (9).

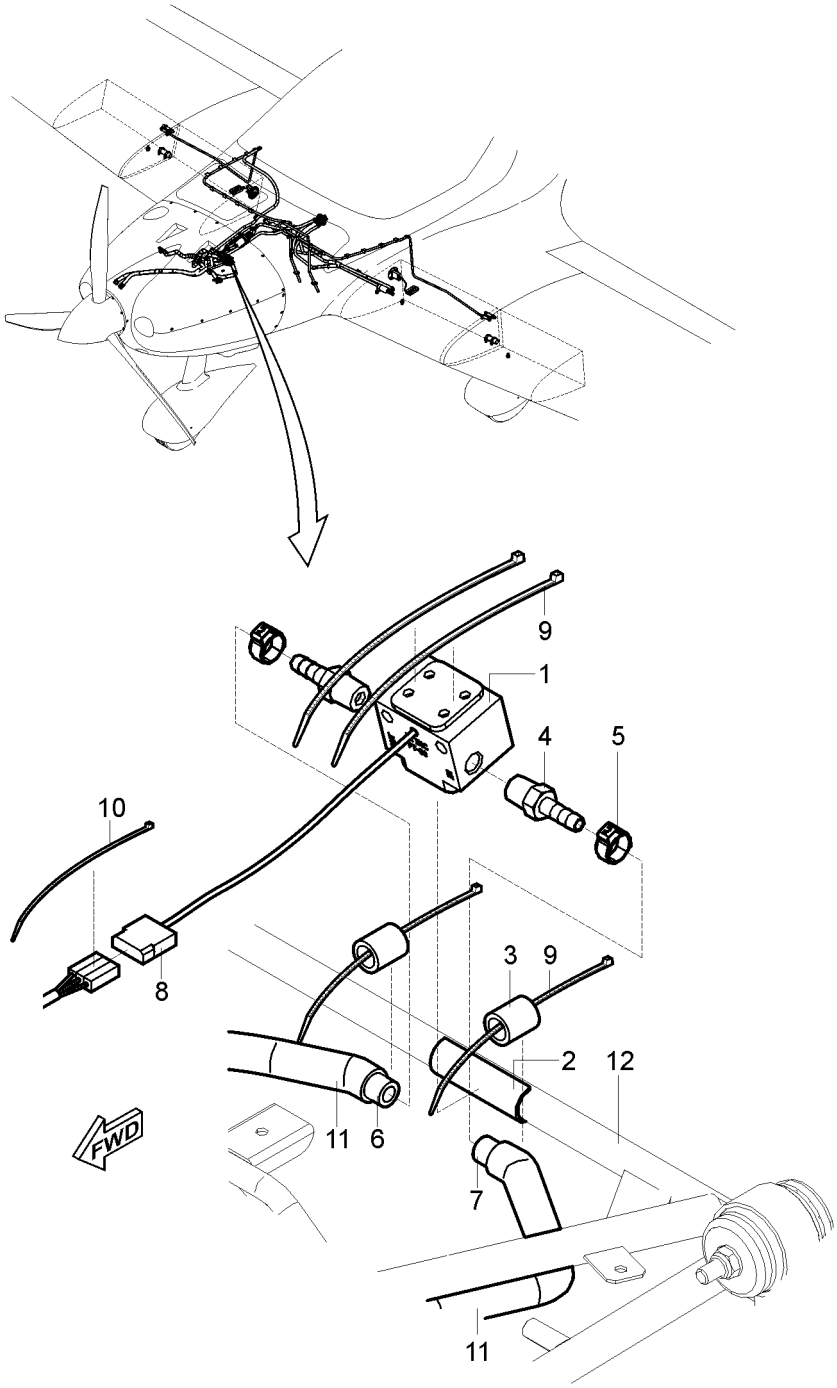
(h) Connect connector (8) and secure with cable tie (10).

(i) Connect negative terminal of the battery (Chapter 24-30).

(j) Install the engine cowlings (Chapter 71-10).

(k) Remove the ground cable from the aircraft.

(l) Carry out an operational test and modify the fuel flow K-factor as necessary.



1 – Fuel flow transducer
2 – Rubber plate
3 – Rubber distant hose
4 – Hose socket
5 – Hose clamp 14.5
6 – Fuel hose
7 – Fuel hose
8 – Electrical connector
9 – Cable tie 4.8
10 – Cable tie 2.6
11 – Pyro jacket covering
For information:
12 – Engine mount

Fig 28-11 Fuel Flow Transducer Removal / Installation

31 INDICATING / RECORDING SYSTEMS

CONTENTS

Chapter	Description	Page
31-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	3
31-30	**RECORDERS**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Flying hours counter	5
	B. Hobbs meter	5
31-50	**CENTRAL WARNING SYSTEMS**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	10
	A. Low value warning unit	10
	B. Stall warning transducer	12
	C. ACI Stall warner	13
	D. Control stick shaker	14
	E. SV-ADAHRS-200 module	14
	F. SV-D1000 display	14
	G. Stall warning lamp	14

This page is left blank intentionally

31-00 GENERAL

1. INTRODUCTION

This chapter describes equipment which provides visual, aural and tactile warning of conditions in unrelated systems.

This includes the hour meters, control / warning lamps, low value warning unit and stall warning system.

Wiring diagram of this equipment is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Hobbs meter does not operate.	Defective Hobbs meter.	Replace the Hobbs meter.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
Warning indication incorrect.	Defective warning lamp.	Replace the warning lamp.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
Warning lamp (stall warning system) does not operate	Defective warning lamp.	Replace the warning lamp.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
Buzzer (stall warning system) does not operate	Defective buzzer.	Replace the buzzer.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

TROUBLE	POSSIBLE CAUSE	REMEDY
ACI stall warner does not operate	Defective ACI stall warner.	Replace the ACI stall warner.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
Control stick shaker (stall warning system) does not operate	Defective control stick shaker.	Replace the control stick shaker.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
	Defective ACI stall warner.	Replace the ACI stall warner.
Stall warning transducer does not operate (Test button activates the system)	Defective stall warning transducer.	Replace stall warning transducer.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).
	Defective pitot-static system hoses.	Carry out a continuity test of hoses. Repair/replace defective hoses.
Dynon visual stall warning does not operate.	Wrong Dynon setting.	Perform setting of Dynon stall warning.
Dynon aural stall warning does not operate.	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

31-30 RECORDERS

1. DESCRIPTION

The aircraft is equipped with the flying hours counter and engine operated Hobbs hours meter.

The Winter FSMZ flying hours counter has an electrically driven counter mechanism and the readings are in hours and minutes. It is connected to the aircraft's total pressure sensor and automatically switches on when the airspeed reaches 32 kts (60 km/h). This ensures that the actual flight time only is recorded, while secondary times for takeoff and landing are ignored.

Hobbs meter is a device used to measure the engine running time. The meter displays hours and tenths of an hour. The meter is activated from the keyed ignition switch.

2. MAINTENANCE PRACTICES

A. Flying hours counter

For installation / removal procedures refer to Chapter 39-10.

B. Hobbs meter

For installation/ removal procedures refer to Chapter 39-10.

This page is left blank intentionally

31-50 CENTRAL WARNING SYSTEMS

1. DESCRIPTION

The aircraft is equipped with the Low Value Warning (LVW) system for oil quantity and fuel quantity. The system triggers a warning indicated by the warning lamps when the oil or fuel quantity decreases below the critical level.

Stall Warning System consists of two independent stall warning sensors. The first sensor is the Stall Warning Port (AoA port) located on the pitot-static probe (1, Chapter 34-10, Fig. 34-1). The second sensor is ACI stall warner (1, Fig. 31-1) installed on the left wing leading edge.

ACI stall warner (1) is connected to ACI transducer (2a) and triggers the control stick shaker (4), buzzer (3) and stall warning lamp (8).

Stall warning transducer (2b) is connected to the pitot-static system and triggers buzzer (3) and stall warning lamp (8).

EFIS transducer (ADAHRS module (5)) is connected to the pitot-static system and triggers visual signalization on the Dynon screens (6; 7) and aural indication in the headset.

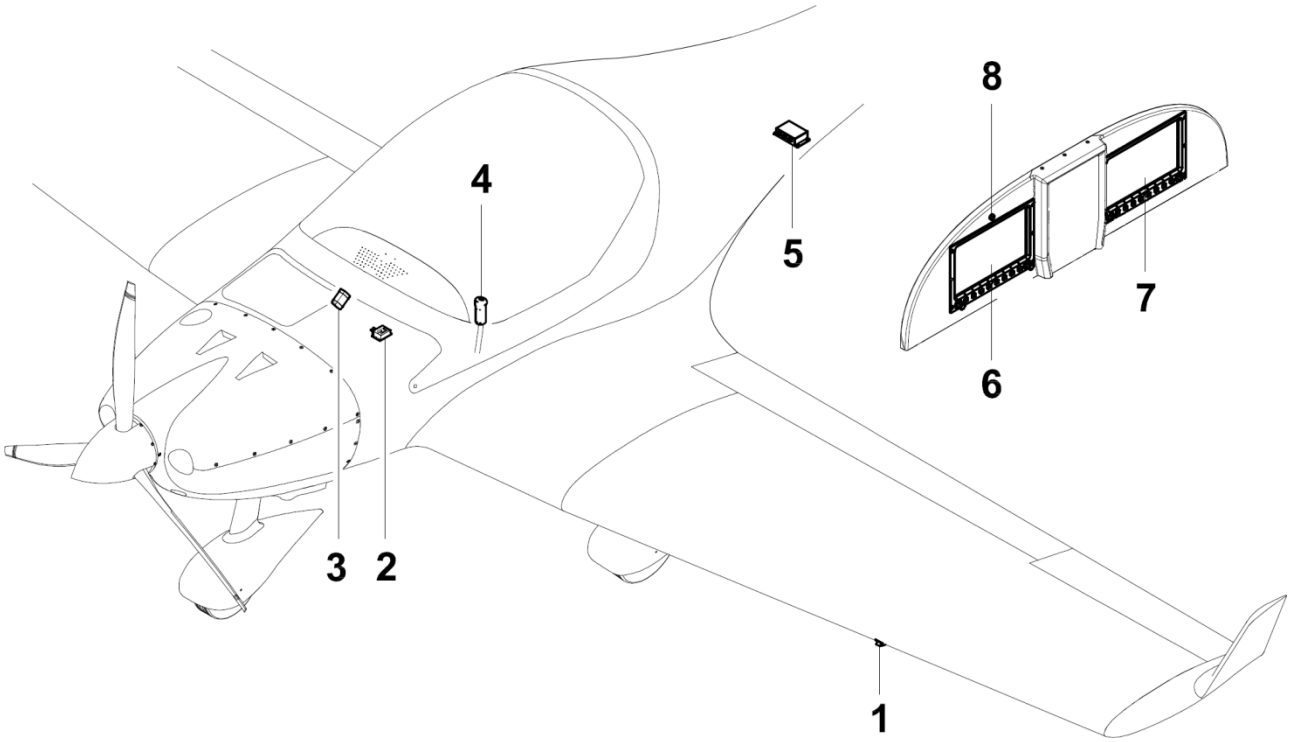
Each stall warning sub-system is adjusted to start the warning within the range 9-19 km/h (5-10 kts) before stalling. Scheme of stall warning system is shown on Fig. 31-2.

Stall warning system has following indication of imminent stall:

- Visual indication:
  - Indicator on the EFIS screen (Dynon SkyView D1000)
  - Stall warning light on the instrument panel
- Aural indication:
  - Headset sound (Dynon SkyView D1000)
  - Buzzer
- Tactile indication:
  - Control stick shaker consists of motor with the eccentric mass installed in the left control stick handle

The aircraft is equipped with the test button (see Chapter 39-10) for ground test of stall warning indication. Test button activates:

- Stall warning light on the instrument panel
- Buzzer
- Control stick shaker



1 – ACI stall warner
2a – ACI transducer
2b – Stall warning transducer
3 – Buzzer
4 – Control stick shaker
5 – ADAHRS module
6 – PFD Dynon SkyView
7 – MFD Dynon SkyView
8 – Stall warning lamp

Fig. 31-1 Stall Warning System

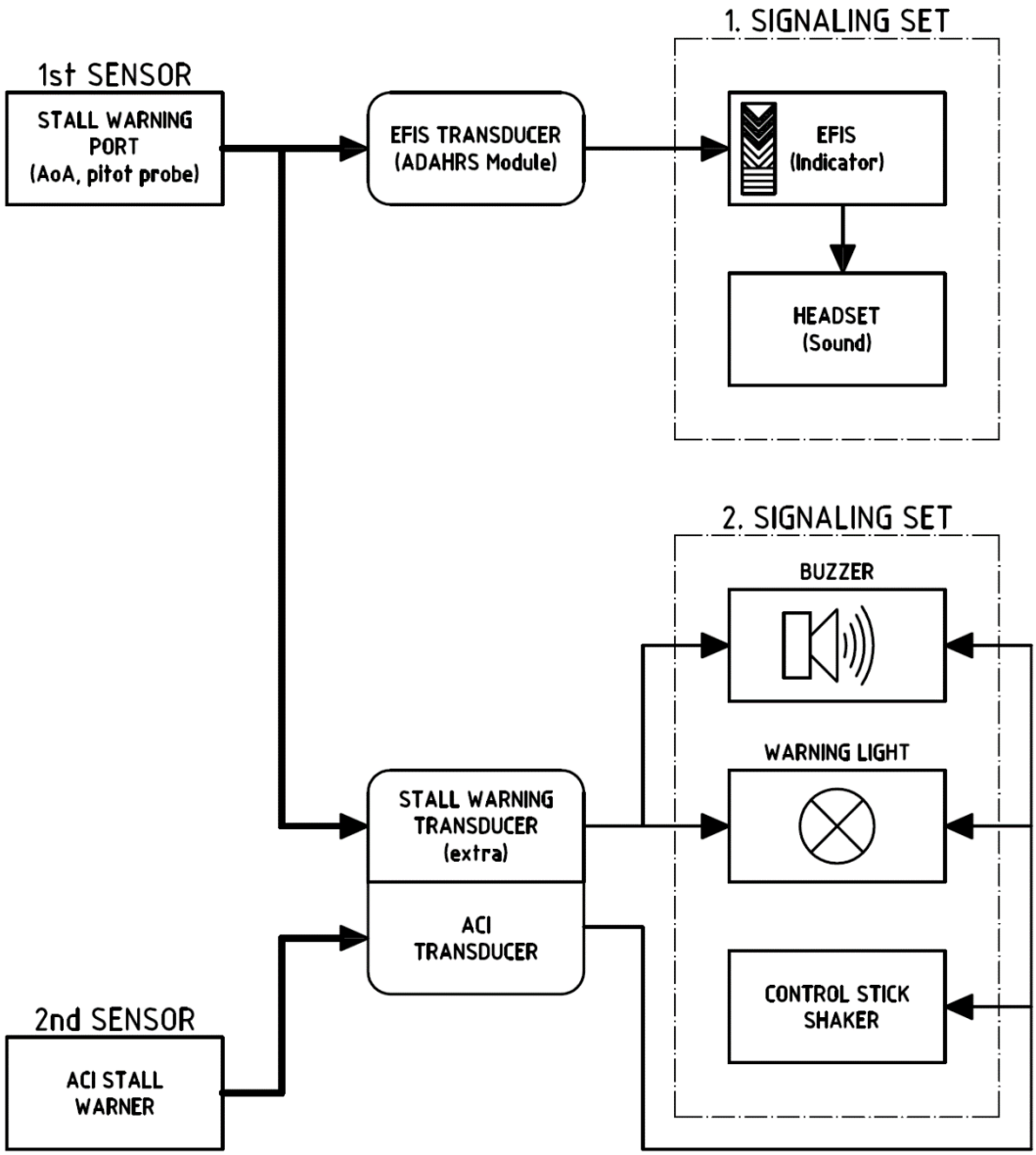


Fig. 31-2 Stall Warning System Scheme

2. MAINTENANCE PRACTICES

A. Low value warning unit

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

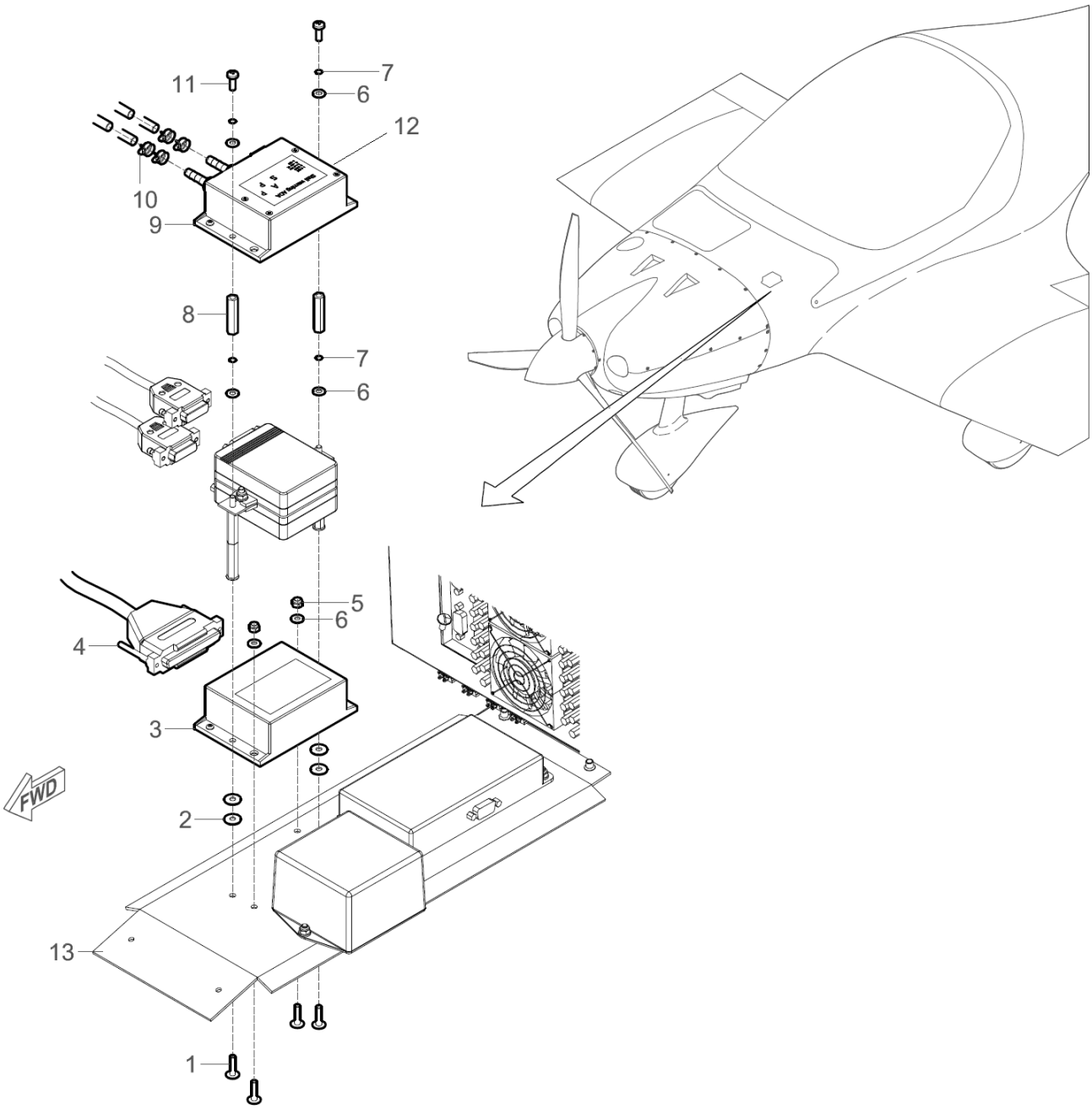
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	1 pc
Screwdriver	1 pc
Philips screwdriver	1 pc
Persons	1

Tab. 31-1 Recommended tools, materials, persons and documentation

(1) Low value warning unit removal:
- (a) Set the **MASTER SWITCH** to **OFF** position.
- (b) Remove the instrument panel cover (Chapter 39-10).
- (c) Disconnect the connector (4, Fig. 31-3) from the LVW unit (3).
- (d) Remove the mounting nuts (5), washers (2; 6) and bolts (1).
- (e) Remove the LVW unit (3) from the instrument floor.

(2) Low value warning unit installation:
- (a) Put the LVW unit (3, Fig. 31-3) in position on the instrument floor (12).
- (b) Hold the LVW unit and attach it with bolts (1), washers (2; 6) and nuts (5).
- (a) Connect the connector (4) to the LVW unit.
- (b) Install the instrument panel cover (Chapter 39-10).
- (c) Place the **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Screw M4 x 12
2 – Washer ø4.3 x 9 x 0.8
3 – LVW unit
4 – LVW connector
5 – Self-locking nut M4
6 – Washer ø4.3 x 9 x 0.9
7 – Washer ø4.3 x 7.6 x 0.9
8 – Nut
9 – Stall warning transducer
10 – Clamp
11 – Screw M4 x 12
12 –Connector of stall warning transducer
For information:
13 – LH instrument floor

Fig. 31-3 Low Value Warning Unit and Stall Warning Transducer Removal / Installation

B. Stall warning transducer

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	1 pc
Philips screwdriver	1 pc
Persons	1

Tab. 31-2 Recommended tools, materials, persons and documentation

(1) Stall warning transducer removal:
- (a) Set the **MASTER SWITCH** to **OFF** position.
- (b) Remove the instrument panel cover (Chapter 39-10).
- (c) Disconnect connector (12, Fig. 31-3).
- (d) Remove clamps (10) and disconnect pitot-static hoses from stall warning transducer (9).
- (e) Remove bolts (11) and washers (6; 7).
- (f) Remove stall warning transducer (9).

(2) Stall warning transducer installation:
- (a) Put the stall warning transducer (9, Fig. 31-3) in correct position.
- (b) Hold the stall warning transducer and attach it with bolts (11), washers (6; 7).
- (c) Connect the pitot-static hoses to stall warning transducer (9) and secure with clamps (10).
- (d) Connect the connector (12) to the warning transducer (9).
- (e) Install the instrument panel cover (Chapter 39-10).
- (f) Place the **MASTER SWITCH** to **ON** position and carry out an operational test.
- (g) Correct function verify by flight test.

C. ACI Stall warner

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Knife	1 pc
Double sided tape	AR
Persons	1

Tab. 31-3 Recommended tools, materials, persons and documentation

(1) ACI stall warner removal:

(a) Set the **MASTER SWITCH** to **OFF** position.

(b) Remove left wing (Chapter 57-20).

(c) Remove installation hole cover (9, Chapter 06-00, Fig. 06-3).

(d) Remove cover film (3, Fig. 31-4)

(e) Release the wires in the wing and carefully remove the stall warner (1) using a knife.

(f) Remove shrink tubes, unsolder the wires and remove ACI stall warner (1).

(2) ACI stall warner installation:

(a) Slide shrink tubes on the wires and solder the wires to ACI stall warner (1, Fig. 31-4).

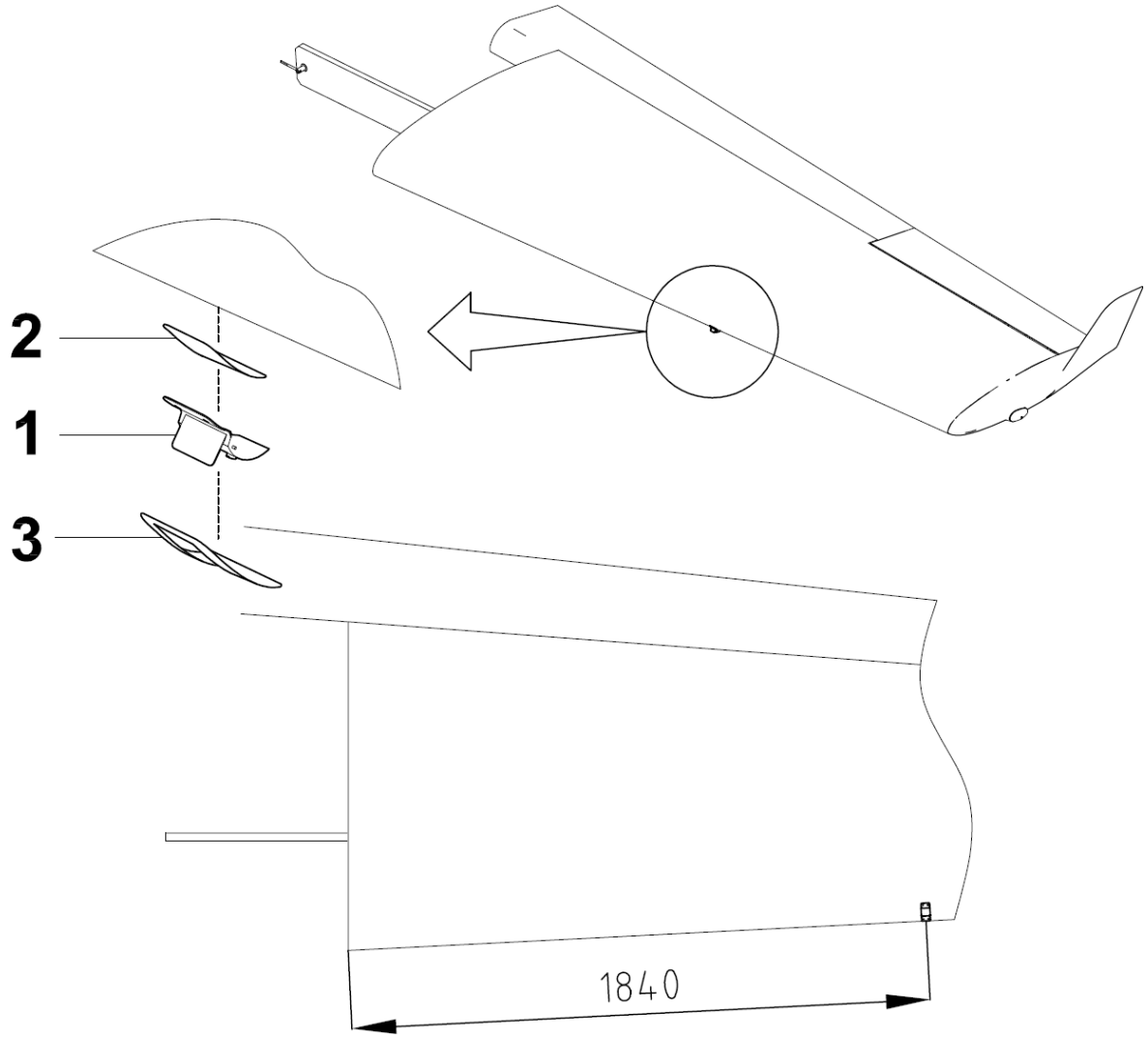
(b) Using double sided tape (2) install the ACI stall warner (1) on left wing leading edge. Position of the warner is defined on Fig. 31-4 and by impression on the wing. Stick the cover film (3).

(c) Install cover (9, Chapter 06-00, Fig. 06-3).

(d) Install left wing (Chapter 57-20).

(e) Set the **MASTER SWITCH** to **ON** position and carry out an operational test.

(f) Correct position and setting verify by flight test.



1 – ACI stall warner
2 – Double sided tape
3 – Cover film

Fig. 31-4 ACI Stall Warner Removal / Installation

D. Control stick shaker

For removal / installation procedures refer to Chapter 27-10.

E. SV-ADAHRS-200 module

For removal / installation procedures refer to Chapter 34-10.

F. SV-D1000 display

For removal / installation procedures refer to Chapter 39-10.

G. Stall warning lamp

For removal / installation procedures refer to Chapter 39-10.

32 LANDING GEAR

CONTENTS

Chapter	Description	Page
32-00	**GENERAL**	**3**
	1. INTRODUCTION	3
32-10	**MAIN GEAR**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Main wheel fairing	6
	B. Main wheel	8
	C. Main landing gear leg	10
32-20	**NOSE GEAR**	**15**
	1. DESCRIPTION	15
	2. MAINTENANCE PRACTICES	17
	A. Nose wheel fairing	17
	B. Nose wheel	19
	C. Nose landing gear leg	22
	D. Nose landing gear leg supports	29
32-40	**WHEELS AND BRAKES**	**33**
	1. DESCRIPTION	33
	2. MAINTENANCE PRACTICES	36
	A. Main wheel	36
	B. Nose wheel	39
	C. Brake system	41
32-50	**STEERING**	**53**
	1. DESCRIPTION	53
	2. MAINTENANCE PRACTICES	53
	A. Steering push rods	53

This page is left blank intentionally

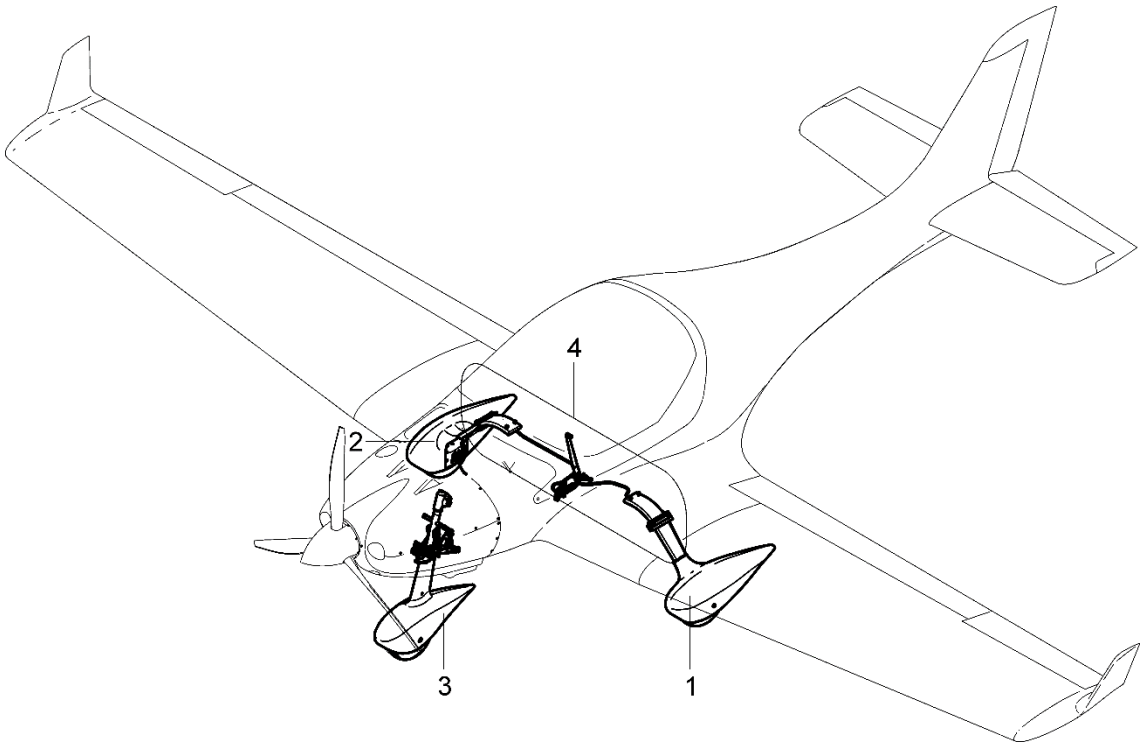
32-00 GENERAL

1. INTRODUCTION

The aircraft is equipped with a fixed tricycle landing gear with steerable nose wheel (Fig. 32-1). The main wheels are mounted on composite spring legs; the nose wheel leg is made of metal; the fork is made of carbon. The wheels are equipped with the wheel fairings, which are made of composite shell.

The aluminium nose and main landing gear wheel discs are to be used with tubeless tires.

The main wheels are equipped with hydraulic disc brakes which are actuated by the brake lever operated by hand. The brake lever has the function of parking brake as well.



1 – Left main landing gear
2 – Right main landing gear
3 – Nose landing gear
4 – Brake system

Fig. 32-1 Landing Gear

This page is left blank intentionally

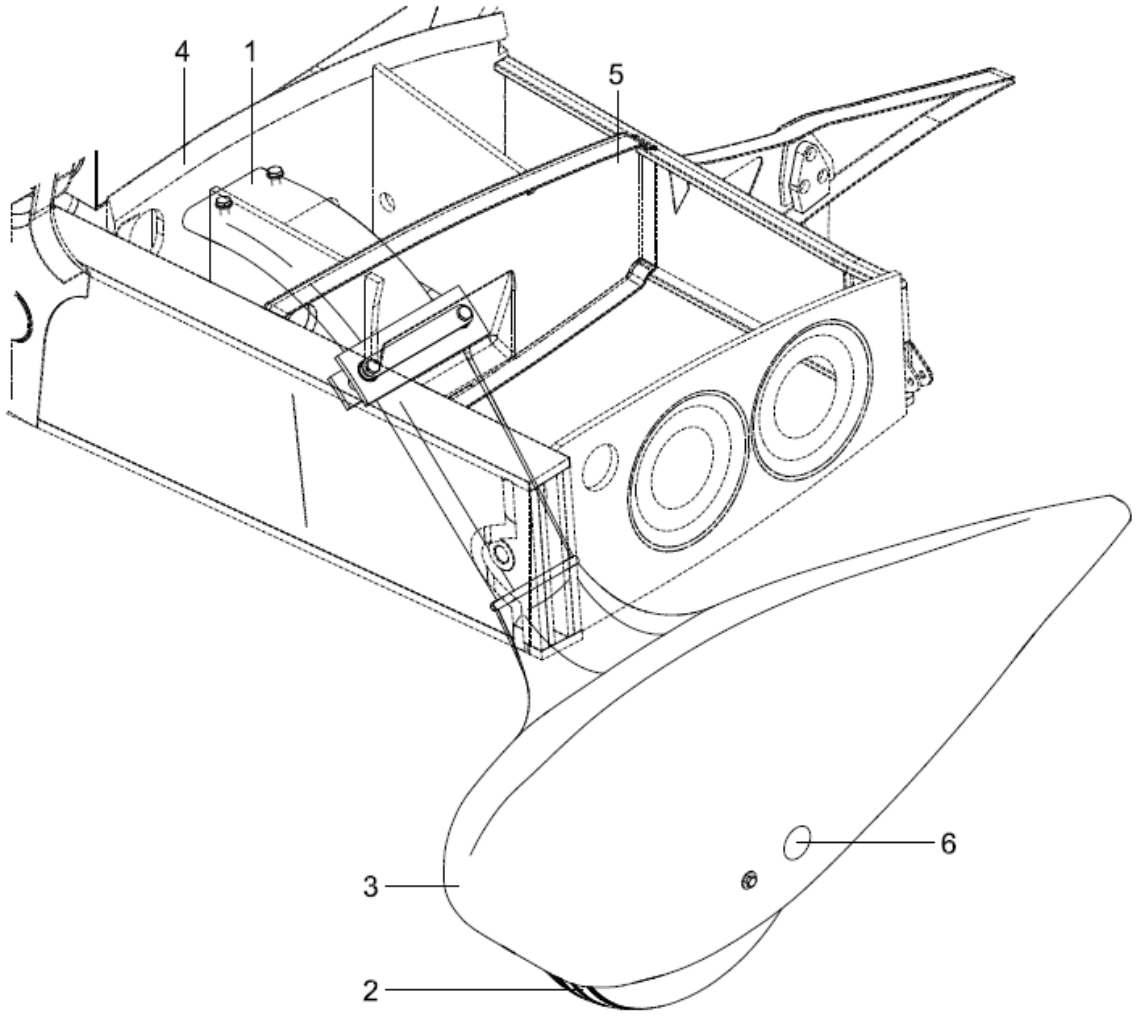
32-10 MAIN GEAR

1. DESCRIPTION

The main landing gear consists of two composite landing gear legs (1, Fig. 32-2). The main gear legs are fixed in the inner (4) and outer ribs (5) inside of the fuselage in the wing central section.

Main landing gear wheels are equipped with aluminium wheel discs and tubeless tires (2) (see Chapter 32-40). The main wheels are equipped with hydraulic brakes (see Chapter 32-40).

Main wheels are fitted with aerodynamic fairings (3). There is a tire inflation hole (6) in the fairing.



1 – Main landing gear leg
2 – Wheel
3 – Wheel fairing
4 – Inner rib
5 – Outer rib
6 – Tire inflation hole

Fig. 32-2 Main Landing Gear

2. MAINTENANCE PRACTICES

A. Main wheel fairing

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Hex key 6	1 pc
Wrench 10	1 pc
Wrench 13	1 pc
Loctite 243	AR
Persons	1

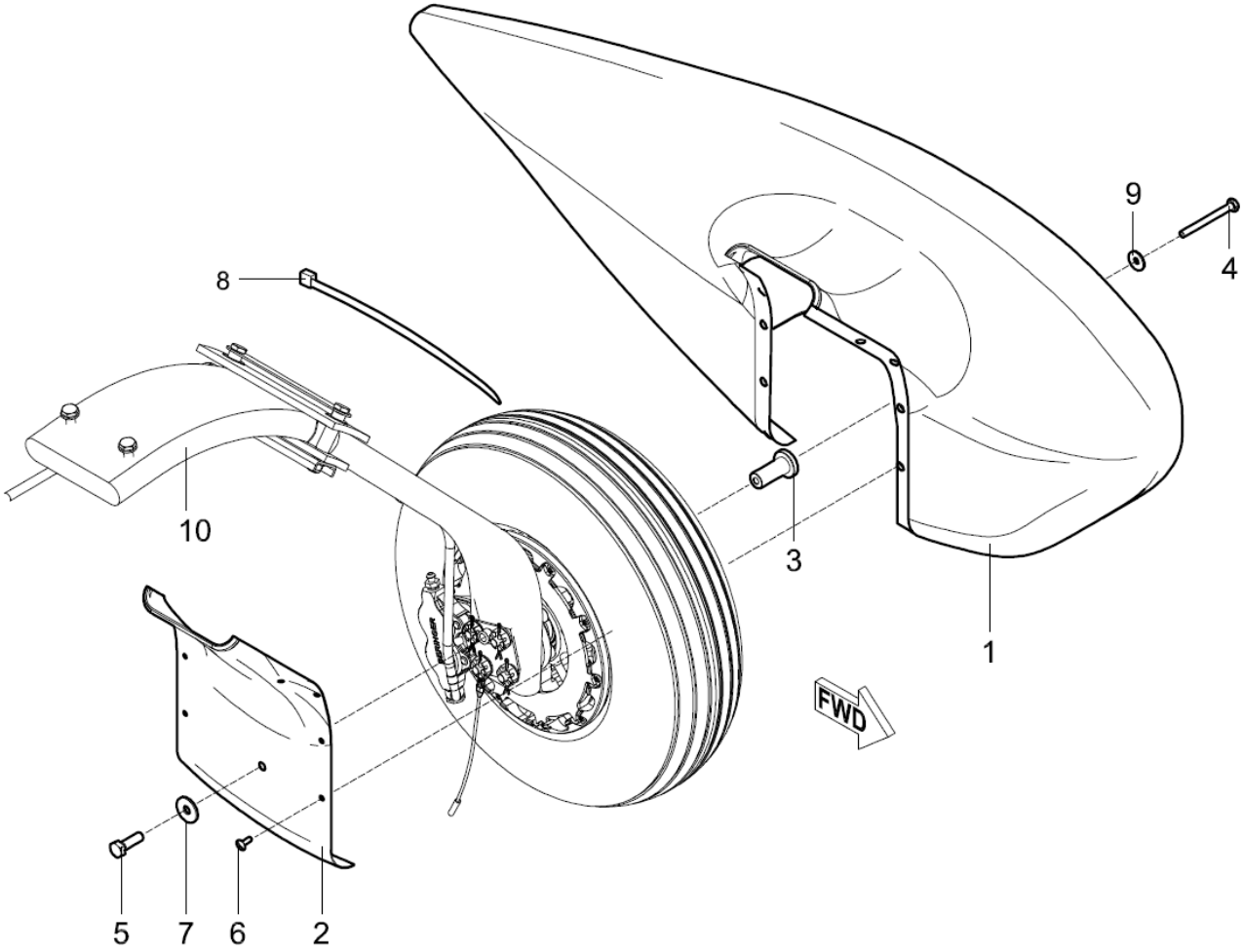
Tab. 32-1 Recommended tools, materials, persons and documentation

NOTE

The procedure for removal of the left main wheel fairing is described. Removal / installation is the same for the left and right fairing.

(1) Main wheel fairing removal:
- (a) Unscrew the bolts and remove the main leg cover (6L/6R, Chapter 06-00, Fig. 06-3).
- (b) Cut the cable tie (8, Fig. 32-3).
- (c) On the inner side of the main landing gear, unscrew the bolts (6), bolt (5) and remove the washer (7); remove the inner cover (2).
- (d) On the outer side of the main landing gear, unscrew the bolt (4), remove the washer (9) and the distance tube (3).
- (e) Remove the fairing (1).

(2) Main wheel fairing installation:
- (a) Thoroughly clean the inside of the fairing before each installation.
- (b) Adjust the wheel fairing (1, Fig. 32-3) to the appropriate position.
- (c) On the outer side of the main landing gear, install the distance tube (3), washer (9), apply Loctite 243 on the bolt (4) thread and screw the bolt in.
- (d) On the inner side of the main landing gear, install the inner cover (2) using the bolt (6); apply Loctite 243 on the bolt (5) thread, install the washer (7) and screw the bolt (5) in.
- (e) Install the cable tie (8) around the upper part of the inner cover (2) and the fairing (1).
- (f) Install the main leg cover (6L/6R, Chapter 06-00, Fig. 06-3).



1 – Main wheel fairing
2 – Inner cover
3 – Distance tube
4 – Bolt M6 x 60
5 – Bolt M8 x 25
6 – Bolt M5 x 12
7 – Washer ø8.4 x 24 x 2
8 – Cable tie 4.8
9 – Washer ø6.4 x 18 x 1.6
For information:
10 – Main landing gear leg

Fig. 32-3 Main Wheel Fairing Removal / Installation

B. Main wheel

The procedure for removal of the left main wheel is described.

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Phillips screwdriver	1 pc
Pliers	1 pc
Wrench 32	1 pc
Persons	1

Tab. 32-2 Recommended tools, materials, persons and documentation

(1) Main wheel removal:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the main gear fairing (see 2.A.(1)).

(c) Remove the split pin (6, Fig. 32-4), unscrew the nut (4) and remove the distance tube (5).

(d) Remove the safety stainless wire (2) and pull the main wheel (1) with the brake disc (3) out.

(2) Main wheel installation:

(a) Before assembling the main landing gear, ensure the wheel axle connection is not damaged.

(b) Align the brake disc (3, Fig. 32-4) with the gap in the brake caliper; install the wheel (1) on the wheel axle (7).

NOTE

Tabs of the brake disc (3) must fit between the wheel disc tabs.

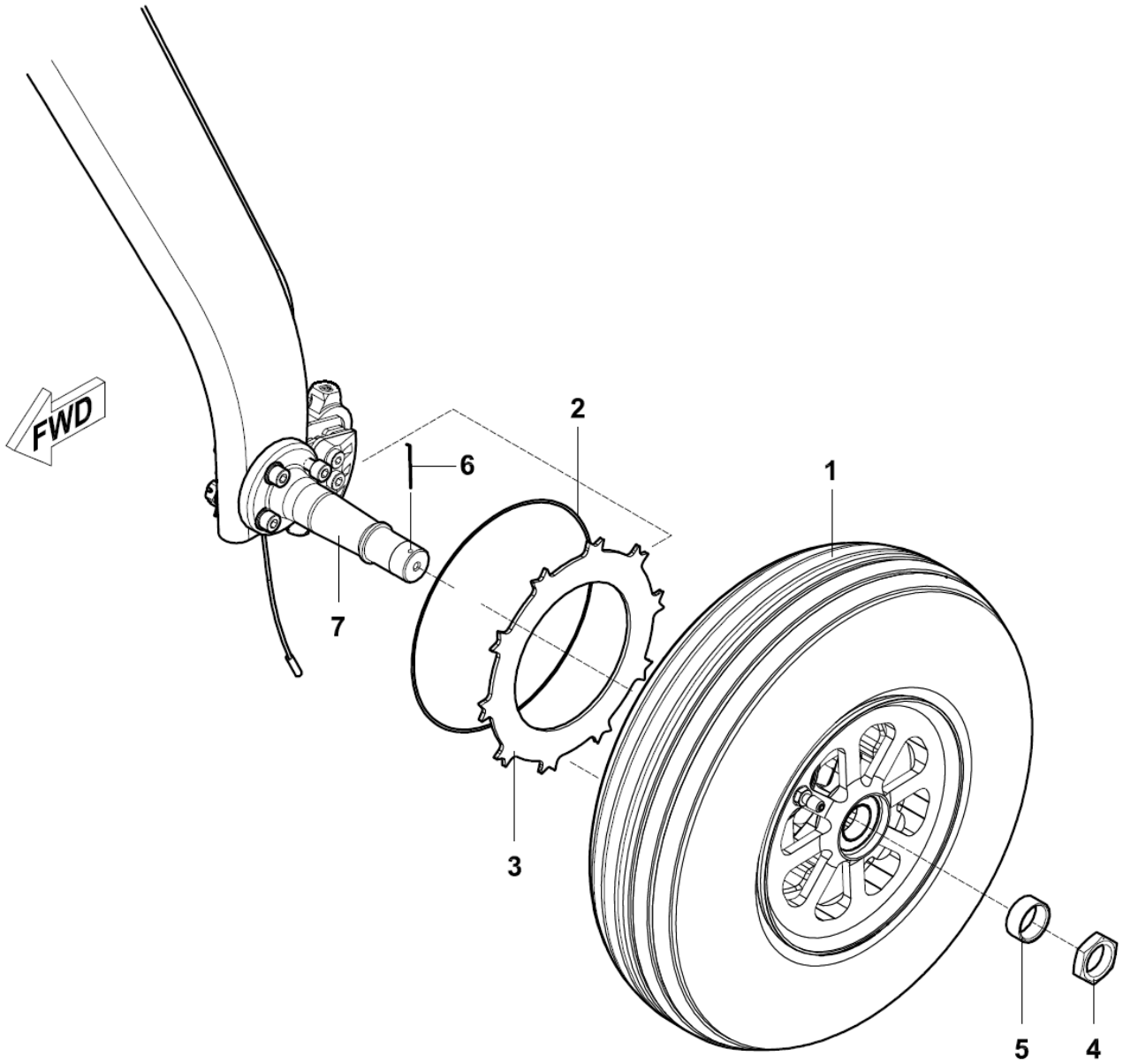
(c) Install the distance tube (5), tighten the nut (4) and lock it with the split pin (6).

(d) Wind the safety stainless wire (2) around the disc tabs and secure it.

(e) Install the main wheel fairing (see 2.A.(2)).

(f) Carry out a test and check:

- If all bolt connections are tight.
- Plays.
- Free rotation of the main wheel.
- Tire pressure (250 kPa).
- If grounding wire is touching the ground.



1 – Main wheel
2 – Safety stainless wire ø1 mm
3 – Brake disc
4 – Nut M25
5 – Distance tube
6 – Split pin ø0.8 mm
7 – Brake caliper with wheel axle

Fig. 32-4 Main Wheel Removal / Installation

C. Main landing gear leg

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Wrench 13	1 pc
Hex key 6	1 pc
Screwdriver	1 pc
Socket 13	1 pc
Pliers	1 pc
Drill bit ø8 mm	1 pc
Split pin ø2 x 32 mm	4 pcs
Stainless wire ø1 mm	AR
Silicone	AR
Contact adhesive	AR
Sealing adhesive tape	AR
Loctite 243	AR
Persons	2

Tab. 32-3 Recommended tools, materials, persons and documentation

(1) Main landing gear leg removal:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the main wheel (see 2.B.(1)).

(c) Remove the split pins (11, Fig. 32-5) and unscrew the nuts (6).

(d) Remove the washer (7), disconnect the wire (22), cable (10), remove the inner holder (8), guying plate (9), washers (5), bolts (3; 4).

(e) Disconnect the brake caliper with wheel axle (2).

NOTE

Disassembly of the brake caliper from the wheel axle is described in Chapter 32-40.

(f) Release the brake line from the main landing leg (1) by removing the adhesive tape (21).

(g) Under the wing centre section, remove the cover (8, Chapter 06-00, Fig. 06-3).

(h) Remove the laminated seat (Chapter 25-10) and remove the side cover (6, Chapter 06-00, Fig. 06-4) with a knife.

(i) Tear off the upholstery; remove the cover (5, Chapter 06-00, Fig. 06-4) with a knife.

(j) On the lower attachment (24, Fig. 32-5), unscrew the nuts (19), remove the washers (7), bottom support (17), support distance tubes (15) rubber plate (16), rubber plate (13), washer plate (12) and bolts (18).

(k) On the upper attachment (23), unscrew the nuts (19), remove the washers (7) and bolts (20).

(l) Pull the main landing leg (1) from the aircraft.

(2) Main landing gear leg installation:

(a) Before assembly of the main landing gear, check the outer surface of the landing gear leg for any cracks and ensure the wheel axle connection is not damaged.

(b) Insert the main landing leg (1, Fig. 32-5) into the centre section.

NOTE

In case of new main landing gear leg: Align the flat end of the main landing gear leg (1) with the ends on the upper attachment (23). Secure firmly and make new holes into main landing gear leg (1) according to the holes in the upper attachment (23) by using ø8 mm drill.

(c) On the upper attachment (23), install the bolts (20), washers (7) and slightly tighten the nuts (19).

(d) On the lower attachment (24), install the rubber plate (13), washer plate (12) and bolts (18).

(e) Install support distance tubes (15), rubber plate (16), bottom support (17), washers (7) and slightly tighten the nuts (19).

(f) Tighten all nuts (19) connecting the landing leg (1) with the aircraft.

(g) Bond the covers (5; 6; Chapter 06-00, Fig. 06-4) with silicone (remove old silicone); glue the upholstery with contact adhesive.

(h) Install the laminated seat (Chapter 25-10).

(i) Under the wing centre section install the cover (8, Chapter 06-00, Fig. 06-3).

(j) Attach the brake line and grounding wire with sealing adhesive tape (21, Fig. 32-5) in the middle of the main landing leg.

(k) On the bottom of the main landing leg, install the wheel axle with brake caliper (2), bolts (3; 4), washers (5), guying plate (9), inner holder (8), cable (10) with grounding wire (22) and washer (7); tighten the nuts (6) and lock them with new split pins (11).

(l) Install the main wheel (see 2.B.(2)).

(m) Carry out a test and check:

- That the castle nuts are secured with split pins.
- If all bolt connections are tight.
- Plays.
- Free rotation of the main wheel.
- Tire pressure (250 kPa).
- If grounding wire is touching the ground.
- That no foreign objects remain in the aircraft.
- There is no air in the brake system.

(3) Main landing gear inspection / check:

In the following table are shown the permissible plays for main landing gear attachment. These values should be not exceeded in operation.

SYSTEM	PROCEDURE TO FIND A PLAY	PROCEDURE TO REMEDY A PLAY	MAX. PRODUCT. PLAY	MAX. OPERATING PLAY
Main landing gear	Lift the aircraft. Move the main wheel forward/backward and inboard/outboard to find possible plays.	Check the legs attachment, wheels attachment. Replace the bearings, if necessary.	1 mm / 0.039 in	3 mm / 0.118 in

Tab. 32-4 Maximum Permissible Plays

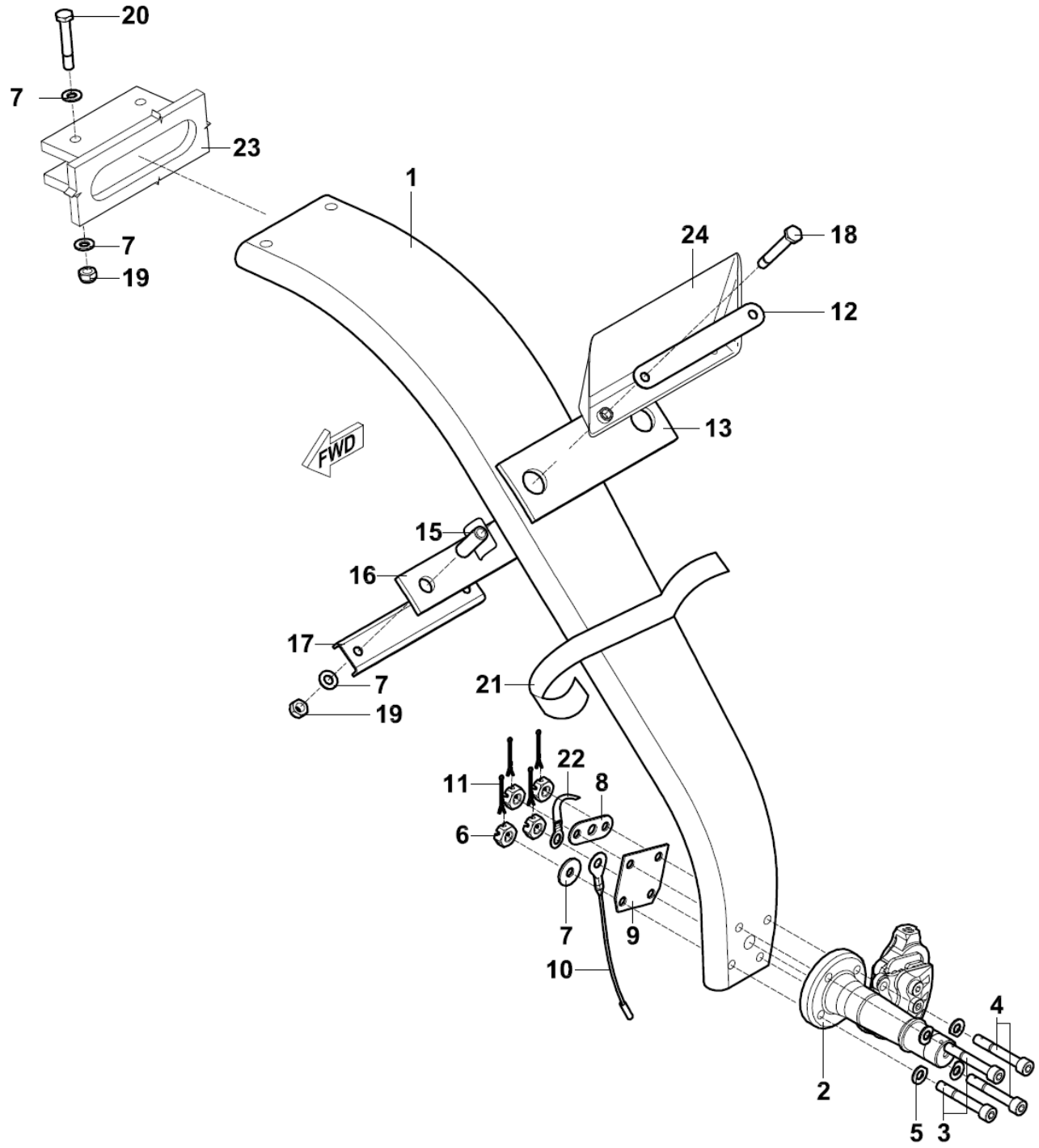


Fig. 32-5 Main Landing Gear Leg Removal / Installation (page 1 of 2)

1 – Main landing gear leg
2 – Brake caliper with wheel axle
3 – Bolt M8 x 52
4 – Bolt M8 x 57
5 – Cut washer ø8.4
6 – Castle nut M8
7 – Washer ø8.4 x 16 x 1.6
8 - Inner holder
9 - Guying plate
10 - Cable
11 - Split pin ø2 x 32
12 - Washer plate
13 - Rubber plate
14 - Empty
15 - Support distance tube
16 - Rubber plate
17 - Bottom support
18 - Bolt M8 x 58
19 - Self-locking nut M8
20 - Bolt M8 x 48
21 - Sealing adhesive tape
22 - Grounding wire

For information:

23 - Upper attachment
24 - Lower attachment

Fig. 32-5 Main Landing Gear Leg Removal / Installation (page 2 of 2)

32-20 NOSE GEAR

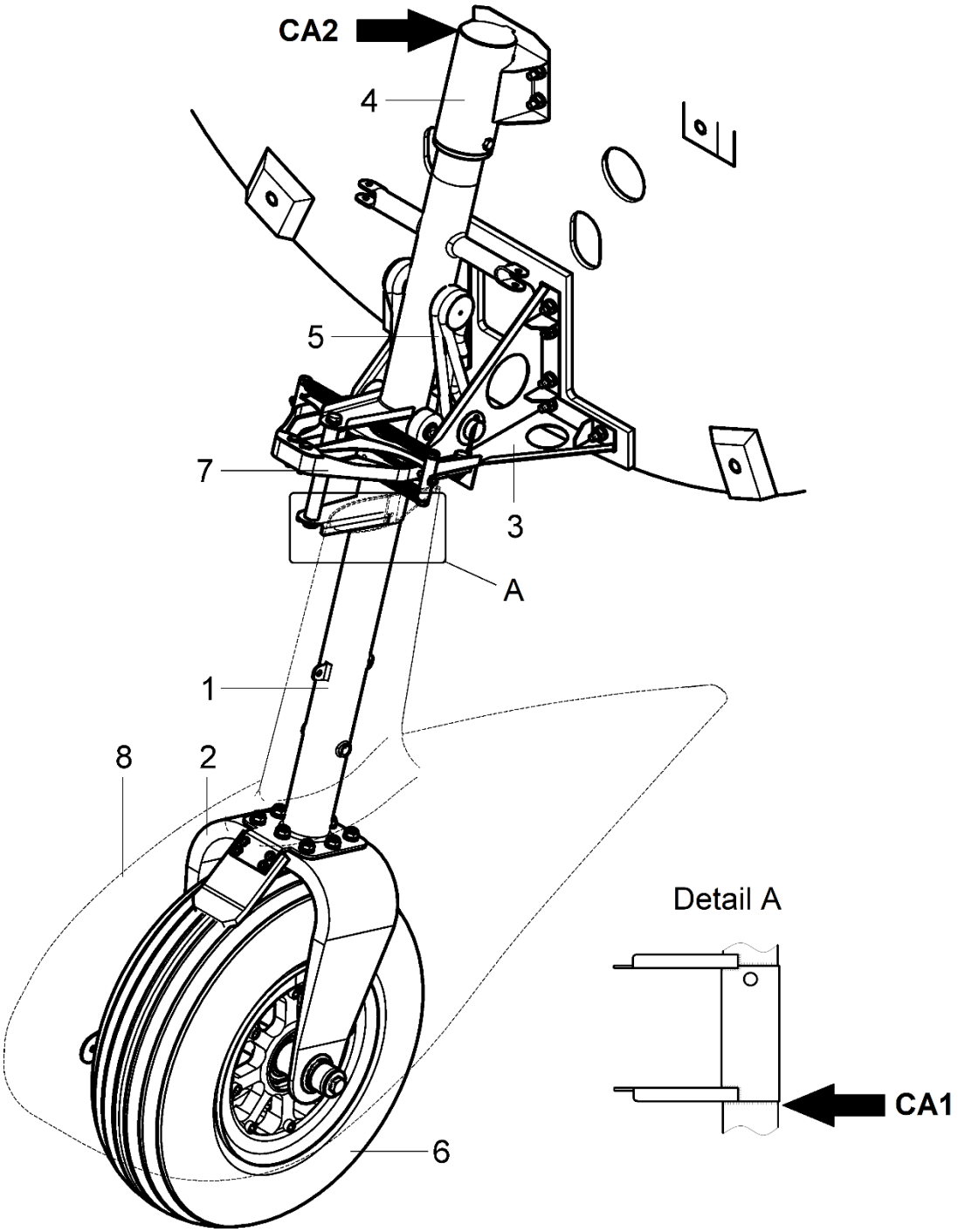
1. DESCRIPTION

The metal nose landing gear leg (1, Fig. 32-6) with carbon fork (2) is attached to the firewall in the lower (3) and upper (4) supports. The nose landing gear incorporates bungees (5) (nose leg - lower support) and rubber damper (nose leg - upper support). Nose leg is steerable and controlled by foot control pedals by means of pull-push rods and is fitted with the centring mechanism (7).

The nose landing gear is equipped with aluminium wheel disc with tubeless tire (6) (see Chapter 32-40).

The nose wheel is fitted with the aerodynamic fairing (8).

Increased attention during periodic inspections, especially after a hard landing must be focused on cracks in the critical areas of nose gear components.
The critical area on the nose landing gear leg (1, Fig. 32-6) is located around the weld of main tube and reinforcement tube (CA1). The critical area of upper support (2) is located around the weld of support's tube and lid (CA2).



1 – Landing gear leg
2 – Carbon fork
3 – Lower support
4 – Upper support
5 – Bungee
6 – Nose wheel
7 – Centring mechanism
8 – Wheel fairing

Fig. 32-6 Nose Landing Gear

2. MAINTENANCE PRACTICES

A. Nose wheel fairing

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

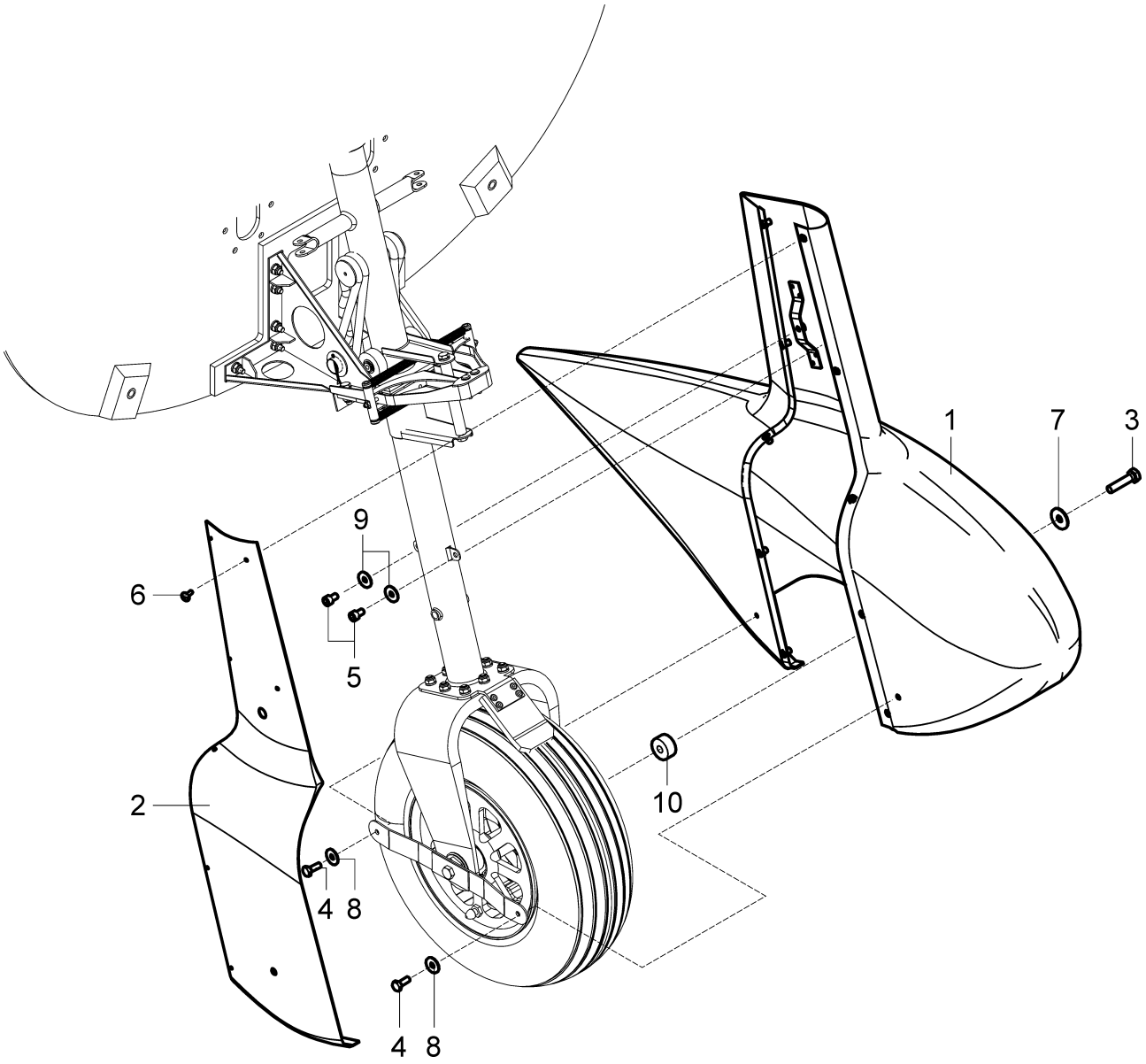
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Hex key 6	1 pc
Wrench 10	1 pc
Wrench 13	1 pc
Loctite 243	AR
Persons	1

Tab. 32-5 Recommended tools, materials, persons and documentation

(1) Nose wheel fairing removal:
- (a) Unscrew the bolts (6, Fig. 32-7) and remove the cover (2).
- (b) Unscrew the bolts (3; 4; 5) and remove the washers (7; 8; 9).
- (c) Remove the wheel fairing (1) with the distance roller (10).

(2) Nose wheel fairing installation:
- (a) Thoroughly clean the inside of the fairing before each installation.
- (b) Adjust the wheel fairing (1, Fig. 32-7) with the distance roller (10) to the appropriate position.
- (c) Install the washers (7; 8; 9); apply Loctite 243 on the bolts threads and screw the bolts (3; 4; 5) in.
- (d) Install the cover (2) using the bolts (6).



1 – Nose wheel fairing
2 – Cover
3 – Bolt M8 x 35
4 – Bolt M6 x 16
5 – Allen bolt M6 x 10
6 – Bolt M5 x 12
7 – Washer ø8.4 x 24 x 2
8 – Washer ø6.4 x 18 x 1.6
9 – Serrated locking washer ø6.4
10 – Distance roller

Fig. 32-7 Nose Wheel Fairing Removal / Installation

B. Nose wheel

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 13	1 pc
Wrench 24	2 pcs
Screwdriver	1 pc
Knife	1 pc
Socket 10	1 pc
Persons	1

Tab. 32-6 Recommended tools, materials, persons and documentation

(1) Nose wheel removal:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the nose wheel fairing (see 2.A.(1)).

(c) Unscrew the bolt (8, Fig. 32-8), remove the washer (9) and the wheel fairing bracket (7).

(d) Unscrew the bolt (5), remove the tab washer (6) and pull the nose wheel axle (2) out.

(e) Remove the nose wheel (1) with the short distance tube (4) and the long distance tube (3).

(2) Nose wheel installation:

(a) Insert the nose wheel (1, Fig. 32-8) with the short distance tube (4) and the long distance tube (3) into the carbon fork (10).

(b) Slide the nose wheel axle (2) from the left side in; install the tab washer (6), tighten and secure the bolt (5) by bending of washer.

(c) Install the wheel fairing bracket (7), the washer (9), apply Loctite 243 on the bolt (8) thread and tighten the bolt (8).

(d) Check free rotation of the wheel (1) and if the braking plate (11) is effectively braking the wheel.

(e) Install the nose wheel fairing (see 2.A.(2)).

(f) Carry out a test and check:

- If all bolt connections are tight.
- Plays.
- Free movement, rotation and damping of the nose landing gear.
- If the brake plate is braking the wheel.
- Tire pressure (200 kPa).
- That no foreign objects remain in the aircraft.

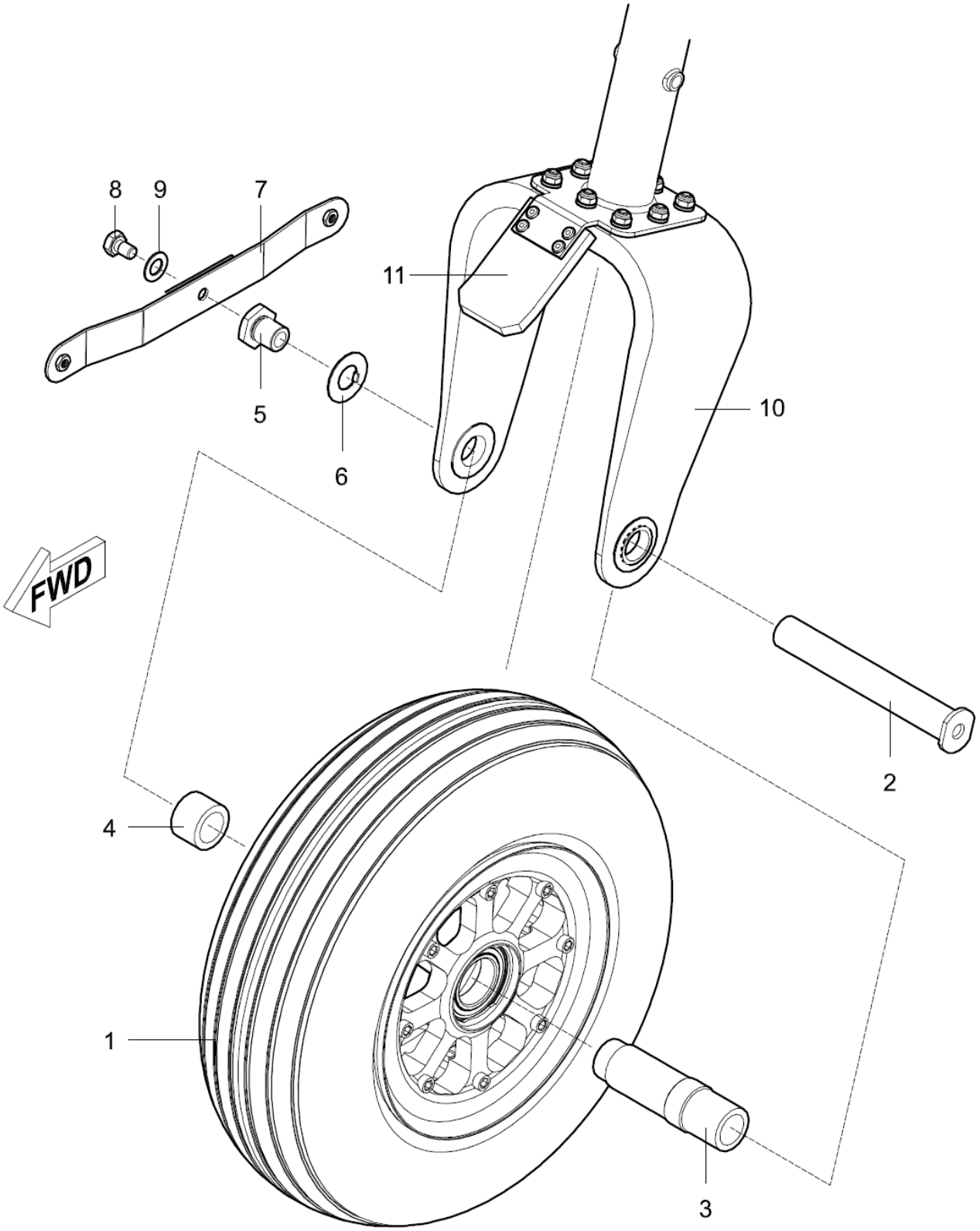


Fig. 32-8 Nose Wheel Removal / Installation (page 1 of 2)

1 – Nose wheel
2 – Nose wheel axle
3 – Long distance tube
4 – Short distance tube
5 – Bolt
6 – Tab washer
7 – Wheel fairing bracket
8 – Bolt M8 x 12
9 – Washer ø8.4 x 16 x 1.6
10 – Fork
11 – Braking plate

Fig. 32-8 Nose Wheel Removal / Installation (page 2 of 2)

C. Nose landing gear leg

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 13	1 pc
Wrench 24	2 pcs
Screwdriver 10	1 pc
Hex key 2	1 pc
Socket 10	1 pc
Hand riveting tool	1 pc
Heat gun	1 pc
Knife	1 pc
Drill	1 pc
Drill bit ø4 mm	1 pc
Rubber rope	AR
Split pin ø2 x 32 mm	2 pcs
Lock wire ø1.2 mm	AR
Vaseline	AR
Loctite 243	AR
Persons	2

Tab. 32-7 Recommended tools, materials, persons and documentation

(1) Nose landing gear leg removal:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the engine cowlings (Chapter 71-10).

(c) Remove the nose wheel (see 2.B.(1)).

(d) Disconnect the push rods from the landing strut levers (Chapter 32-50).

(e) Cut the rubber ropes (12, Fig. 32-9).

(f) Unscrew the nuts (30) and the bolts (32) and remove the springs (29).

(g) Unscrew the bolts (25), remove the washers (15) and the tube (26).

(h) Remove the split pins (17) and the tube (10).

(i) Remove the circlips (24), guiding wheels (6), guiding wheel axle (5).

(j) Remove the damping plate (11).

(k) On the rear side of the clip assembly, unscrew the nuts (16), remove the washers (15) and the bolts (13).

NOTE

Clip assembly consists of pos. 7, 8, 9.

(l) On clip assembly, unscrew the nuts (16) remove the washers (15), washers (34) and the bolts (14).

(m) Remove the clip assembly, stirrup (27) with beams (28).

(n) On the stirrup, remove the split pins (33), remove the washers (15), bolts (31) and remove the beams.

(o) Remove the nose landing gear (1).

(p) Remove the upper and lower supports (see 2.D.(1)).

(q) As necessary, remove the carbon fork (18) and the braking plate (21):

- Remove the carbon fork (18), by removing the nuts (16), washers (15), bolts (19) and washer plate (20).
- Remove the braking plate (21), by drilling out the blind rivets (22) and removing washers (23).

(2) Nose landing gear leg installation:

(a) Before assembly of the nose landing gear, check the outer surface of the nose landing gear for any cracks and corrosion. Check the rubber absorber (4, Fig. 32-9) for damage.

(b) As necessary, install the carbon fork and the braking plate:

- Install the carbon fork (18) on the landing strut (1), using bolts (19), washer plate (20), washers (15) and the nuts (16).
- Install the braking plate (21) on the landing strut tab, by drilling 4 holes ø4 in the braking plate (21) referring to landing strut tab holes. Put the washers (23) on blind rivets (22) and connect the braking plate (21) with the landing strut tab using the hand riveting tool.

(c) Install the upper and lower supports (see 2.D.(2)).

(d) Insert the guiding wheel axle (5), install the guiding wheels (6) and lock them with circlips (24).

(e) Lubricate the rubber absorber (4) with vaseline and slide it into the upper support assembly (2).

(f) Slide the landing strut (1) into the upper support assembly (2) and push it into the lower support (3).

NOTE

It is necessary use greater force.

(g) Put the damping plate (11) between the guiding wheels (6) and the lower support (3).

(h) Apply Loctite 243 on the bolt (9) thread, screw the bolt (9) into the sliding bearing (7).

(i) Put the bronze bushings (8) on the landing strut (1) with the rear sliding bearing (7).

NOTE

Allen head bolt (9) must fit into the gap between the bronze bushings (8).

(j) Connect the stirrup (27) with beams (28) using bolts (31), washers (15) and spit pins (33).

(k) Install the stirrup (27) with beams (28) on the lower support (3).

(l) Connect the rear sliding bearing (7) with the lower support (3), using bolts (14), washers (15) and nuts (16) (do not tighten it).

(m) Connect the front sliding bearing with the rear sliding bearing (7) using bolts (13), washers (15) and nuts (16) (do not tighten it).

(n) Connect the front sliding bearing (7) with the lower support (3) using bolts (14), washers (15) and nuts (16).

(o) Tighten all nuts fastening upper and lower supports (2; 3) (see 2.D.(2)); tighten all nuts (16) on the lower support (3), apply Loctite 243 on the bolts (9) threads and tighten the bolts (9).

(p) Check free movement of the landing strut (1).

(q) At one end of the rubber ropes (12) make loops ø20 mm and secure it with lock wire; seal the ends.

(r) Slide the rubber ropes (12) on the tube (10), put them (10; 12) into the lower support (3) and lock with split pins (17).

(s) Stretch the rubber ropes (12) (see Fig. 32-10) with force 100 N - 110 N, secure the ends with lock wire; cut and seal the ends.

CAUTION

ENSURE THAT THE FORCE IS DISTRIBUTED EVENLY ON FULL LENGTH OF THE RUBBER ROPES (12).

(t) Install the tube (26, Fig. 32-9) on the landing strut (1) using bolts (25), washers (15).

(u) Install the springs (29) and bolts (32) on the beams (28); equally screw the bolts (32) so that the springs are tensioned; secure the bolts with nuts (30).

(v) Connect the nose gear push rods with nose gear levers (Chapter 27-20).

(w) Install the engine cowlings (Chapter 71-10).

(x) Install the nose wheel (see 2.B.(2)).

(y) Carry out a test and check:

- That parts are secured with split pins and circlips.
- If all bolt connections are tight.
- Plays.
- Free movement, rotation and damping of the nose landing gear.
- If the braking plate is braking the wheel.
- That the rubber ropes are secured with lock wire.
- Tire pressure (200 kPa).
- That no foreign objects remain in the aircraft.

(3) Nose landing gear inspection / check

In the following table the permissible plays for nose landing gear attachment are shown. These values should not be exceeded in operation.

SYSTEM	PROCEDURE TO FIND A PLAY	PROCEDURE TO REMEDY A PLAY	MAX. PRODUCT. PLAY	MAX. OPERATING PLAY
Nose landing gear	Lift the aircraft. Move the nose wheel forward and backward to find possible plays.	Replace the bushings of the upper and lower support.	1 mm / 0.039 in	3 mm / 0.118 in

Tab. 32-8 Maximum Permissible Plays

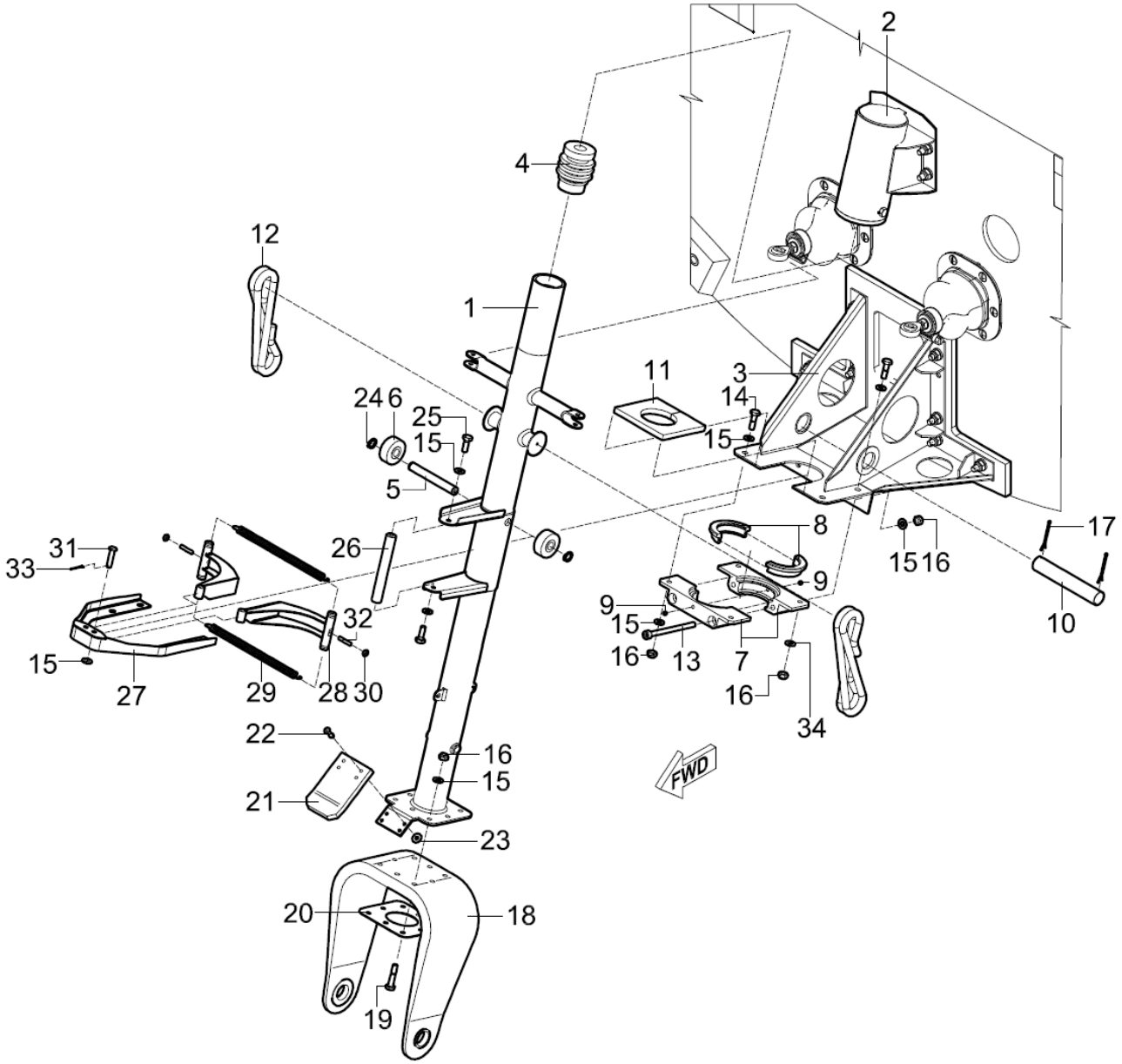


Fig. 32-9 Nose Landing Gear Leg Removal / Installation (page 1 of 2)

1 – Landing strut
2 – Upper support assembly
3 – Lower support
4 – Rubber absorber
5 – Guiding wheel axle
6 – Guiding wheels
7 – Sliding bearing
8 – Bronze bushing
9 – Allen head bolt M4 x 5
10 – Tube
11 – Damping plate
12 – Rubber rope
13 – Bolt M6 x 80
14 – Bolt M6 x 20
15 – Washer ø6.4 x 12 x 1.6
16 – Self-locking nut M6
17 – Split pin ø2 x 32
18 – Carbon fork
19 – Bolt M6x28
20 – Washer plate
21 – Brake plate
22 – Blind rivet ø4 x 20
23 – Washer ø4.3 x 12 x 1
24 – Circlip ø10
25 – Bolt M6 x 16
26 – Tube
27 – Stirrup
28 – Beam
29 – Spring
30 – Nut M4
31 – Bolt
32 – Allen head bolt M4 x 20
33 – Split pin ø2 x 16
34 – Washer ø6.1 x 12 x 0.5

Fig. 32-9 Nose Landing Gear Leg Removal / Installation (page 2 of 2)

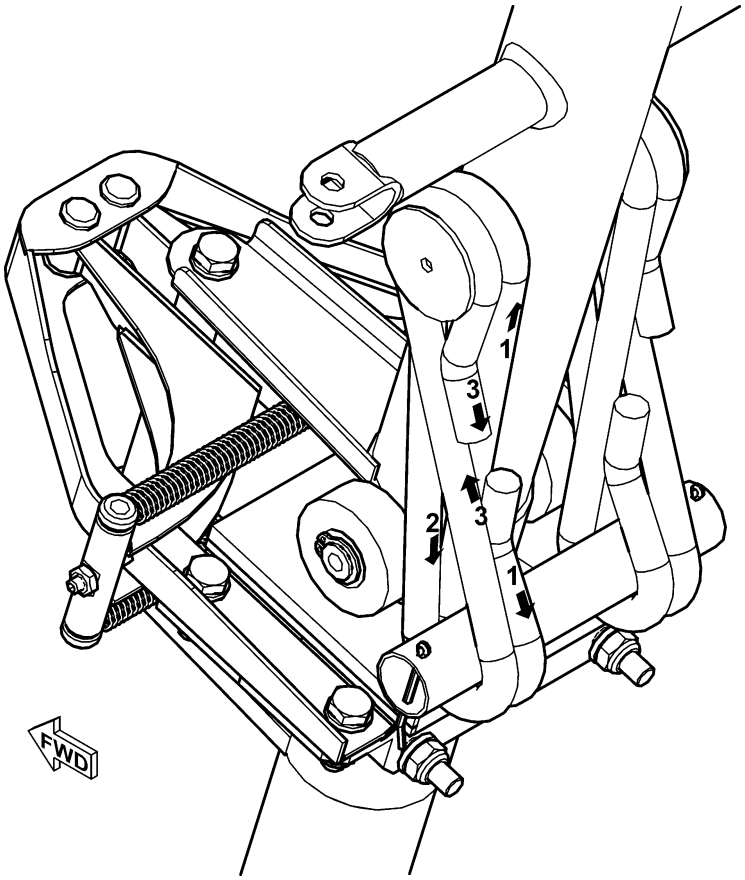


Fig. 32-10 Method of Turning the Rubber Rope

D. Nose landing gear leg supports

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Wrench 8	1 pc
Loctite 243	AR
Persons	2

Tab. 32-9 Recommended tools, materials, persons and documentation

(1) Nose landing gear leg supports removal:

(a) Remove the nose landing gear leg (see 2.C.(1)).

(a) Remove the lower support (3, Fig. 32-11), by unscrewing the nuts (8), removing the washers (9; 10) and bolts (6).

(b) Remove the upper support assembly (1), by unscrewing the nuts (8), removing the washers (9; 10) and bolts (7).

(c) Disassemble the upper support assembly (1), by unscrewing the bolts (5) and removing the bushing (4).

(2) Nose landing gear leg supports installation:

(d) Complete the upper support assembly (1, Fig. 32-11), by sliding bushing (4) into the upper support (2), apply Loctite 243 on the bolts (5) threads and tighten the bolts (5).

(a) Install the upper support assembly (1) on the firewall (11), using the bolts (7) and washers (9; 10), slightly screw the nuts (8) in.

NOTE

Nuts will be tightened after assembly of the landing strut.

(b) Install the lower support (3) on the firewall, using bolts (6), washers (9; 10) and nuts (8).

(c) Install the nose landing gear leg (see 2.C.(2)).

(d) Tighten the nuts (8) fastening the upper and lower supports (2; 3).

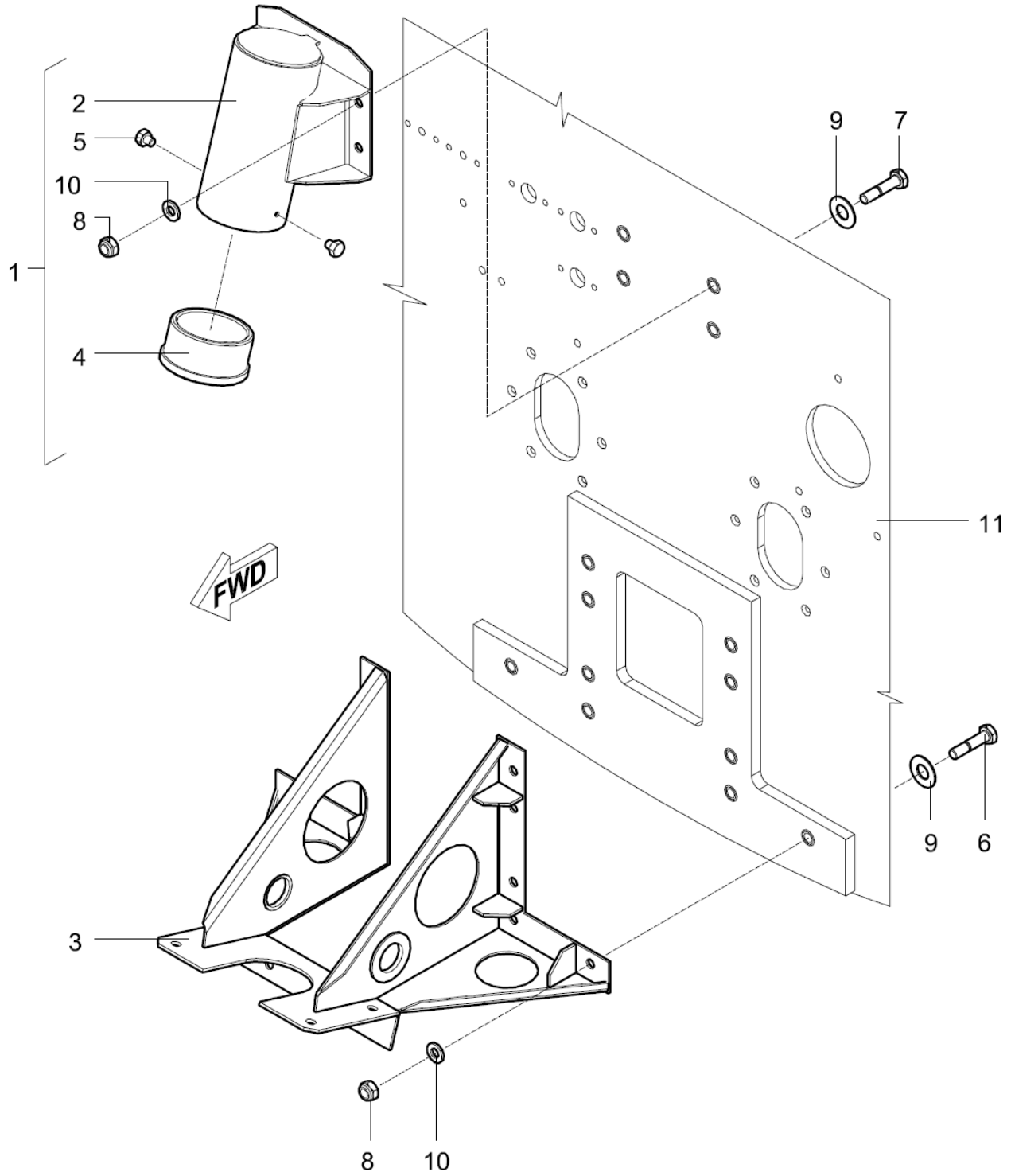


Fig. 32-11 Nose Landing Gear Leg Supports Removal / Installation (page 1 of 2)

1 – Upper support assembly
2 – Upper support
3 – Lower support
4 – Bushing
5 – Bolt M5 x 5
6 – Bolt M6 x 26
7 – Bolt M6 x 28
8 – Self-locking nut M6
9 – Washer ø6.4 x 18 x 1.6
10 – Washer ø6.4 x 12 x 1.6

For information:

11 – Firewall

Fig. 32-11 Nose Landing Gear Leg Supports Removal / Installation (page 2 of 2)

This page is left blank intentionally

32-40 WHEELS AND BRAKES

1. DESCRIPTION

This chapter describes the wheels and brake system and their operation.

The main landing gear is equipped with an aluminium Beringer wheel discs (1, Fig. 32-12) with tubeless tires 15x6.00-6 (2). The wheel discs consist of split rim with two ball bearings. The main wheels are equipped with hydraulic brakes.

The nose landing gear is equipped with an aluminium Beringer wheel disc (3) with tubeless tire 13x5.00-6 (4). The wheel disc consists of split rim with two ball bearings.

The main gear wheels are equipped with Beringer hydraulic brakes which are controlled by the brake lever (10) located on the central console. The brake lever acts through the push rod and lever directly onto the master cylinder (7) located in the central console. The brake fluid reservoir (9) and assembled pressure limiter (8) are located under the left seat. Master cylinder is connected with the pressure limiter and both brake calipers (5) by hydraulic hoses (11).

Brake discs (6) are inserted into to the shaped wheel rim and locked by a wire. Calipers (5) are attached to the wheel axles.

The brakes have two positions using grooves at the slotted link: parking brake and maximum braking.

Parking brake operation:

– To apply parking braking, move brake lever backward to **PARK** position.

– To release parking braking, unlatch the brake lever and release fully forward.

Maximum braking operation:

– To apply the maximum braking, move the brake lever fully backward to **MAX** position.

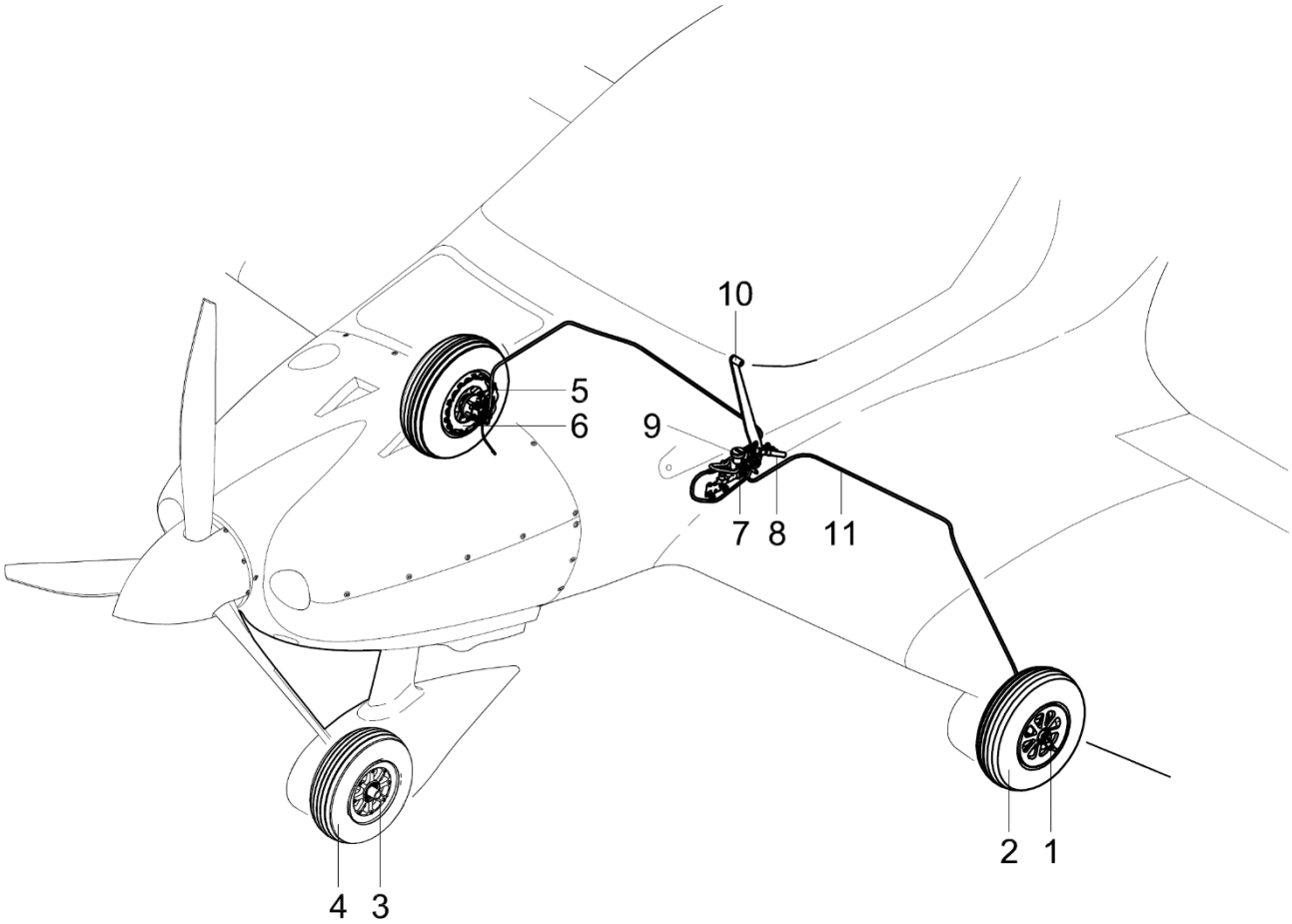
– To release maximum braking, unlatch the brake lever and release fully forward.

Scheme of the brake system is shown in Fig. 32-13.

Only brake fluid of DOT-4 (meets classification J1703c) should be used for the brake system (type for medium hard or hard operation). In general, the certified automobile brake fluid meets the requirements. Brake fluid refilling is necessary when the efficiency of the brake system becomes low due to a fluid leak. The brake system is fed from the brake fluid reservoir located under the pilot seat.

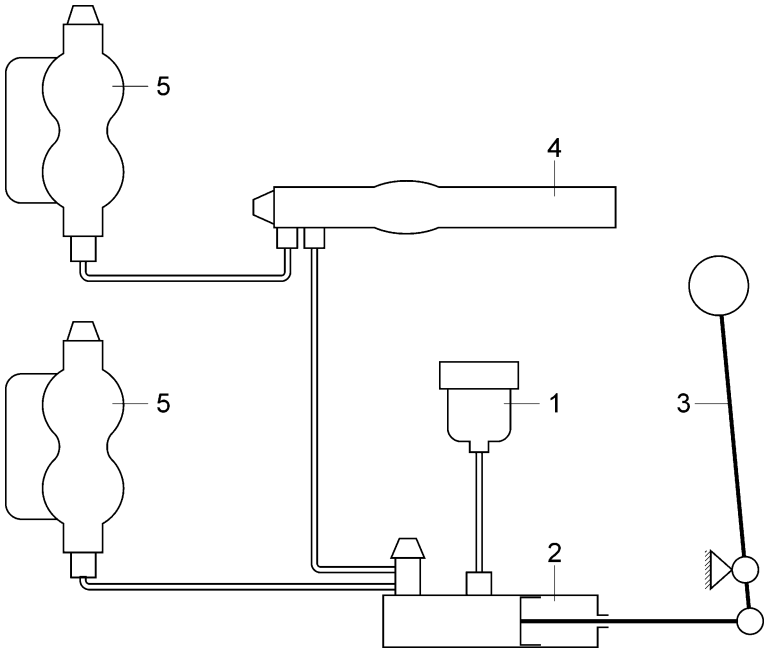
The brake fluid gets thick during aircraft operation and absorbs air humidity. This is the most important condition, which causes brake system failures. It is not possible to determine exactly when it occurs.

Information about the brake fluid used by the manufacturer is recorded on a placard at the firewall in the engine compartment.



1 – Main wheel disc
2 – Main wheel tire
3 – Nose wheel disc
4 – Nose wheel tire
5 – Brake caliper
6 – Brake disc
7 – Master cylinder
8 – Pressure limiter
9 – Brake fluid reservoir
10 – Brake lever
11 – Hose

Fig. 32-12 Wheels and Brakes



1 – Brake fluid reservoir
2 – Master cylinder
3 – Brake lever
4 – Pressure limiter
5 – Brake caliper

Fig. 32-13 Brake System Scheme

2. MAINTENANCE PRACTICES

All wheels (with tires fitted) must be balanced before the installation. If a new tire is installed, the wheel must be re-balanced (with the tire fitted) before the installation. Unbalanced wheels can cause vibration to the landing gear.

A. Main wheel

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hex key 5	1 pc
Beringer jig	1 pc
Circlip pliers	1 pc
O ring	2 pcs
Loctite 243	AR
Persons	1
Beringer documentation- Procedure to change brake pads on 2 piston caliper ref: EA-01	-

Tab. 32-10 Recommended tools, materials, persons and documentation

(1) Main wheel tire replacement:
- (a) Remove the main wheel (Chapter 32-10).
- (b) Deflate the tire to zero pressure.
- (c) Separate the tire (1, Fig. 32-14) from the discs (2; 3).
- (d) Unscrew the bolts (5) and disassemble discs (2; 3).
- (e) Remove the O-ring (4).
- (f) Before assembly of the wheel, thoroughly clean the discs and tires on contact surfaces.
- (g) Press the tire (1) using the Beringer jig (Fig. 32-15).
- (h) Install the new O-rings (4) and discs (2; 3).

CAUTION

A NEW O-RING HAS TO BE INSTALLED AT EACH TIRE CHANGE.

(i) Apply Loctite 243 on the bolts (5) threads and tighten the bolts (5) at torque moment 10 Nm, in order acc. to Fig. 32-15; make sure that the assembled parts are sealed well.

(j) Inflate the tire to the appropriate pressure 250 kPa.

(k) After 24 hours check that the air leakage is not more than 10%.

(l) Inflate the tire to the appropriate pressure.

(2) Main wheel bearings replacement:

(a) Remove the main wheel (Chapter 32-10).

(b) Deflate the tire to zero pressure.

(c) Separate the tire (1, Fig. 32-14) from the discs (2; 3).

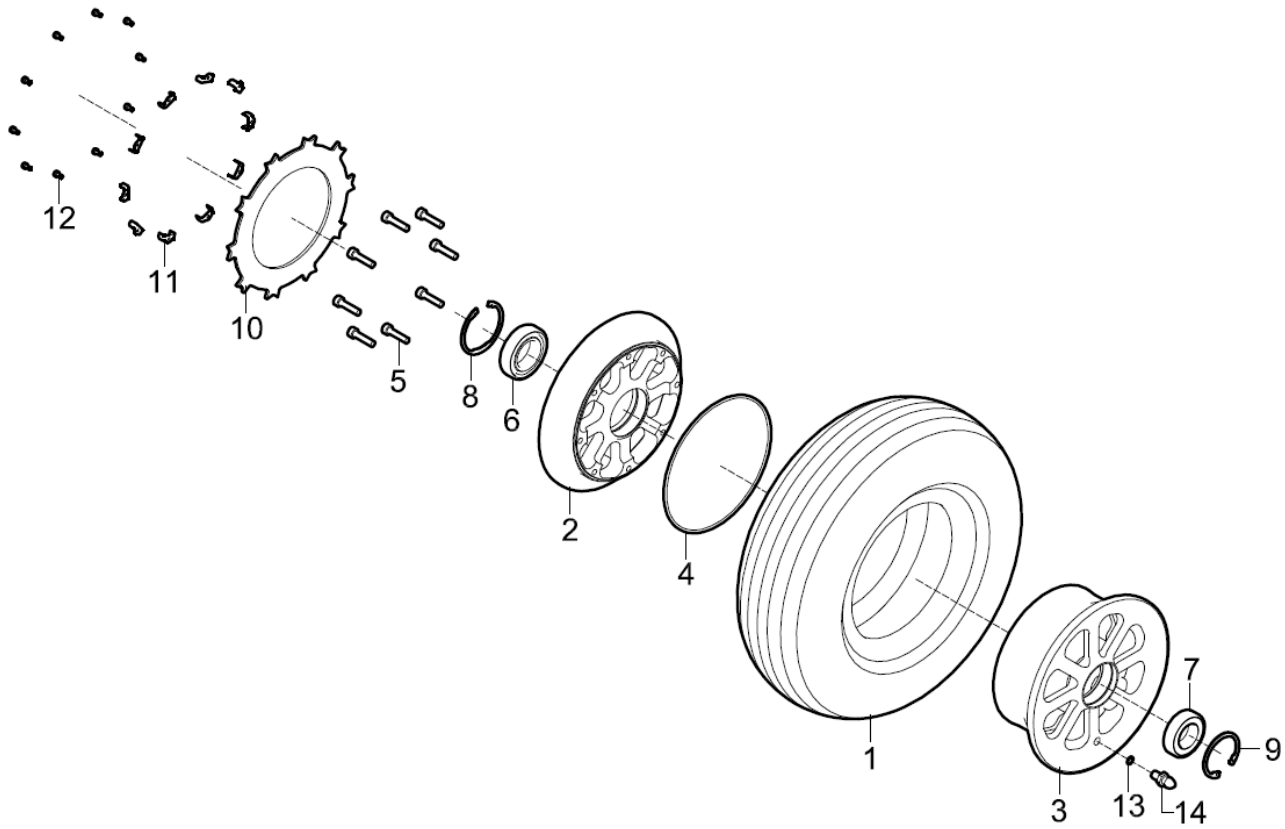
(d) Unscrew the bolts (5) and disassemble the discs (2; 3).

(e) Remove the O-ring (4).

(f) Use Circlip pliers to remove the circlips (8; 9) and pull out the bearings (6; 7).

(g) Slide in the new bearings (6; 7) and secure with circlips (8; 9).

(h) Install the tire (see 2.A.(1)).



1 –	Tire	8 –	Circlip
2 –	Inner disc	9 –	Circlip
3 –	Outer disc	10 –	Brake disc
4 –	O-ring	11 –	Clip
5 –	Bolt	12 –	Clip screw
6 –	Bearing	13 –	O-ring
7 –	Bearing	14 –	Valve

Fig. 32-14 Main Wheel

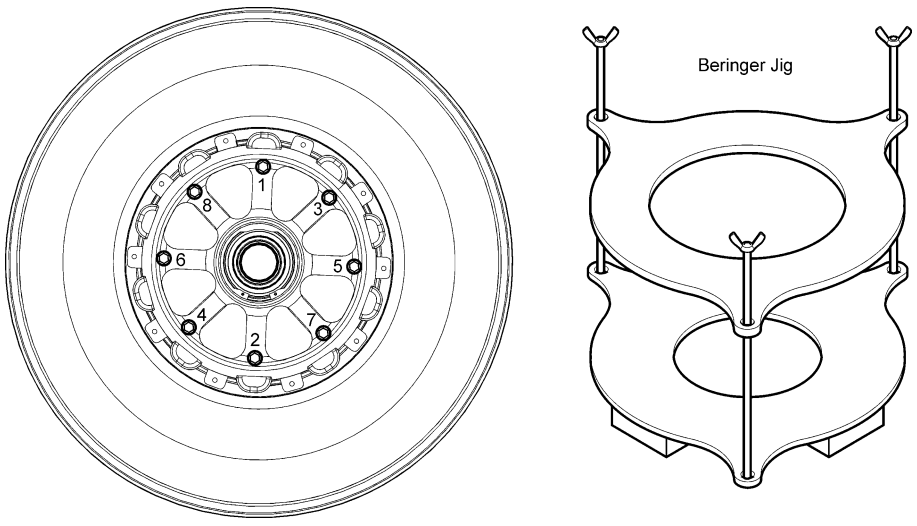


Fig. 32-15 Order of Tightening the Allen Bolts, Beringer Jig

B. Nose wheel

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hex key 5	1 pc
Beringer jig	1 pc
Circlip pliers	1 pc
O ring	2 pcs
Loctite 243	AR
Persons	1
Beringer documentation- Procedure to change brake pads on 2 piston caliper ref: EA-01	-

Tab. 32-11 Recommended tools, materials, persons and documentation

(1) Nose wheel tire replacement:

(a) Remove the nose wheel (Chapter 32-20).

(b) Deflate the tire to zero pressure.

(c) Separate the tire (1, Fig. 32-16) from the discs (2; 3).

(d) Unscrew the bolts (5) and disassemble the discs (2; 3).

(e) Remove the O-ring (5).

(f) Before assembly of the wheel, thoroughly clean the discs and tires on the contact surfaces.

(g) Press the tire (1) using the Beringer jig (Fig. 32-15).

(h) Install the new O-ring (5) and discs (2; 3).

CAUTION

A NEW O-RINGS MUST BE INSTALLED AT EACH TIRE CHANGE.

(i) Apply Loctite 243 on the bolts (4) threads and tighten the bolts (4) at torque moment 10 Nm, in order acc. to Fig. 32-15; make sure that the assembled parts are sealed well

(j) Inflate the tire to appropriate pressure 250 kPa.

(k) After 24 hours check that the air leakage is not more than 10%.

(l) Inflate the tire to the appropriate pressure.

(2) Nose wheel bearings replacement:

(a) Remove the wheel (Chapter 32-20).

(b) Deflate the tire to zero pressure.

(c) Separate the tire (1, Fig. 32-16) from the discs (2; 3).

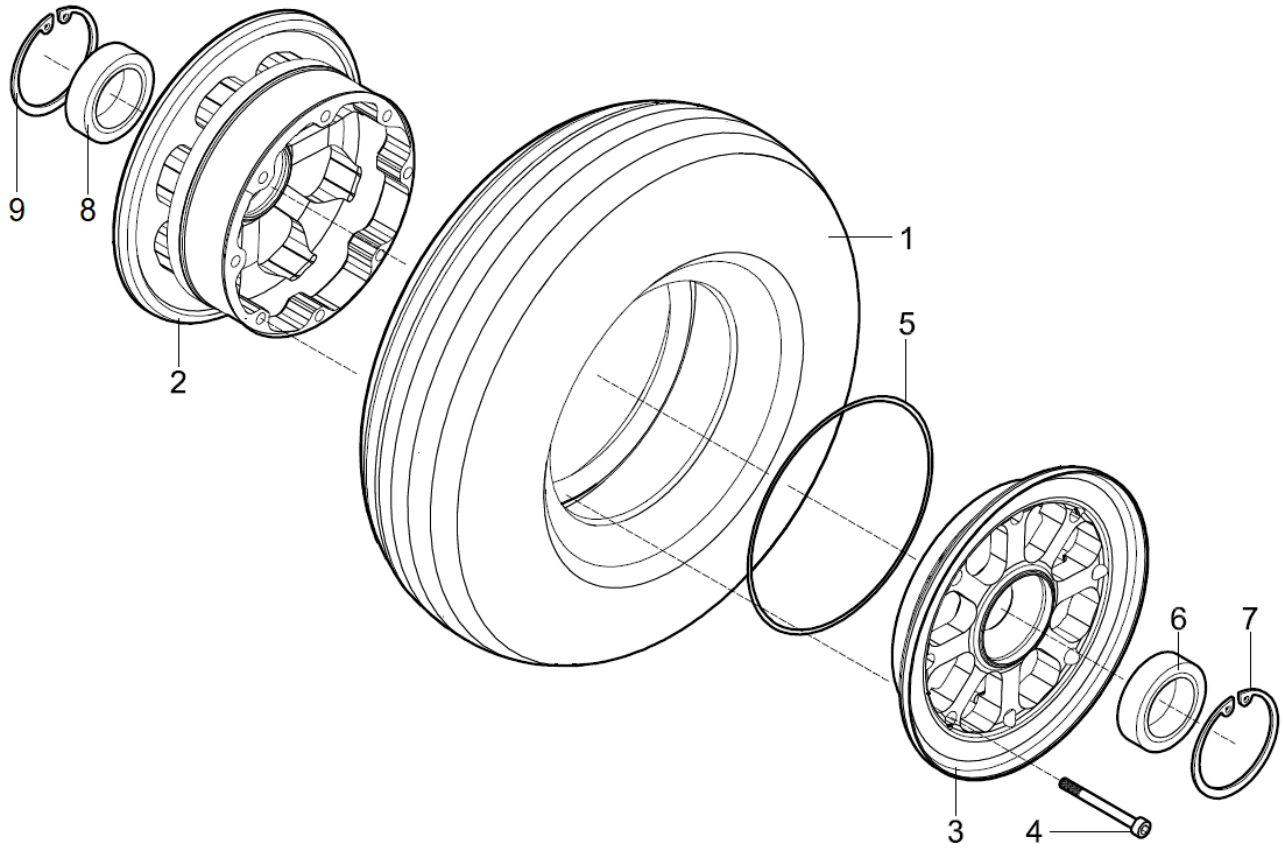
(d) Unscrew the bolts (4) and disassemble the discs (2; 3).

(e) Remove the O-ring (5).

(f) Use Circlip pliers to remove the circlips (7) and pull out the bearings (6).

(g) Slide in the new bearings (6) and secure with circlips (7).

(h) Install the tire (see 2.B.(1)).



1 – Tire
2 – Disc 1
3 – Disc 2
4 – Allen bolt M8 x 70
5 – O-ring
6 – Bearing
7 – Circlip
8 – Bearing
9 – Circlip

Fig. 32-16 Nose Wheel

C. Brake system

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 12	1 pc
Wrench 10	1 pc
Socket set 14	1 pc
Screwdriver 5	1 pc
Hex key 4	1 pc
Hex key 5	1 pc
Hex key 6	1 pc
Pliers	1 pc
Serrated locking washer ø6.4 mm	2 pcs
Copper gasket ring ø10 x 15 x 1.5 mm	8 pcs
Vaseline	AR
Sealing adhesive tape	AR
Persons	2
Beringer documentation - Assembly instructions for hose and banjo fittings	

Tab. 32-12 Recommended tools, materials, persons and documentation

(1) Brake fluid reservoir removal:

(a) Remove the brake fluid from the brake system (see 2.C.(11)).

(b) Remove the left laminated seat (Chapter 25-10).

(c) On the reservoir holder (38, Fig. 32-17), loosen and remove the bolt (39), remove the washer (37) and nut (33).

(d) Remove the hose clamp (35) and remove the brake fluid reservoir (1).

(2) Brake fluid reservoir installation:

(a) Connect the fluid reservoir (1, Fig. 32-17) with the hose (14) and secure with the hose clamp (35).

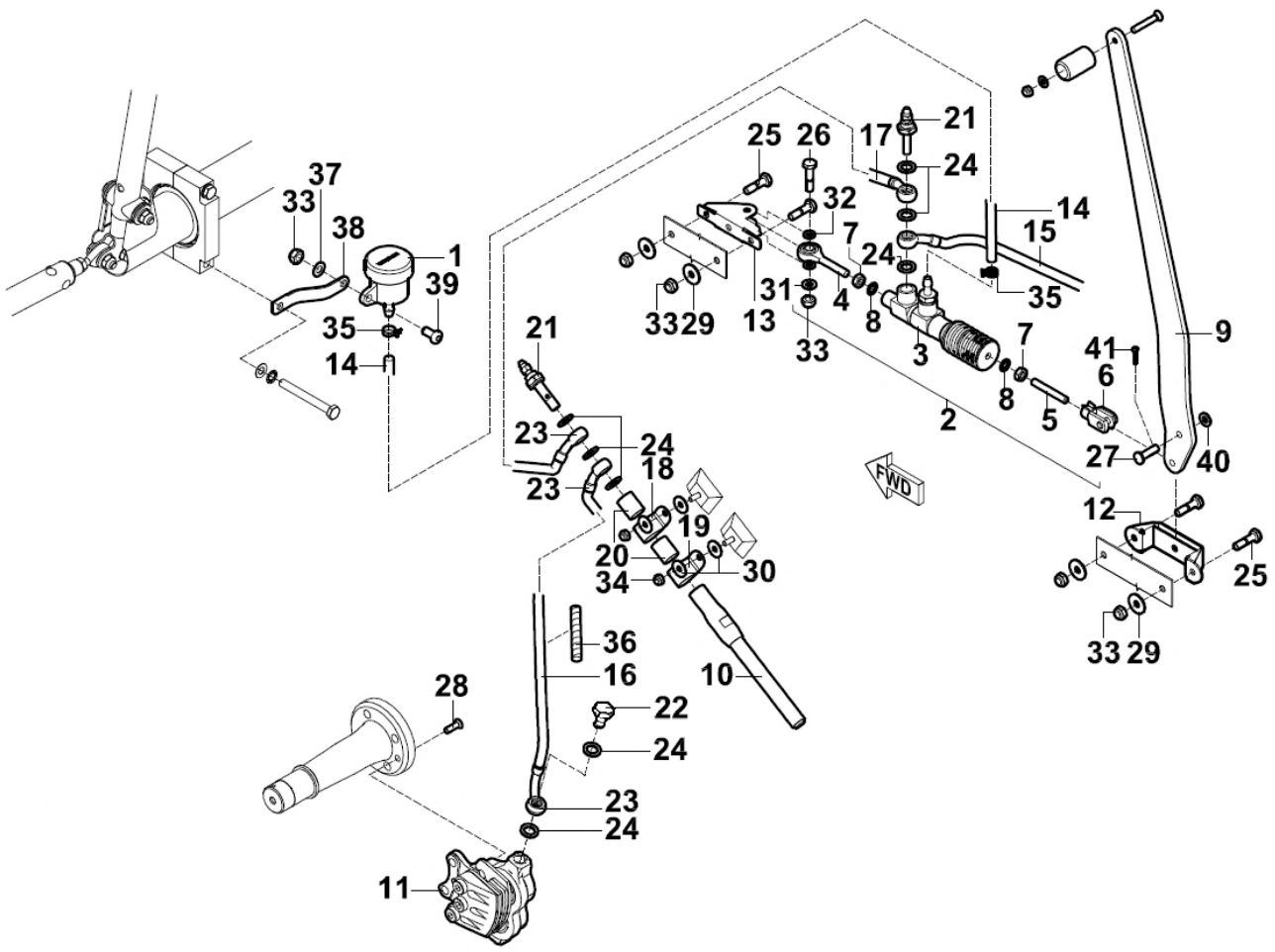
(b) Install the fluid reservoir (1) using the bolt (39) with the washer (37) and nut (33) on the reservoir holder (38).

(c) Fill the brake system with the brake fluid (see 2.C.(11)).

(d) Install the left laminated seat (Chapter 25-10).

(e) Carry out a test and check:

- If all bolt connections are tight.
- Tightness of the brake system.
- That no foreign objects remain in the aircraft.



1 – Brake fluid reservoir	15 – Brake hose R	29 – Washer ø6.4x18x1.6
2 – Master cylinder assembly	16 – Brake hose L	30 – Washer ø5.3 x 15 x 1
3 – Master cylinder	17 – Connecting brake hose	31 – Washer ø6.4x12x1.6
4 – Swivel bearing	18 – Holder ø75	32 – Washer ø6.4x10x1.6
5 – Thread rod M6 x 40	19 – Holder ø70	33 – Self-locking nut M6
6 – Fork with safety pin	20 – Rubber	34 – Self-locking nut M5
7 – Nut M6	21 – Double banjo bolt M10	35 – Hose clamp
8 – Serrated locking washer ø6.4	22 – Banjo bolt M10	36 – Spiral hose ø8
9 – Brake lever	23 – Banjo fitting	37 – Washer ø6.4x12x0.5
10 – Pressure limiter	24 – Copper gasket ring ø10 x 15 x 1.5	38 – Reservoir holder
11 – Caliper	25 – Bolt M6x22	39 – Bolt M6 x 12
12 – Bracket	26 – Bolt M6x25	40 – Washer ø5.3 x 10 x 1
13 – Bracket	27 – Pin ø6 x 14	41 – Split pin ø1.6 x 25
14 – Hose	28 – Allen bolt M6 x 16	

Fig. 32-17 Brake System Components Removal / Installation

(3) Master cylinder assembly with brake lever removal:

(a) Remove the brake fluid from the brake system (see 2.C.(11)).

(b) Remove the pedestal panel (Chapter 27-50).

(c) Remove the left laminated seat (Chapter 25-10).

(d) Remove the elevator push rod in the central tunnel (Chapter 27-30).

(e) Remove the hose clamp (35, Fig. 32-17) and the hose (14).

(f) Disconnect the brake hoses (15; 17) by removing the banjo bolt (21) and the gasket rings (24).

(g) Disconnect the brake lever (9) from the fork (6), by removing the safety pin.

(h) Remove the master cylinder assembly (2) with the bracket (13), by removing the nuts (33), washers (29) and bolts (25).

(i) Remove the bracket (13), by removing the nut (33), washers (31; 32) and bolt (26).

(j) Disassemble the master cylinder assembly (2):

- Unscrew the thread rod (5) with the fork (6).
- Unscrew the swivel bearing (4).

(k) Remove the bracket (12) with the brake lever (9) by removing the nuts (33), washers (29) and bolts (25).

(l) Remove the brake lever (9), by removing the split pin (41), washer (40) and bolt (27).

(4) Master cylinder assembly with brake lever installation:

(a) Connect the bracket (12, Fig. 32-17) with the brake lever (9), using bolt (27), washer (40) and split pin (41).

CAUTION

DO NOT FORGET TO LUBRICATE THE ROTATING POINTS OF THE BRAKE LEVER.

(b) If necessary, assemble the master cylinder assembly (2):

- Screw the swivel bearing (4) with the washer (8) almost fully in and tighten the lock nut (7).
- Screw the thread rod (5) with the fork (6), washer (8) and lock nut (7) in; do not tighten yet.

(c) Connect the bracket (13) with the swivel bearing (4), using bolt (26), washers (31; 32) and nut (33).

(d) Install the whole unit (13; 2) into the central tunnel using bolts (25), washers (29) and nuts (33).

(e) Enclose the central console and adjust the length of the thread rod (5) so that the brake lever is fully unloaded (front position) and the master cylinder (2) is not pushed.

(f) Remove the central console, secure the fork (6) with the safety pin and tighten the lock nut (7).

(g) Assemble the brake hoses (15; 17) with banjo fittings (23) (see 2.C.(10)).

(h) Connect the brake hoses (15; 17) with the master cylinder (3), using banjo bolt (21) and gasket rings (24).

CAUTION

A NEW GASKET RINGS MUST BE INSTALLED AT EACH MASTER CYLINDER ASSEMBLY.

(i) Connect the hose (14) with the master cylinder (3) and secure with hose clamp (35).

(j) Fill the brake system with the brake fluid (see 2.C.(11)).

(k) Install the elevator push rod in the central tunnel (Chapter 27-30).

(l) Install the left laminated seat (Chapter 25-10).

(m) Install the pedestal panel (Chapter 27-50).

(n) Carry out a test and check:

- If all bolt connections are tight.
- Tightness of the brake system.
- That no foreign objects remain in the aircraft.

(5) Pressure limiter removal:

(a) Remove the brake fluid from the brake system (see 2.C.(11)).

(b) Remove the pedestal panel (Chapter 27-50).

(c) Remove the left laminated seat (Chapter 25-10).

(d) Disconnect the hoses (16; 17, Fig. 32-17) by removing the banjo bolt (21) and gasket rings (24).

(e) Remove the pressure limiter (10) by removing the nuts (34) and washers (30).

(f) Remove the holders (18; 19) and rubbers (20).

(6) Pressure limiter installation:

(a) Install the rubbers (20, Fig. 32-17) and the holders (18; 19) on the pressure limiter (10).

(b) Install the pressure limiter (10) on the central tunnel under the left seat using washers (30) and nuts (34).

(c) Pass the connecting brake hose (17) through the holes in the central tunnel.

(d) Assemble the hoses (16; 17) with banjo fittings (23) (see 2.C.(10)).

(e) Connect the hoses (16; 17) with the pressure limiter (10) using banjo bolt (21) and gasket rings (24).

(f) Fill the brake system with the brake fluid (see 2.C.(11)).

(g) Install the left laminated seat (Chapter 25-10).

(h) Install the pedestal panel (Chapter 27-50).

(i) Carry out a test and check:

- If all bolt connections are tight.
- Tightness of the brake system.
- That no foreign objects remain in the aircraft.

(7) Brake caliper removal:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the main wheel (Chapter 32-10).

(c) On the main landing strut, remove the sealing adhesive tape and the spiral hose (36, Fig. 32-17).

(d) Disconnect the brake hose (16, 15) by removing the hose fitting (23), banjo bolt (22) and gasket rings (24).

(e) Remove the wheel axle with the brake caliper (11) (Chapter 32-10).

(f) Unscrew the bolt (28) and remove the brake caliper (11) from the wheel axle.

(8) Brake caliper installation:

(a) Install the brake caliper (11, Fig. 32-17) with the wheel axle on the main landing gear leg (Chapter 32-10).

CAUTION

BLEEDING SCREW MUST DIRECT DOWN.

(b) Apply Loctite 243 on the bolt (28) thread and fix the brake caliper (11) to the wheel axle.

(c) Assemble the hoses (16/15) with banjo fittings (23) (see 2.C.(10)).

(d) Connect the brake hoses (16/15) with the brake calipers (11) using banjo bolts (22) and gasket rings (24).

(e) The brake hoses (16/15) pass through the hole in the fuselage near the landing gear leg.

(f) Connect the brake hoses to the wire using the spiral hose (36) and secure it with sealing adhesive tape to the middle of the landing leg.

(g) Install the main wheel (Chapter 32-10).

(h) Carry out a test and check:

- If all bolt connections are tight.
- Tightness of the brake system.
- That no foreign objects remain in the aircraft.

(9) Brake hoses removal:

(a) Cut the hose fittings at the end of hoses and pull them out.

(10) Assembly of the banjo fittings on hoses:

NOTE

Install a new banjo fittings when specified during the installation of the brake system.

(a) Before each installation use always a new main fitting body, olive, and socket (Fig. 32-18).

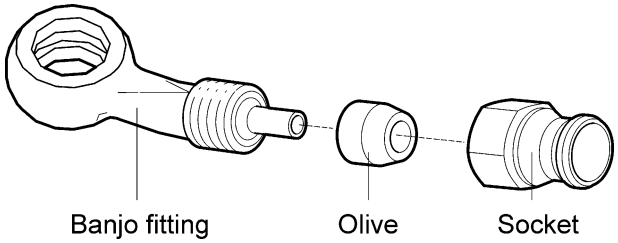


Fig. 32-18 Nose Banjo Fittings

(b) Cut the hose to a required length (hole must be circular profile). Push the socket onto the hose. Rub down the stainless steel from the PTFE tube (5 mm min. length) (Fig. 32-19).

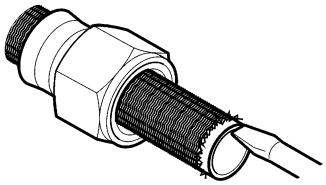


Fig. 32-19 Rub-down of Stainless Steel from the PTFE Tube

(c) Push the olive onto the end of PTFE inner tube and under stainless steel.

CAUTION

CAUTION: MAKE SURE THAT ALL THE STAINLESS STEEL FIBRES ARE OUTSIDE THE OLIVE.

(d) Push the olive against a flat solid surface, make sure that the PTFE tube is fully settled on the olive (Fig. 32-20).

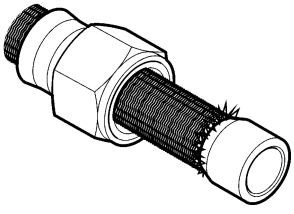


Fig. 32-20 Settled PTFE Tube on the Olive

(e) Insert the main fitting body, lubricate the thread, screw the socket in and tighten using a Vice (Fig. 32-21).

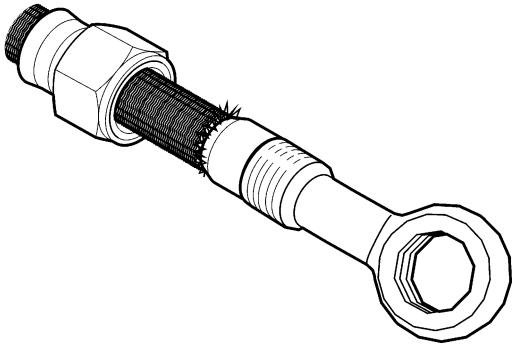


Fig. 32-21 Assembled Main Fitting Body on the Hose

(11) Brake system bleeding:

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Beringer jig	1 pc
Rags	2 pcs
Drain hose ø 6x300 mm	3 pcs
Container	2 pcs
Brake fluid	AR
Loctite 243	AR
Persons	2
Beringer documentation - Brake system bleeding procedure	-

Tab. 32-13 Recommended tools, materials, persons and documentation

(a) Put the aircraft on levelled surface.

(b) Remove the main landing gear fairings (Chapter 32-10).

(c) Install wheel chocks.

(d) Release the brake lever.

(e) Remove the left seat (Chapter 25-10).

(f) On both calipers, connect the drain hose to the bleeding screw (4, Fig. 12-01) and put the free end into the containers. Release both bleeding screws.

(g) Unscrew the cap on the brake fluid reservoir and remove the membrane. Screw the Beringer jig on the brake fluid reservoir (Fig. 32-22).



Fig. 32-22 Beringer Jig

(h) Pump on the Beringer jig until all brake fluid has been drained into the containers.

(i) Pour the new brake fluid into the smaller tank on the Beringer jig.

(j) Remove Beringer jig from brake fluid reservoir.

(k) Install bleeding container on the brake fluid reservoir (Fig. 32-23).



Fig. 32-23 Bleeding Container

(l) Remove drain hoses from caliper's bleeding screws and install the Beringer jigs on both caliper's bleeding screws (4, Fig. 12-01).

(m) Pour the new brake fluid into the tank of Beringer jigs.

(n) Pump on the Beringer jigs until a clear brake fluid begins to flow out from brake fluid reservoir.

(o) Connect the drain hose on pressure limiter and put the free end into the container. Release the bleeding screw of pressure limiter (10, Fig. 12-01). Pump on the Beringer jigs until brake fluid begins to flow out without air bubbles. Tighten bleeding screw of pressure limiter.

(p) Remove drain hose from pressure limiter.

NOTE

Push the brake lever forward and backwards to speed up the bubble release.

(q) Connect drain hose to the master cylinder bleeding screw (9, Fig. 12-01) and put the free end into the container. Release the bleeding screw of master cylinder. Pump on the Beringer jigs until brake fluid begins to flow out without air bubbles. Tighten bleeding screw of master cylinder.

(r) Remove drain hose.

(s) Pump on the Beringer jigs until a clear brake fluid begins to flow out from brake fluid reservoir.

(t) Tighten the caliper's bleeding screws.

(u) Decompress and disconnect the Beringer jigs.

(v) Put a cloth under the brake fluid reservoir and disconnect the bleeding container from the brake fluid reservoir.

CAUTION

CAUTION: CHECK THE LEVEL OF THE BRAKE FLUID IN THE BRAKE FLUID RESERVOIR.

(w) Clean spilled brake fluid and replenish the brake fluid to the max. level in the brake fluid reservoir. Install the membrane and cap of brake fluid reservoir.

(x) Check and tighten all the bleeding screws.

(y) Install the left seat (Chapter 25-10).

(z) Remove wheel chocks.

(aa) Install the main landing gear fairings (Chapter 32-10).

(12) Brake pads replacement:

The brake pads must be replaced when the thickness of the braking layer is under 2 mm. The brake pads must be replaced on both brake calipers.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Rag	1 pc
Hex key 6	1 pc
New brake pads	2 pcs
Loctite 243	AR
Persons	1
Beringer documentation- Change of brake pads	-

Tab. 32-14 Recommended tools, materials, persons and documentation

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the main wheel (Chapter 32-10).

(c) Unscrew the bolts (1; 2, Fig. 32-24), remove the brake pad support (3) and the brake pads (4).

(d) Clean the area around the pistons with a dry rag.

(e) Push the pistons backward with one finger (no force is needed). If you cannot push the pistons backward with one finger, the caliper must be checked and rebuilt.

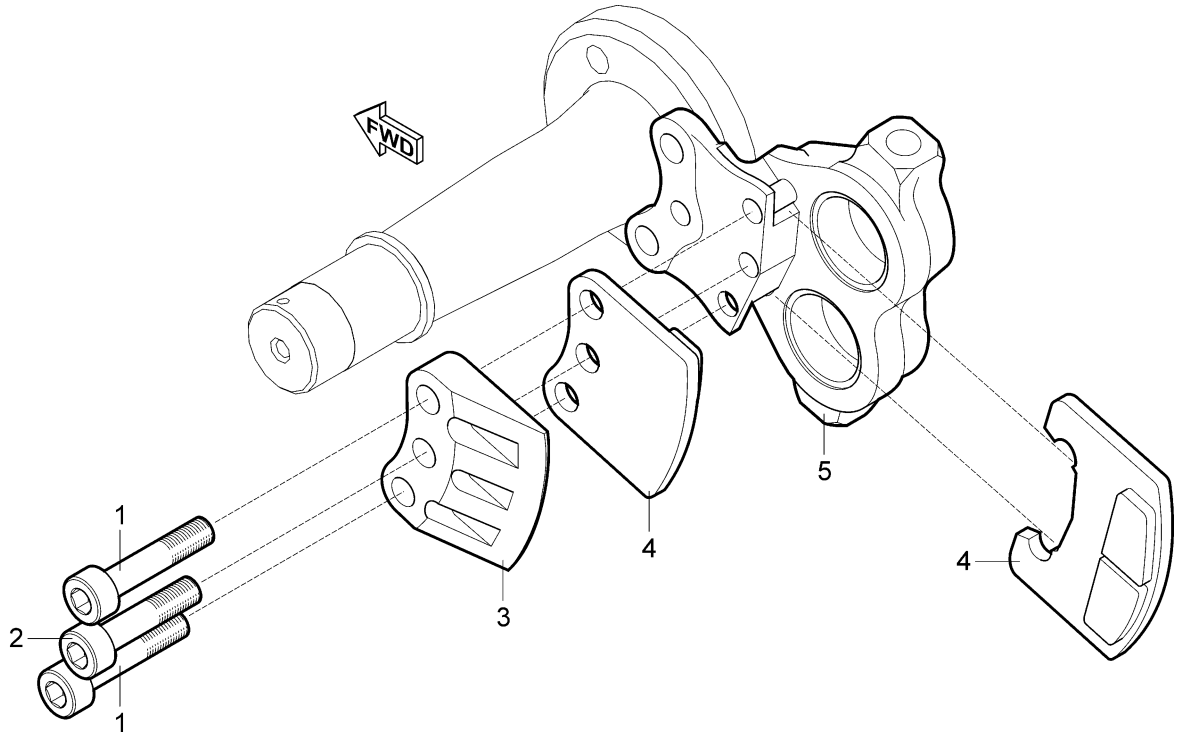
(f) Install the new brake pads (4) and brake pad support (3).

(g) Apply Loctite 243 on the bolts (1; 2) threads and tighten the bolts (1; 2) at torque moment 25 Nm.

(h) Install the main wheel (Chapter 32-10).

(i) Carry out a test and check:

- Torque moments.
- Brake system efficiency.



1 – Allen bolt M8 x 41
2 – Allen bolt M8 x 30
3 – Brake pad support
4 – Brake pad
5 – Brake caliper body

Fig. 32-24 Brake Pads

32-50 STEERING

1. DESCRIPTION

The aircraft is equipped with a steerable nose gear. The steering is controlled by the rudder pedals.

The rudder pedals are connected to the nose landing gear leg by means of push-pull rods fitted with bearing eyes. The hole in the firewall for push-pull rod is protected with a flange with fireproof sleeve.

2. MAINTENANCE PRACTICES

A. Steering push rods

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Hex key 5	1 pc
Screwdriver	1 pc
Serrated locking washer ø6.4	4 pcs
Persons	1

Tab. 32-15 Recommended tools, materials, persons and documentation

(1) Steering push rods removal:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) Remove the the engine cowlings (Chapter 71-10).

(c) In the engine compartment, disconnect the push rod from the nose strut lever by unscrewing the nut (12, Fig. 32-25), remove the washers (8, 9) and the bolt (6).

(d) At the push rod, loosen the hose clamp (14) and the sleeve (3).

(e) If necessary, remove the sleeve by unscrewing the bolts (7).

(f) In the cockpit, disconnect the push rod from the foot control by removing the nut (12) washer (9) and bolt (5).

(g) Remove the second push rod.

(2) Steering push rods installation:

(a) Jack the aircraft and secure the tail (Chapter 07-10).

(b) If necessary, install the sleeve (3, Fig. 32-25) using bolts (7) and sleeve flange (4) on the firewall.

(c) Slide the push rod through the firewall and the sleeve. Then slide the hose clamp (14) on the sleeve (3).

NOTE

Pay attention to correct connecting of the push rods. The longer push rod (1) is on the right side and the shorter push rod (2) is on the left side.

(d) Connect the push rod with the torsion tube using bolt (5), washer (9) and nut (12).

(e) Connect the push rod with the nose strut lever using bolt (6), washers (8; 9) and nut (12).
If a new push rod(s) is used (1; 2):

- At the engine side of the push rod end, install the washer (10).
- Set the pedals to the middle position.
- Align the axis of the pedals at a distance of 230 mm from the firewall and fix them.
- Fix the nose landing gear in the neutral position.
- Adjust the length of the push rods (1; 2) so it is possible to connect the nose strut with the foot control.

(f) Tighten the hose clamps (14) so that a full steering is available.

(g) Install the engine cowlings (Chapter 07-10).

(h) Carry out a test and check:

- If all bolt connections are tight.
- Alignment of the rudder with the nose gear.
- Plays.
- Free movement of the rudder control system (nose wheel must be off the ground).

(i) That no foreign objects remain in the aircraft.

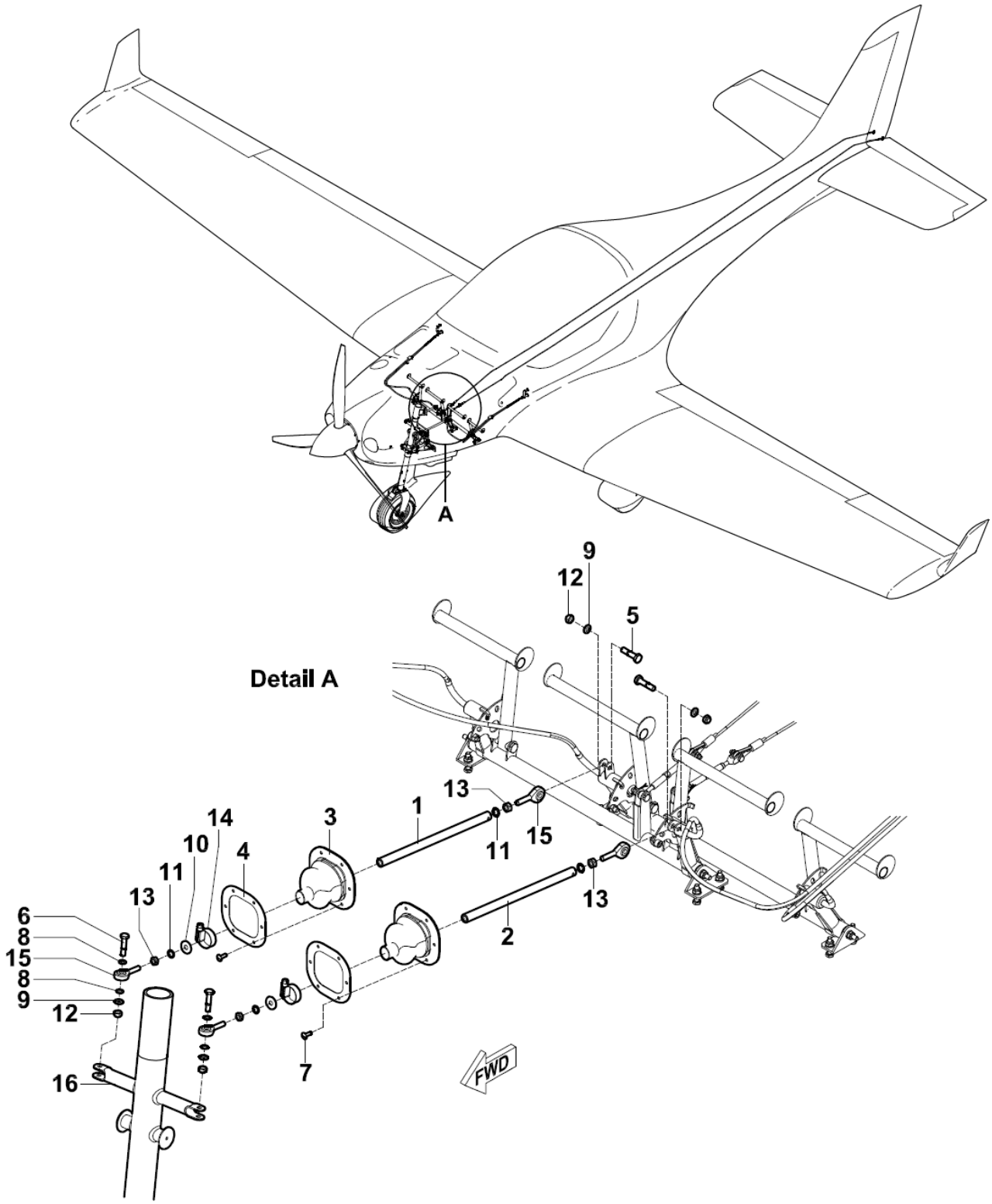


Fig. 32-25 Steering Push Rods Removal / Installation (page 1 of 2)

1 – Push rod
2 – Push rod
3 – Sleeve
4 – Sleeve flange
5 – Bolt M6 x 25
6 – Bolt M6 x 28
7 – Bolt M3 x 10
8 - Washer ø6.4 x 10 x 1
9 - Washer ø6.4 x 12 x 1.6
10 - Washer ø6.4 x 30 x 1.6
11 - Serrated locking washer ø6.4
12 - Self-locking nut M6
13 - Nut M6
14 - Hose clamp ø16-27
15 - Swivel bearing
16 - Nose landing gear leg

Fig. 32-25 Steering Push Rods Removal / Installation (page 2 of 2)

33 LIGHTS

CONTENTS

Chapter	Description	Page
33-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	4
33-40	**EXTERIOR LIGHTING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Anti-collision / position lights	6
	B. Landing lights	8

This page is left blank intentionally

33-00 GENERAL

1. INTRODUCTION

This chapter describes the system and maintenance practices about the lighting on the airplane.

Wiring diagram of the airplane lighting is described in the Airplane Wiring Manual (Doc. No. AS-AWM-01-000).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Both position lights do not operate.	Circuit-breaker not set or defective.	Set/replace the circuit-breaker.
	Defective position light switch.	Replace the switch.
	Defective wiring	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Airplane Wiring Manual (Doc. No. AS-AWM-01-00)
One position light does not operate.	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Airplane Wiring Manual (Doc. No. AS-AWM-01-00).
Landing light not operate.	Defective light.	Replace the light.
	Circuit-breaker not set or defective.	Set/replace the circuit-breaker.
	Defective landing light switch.	Replace the switch.
	Defective wiring.	Carry out a continuity test of the wiring. Repair/replace defective wiring. Refer to Airplane Wiring Manual (Doc. No. AS-AWM-01-000).
	Loose connector next to the light.	Connect the connector correctly.
Decrease of light transmission (milky appearance)	Degradation of light cover surface.	Polish with a good automotive cleaner wax and/or a liquid polishing compound, apply coat of an automotive polish and polish with electric buffing machine.

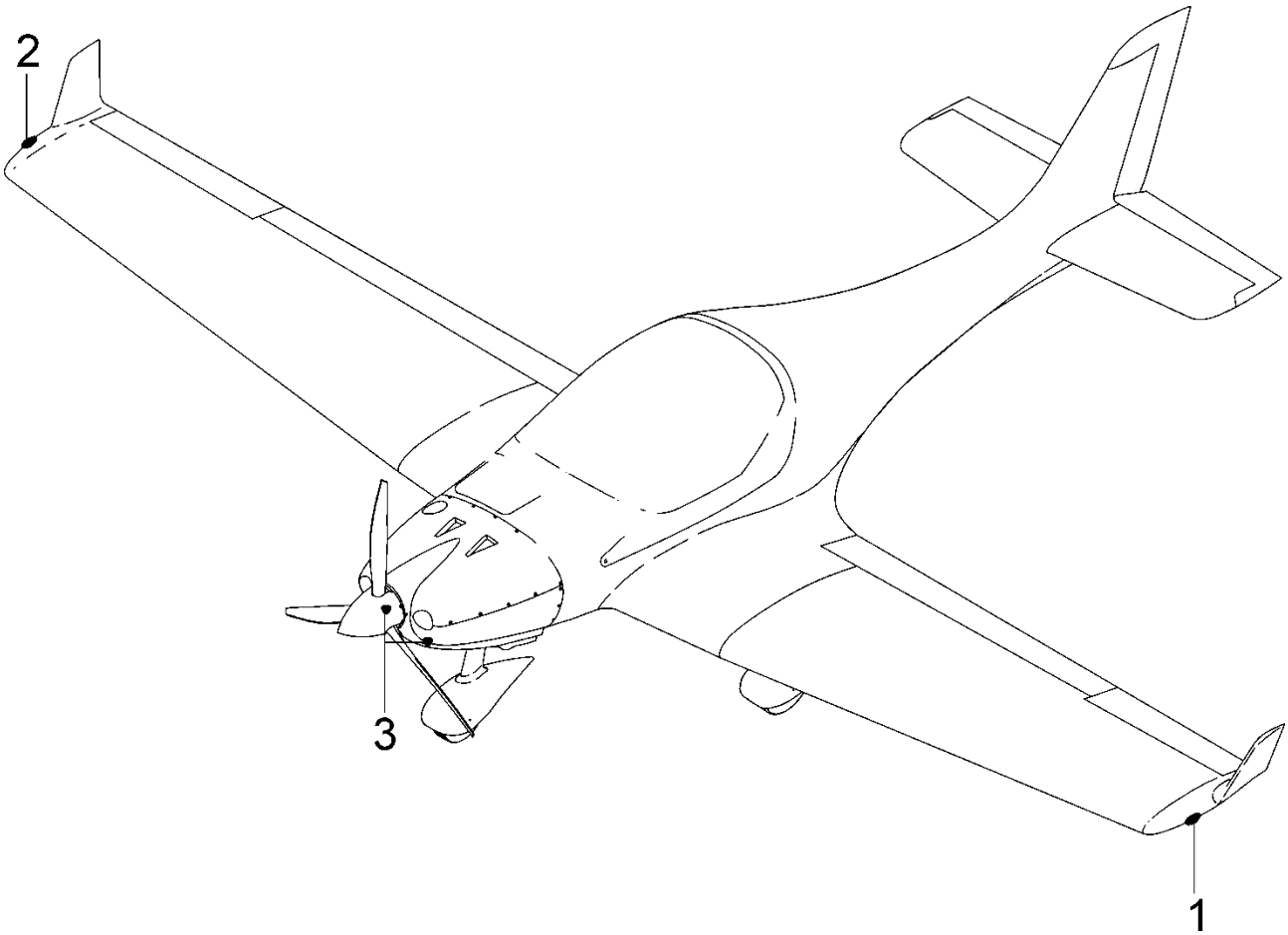
33-40 EXTERIOR LIGHTING

1. DESCRIPTION

This chapter contains information on servicing the anti-collision / position and landing lights. The anti-collision / position lights (1; 2, Fig. 33-1) are mounted to the outboard surface of each wing tip. The light assembly includes a LED strobe light with forward (red-left, green-right) and white position LED lights.

The landing lights (3) are mounted to the bottom engine cowl.

Landing lights are activated by switch labelled as **LAND** and they are connected through a circuit breaker to the master switch. Anti-collision / position lights are activated by switch labelled as **ACL/NAV** and they are connected through a circuit breaker to the master switch.



1 – Left anti-collision / position light (red)
2 – Right anti-collision / position light (green)
3 – Landing lights

Fig. 33-1 Exterior Lighting

2. MAINTENANCE PRACTICES

A. Anti-collision / position lights

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Phillips screwdriver	1 pc
Knife	1 pc
Soldering gun	1 pc
Cable tie 2.6	1 pc
Shrink tube ø3.2 x 1.6	AR
Persons	1

Tab. 33-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRPLANE BATTERY.

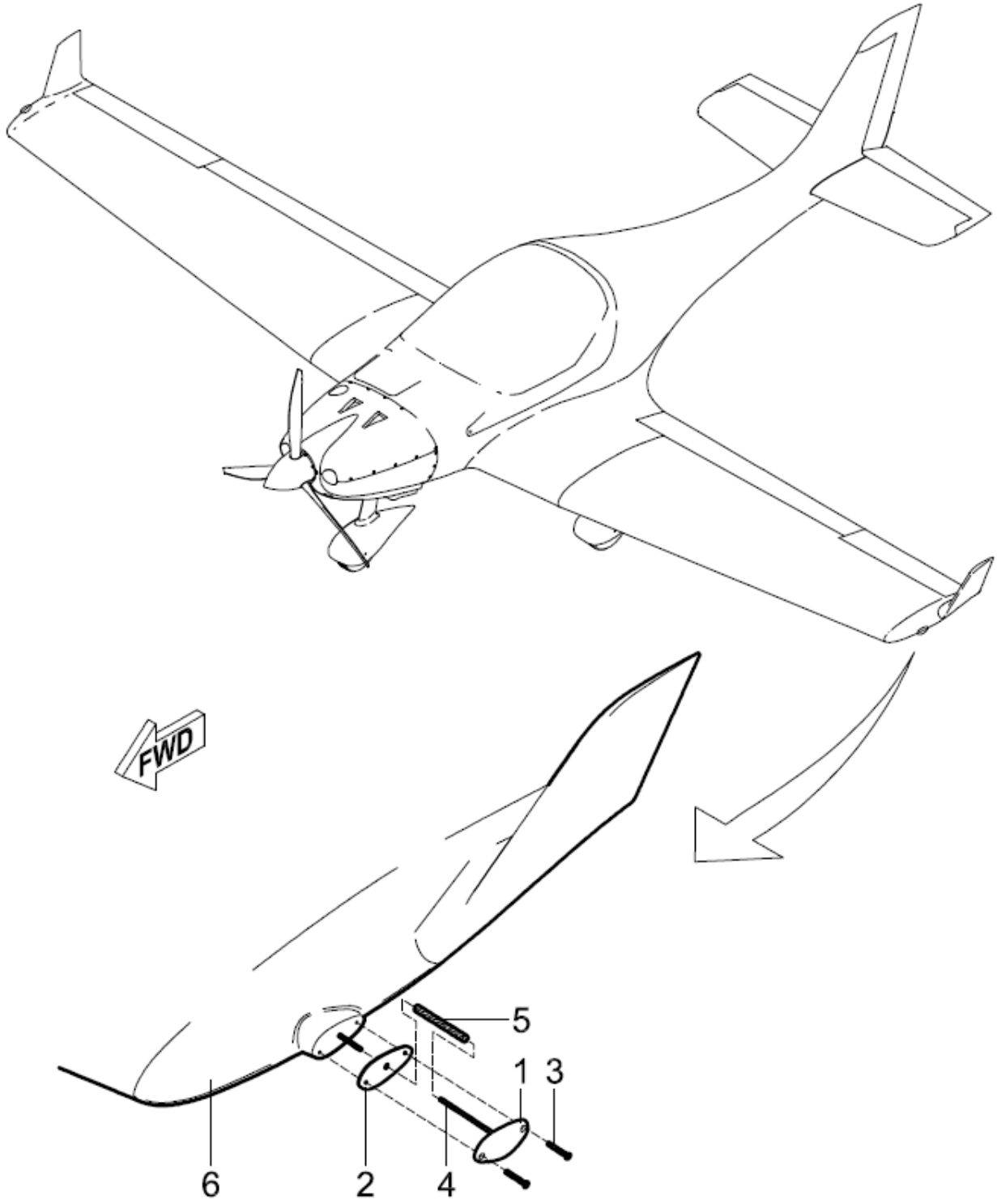
(1) Anti-collision / position light removal:
- (a) Remove wing (Chapter 57-10).
- (b) On wing root remove cable tie and push wires into the wing.
- (c) On wing tip unscrew the screws (3, Fig. 33-2).
- (d) Pull out light (1), remove the spiral hose (5), remove shrink tubes and unsolder the el. wires (4).
- (e) Remove the light (1) and gasket (2).

(2) Anti-collision / position light installation:
- (a) Shorten the wires (4, Fig. 33-2) of the light (1) to 100 mm.
- (b) Pass the wires (4) through the appropriate hole in the gasket (2).
- (c) Put the shrink tubes on wires, using soldering gun connect the wires, pull the shrink tubes over joints and apply heat to shrink them.
- (d) Apply spiral hose (5) on joint. Set the position light (1) with the gasket (2) to the wing tip (6) and fasten it with screws (3).
- (e) Install wing (Chapter 57-10).
- (f) Carry out an operational test.

(3) Anti-collision / position light polishing:
- (a) Polish the lights after installation.

NOTE

Under no circumstances should any petroleum based product be used to clean the lights.



1 – Anti-collision / position light
2 – Gasket
3 – Screw M3 x 20
4 – Wires and shrink tubes (3 + 1)
5 – Spiral hose ø3
6 – Wing tip

Fig. 33-2 Anti-collision / Position Light Removal / Installation

B. Landing lights

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Silicone	AR
Persons	1

Tab. 33-2 Recommended tools, materials, persons and documentation

WARNING

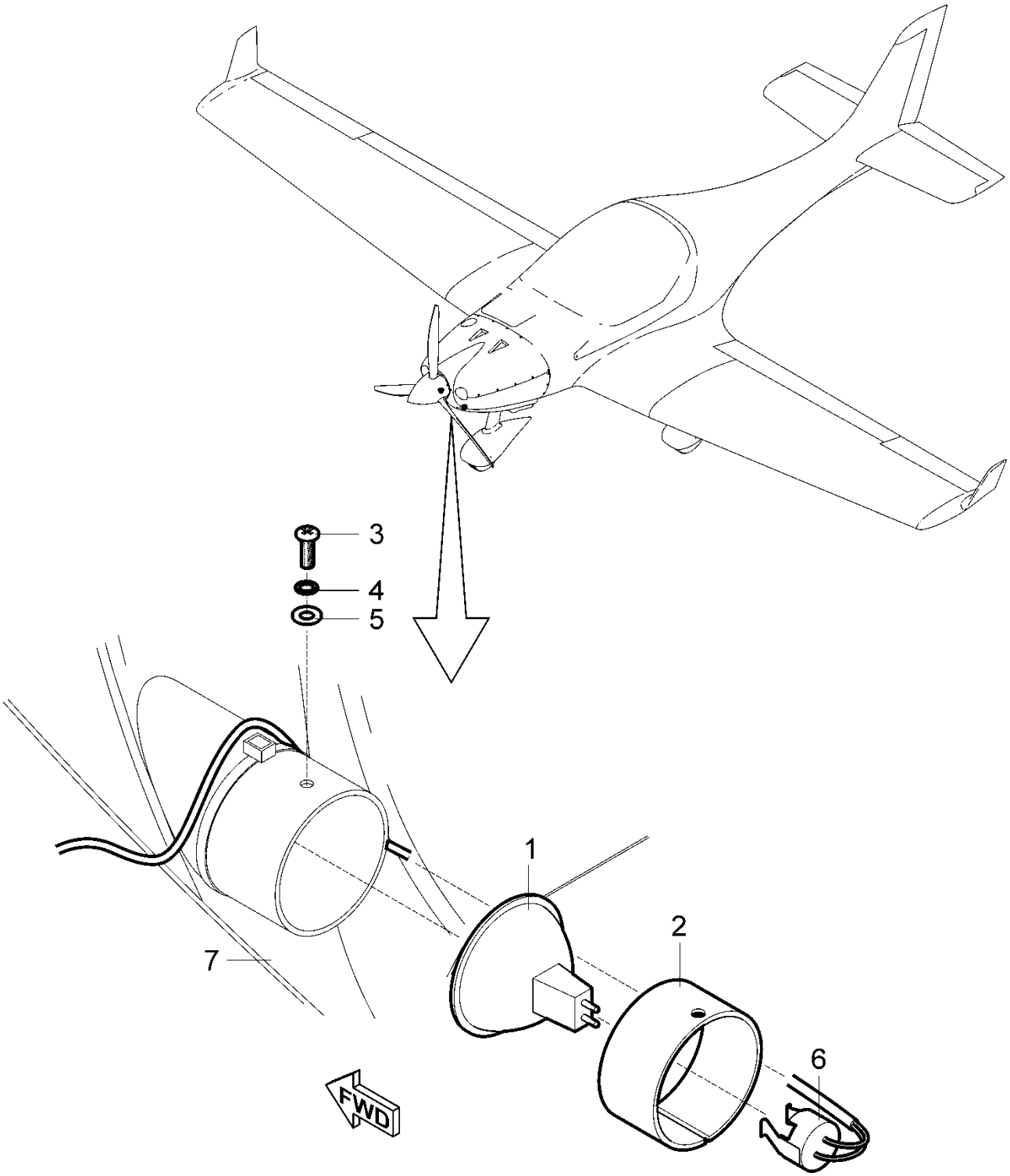
ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRPLANE BATTERY.

NOTE

Removal / installation is the same for both landing lights.

(1) Landing light removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the engine cowlings (Chapter 71-10).
- (c) On bottom cowling disconnect connector (6, Fig. 33-3).
- (d) Unscrew the screw (3), remove the washers (4; 5).
- (e) Remove old silicone.
- (f) Pull out holder (2) and the landing light (1).

(2) Landing light installation:
- (a) Clean all silicone residues.
- (b) Make sure that the **IGNITION** switches are set to **OFF**.
- (c) Place the holder (2, Fig. 33-3) with the light (1) to the bottom cowling (7).
- (d) Insert the screw (3) with washers (4; 5) to the hole; tighten the screw.
- (e) Connect the connector (6) to the light (1).
- (f) Install the engine cowlings (Chapter 71-10).
- (g) Carry out an operational test.



1 – Landing light
2 – Holder
3 – Screw M4 x 10
4 – Spring washer ø4.3
5 – Washer ø4.3 x 12 x 1
6 – Connector
For information:
7 – Bottom engine cowl

Fig. 33-3 Landing Lights Removal / Installation

This page is left blank intentionally

34 NAVIGATION

CONTENTS

Chapter	Description	Page
34-00	**GENERAL**	**3**
	1. INTRODUCTION	3
34-10	**FLIGHT ENVIRONMENTAL DATA**	**5**
	1. DESCRIPTION	5
	2. TROUBLESHOOTING	7
	3. MAINTENANCE PRACTICES	9
	A. Pitot-static probe	9
	B. SV-ADAHRS-200 module	11
	C. Altitude encoders ACK-30	14
	D. Airspeed indicator	16
	E. Altimeter	16
	F. Vertical speed indicator	16
	G. Flight hours counter	16
	H. Stall warning transducer	16
	I. Drain sumps	17
	J. Pitot-static system	19
34-20	**ATTITUDE AND DIRECTION**	**23**
	1. DESCRIPTION	23
	2. TROUBLESHOOTING	25
	3. MAINTENANCE PRACTICES	26
	A. SV-D1000 display	26
	B. Magnetic compass	26
	C. Standby bank indicator	26

34-40 INDEPENDENT POSITION DETERMINING 27

1. DESCRIPTION 27
2. MAINTENANCE PRACTICES 28
   - A. FLARM, ADS-B Antenna 28
   - B. TRX-1500 traffic sensor 30
   - C. VHF COMM antenna 32

34-50 DEPENDENT POSITION DETERMINING 33

1. DESCRIPTION 33
2. MAINTENANCE PRACTICES 34
   - A. Garmin GNC 255A NAV/COMM 34
   - B. Garmin GTX 328 transponder 34
   - C. VOR/LOC antenna 34
   - D. Transponder antenna 34
   - E. SV-GPS-250 antenna 36
   - F. TRX GPS antenna 38

34-00 GENERAL

1. INTRODUCTION

This chapter describes the navigation systems, units, and components which provide aircraft navigational information. Included are pitot-static, compass, navigation systems, and indicators. The subjects to be covered in this chapter are as follows:

The Flight Environmental Data/Pitot Static section describes systems which sense environmental conditions and use the data to influence navigation of the aircraft. This includes components that depend on the pitot-static system such as airspeed indicator, altimeter, vertical speed indicator and ADAHRS module of the Dynon SkyView system.

The Attitude and Direction section describes systems which use magnetic, gyroscopic and inertia forces. This includes Dynon SkyView system and the magnetic compass.

The Independent Position Determining section describes systems which provide information to determine position from sources which are mainly independent of ground installations. This includes the global positioning system and traffic sensor.

The Dependent Position Determining section describes systems which provide information to determine position from sources which are mainly dependent on ground installations. This includes systems such as radio navigational aids and transponder.

Wiring diagram of above mentioned equipment is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

This page is left blank intentionally

34-10 FLIGHT ENVIRONMENTAL DATA

1. DESCRIPTION

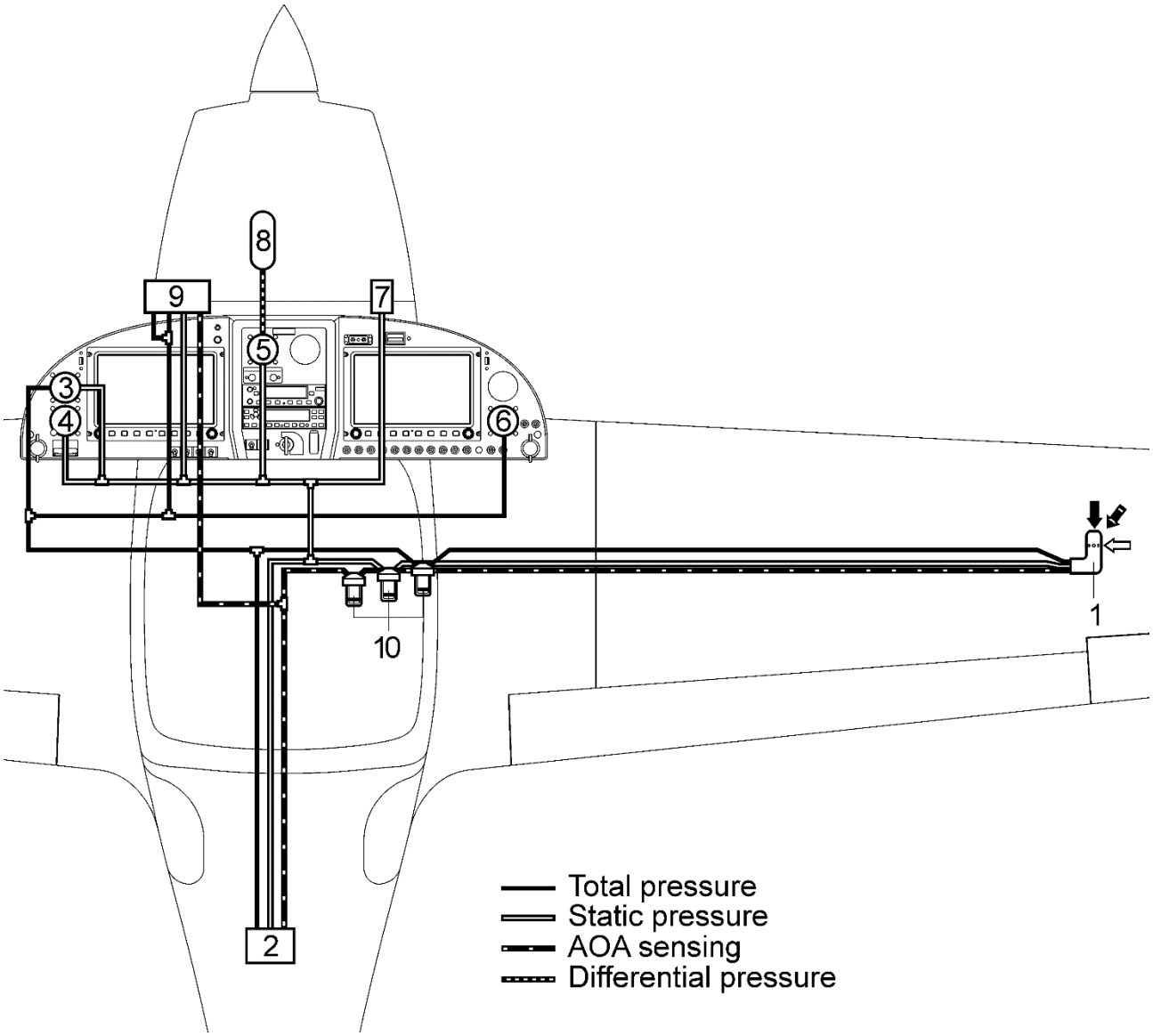
Arrangement and scheme of the pitot-static system is given on the Fig. 34-1.

The Pitot-static probe (1) is installed under the right wing. It receives total pressure (hoses marked “P”), static pressure (hoses marked “S”) and is equipped with AOA sensing (hoses marked “A”).

Pressure distribution to individual instruments on the airspeed indicator (3), altimeter (4), vertical speed indicator (5) expansion bottle (8), flight hours counter (6), altitude encoder (7), ADAHRS module (2) and stall warning transducer (9) (Chapter 31-50) in the cockpit is performed through the flexible plastic hoses. There are also three drain sumps (10) included in the pitot-static system.

NOTE

ADAHRS module is a part of the Dynon SkyView system, which is described in Chapter 34-20.



1 – Pitot-static probe
2 – ADAHRS module
3 – Airspeed indicator
4 – Altimeter
5 – Vertical speed indicator
6 – Flight hours counter
7 – Altitude encoder
8 – Expansion bottle
9 – Stall warning transducer
10 – Drain sumps

Fig. 34-1 Pitot-Static System

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Pitot static system		
Low or sluggish airspeed indication. Normal altimeter and vertical speed indication.	Pitot-static probe deformed. Leak or obstruction in total line.	Repair or replace damaged component.
Incorrect or sluggish response on all three pitot-static instruments.	Leaks or obstruction in static line.	Repair or replace line. Remove obstruction.
Vertical speed indicator		
Pointer does not set on zero.	Leaking or ruptured diaphragm.	Substitute known-good indicator and check reading. Replace or repair instrument.
Pointer fails to respond.	Obstruction in static line.	Check line for obstruction.
Pointer oscillates or fails to respond.	Leaks in static line.	Check line for obstruction.
	Defective instrument.	Replace or repair instrument.
	Excessive vibration caused by loose mounting bolts.	Tighten mounting bolts.
	Excessive tube vibration.	Tighten clamps and connections.
Airspeed indicator		
Pointer fails to respond or indicates improperly.	Leak in instrument case.	Replace or repair instrument.
	Obstruction in total line.	Check line for obstruction.
Incorrect indication or pointer oscillates.	Leak in total or static lines.	Repair or replace damaged lines. Tighten connections.
	Leaking or ruptured diaphragm.	Substitute know-good indicator and check reading. Replace or repair instrument.

TROUBLE	POSSIBLE CAUSE	REMEDY
Airspeed indicator (cont.)		
Pointer vibrates.	Excessive vibration caused by loose mounting bolts.	Tighten mounting bolts.
	Excessive tube vibration.	Tighten clamps and connections.
Altimeter		
Excess scale error.	Improper calibration adjustment.	Replace instrument.
Excessive pointer oscillation.	Defective instrument.	Replace or repair instrument.
High reading.	Static system leak.	Inspect static system.
Difficult to turn setting knob.	Wrong or lack of lubrication.	Replace or repair instrument.

3. MAINTENANCE PRACTICES

WARNING

AVOID OF IMPURITIES AND WATER INFILTRATION INTO THE PITOT-STATIC SYSTEM. IT MAY CAUSE WRONG FUNCTION OR DAMAGE OF THE INSTRUMENTS!

A. Pitot-static probe

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Oetiker pliers- Crimping pliers	1 pc
Persons	1

Tab. 34-1 Recommended tools, materials, persons and documentation

(1) Pitot-static probe removal:

a) Hold the pitot-static probe (1, Fig. 34-2); remove the attaching bolts (2) for the tube from below the wing.

b) Move the tube down to give access to the connections.

c) Release hose clamps (6) and disconnect all hoses (3; 4; 5).

d) Identify the connections. Put the caps on the hoses.

e) Remove the pitot-static probe (1).

(2) Pitot-static probe installation:

WARNING

BEWARE THAT CORRECT A-P-S HOSES ARE INSTALLED TO CORRECT POSITIONS ON PITOT-STATIC PROBE. INCORRECT INSTALLATION MAY CAUSE LOSS OF AIRCRAFT!

a) Remove the caps from the hoses.

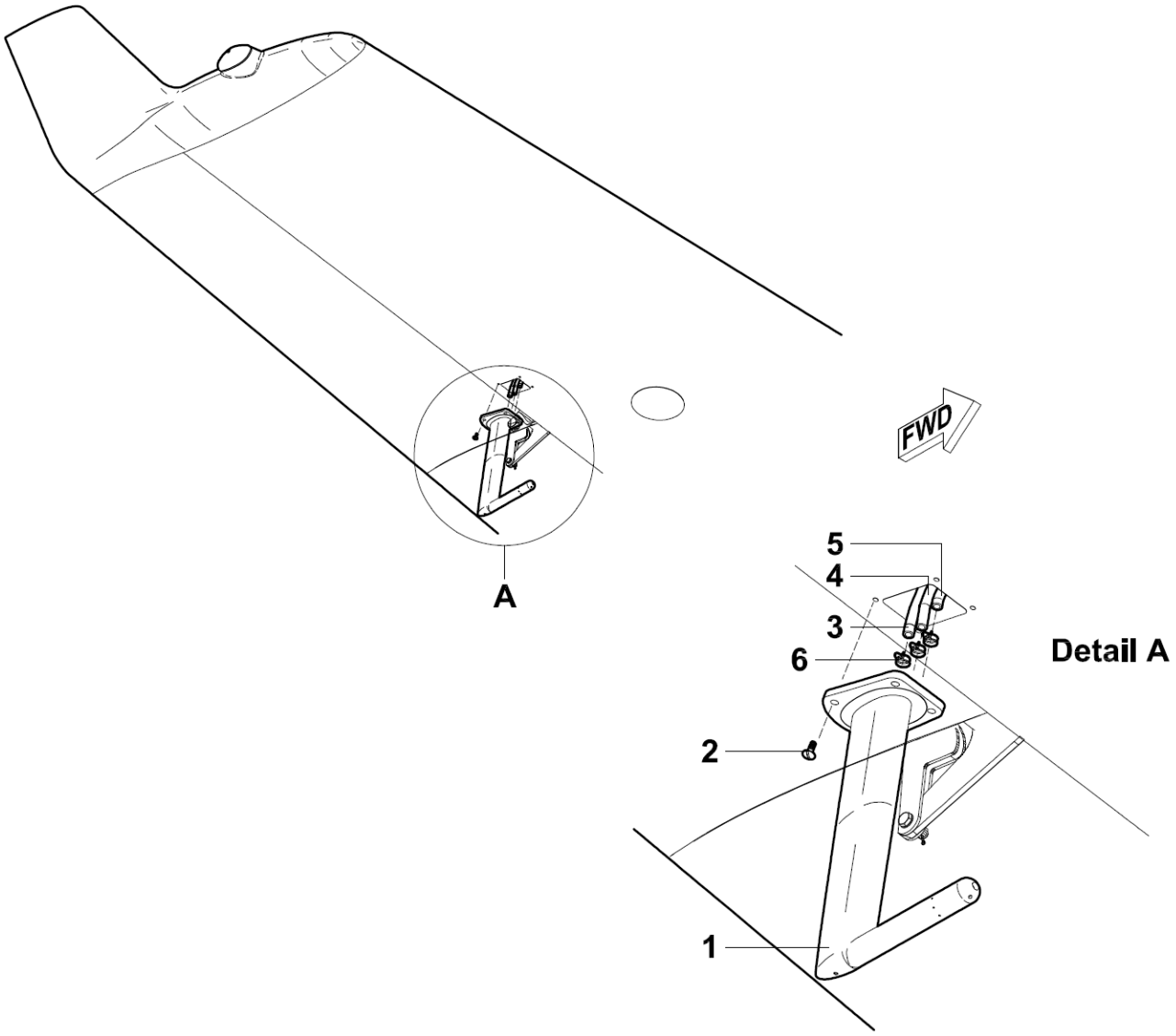
b) Hold the pitot-static probe (1, Fig. 34-2) close to the mounting below the wing.

c) Connect the all hoses (3; 4; 5) and secure with hose clamps (6).

d) Put the tube (1) in position on the mounting.

e) Install the attaching bolts (2).

f) Carry out a pitot-static system leak test (see 3.J).



1 – Pitot-static probe
2 – Bolt M4 x 12
3 – Total pressure hose (P)
4 – Static pressure hose (S)
5 – AOA hose (A)
6 – Hose clamp

Fig. 34-2 Pitot-Static Probe Removal / Installation

B. SV-ADAHRS-200 module

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Oetiker pliers- Crimping pliers	1 pc
Sealing Teflon tape	AR
Persons	1

Tab. 34-2 Recommended tools, materials, persons and documentation

WARNING

UNAUTHORIZED ENTRY TO THE SYSTEM SETTINGS AND A FAILURE TO FOLLOW PROCEDURES FOR SYSTEM ACTUALIZATION MAY CAUSE INCORRECT FUNCTIONALITY OR TOTAL FAILURE OF THE WHOLE SKYVIEW SYSTEM!

(1) SV-ADAHRS-200 module removal:

a) Set **MASTER SWITCH** to **OFF** position.

b) Remove the baggage bulkhead cover (13, Chapter 06-00, Fig. 06-4).

c) In the rear fuselage remove the clamps (8, Fig. 34-3) and disconnect all hoses (9; 10; 11).

d) Disconnect connectors (6; 7)

e) Unscrew the bolts (3), remove the washers (5).

f) Remove the module (1).

g) As necessary, remove the hose sockets (2).

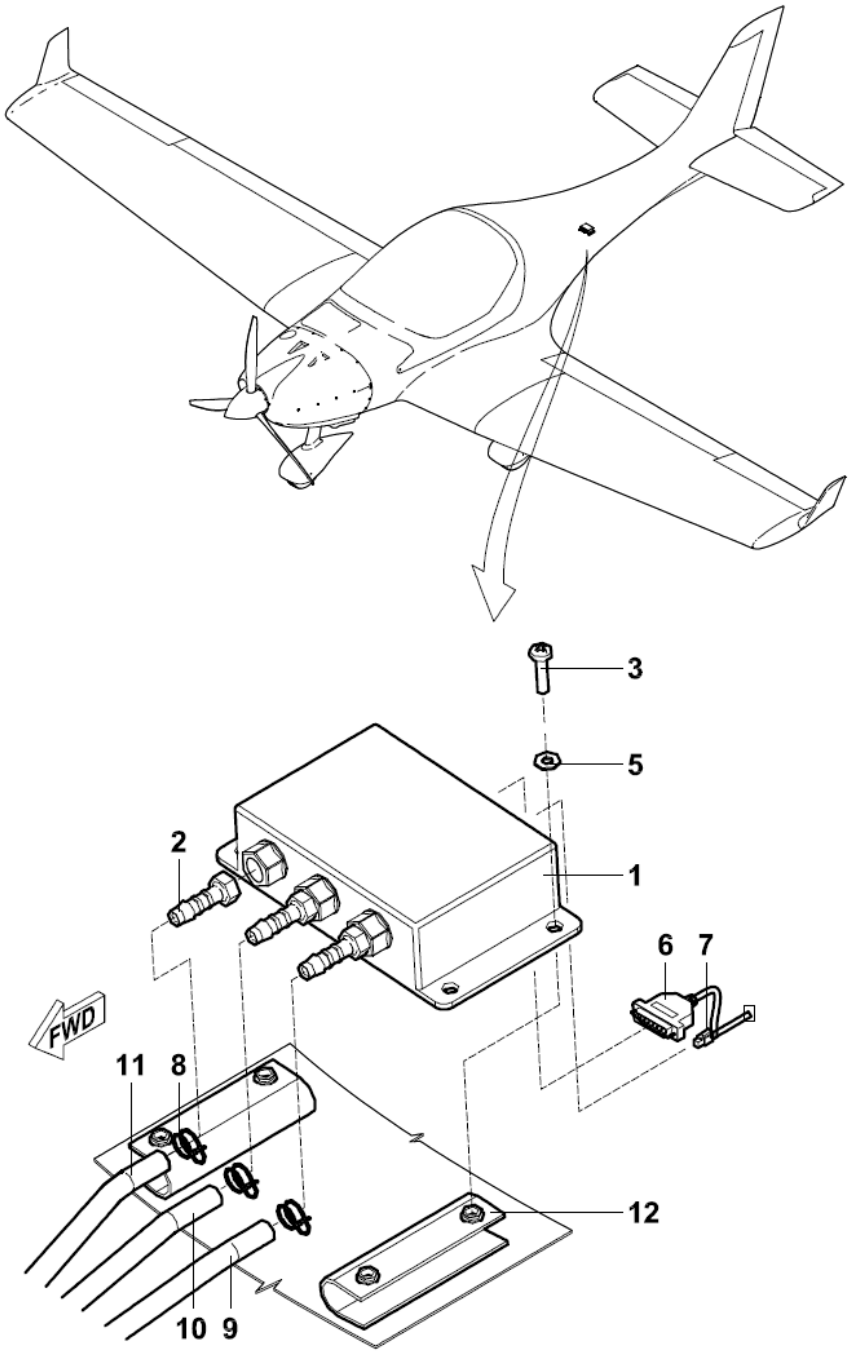
h) Identify the connections. Put the caps on the hoses and module ports.

(2) SV-ADAHRS-200 Module installation:

WARNING

BEWARE THAT CORRECT A-P-S HOSES ARE INSTALLED TO CORRECT POSITIONS ON SV-ADAHRS-200 MODULE. INCORRECT INSTALLATION MAY CAUSE LOSS OF AIRCRAFT!

a) Remove the caps from the hoses and module ports.
b) As necessary, screw hose socket (2, Fig. 34-3) sealed with Teflon tape.
c) Install the module (1) on holders (12) using the bolts (3) and washers (5).
d) Connect connectors (6; 7).
e) Connect the all hoses (9; 10; 11) and secure them with clamps (8).
f) Carry out a pitot-static system leak test (see 3.J).
g) Install baggage bulkhead cover (13, Chapter 06-00, Fig. 06-4)
h) Set **MASTER SWITCH** to **ON** position and carry out an operational test or calibration (Refer to “Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q” or later for calibration procedure).



1 – SV-ADAHRS-200 Module
2 – Hose socket
3 – Bolt M4 x 16
5 – Washer ø4.3 x 9 x 0.8
6 – Electrical connector
7 – Electrical connector
8 – Spring clamp ø9
9 – Static pressure hose (S)
10 – Total pressure hose (P)
11 – AOA hose (A)

For information:

12 – Holder

Fig. 34-3 SV-ADAHRS-200 Module Removal / Installation

C. Altitude encoders ACK-30

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Oetiker pliers - Crimping pliers	1 pc
Persons	1

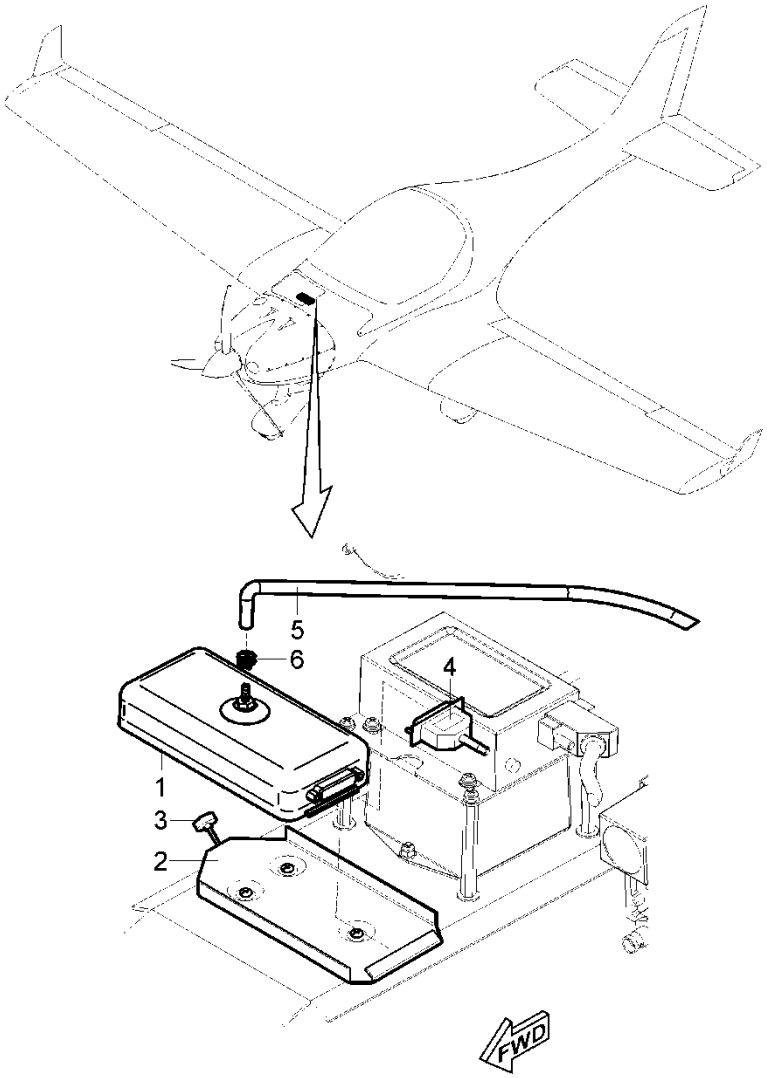
Tab. 34-3 Recommended tools, materials, persons and documentation

(1) Altitude encoder ACK-30 removal:

a) Set **MASTER SWITCH** to **OFF** position.
b) Remove the instrument panel cover (Chapter 39-10).
c) Disconnect the connector (4, Fig. 34-4) from the altitude encoder.
d) Remove the clamp (6).
e) Disconnect the hose (5) from the port of the altitude encoder.
f) Loose the nut (3) and remove the altitude encoder (1) from the mounting tray (2).
g) Put the caps on the hose and altitude encoder port.

(2) Altitude encoder ACK-30 installation:

a) Remove the caps from the altitude encoder port and hose.
b) Put the altitude encoder (1, Fig. 34-4) in position in the mounting rack (2).
c) Secure the altitude encoder with the nut (3) and tighten it.
d) Connect the hose (5) to the port of the altitude encoder (1) and secure it with clamp (6).
e) Connect the connector (4) to the altitude encoder (1).
f) Carry out a pitot-static system leak test (see 3.J).
g) Install the instrument panel cover (Chapter 25-10).
h) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Altitude encoder
2 – Mounting tray
3 – Knurled nut
4 – Electrical connector
5 – Static pressure hose
6 – Spring clamp ø9

Fig. 34-4 Altitude Encoders Removal / Installation

D. Airspeed indicator

For removal / installation procedures refer to Chapter 39-10.

E. Altimeter

For removal / installation procedures refer to Chapter 39-10.

F. Vertical speed indicator

For removal / installation procedures refer to Chapter 39-10.

G. Flight hours counter

For removal / installation procedures refer to Chapter 39-10.

H. Stall warning transducer

For removal / installation procedures refer to Chapter 31-50.

I. Drain sumps

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Oetiker pliers- Crimping pliers	1 pc
Clippers	AR
Persons	1

Tab. 34-4 Recommended tools, materials, persons and documentation

NOTE

If you find impurities or water in pitot-static system drain sumps, these sumps must be drain. The below mentioned procedure is the same for all drain sumps.

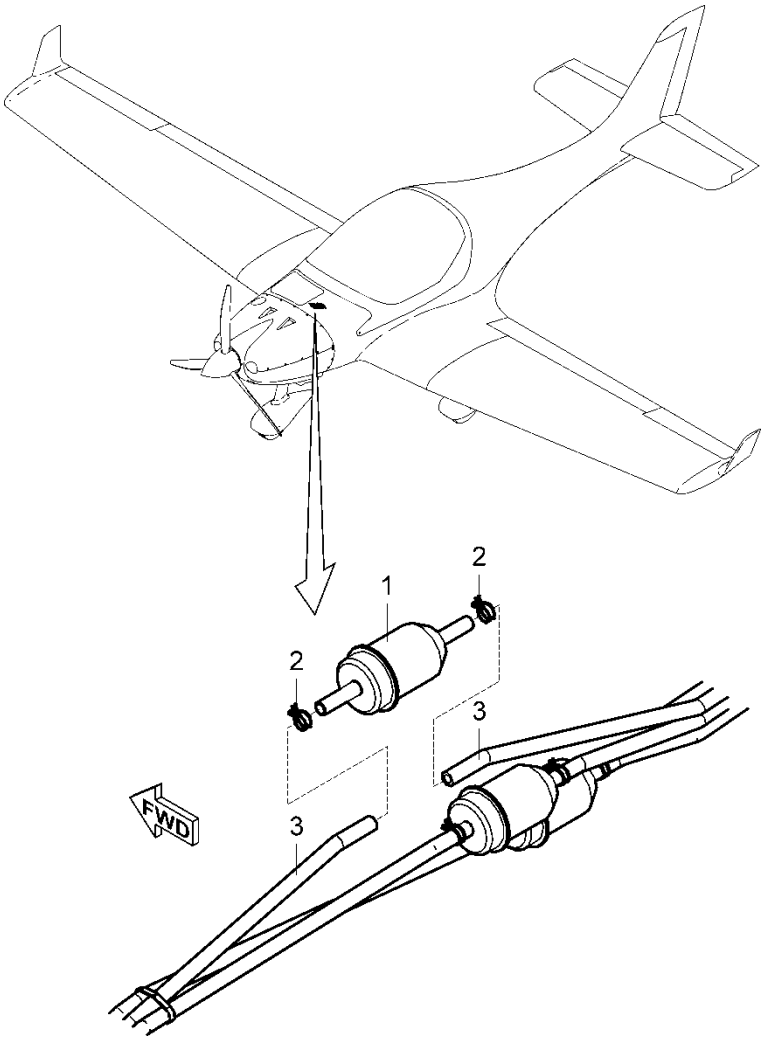
(1) Draining of drain sumps:

a) Remove the right seat (Chapter 25-10).
b) Remove cable ties securing the hoses and sumps.
c) Remove the clamps (2, Fig. 34-5) from hoses (3).
d) Disconnect hoses (3) from the appropriate drain sump (1).
e) Clean, dry or replace the sump.

WARNING

PAY ATTENTION TO THE CORRECT PLUGGING OF THE SUMPS AND HOSES!

f) Connect the hoses (3) to the appropriate drain sump (1) and secure them with clamps (2).
g) Carry out a pitot-static system leak test (see 3.J).
h) With cable ties secure the hoses and sumps.



1 – Drain sump
2 – Spring clamp ø9
3 – Hose

Fig. 34-5 Drain Sumps Removal / Installation

J. Pitot-static system

(1) Adjustment / leak test

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
DPST-3500M testing device	1 pc
Pitot-static probe adapter (P1-0011-00)	1 pc
Persons	1

Tab. 34-5 Recommended tools, materials, persons and documentation

Test the pitot-static system tightness using the DPST-3500M testing device (or similar). Carry out the test at the scheduled maintenance periods or after each disconnection of the pitot-static system.

The allowed ranges of the measuring devices must not be exceeded during the measurement.

The measurement must be performed in accordance with the instructions and limitations stated in the handbooks of the DPST-3500M, Dynon SkyView and other devices (vertical speed indicator, altimeter, airspeed indicator).

(2) Pitot-static system leak test preparation:

a) Verify the correct function of the DPST-3500M testing device (before each measurement) by the following procedure:

b) Plug the total pressure hose “P” from the pitot-static probe adapter (2, Fig. 34-6) into the total pressure input on the DPST-3500M testing device (9, Fig. 34-7) and the static pressure hose “S” from the pitot-static probe adapter (2, Fig. 34-6) into the static pressure input on the testing device (8, Fig. 34-7).

c) Attach the pitot-static probe adapter (2, Fig. 34-6) to the tested pitot-static probe (3), so that the static and total pressure receivers are properly sealed (depressurized during the measurement).

d) Verify the sealing and attachment of the pitot-static probe adapter (2), and perform a pitot-static system leak test (see 3.J).

(3) Pitot-static system leak test:

a) Set the onboard altimeters to the reference pressure 1013.3 mbar (29.92 inHg).

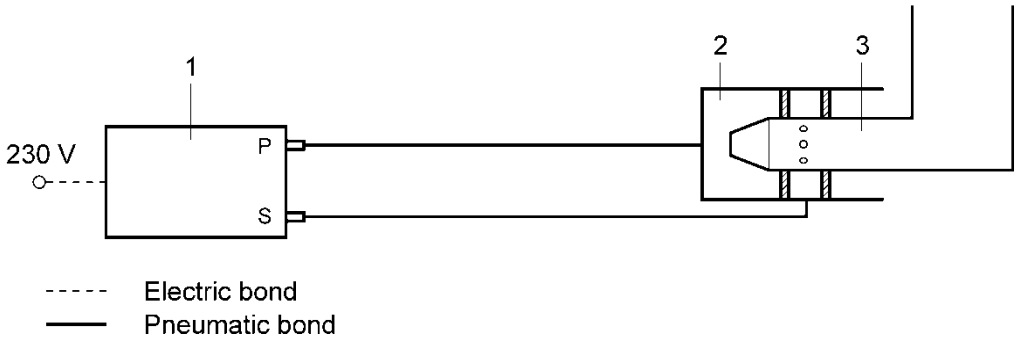
b) Monitor the values displayed on the DPST-3500M testing device. Slowly adjust the altitude on the display (3) to the 4 000 ft.

c) Monitor the values displayed on the DPST-3500M testing device. Slowly adjust the airspeed on the display (3) to the: 150 kts.

d) After stabilization of the indicators monitor the altitude and airspeed for 60 seconds.

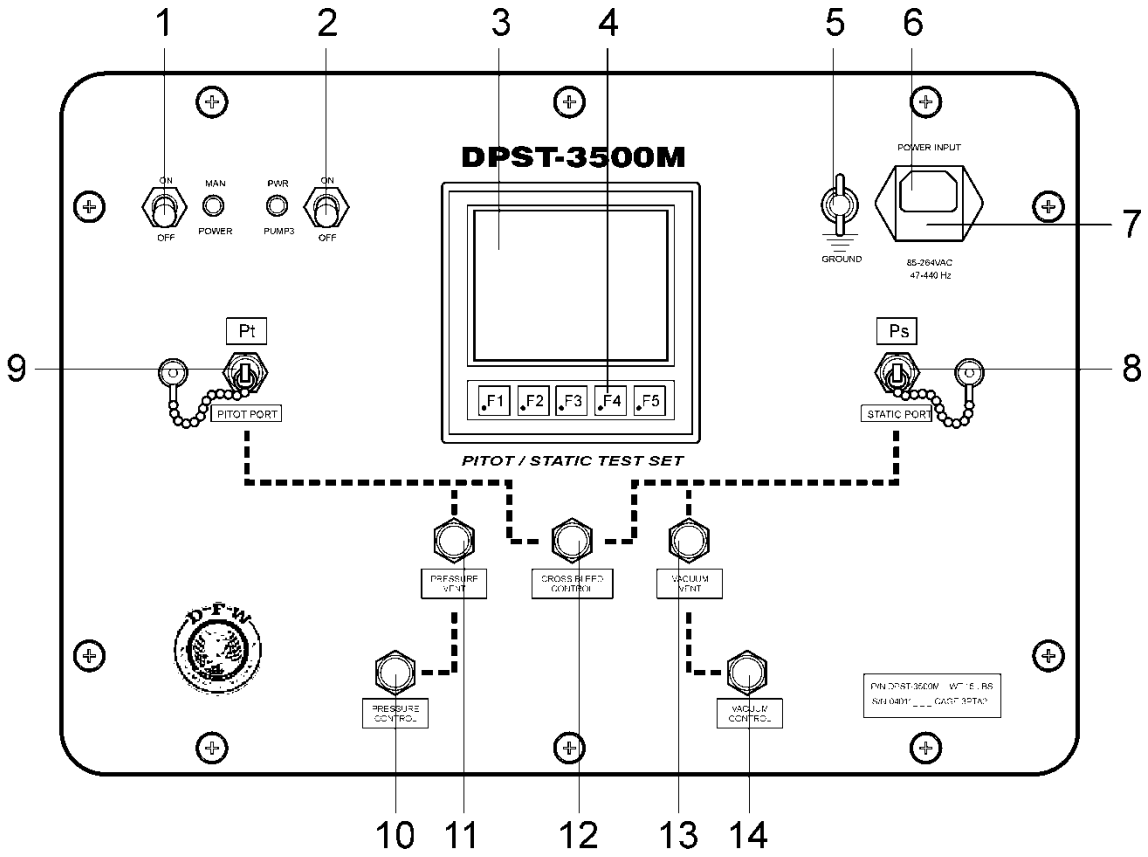
e) After 60 seconds the altitude decrease must not be more than 50 ft and airspeed decrease must not be more than 3 kts.

f) Depressurize the system and disconnect test device.



1 – DPST-3500M testing device
2 – Pitot-static probe adapter
3 – Pitot-static probe

Fig. 34-6 Connection diagram of the DPST-3500M Testing Device



1 – Main switch
2 – Pump switch
3 – Display
4 – Control panel
5 – Grounding
6 – Power input
7 – Electrical fuse
8 – Static pressure input
9 – Total pressure input
10 – Pressure control
11 – Pressure vent
12 – Cross bleed control
13 – Vacuum vent
14 – Vacuum control

Fig. 34-7 DPST-3500M Testing Device (example)

This page is left blank intentionally

34-20 ATTITUDE AND DIRECTION

1. DESCRIPTION

This chapter contains information pertaining to those portions of the system which use magnetic, gyroscopic, and inertia forces. Included is the Dynon SkyView system, magnetic compass and standby bank indicator.

Dynon SkyView system is the next generation of glass panel avionics for light sport aircraft. The system architecture is shown on Fig. 34-8.

The SV-D1000 displays are very bright, high-resolution screens and contain the main control CPU, graphics processor, and terrain data-base. Displays can act as a Primary Flight Display (PFD) with Synthetic Vision, an Engine Monitoring System (EMS), and a Moving Map in a variety of screen layouts.

The most used functions are accessed via two rotary/multi-direction joysticks. Almost all other in flight commands are all available via eight buttons.

Every SkyView system display and module is connected by two independent power and data buses. The failure of any bus connection or module results in an automatic switch to a working bus or module.

Two SV-BAT-320 Backup Batteries provides over an hour of backup power to display and connected modules (see Chapter 24-30).

SV-EMS-220 engine module measures engine parameters - engine speed, manifold pressure, oil temperature and pressure, exhaust gas temperature, coolant temperature, fuel quantity, voltage, current, fuel pressure and fuel flow (see Chapter 77-10).

The SV-ADAHRS-200 is a complete MEMS-based attitude reference and air data computer, integrated with a digital compass. This allows easier mounting and higher accuracy calibration between the system components.

NMEA compatible GPS antenna, mounted inside the fuselage under the left part of the instrument panel (Chapter 34-50), is connected to the SkyView system.

Convenient program and data updates are realised via USB memory stick.

NOTE

Refer to “Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q” or later for additional information.

The magnetic compass, mounted to the fuselage above the windshield, contains a circular compass card, visible through the compass case window, suspended in alcohol solution. The compass is equipped with compensating magnets and has two adjusting set bolts, one for North-South adjustment and one for East-West adjustment. These set bolts are located behind the access plate on face of the compass.

Standby bank indicator is mounted on the left instrument panel.

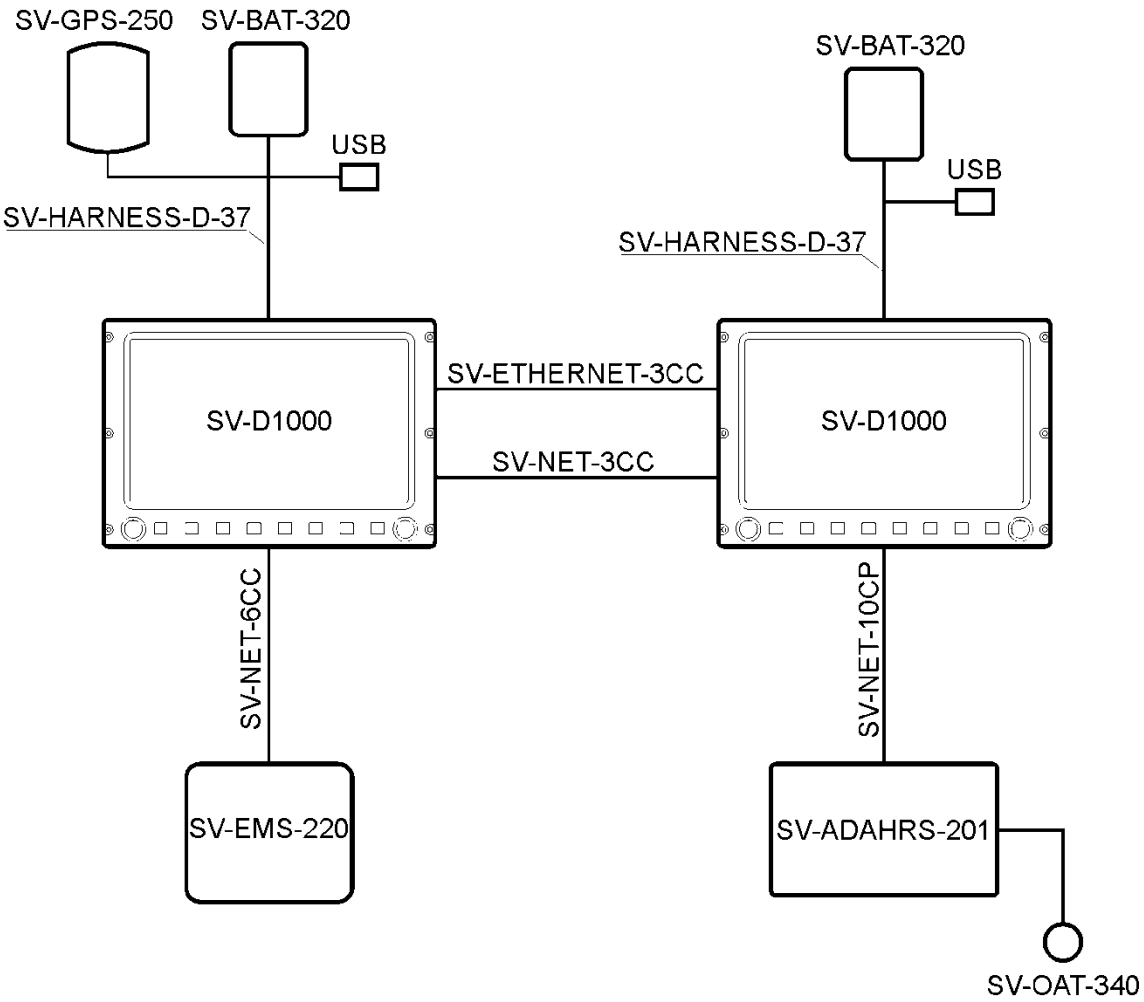


Fig. 34-8 Dynon Skyview System Scheme

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Pitot static system		
Excessive card error.	Compass not properly compensated.	Compensate instrument.
	External magnetic interference.	Locate magnetic interference and eliminate if possible.
Excessive card oscillation.	Insufficient fluid.	Replace instrument.
Card sluggish.	Weak card magnet.	Replace instrument.
	Excessive pivot friction or broken jewel.	Replace instrument.
Liquid leakage.	Loose bezel bolts.	Replace instrument.
	Broken cover glass.	Replace instrument.
	Defective sealing gaskets.	Replace instrument.
Card sticks.	Altitude compensating diaphragm collapsed.	Replace instrument.
Card does not move when compensating bolts are turned.	Gears that turn compensating magnets stripped.	Replace instrument.
Excessive drift in either direction.	Excessive vibration.	Tighten mounting bolts.

3. MAINTENANCE PRACTICES

A. SV-D1000 display

For removal / installation procedures refer to Chapter 39-10.

B. Magnetic compass

For removal / installation procedures refer to Chapter 39-10.

C. Standby bank indicator

For removal / installation procedures refer to Chapter 39-10.

34-40 INDEPENDENT POSITION DETERMINING

1. DESCRIPTION

This chapter covers that portion of the system that provides information to determine position from sources that are mainly independent of ground installations. This includes the GPS and TRX-1500 traffic sensor.

GPS signals are received by an SV-GPS-250 antenna mounted inside the fuselage under the left part of the instrument panel (Fig. 34-12), which is connected to the SkyView system.

The TRX-1500 traffic sensor combines a high performance ADS-B receiver with an integral FLARM module. FLARM is a very popular collision avoidance system for general aviation and gliders, which monitors airspace around aircraft. GPS signals are received by a TRX GPS antenna mounted inside the fuselage under the right part of the instrument panel (Fig. 34-12).

FLARM and ADS-B antennas are attached on the bottom side of the instrument panel cover (Fig. 34-9).

NOTE

Refer to TRX-1500 ADS-B / FLARM Traffic sensor, User Manual Installation Manual, Revision: 1.0a, 31 Jan. 2012 or later for additional information.

2. MAINTENANCE PRACTICES

A. FLARM, ADS-B Antenna

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Persons	1
Cable ties 2.6	AR

Tab. 34-6 Recommended tools, materials, persons and documentation

NOTE

Removal / installation is the same for the FLARM, ADS-B antenna.

(1) FLARM / ADS-B antenna removal:

a) Set **MASTER SWITCH** to **OFF** position.

b) Remove and carefully lift the instrument panel cover (Chapter 39-10).

c) Disconnect the connector (3 / 4, Fig. 34-10) from the unit.

d) Remove ADS-B (1, Fig. 34-9) / FLARM (3) antenna.

e) Remove all cable ties on length of cable (2 / 4).

(2) FLARM / ADS-B antenna installation:

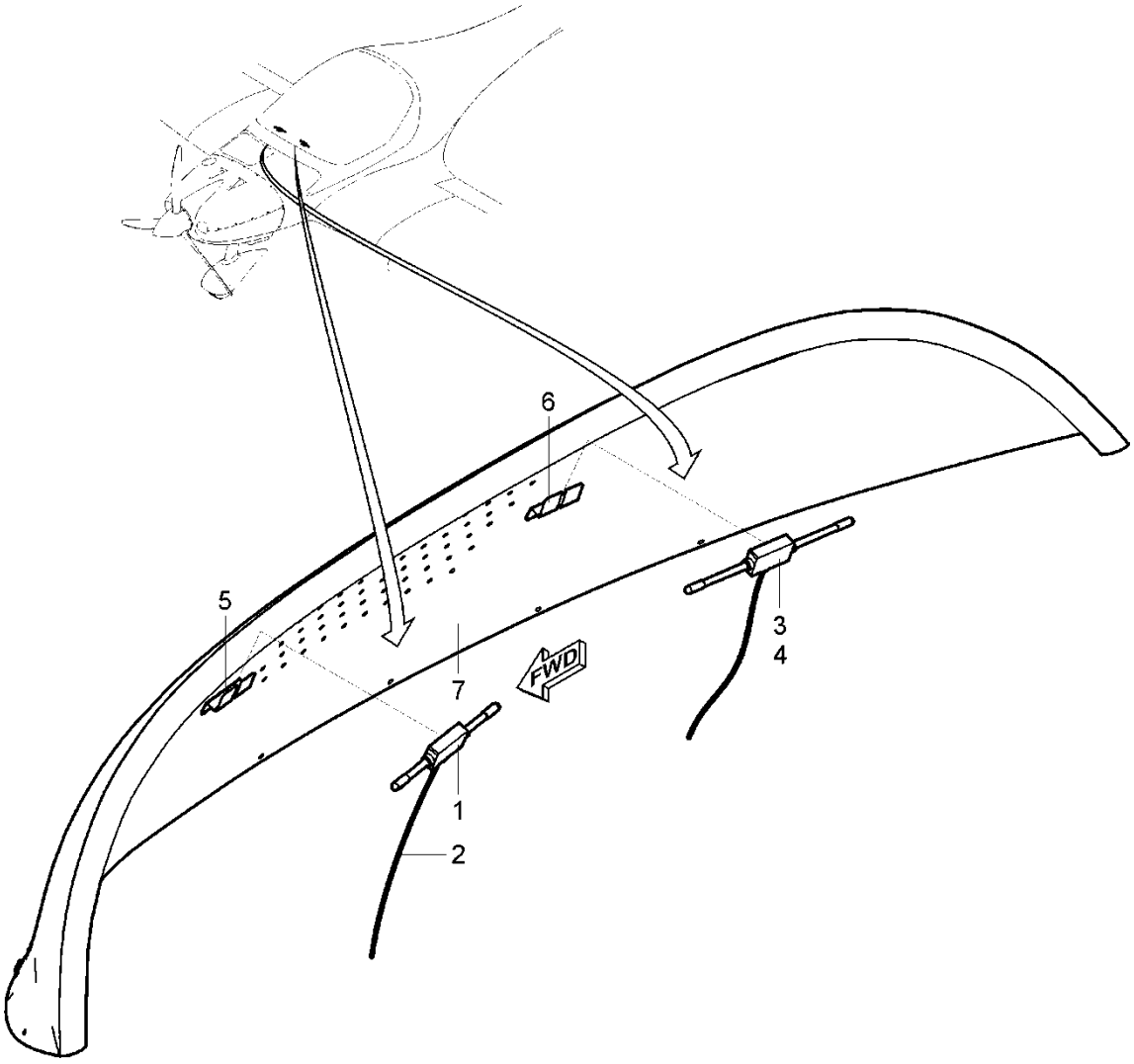
a) Install ADS-B (1, Fig. 34-9) / FLARM (3) antenna to the appropriate bracket (5 / 6).

b) Attach cables (2 / 4) by using cable ties.

c) Connect the connector (3 / 4, Fig. 34-10) to the unit (1).

d) Install the instrument panel cover (1) on the fuselage (Chapter 39-10).

e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – ADS-B antenna
2 – Cable
3 – FLARM antenna
4 – Cable
5 – Bracket
6 – Bracket
7 – Instrument panel cover

Fig. 34-9 FLARM / ADS-B Antenna Removal / Installation

B. TRX-1500 traffic sensor

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Persons	1

Tab. 34-7 Recommended tools, materials, persons and documentation

(1) TRX-1500 traffic sensor removal:

a) Set **MASTER SWITCH** to **OFF** position

b) Remove the instrument panel cover (Chapter 39-10).

c) Disconnect the connectors (2; 3; 4; 5, Fig. 34-10 from the unit (1).

d) Remove the mounting bolts (6) and washers (7; 8).

e) Remove the unit (1) from the bracket.

(2) TRX-1500 traffic sensor installation:

a) Put the unit (1, Fig. 34-10) in position on the bracket (9).

b) Hold the unit and attach it with bolts (6) and washers (7; 8).

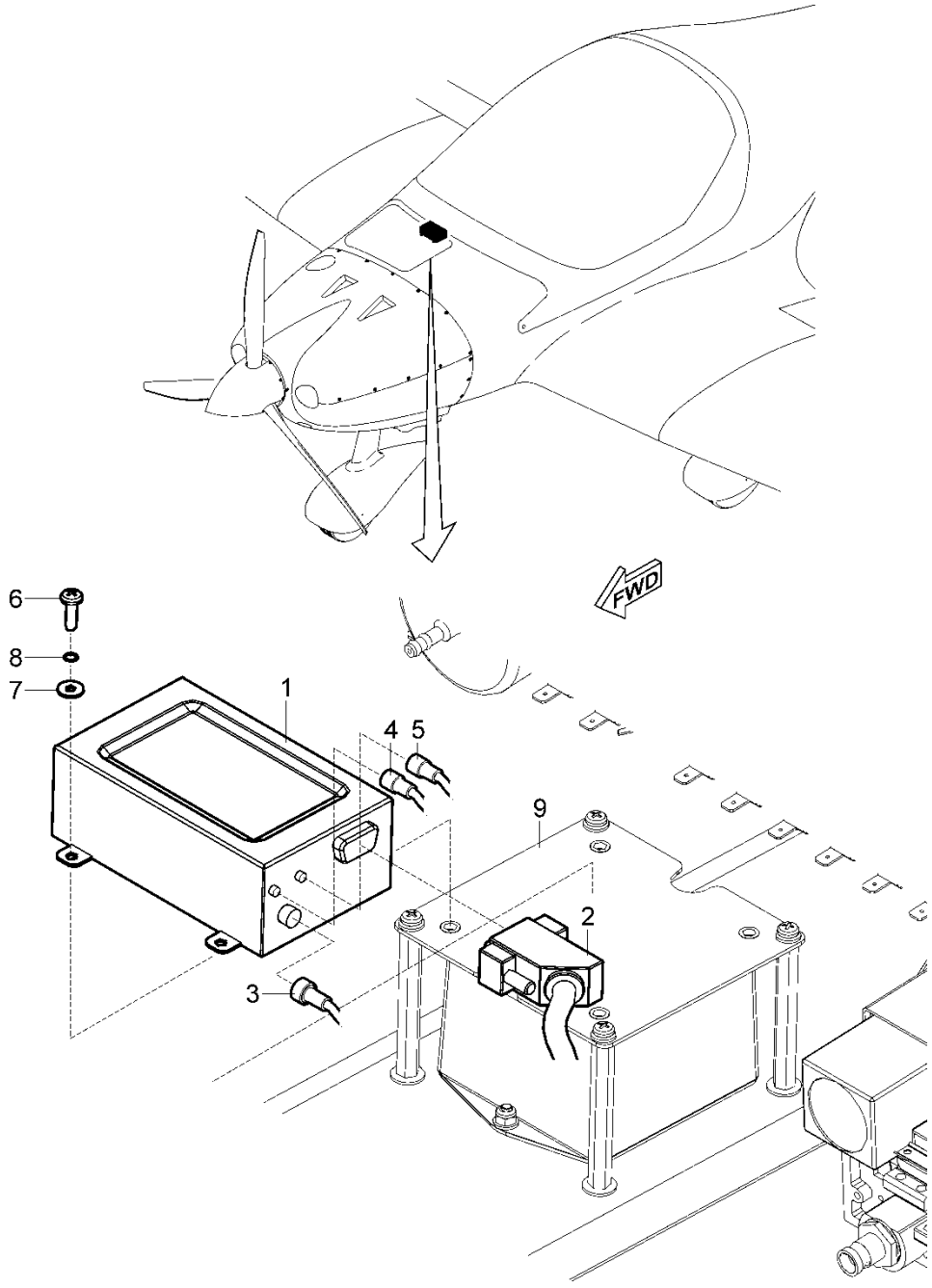
c) Connect the connectors (2; 3; 4; 5) to the unit.

d) Install the instrument panel cover (Chapter 39-10).

e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.

(3) TRX-1500 traffic sensor adjustment / test:

The integral FLARM module requires the update procedure. Refer to TRX-1500 ADS-B / FLARM Traffic sensor, User Manual Installation Manual, Revision: 1.0a, 31 Jan. 2012 or later for additional information



1 – TRX-1500 unit
2 – Main connector
3 – ADS-B antenna connector
4 – FLARM antenna connector
5 – GPS antenna connector
6 – Bolt M4 x 12
7 – Washer 4.3 x 9 x 0.8
8 – Spring washer 4.3

For information:

9 – Bracket

Fig. 34-10 TRX-1500 Traffic Sensor a Removal / Installation

C. VHF COMM antenna

For removal / installation procedures refer to Chapter 23-10.

34-50 DEPENDENT POSITION DETERMINING

1. DESCRIPTION

This chapter covers that portion of the system which provides information to determine position from sources which are mainly dependent on ground installations. This includes the GNC 255A NAV / COMM, Garmin GTX 328 Transponder system, and VOR/LOC antenna and transponder antenna.

The aircraft is equipped with Garmin GNC 255A NAV / COMM device (Chapter 39-10). Garmin GNC 255A NAV / COMM consists of a transmitter / receiver for VHF communication (COM) and a receiver for navigation information (NAV). These are combined with operating controls in one unit. The COM section of the GNC 255A NAV / COMM operates in the aviation voice band, from 118.000 to 136.975 MHz, in 25 kHz steps (default). For European operations, a Com radio configuration of 8.33 kHz steps is also available. The NAV section operates from 108 MHz to 117.95 MHz decoding both the VHF Omni Range and Localizer navigation signals. The built-in Glideslope receiver will automatically tune the corresponding glideslope paired frequencies (328 MHz to 335 MHz) when the localizer is tuned.

The Garmin GTX 328 panel mounted Mode S transponder is a radio transmitter and receiver that operates on radar frequencies, receiving ground radar or TCAS interrogations at 1030 MHz and transmitting a coded response of pulses to ground based radar on a frequency of 1090 MHz. The GTX 328 is equipped with IDENT capability that activates the Special Position Identification (SPI) pulse for 18 seconds. Mode S transmit/receive capability also requires 1090 MHz transmitting and 1030 MHz receiving for Mode S functions.

In addition to displaying the code, reply symbol and mode of operation, the GTX 328 screen will display pressure altitude, and timer functions. The unit also features an altitude monitor, and flight timers. A voice or tone audio output announces altitude deviation, and count down timer expiration.

The GTX 328 transponder (Chapter 39-10) is powered on by pressing the STBY, ALT or ON keys. After power on a start-up page will be displayed while the unit performs a self-test.

2. MAINTENANCE PRACTICES

A. Garmin GNC 255A NAV/COMM

For removal / installation procedures refer to Chapter 39-10.

B. Garmin GTX 328 transponder

For removal / installation procedures refer to Chapter 39-10.

C. VOR/LOC antenna

To replace this antenna, contact the aircraft manufacturer.

D. Transponder antenna

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 19	1 pc
Persons	1

Tab. 34-8 Recommended tools, materials, persons and documentation

(1) Transponder antenna removal:

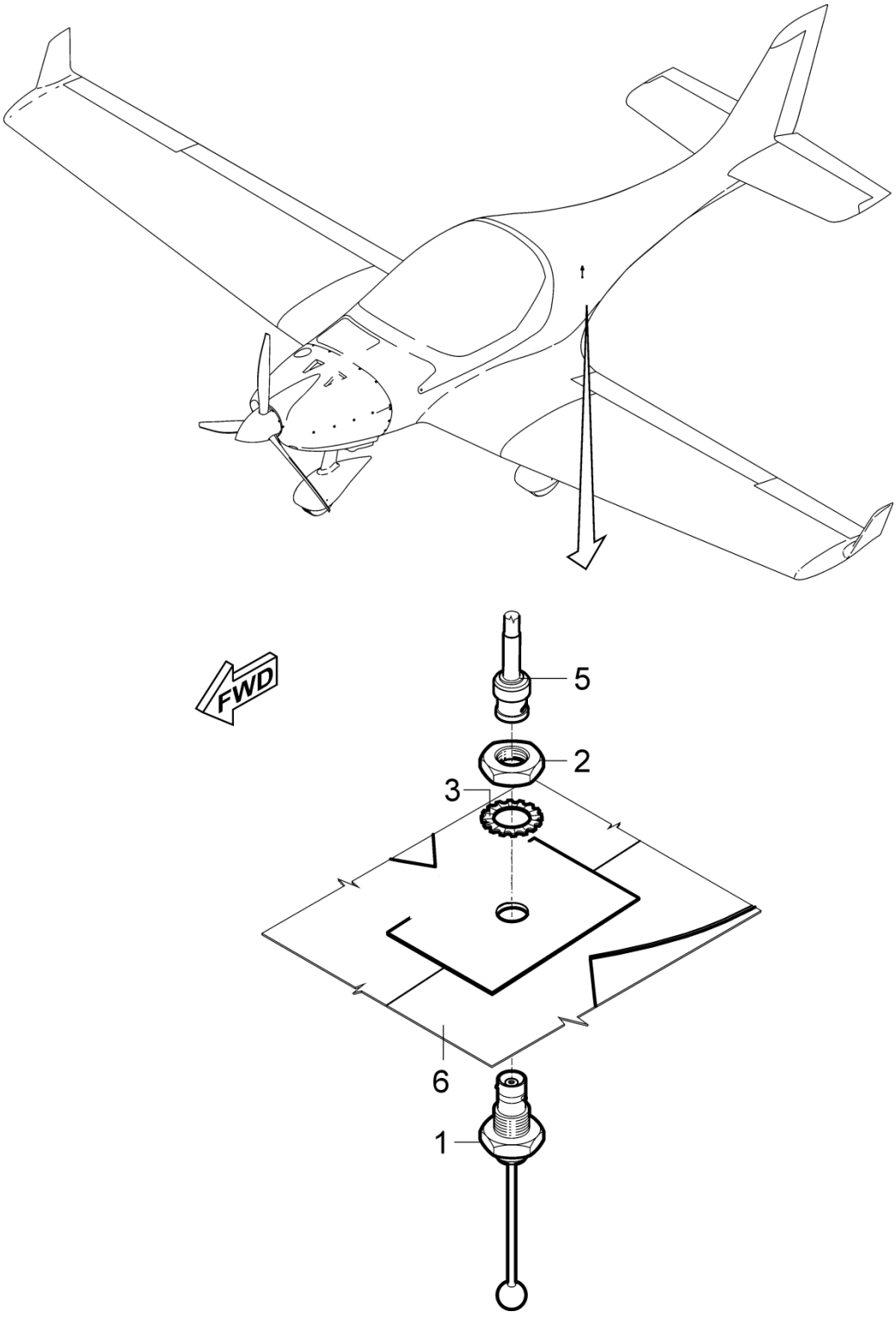
CAUTION

DO NOT ACTIVATE ELT WHEN REMOVING COVER. IT IS SENSITIVE FOR SHOCKS.

a) Set **MASTER SWITCH** to **OFF** position.
b) Remove cover of rear central console (in baggage compartment).
c) Disconnect coaxial cable (5, Fig. 34-11) from transponder antenna (1).
d) Unscrew the nut (2), remove washer (3) and pull out transponder antenna from the fuselage bottom part (6).
e) Install the protective cover on the antenna connector.

(2) Transponder antenna installation:

a) Remove the protective cover from the antenna connector.
b) Insert the antenna (1, Fig. 34-11) with the gasket ring to the hole in the fuselage bottom part (6).
c) Insert the washer (3), screw and tighten the nut (2).
d) Connect coaxial cable (5).
e) Refit top cover.
f) Set **MASTER SWITCH** to **ON** position and carry out an operational test - refer to the Garmin GTX 328 Transponder Installation Manual, P/N 190-00420-04 (revision C or later).



1 – Transponder antenna
2 – Antenna nut
3 – Serrated locking washer
5 – Coaxial cable
For information:
6 – Fuselage bottom part

Fig. 34-11 XPDR Antenna Removal / Installation

E. SV-GPS-250 antenna

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Cable ties 2.6	AR
Persons	1

Tab. 34-9 Recommended tools, materials, persons and documentation

(1) SV-GPS-250 antenna removal:

a) Set **MASTER SWITCH** to **OFF** position.

b) Remove the instrument panel cover (Chapter 39-10).

c) Disconnect the connector of cable (2, Fig. 34-12) from the display.

d) Remove all cable ties on length of cable (2).

e) Unscrew the bolts (3), remove washers (6), nuts (7) and remove the antenna (1).

(2) SV-GPS-250 antenna installation:

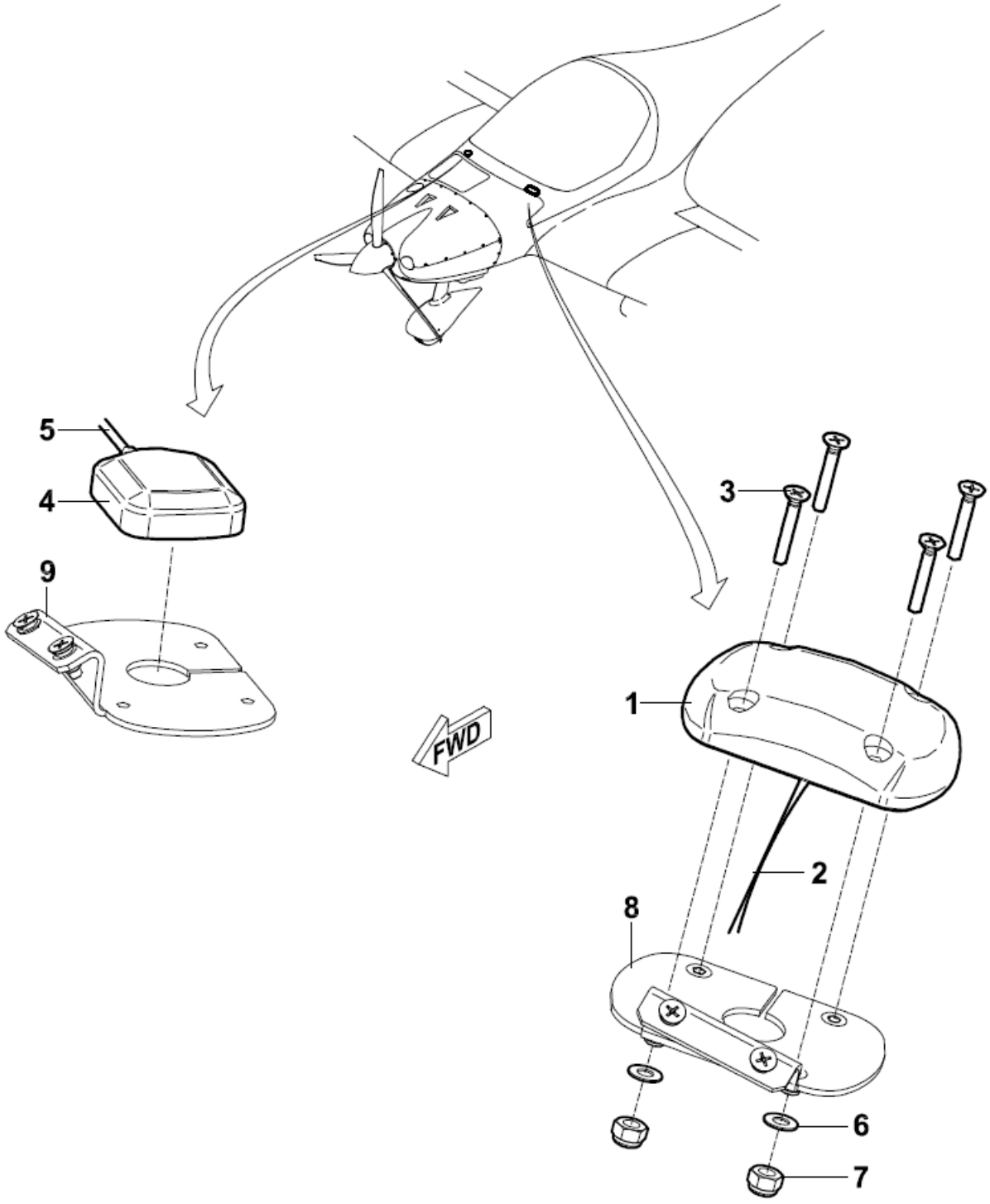
a) Put the antenna (1, Fig. 34-12) to the bracket (8) and fasten it by means of the bolts (3), washers (6) and nuts (7).

b) Attach cable (2) by using cable ties.

c) Connect the connector of cable (2) to the display.

d) Install the instrument panel cover (Chapter 39-10).

e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – SV-GPS-250 antenna
2 – Cable
3 – Bolt M4 x 25 (4 pcs)
4 – TRX GPS antenna
5 – Cable
6 – Washer 6 x 12 x 0.5
7 – Nut M4

For information:

8 – Bracket
9 – Bracket

Fig. 34-12 SV-GPS-250 and TRX GPS Antennas Removal / Installation

F. TRX GPS antenna

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Knife	1 pc
Double side tape	AR
Cable ties 2.6	AR
Persons	1

Tab. 34-10 Recommended tools, materials, persons and documentation

(1) TRX GPS antenna removal:

a) Set **MASTER SWITCH** to **OFF** position.

b) Remove the instrument panel cover (Chapter 39-10).

c) Disconnect the connector of cable (5, Fig. 34-12) from the TRX unit.

d) Remove all cable ties on length of cable (5).

e) Using knife, carefully remove the antenna (4).

(2) TRX GPS antenna installation:

a) Remove all remains of tape from antenna (4, Fig. 34-12) and bracket (7).

b) Glue new tape on the antenna (4) and put it on the bracket (7).

c) Attach cable (5) by using cable ties.

d) Connect the connector (5) to the TRX unit.

e) Install the instrument panel cover (Chapter 39-10).

f) Set **MASTER SWITCH** to **ON** position and carry out an operational test.

39 INSTRUMENT AND CONTROL PANELS

CONTENTS

Chapter	Description	Page
39-00	**GENERAL**	**3**
	1. INTRODUCTION	3
39-10	**INSTRUMENT AND CONTROL PANELS**	**5**
	1. DESCRIPTION	5
	A. WT9 Dynamic LSA / Club FG 912 Instrument panel	5
	B. WT9 Dynamic LSA / Club FG 912T Instrument panel	8
	2. MAINTENANCE PRACTICES	12
	A. Instrument panel cover	12
	B. Instrument panel	14
	C. 12 V socket	16
	D. Circuit breakers KLIXON	18
	E. Circuit breakers ETA 106-P10	20
	F. Switches	22
	G. Control / warning lamp	24
	H. Test button	26
	I. Airspeed indicator, altimeter	27
	J. Vertical speed indicator	30
	K. Standby RPM indicator	32
	L. Propeller regulator PR1-P	34
	M. Flight hours counter	36
	N. Standby bank indicator	38
	O. SV-D1000 display	40
	P. PM3000 intercom	44
	Q. Radio Garmin GNC 255A NAV/COMM	46

R. Transponder Garmin GTX 328 48
S. Magnetic compass 50
T. Ignition switches 54
U. Keyed ignition switch 57
V. ELT remote control unit 58
W. Standby fuel pressure indicator 60

39-00 GENERAL

1. INTRODUCTION

The instrument panel is arranged primarily for use by the pilot in the left seat; however, it can be viewed from the co-pilot in the right seat. Primary flight display and warning and control lamps are located on the left side of the panel and engine monitoring system is located on the right side of the instrument panel.

This page is left blank intentionally

39-10 INSTRUMENT AND CONTROL PANELS

1. DESCRIPTION

Instrument panel is made of glass/carbon fabric laminate and is attached to the central tunnel and both sides of fuselage. In the middle of top edge is the panel supported with composite stiffener. The instrument panel is covered with glass laminate cover. The cover overlaps the instrument panel to limits undesirable reflections on instruments displays. The panel is divided into three sections: left, centre and right. Under the instrument panels, on both left and right side, are located remote controls for position adjustment of rudder pedals.

Depending on the installed equipment, there are available two layouts of instrument panel. For basic instrument panel layout see 1.A., for instrument panel layout with installed towing equipment see 1.B.

A. WT9 Dynamic LSA / Club FG 912 Instrument panel

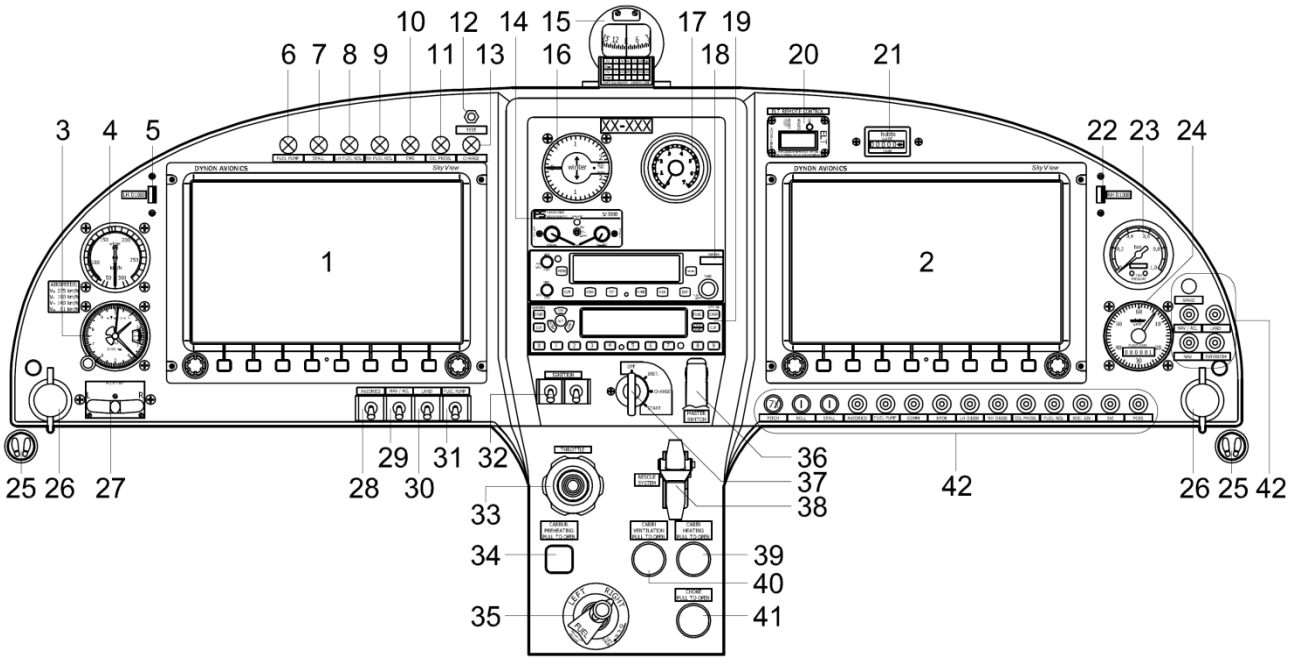


Fig. 39-1 Instrument Panel Layout (page 1 of 2)

1 – PFD Dynon SkyView SV-D1000
2 – MFD Dynon SkyView SV-D1000
3 – Standby altimeter
4 – Standby airspeed indicator
5 – USB Connector (LH-D1000)
6 – **FUEL PUMP** control lamp
7 – **STALL** warning lamp
8 – **LH FUEL RES.** warning lamp
9 – **RH FUEL RES.** warning lamp
10 – **EMS** warning lamp
11 – **OIL PRESS.** warning lamp
12 – **TEST** button
13 – **CHARGE** warning lamp
14 – Intercom
15 – Magnetic compass
16 – Standby variometer
17 – Standby RPM indicator
18 – NAV / COMM radio
19 – Transponder
20 – ELT remote control
21 – Engine Hours Counter
22 – USB Connector (RH-D1000)
23 – Standby fuel pressure indicator
24 – Flying hours counter
25 – Pedal's adjustment remote control handle
26 – 12V/10A Power socket
27 – Standby bank indicator
28 – **AVIONICS** switch
29 – **NAV / ACL** switch
30 – **LAND** switch
31 – **FUEL PUMP** switch
32 – **IGNITION** switches
33 – **THROTTLE** control
34 – **CARBUR. PREHEATING** handle
35 – Fuel selector valve
36 – **MASTER SWITCH**
37 – Keyed ignition switch
38 – **RESCUE SYSTEM** activating handle
39 – **CABIN HEATING** control
40 – **CABIN VENTILATION** control
41 – **CHOKE** control
42 – Circuit breakers

Fig. 39-1 Model Instrument Panel Layout (page 2 of 2)

Left section of instrument panel:

Installed are: standby airspeed indicator Winter 7FMS511 (or 7FMS513), altimeter Winter 4FGH40 and bank indicator Winter QMII.

Primary Flight Display (PFD) Dynon SkyView SV-D1000 is installed in the middle of left section. This instrument also can display data of Engine Monitoring System (EMS) and MAP data.

Under the PFD, in the lower right corner of the left section are located the following switches: **AVIONICS**, **NAV / ACL** (navigation and anti-collision lights), **LAND** (landing lights) and **FUEL PUMP**.

Above the PFD is located a row of control and warning lamps as follows (with their meaning):

- **FUEL PUMP** activation of the auxiliary electric fuel pump
- **STALL** activation of the stall warning system
- **LH FUEL RES.** fuel quantity in the left tank is less than 16 liters
- **RH FUEL RES.** fuel quantity in the right tank is less than 16 liters
- **EMS** exceeding of the engine limit parameters
- **OIL PRESS.** oil pressure is less than 2 bar / 29 psi
- **CHARGE** voltage is less than approximately 12.5 volts**.**

Control and warning lamps function can be verified by pressing of the **TEST** button.

In the left lower corner is located 12 V / 10 A power socket.

Central section of instrument panel:

In bottom section are installed: **IGNITION** switches, starter key and **MASTER SWITCH**. There are also installed transponder Garmin GTX 328, radio Garmin GNC 255A, intercom PM3000, standby variometer 5StVM 10 and standby RPM indicator ROAD IF61.2B35.2301.

Sticker with registration marks is also placed in this section.

At the top of centre section there is installed magnetic compass Airpath C-2400P on the glare shield.

Right section of instrument panel:

Multifunction Flight Display (MFD) Dynon Skyview SV-D1000 is installed in the middle of right section. This instrument displays data of Engine Monitoring System (EMS).

On the right part are installed: standby fuel pressure indicator Skydrive FP-912/10 and flying hours counter Winter FSMZ.

Circuit breakers are placed in a row at the lower edge of right section and on the right side of right section (list of circuit breakers with values is in Chapter 24-60). In the right lower corner is 12 V / 10 A power socket.

Remote control of the Emergency Locator Transmitter (ELT) and Engine Hours Counter Hobbs are placed in the left upper area of right section.

Central console:

Vertical section contains throttle control, rescue system actuator, carburetor preheating control, cockpit heating and ventilation control handles, fuel selector valve and choke control.

Pedestal panel between pilot and co-pilot is equipped with flaps control, pitch and roll trim switches and brake lever (see Chapter 27-50).

Instrument Panel Cover:

Instrument panel cover (1, Fig. 39-3) is made of glass laminate. It is attached to the fuselage with screws. On the top of the cover is attached magnetic compass (Chapter 39-10, see 2.S.), on the bottom part are attached ADS-B and FLARM antennas (Chapter 34-40).

B. WT9 Dynamic LSA / Club FG 912T Instrument panel

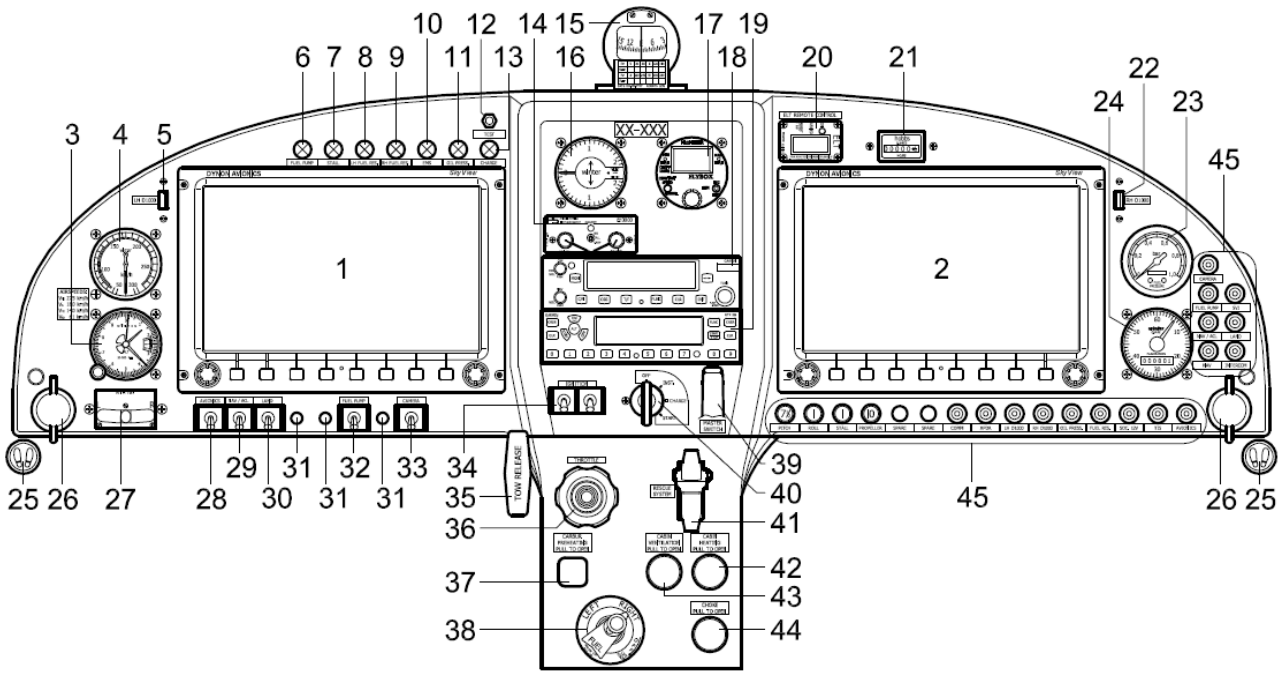


Fig. 39-23 Instrument Panel Layout (Towing Version) (page 1 of 2)

1 – PFD Dynon SkyView SV-D1000
2 – MFD Dynon SkyView SV-D1000
3 – Standby altimeter
4 – Standby airspeed indicator
5 – USB Connector (LH-D1000)
6 – **FUEL PUMP** control lamp
7 – **STALL** warning lamp
8 – **LH FUEL RES.** warning lamp
9 – **RH FUEL RES.** warning lamp
10 – **EMS** warning lamp
11 – **OIL PRESS.** warning lamp
12 – **TEST** button
13 – **CHARGE** warning lamp
14 – Intercom
15 – Magnetic compass
16 – Standby variometer
17 – Propeller regulator
18 – NAV / COMM radio
19 – Transponder
20 – ELT remote control
21 – Engine Hours Counter
22 – USB Connector (RH-D1000)
23 – Standby fuel pressure indicator
24 – Flying hours counter
25 – Pedal's adjustment remote control handle
26 – 12V/10A Power socket
27 – Standby bank indicator
28 – **AVIONICS** switch
29 – **NAV / ACL** switch
30 – **LAND** switch
31 – Spare
32 – **FUEL PUMP** switch
33 – **CAMERA** switch
34 – **IGNITION** switches
35 – **TOW RELEASE** handle
36 – **THROTTLE** control
37 – **CARBUR. PREHEATING** handle
38 – Fuel selector valve
39 – **MASTER SWITCH**
40 – Keyed ignition switch
41 – **RESCUE SYSTEM** activating handle
42 – **CABIN HEATING** control
43 – **CABIN VENTILATION** control
44 – **CHOKE** control
45 – Circuit breakers

Fig. 39-2 Instrument Panel Layout (Towing Version) (page 2 of 2)

Left section of instrument panel:

Installed are: standby airspeed indicator Winter 7FMS511 (or 7FMS513), altimeter Winter 4FGH40 and bank indicator Winter QMII.

Primary Flight Display (PFD) Dynon SkyView SV-D1000 is installed in the middle of left section. This instrument also can displays data of Engine Monitoring System (EMS) and MAP data.

Under the PFD, in the lower right corner of the left section are located the following switches: **AVIONICS**, **NAV / ACL** (navigation and anti-collision lights), **LAND** (landing lights), **FUEL PUMP** and **CAMERA**.

Above the PFD is located a row of control and warning lamps as follows (with their meaning):

- **FUEL PUMP** activation of the auxiliary electric fuel pump
- **STALL** activation of the stall warning system
- **LH FUEL RES.** fuel quantity in the left tank is less than 16 liters
- **RH FUEL RES.** fuel quantity in the right tank is less than 16 liters
- **EMS** exceeding of the engine limit parameters
- **OIL PRESS.** oil pressure is less than 2 bar / 29 psi
- **CHARGE** voltage is less than approximately 12.5 volts**.**

Control and warning lamps function can be verified by pressing of the **TEST** button.

In the left lower corner is located 12 V / 10 A power socket.

Central section of instrument panel:

In bottom section are installed: **IGNITION** switches, starter key and **MASTER SWITCH**. There are also installed transponder Garmin GTX 328, radio Garmin GNC 255A, intercom PM3000, standby variometer 5StVM 10 and Flybox Propeller regulator PR1-P. Sticker with registration marks is also placed in this section.

At the top of centre section there is installed magnetic compass Airpath C-2400P on the glare shield.

Right section of instrument panel:

Multifunction Flight Display (MFD) Dynon Skyview SV-D1000 is installed in the middle of right section. This instrument displays data of Engine Monitoring System (EMS).

On the right part are installed: standby fuel pressure indicator Skydrive FP-912/10 and flying hours counter Winter FSMZ.

Circuit breakers are placed in a row at the lower edge of right section and on the right side of right section (list of circuit breakers with values is in Chapter 24-60). In the right lower corner is 12 V / 10 A power socket.

Remote control of the Emergency Locator Transmitter (ELT) and Engine Hours Counter Hobbs are placed in the left upper area of right section.

Central console:

Vertical section contains throttle control, rescue system actuator, carburetor preheating control, cockpit heating and ventilation control handles, fuel selector valve and choke control.

On the left side of central console is attached **TOW RELEASE** handle.

Pedestal panel between pilot and co-pilot is equipped with flaps control, pitch and roll trim switches and brake lever (see Chapter 27-50).

Instrument Panel Cover

Instrument panel cover (1, Fig. 39-3) is made of glass laminate. It is attached to the fuselage with screws. On the top of the cover is attached magnetic compass (Chapter 39-10, 2.S.), on the bottom part are attached ADS-B and FLARM antennas (Chapter 34-40).

2. MAINTENANCE PRACTICES

A. Instrument panel cover

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

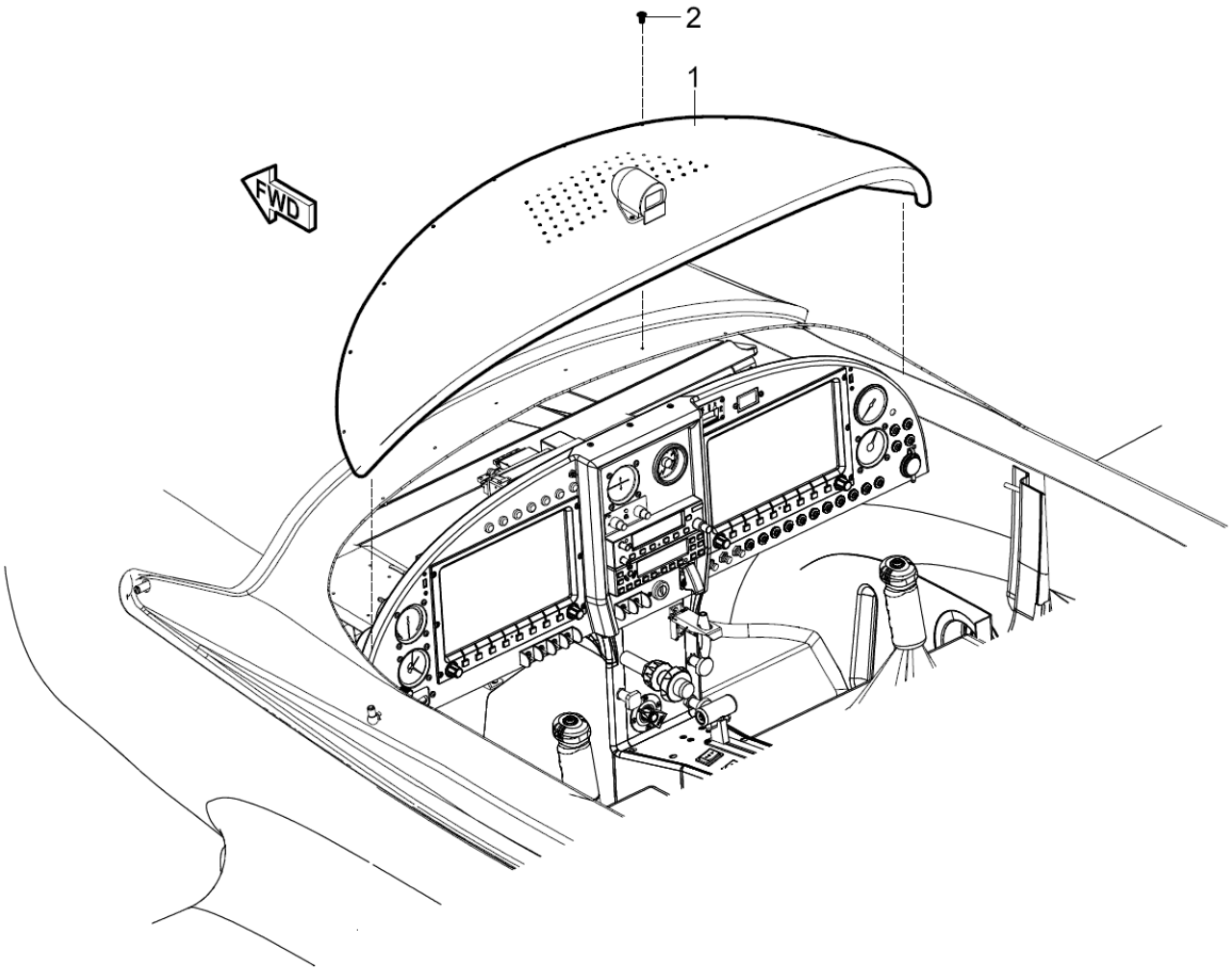
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Flat screwdriver 10	1 pc
Persons	1

Tab. 39-1 Recommended tools, materials, persons and documentation

(1) Instrument panel cover removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Remove screws (2, Fig. 39-3) and carefully lift the instrument panel cover (1).
- (c) Remove ADS-B and FLARM antennas (Chapter 34-40).
- (d) Remove instrument panel cover (1).

(2) Instrument panel cover installation:
- (a) Install ADS-B and FLARM antennas (Chapter 34-40) to the instrument panel cover (1, Fig. 39-3).
- (b) Put the instrument panel cover (1) on the fuselage and attach it with screws (2).
- (c) Set **MASTER SWITCH** to **ON** position.



1 – Instrument panel cover 2 – Screw M4 x 12

Fig. 39-3 Instrument Panel Cover Removal / Installation

B. Instrument panel

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

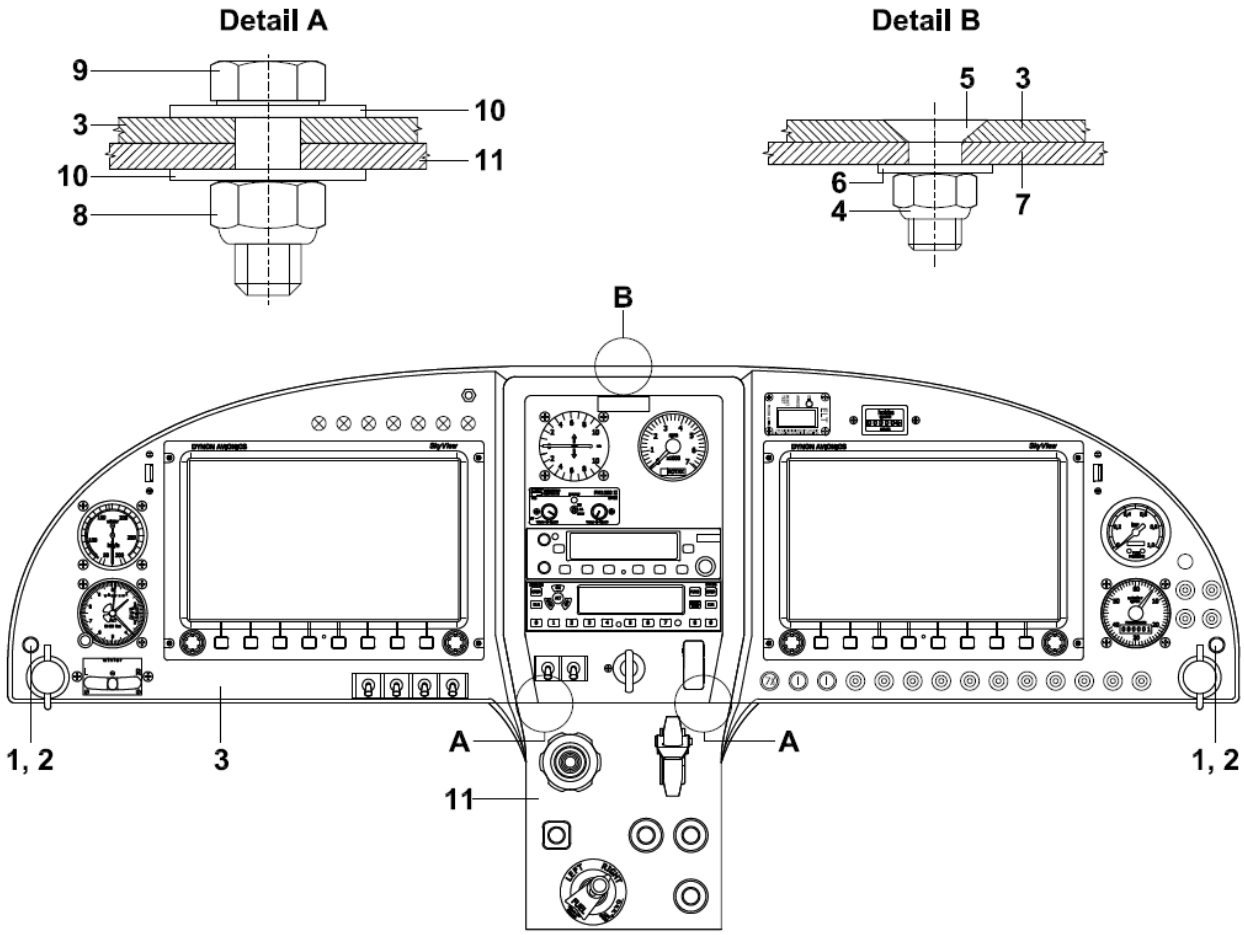
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 8	1 pc
Wrench 10	1 pc
Phillips screwdriver 2	1 pc
Persons	2

Tab. 39-2 Recommended tools, materials, persons and documentation

(1) Instrument panel removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Disconnect the wires and connectors from instruments.
- (e) Disconnect hoses from pitot-static system (Chapter 34-10).
- (f) Remove caps (1, Fig. 39-4) and unscrew nuts (2) attaching the instrument panel (3) to the silentblocks.
- (g) Remove nut (4), screw (5), washer (6) and disconnect the instrument panel (3) from support bar (7).
- (h) Remove nuts (8), bolts (9), washers (10) and disconnect the instrument panel (3) from the central console (11).
- (i) Carefully remove the instrument panel (3).

(2) Instrument panel installation:
- (a) Make sure that the battery is disconnected.
- (b) Carefully place the instrument panel (3, Fig. 39-4) to the cockpit.
- (c) Join the instrument panel (3) to the central console (11) with bolts (9), washers (10) and nuts (8).
- (d) Attach the instrument panel (3) to the support bar (7) with screws (5), washers (6) and nuts (4).
- (e) Attach the instrument panel (3) to silentblocks through nuts (2); install caps (1).
- (f) Connect hoses from pitot-static system (Chapter 34-10).
- (g) Connect wires and connectors from instruments.
- (h) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (i) Connect the battery.
- (j) Install engine cowlings (Chapter 71-10).
- (k) Carry out an operational test.



1 – Cap
2 – Nut M6
3 – Instrument panel
4 – Nut M4
5 – Screw M4 x 12
6 – Washer 4.3 x 9 x 0.8
7 – Support bar
8 – Nut M5
9 – Bolt M5 x 15
10 – Washer 5.3 x 15 x 1.2
11 – Central tunnel

Fig. 39-4 Instrument Panel Removal / Installation

C. 12 V socket

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

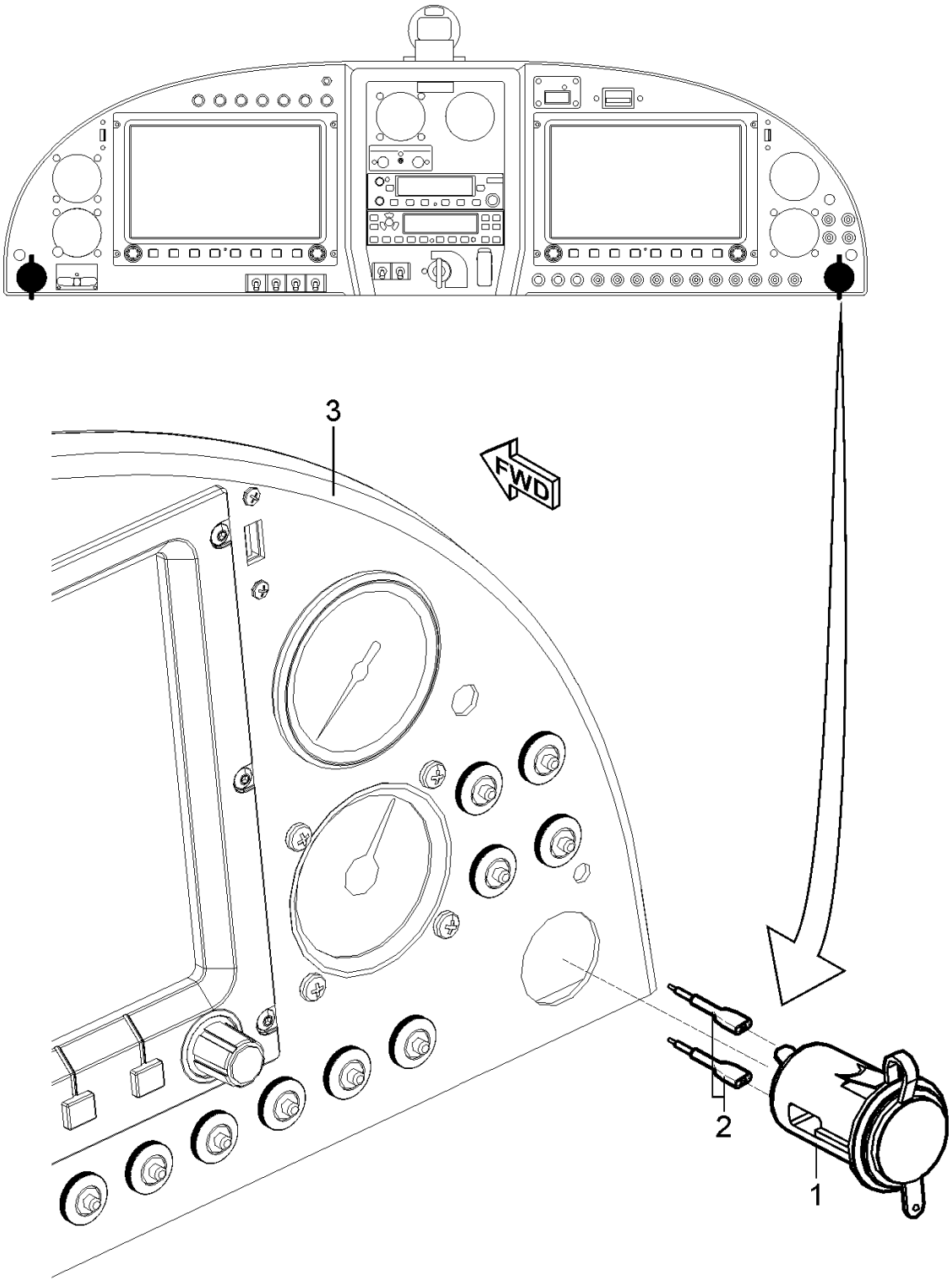
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Persons	1

Tab. 39-3 Recommended tools, materials, persons and documentation

(1) 12 V socket removal:
- (a) Set the **MASTER SWITCH** to **OFF** position.
- (b) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (c) Disconnect the wires (2, Fig. 39-5) from the socket.
- (d) Compress the retainers on the socket (1) and push up to remove.

(2) 12 V socket installation:
- (a) Compress the retainers on the socket (1, Fig. 39-5) and push down into position on the instrument panel (3).
- (b) Connect wires (2) to the socket.
- (c) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (d) Set the **MASTER SWITCH** to **ON** position.



1 – 12 V socket
2 – Wires

For information:
3 – Instrument panel

Fig. 39-5 12 V Socket Removal and Circuit Breaker Removal / Installation

D. Circuit breakers KLIXON

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Wrench 1/2 in	1 pc
Persons	1

Tab. 39-4 Recommended tools, materials, persons and documentation

NOTE

Removal / installation are the same for each KLIXON 7277-2 circuit breaker.

(1) KLIXON 7277-2 circuit breaker removal:

(a) Remove the engine cowlings (Chapter 71-10).

(b) Disconnect the battery.

(c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).

(d) Unscrew the nut (2, Fig. 39-6) and pull out the circuit breaker (1) a bit.

(e) Disconnect the wires (7) from the circuit breaker by unscrewing the bolts (5) and remove washers (6).

(f) Remove the circuit breaker (1) with the washers (3; 4).

(2) KLIXON 7277-2 circuit breaker installation:

(a) Connect wires (7, Fig. 39-6) by means of the bolts (5) and washers (6).

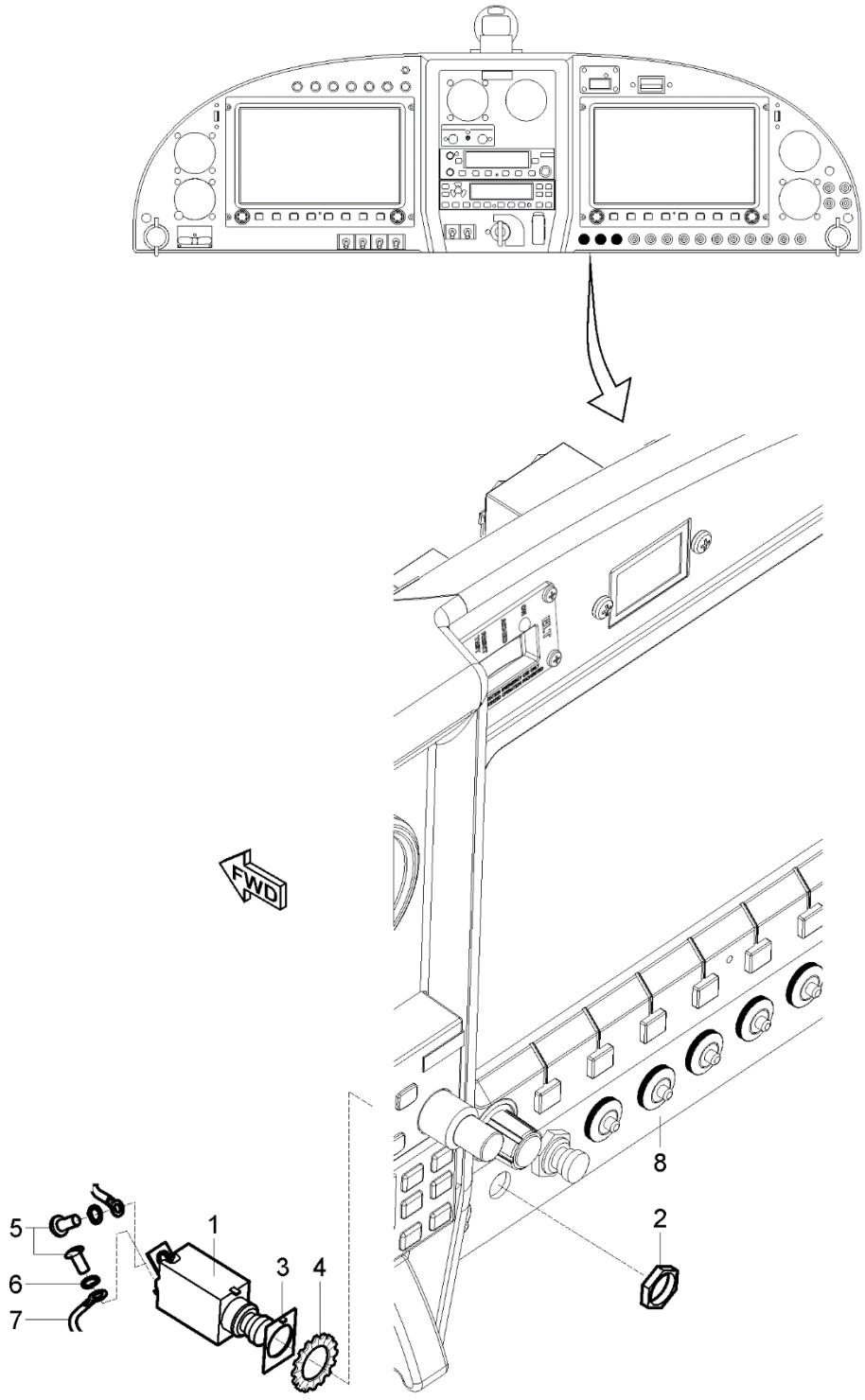
(b) Insert the circuit breaker (1) with washers (3; 4) to the appropriate hole on the back of the instrument panel (8).

(c) Screw and tighten the nut (2).

(d) Connect the battery.

(e) Install the engine cowlings (Chapter 71-10).

(f) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).



1 – KLIXON 7277-2 circuit breaker
2 – Nut of circuit breaker
3 – Keyway washer
4 – Serrated washer
5 – Bolt of circuit breaker
6 – Locking washer
7 – Wire

For information:

8 – Instrument panel

Fig. 39-6 KLIXON 7277-2 Circuit Breaker Removal / Installation

E. Circuit breakers ETA 106-P10

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Persons	1

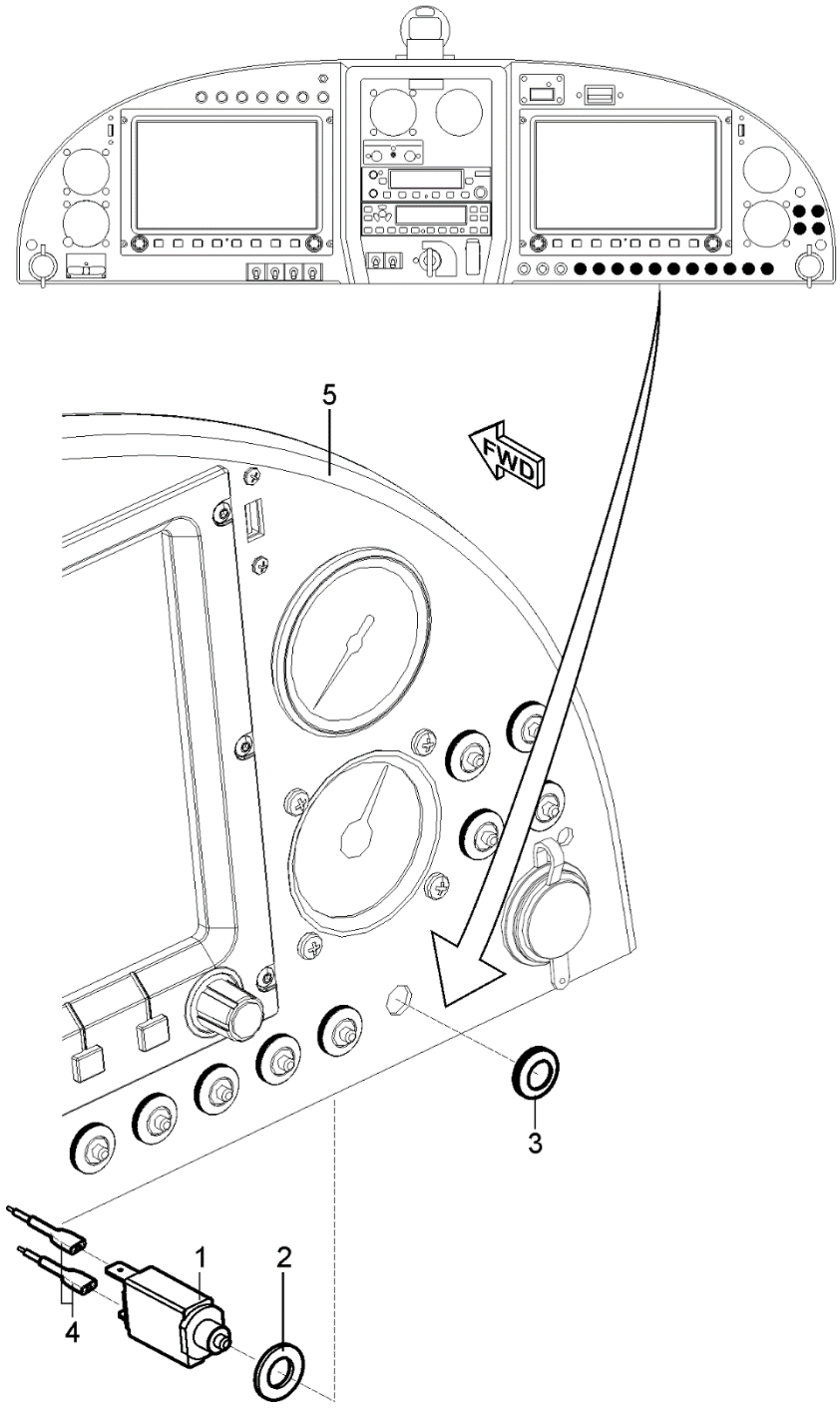
Tab. 39-5 Recommended tools, materials, persons and documentation

NOTE

Removal / installation are the same for each ETA 106-P10 circuit breaker.

(1) ETA 106-P10 circuit breaker removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Disconnect the wires (4, Fig. 39-7) from the circuit breaker.
- (e) Unscrew the ring (3) and remove the circuit breaker (1) with washer (2).

(2) ETA 106-P10 circuit breaker installation:
- (a) Insert the circuit breaker (1, Fig. 39-7) with the washer (2) to the appropriate hole on the back of the instrument panel (7).
- (b) Screw and tighten the ring (3).
- (c) Connect wires (4) to the circuit breaker.
- (d) Connect the battery.
- (e) Install the engine cowlings (Chapter 71-10).
- (f) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).



1 – ETA 106-P10 Circuit breaker
2 – Washer
3 – Ring
4 – Wire

For information:

5 – Instrument panel

Fig. 39-7 ETA 106 P-10 Circuit Breaker Removal / Installation

F. Switches

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Socket wrench 10	1 pc
Soldering gun	1 pc
Shrink tube Ø3.2 x 1.6 mm	AR
Knife	1 pc
Pliers	1 pc
Persons	1

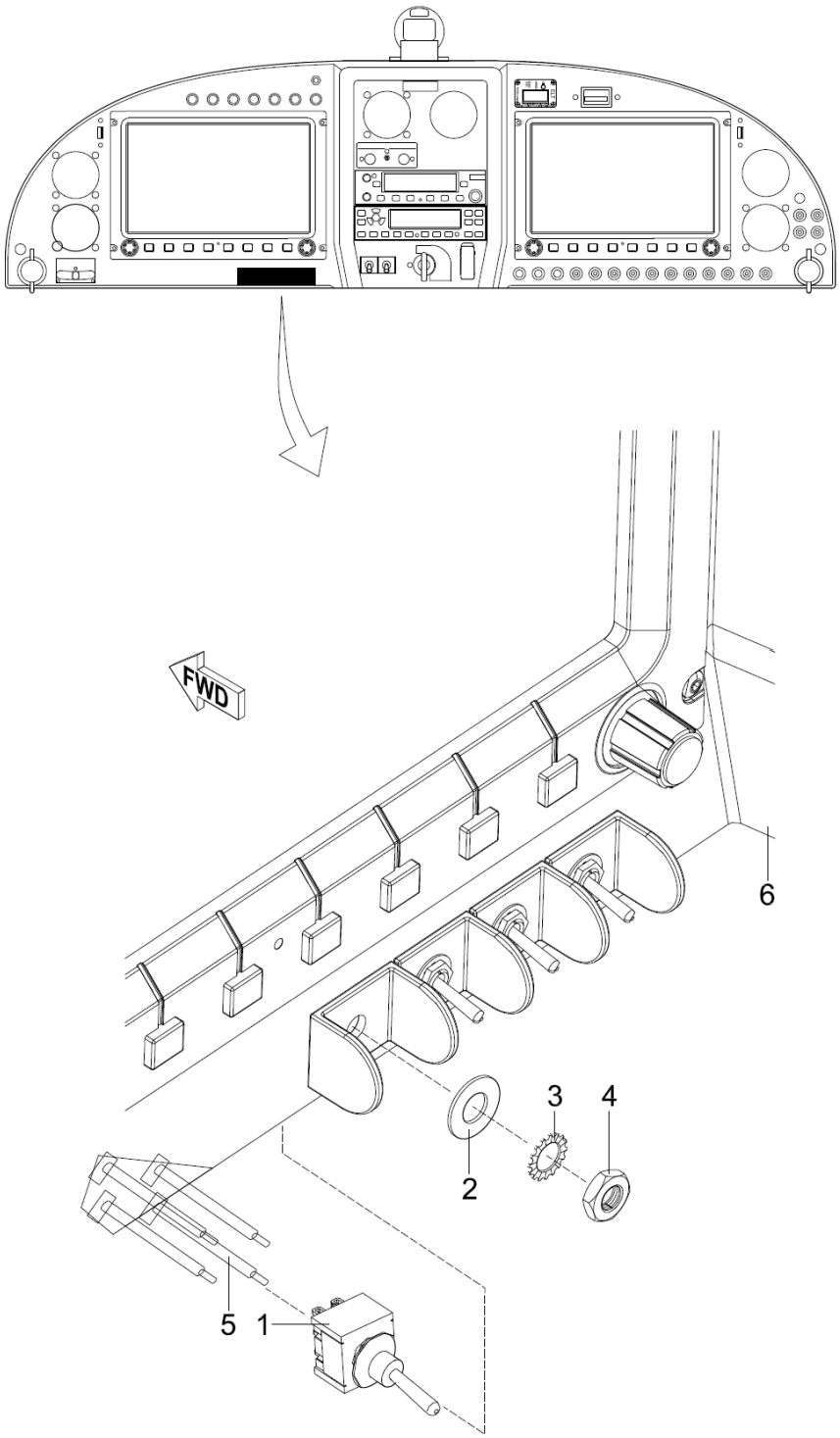
Tab. 39-6 Recommended tools, materials, persons and documentation

NOTE

Removal / installation is the same for all switches.

(1) Switch removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Unscrew the nut (4, Fig. 39-8), remove the washers (2; 3) and pull out the switch (1).
- (e) Remove shrink tubes and unsolder the el. wires (5).

(2) Switch installation:
- (a) Make sure that the battery is disconnected.
- (b) Put shrink tubes on wires (5, Fig. 39-8), solder wires to the switch (1); pull the shrink tubes over join and apply heat to shrink them.
- (c) Place the switch (1) on the back of the instrument panel.
- (d) Insert the washers (2; 3), screw and tighten the nut (4).
- (e) Connect the battery.
- (f) Install the engine cowlings (Chapter 71-10).
- (g) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (h) Carry out an operational test.



1 – Switch
2 – Washer of switch
3 – Serrated washer
4 – Nut of switch
5 – Wires

For information:

6 – Instrument panel

Fig. 39-8 Switches Removal / Installation

G. Control / warning lamp

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Narrow flat screwdriver	1 pc
Persons	1

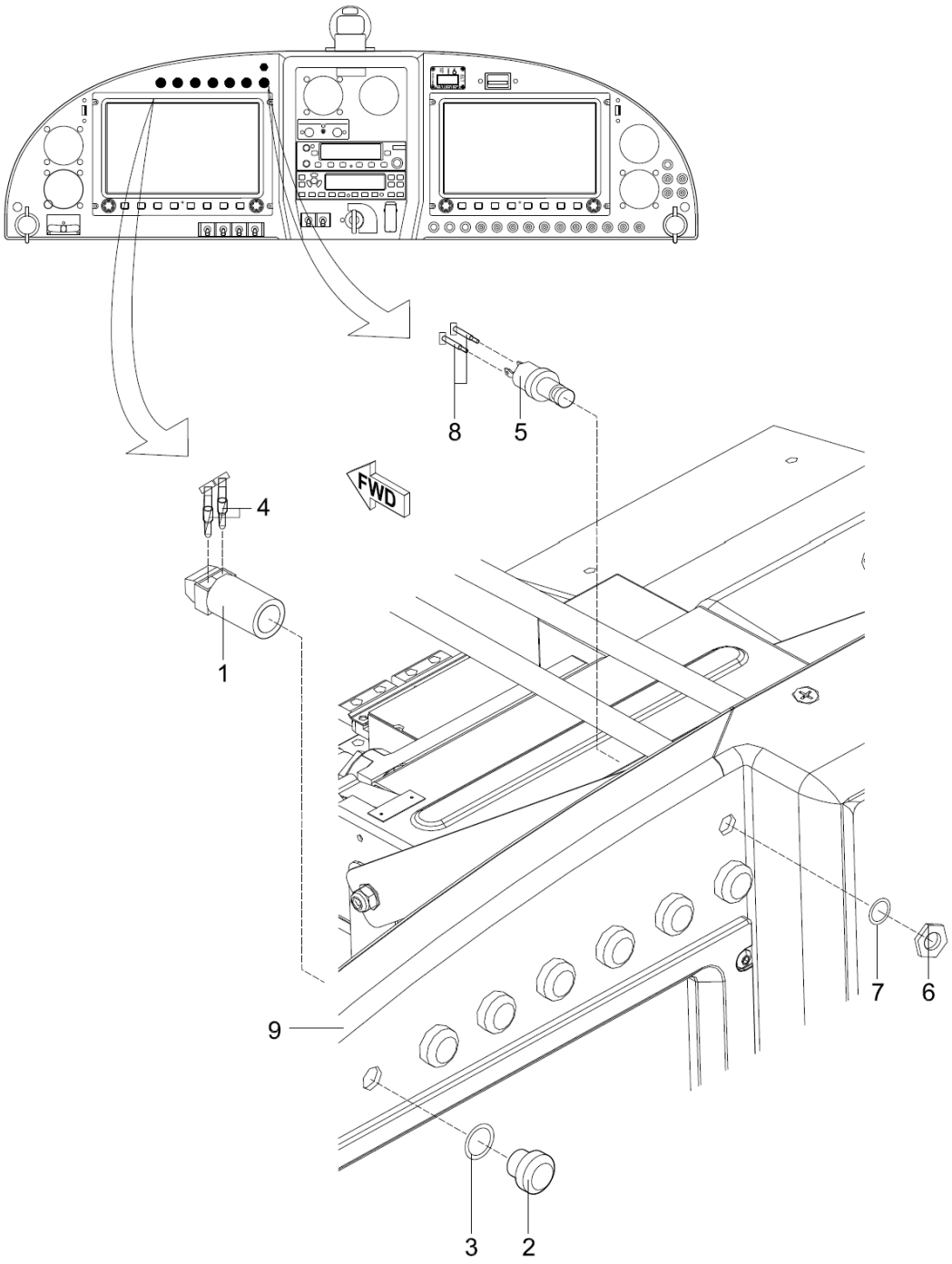
Tab. 39-7 Recommended tools, materials, persons and documentation

NOTE

Removal / installation are the same for each lamp.

(1) Control / warning lamp removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Loosen the screws in the rear part of the lamp body and remove the wires (4, Fig. 39-9).
- (e) Unscrew the cover (2) and remove the lamp body (1).

(2) Control / warning lamp installation:
- (a) Place the lamp body (1, Fig. 39-9) in the back of the instrument panel (9).
- (b) Insert the cover (2) with rubber washer (3) into the hole; tighten the cover.
- (c) Insert the wires (4) to the appropriate holes in the rear part of the lamp body and tighten the screws.
- (d) Connect the battery.
- (e) Install the engine cowlings (Chapter 71-10).
- (f) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (g) Carry out an operational test.



1 – Lamp body
2 – Cover
3 – Rubber washer
4 – Wire
5 – Test button body
6 – Nut of button
7 – Rubber washer
8 – Wire
For information:
9 – Left instrument panel

Fig. 39-9 Control / Warning Lamp, Test Button Removal / Installation

H. Test button

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 11	1 pc
Soldering gun	1 pc
Shrink tube ø3.2 x 1.6	AR
Persons	1

Tab. 39-8 Recommended tools, materials, persons and documentation

(1) Test button removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Unscrew the nut (6, Fig. 39-9), remove the washer (7) and pull out the test button (5).
- (e) Remove the shrink tubes and unsolder the el. wires (8).

(2) Test button installation:
- (a) Put the shrink tube on the wire (8, Fig. 39-9) and connect using soldering gun; pull the shrink tube over the joint.
- (b) Place the test button (5) in the back of the instrument panel (9).
- (c) Insert the rubber washer (7), screw and tighten the nut (6).
- (d) Connect the battery.
- (e) Install the engine cowlings (Chapter 71-10).
- (f) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (g) Carry out an operational test.

I. Airspeed indicator, altimeter

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Oetiker pliers- Crimping pliers	1 pc
Persons	1

Tab. 39-9 Recommended tools, materials, persons and documentation

(1) Airspeed indicator removal:

(a) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
(b) Remove the clamps (4, Fig. 39-10).
(c) Disconnect the hoses (5; 6) from the ports of the instrument.
(d) Remove the mounting screws (3); hold the instrument (1).
(e) Remove the instrument (1) from the panel.
(f) Put the caps on the hoses and instrument ports.

(2) Airspeed indicator installation:

WARNING

PAY ATTENTION TO THE CORRECT PLUGGING OF THE PORTS AND HOSES AND CORRECT PLUMBING OF THE HOSES!

(a) Remove the caps from the instrument port and hoses.
(b) Calibrate the instrument as required.
(c) Put the instrument (1, Fig. 39-10) in position in the panel (7).
(d) Install mounting screws (3).
(e) Connect the hoses (5; 6) to the ports of the instrument (1) and secure them with clamps (4).
(f) Carry out a pitot-static leak test (Chapter 34-10).
(g) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).

(3) Altimeter removal:

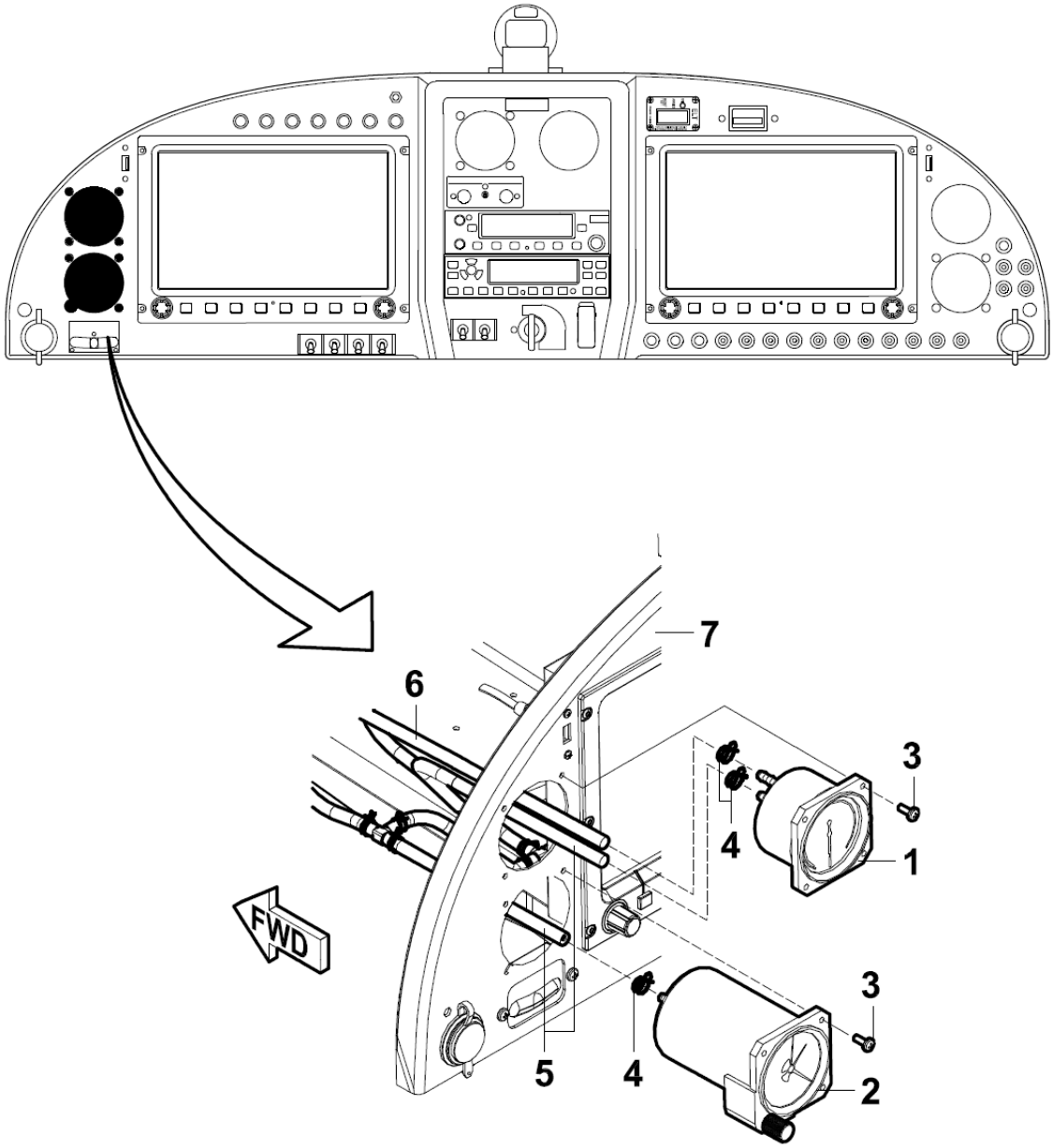
(a) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
(b) Remove the clamps (4, Fig. 39-10).
(c) Disconnect the hose (5) from the port of the instrument.
(d) Remove the mounting screws (3); hold the instrument (2).
(e) Remove the instrument (2) from the panel.
(f) Put the caps on the hose and instrument port.

(4) Altimeter installation:

WARNING

PAY ATTENTION TO THE CORRECT PLUGGING OF THE PORTS AND HOSES AND CORRECT PLUMBING OF THE HOSES!

(a) Remove the caps from the instrument port and hose.
(b) Calibrate the instrument as required.
(c) Put the instrument (2, Fig. 39-10) in position in the panel (7).
(d) Install the mounting screws (3).
(e) Connect the hose (5) to the port in the instrument (2) and secure it with clamp (4).
(f) Carry out a pitot-static leak test (Chapter 34-10).
(g) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).



1 – Airspeed indicator
2 – Altimeter
3 – Screw M4 x 10
4 – Spring clamp ø9
5 – Static pressure hose
6 – Total pressure hose
For information:
7 – Left instrument panel

Fig. 39-10 Airspeed Indicator, Altimeter Removal / Installation

J. Vertical speed indicator

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Oetiker pliers- Crimping pliers	1 pc
Persons	1

Tab. 39-10 Recommended tools, materials, persons and documentation

(1) Vertical speed indicator removal:

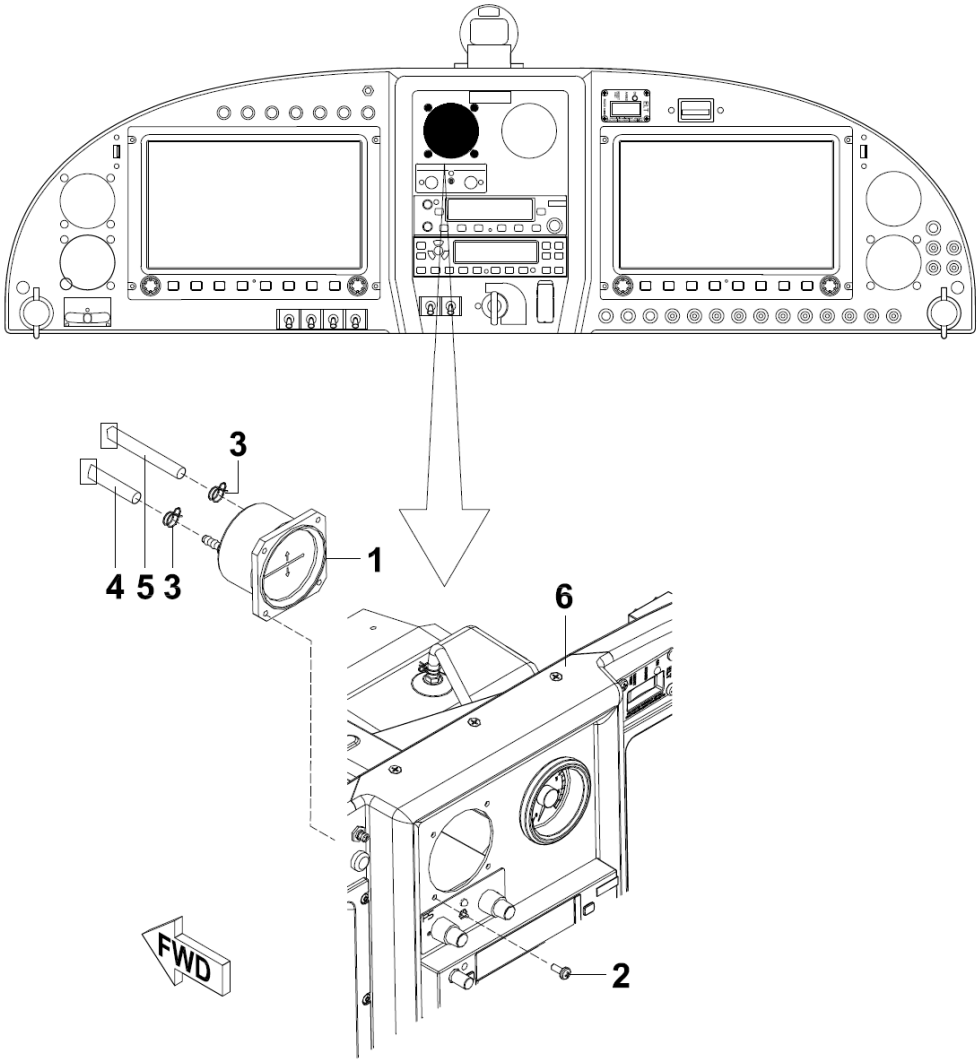
(a) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
(b) Remove the clamps (3, Fig. 39-11).
(c) Disconnect the hoses (4; 5) from the ports of the instrument (1).
(d) Remove the mounting screws (2); hold the instrument (1).
(e) Remove the instrument (1) from the panel.
(f) Put the caps on the hoses and instrument ports.

(2) Vertical speed indicator installation:

WARNING

PAY ATTENTION TO THE CORRECT PLUGGING OF THE PORTS AND HOSES AND CORRECT PLUMBING OF THE HOSES!

(a) Remove the caps from the instrument port and hoses.
(b) Put the instrument (1, Fig. 39-11) in position in the panel (6).
(c) Install mounting screws (2).
(d) Connect the hoses (4; 5) to the ports of the instrument (1) and secure them with clamps (3).
(e) Carry out a pitot-static leak test (Chapter 34-10).
(f) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).



1 – Airspeed indicator
2 – Screw M4 x 10
3 – Spring clamp ø9
4 – Differential pressure hose
5 – Static pressure hose

For information:

6 – Central instrument panel

Fig. 39-11 Vertical Speed Indicator Removal / Installation

K. Standby RPM indicator

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

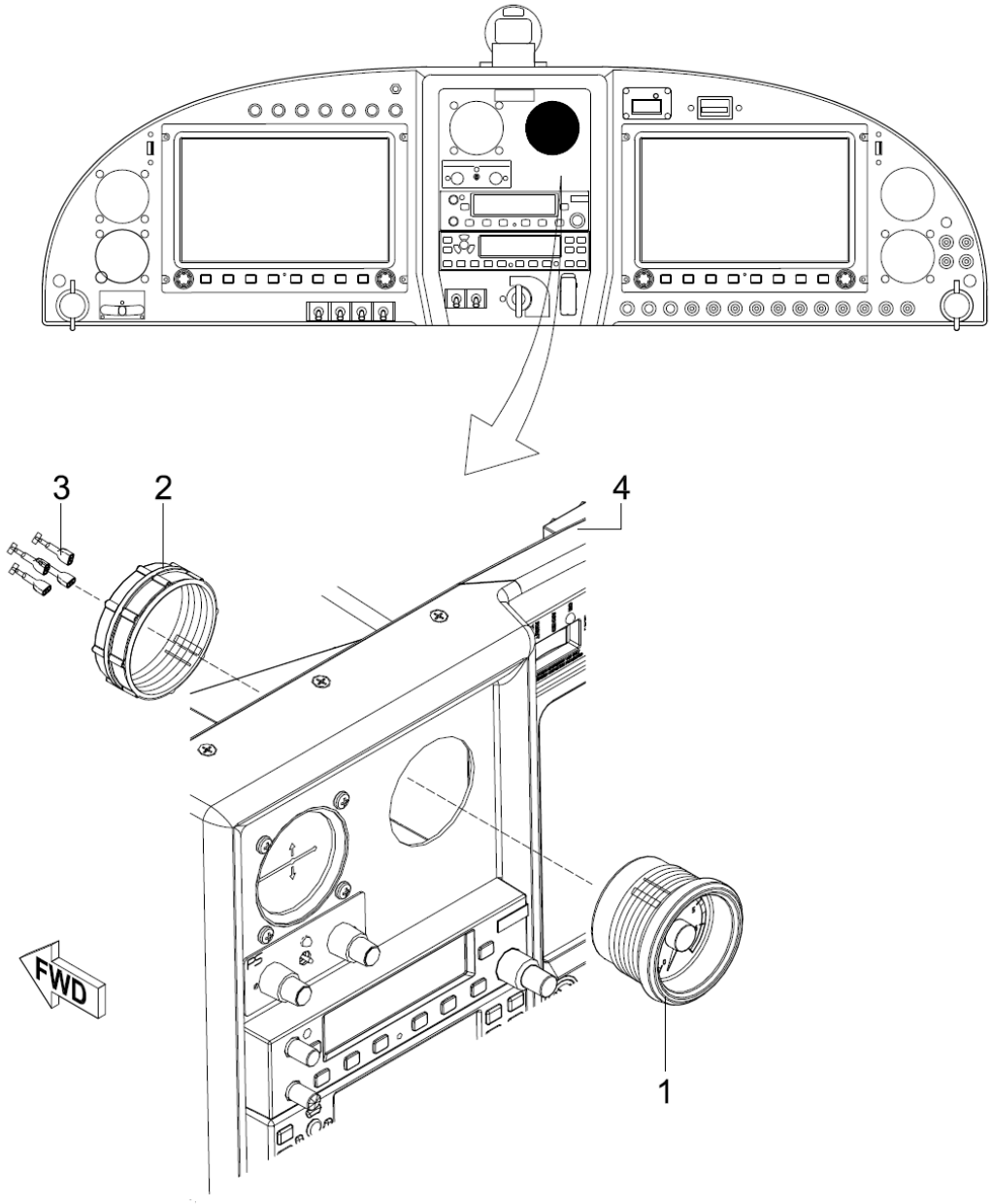
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Aircraft Wiring Manual (Doc. No. AS-AWM-01-000)	-
Persons	1

Tab. 39-11 Recommended tools, materials, persons and documentation

(1) Standby RPM indicator removal:
- (a) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (b) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (c) Disconnect the connectors (3, Fig. 39-12) from the instrument.
- (d) Remove the retaining ring (2) from the instrument.
- (e) Remove the instrument (1) from the panel.

(2) Standby RPM indicator installation:
- (a) Put the instrument (1, Fig. 39-12) in position in the panel (4).
- (b) Put the retaining ring (2) onto the instrument (1); turn the retaining ring clockwise until the instrument is tight in position.
- (c) Connect the connectors (3) to the instrument.
- (d) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Standby RPM indicator
2 – Retaining ring
3 – Electrical connector

For information:
4 – Instrument panel center section

Fig. 39-12 Standby RPM Indicator Removal / Installation

L. Propeller regulator PR1-P

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Persons	1

Tab. 39-11 Recommended tools, materials, persons and documentation

(3) Propeller regulator PR1-P removal:

(f) Make sure that the **MASTER SWITCH** is set to **OFF**.

(g) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).

(h) Disconnect the connector (2, Fig. 39-13) from the instrument.

(i) Remove the mounting screws (3); hold the instrument (1).

(j) Remove the instrument (1) from the panel.

(4) Propeller regulator PR1-P installation:

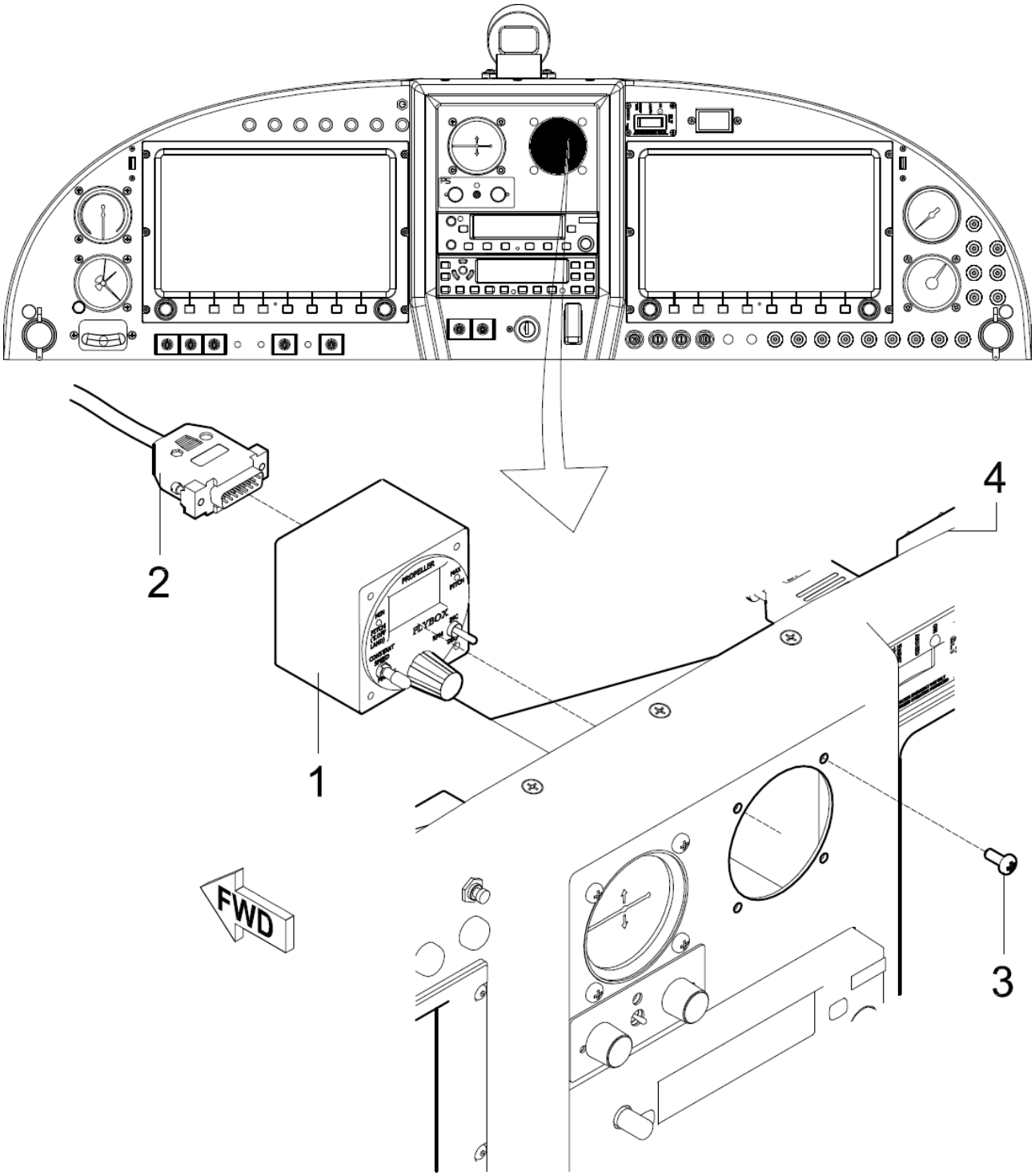
(a) Put the instrument (1, Fig. 39-13) in position in the panel (4).

(b) Install mounting screws (3).

(c) Connect the connector (2) to the instrument.

(d) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).

(e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Propeller regulator PR1-P
2 – Electrical connector
3 – Screw M4 x 10

For information:
4 – Instrument panel center section

Fig. 39-13 Propeller regulator PR1-P Removal / Installation

M. Flight hours counter

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

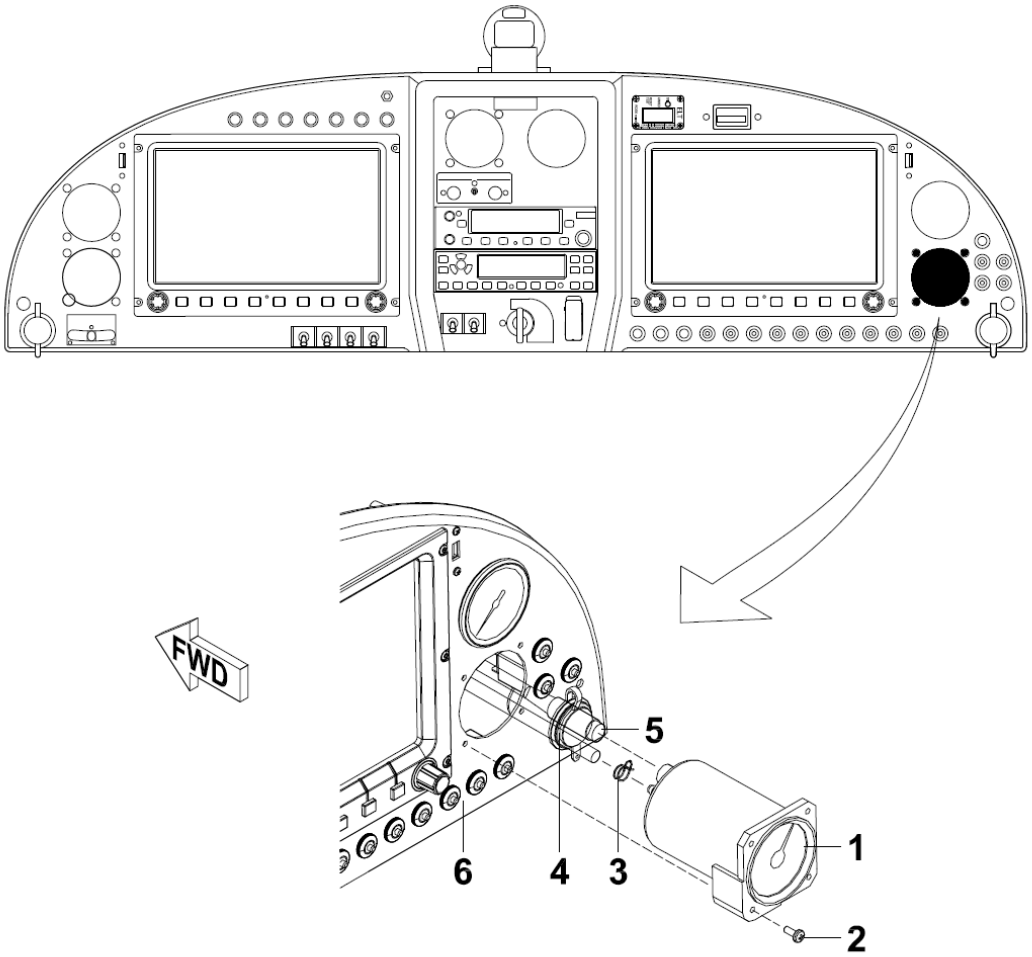
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Oetiker pliers- Crimping pliers	1 pc
Persons	1

Tab. 39-12 Recommended tools, materials, persons and documentation

(1) Flight hours counter removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (c) Disconnect the connector (5, Fig. 39-14) from the instrument.
- (d) Remove the clamp (3).
- (e) Disconnect the hose (4) from the port of the instrument.
- (f) Remove the mounting screws (2); hold the instrument (1).
- (g) Remove the instrument (1) from the panel.
- (h) Put the caps on the hose and instrument port.

(2) Flight hours counter installation:
- (a) Remove the caps from the instrument port and hoses.
- (b) Put the instrument (1, Fig. 39-14) in position in the panel (6).
- (c) Install mounting screws (2).
- (d) Connect the hose (4) to the port of the instrument (1) and secure it with clamp (3).
- (e) Connect the connector (5) to the instrument (1).
- (f) Carry out a pitot-static leak test (Chapter 34-10).
- (g) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (h) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Flight hours counter
2 – Screw M4 x 10
3 – Spring clamp ø9
4 – Static pressure hose
5 – Electrical connector
For information:
6 – Right instrument panel

Fig. 39-14 Flight Hours Counter Removal / Installation

N. Standby bank indicator

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Wrench 7	1 pc
Persons	1

Tab. 39-13 Recommended tools, materials, persons and documentation

(1) Standby bank indicator removal:

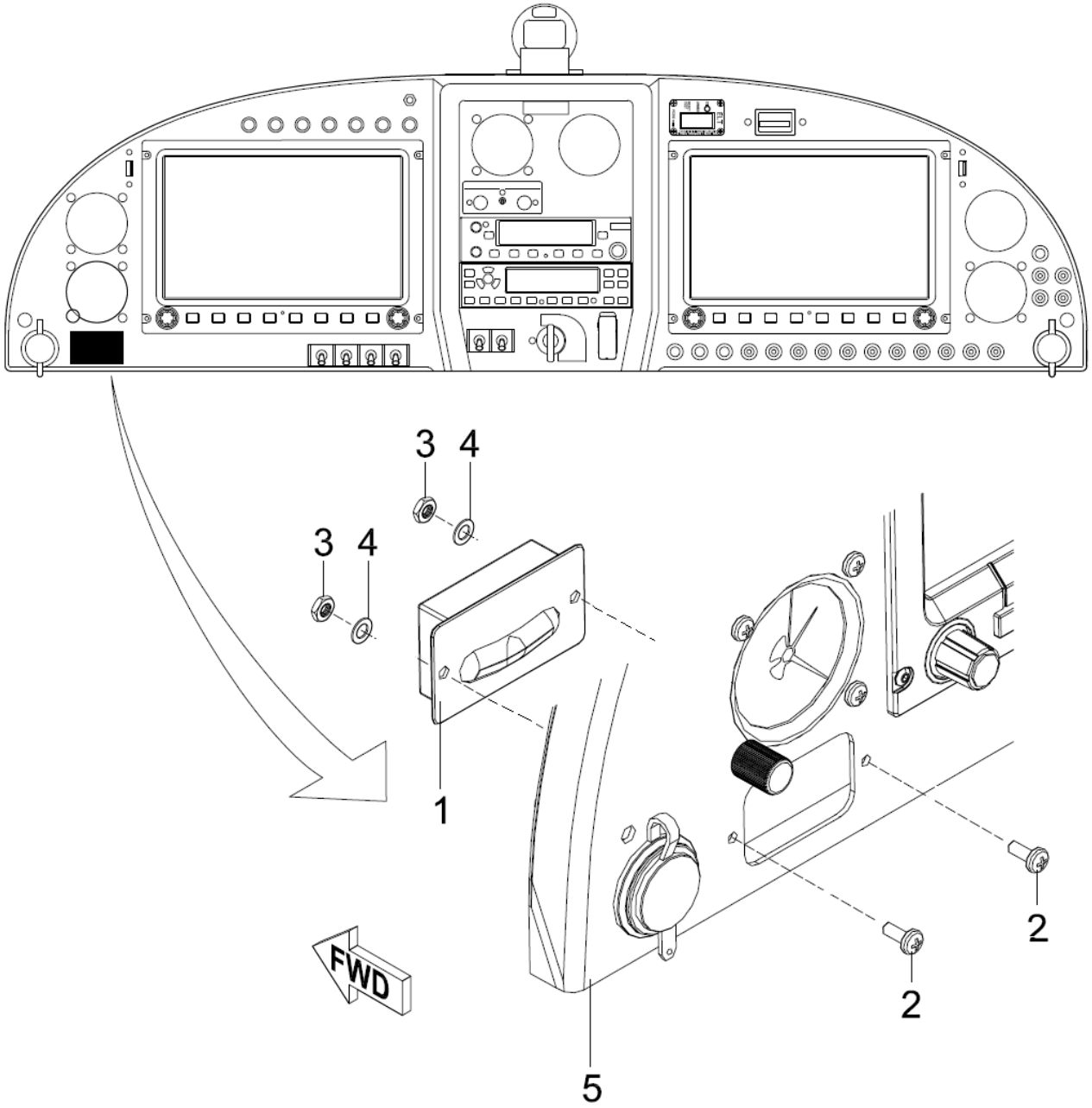
(a) Remove the mounting nuts (3, Fig. 39-15), washers (4) and screws (2).

(b) Remove standby bank indicator (1).

(2) Standby bank indicator installation:

(a) Place the standby bank indicator (1, Fig. 39-15) to opening on the left side of the instrument panel (5) and attach it with screws (2), washers (4) and nuts (5); do not tighten them.

(b) Set the aircraft to the horizontal position with lift jacks and spirit level (see Chapter 08-10). Set standby bank indicator (1) to horizontal position and tighten the nuts (5).



1 – Bank indicator
2 – Screw M4 x 10
3 – Self-locking nut M4
4 – Washer ø4.3 x 9 x 0.8
For information:
5 – Instrument panel

Fig. 39-15 Standby Bank Indicator Removal / Installation

O. SV-D1000 display

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Hex key 5/64”	1 pc
Persons	1

Tab. 39-14 Recommended tools, materials, persons and documentation

WARNING

UNAUTHORIZED ENTRY TO THE SYSTEM SETTINGS AND A FAILURE TO FOLLOW PROCEDURES FOR SYSTEM ACTUALIZATION MAY CAUSE INCORRECT FUNCTIONALITY OR TOTAL FAILURE OF THE WHOLE SKYVIEW SYSTEM!

CAUTION

RANDOM AND UNAUTHORIZED MANIPULATION OF THE SKYVIEW SYSTEM SETTINGS IS PREVENTED BY THE SYSTEM LOCK FEATURES AND BY A PASSWORD PROHIBITING AN ACCESS TO THE SYSTEM SETTINGS AND TO THE ACTUALIZATION FUNCTIONS. MAP DATABASES ACTUALIZATION AND DATA EXPORT FROM SKYVIEW SYSTEM IS LEFT ACCESSIBLE. THE SOFTWARE CAN BE CHANGED ONLY BY A PERSON WITH INDEPENDENT CERTIFYING STAFF QUALIFIED IN ACCORDANCE WITH PART-66 OR EQUIVALENT CATEGORY B2, OR HIGHER AVIONIC APPROVAL, OR SEND DEVICE TO MANUFACTURER.

NOTE

Removal / installation are the same for both displays.

(1) SV-D1000 display removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (c) Remove the screws (5, Fig. 39-16), remove the consoles (6) and carefully pull out the display (1).
- (d) Disconnect the connectors (2; 3; 4) from the display (1).
- (e) Install the protective covers on the rear connectors of the display (1).

(2) SV-D1000 display installation:

(a) Remove the protective covers from the rear connectors of the display (1).

(b) Connect the connectors (2; 3; 4, Fig. 39-16) to the display (1).

(c) Put the display (1) to the instrument panel (7) and fasten it by means of the screws (5) and consoles (6).

(d) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).

(e) Set **MASTER SWITCH** to **ON** position and carry out an operational test.

(3) SV-D1000 display adjustment / test:

CAUTION

DURING THE ACTUALIZATION PROCEDURE, CONSTANT ELECTRICAL SUPPLY HAS TO BE MAINTAINED AND SECURED AND THE CONNECTED USB FLASH DRIVES CANNOT BE UNPLUGGED NOR MANIPULATED.

Dynon Avionics provides a free-of-charge upgrade of a firmware for all Dynon's products and is continuously adding new functions to these products and enhances its properties. These activities are monitored by aircraft manufacturer which also evaluates whether the last Dynon firmware versions is compatible with aircraft manufacturer SkyView settings and through the Mandatory Service Bulletin issuance (newest firmware version publication) aircraft manufacturer will inform aircraft operators regarding the related system changes and actualization procedures to update SkyView system.

SkyView SV-D1000 display firmware upgrade automatically updates all related modules connected to the internal network with the SkyView displays. That's why all devices connected within the system have to be turned on during the actualization procedure. The firmware actualization has to be performed separately on each SV-D1000 display. The actualization procedure requires to copy all upgrade related files to the SkyView display from a given USB flash drives (separately for each display due to different setting of each display) which have to be plugged into the related USB ports (**LH D1000**, **RH D1000**).

Map Databases updates are not controlled by aircraft manufacturer Mandatory Service Bulletin. Publication of the Map Databases new versions is to be monitored entirely by an aircraft owner / operator. A free-of-charge Terrain Databases updates provided by Dynon Avionics (REG-04-EUROPE HIRES, WORLD WIDE TERRAIN-LOW RES, WORLD WIDE TERRAIN-VERY LOW RES) are needed to be performed separately on each SkyView screen. A free-of-charge default Map Database updates provided by Dynon Avionics (BASE MAP – EUROPE) and a paid updates of the Aviation and Obstacle Databases provided by PocketFMS and Jeppesen (AVDATA and OBDATA) are performed on one screen only.

The second screen will be automatically synchronized through the internal network, once it has been activated.

A recommended 4GB USB flash drive intended for the files transfer during the actualization procedure is supplied with every SkyView display SV-D1000.

Update of Dynon SkyView (firmware actualization or settings update) by means of .duc file perform as follows:

(a) Save the file in .duc format to an USB flash disc.

NOTE

The .duc file must be saved in a root folder on an USB flash disc, otherwise the file will not be displayed in the Dynon SkyView menu.

(b) Connect the aircraft to the external power source.

(c) Set **MASTER SWITCH** to **ON** position and wait until Dynon SkyView turns on.

(d) Insert the USB flash disc into the appropriate USB connector located on the instrument panel (LH-D1000, RH-D1000).

(e) Press and hold the function keys “7” and “8” simultaneously until the “SYSTEM SOFTWARE” menu shows up.

(f) Select the item “LOAD FILE” and enter the menu.

(g) Select the .duc file and press the function key “LOAD” and then “YES”.

NOTE

The content of .duc file will be installed. During installation the system may reboot automatically or will require restart to appear the changes. If a warning message is shown during the installation, refer to “Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q” or later for additional information or contact the aircraft manufacturer.

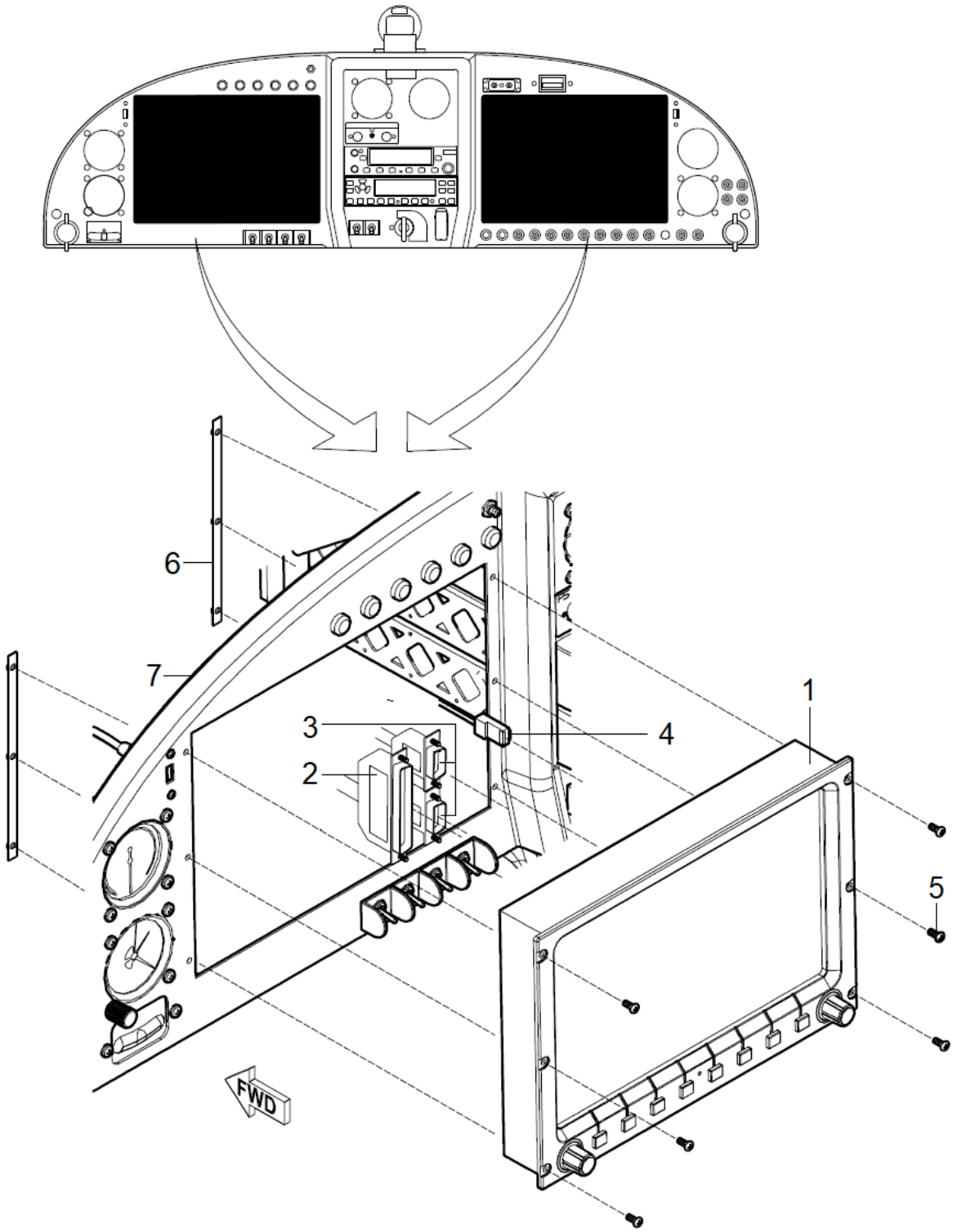
(h) Press “DONE” and “EXIT” to leave the menu.

(i) Remove the USB flash disc from the USB connector.

(j) Restart Dynon SkyView.

(k) Check if the changes appear.

(l) Set **MASTER SWITCH** to **OFF** position and disconnect the aircraft from external power source (see Chapter 24).



1 – SV-D1000 display
2 – DB37 display connector
3 – SkyView network connector
4 – Ethernet connector
5 – Screw M3 x 16
6 – Skyview console
For information:
7 – Instrument panel

Fig. 39-16 SV-D1000 Display Removal / Installation

P. PM3000 intercom

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Persons	1

Tab. 39-15 Recommended tools, materials, persons and documentation

(1) PM-3000 intercom removal:
- (a) Set **MASTER SWITCH** to **OFF** position.
- (b) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (c) Disconnect the connector (5, Fig. 39-17) from the unit (1).
- (d) Remove the mounting screws (4), knobs (2) and face plate (3); hold the unit.
- (e) Remove the unit (1) from the instrument panel (6).

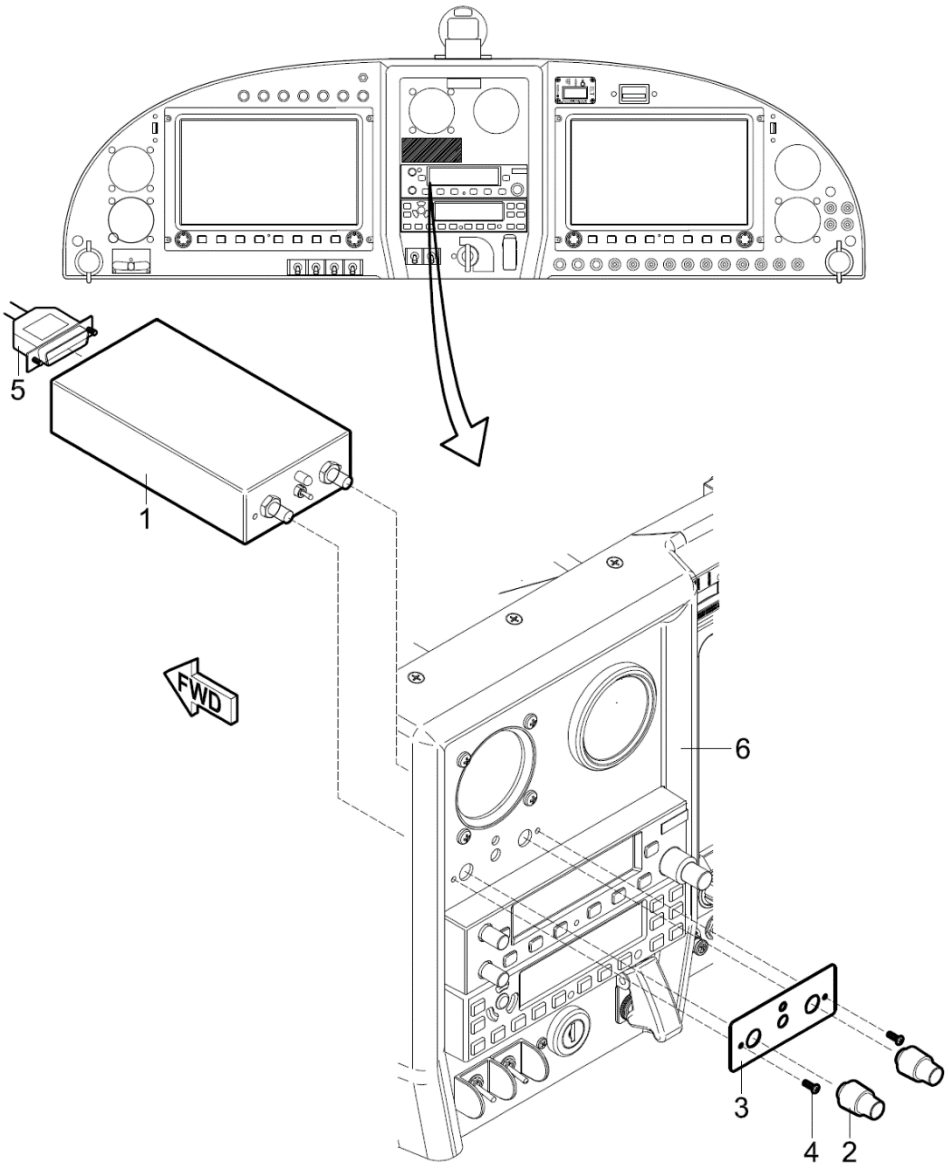
(2) PM-3000 intercom installation:
- (a) Insert the unit (1, Fig. 39-17) from behind the instrument panel (6), aligning the holes for knobs, LED, and switch; hold the unit.
- (b) Place the faceplate (3) over the knob shafts and install attaching screws (4).
- (c) Install knobs (2) over the volume and squelch control shafts.
- (d) Connect the connector (5) to the unit.
- (e) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (f) Set **MASTER SWITCH** to **ON** position.
- (g) Carry out a function test.

(3) PM-3000 intercom adjustment / function test:
- (a) Apply power to the aircraft and avionics.
- (b) Plug headsets into the pilot and co-pilot positions.
- (c) Verify that the pilot position can transmit and receive with the intercom in the OFF position (left hand knob controls on/off by push on-push off).
- (d) Push the volume knob to switch the PM3000 on. Rotate the volume clockwise, about half way. Verify that the **Pwr/Xmt** light comes on green. If the LED is blue (or red, depending upon serial number), immediately switch off the avionics, and troubleshoot the PTT installation.
- (e) Verify that the pilot can transmit and receive on the communications transceivers.
- (f) Verify proper intercom operation for pilot and co-pilot.

(g) Verify proper transmit and receive operation on the co-pilot position, noting that the co-pilot PTT switch allows proper transmission.

(h) Verify proper Intercom system operation in the ALL, ISO modes.

(i) Verify that the intercom system does not adversely affect any other aircraft system by systematically switching the unit on and off, while monitoring the other avionics and electrical equipment on the aircraft.



1 – Intercom
2 – Knob, outer and inner
3 – Face plate
4 – Screw of intercom
5 – Electrical connector

For information:

6 – Central instrument panel

Fig. 39-17 PM3000 Intercom Removal / Installation

Q. Radio Garmin GNC 255A NAV/COMM

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Allen wrench 3/32”	1 pc
Persons	1

Tab. 39-16 Recommended tools, materials, persons and documentation

(1) Radio Garmin GNC 255A NAV/COMM removal:

(a) Set **MASTER SWITCH** to **OFF** position.

(b) Put a 3/32 Allen wrench into the access hole (2, Fig.39-18) for the locking screw; engage the screw.

(c) Turn the screw anticlockwise until the unit (1) disengages from the mounting rack.

CAUTION

DO NOT PULL ON THE KNOBS. DO NOT PRY THE FACE-PLATE. YOU CAN DAMAGE THE UNIT.

DO NOT TOUCH THE CONNECTOR CARD AT THE REAR OF THE UNIT. THE ELECTROSTATIC CHARGE ON YOUR BODY CAN DAMAGE THE UNIT.

(d) Pull gently on the sides of the unit (1) to remove it from the mounting rack (3).

(e) Install the protective covers on the rear connectors of the unit.

(2) Radio Garmin GNC 255A NAV/COMM installation:

(a) Remove the protective covers from the connectors on the unit (1, Fig. 39-18).

(b) Looking at the bottom of the unit, make sure the front lobe of the locking mechanism is in vertical position.

(c) Slide the unit (1) into the rack (3). Engage the locking screw so that the latch front lobe touches the rack.

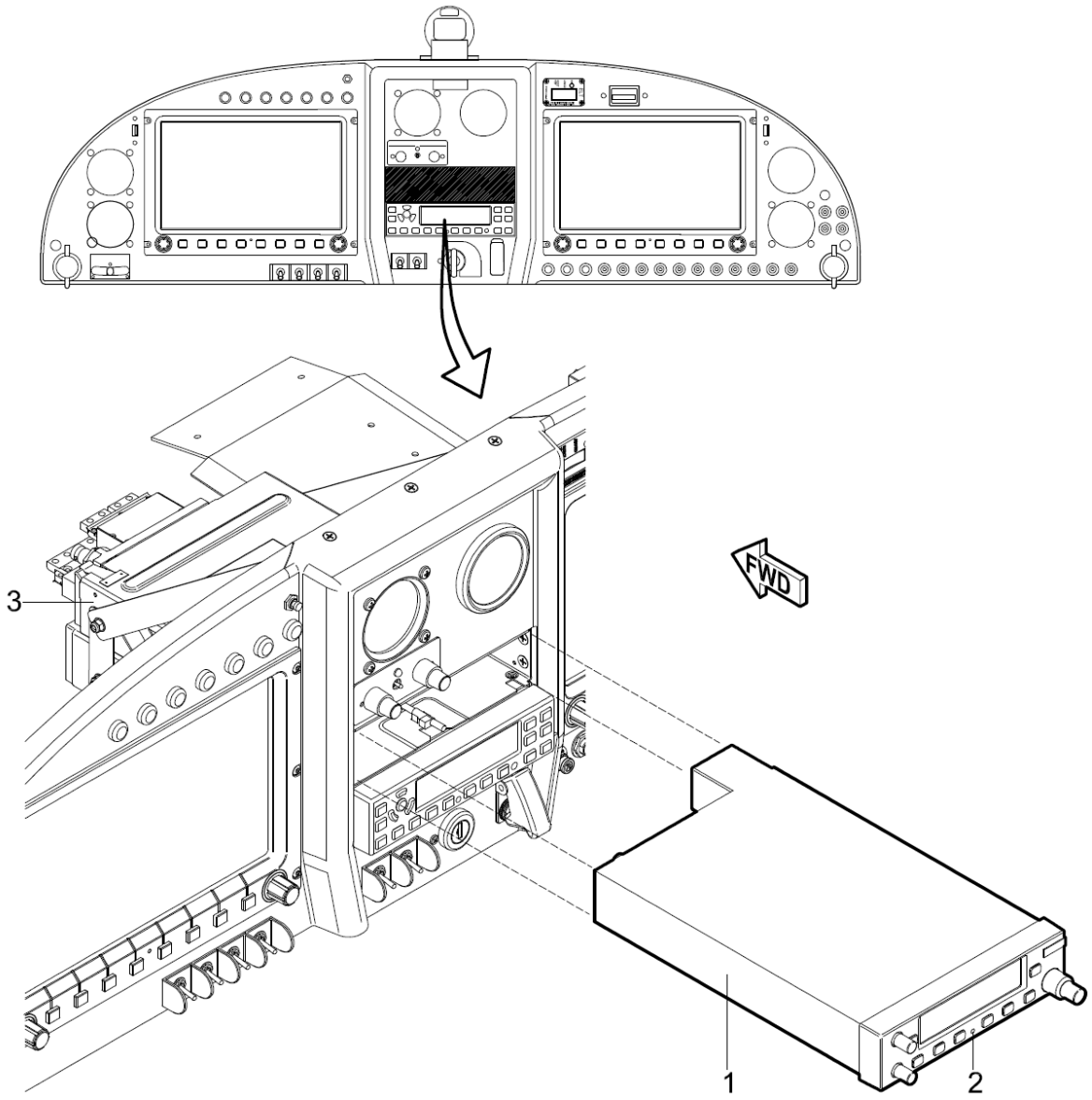
(d) Turn the locking screw clockwise so that the rear lobe engages the mounting rack.

(e) Continue to turn the screw until the unit is fully installed in the mounting rack.

CAUTION

DO NOT OVER-TIGHTEN THE LOCKING SCREW. YOU CAN DAMAGE THE LOCKING MECHANISM.

(f) Set **MASTER SWITCH** to **ON** position and carry out setting (as necessary) and operational test - refer to the Garmin GTR 225 / GNC 255 TSO Installation Manual, P/N 190-01182-02 (revision B or later).



1 – GNC 255A NAV/COMM unit
2 – Access hole for locking screw

For information:
3 – Mounting rack

Fig. 39-18 Garmin GNC 255A NAV/COMM Removal / Installation

R. Transponder Garmin GTX 328

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Allen wrench 3/32”	1 pc
Persons	1

Tab. 39-17 Recommended tools, materials, persons and documentation

(1) Transponder Garmin GTX 328 removal:

(a) Set **MASTER SWITCH** to **OFF** position.

(b) Put a 3/32 Allen wrench into the access hole (2, Fig. 39-19) for the locking screw; engage the screw.

(c) Turn the screw counter-clockwise until the unit (1) disengages from the mounting rack.

CAUTION

DO NOT PULL ON THE KNOBS. DO NOT PRY THE FACE-PLATE. YOU CAN DAMAGE THE UNIT.

DO NOT TOUCH THE CONNECTOR CARD AT THE REAR OF THE UNIT. THE ELECTROSTATIC CHARGE ON YOUR BODY CAN DAMAGE THE UNIT.

(d) Pull gently on the sides of the unit (1) to remove it from the mounting rack (3).

(e) Install the protective covers on the rear connectors of the unit.

(2) Transponder Garmin GTX 328 installation:

(a) Remove the protective covers from the connectors on the unit (1, Fig. 39-19).

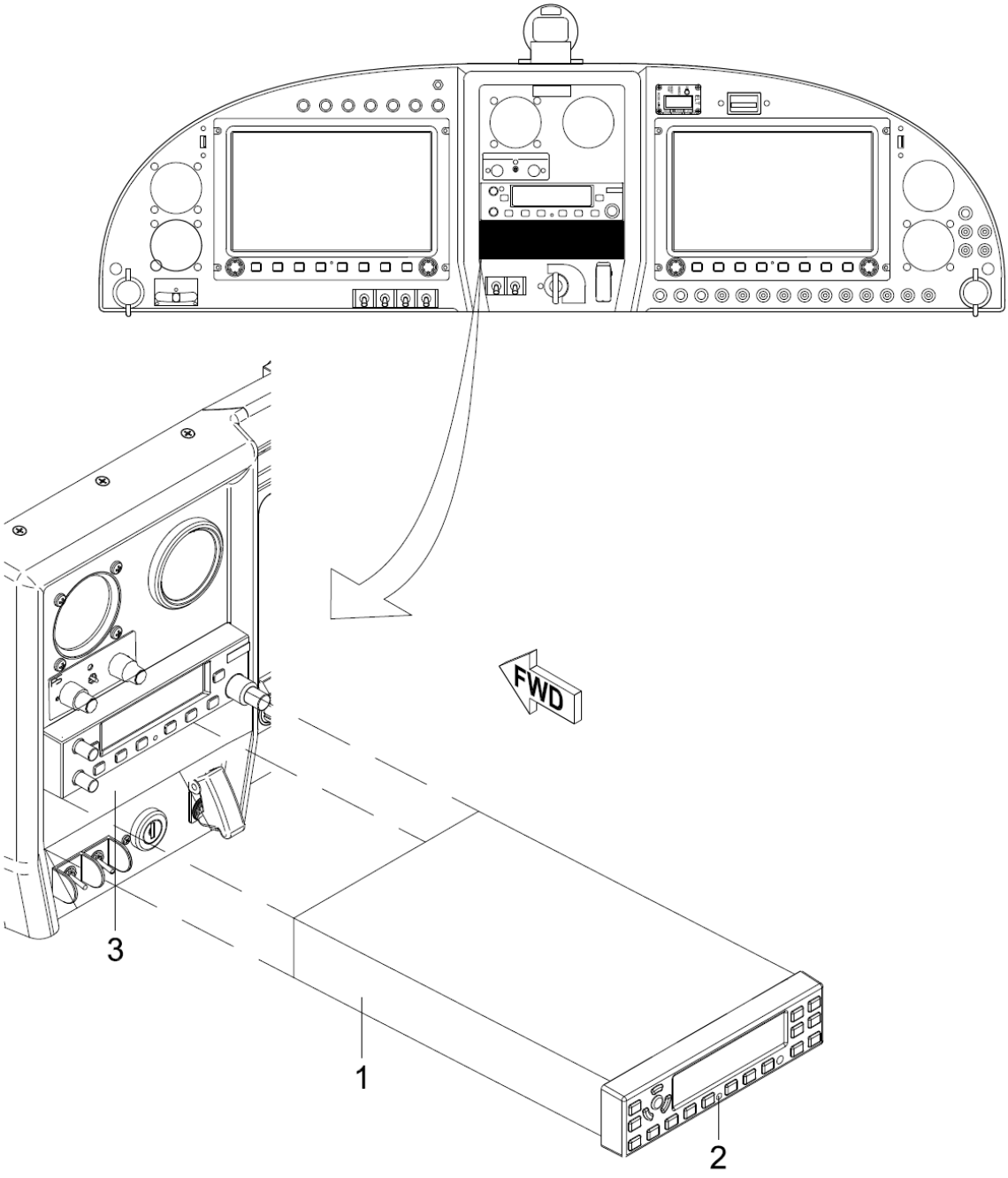
(b) Looking at the bottom of the unit, make sure the front lobe of the locking mechanism is in a vertical position.

(c) Slide the unit (1) into the rack (3). Engage the locking screw so that the latch front lobe touches the rack. Turn the locking screw clockwise so that the rear lobe engages the mounting rack. Continue to turn the screw until the unit is fully installed in the mounting rack.

CAUTION

DO NOT OVER-TIGHTEN THE LOCKING SCREW. YOU CAN DAMAGE THE LOCKING MECHANISM.

(d) Set **MASTER SWITCH** to **ON** position and carry out setting (as necessary) and operational test - refer to the Garmin GTX 328 Transponder Installation Manual, P/N 190-00420-04 (revision C or later).



1 – Transponder GTX 328 (unit)
2 – Access hole for locking screw

For information:
3 – Mounting rack (for GTX 328)

Fig. 39-19 Transponder Garmin GTX 328 Removal / Installation

S. Magnetic compass

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Non-magnetic Philips screwdriver	1 pc
Non-magnetic wrench 7	1 pc
Persons	1

Tab. 39-18 Recommended tools, materials, persons and documentation

WARNING

WHEN PERFORMING MAINTENANCE PRACTICES ON THE MAGNETIC COMPASS, USE A NON-MAGNETIC OR PLASTIC SCREWDRIVER.

(1) Magnetic compass removal:
   (a) Remove screws and carefully lift the instrument panel cover (Chapter 39-10, 2.A.(1)).
   (b) Remove the mounting nuts (3, Fig. 39-20), washers (4) and screws (2).
   (c) Remove compass (1).

(2) Magnetic compass installation:
   (a) Place the compass (1, Fig. 39-20) on the instrument panel cover (5); hold the compass and attach it with screws (2), washers (4) and nuts (3).
   (b) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).

(3) Magnetic compass adjustment / test:

Carry out a test for correct operation of the compass (compass swing):

- After replacing a major component
- After replacing the compass
- After modification to the aircraft.

Compass swing must be performed on the approved compass swing area, which is at least 100 m (300 ft) from steel structures, electric leading or other over ground or underground steel equipment or objects.

Compass swing is carried out twice. During the individual test different aircraft electrical equipment are switched on as mentioned in the form (Fig. 39-21).

If the compass north is westward from magnetic north, the deviation is westward, i.e. negative. If the compass north is eastward from magnetic north, the deviation is eastward, i.e. positive.

CAUTION

USE ONLY NON-MAGNETIC TOOLS TO ADJUST THE COMPASS.

DO NOT WEAR OR CARRY METALLIC MATERIAL (WATCHES, BRACELETS ETC.) WHEN YOU ADJUST THE COMPENSATING MAGNETS OR OPERATE THE LAND COMPASS. METALLIC MATERIAL CAN CAUSE ERRORS.

(4) Magnetic compass swing procedure:

(a) Place the aircraft on the approved compass swing area.

(b) Set appropriate electrical equipment to ON (see form Fig. 39-21).

(c) Align the aircraft to magnetic north “N”. Adjust the N-S compensator so that the compass indicates a heading of 0 degrees.

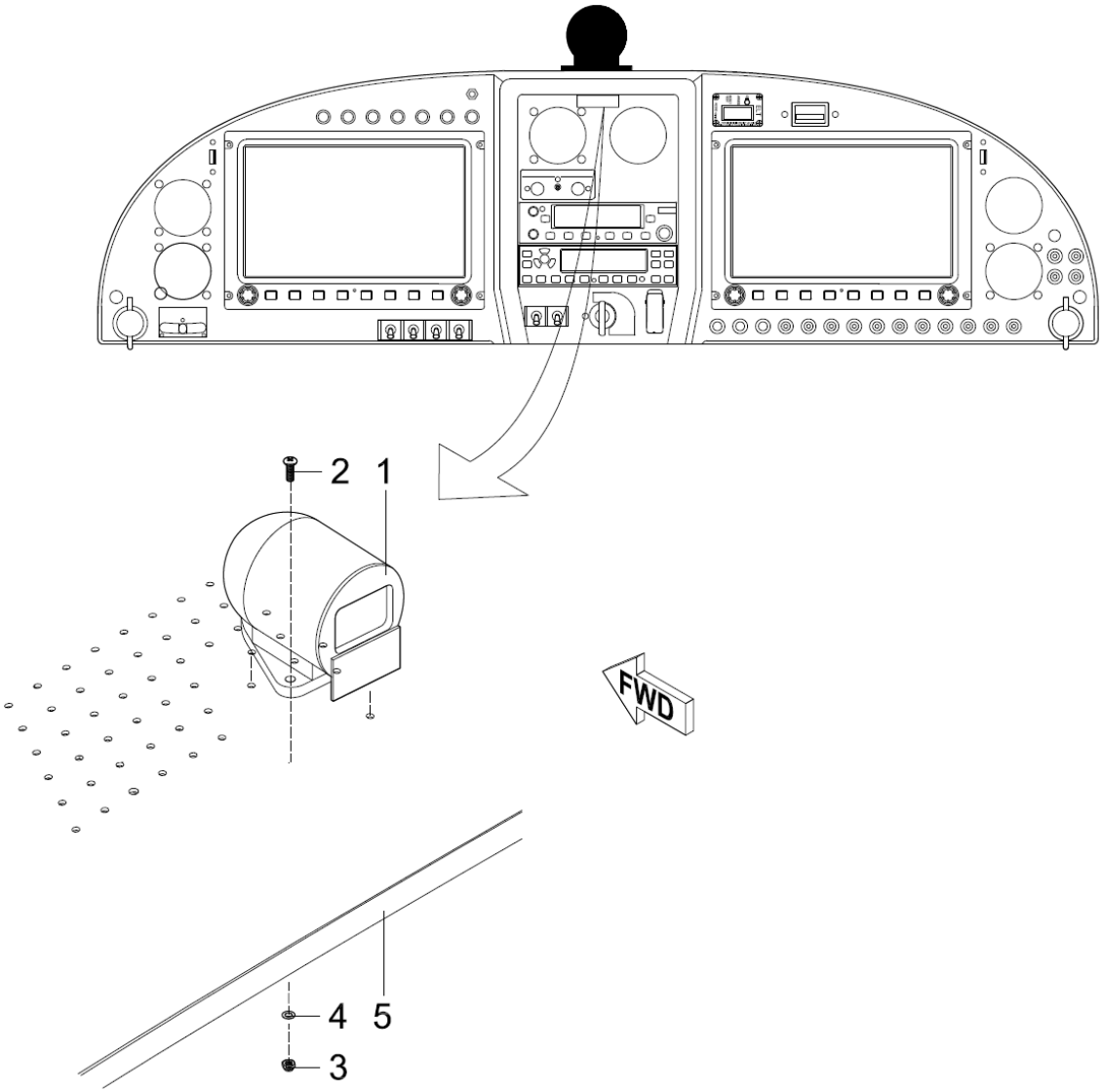
(d) Align the aircraft to magnetic east “E”. Adjust the E-W compensator so that the compass indicates a heading of 90 degrees.

(e) Align the aircraft to magnetic south “S”. Reduce the found out deviation to the half value by the N-S compensator.

(f) Align the aircraft to magnetic west “W”. Reduce the found out deviation to the half value by E-W compensator.

(g) Turn the aircraft through 360 degrees by grades in magnetic compass compensation record. Record the deviation at each 30 degrees. Prepare a deviation table that shows the corrections that must be applied to each heading. If large deviations occur when you operate electrical equipment/systems, the deviation table must also show the corrections to apply at each 30 degrees heading when the system is operated.

(h) Install the deviation table in the compass card holder below the compass.



1 – Magnetic compass
2 – Screw M4x10 aluminum
3 – Low nut M4 (brass)
4 – Washer 4.3 x 9 x 0.8 brass
For information:
5 – Instrument panel cover

Fig. 39-20 Magnetic compass Removal / Installation

MAGNETIC COMPASS COMPENSATION RECORD		
Aircraft	Type/Model: **WT9 Dynamic LSA / Club**	Serial number:
Compass	Type:	Serial number:

Conditions:	**Measurement 1** **A.** Aircraft stands on landing gear. **B.** All electrical equipment ON and operating. **C.** XPDR ON, COMM receiving.		**Measurement 2** **A.** Aircraft stands on landing gear. **B.** Switched ON only those instruments, which are necessary for VFR flight. COMM, NAV, XPDR, lights switched OFF.	
Heading	Measured	Deviation	Measured	Deviation
N 000				
030				
060				
E 090				
120				
150				
S 180				
210				
240				
W 270				
300				
330				

Notes:
Maximum allowed deviation ± 5°

General evaluation: ☐ Passed ☐ Failed

Performed by:

.....

Name, date, signature

Fig. 39-21 Compass Compensation Record

T. Ignition switches

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Socket wrench 10	1 pc
Soldering gun	1 pc
Shrink tube ø3.2 x 1.6 mm	AR
Knife	1 pc
Pliers	1 pc
Aircraft Wiring Manual (Doc. No. AS-AWM-01-000)	-
Persons	1

Tab. 39-19 Recommended tools, materials, persons and documentation

NOTE

Removal / installation are the same for both switches.

(1) Ignition switch removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Unscrew the nut (10, Fig. 39-22), remove the washers (8; 9) and pull out the switch (7).
- (e) Remove shrink tubes and unsolder the el. wires (11).

(2) Ignition switch installation:
- (a) Make sure that the battery is disconnected.
- (b) Put on the wires (11, Fig. 39-22) shrink tube, using soldering gun connect wires to the switch (7); pull the shrink tube over join.
- (c) Place the switch (7) on the back of the instrument panel.
- (d) Insert the washers (8; 9), screw and tighten the nut (10).
- (e) Connect the battery.
- (f) Install the engine cowlings (Chapter 71-10).
- (g) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (h) Carry out an operational test.

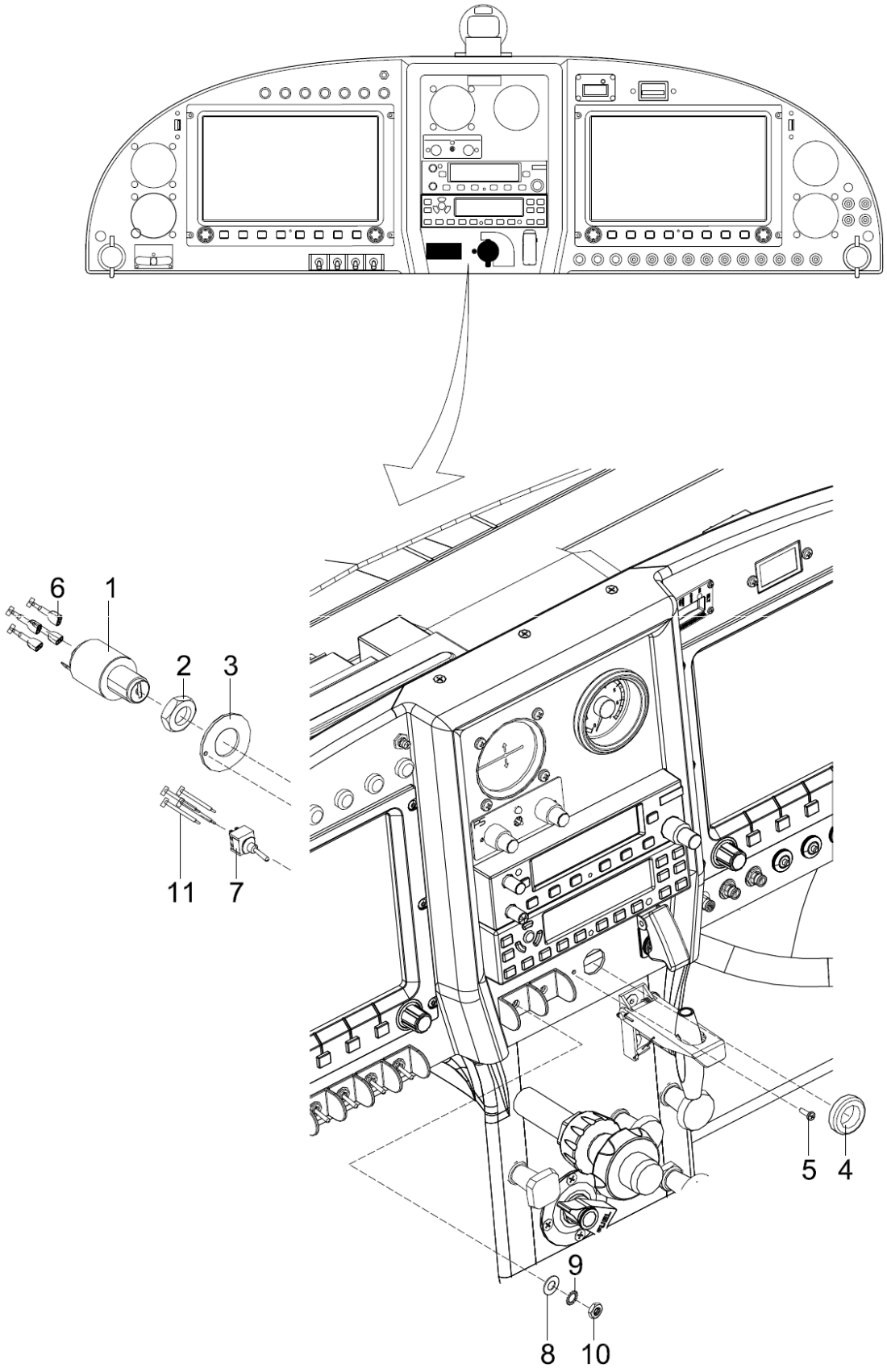


Fig. 39-22 Ignition Switches Removal / Installation (page 1 of 2)

1 – Keyed ignition switch
2 – Nut
3 – Washer of ignition switch
4 – Knurled ring
5 – Screw M3 x 10
6 – El. wires
7 – Switch
8 – Washer of switch
9 – Serrated washer
10 – Nut
11 – Wires

Fig. 39-22 Ignition Switches Removal / Installation (page 2 of 2)

U. Keyed ignition switch

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 22	1 pc
Pliers	1 pc
Philips screwdriver 2	1 pc
Aircraft Wiring Manual (Doc. No. AS-AWM-01-000)	-
Persons	1

Tab. 39-20 Recommended tools, materials, persons and documentation

(1) Keyed ignition switch removal:
- (a) Remove the engine cowlings (Chapter 71-10).
- (b) Disconnect the battery.
- (c) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (d) Remove key from the switch (1, Fig. 39-22) and disconnect the wires (6) from the switch.
- (e) Remove the screw (5) and knurled ring (4).
- (f) Pull out the switch (1) with washer (3).

(2) Keyed ignition switch installation:
- (a) Make sure that the battery is disconnected.
- (b) Connect the wires (6, Fig. 39-22) to the switch (1).
- (c) Put the switch (1) with washer (3) in position in the instrument panel.
- (d) Hold the switch and attach it with and knurled ring (4) and screw (5).
- (e) Connect the battery.
- (f) Install the engine cowlings (Chapter 71-10).
- (g) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (h) Carry out an operational test.

(3) Keyed ignition switch test:
- (a) Disconnect connector of ignition switch. Use the multimeter to check if ignition switches are in **OFF** position, wires B1-MAG1, B1-MAG2 with negative terminal, circuit is closed. When the ignition switches are switched **ON**, wires B1-MAG1, B1-MAG2 with negative terminal, circuit is open.

V. ELT remote control unit

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

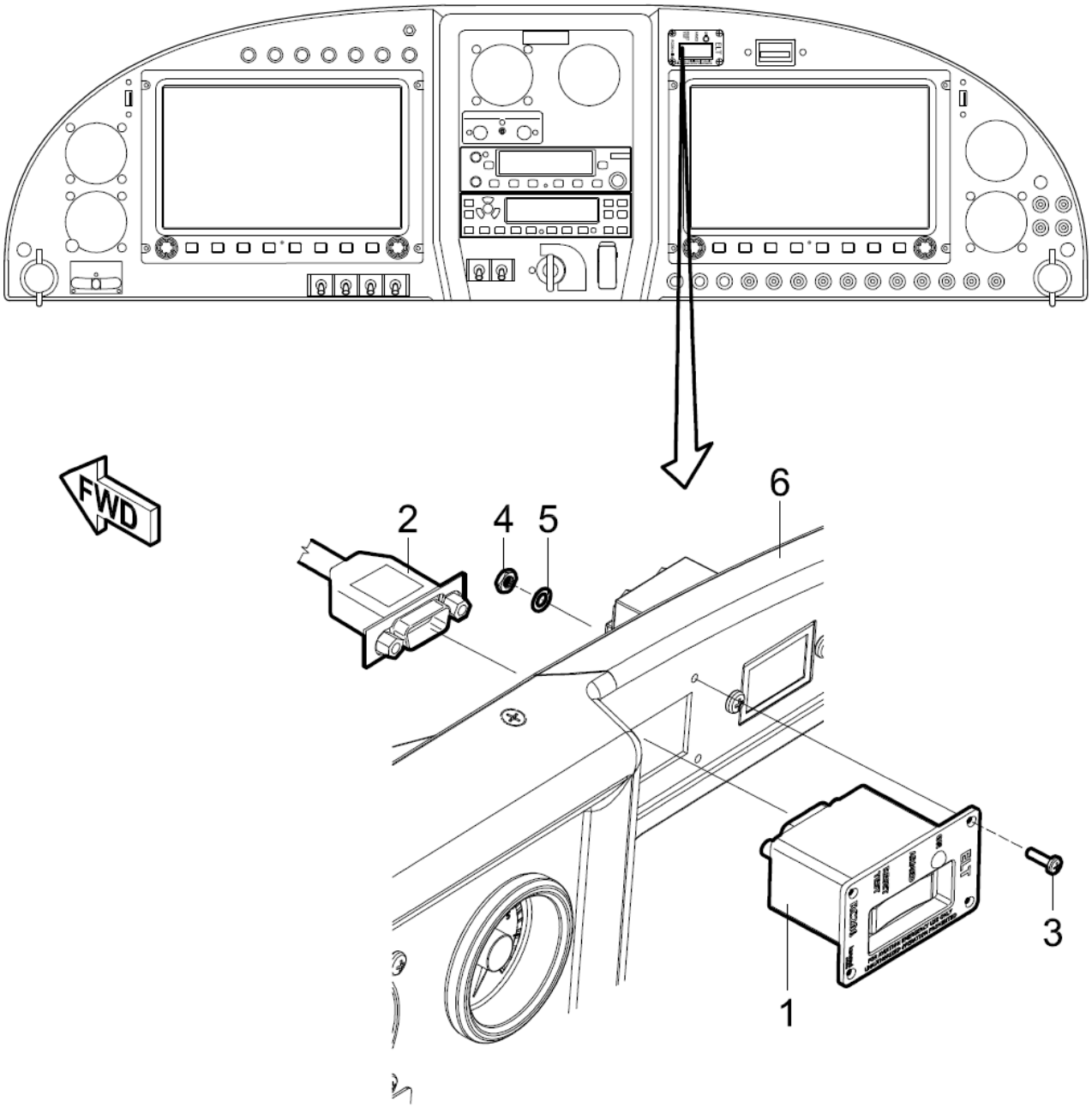
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Wrench 7	1 pc
Persons	1

Tab. 39-21 Recommended tools, materials, persons and documentation

(1) ELT remote control unit removal:
- (a) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (b) Disconnect the connector (2, Fig. 39-23) from the unit (1).
- (c) Remove mounting nuts (4), washers (5) and screws (3).
- (d) Remove the unit (1) from the instrument panel (6).

(2) ELT remote control unit installation:
- (a) Put the unit (1, Fig. 39-23) in the instrument panel (6).
- (b) Hold the unit and attach it with screws (3), washers (5) and nuts (4).
- (c) Connect the connector (2) to the unit.
- (d) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (e) Carry out an operational test - refer to the Installation and Operation Manual ELT KANNAD 406 AF-COMPACT, Doc. No. DOC08038F (Revision 05 or later) / Initial Installation Manual KANNAD AF INTEGRA, Doc. No DOC09081E (Revision 04 or later) and Operation Manual KANNAD AF INTEGRA Doc. No DOC09078E (Revision 04 or later).



1 – ELT remote unit
2 – Connector
3 – Screw M3 x 10
4 – Self-locking nut M3
5 – Washer ø3.2 x 7 x 0.5
For information:
6 – Instrument panel

Fig. 39-23 ELT Remote Control Unit Removal / Installation

W. Standby fuel pressure indicator

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

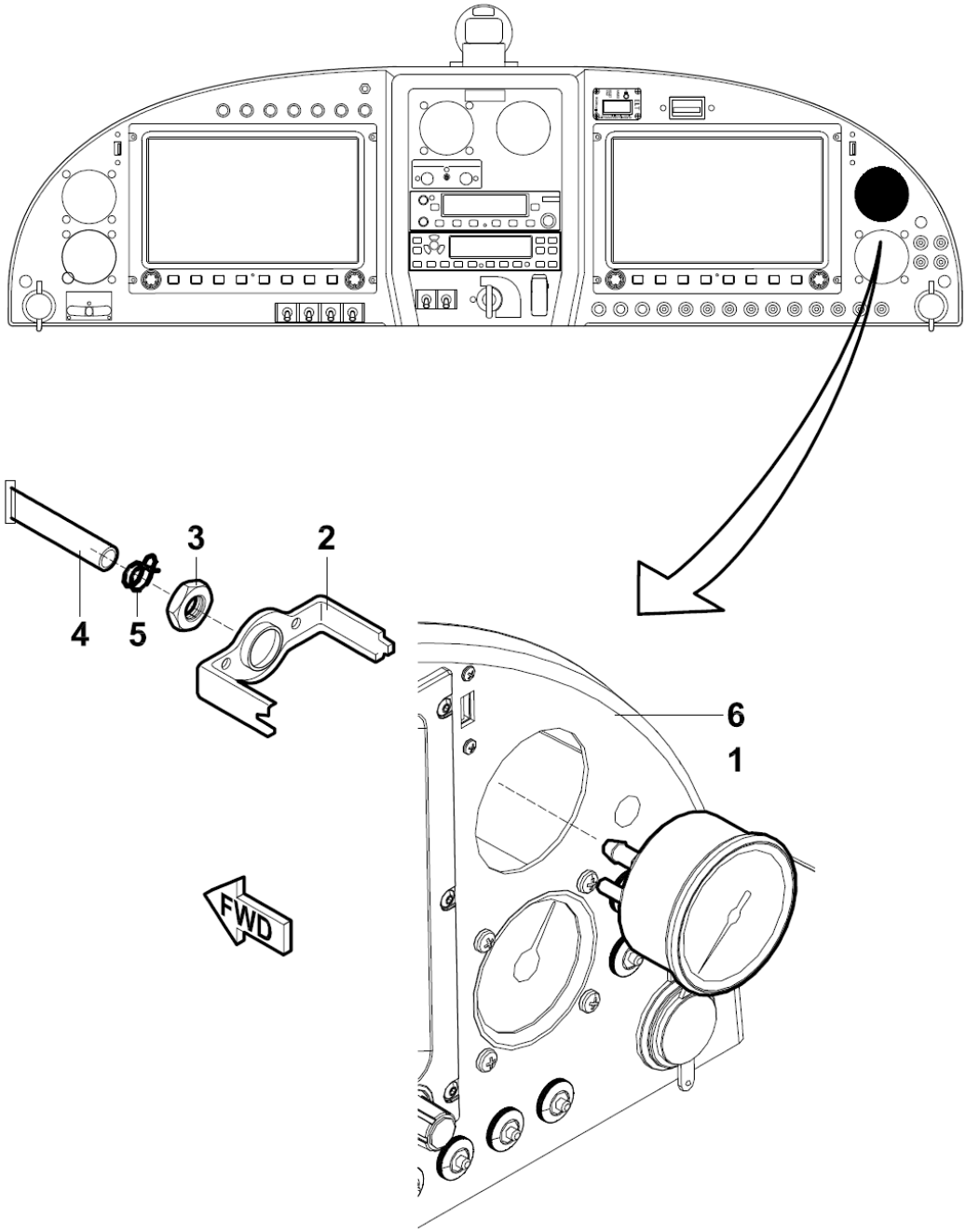
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 9	1 pc
Oetiker pliers- Crimping pliers	1 pc
Persons	1

Tab. 39-22 Recommended tools, materials, persons and documentation

(1) Standby fuel pressure indicator removal:
- (a) Remove the instrument panel cover (Chapter 39-10, 2.A.(1)).
- (b) Remove the clamp (5, Fig. 39-24) and disconnect the hose (4) from the port of the instrument.
- (c) Hold the instrument and remove the nut (3) and holder (2).
- (d) Remove the instrument (1) from the panel.
- (e) Put the caps on the hose and instrument port.

(2) Standby fuel pressure indicator installation:
- (a) Remove the caps from the instrument port and hose.
- (b) Put the instrument (1, Fig. 39-24) in position on the panel (6).
- (c) Install the holder (2) and nut (3).
- (d) Connect the hose (4) to the port of the instrument (1) and secure it with clamp (5).
- (e) Install the instrument panel cover (Chapter 39-10, 2.A.(2)).
- (f) Carry out an operational test.



1 – Standby fuel pressure indicator
2 – Holder
3 – Special nut NPT1/8
4 – Hose
5 – Spring clamp ø9

For information:

6 – Right instrument panel

Fig. 39-24 Standby Fuel Pressure Indicator Removal / Installation

This page is left blank intentionally

51 STANDARD PRACTICES AND STRUCTURES - GENERAL

CONTENTS

Chapter	Description	Page
51-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	A. General safety information	3
	B. Aircraft description	4
	C. Spare parts source	4
51-10	**REPAIRS**	**5**
	1. GENERAL	5
	2. REPAIR CLASSIFICATION	6
	A. Repair Class 1	6
	B. Repair Class 2	6
	C. Repair Class 3	6
	D. Repair Class 4	6
	3. CONSTRUCTION	6
	4. MATERIALS	7
	A. Epoxy system	7
	B. Reinforcements	8
	C. Rovings	8
	D. Foams and fillers	9
	E. Paints	9

5. REPAIR PREPARATION 10
A. Repair Class 4 10
B. Repair Class 3 10
C. Repair Class 2 11
D. Repair Class 1 12
6. PLY LAY-UP SCHEME 13
7. REPAIRS OF METAL PARTS..... 17
8. REPAIRS OF PLEXIGLASS 17
9. TEST FLIGHT AFTER REPAIR 17
A. Test flight flying time: 18
B. Aircraft inspection before a Test flight:..... 18
C. Test crew: 18

51-20 EXTERIOR FINISH REPAIR 19

1. REPAIR SURFACES 19
A. Puttying..... 19
B. Painting..... 20

51-00 GENERAL

1. INTRODUCTION

This chapter contains information and procedures applicable to all composite repairs as well as information and procedures for aircraft painting and priming. The basic elements of successful repair are; preparation of the laminate and repair material, proper mixing of resin, technique, and a complete cure cycle. If any element is not properly executed the repair will be substandard.

A. General safety information

In the production of composite parts worker is exposed to various hazardous chemicals. All used types of resins, hardeners, separators, paints, solvents are hazardous when in direct contact with skin and mucous membranes. Equally dangerous is the inhalation of the vapours. Another adverse health factor for working on composite parts is dust environment. Therefore, it is the duty to protect your health and the health of their employees. When working with chemicals, it is necessary to follow this safety information:

CAUTION

IN ALL PRODUCTION SPACES IS FORBIDDEN TO EAT, DRINK, SMOKE AND MANIPULATE WITH FIRE!

- Working clothes must not be torn and must be appropriately tight to the body. It is recommended to use long trousers and a shirt or T-shirt with long sleeves. After contact with skin chemicals threaten burns and allergies. Dangerous are stubborn stains from epoxy mixture on your clothes, they can cause scratches;
- When laminating use undamaged latex gloves, which go for wristbands. Damaged gloves immediately replace with new ones;
- When working with the materials or products that are grounded, cut or drilled, a large quantity of dust creates. Therefore, protect the airway with a respiratory protective equipment;
- When spraying, use protective clothing, respiratory protective equipment and goggles;
- Any injuries must be treated and report it to your supervisor. Do not underestimate any injury!

B. Aircraft description

The WT9 Dynamic LSA is a single engine, two seat, cantilever low wing aircraft with a cruciform tail. The primary structures consist of glass and carbon fibre composite. The aircraft is equipped with fixed tricycle undercarriage with steerable nose wheel and emergency parachute system. This aircraft is intended for sporting, recreation and tourist flying in accordance with VFR day.

C. Spare parts source

Spare parts can be ordered from www.aerospool.sk under “Products / Dynamic WT9 / Spare Parts” or writing by an e-mail spareparts@aerospool.sk.

E-mail must contain the following information:

- Aircraft S/N
- Billing address
- Shipping address (if is not the same as the billing address)
- VAT (if is registered)
- Contact person name
- Contact person phone
- List of required spare parts (part number and quantity, see current Illustrated Parts Catalogue)

NOTE

The resins can only be distributed by the personal collection.

51-10 REPAIRS

1. GENERAL

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
See Chapter 51-10, par. 4.	AR
Persons	1

Tab. 51-1 Recommended tools, materials, persons and documentation

The described procedures concern only to relatively minor damage. Large-scale repairs may be performed only by the manufacturer or authorized repair station. Sandwich shells, from which the aircraft comprises, are difficult to repair. The disclosed methods are applicable only to minor repairs of coatings sandwich shells.

Every material used for repairs must be suitable for the appropriate repair.

Before repairs provide a needed fabrics reserve in sufficient quantity. Fabrics are sensitive to moisture; therefore they need to be properly stored in a cool, dry, dark place. For proper storage, resin and fabric is necessary to follow the manufacturer's recommendations.

Abrupt changes in the thickness of the laminate should be avoided in order to prevent stress concentration. If possible, cut pieces of fabric to be oval or circular instead of rectangular shape. The transition between the repaired and undamaged area should be gradual and as smooth as possible.

Chamfering of the coarse fabric has to be in the range 1:50 to 1:100, the fine fabric has the no chamfering and must be folded.

Epoxy resins, hardeners and all kinds of fabrics are hygroscopic. In the event of increase of water content in the resin or the hardener, the epoxy composition will be cloudy and milky appearance. This composition is unusable.

A relative atmospheric humidity for lamination should be in the range of 20 to 50 %. At the relative humidity is higher than 50 %, the time to start gelation of the mixture reduces. Also increases the weight of the product due to moisture absorption of the epoxy mixture. Increased moisture during production has no significant effect on the mechanical properties of the cured product.

When the elevator, rudder, aileron and wing flaps were repaired, the static moments and weights must be checked, whether they are within the permissible range according to Tab. 51-2.

CONTROL SURFACE (PAINTED)	PERMISSIBLE WEIGHT (kg)	PERMISSIBLE STATIC MOMENT (N.cm)
Aileron LH	1.530 – 1.690	17.298 – 30.298
Aileron RH (including trim tab)	2.042 – 2.200	17.298 – 30.298
Wing flap	1.950 – 2.450	160.0 – 195.0
Elevator	1.132 – 1.338	9.198 – 20.398
Rudder	1.611 – 1.969	(-38.5) – (-31.5)

Tab. 51-2 Control Surfaces Weight and Moment Limits

2. REPAIR CLASSIFICATION

The repairs are divided according to the influence to the airworthiness of all aircraft into following classes:

A. Repair Class 1

Large damages required a partial replacement of the airframe, large repairs or repair of main structure can be carried out only by the aircraft manufacturer or a repair workshop approved by local Civil Aviation Authority. The repair procedure is not provided and must be prepared individually after damage examination.

B. Repair Class 2

Destruction of the whole shell (also the inner laminate is destroyed), however small size only.

C. Repair Class 3

Simple surface damage (only the outer laminate is damaged) and small damage of the foam filling.

D. Repair Class 4

The damages caused by the scores and the scrapes without the outer laminate damage and without the breakage of the element.

3. CONSTRUCTION

WT9 Dynamic LSA airframe consists of a sandwich shells from composite material. The shell is of three-layer construction. The external and internal shell layers are made of a glass and carbon fibre fabrics, which are saturated with a resin. Between them there is a filling from a hard foam panels (polyurethane foam HEREX from 3 to 15 mm thick).

4. MATERIALS

A. Epoxy system

The laminates are made using following epoxy system type:

ITEM	TYPE	MANUFACTURER
Resin	L 285	GRM Systems s. r. o.
Hardener	L 287	GRM Systems s. r. o.

Mixing ratio of resin and hardener:

ITEM	RESIN : HARDENER
Parts by weight	100 : 40±2
Parts by volume	100 : 50±2

The given mixing proportion of components must be observed as exactly as possible. Mixture of a resin and a hardener must be stirred thoroughly until there are no cloudiness and no bubbles in a vessel.

The thickeners and the resin-fillers are added after stirring.

Gel time is approximately 5-6 hours at 20-25 °C. Initial curing is 24 hours at 20-25 °C. The mixture reaches final properties after 15 hours curing at a temperature 55 °C.

B. Reinforcements

MARKING	WEAVE	WEIGHT PER AREA (g/m^2)	APPLICATION
GLASS FABRICS			
91111	Cross twill 1/3	106	Outer skin, inner skin, aileron, wing, fuselage, wheel cover, canopy frame, fin
92110	Cross twill 2/2	163	Outer skin, inner skin, aileron, wing, fuselage, stabilizer, engine cowling, fin, rudder, landing gear leg cover
92125	Cross twill 2/2	280	Inner skin, fuselage, wheel cover, landing gear leg cover
92145	Unidirectional	220	Wing, fuselage
90070	Fibre cloth	81	Inner skin, stabilizer
02037	Fibre cloth	49	Outer skin, inner skin, winglets, elevator, rudder
CARBON FABRICS			
CF 80	Fibre cloth	80	Outer skin, inner skin, winglet, stabilizer, elevator
CF 200	Fibre cloth	200	Outer skin, fuselage, wing, engine cowling, canopy frame
CF 140	Unidirectional	140	Outer skin, winglet, stabilizer, canopy frame, fuselage
HYBRID FABRICS			
CF/AR 160	Fibre cloth	165	Inner skin, fuselage, cockpit

C. Rovings

Carbon:	TORAYCA T700S 24K 1650 g /1000 m
Glass:	STARROV 908 2400 g / 1000 m

D. Foams and fillers

Rigid Foam:	HEREX C70.55
Resin Fillers:	Aerosil Cotton flakes Microballoons white (brown)

E. Paints

ITEM
Mipa 4+1 2K HS -Filler
MIPA OC MISCHLACK-KONZENTRAT-Paint
MIPA 2K-HÄRTER H5- Hardener
Mipa 2K- Thinner
Mipa C85 2K-HS-Clearcoat

5. REPAIR PREPARATION

For all repairs, it is important to know the number of layers of the laminate, density of weave and directional fabrics fibers orientation relative to the main part dimensions.
The first step is removing all damage parts and all portion of the shell that has become delaminated from a damage area. Repair area wash with soap and dry up. Then degrease a repair area. Repaired surface roughen with the sandpaper No. 60 to 80. Areas that could be damaged and dirty during work protect with a foil. Fabrics must not have high relative air humidity, as necessary they dry up, for example by a hot air gun.

Prepare clean vessels for stirring the mixtures of a resin and a hardener.

A. Repair Class 4

The erosion damages caused by the rain, the scores, the scrapes without the outer laminate damage require the lacquer works only.

See Chapter 51-20 Exterior finish repair.

In case of first cloth layer damage, then whole repair area cleans well and sands smooth with a sand paper. Prepare cloth on the foil, saturate with resin and lay on the repair area. If the resin is dry, the repair area can be puttied and repainted with lacquer.

B. Repair Class 3

On the damaged area of the outer shell cut a circular or rounded hole with sufficiently size. Make sure that all delaminated parts of the shell have been removed. If the foam is also damaged, remove it too, eventually to the internal shell layer. Tap the surroundings of the damage area to determine the extent of delamination from the foam. Remove the lacquer from the edge of the cut hole at least 4 cm by means sandpaper.

Around the edge of the damaged area where the shell is still firmly bonded, chamfer the shell. For top thin cloth layer the chamfer about 15 mm is necessary.

After chamfering the shell, blow out thoroughly the whole repair area including the pores of the foam. Now fill the hole in the foam with microballoons and simultaneously fill the pores of the exposed foam. Then lay necessary layer of patches with diagonal weave direction (stepwise largest patch first) over the damaged area. After hardening (app. 24 hours at 20-25 °C) the damaged area should be smoothed, filled and painted. In smoothing take care that only the edges of the patches are sanded.

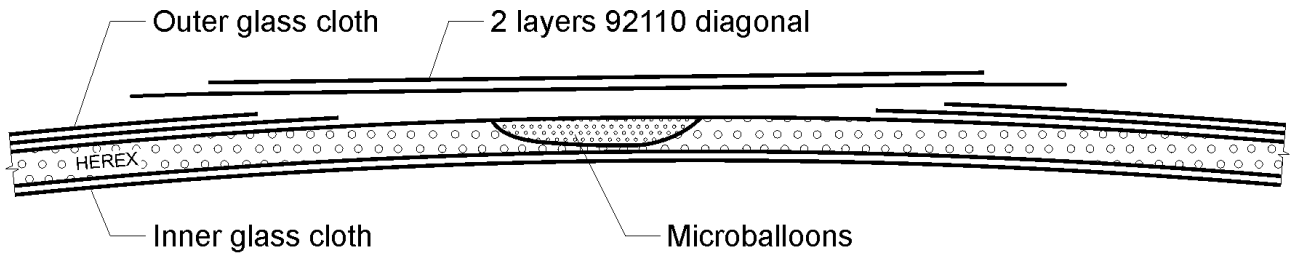


Fig. 51-1 Repair Class 3

C. Repair Class 2

If there is a through hole in the sandwich shell, then remove all delaminated parts and sand the edge of the hole. Enlarge the hole until good bonding to the foam is evidenced. Then remove the foam next 20 mm around the hole while the inner fabric remains undamaged. On thus exposed inner fabric make chamfer around the circumference. Outer fabric layer chamfer about 20 mm.

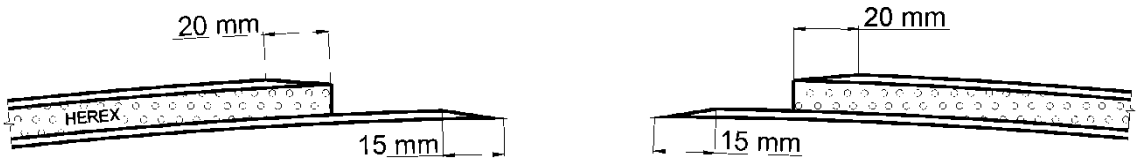


Fig. 51-2 Repair Class 2 – Step 1

If the hole is not greater than 10 cm, then glue with Super Glue a thin laminate plate from bottom of the hole. Glued laminate can be supported by means of the nail or wire. Then lay inner layer of patches. Allow the inner layer harden before doing further work. Prepare the foam plug that will be inserted according the hole. If necessary warm the foam with hairdryer and bend. Scratch the previous layered patches with sandpaper 80 to ensure good glued contact. Glue the foam plug in the hole with thickened resin (microballoons) to close the pores. Make sure no air bubbles occur especially in inner corners. If necessary add weight to ensure better contact. Let the epoxy accomplish (app. 24 hours at room temperature).

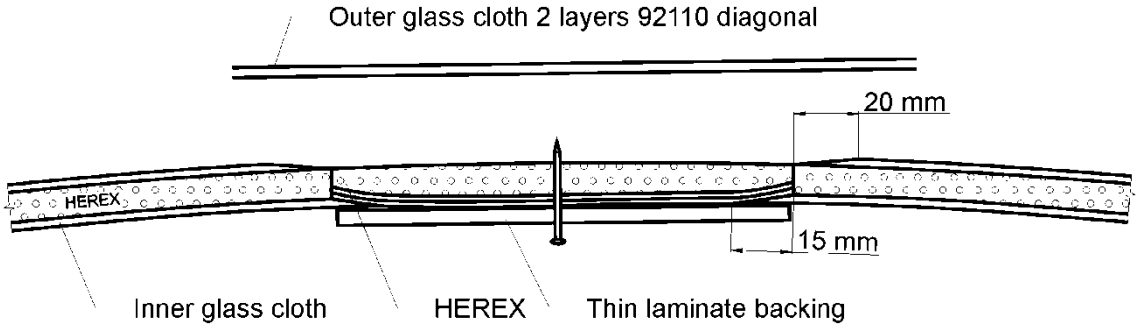


Fig. 51-3 Repair Class 2 – Step 2

Once the epoxy is accomplished it can be smoothed, puttied with epoxy thickened with microballoons to close the pores and the outer laminate layers applied.

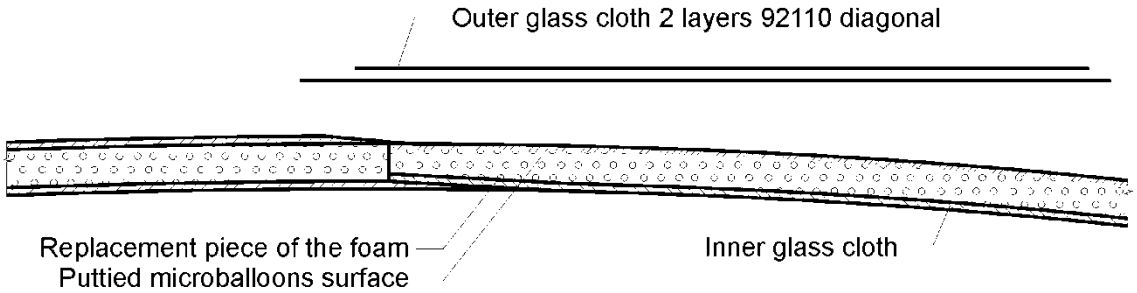


Fig. 51-4 Repair Class 2 – Step 3

D. Repair Class 1

These repairs have serious character and can be carried out only by the aircraft manufacturer or a repair workshop approved by local Civil Aviation Authority (CAA). In any case contact the aircraft manufacturer.

6. PLY LAY-UP SCHEME

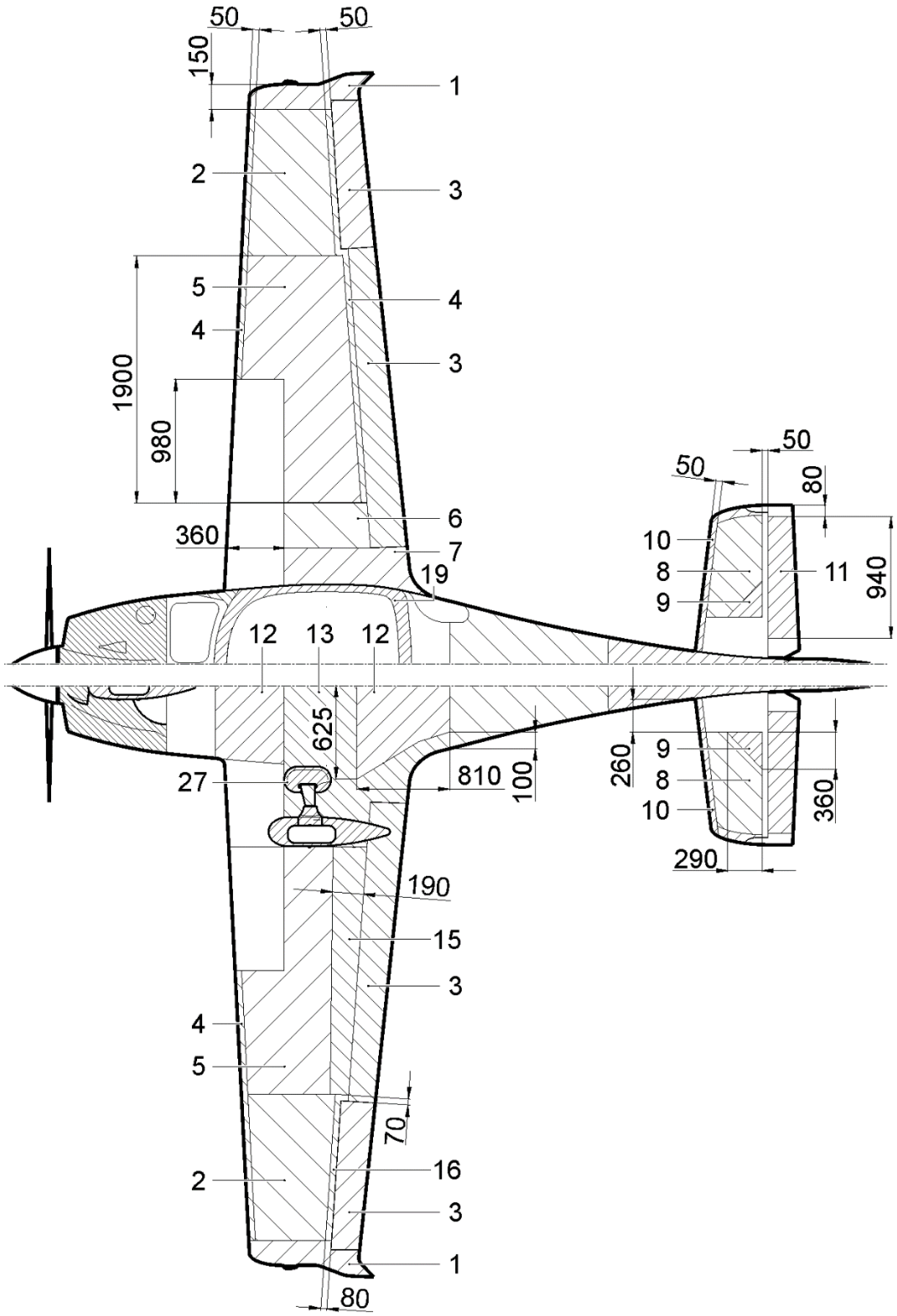


Fig. 51-5 Ply Lay-up (page 1 of 2)

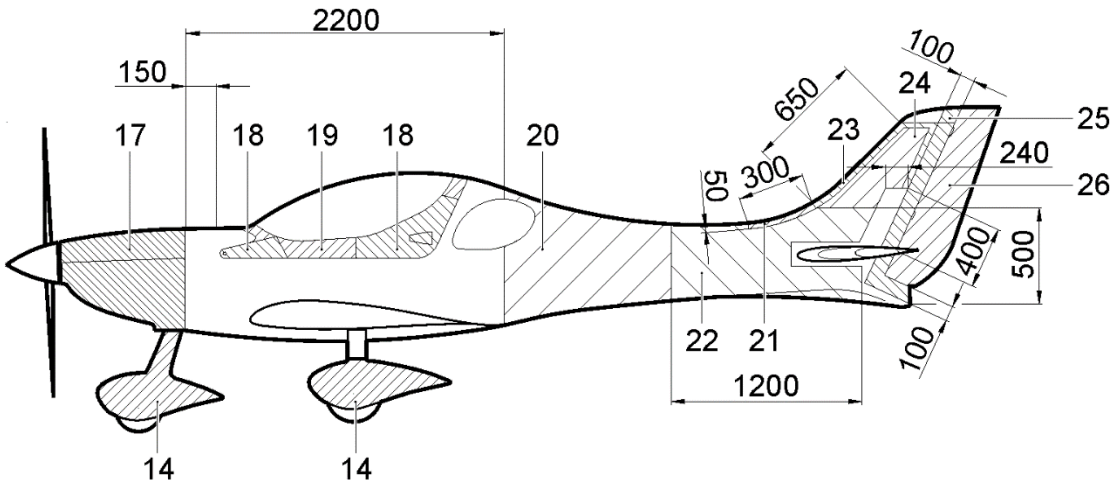


Fig. 51-5 Ply Lay-up (page 2 of 2)

Each fabric must be properly oriented with respect to the long side of the aircraft. The patch must be composed of an equal number of layers as a repair area plus one technology layer that prevents damage of the top layer due to finishing.

The table shows the layers necessary for repairs in order from the outer to the inner.

Repair the damage are allowed only 5 cm from the spar, rib or bulkhead. If there was also damage the spar, bulkhead, contact the manufacturer.

If the collar on the leading edges of the wings and horizontal stabilizer is damaged, it is necessary to laminate new ones.

ITEM	LAYER POSITION	LAYER	WEAVE DIRECTION	NOTE
1	Outer	02037	X	Technological layer
	Outer	02037	X	
	Outer	CF80	X	
	Outer	CF140	=	
	-	Herex		3 mm
	Inner	CF80	X	
2	Outer	92110	X	Technological layer
	Outer	92110	X	
	-	Herex		6 mm
	Inner	92110	X	
3	Outer	92110	X	Technological layer
	Outer	92110	X	
	-	Herex		3 mm
	Inner	91111	X	
4	-	92110	X	Technological layer
	-	92110	X	
	-	92110	X	Only for the leading edge collar
	-	92110	X	Only for the leading edge collar
	-	91111	X	
5	Outer	92110	X	Technological layer
	Outer	92110	X	
	Outer	92110	X	
	-	Herex		6 mm
	Inner	91111	X	
6	Outer	92110	X	Technological layer
	Outer	92110	X	
	Outer	CF200	X	
	-	Herex		8 mm
	Inner	92110	X	
7	Outer	92110	X	Technological layer
	Outer	92110	X	
	Outer	CF200	X	
	Outer	CF200	X	
	-	Herex		8 mm
	Inner	92110	X	

ITEM	LAYER POSITION	LAYER	WEAVE DIRECTION	NOTE
8	Outer	CF80	X	Technological layer
	Outer	CF80	X	
	-	Herex		5 mm
	Inner	90070	+	
9	Outer	CF80	X	Technological layer
	Outer	CF80	X	
	Outer	CF140	=	
	-	Herex		5 mm
	Inner	90070	+	
10	-	92110	+	Technological layer
	-	92110	+	
	-	92110	+	
	-	92110	+	
	-	90070	+	
	-	3x92110	X	Splicing collar
11	Outer	CF80	X	Technological layer
	Outer	CF80	X	
	-	Herex		3 mm
	Inner	02037	X	
12	Outer	92110	+	Technological layer
	Outer	92110	+	
	Outer	92110	X	
	-	Herex		5 a 8 mm
	Inner	91111	X	
	Inner	92125	X	
13	Outer	92110	+	Technological layer
	Outer	92110	+	
	Outer	92110	X	
	-	Herex		5 a 8 mm
	Inner	91111	X	
14	-	91111	X	Technological layer
	-	91111	X	
	-	92125	X	
	-	92125	X	Only 70 mm around the cutout of the wheel and its attachment
	-	92125	X	

ITEM	LAYER POSITION	LAYER	WEAVE DIRECTION	NOTE
15	-	92110	X	Technological layer
	-	92110	X	
	-	92110	X	
	-	92110	X	
	-	92110	X	
16	-	92110	X	Technological layer
	-	92110	X	
	-	CF200	X	
	-	91111	X	
17	-	92110	X	Technological layer
	-	92110	X	
	-	CF200	X	
	-	CF200	X	
18*	-	91111	X	Technological layer
	-	91111	X	
	-	CF200	X	
	-	CF200	X	
	-	CF140	=	
19*	-	91111	X	Technological layer
	-	91111	X	
	-	CF200	X	
	-	CF140	=	
20	Outer	92110	X	Technological layer
	Outer	92110	X	
	Outer	CF140	=	
	-	Herex		5 mm
	Inner	91111	X	
21	-	92110	X	Technological layer
	-	92110	X	
	-	92110	X	
	-	92110	X	
	-	91111	X	
	-	CF140	=	
	-	CF200	X	
	-	91111	X	
22	Outer	92110	X	Technological layer
	Outer	92110	X	
	Outer	91111	X	
	Outer	CF140	=	
	-	Herex		5 mm
	Inner	91111	X	
23	-	92110	X	Technological layer
	-	92110	X	
	-	92110	X	
	-	92110	X	
	-	91111	X	
24	Outer	92110	X	Technological layer
	Outer	92110	X	
	-	Herex		5 mm
	Inner	91111	X	
25	Outer	92110	X	Technological layer
	Outer	92110	X	
	Outer	92110	+	
	-	Herex		3 mm
	Inner	02037	X	
26	Outer	92110	X	Technological layer
	Outer	92110	X	
	-	Herex		3 mm
	Inner	02037	X	
27	-	92110	X	Technological layer
	-	92110	X	
	-	92125	X	

* valid for the outer and as well as inner shell

Tab. 51-3 Ply Lay-up

7. REPAIRS OF METAL PARTS

In case of a damage of any fittings, if a damage reason was not designate immediately, contact the aircraft manufacturer. It is necessary take account to an element function, a material composition, a processing technology and etc. The aircraft manufacturer can evaluate all these factors only.

Welding should be carried out only by an approved aircraft welder. All welds made by the aircraft manufacturer are by the Argon-arc welding method.

8. REPAIRS OF PLEXIGLASS

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Driller Ø1.5 – 2.0	AR
Persons	1

Tab. 51-4 Recommended tools, materials, persons and documentation

Most common damage which occurs on plexiglass are cracks, which usually start around vent windows rails as result of using of these windows to open or close the canopy.

When the crack occurs, it is important to stop its propagation immediately after discovering it. This can be done by drilling a hole in direction of crack trajectory. The hole has to be drilled perpendicular to surface, on farthermost visible point of the crack (crack tip). This has to be done for each crack tip, except the end is in hole, or on edge. Diameter of the hole should not be less than 1 mm, and not greater than 2 mm.

9. TEST FLIGHT AFTER REPAIR

WARNING

ONLY QUALIFIED PILOT MAY PERFORM A TEST FLIGHT!

The test flight should be performed above all in following cases:

After repair or replace of fixed surfaces – wing, fin, stabilizer, or control surfaces – elevator, aileron and wing flap. Flight characteristics and aircraft stability can be affected when above mentioned part is replaced or adjusted. Therefore a test flight should be performed to check aircraft flight characteristics, control surfaces setting, manoeuvrability, stability, and stall characteristics. The characteristics are check during taxiing, takeoff, climbing, cruise, descent, approach and landing. The extend of flight test necessary to perform depends on the extend of repair.

A. Test flight flying time:

Test flight flying time depends on the extend of the tests necessary to perform after a repair.

B. Aircraft inspection before a Test flight:

Prior to the test flight the aircraft shall be thoroughly inspected, weighed, found faults debugged and the aircraft shall be prepared for the flight (replenishing etc.).

C. Test crew:

Only qualified persons (test pilots) are permitted to perform a test flight. In-flight found faults should be debugged forthwith the test flight

.

51-20 EXTERIOR FINISH REPAIR

1. REPAIR SURFACES

During the operational life of the aircraft, small scratches and dents may appear on the composite surfaces. This damage needs to be repaired. Refinishing of the damage is permitted as long as there is no damage to the fiber fabrics.

When control surfaces are painted, they must comply with weight and static moment range according to Tab. 51-2.

A. Puttying

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Sandpapers to density 240	-
Polyester putty	-
Benzine	-
Persons	1

Tab. 51-5 Recommended tools, materials, persons and documentation

(1) Instructions:

(a) Localize and mark every dent.

(b) Sand the paint on the dent and the surrounding area using sandpaper 240.

(c) Degrease surface with Benzine.

(d) Mix required amount of putty, refer their manual.

(e) Apply required amount of putty on dent.

(f) Let putty harden.

(g) Sand the repaired area with sandpaper 240.

(h) Any imperfections putty again and then re-sand.

(i) Visually inspect and touch check. If surface is smooth without dents continue with painting.

B. Painting

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Airbrush	1 pc
Brush	1 pc
Polishing pad	AR
Sandpapers 400-2000	AR
Mipa 4+1 2K HS -Filler	AR
MIPA OC MISCHLACK-KONZENTRAT-Paint	AR
MIPA 2K-HÄRTER H5- Hardener	AR
Mipa 2K- Thinner	AR
Mipa C85 2K-HS-Clearcoat	AR
Grinding paste	AR
Polish	AR
Benzine	AR
Persons	1

Tab. 51-6 Recommended tools, materials, persons and documentation

(1) Instructions:

(a) Localize and mark every dent.

(b) Sand surface with sandpapers to 400.

(c) Degrease surface with Benzine.

(d) Mix required amount of Filler, refer their manual.

(e) Apply required amount of layers of Filler on surface to smooth indentations.

(f) Let filler harden.

(g) Smooth indentations with sandpapers to 1200.

(h) Any imperfections fill again and then smooth.

(i) For small repairs use a brush, for bigger repairs use an airbrush. Apply paint in thin layers. Allow to harden.

(j) Polish surface with a grinding paste.

(k) Visually inspect and touch check that surface is smooth without dents.

(l) After painting on control surfaces their weight and inertia moment must be checked.

52 DOORS

CONTENTS

Chapter	Description	Page
52-00	**GENERAL**	**3**
	1. INTRODUCTION	3
52-10	**CANOPY FRAME**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	7
	A. Canopy frame	7
	B. Gas spring	9

This page is left blank intentionally

52-00 GENERAL

1. INTRODUCTION

The aircraft is equipped with the canopy which enables the access into the cockpit.

This page is left blank intentionally

52-10 CANOPY FRAME

1. DESCRIPTION

The aircraft has a one-piece tilting canopy (Fig. 52-1). Canopy frame is attached in front section to the fuselage using two hinges (2) and supported by two gas springs. It is opened in upside-forward direction. Guide pins located on both sides of the canopy frame ensures centering of the canopy during the closing. Canopy is equipped with 3 mm thick Plexiglas windshield and sliding windows on both sides. The frame (1) is a hollow laminate structure, through which flows venting air. Canopy is fitted with eyeball vents on both sides and holes for blowing of windshield (see Chapter 21-20). Closing mechanism of canopy frame (3; 4) with handle (6) is situated in the middle of the frame in rear part of the canopy frame and is accessible from both - pilot and co-pilot seats. The canopy frame is also equipped with a canopy lock (5). Closing mechanism is secured only when the lock lever is fully plugged backwards (red ring indicates correct locking).

The towing version is equipped with mirror fitting (7) installed inside of canopy frame (1).

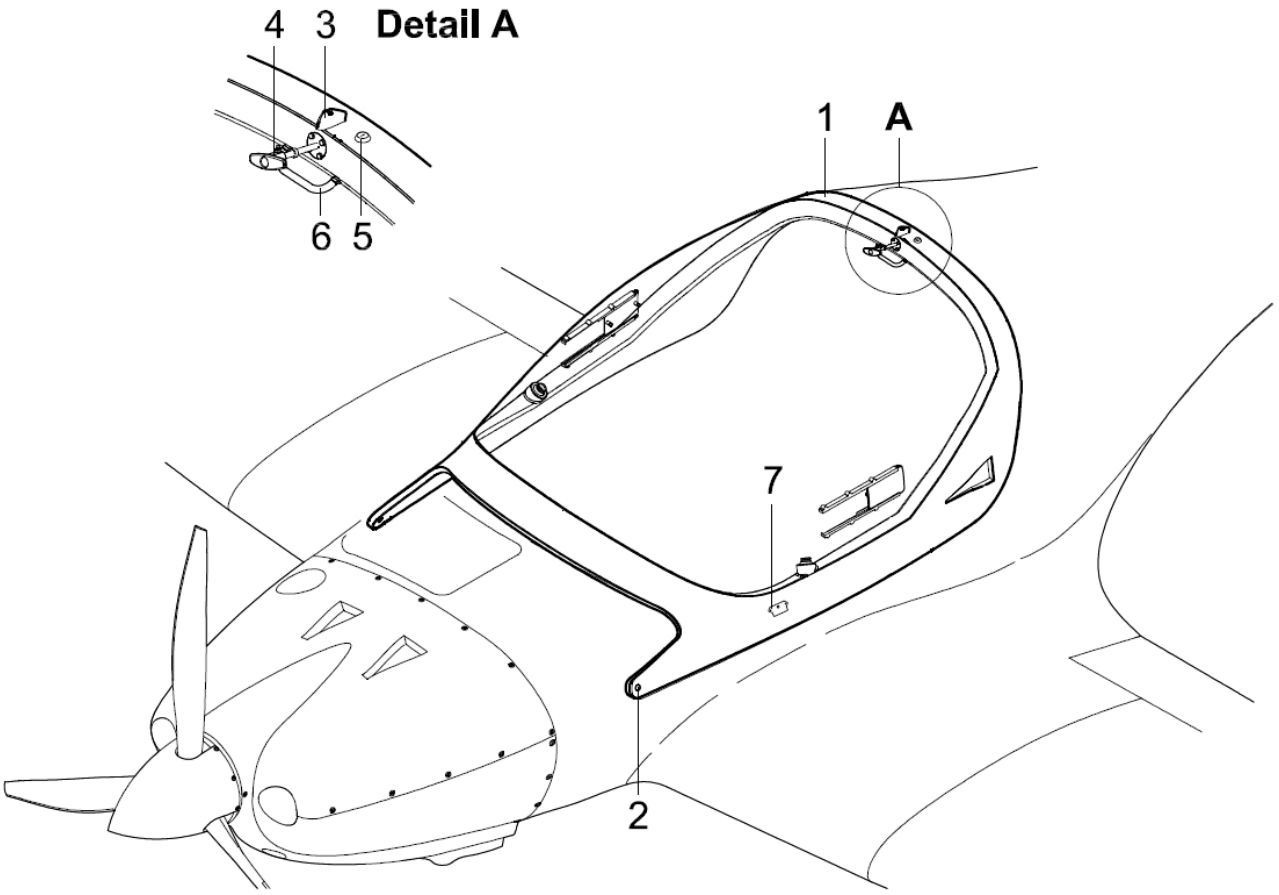


Fig. 52-1 Canopy Frame (page 1 of 2)

1 – Canopy frame
2 – Canopy hinge
3 – Canopy closing mechanism handle (exterior)
4 – Canopy closing mechanism handle (interior)
5 – Canopy lock
6 – Handle
7 – Mirror fitting (towing version)

Fig. 52-1 Canopy Frame (page 2 of 2)

2. MAINTENANCE PRACTICES

A. Canopy frame

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Wrench 10	1 pc
Blinder ø 25 mm	2 pcs
Persons	2

Tab. 52-1 Recommended tools, materials, persons and documentation

(1) Canopy frame removal:

CAUTION

DURING CANOPY FRAME REMOVAL, PAY ATTENTION NOT TO SCRATCH THE WINDSHIELD!

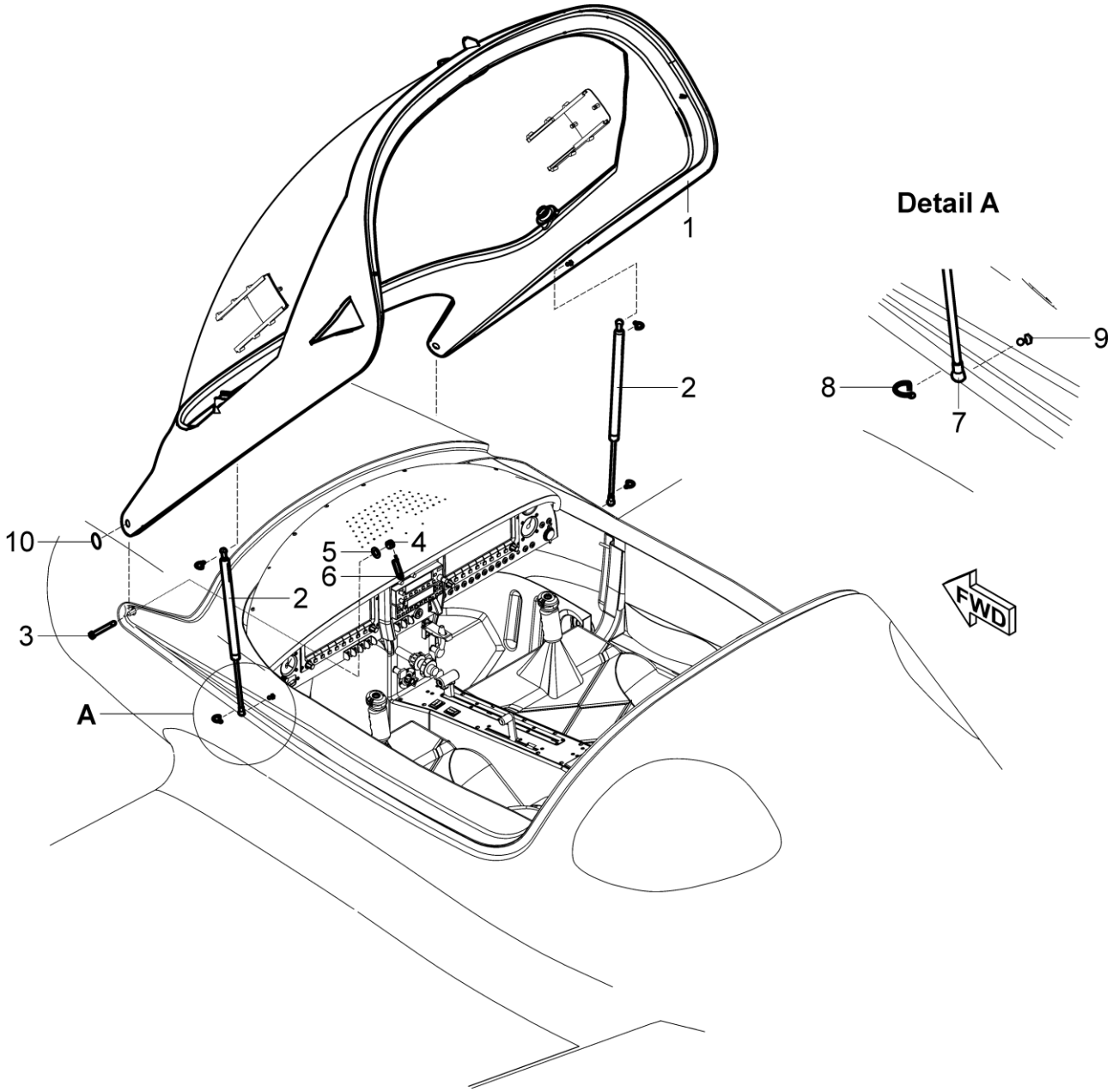
(a) Remove blinders (10, Fig. 52-2).
(b) Open the canopy frame (1).
(c) Disconnect upper end of gas springs (2) on both sides of the canopy frame (1) (see par. 2. B (1)).
(d) Remove safety pins (6), unscrew nuts (4) and remove washers (5).
(e) Remove the canopy frame hinge bolts (3).
(f) Carefully remove the canopy frame (1).

(2) Canopy frame installation:

CAUTION

DURING CANOPY FRAME INSTALLATION, PAY ATTENTION NOT TO SCRATCH THE WINDSHIELD!

(a) Place the canopy frame (1, Fig. 52-2) on the fuselage.
(b) Insert bolts (3) into hinges.
(c) Open the canopy frame (1) and support it.
(d) Install washers (5), screws and tighten nuts (4); install safety pins (6)
(e) Connect upper end of gas springs (2) on both sides of the canopy frame (1) (see par. 2. B (2)).
(f) Stick new 25 mm blinders (10).



1 – Canopy
2 – Gas spring
3 – Bolt M6 x 47
4 – Castle nut M6
5 – Washer 6.4 x 16 x 1.6
6 – Safety pin 1.4 x 20
7 – Ball socket
8 – Safety clip
9 – Ball stud
10 – Blinder ø25 mm

Fig. 52-2 Canopy Frame Removal / Installation

B. Gas spring

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver	1 pc
Pliers	1 pc
Persons	1

Tab. 52-1 Recommended tools, materials, persons and documentation

(1) Gas spring removal:
   (a) Open the canopy frame (1, Fig. 52-2) and support it.
   (b) Remove safety clips (8) from both ball sockets (7) of the gas spring.
   (c) Remove the gas spring (2).

(2) Gas spring installation:
   (a) Inspect the gas spring (2, Fig. 52-2) whether it is not damaged.
   (b) Insert ball socket (7) on the ball stud (9) in the canopy frame and bottom ball socket (7) on the ball stud (9) in the fuselage.

   Pay attention to proper gas spring orientation - cylinder part of the gas spring has to be connected to the canopy frame (1), piston part has to be connected to the fuselage.
   (c) Secure sockets with safety clips (8).

This page is left blank intentionally

53 FUSELAGE

CONTENTS

Chapter	Description	Page
53-00	**GENERAL**	**3**
	1. INTRODUCTION	3
53-10	**FUSELAGE STRUCTURE**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	7

This page is left blank intentionally

53-00 GENERAL

1. INTRODUCTION

The fuselage is a monocoque structure made primarily of glass and carbon fibre composite materials.

Chapter 53-10 gives the data for the fuselage structure.

This page is left blank intentionally

53-10 FUSELAGE STRUCTURE

1. DESCRIPTION

Fuselage is monocoque glass/carbon composite construction consisting of three parts that are bonded together: left side (1, Fig. 53-1), right side (2) and lower section (3). There is shaped fuselage end and a rear lower fin bonded to the fuselage to enlarge the area of stabilizing surface.

The fuselage sandwich shell is stiffened with firewall, bulkheads, ribs, stiffeners and interior components creating cockpit. Major items of structure are main (4) and auxiliary spar (5) to which the wings are attached. Main and auxiliary spar are bonded in the central section of fuselage. The caps of these spars are made of carbon rovings and the web is made of glass fabrics, foam panels with plywood inserts.

There is a steel rope for emergency parachute system incorporated in the right side of fuselage.

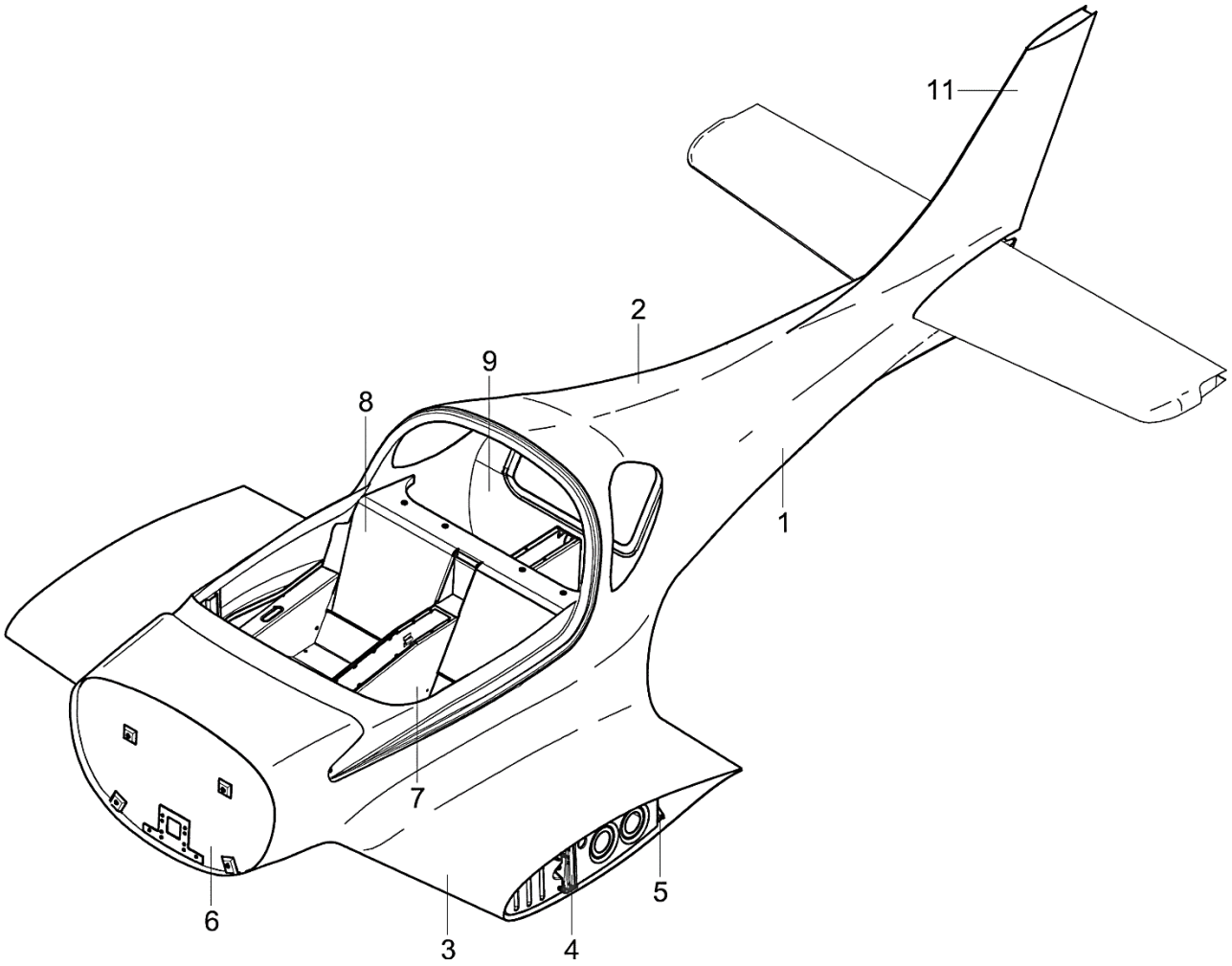
The plywood firewall (6) to which the engine is attached is stiffened with a carbon stiffener, interior floor and rescue system board. Firewall has stiffened areas for engine mount and nose landing gear leg attaching. From the engine compartment is covered with a stainless steel shield.

In the cockpit there are two not adjustable seats which are arranged side by side. The crew space is limited by firewall in the front and backrest (8) in the rear. In the middle of cockpit there is a central tunnel which divides cockpit for left and right side and passes through the baggage compartment which is also divided in two sections. Baggage compartment is limited by backrest in the front and by baggage bulkhead (9) in the rear. Baggage bulkhead is sloped in the upper section and fitted with covered opening allowing access to the rear section of fuselage. Rear section of fuselage is stiffened with the elliptical bulkheads. On the both sides of the fuselage there are windows in the baggage compartment.

Vertical stabilizer (11) sandwich shell construction and is integral part of fuselage. Rudder hinges are attached to the rear web of vertical stabilizer. The horizontal stabilizer is fixed bonded to the fuselage and is sandwich shell construction with a rear web (Chapter 55-10).

Integral fuel tanks are located in the forward box of wing central section (3) on the left and right sides.

In the wing central section are bonded ribs to which the main landing gear legs are attached.



1 – Left side
2 – Right side
3 – Lower (wing central) section
4 – Main spar
5 – Auxiliary spar
6 – Firewall
7 – Central tunnel
8 – Backrest
9 – Baggage bulkhead
11 – Vertical stabilizer

Fig. 53-1 Fuselage Structure

2. MAINTENANCE PRACTICES

Fuselage is made from composite materials, no servicing is required. Repairs of the fuselage are described in Chapter 51.

This page is left blank intentionally

55 STABILIZERS

CONTENTS

Chapter	Description	Page
55-00	**GENERAL**	**3**
	1. INTRODUCTION	3
55-10	**HORIZONTAL STABILIZER**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Horizontal stabilizer	5
55-20	**ELEVATOR**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	7
	A. Elevator	7
55-30	**VERTICAL STABILIZER**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	9
	A. Vertical stabilizer	9
55-40	**RUDDER**	**11**
	1. DESCRIPTION	11
	2. MAINTENANCE PRACTICES	11
	A. Rudder	11

This page is left blank intentionally

55-00 GENERAL

1. INTRODUCTION

The aircraft has conventional tail configuration, with horizontal stabilizer located in bottom part of fin. The empennage consists of vertical stabilizer with rudder and horizontal stabilizer with elevator.

Vertical stabilizer is integral part of fuselage. The horizontal stabilizer is bonded into the fuselage.

This page is left blank intentionally

55-10 HORIZONTAL STABILIZER

1. DESCRIPTION

Horizontal stabilizer is a glass/carbon composite sandwich construction. It consists of upper and lower skin, auxiliary web and a web inside of stabilizer up to ¼ of stabilizer span from the plane of symmetry.

2. MAINTENANCE PRACTICES

A. Horizontal stabilizer

Because the horizontal stabilizer is made from composite materials and is bonded into the fuselage, no servicing is required.

This page is left blank intentionally

55-20 ELEVATOR

1. DESCRIPTION

Elevator is a glass/carbon composite sandwich construction. It consists of upper and lower skin and ribs.

Each half of the elevator is attached to the horizontal stabilizer through two carbon hinges. Both halves of the elevator are connected together with elevator root hinge located in the aircraft's plane of symmetry.

Each half of elevator is fitted with a balance weight located in horn.

2. MAINTENANCE PRACTICES

A. Elevator

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Self-locking nut M6	2 pcs
Thin self-locking nut M6	1 pc
Vaseline	AR
Persons	1

Tab. 55-1 Recommended tools, materials, persons and documentation

NOTE

Described is removal and installation of one half of the elevator.

(1) Elevator removal:
- (a) Secure the aircraft.
- (b) Remove the rudder (Chapter 55-40).
- (c) Disconnect the push-pull rod from the root fitting (6, Fig. 55-1) (Chapter 27-30).
- (d) Disconnect the half of the elevator (1) from the root fitting (6) by unscrewing nuts (4; 5) and removing washers (2; 3).
- (e) Pull the half of the elevator (1) along the hinge line outboards.

(2) Elevator installation:
- (a) Thoroughly clean and lubricate all elevator hinges before each assembling (Chapter 12-20).
- (b) Put the half of the elevator (1, Fig. 55-1) on hinges of the horizontal stabilizer. Fit the root fitting (6) on bolts.
- (c) Put on washers (2; 3) and new nuts (4; 5). So far, do not tighten nuts!

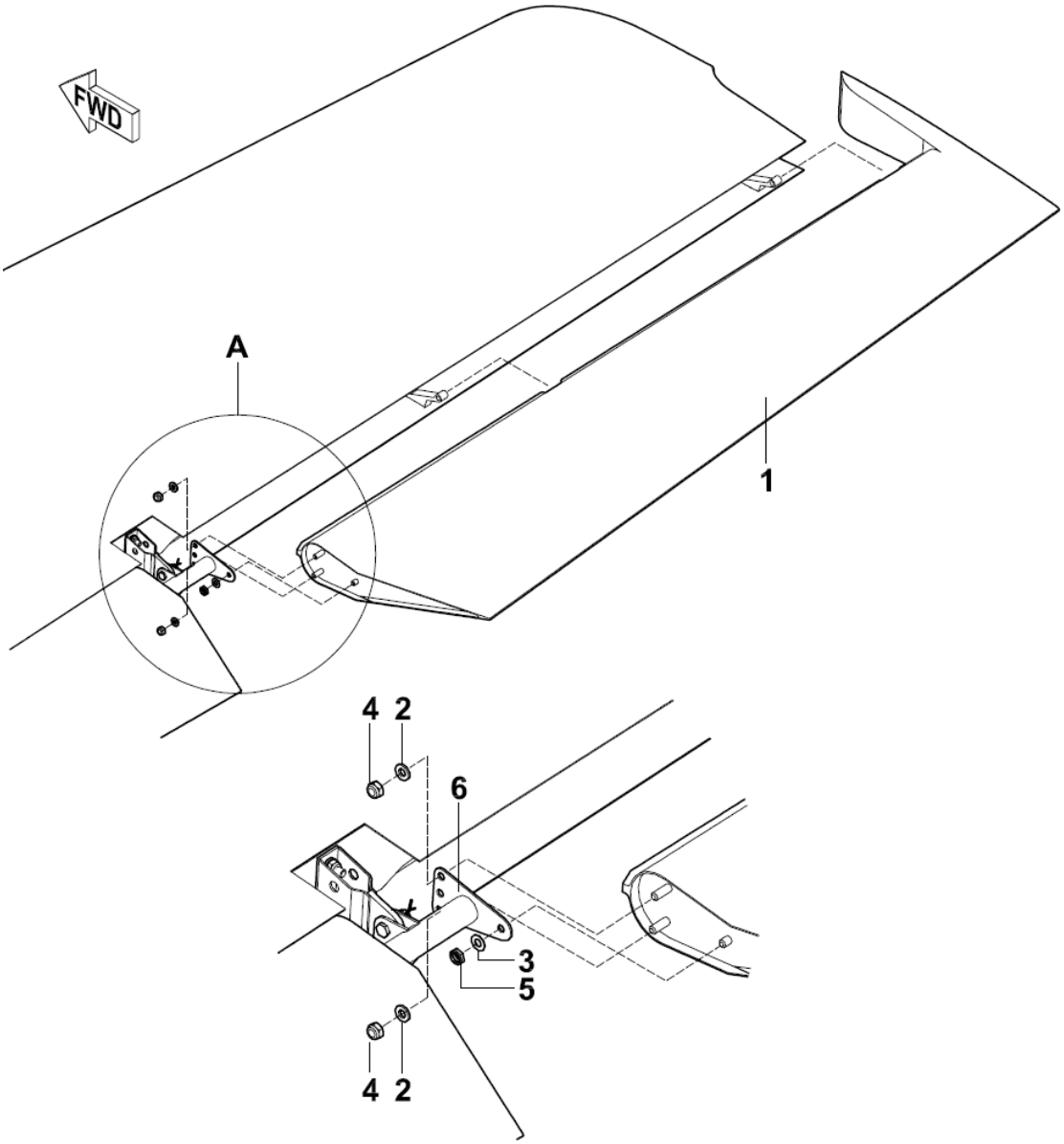
(d) Align trailing edges of both elevator halves and tighten nuts (4; 5).

(e) Connect the push-pull rod to the root fitting (6) (Chapter 27-30).

(f) Install the rudder (Chapter 55-40).

(g) Carry out test and check:

- Screw and nuts connections are tight.
- Free plays.
- Free movement of elevator.
- Elevator deflection limits.
- Alignment of elevator trailing edges.
- Unobstructed draining and vent holes.



1 – Half of elevator
2 – Washer ø6 x 12 x 1.6
3 – Washer ø6 x 12 x 0.5
4 – Self-locking nut M6
5 – Thin self-locking nut M6
6 – Root fitting

Fig. 55-1 Elevator Removal / Installation

55-30 VERTICAL STABILIZER

1. DESCRIPTION

Vertical stabilizer is a sandwich shell construction and is integral part of the fuselage. There is an auxiliary web to which the rudder hinges are glued and the tip rib.

2. MAINTENANCE PRACTICES

A. Vertical stabilizer

Because the vertical stabilizer is made from composite materials and is integral part of fuselage, no servicing is required.

This page is left blank intentionally

55-40 RUDDER

1. DESCRIPTION

The rudder is a glass/carbon composite sandwich construction. The rudder is attached to the fin through two hinges and one root hinge.

Rudder is fitted with a balance weight located in its horn.

2. MAINTENANCE PRACTICES

A. Rudder

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Socket set 10	1 pc
Pliers	1 pc
Screwdriver	1 pc
Tensometer	1 pc
Vaseline	AR
White adhesive tape 12 mm	AR
Self-locking nut M6	2 pcs
Split pin ø1.6 x 16	1 pc
Blinder ø25 mm	3 pcs
Persons	1

Tab. 55-2 Recommended tools, materials, persons and documentation

(1) Rudder removal:

(a) Secure the aircraft.

(b) Remove blinders (11, Fig. 55-2) - white stickers, located on both sides of the fuselage (right below rudder root hinge) and in the bottom part of the fuselage.

(c) Remove split pin (8) through holes, located in the side of the fuselage rear part, right below rudder root hinge.

(d) Unscrew castle nut (7) and remove washer (6) through the hole located in the bottom rear part of the fuselage.

(e) Disconnect control cables (5) by unscrewing nuts (3), removing washers (6), bolts (2) and distance tubes (4).

(f) Lift the rudder (1) to remove it from hinges. Remove the washer (10) from root hinge

(2) Rudder installation:

(a) Thoroughly clean and lubricate all the rudder hinges and other movable parts with Vaseline before each assembling (Chapter 12-20). Do not lubricate the thread of the rudder root hinge.

(b) Put the washer (10, Fig. 55-2) on the rudder root hinge.

(c) Put the rudder (1) on hinges.

(d) Through the maintenance holes located in the side and in the bottom of the fuselage rear part, put the washer (6), tighten castle nut (7) and secure it with split pin (8).

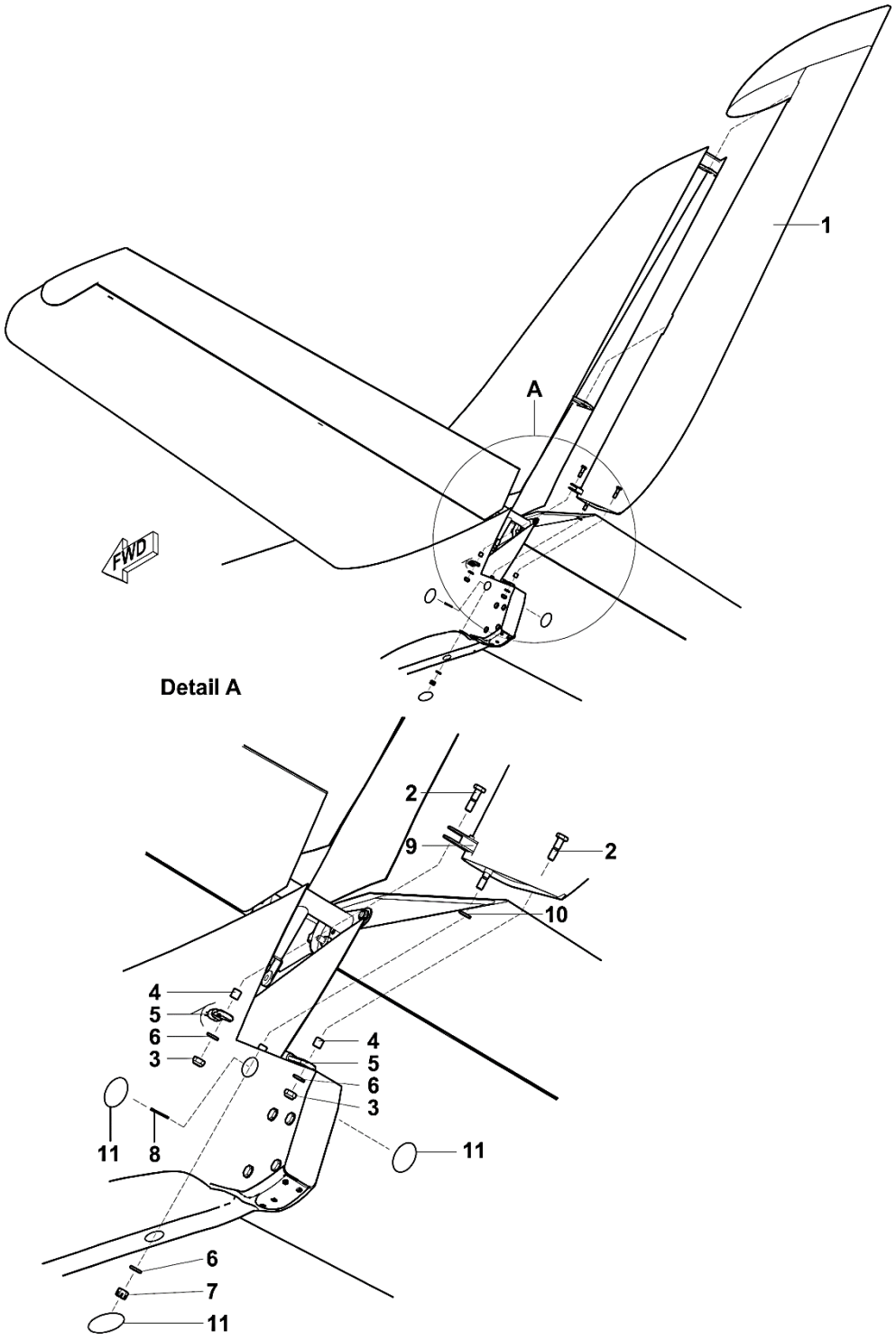
(e) Stick new 25 mm blinders (11).

(f) Connect rudder control cables (5) to the rudder control arms (9), by using bolts (2), distance tubes (4), washers (6) and tighten new self-locking nuts (3).

(g) Check the tension of rudder control cables with tensometer. Allowable tension is 61-65 N, if not, adjust the tension according to Chapter 27-20.

(h) Carry out test and check:

- The castle nut is secured with a split pin.
- All screw connections are tight.
- Free movement of rudder (nose landing gear is unloaded).
- Rudder deflection limits.
- Tension of cables.
- Unobstructed draining and vent holes.



1 – Rudder
2 – Bolt M6 x 22
3 – Self-locking nut M6
4 – Distance tube
5 – Control cable
6 – Washer ø6.4 x 12 x 1.6
7 – Castle nut M6
8 – Split pin ø1.6 x 16
9 – Rudder control arm
10 – Washer ø6.4 x 12 x 0.5
11 – Blinder ø25 mm

Fig. 55-2 Rudder Removal / Installation

This page is left blank intentionally

56 WINDOWS

CONTENTS

Chapter	Description	Page
56-00	**GENERAL**	**3**
	1. INTRODUCTION	3
56-10	**FLIGHT COMPARTMENT**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Windshield	6
	B. Vent windows	11
	C. Side windows	13

This page is left blank intentionally

56-00 GENERAL

1. INTRODUCTION

The aircraft is equipped with a windshield and two side windows in (one on left and one on right side).

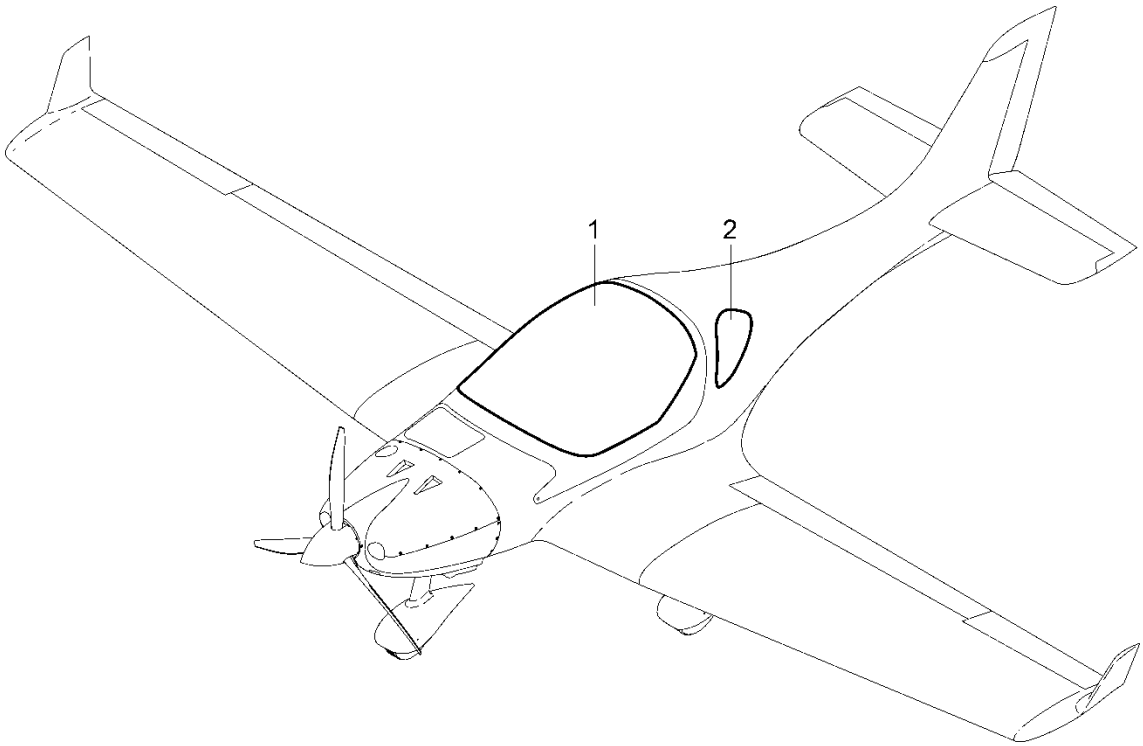
The windshield and both side windows are made of stretched Plexiglas. The windshield is bonded to the canopy frame, side windows are bonded to the fuselage structure. Side windows are fixed and cannot be opened.

This page is left blank intentionally

56-10 FLIGHT COMPARTMENT

1. DESCRIPTION

The aircraft has a one-piece tilting canopy, which is equipped with 3 mm thick Plexiglas windshield (1, Fig. 56-1) and side windows (2) on both sides of fuselage.



1 – Windshield

2 – Side window (LH)

Fig. 56-1 Windows

2. MAINTENANCE PRACTICES

A. Windshield

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Grinding tool	1 pc
Masking tape	AR
Cover foil	AR
Sandpaper 80 grit	AR
Cleaner Isopropyl alcohol	AR
Adhesive Swiftbond 9622	AR
Hardener Swifthardener 9533	AR
Cotton flakes	AR
Aerosil	AR
Microbaloons	AR
Drill	1 pc
Drill bit ø4 mm	1 pc
Dremel rotary tool	1 pc
Engraving cutter	1 pc
Plastic scraper	1 pc
Foam tape 4 mm SSA Moll 10406	AR
Application spatula	1 pc
Knife	1 pc
Cotton gloves (clean, lint free)	Two pairs
Cotton cloth (clean and lint free)	AR
Persons	2

Tab. 56-1 Recommended tools, materials, persons and documentation

(1) Windshield removal:

(a) Remove canopy (Chapter 52-10).

(b) Remove vent windows (5.B.(1)).

(c) Use a grinding tool and a cut-off disk to cut out the inner portion of the windshield to gain access to the bonding flange. The windshield should be cut as close as possible to the canopy frame. Use care to prevent damage to the canopy frame.

CAUTION

EXERCISE CARE TO PREVENT THE REMOVAL OF LAMINATE FROM THE CANOPY FRAME WHEN CUTTING AND REMOVING THE ADHESIVE FROM GAP BETWEEN THE CANOPY FRAME AND WINDSHIELD. IF LAMINATE IS DAMAGED, IT MUST BE REPAIRED PRIOR TO INSTALLING THE NEW WINDSHIELD.

(d) Cut remainders of the windshield in a perpendicular direction to around 10 cm strips (see Fig. 56-2).

(e) Cut adhesive from gap between canopy frame and windshield strips using a small knife. While pushing on the windshield strips, follow the edge of the canopy frame with the tip of the blade, then cut back towards the canopy frame to remove adhesive (see Fig. 56-2).

(f) Using a knife, isopropyl alcohol and sandpaper, remove all remaining adhesive from the canopy frame bonding flange.

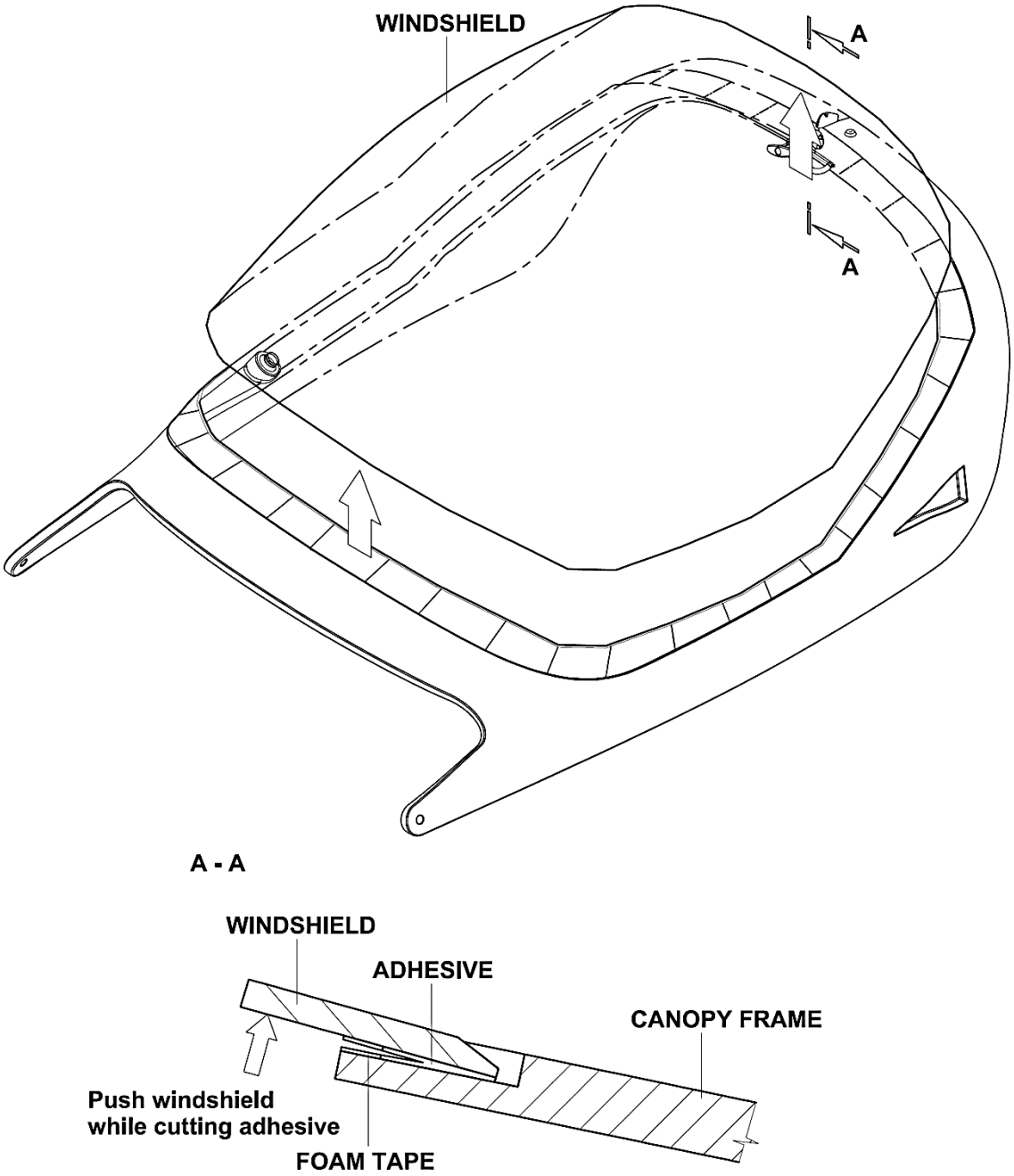


Fig. 56-2 Windshield Removal

(2) Windshield installation:

CAUTION

EXERCISE CARE TO PROTECT THE INNER AND OUTER WINDSHIELD SURFACES FROM DAMAGE DURING THE INSTALLATION PROCESS.

(a) Inspect canopy frame bonding flange for any remaining adhesive or contaminates, remove and clean if necessary.

(b) Cover the flight compartment and instrument panel with a foil to prevent contamination.

(c) Fit the canopy frame on the fuselage (Chapter 52-10).

(d) Attach the cover foil to the windshield in the distance of 30 mm from the edge of the windshield.

(e) Remove peel ply from bonding flange of the canopy frame (only if new canopy frame is installed).

(f) Fit the windshield to the canopy frame and grind edges of the glass so that between windshield and canopy frame remains equal gap of 2.5 mm (see Fig. 56-3).

(g) Using the tape, fix the windshield on the canopy frame. Inspect the windshield for proper fit. The windshield must have equal gap of 2.5 mm around the perimeter of the windshield.

(h) Make several alignment marks around edges of masking tape on the canopy frame and on masking tape on the windshield.

(i) Remove the windshield from the canopy frame and apply protective tape on inner side of the windshield, which copies outer edge of protective tape applied in previous step.

(j) Using sandpaper, abrade the bonding flange of the windshield and canopy frame. Clean bonding surfaces from debris and dust. Apply a continuous piece of a foam tape around the inner edge of the canopy frame.

(k) Mix the adhesive in the rate of 250 g Swiftbond 9622 + 42 g Swifthardener 9533. Thicken adhesive with cotton flakes (5 g) and Aerosil (2 g) into the consistency of a paste and apply it on the canopy bonding flange.

(l) Carefully place the windshield to the canopy frame and secure the windshield into position making sure the alignment marks made earlier (step h) are aligned and that the contour of the windshield matches the contour of the canopy frame.

(m) Remove adhesive excesses from the gap and let the adhesive to harden.

(n) After curing, remove adhesive excesses from the gap. Fill the gap with epoxy mixture thickened with brown microballoons.

(o) Install vent windows (5.B.(1)).

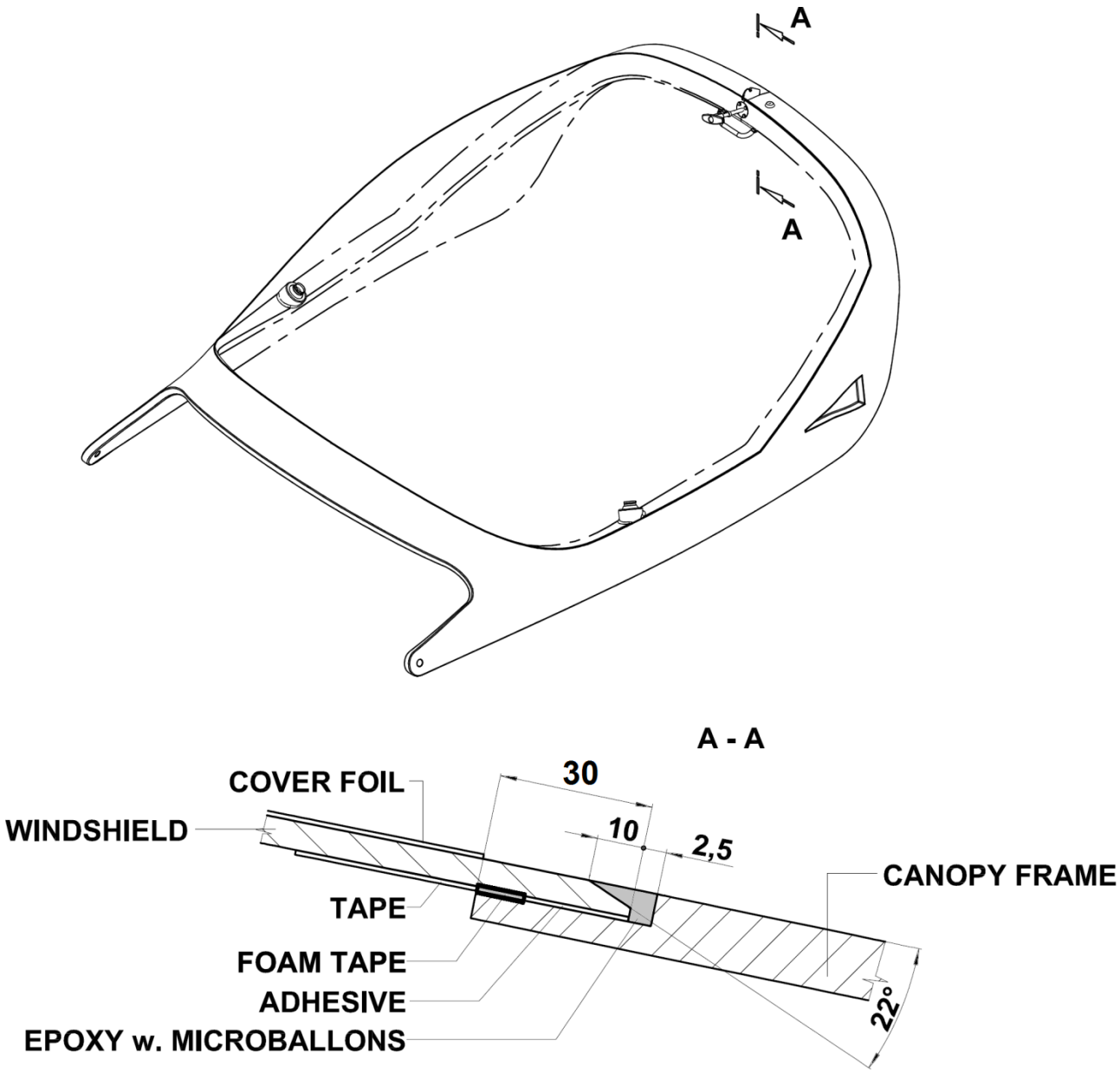


Fig. 56-3 Windshield Installation

B. Vent windows

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Allen key 2	1 pc
Persons	1

Tab. 56-2 Recommended tools, materials, persons and documentation

NOTE

Described is removal and installation of one of vent windows.

(1) Vent window removal:

(a) Remove bolts (7, Fig. 56-4) which connect upper rail (3) to windshield (1); Remove stop plate (8) and upper rail (3).

(b) Remove slider (5) including springs (6). Be careful not to lose springs.

(c) Carefully push up the vent window (2) from lower rail (4). Pay attention to slider (5), which can jump out of the rail.

(d) Remove lower slider (5) including springs (6).

(e) Unscrew bolts (7) from windshield side; Remove stop plate (8) and lower rail (4).

(2) Vent window installation:

(a) If necessary, drill holes according to Fig. 56-4

(b) Fix lower rail (4, Fig. 56-4) to windshield (1) using bolts (7). Use foremost bolt to fix the stop plate (8). Do not tighten bolts yet.

(c) Insert springs (6) to holes in slider (5). Put such pre-assembled slider along lower edge of vent window (2). Lug of vent window has to fit into slider groove. Springs have to touch inner side of the vent window.

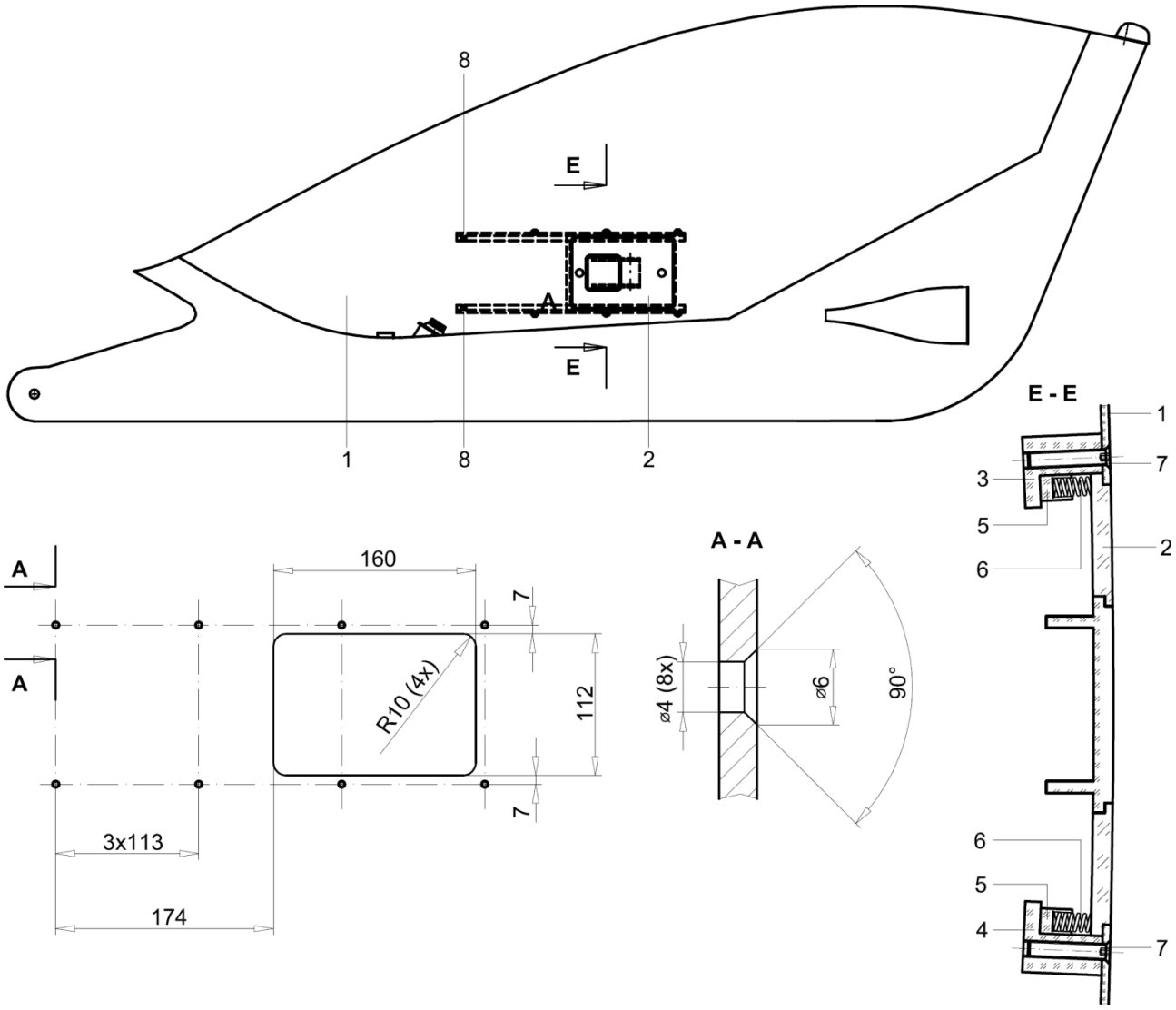
(d) Carefully pull down pre-assembled vent window (2) along with slider (5) and springs (6) into lower rail (4). Pay attention to proper window orientation.

(e) Repeat step (c) to fit slider (5) to upper edge of vent window (2).

(f) Fix upper rail (3) to windshield (1) using bolts (7). Use foremost bolt to fix the stop plate (8). Do not tighten bolts yet.

(g) Slide the vent window and check functionality.

(h) Finalize all bolts (7).



1 –	Windshield	5 –	Slider
2 –	Side window	6 –	Spring
3 –	Upper rail	7 –	Bolt M3 x 6
4 –	Lower rail	8 –	Stop plate

Fig. 56-4 Vent Window Installation

C. Side windows

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Grinding tool	1 pc
Masking tape	AR
Cover foil	AR
Sandpaper 80 grit	AR
Cleaner Isopropyl alcohol	AR
Adhesive Swiftbond 9622	AR
Hardener Swifthardener 9533	AR
Cotton flakes	AR
Aerosil	AR
Microbaloons	AR
Drill	1 pc
Drill bit ø4 mm	1 pc
Dremel rotary tool	1 pc
Engraving cutter	1 pc
Plastic scraper	1 pc
Foam tape 4 mm SSA Moll 10406	AR
Application spatula	1 pc
Knife	1 pc
Cotton gloves (clean, lint free)	Two pairs
Cotton cloth (clean and lint free)	AR
Persons	2

Tab. 56-3 Recommended tools, materials, persons and documentation

NOTE

Described is removal and installation of one of side windows.

(1) Side window removal:

(a) Use a grinding tool and a cut-off disk to cut out the inner portion of the side window to gain access to the bonding flange. The window should be cut as close as possible to the fuselage flange. Use care to prevent damage to the fuselage.

CAUTION

EXERCISE CARE TO PREVENT THE REMOVAL OF LAMINATE FROM THE FUSELAGE FLANGE WHEN CUTTING AND REMOVING THE ADHESIVE FROM GAP BETWEEN THE FUSELAGE FLANGE AND SIDE WINDOW. IF LAMINATE IS DAMAGED, IT MUST BE REPAIRED PRIOR TO INSTALLING THE NEW SIDE WINDOW.

(b) Cut remainders of the side window in a perpendicular direction to around 10 cm strips (see Fig. 56-5).

(c) Cut adhesive from gap between the fuselage flange and side window strips using a small knife. While pushing on the window strips, follow the edge of the fuselage flange with the tip of the blade, then cut back towards the fuselage flange to remove adhesive (see Fig. 56-5).

(d) Using a knife, isopropyl alcohol and sandpaper, remove all remaining adhesive from the fuselage bonding flange.

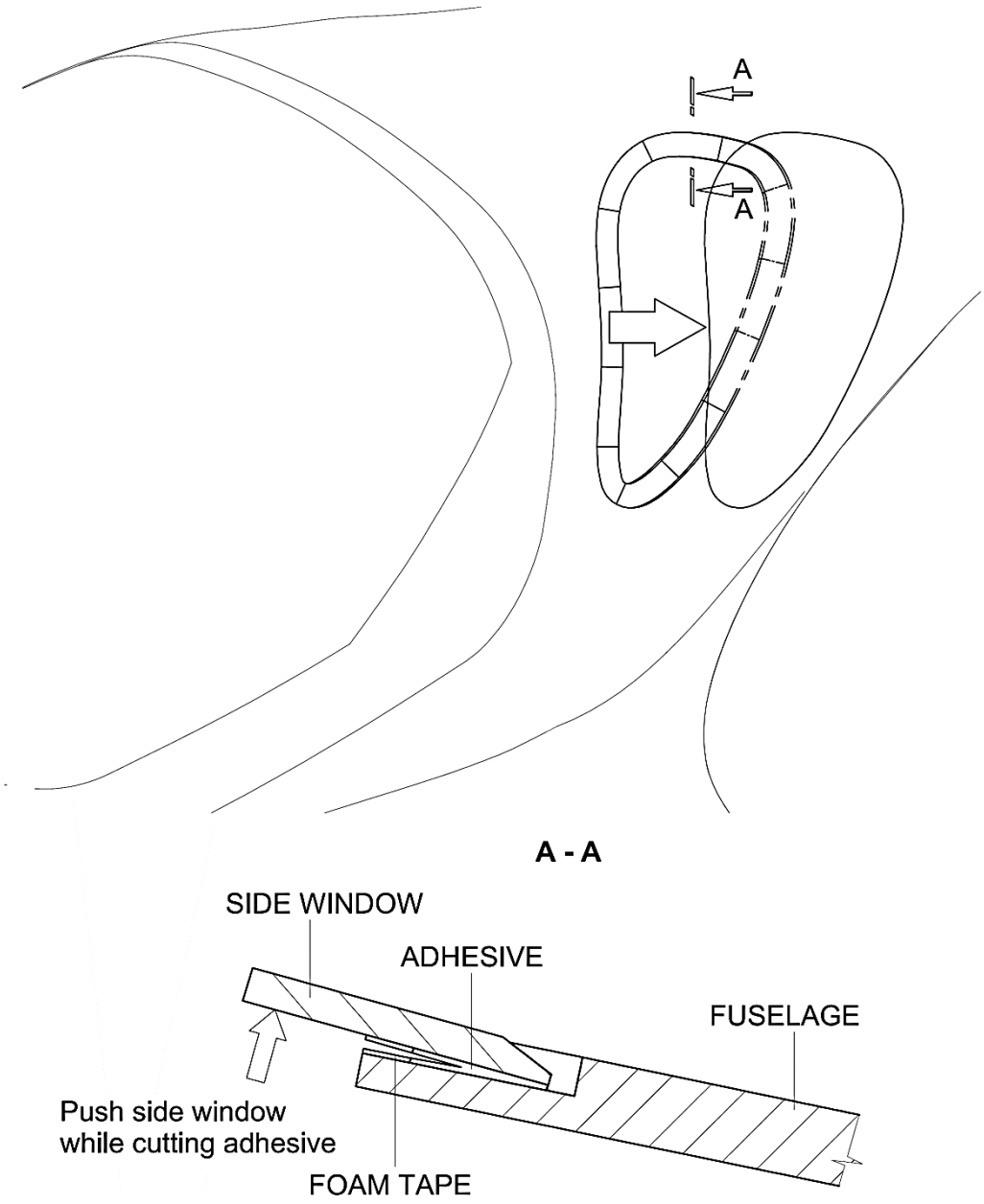


Fig. 56-5 Side Window Removal

(2) Side window installation:

CAUTION

EXERCISE CARE TO PROTECT THE INNER AND OUTER SIDE OF THE SIDE WINDOW SURFACES FROM DAMAGE DURING THE INSTALLATION PROCESS.

(a) Inspect fuselage bonding flange for any remaining adhesive or contaminates, remove and clean if necessary.

(b) Cover the interior with a foil to prevent contamination.

(c) Attach the cover foil to the side window in the distance of 16.5 mm from the edge of the window.

(d) Fit the window to the fuselage and grind edges of the glass so that between window and fuselage remains equal gap of 2.5 mm (see Fig. 56-6).

(e) Using the tape, fix the window on the fuselage. Inspect the window for proper fit. The windshield must have equal gap of 2.5 mm around the perimeter of the windshield.

(f) Make several alignment marks around edges of masking tape on the fuselage and on masking tape on the window.

(g) Remove the window from the fuselage and apply protective tape on inner side of the window, which copies outer edge of protective tape applied in previous step.

(h) Using sandpaper, abrade the bonding flange of the side window and fuselage. Clean bonding surfaces from debris and dust. Apply a continuous piece of a foam tape around the inner edge of the fuselage.

(i) Mix the adhesive in the rate of 100 g Swiftbond 9622 + 17 g Swifthardener 9533. Thicken adhesive with cotton flakes (3 g) and Aerosil (1 g) into the consistency of a paste and apply it on the fuselage bonding flange.

(j) Carefully place the side window to the canopy frame and secure it on position making sure the alignment marks made earlier (step f) are aligned and that the contour of the window matches the contour of the fuselage.

(k) Remove adhesive excesses from the gap.

(l) After curing, remove adhesive excesses from the gap. Fill the gap with epoxy mixture thickened with brown microballoons.

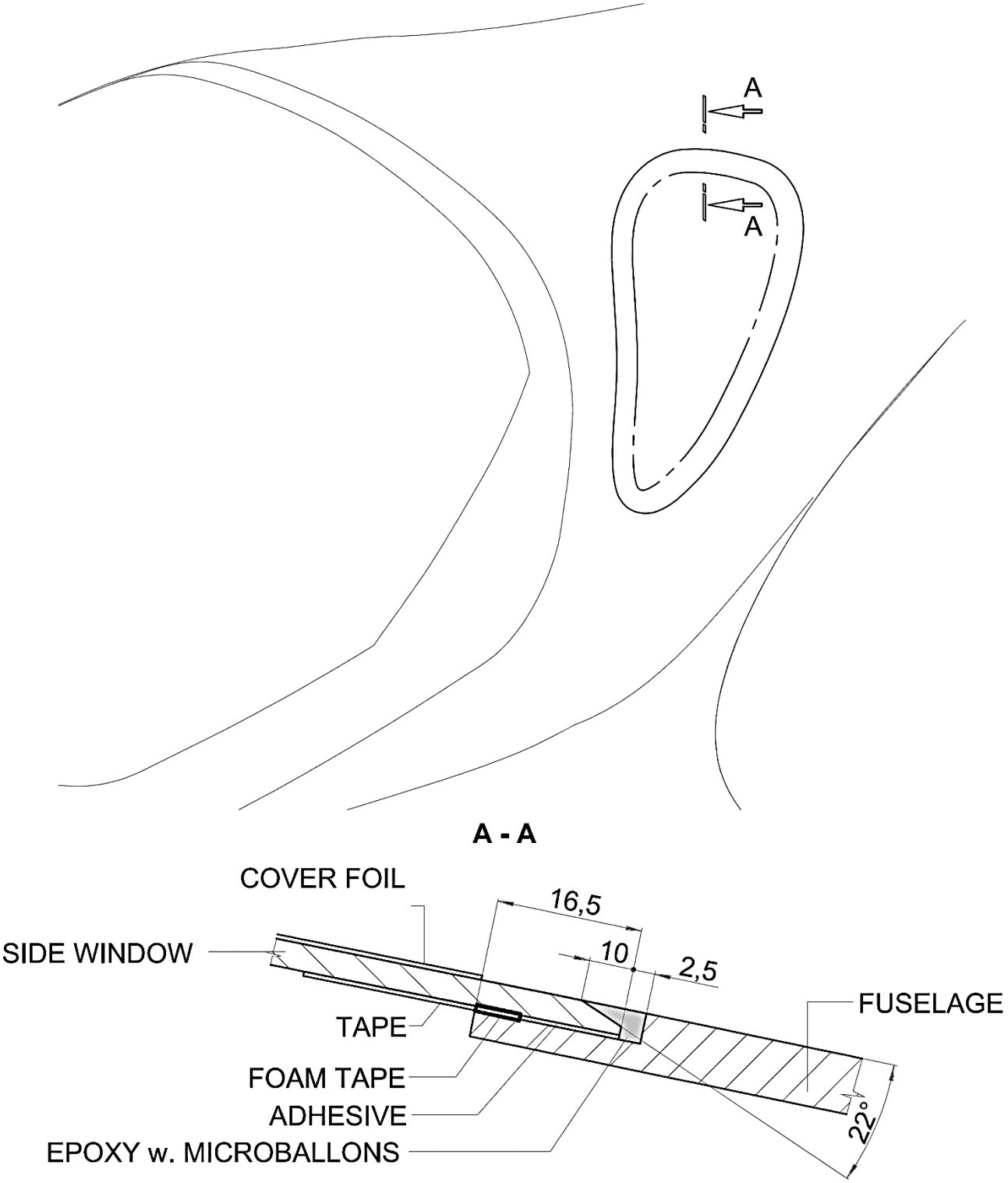


Fig. 56-6 Side Window Installation

This page is left blank intentionally

57 WINGS

CONTENTS

Chapter	Description	Page
57-00	**GENERAL**	**3**
	1. INTRODUCTION	3
57-20	**OUTER WING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	5
	A. Wings	5
57-40	**LEADING EDGE DEVICES**	**11**
	1. DESCRIPTION	11
	2. MAINTENANCE PRACTICES	11
	A. Stall strips	11
57-50	**WING FLAPS**	**15**
	3. DESCRIPTION	15
	4. MAINTENANCE PRACTICES	15
	A. Wing flaps	15
57-60	**AILERONS**	**19**
	1. DESCRIPTION	19
	2. MAINTENANCE PRACTICES	19
	A. Ailerons	19
	B. Aileron trim tab actuator	22
	C. Aileron trim tab:	25

This page is left blank intentionally

57-00 GENERAL

1. INTRODUCTION

The WT9 Dynamic LSA is low-wing aircraft with cantilever wings. Each wing has a flap inboard and aileron on the outboard trailing edge. The wings are glass/carbon composite sandwich construction.

Refer to Chapter 27 for data on the control systems for the flaps and ailerons; refer to Chapter 28 for data on the wing tanks. Refer to Chapter 51 for general repair data.

This page is left blank intentionally

57-20 OUTER WING

1. DESCRIPTION

The wing has trapezoidal shape and is glass/carbon composite sandwich construction. Upper and lower skin is glued together with one main spar and one auxiliary web. Tie-down point is attached to the main spar of each wing. Wing tips are fitted with winglets. There is a Pitot probe with angle of attack sensing installed on the lower skin of the right wing.

The main spar of each wing is attached to the fuselage's main spar through two main pins. Auxiliary web of each wing is attached to the fuselage's auxiliary spar through an auxiliary pin. The outer pin is inserted through the access hole of the lower wing surface. Inner pin is inserted from interior. Auxiliary pin is accessible from rear side, after disconnecting the flap control and folding down the flap.

There is an integral fuel tank in each wing, with volume 26 l. The fuel tank is located in wing root section in front of main spar. The tank has aluminum filler neck with lockable cap. The tank is equipped with drain valve, located in its lowest point, near wing root rib. Wing fuel tank is interconnected to fuselage fuel tank with hoses.

2. MAINTENANCE PRACTICES

A. Wings

The aircraft has the possibility to disassemble wings for transportation purposes or to save space in the hangar.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Socket 7	1 pc
Wrench 9	1 pc
Wrench 10	1 pc
Wrench 16	1 pc
Pliers	1 pc
Screwdriver	1 pc
Loctite 243	AR
Vaseline	AR
Persons	2

Tab. 57-1 Recommended tools, materials, persons and documentation

(1) Outer wing removal:

(a) Drain the fuel tanks (Chapter 12-10)

(b) Remove the adhesive sealing tape covering the gap between wing and the wing central section.

(c) Under the wing central section, remove the cover (8, Chapter 06-00, Fig. 06-2) by unscrewing bolts with washers.

(d) Disconnect aileron push rod by removing safety pin (9, Fig. 57-2), unscrew the nut (7), remove the bolt (6) and washer (8).

CAUTION

BEFORE DISCONNECTING FLAP PUSH ROD, PROTECT THE UPPER SURFACE OF THE WHEEL FAIRING AS THE FLAP WILL FALL DOWN.

(e) Disconnect the wing flap lever by unscrewing the nut (15) and removing the washer (16).

(f) Hold the wing flap; disconnect the wing flap push rod (13) by removing the split pin (12) and pulling out the pin (11).

(g) Remove safety pins (5) securing wing pins. Pull out all wing's pins in the following order: first outside main pin (1, Fig. 57-1) through the installation hole, second auxiliary pin (3) and third inner main pin (2) in the cockpit. During this procedure slightly move the wingtip up and down to unload pins.

(h) Release hose clamps (Chapter 28-20) on the fuel hoses.

(i) Pull out the wing so that there is approximately 100 mm distance between the wing central section and the wing root, unplug all hoses and wires.

(j) Carefully remove the wing and put it on soft mats. Protect all fuel tank sockets from contamination by foreign objects with an adhesive tape. Stick the wires and hoses to the wing root rib using adhesive tape.

(k) If necessary, remove Pitot probe (Chapter 34-10). Applicable for right wing only.

(2) Outer wing installation:

(a) If necessary, install Pitot probe (Chapter 34-10), applicable for right wing only.

(b) Thoroughly clean and lubricate all the wing fittings and pins with vaseline before each assembly (Chapter 12-20).

(c) Fit the wing spar into fuselage main spar and push the wing so that there will be distance approx. 100 mm between wing root and wing central section.

(d) Connect the Pitot probe hoses (right wing only) and conductive connection wiring; avoid of pitot-static hoses twisting. Put hose clamps on fuel hoses.

(e) Push the wing further inside, pull on the wing fuel tank hoses on the central section tanks sockets and pull the wing flap lever (14, Fig. 57-2) on the central section flap hinge (10).

(f) Push the wing fully into the fuselage main spar. Insert the outside pin (3), inside pin (2) (slightly shake the wing up and down to make pin insertion easier). Secure both pins with the safety pins (5).

(g) Insert the auxiliary pin (4) and secure it with the safety pin (5).

(h) Tighten the fuel hoses clamps (Chapter 28-20).

(i) Lock the central section flap hinge using washer (16) and nut (15).

(j) Connect the flap rod (13) to the wing flap lever bearing using a pin (11) and lock with the split pin (12); during this procedure, put the flap control lever to the flaps fully extended position.

(k) Connect aileron pull-push rods (17, 18) with bolt (6), nut (7) and washer (8); secure the connection with safety pin (9).

(l) Check the securing of all connections.

(m) Cover the gap between wing and wing central section using an adhesive tape.

(n) Carry out test and check:

- That pins are secured.
- That the castle nut is secured with safety pin.
- If all bolt connections are tight.
- Plays on main hinges.
- That fuel and Pitot/static hoses are securely connected.
- Free movement of wing flaps and ailerons.
- Draining and vent holes.
- That no foreign objects remained in aircraft.

(3) Outer wing inspection / check:

In the following table are shown permissible plays for wing attachment. These values should be not exceeded in operation:

SYSTEM	PROCEDURE TO FIND A PLAY	PROCEDURE TO REMEDY A PLAY	MAX. PRODUCT PLAY	MAX. OPERATION PLAY
Wing – Wing central section attachment	Move the wing tip up and down to find possible plays.	Check the wing pins. Replace if necessary.	0 mm / 0.000 in (at the wing tip)	2 mm / 0.078 in (at the wing tip)

Tab. 57-2 Maximum Permissible Plays

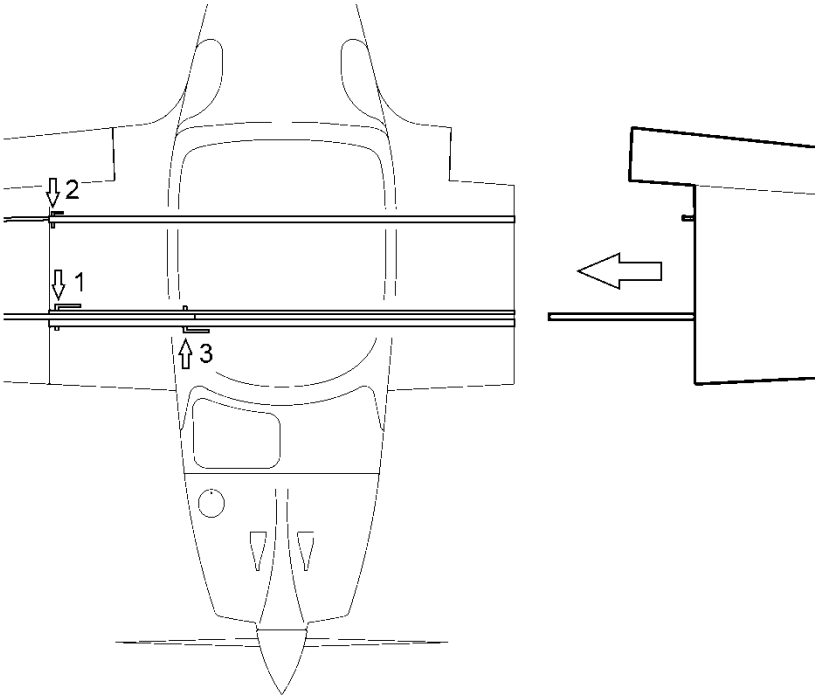


Fig. 57-1 Order of Wing Pins Removal / Installation

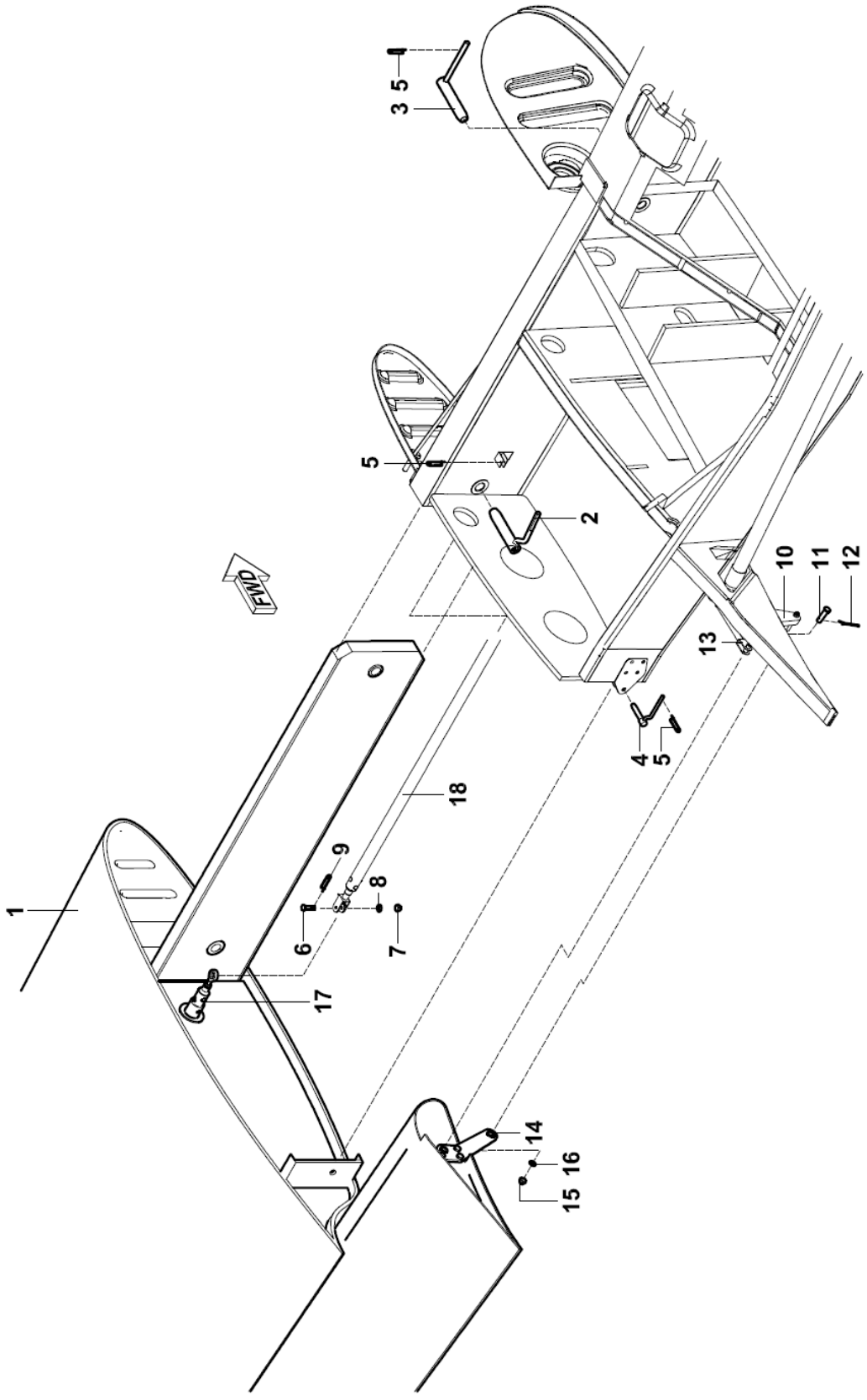


Fig. 57-2 Wing Removal / Installation (page 1 of 2)

1 – Wing
2 – Inside main pin
3 – Outside main pin
4 – Auxiliary pin
5 – Safety pin
6 – Bolt M6 x 25
7 – Castle nut M6
8 – Washer ø6.4 x 12 x 1.6
9 – Safety-pin ø1.3 x 23
10 – Central section flap hinge
11 – Pin ø6 x 21.5
12 – Split pin ø1.6 x 25
13 – Push rod
14 – Flap lever
15 – Self-locking nut M6
16 – Washer ø6.4 x 10 x 1.6
17 – Push-rod 2
18 – Push-rod 1

Fig. 57-2 Wing Removal / Installation (page 2 of 2)

57-40 LEADING EDGE DEVICES

1. DESCRIPTION

To improve stall behaviour of an aircraft, stall strips are installed on outer wing (LH and RH, marked as 200mm stall strip (2) on Fig. 57-3) and wing central section (LH and RH, marked as 400mm stall strip (1)).

2. MAINTENANCE PRACTICES

A. Stall strips

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Knife	1 pc
Sand paper	AR
Araldite (2-compound epoxy adhesive)	AR
Persons	1

Tab. 57-3 Recommended tools, materials, persons and documentation

NOTE:

Described is removal and installation of one of stall strip.

(1) Stall strips removal:

(a) Using hot air, heat the stall strip up to app. 60 °C. The resin, used to glue the strip to leading edge will become softer.

CAUTION

DO NOT OVERHEAT THE AREA UNDER AND AROUND THE STALL STRIP TO AVOID OF WING STRUCTURE DAMAGE.

(b) Using knife, carefully remove the stall strip.

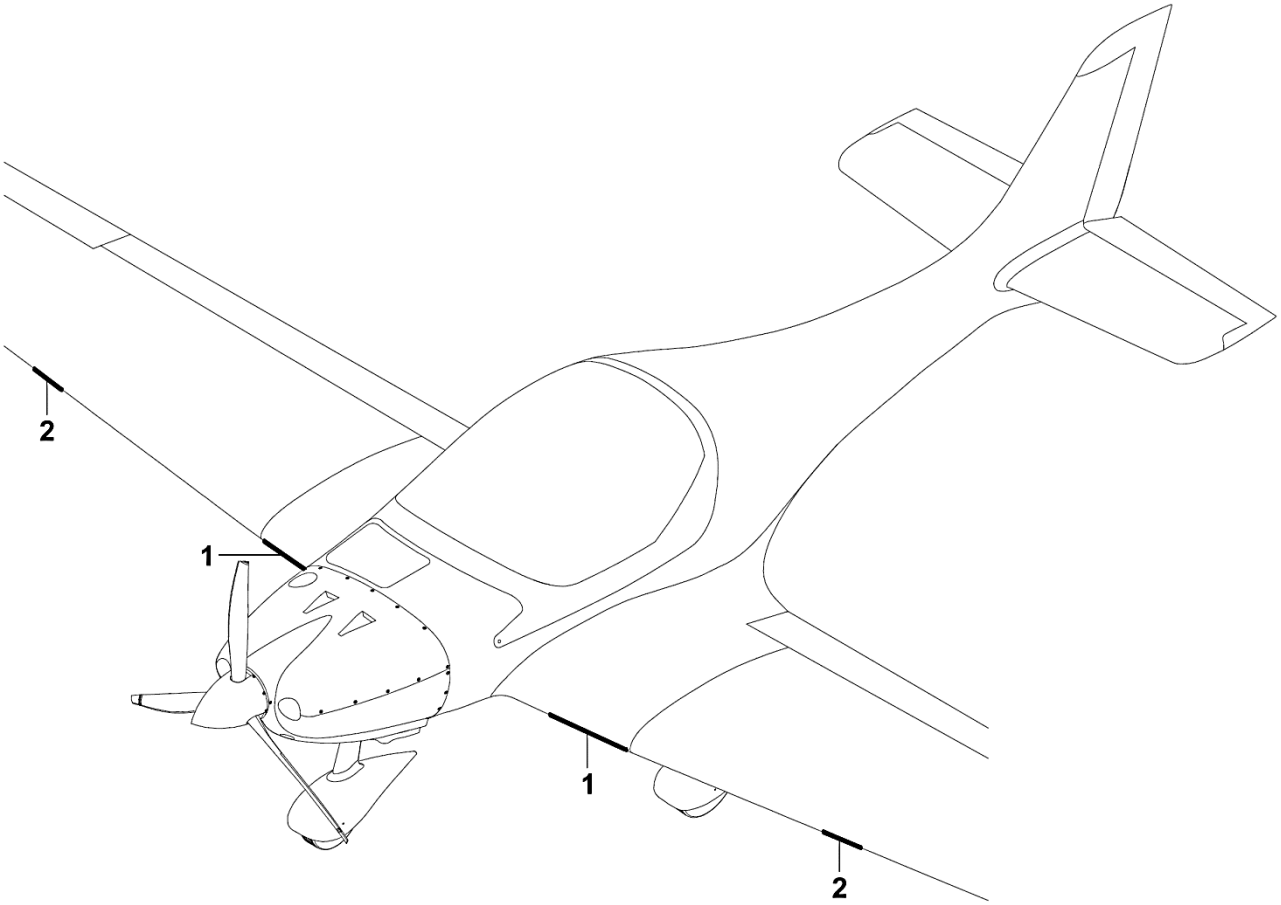
(2) Stall strips installation:

(a) Mark position of stall strip on leading edge according dimensions on Fig. 57-4.

(b) Sand the leading edge area under the stall strip and degrease.

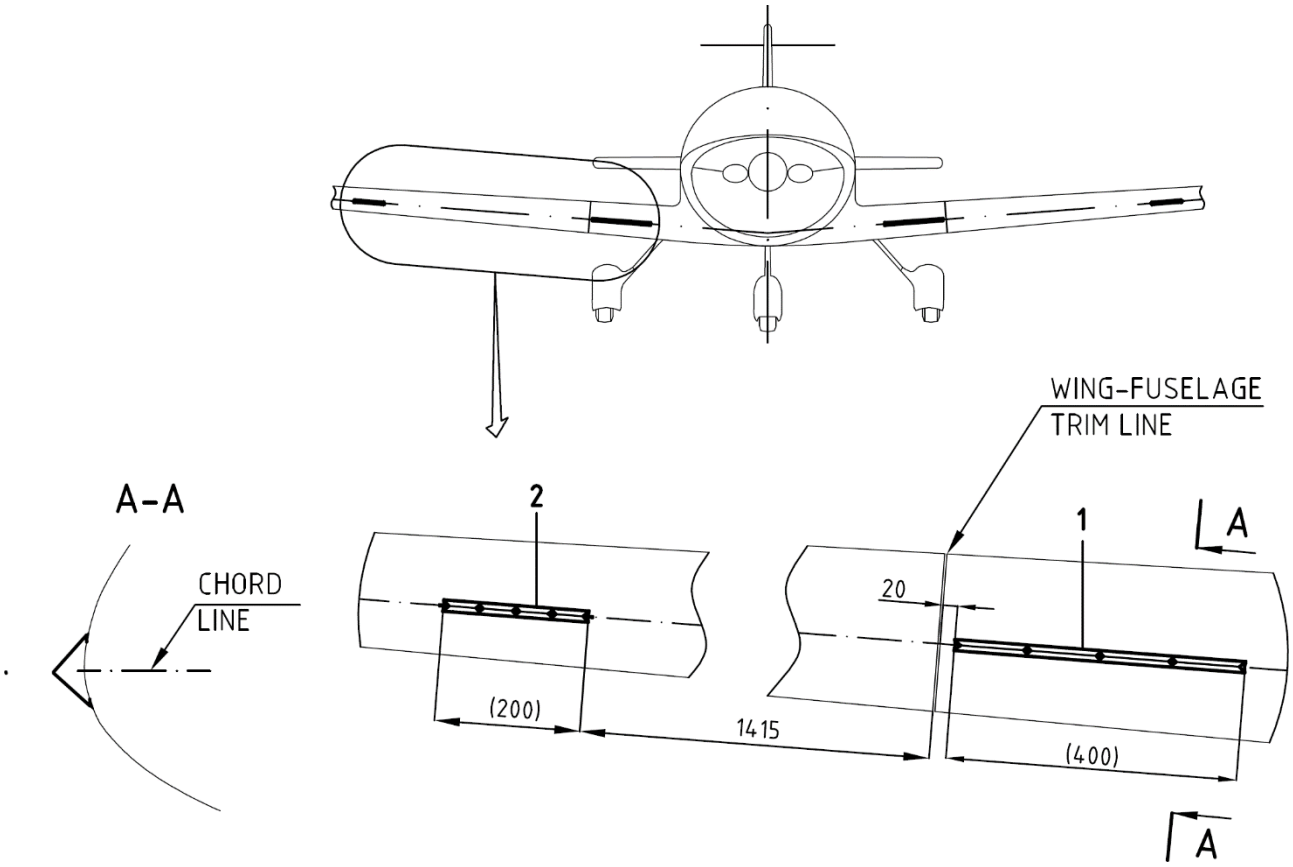
(c) Mask surrounding area with masking tape.

(d) Bond stall strip to leading edge using araldite. Remove excessive glue. Let it to harden.



1 – 400 mm stall strip 2 – 200 mm stall strip

Fig. 57-3 Stall strip position



1 – 400 mm stall strip 2 – 200 mm stall strip

Fig. 57-4 Stall strip position

This page is left blank intentionally

57-50 WING FLAPS

3. DESCRIPTION

Installed are slotted wing flaps that are glass/carbon composite sandwich construction. Wing flap consists of upper and lower skin, ribs and a web. Each wing flap is attached to the wing through three carbon hinges and one carbon/metal root hinge.

4. MAINTENANCE PRACTICES

A. Wing flaps

Described is removal and installation of the left wing flap.

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Wrench 9	1 pc
Pliers	1 pc
Screwdriver	1 pc
Serrated locking washer ø6.4	3 pcs
Split pin ø1.6 x 25	1 pc
Vaseline	AR
Loctite 243	AR
Persons	1

Tab. 57-4 Recommended tools, materials, persons and documentation

(1) Wing flap removal:

(a) If wing is disassembled, continue with point (f).

(b) If wing is assembled on aircraft, set the wing flaps lever to position 3 (flaps fully extended).

(c) Unscrew the nut (9, Fig. 57-5), remove washer (7).

CAUTION

BEFORE DISCONNECTING FLAP PUSH ROD, PROTECT THE UPPER SURFACE OF THE WHEEL FAIRING AS THE FLAP WILL FALL DOWN.

(d) Remove the split pin (11) and pull out the pin (10). Disconnect the push rod (13) from the wing flap lever (12).
(e) Retract wing flap and fix it with adhesive tape.
(f) Remove split pins (11), unscrew nuts (8), remove washers (5; 6) and pull out bolts (2) from three carbon hinges.
(g) Remove wing flap (1) from hinges.
(h) If necessary remove the wing flap lever (12), by unscrewing bolts (3) and removing washers (4; 5).

(2) Wing flap installation:

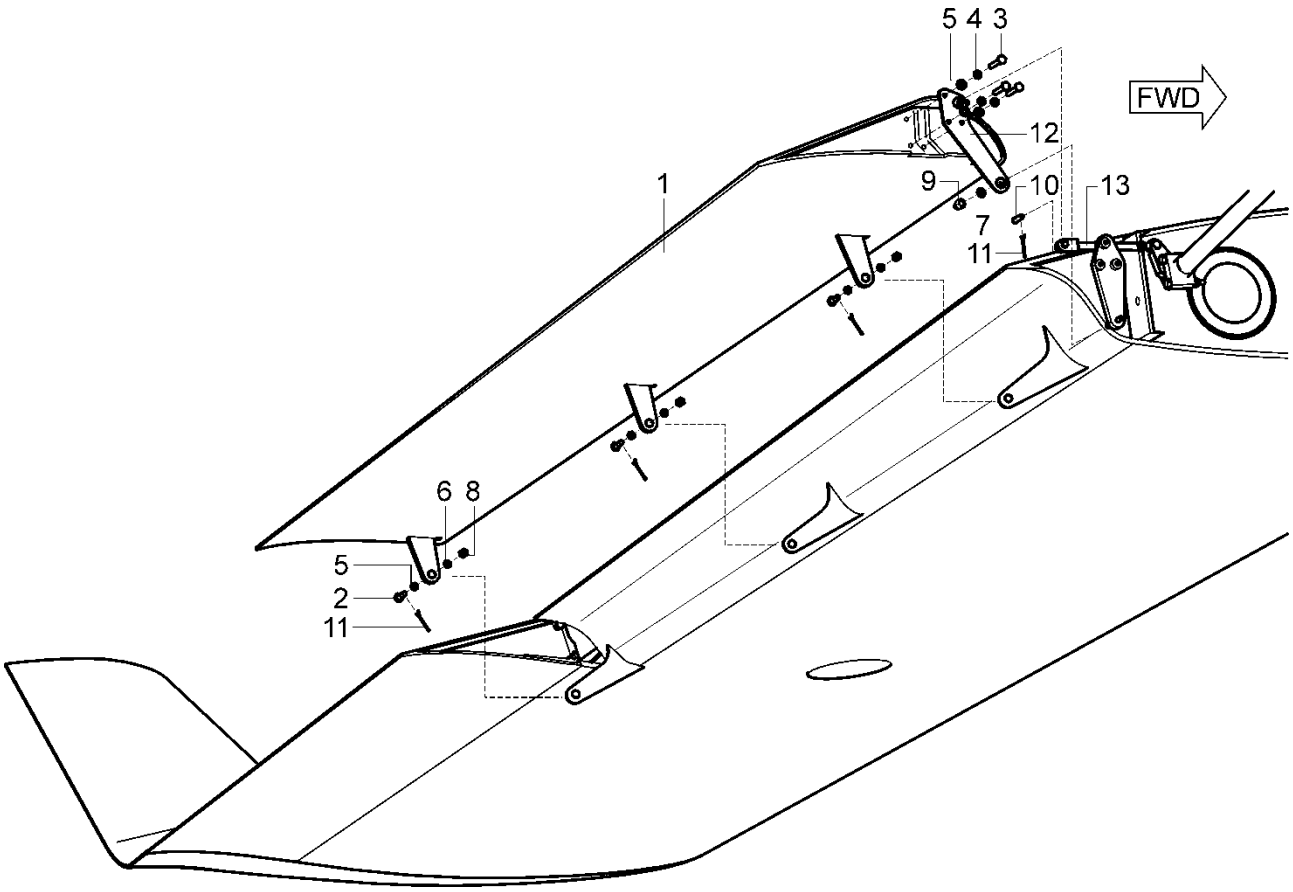
(a) Thoroughly clean and lubricate all hinges, pins and bearings with vaseline before each assembling (Chapter 12-20).
(b) If necessary install the wing flap lever (12, Fig. 57-5), using bolts (3) and washers (4; 5).
(c) Put the flap (1) in position on the aircraft; hold the flap.
(d) Secure flap (with adhesive tape) to prevent falling.
(e) Connect flaps hinges to wing hinges using bolts (2), washers (5; 6) and nuts (8); secure joints with new split pins (11).

NOTE

Assembled wing flaps have to move easily. Wing flap will move to lower position under its own weight when wing flap lever (12) is not connected to push rod (13). If it does not, lubricate carbon hinges or adjust tightness of nuts (8).

(f) Check flap move to lower position due to its own weight.
(g) Connect push rod (13) to the wing flap lever (12) using pin (10); secure joint with the new split pin (11).
(h) Carry out test and check:

- That castle nuts are secured with split pins.
- If all bolt connections are tight.
- Free plays.
- Free movement of flaps.
- Draining and vent holes.
- Alignment of the trailing edges of ailerons and wing.
- Neutral position and deflections in all flap positions.



1 – Wing flap
2 – Bolt M6 x 22
3 – Bolt M6 x 35
4 – Serrated locking washer ø6.4
5 – Washer ø6.4 x 12 x 0.5
6 – Washer ø6.4 x 12 x 1.6
7 – Washer ø6.4 x 10 x 1.6
8 – Castle nut M6
9 – Self-locking nut M6
10 – Pin ø6 x 21.5
11 – Split pin ø1.6 x 25
12 – Flap lever
13 – Push rod

Fig. 57-5 Wing Flap Removal / Installation

This page is left blank intentionally

57-60 AILERONS

1. DESCRIPTION

Ailerons are glass/carbon composite sandwich construction. Aileron consists of upper and lower skin, ribs and web. Each aileron is attached to the wing's upper skin through three carbon hinges. The aileron is fitted with a balance weight.

The right aileron is equipped with an electrically actuated trim tab.

Wiring diagram of aileron trim is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. MAINTENANCE PRACTICES

A. Ailerons

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Wrench 9	1 pc
Punch ø2	1 pc
Punch ø5	1 pc
Hammer 100 g	1 pc
Socket 10	1 pc
Pliers	1 pc
Screwdriver	1 pc
Knife	1 pc
Split pin	1 pc
Roll pin	2 pcs
Covering label	1 pc
Double side tape 12 mm	AR
White adhesive tape 12 mm	AR
Adhesive tape	AR
Vaseline	AR
Persons	1

Tab. 57-5 Recommended tools, materials, persons and documentation

(1) Aileron removal:

(a) Remove transparent cover (9, Chapter 06-00 Fig. 06-3) in wing's lower skin and disconnect push rod (10, Fig. 57-6) from bellcrank (Chapter 27-10).

(b) Remove the Mylar tape (9), together with white tape (12) and double sided tape (11).

(c) Secure aileron (with adhesive tape) to prevent of its falling.

(d) Remove split pin (8), unscrew nut (7), remove washers (4; 5) and bolt (2) from aileron root hinge.

(e) Push out roll pins (6) using punch tool ø2 mm and push out pins (3) using punch tool ø5 mm from middle and tip hinge.

(f) Carefully remove aileron with push rod from the wing and hold it.

(g) In case of the right aileron removal, disconnect electrical connector from the trim tab servo box.

(h) Disconnect push rod (10) from aileron (1) (Chapter 27-10).

(i) If necessary, remove PTFE tape (13) from aileron's upper and lower skin.

(2) Aileron installation:

(a) Thoroughly clean and lubricate all hinges, pins and bearings with vaseline before each assembling (Chapter 12-20).

(b) Connect push rod (10, Fig. 57-6) to the aileron (1) (Chapter 27-10).

(c) For right aileron installation, connect electrical connector to the trim tab servo box.

(d) Put the aileron (1) in position on the aircraft; hold the aileron.

(e) Secure aileron (with adhesive tape) to prevent falling.

(f) Insert pins (3) to the middle and tip hinges; secure them with the new roll pins (6).

(g) Connect the aileron root hinge to wing hinge using bolt (2), washers (4; 5) and nut (7); secure joint with the new split pin (8).

NOTE

The assembled aileron has to move easily. The aileron will move to lower position due to its own weight when push rod (10) isn´t connected to bellcrank. If it does not, apply more lubricant to hinges or adjust tightness of the nut (7).

(h) Check if aileron moves to lower position under its own weight.

(i) Connect push rod (10) to the bellcrank (Chapter 27-10).

(j) Check adjustment of aileron control (Chapter 27-10).

(k) If necessary, stick PTFE tape (13) on aileron's upper and lower skin.

(l) Remove old adhesive tapes and old glue from gap between wing and aileron. Stick double side tape (11) on wing surface, install Mylar tape (9) and then stick the white adhesive tape (12) on wing surface and Mylar tape.

(m) Carry out test and check:

- That castle nuts are secured with split pins.
- If all bolt connections are tight.
- Free plays.
- Free movement of ailerons.
- Fitting of roll pins.
- Draining and vent holes.
- Alignment of the trailing edges of ailerons and wing.
- Neutral position and deflection limits.

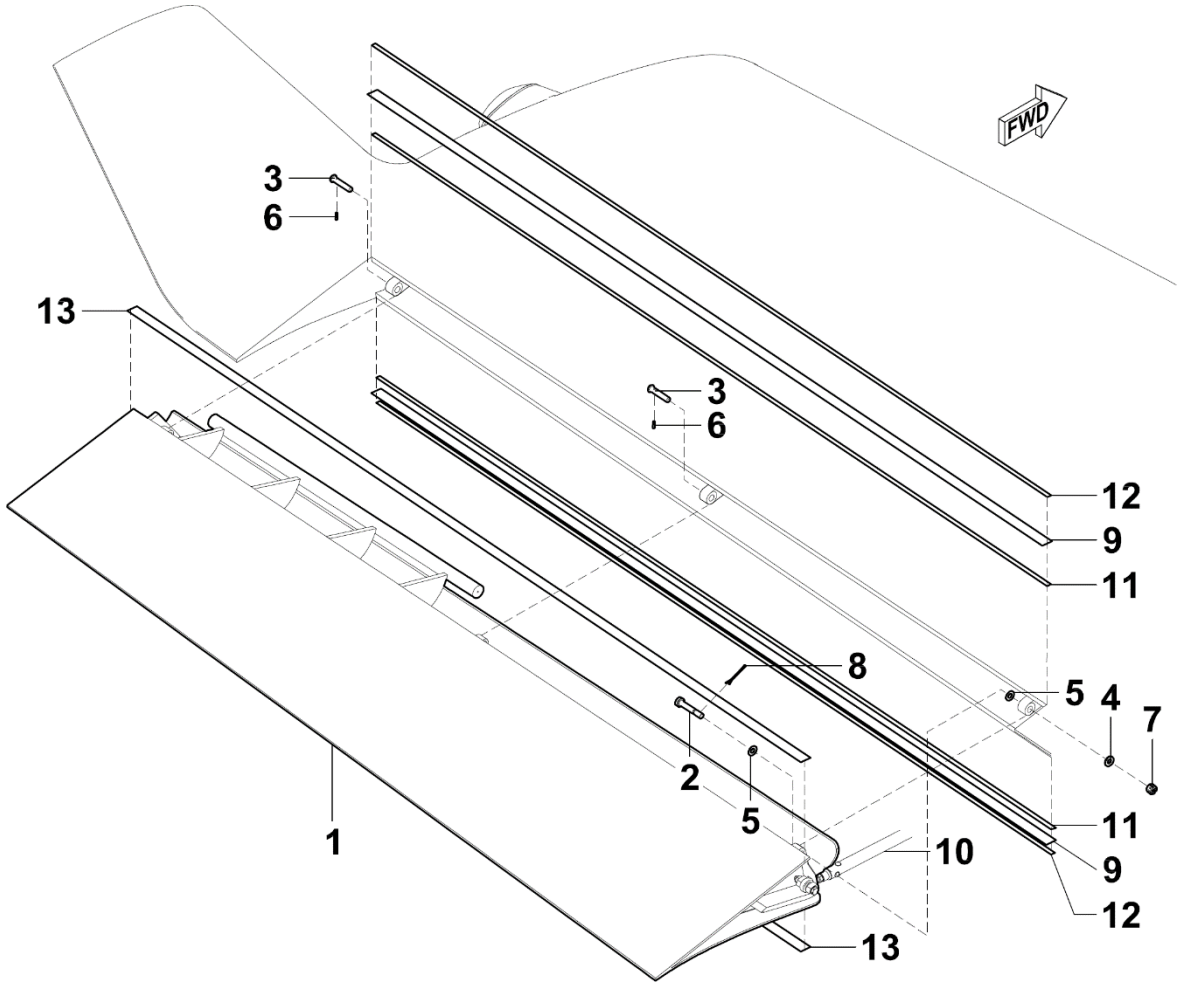


Fig. 57-4 Aileron Removal / Installation (page 1 of 2)

1 – Aileron
2 – Bolt M6 x 37
3 – Pin ø6 x 30
4 – Washer ø6.4 x 12 x 1.6
5 – Washer ø6.4 x 12 x 0.5
6 – Roll pin ø2 x 12
7 – Castle nut M6
8 – Split pin ø1.6 x 25
9 – Mylar tape
10 – Push rod
11 – Double sided tape
12 – White tape
13 – PTFE tape

Fig. 57-6 Aileron Removal / Installation (page 2 of 2)

B. Aileron trim tab actuator

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Philips screwdriver	1 pc
Wrench 10	2 pcs
Pliers	1 pc
Socket 5.5	1 pc
Cotter pin	1 pc
Protractor with deflecting pointer	1 pc
Persons	2

Tab. 27-6 Recommended tools, materials, persons and documentation

(1) Aileron trim tab actuator removal:

(a) Open the **ROLL** circuit-breaker.

(b) Remove the right aileron (see 2.A.(1)).

(c) Unscrew nuts (7, Fig. 57-7), remove washers (8), bolts (9) and cover (10).

(d) Remove the cotter pin (6), washer (5), pin (4) and disconnect the rod (3) from the trim tab lever (12).

(e) Disconnect the electrical connector (2) from the connector (13).

(f) Unscrew nuts (7), remove washers (8) and carefully remove the actuator (1) from the box.

(g) As necessary, remove the cotter pin (6), washer (5), pin (4) and disconnect the rod (3) from the actuator (1).

(2) Aileron trim tab actuator installation:

(a) If necessary, fit the rod (3, Fig. 57-7) to the actuator, insert pin (4) into the hole, insert the washer (5) and secure with the new cotter pin (6).

(b) Insert the trim tab actuator (1) into the box and fit it in place.

(c) Put nuts (7) with washers (8) on the bolts in the box and carefully tighten nuts (7).

(d) Fit the rod (3) to the control lever (12), insert pin (4) into the hole, insert the washer (5) and secure it with the new cotter pin (6).

(e) Connect the electrical connector (2) to the connector (13).

(f) Fit the cover (10) to the box, insert bolts (9) from top side, washers (8) and nuts (7) from bottom side. Tighten nuts.

(g) Install the right aileron (see 2.A.(2))

(h) Close the ROLL circuit-breaker.

(i) Carry out test and check:

- If all bolt connections are tight.
- That all lock nuts are tight.
- Free movement of aileron control system.
- Alignment of the trailing edges of ailerons and wing.
- Neutral position and max. deflections.
- Equal division of the threads on the push rods.
- That no foreign objects remained in the aircraft.

(3) Adjustment / test – aileron trim tab deflections:

CONTROL SURFACE DEFLECTIONS			
Control surface	Up	Down	Distance measurement point from the point of rotation
Trim tab	18 ±1°	20 ±1°	-

Tab. 27-7 Trim Tab Deflections

(a) Set the aileron to neutral position.

(b) Put protractor on trailing edge of aileron trim tab root.

(c) Set the aileron trim tab to neutral position.

(d) Set the protractor to 0°- starting value for measuring.

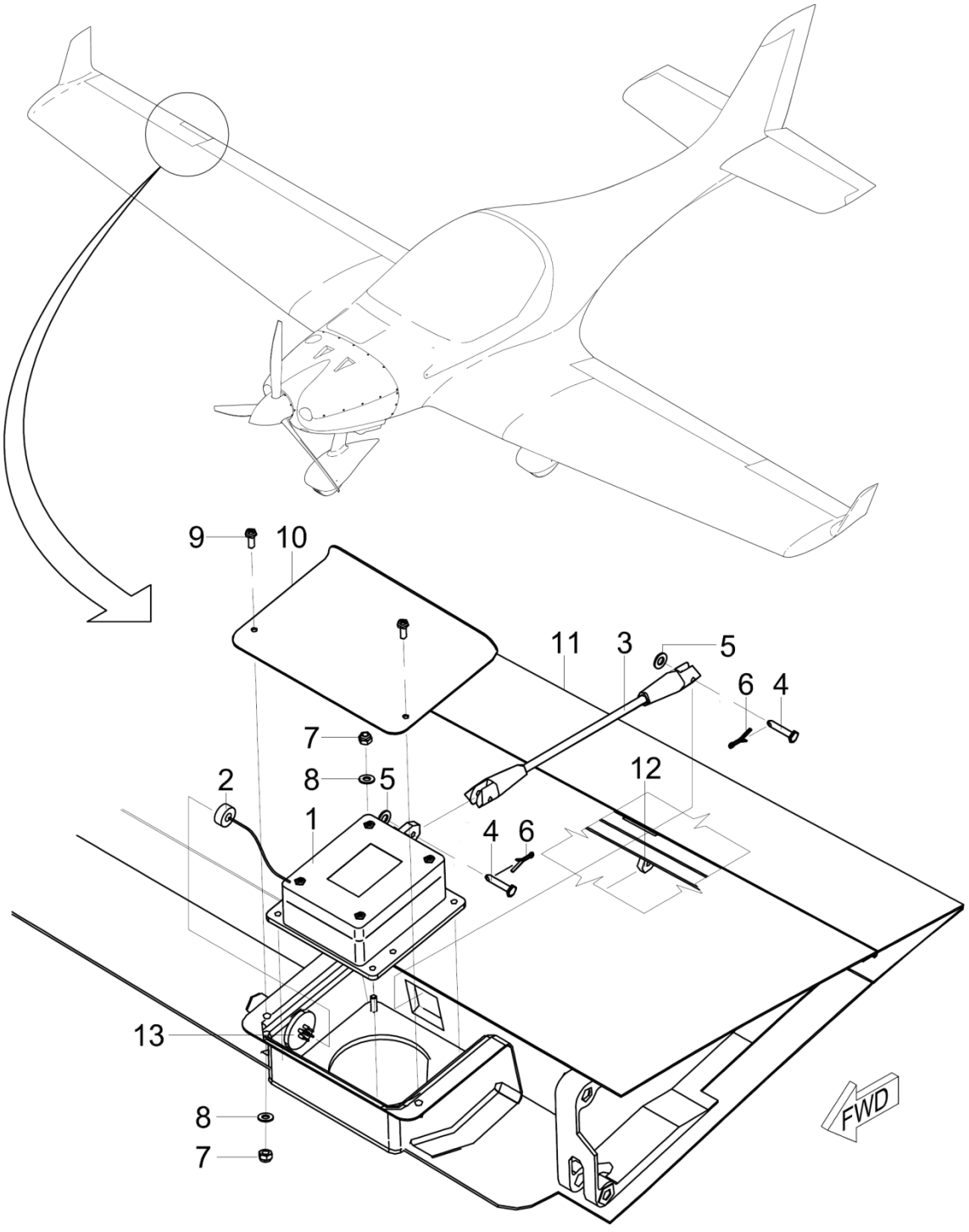
(e) Deflect trim tab to the max. up and max. down possible position and read the deflection value.

(f) Check deflection values in accordance with Tab. 27-7.

(g) If deflections are not within range listed in Tab. 27-7, adjust forks on the push pull rod (3, Fig. 57-7).

(h) Carry out test and check:

- Deflections of aileron trim tab.
- Rod ends are in safety.
- That no foreign objects remain in the aircraft.



1 – Actuator
2 – Electrical connector
3 – Push-pull rod
4 – Pin
5 – Washer
6 – Cotter pin
7 – Nut M3
8 – Washer 3.2 x 7 x 0.5
9 – Bolt M3 x 12
10 – Cover
11 – Right aileron
12 – Trim tab lever
13 – Electrical connector

Fig. 57-7 Aileron Trim Actuator Removal / Installation

C. Aileron trim tab:

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hammer 100 g	1 pc
Pliers	1 pc
Locking wire ø 0.8 mm	AR
Vaseline	AR
Persons	1

Tab. 57-8 Recommended tools, materials, persons and documentation

(1) Aileron trim tab removal:

(a) Remove the right aileron (see 2.A.(1)).

(b) Disconnect servo and push rod from the trim tab lever (3, Fig. 57-7).

(c) Cut the locking wire which is securing hinge rod (2, Fig. 57-8).

(d) Hold the trim tab and remove the hinge rod (2).

(e) Remove the trim tab (1).

(2) Aileron trim tab installation

(a) Thoroughly clean and inspect hinges, lubricate the hinge rod with vaseline (Chapter 12-20).

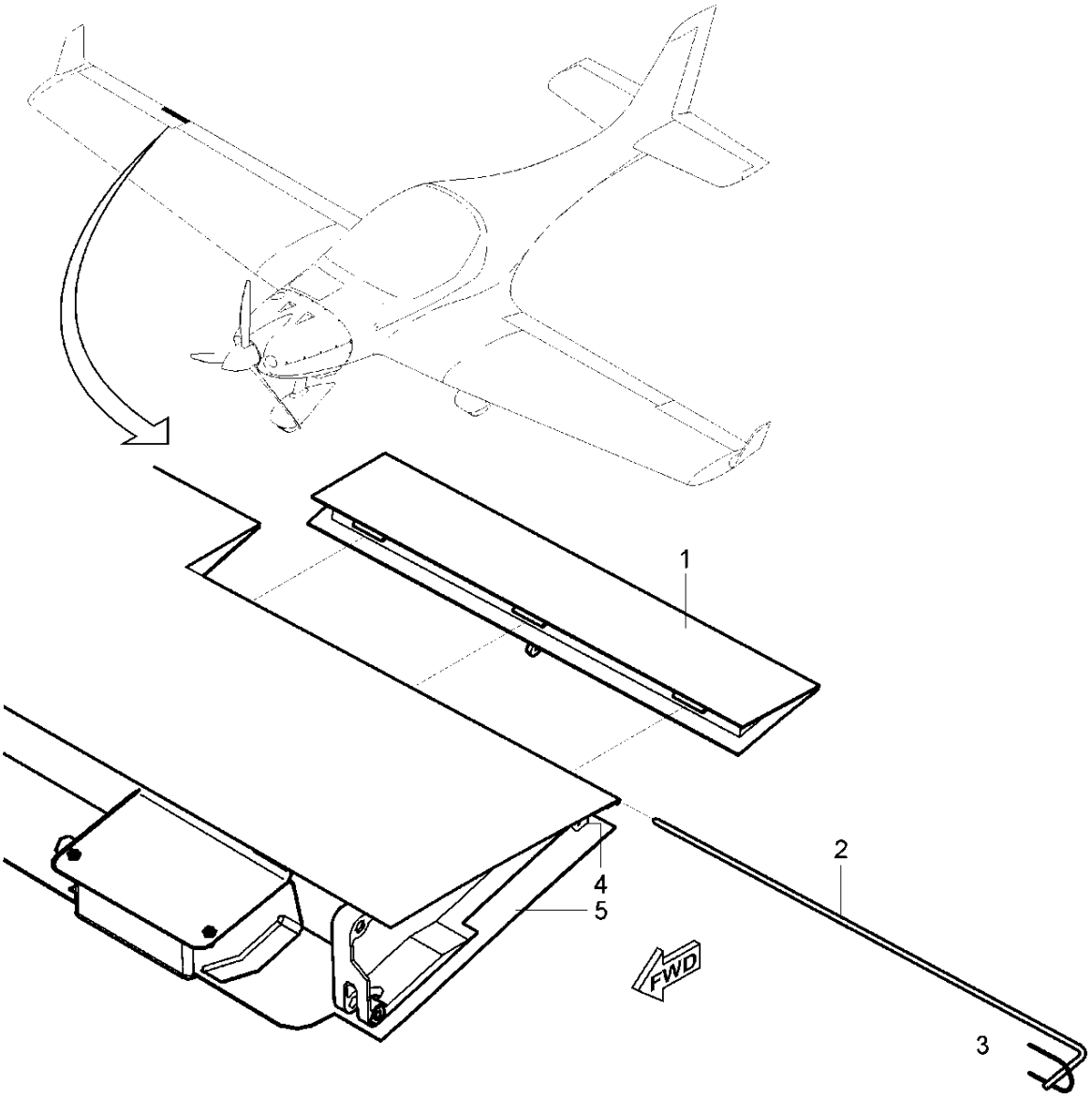
(b) Align trim tab hinges with hinges on the aileron.

(c) Carefully insert the hinge rod (2, Fig. 57-8).

(d) Secure end of the rod (2) to the bracket (4) with locking wire (3) (Chapter 20-20).

(e) Connect servo push rod to the trim tab lever (3, Fig. 57-7).

(f) Install the right aileron (see 2.A.(2)).



1 – Trim tab
2 – Hinge rod
3 – Locking wire ø0.8 mm
4 – Bracket
5 – Right aileron

Fig. 57-8 Aileron Trim Tab Removal / Installation

61 PROPELLERS

CONTENTS

Chapter	Description	Page
61-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	3
61-10	**PROPELLER ASSEMBLY**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Propeller EVRA PerformanceLine 175/xxx/805.5	6
	B. Propeller KW-31	14

This page is left blank intentionally

61-00 GENERAL

1. INTRODUCTION

The aircraft can be equipped with three blades fixed pitch propeller EVRA PerformanceLine 175/xxx/805.5 or with three blades in-flight adjustable propeller KW-31 (EASA.P.177).

2. TROUBLESHOOTING

For troubleshooting of propeller KW-31 follow the instructions in the original equipment manuals.

TROUBLE	POSSIBLE CAUSE	REMEDY
Engine vibration	Propeller out of balance.	Examine the propeller. If you find damage, contact aircraft manufacturer.
	The propeller mounting bolts are loose.	Tighten propeller mounting bolts to specific torque in crosswise pattern.
	The spinner attaching bolts are loose.	Tighten spinner attaching bolts to specific torque.
	Blade tracking not correct.	Contact aircraft manufacturer.
	Incorrect propeller alignment.	Remove the propeller. Install the propeller in the correct position. Refer to Chapter 61-10.

This page is left blank intentionally

61-10 PROPELLER ASSEMBLY

1. DESCRIPTION

A. **EVRA PerformanceLine 175/xxx/805.5** is 3-blade on ground adjustable propeller with diameter 1.750 m (68.90 in). Its blades have wooden core covered with glass fabric, stiffened with metal leading edges. Blades are fixed in aluminium hub. Propeller's hub is through spinner flange and a flange connected to engine's propeller shaft. Composite spinner is fixed to the base plate.

NOTE

For more details refer to “Tips, Practices, Mounting and Maintenance for Propeller EVRA (Ed: Amdt 3: - Date 11/00 CMM-10.01.61)”, or latest issue.

B. **KW-31 (EASA.A.177)** is a 3-blade electrically operated in flight adjustable aircraft propeller with diameter 1.726 m (67.95 in) diameter. The blades are made of combination of lash wood and composite. The propeller can be operated in either manual or with automatic mode as a constant speed propeller. The leading edges are protected by stainless steel stamping.

NOTE

For more details refer to “UM-05 EN - User Manual Aircraft Propeller Type-Model KW-31”, last valid issue.

2. MAINTENANCE PRACTICES

A. Propeller EVRA PerformanceLine 175/xxx/805.5

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 13	1 pc
Screwdriver	1 pc
Hex key 4	1 pc
Hex key 5	1 pc
Hex key 6	1 pc
Loctite 243	AR
Persons	1

Tab. 61-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF! DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Propeller removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Remove upper line of spark plugs from the engine.

(e) Unscrew bolts (7, Fig. 61-1) with washers (8) and remove the propeller spinner (6).

(f) Unscrew and remove nuts (3) and washers (4); hold the propeller (1).

(g) Pull the propeller forward; remove the bolts (2) with washers (4), balance weight (5), propeller (1) and flanges (9; 10) from the engine flange.

(h) Put the protective covers on the propeller blades and store the propeller on a safe place so that no damage can occur.

(i) As necessary, disassemble flanges (9; 10), by unscrewing the bolts (11) and removing washers (12).

(j) If necessary, unscrew the shear pins (14)

(2) Propeller installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Make sure that the battery is disconnected and upper line of spark plugs is removed from the engine.

(c) Check the contacting areas of the flange (13, Fig. 61-1), flanges (9, 10) and the propeller (1). Clear of all impurities.

(d) Remove protective covers from the propeller blades and carry out visual check of the propeller integrity and condition.

(e) If flanges (9, 10) are disassembled, use washers (12) and bolts (11) secure using Loctite 243. If shear pins (14) are disassembled, or in the case of a new part, install shear pins (14) and secure using Loctite 243. Make sure that marks on flange (10) and spinner flange (9) are aligned. If necessary, make new marks (in the case of new parts).

CAUTION

PAY ATTENTION TO ALIGNMENT MARKS (ARROWS).

(f) Attach the assemble flanges (9; 10), propeller (1), and balance weight (5) on engine flange (13) by means of the bolts (2), washers (4) and nuts (3).

(g) After the propeller is correctly positioned on the engine, manually turn the propeller in opposite direction of engine rotation to eliminate the play of the bolts (2) in propeler hub. Ensure that the marks on flange (10) and propeller (1) are aligned. If necessary, make new marks (in the case of new parts). Tighten bolts (2) in order as described on Fig. 61-2 to torque moment 25 Nm. The rated torque of bolts should be applied gradually, in three successive operations. The torque of each operation will be increased starting from 1/3 of the nominal value.

(h) Measure the difference in distance of individual blade tips from marking (see Fig. 61-3). The ends of the blades have to be within range 6 mm. If tolerance is exceeded, do not start the engine operation and investigate the cause.

(i) Put the propeller spinner (6, Fig. 61-1) on the flange (9), align the marks on spinner (6) and spinner flange (9). If necessary, make new marks (in the case of new parts). Attach it with bolts (7) and washers (8).

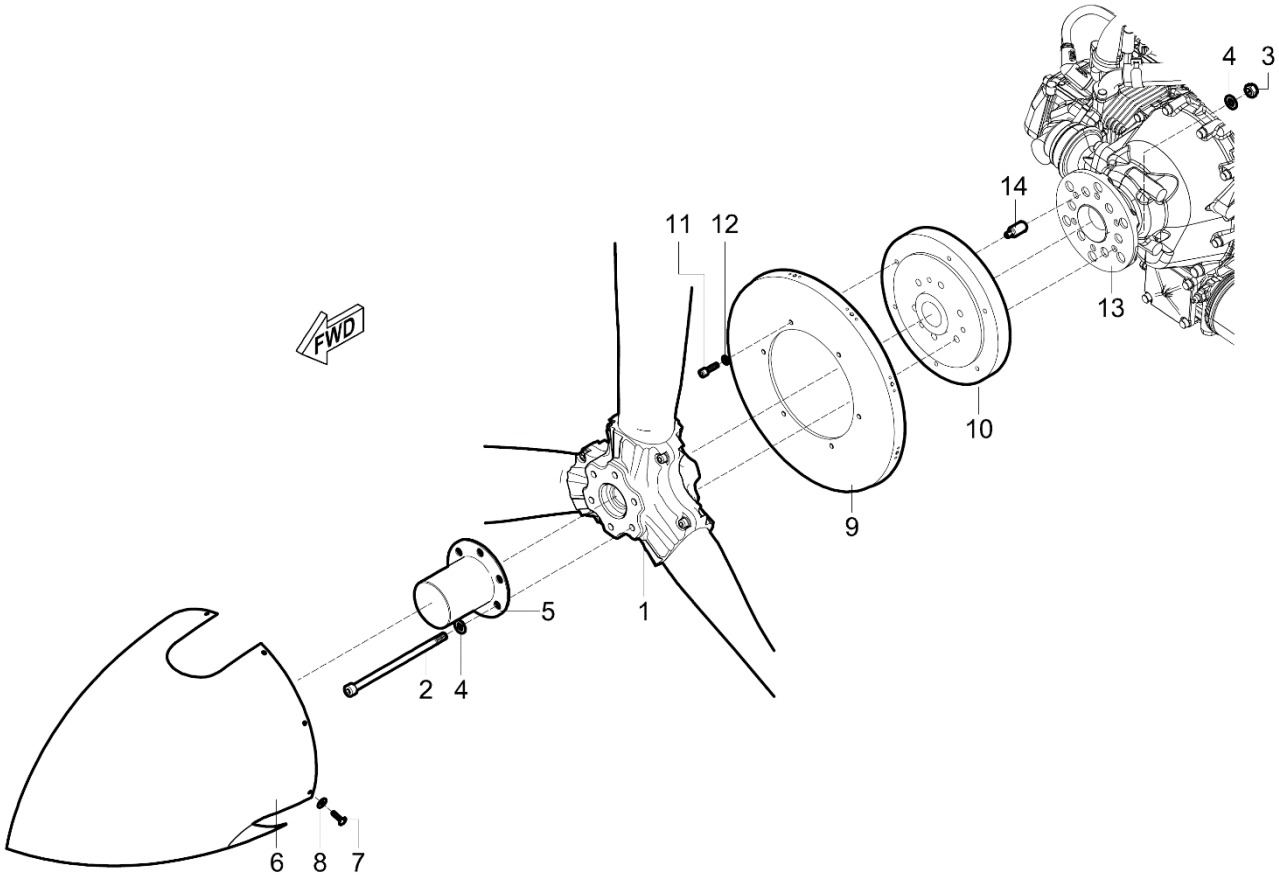
CAUTION

PAY ATTENTION TO ALIGNMENT MARKS (ARROWS).

(j) Install spark plugs in the engine. Tighten them with torque 20 Nm on cold engine.

(k) Connect negative terminal of battery (Chapter 24-30).

(l) Install the upper and lower engine cowling (Chapter 71-10).



1 – Propeller
2 – Bolt M8 x 146 (6 pcs)
3 – Self-locking nut M8 (6 pcs)
4 – Washer ø8.4 x 16 x 1.6 (8 pcs)
5 – Balance weight
6 – Spinner
7 – Bolt M4 x 16 (9 pcs)
8 – Polyamide washer ø4.3 (9 pcs)
9 – Spinner flange
10 – Flange
11 – Bolt M5 x 25 (6 pcs)
12 – Washer ø5.3 x 10 x 1 (6 pcs)
13 – Engine shaft
14 – Shear pin

Fig. 61-1 EVRA PerformanceLine 175/xxx/805.5 Removal / Installation

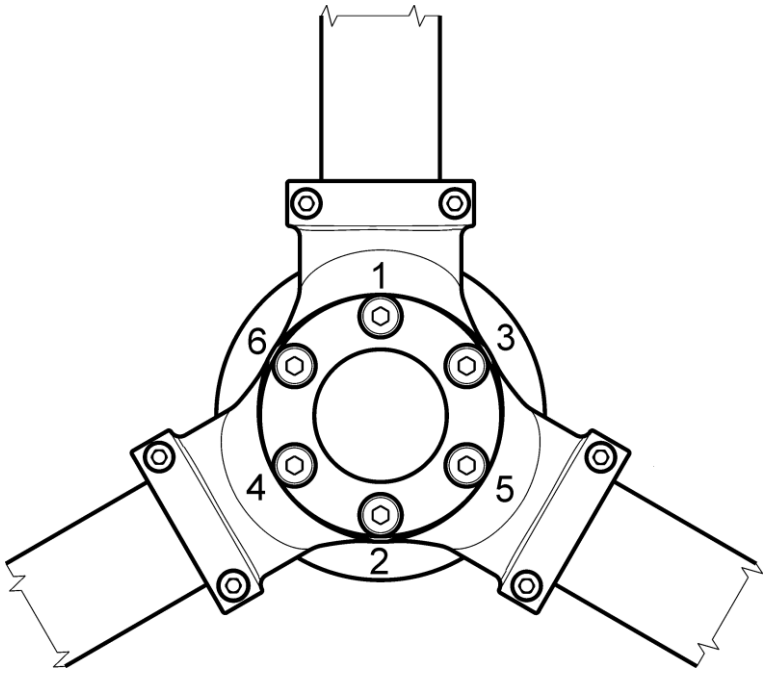


Fig. 61-2 Bolt tightening sequence

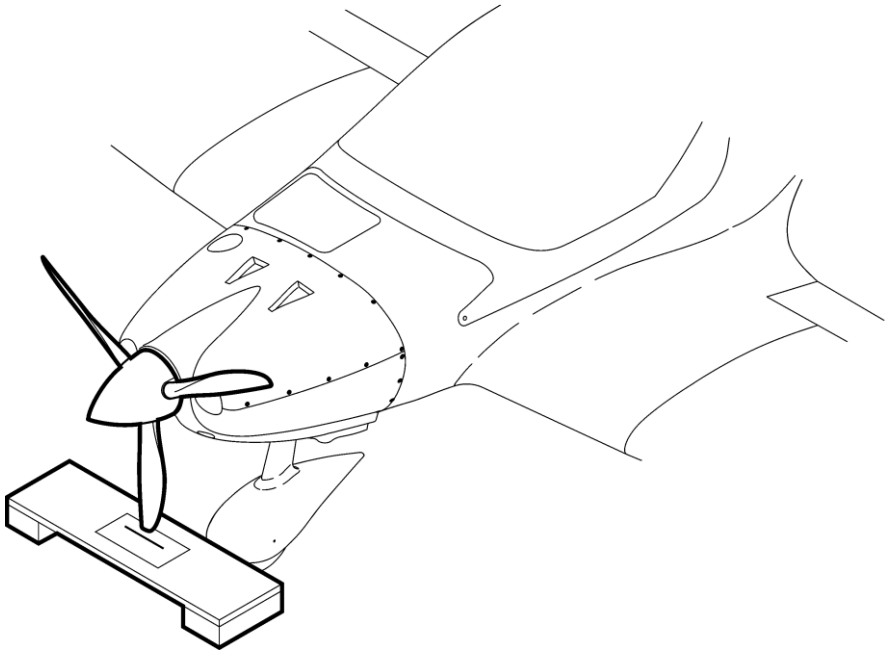
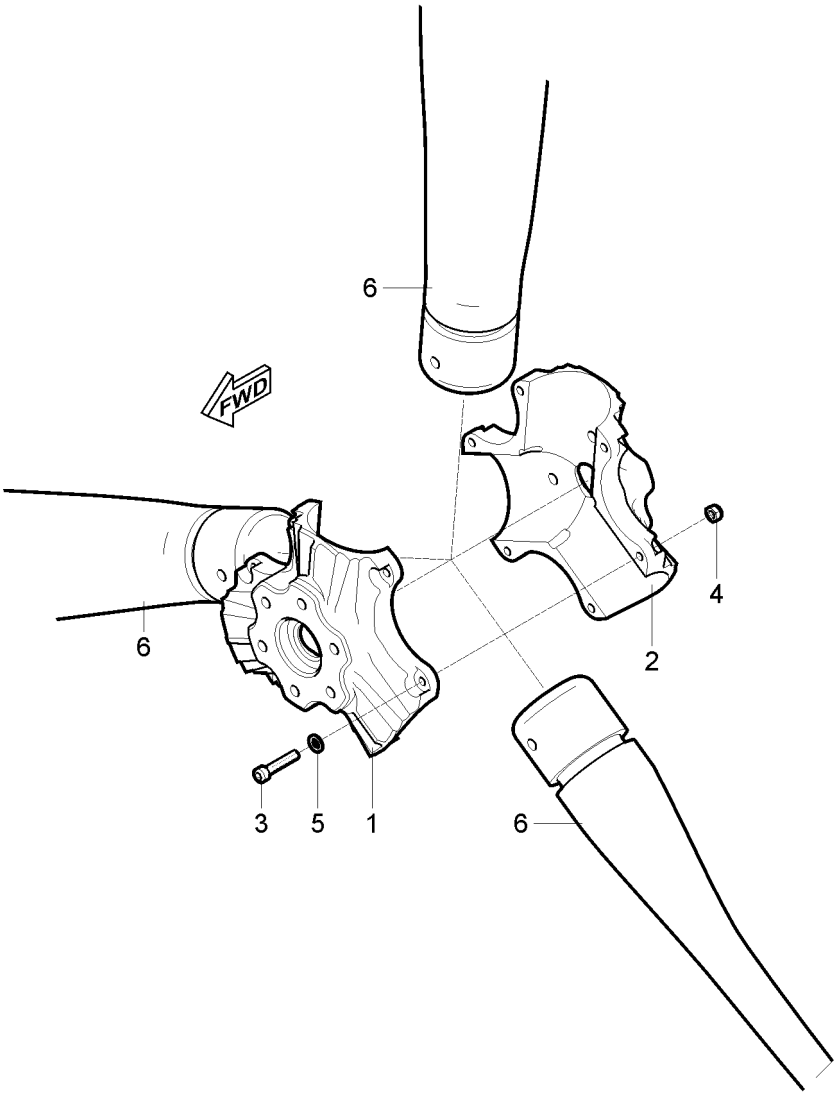


Fig. 61-3 Checking of axial propeller running-out

(3) Propeller disassembling:

(a) Unscrew nuts (4, Fig. 61-4), remove bolts (3) and washers (5).

(b) Remove front propeller hub (1; 2) and blades (6).



1 –	Front propeller hub	4 –	Self-locking nut M6 (6 pcs)
2 –	Rear propeller hub	5 –	Washer ø6.4 x 12 x 1.6 (6 pcs)
3 –	Socket head bolt M6 x 12 (6 pcs)	6 –	Blade

Fig. 61-4 EVRA PerformanceLine 175/xxx/805.5 Disassembling / Assembling

(4) Propeller assembling:

(a) Check contact area of propeller hubs (1; 2, Fig. 61-4), and propeller blades (6). Clear all impurities.

(b) Put blades (6) into the rear propeller hub (2), fit front propeller hub (1).

(c) Insert bolts (3), put washers (5) and screw nuts (4).

WARNING

BEWARE TO ENSURE CORRECT ORIENTATION AND POSITION OF BLADES AND PROPELLER HUB. FOLLOW THE MARKS ON BLADES AND PROPELLER HUB!

(d) Adjust the blades (see 2.A.(5)).

(e) Tighten bolts in the order described on Fig. 61-2. Tighten bolts (3, Fig. 61-4) to torque moments:
- first assembly, new propeller – 18 Nm
- repeated mounting, after control, or propeller repair – 15 Nm.
The rated torque of bolts should be applied gradually, in three successive operations. The torque of each operation will be increased starting from 1/3 of the nominal value.
There must be a gap between the halves of propeller hub. Check all around the constant gap between the halves of propeller hub (1; 2).

WARNING

IF CONTACT OCCURS BETWEEN THE HALVES OF PROPELLER HUB, DO NOT START THE ENGINE. CONTACT THE AIRCRAFT MANUFACTURER FOR ADDITIONAL INSTRUCTIONS.

(5) Propeller pitch adjustment:

Adjust blades pitch and balance the propeller always when replacing the blades, or after hearing noise or feeling vibration during flight.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 13	1 pc
Screwdriver	1 pc
Hex key 5	1 pc
Hex key 6	1 pc
Propeller balancer	1 pc
Protractor	1 pc
Weights	1 pc
Persons	1

Tab. 61-2 Recommended tools, materials, persons and documentation

(a) Put the propeller on a spindle propeller balancer.

(b) Release bolts (2, Fig. 61-1; 3, Fig. 61-4) so that it is possible to adjust angle of attack of blades.

(c) Put the trailing edge of propeller blade horizontal (Fig. 61-5). Put protractor on reference point marked by three lines on blade's leading edge approximately 270 mm from tip of the blade.

(d) Set blade to vertical position. Set reference angle on protractor to 23° and turn the blade around its axis to 23°. Tighten bolts (3, Fig. 61-4) around currently adjusted blade.

(e) Repeat the same procedure (d) for other blades.

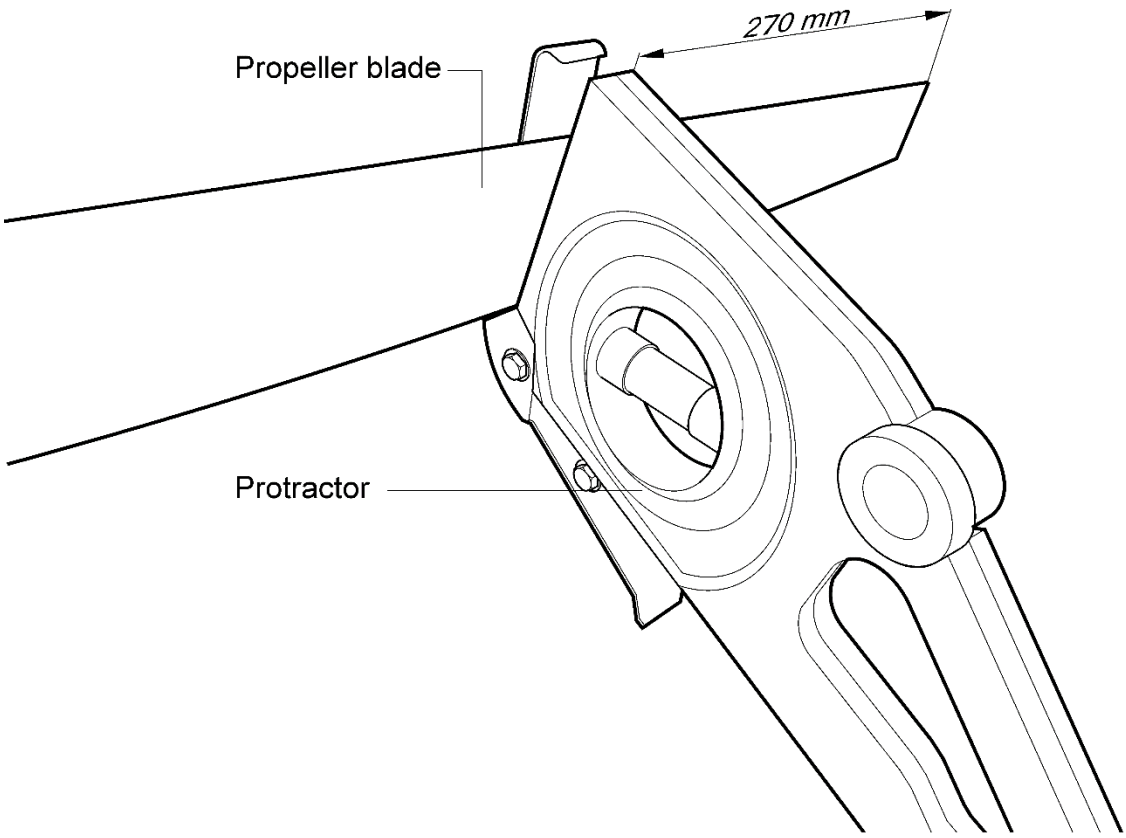


Fig. 61-5 Adjusting Blade´s Pitch

(6) Propeller balancing:
  (a) Put complete propeller (flanges, propeller, weight and spinner) on a balancer.
  (b) If the propeller is out of balance, the heaviest blade will turn downward.
  (c) To balance the propeller, use balancing weights and stick to inside of rear flange (9, Fig. 61-1) on the opposite side of the heavy blade.
  (d) Repeat this procedure (steps “b” and “c”) until all blades remain still-regardless of propeller position.

(7) Propeller inspection:
  (a) If dirty, clean blades with soapy water (Chapter 12-20)
  (b) Check for cracks.
  (c) Check metal leading edges for delamination and damage.
  (d) Check tightening of bolts every 100 flight hours or six months.

B. Propeller KW-31

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 13	1 pc
Screwdriver	1 pc
Hex key 6	1 pc
Loctite 243	AR
Persons	1

Tab. 61-3 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF! DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Propeller removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the upper engine cowling (Chapter 71-10).
- (c) Disconnect negative terminal of battery (Chapter 24-30).
- (d) Remove upper line of spark plugs from the engine.
- (e) Unscrew and remove nuts (3, Fig. 61-6) and bushings (4); hold the propeller (1).
- (f) Pull the propeller forward; remove the propeller (1) from the engine flange (5).
- (g) Put the protective covers on the propeller blades and store the propeller on a safe place so that no damage can occur.
- (h) If necessary, disassemble the carbon brush housing (6), (Chapter 61-10, 2.B.(3)).

(2) Propeller installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the battery is disconnected and upper line of spark plugs is removed from the engine.
- (c) Check the contacting areas of the propeller flange (1, Fig. 61-6), and the engine flange (5). Clear of all impurities.
- (d) Remove protective covers from the propeller blades and carry out visual check of the propeller integrity and condition.
- (e) Attach the propeller (1), on engine flange (8) by means of bushings (4), and nuts (3).

(f) After the propeller is correctly positioned on the engine, tighten nuts (3) in order as described on Fig. 61-7. Tighten nuts (3, Fig. 61-6) to torque moment 22 Nm. The rated torque of nuts should be applied gradually, in three successive operations. The torque of each operation will be increased starting from 1/3 of the nominal value.

(g) Install the carbon brush housing (Chapter 61-10, 2.B.(4)).

(h) Install spark plugs in the engine. Tighten them in accordance with instructions of the engine manual.

(i) Connect negative terminal of battery (Chapter 24-30).

(j) Install the upper engine cowling (Chapter 71-10).

(3) Carbon brushes housing removal:

(a) Make sure that **MASTER SWITCH** and **IGNITION** switches are set to **OFF**.

(b) Remove the upper engine cowling (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

(d) Unscrew the bolts (9, Fig. 61-6), washers (8) and wires (10).

(e) Unscrew the bolts (7).

(f) Remove the carbon brush housing (6).

(4) Carbon brush housing installation:

(a) Make sure that **MASTER SWITCH** and **IGNITION** switches are set to **OFF**.

(b) Connect the wires (10, Fig. 61-6) to the carbon brush housing (6) according to Aircraft Wiring Manual (Doc. No. AS-AWM-01-000). Put washers (8) and tighten by using bolts (9).

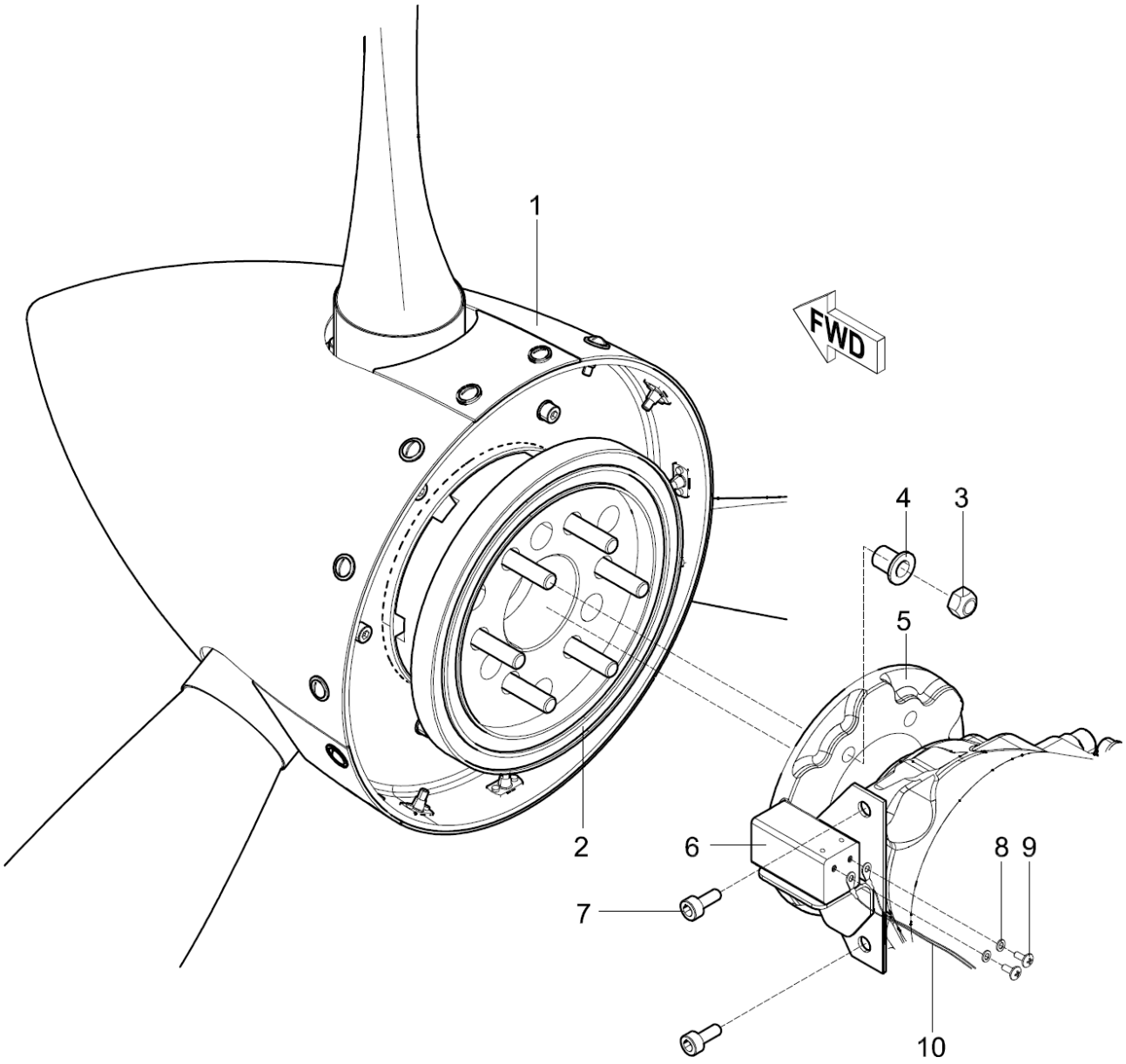
(c) Attach the carbon brush housing to the engine gear box by using bolts (7).

(d) While turning the propeller by hand it should be checked that the carbon brushes seat properly in the centres of the brass slipways (2), and contact with their entire surfaces.

(e) Tighten the bolts (7) and secure using Loctite 243.

(f) Connect negative terminal of battery (Chapter 24-30).

(g) Install the upper engine cowling (Chapter 71-10).



1 – Propeller
2 – Brass slipways
3 – Self-locking nut M8 (6 pcs)
4 – Bushing (6 pcs)
5 – Engine flange
6 – Carbon brush housing
7 – Bolt M8 x 16 (2 pcs)
8 – Spring lock washer M4 (2 pcs)
9 – Bolt M4 x 6 (2 pcs)
10 – Wires

Fig. 61-6 Propeller KW-31 Removal / Installation

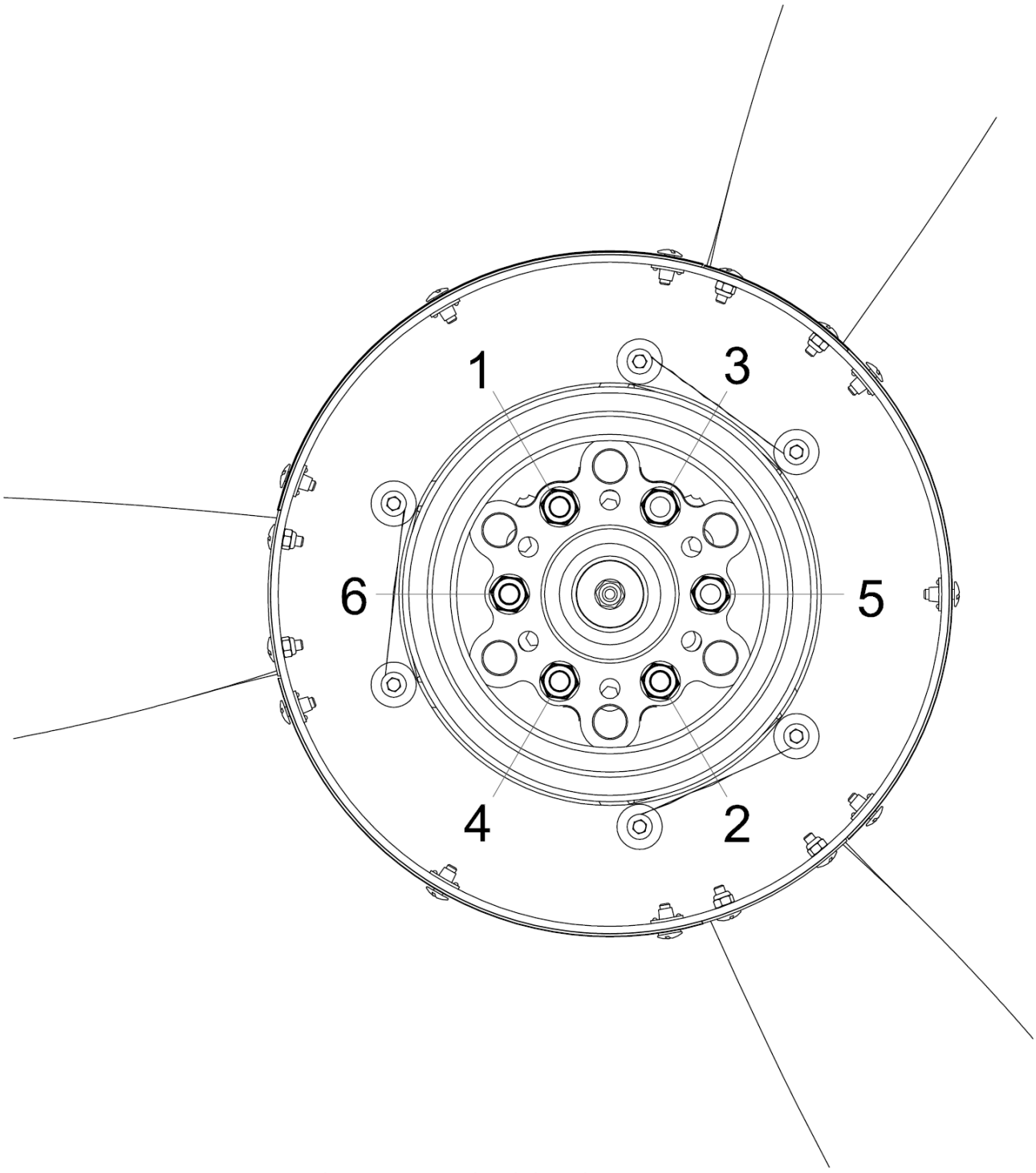


Fig. 61-7 Bolts tightening sequence

This page is left blank intentionally

71 POWER PLANT - GENERAL

CONTENTS

Section	Description	Page
71-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. ENGINE SPECIFICATION	5
	3. TROUBLESHOOTING	6
71-10	**COWLING**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	9
	A. Engine cowlings	9
71-20	**ENGINE ATTACHMENT**	**13**
	1. DESCRIPTION	13
	2. MAINTENANCE PRACTICES	14
	A. Engine attachment	14
	B. Engine mount	22
71-40	**ATTACH FITTINGS**	**25**
	1. DESCRIPTION	25
	2. MAINTENANCE PRACTICES	25
	A. Brackets	25
71-60	**AIR INTAKES**	**27**
	1. DESCRIPTION	27
	2. MAINTENANCE PRACTICES	27
	A. Airbox and air filter holder	27
	B. Air filter	31
	C. Carburettor pre-heat control	32
	D. Airbox pre-heat exchanger	36

71-70 ENGINE DRAINS 37

1. DESCRIPTION 37
2. MAINTENANCE PRACTICES 38
   A. Drains 38

71-00 GENERAL

1. INTRODUCTION

This chapter describes:

- The power plant installed in the aircraft.
- The components that make the power plant.
- Maintenance practices concerning the power plant.

The maintenance of engine Rotax 912 ULS2 itself must be performed according to engine manufacturer's documentation:

- Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912
- Maintenance Manual (Heavy Maintenance) for Rotax Engine Types 912 and 914 Series (Ref. No. MMH-912 / MMH-914

NOTE

Refer to the Pilot´s Operating Handbook WT9 Dynamic LSA / Club for engine start/stop procedures.

The power plant has a top and a bottom engine cowling. The two halves are connected to the airframe with camlock fasteners.

- Cowling (Chapter 71-10)

The engine is fixed to the airframe through an engine mount. Engine mount is attached to the engine with four bolts and to the firewall through four rubber silentblocks.

- Engine attachment (Chapter 71-20)

Holders installed on the engine are used for hoses and wires attachment.

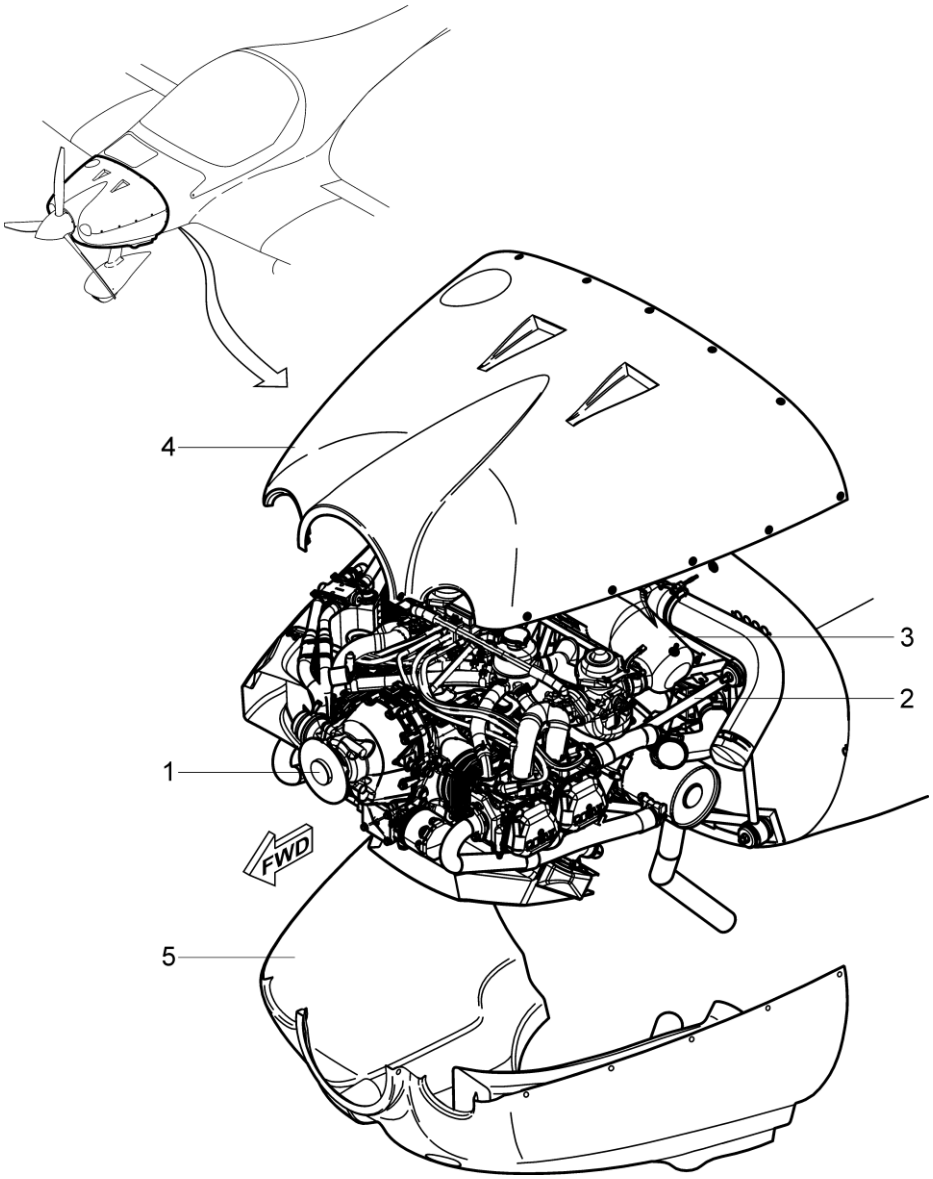
- Attach fittings (Chapter 71-40)

The engine air induction system receives ram air through an intake tunnel glued on the left side of lower engine cowling. The air flows through the air hoses, air filter holder with pre-heating, air filter to airbox. Airbox is connected to two carburettors.

- Air intakes (Chapter 71-60)

The airbox, drip trays under carburettors and mechanical fuel pump are drained.

- Engine drains (Chapter 71-70)



1 – Engine
2 – Engine mount
3 – Airbox
4 – Upper engine cowling
5 – Lover engine cowling

Fig. 71-1 Power Plant

Refer to the following chapters for other engine systems:

- Chapter 28 Fuel system
- Chapter 75 Engine cooling
- Chapter 76 Engine controls
- Chapter 77 Engine indicating
- Chapter 78 Exhaust system
- Chapter 79 Oil system

2. ENGINE SPECIFICATION

The power plant includes engine ROTAX 912 ULS2. Rotax 912 ULS2 is 4-stroke, 4-cylinder horizontally opposed, spark ignition engine, with one central camshaft push-rods-OHV. Cylinder heads are cooled with a liquid and air. The engine is equipped with a dry sump forced lubrication system. The engine is fitted with an electric starter, AC generator, and mechanical fuel pump. Propeller is driven via integrated gearbox with mechanical shock absorber and overload clutch.

Engine manufacturer:	BRP-Powertrain GmbH & Co KG	
Engine type:	ROTAX 912 ULS2	
	Bore:	84 mm / 3.31 in
	Stroke:	61 mm / 2.40 in
	Displacement:	1352 cm^3 / 82.5 in^3
	Compression ratio:	10.8 : 1
Power:	Max. takeoff	73.5 kW / 100 hp
	Max. continuous	69.0 kW / 93 hp
Engine speed:	Max. takeoff	5800 rpm max. 5 minutes
	Max. continuous	5500 rpm
	Idle	1400 rpm
Coolant temperature:	Maximum	120 °C
Oil temperature:	Maximum	130 °C
	Optimum operation	90 – 110 °C
	Minimum	50 °C
Exhaust gas temperature:	Maximum	880 °C
Oil pressure:	Maximum	7.0 bar (for short period admissible at cold start)
	Optimum operation	2.0 – 5.0 bar
	Minimum	0.8 bar
Fuel pressure:	Maximum	0.50 bar
	Minimum	0.15 bar
Engine start, operating temperature		
	Maximum	50 °C (ambient temperature)
	Minimum	-25 °C (oil temperature)
Acceleration	Maximum	5 sec. at max. -0.5 g

3. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Engine does not start.	Improper use of starting procedure.	Refer to Pilot's Operating Handbook.
	Fuel tanks empty.	Inspect and fill tanks.
	Fuel selector valve in **OFF** position.	Place selector valve in on position to tank contains fuel.
	Clogged fuel filter.	Check, clean or renew fuel filter.
	Water in fuel system.	Drain fuel system.
	Fuel contamination.	Drain fuel system.
	Defective ignition switch.	Check continuity; repair or replace switch or wires.
	Spark plugs fouled.	Remove, clean, and re-gap (Rotax Maintenance Manual).
	Spark plugs wet from fuel due to excessive actuation of choke or overflow of carburettor.	Dry spark plugs, check for faults in the fuel system.
	Unclean or jammed fuel needle.	Clean or replace.
	Clogged carburettor jets.	Clean.
	Water in the carburettor.	Drain and clean the carburettor, fuel lines, and separator.
	Insufficient compression.	Check for pressure leakage, repair if necessary.
	Internal engine damage.	Inspect magnetic plugs and oil filter for metal particles; in case of presence, repair engine (Rotax Maintenance Manual).

TROUBLE	POSSIBLE CAUSE	REMEDY
Starting speed low.	Faulty or discharged battery.	Charge or replace battery.
	Start problems on cold engine.	Allow sufficient cooling period to counter for performance drop on hot starter; preheat engine.
Engine idles rough after warm-up period, smoky exhaust emission.	**CHOKE** activated.	Close **CHOKE**.
	Carburettors synchronized inadequately.	Adjust carburettors.
	Fuel needle unclean, jammed, or worn.	Clean or replace.
	Intake manifold leaking.	Tighten all connectors, replace the defective parts.
Engine runs irregularly or misfires occasionally.	Spark plugs do not fire.	Check plugs, clean inside and outside, re-gap. Replace plugs if necessary.
	Spark discharge over ignition cables.	Dry wet wires. Replace defective cables.
	Defective ignition box.	Box has to be repaired, or replace.
	Clogged fuel filter.	Check, clean or renew fuel filter.
Engine keeps running with ignition OFF.	Overheating of engine.	Allow engine to cool down at 1400 rpm.
	Defective ignition switch.	Check ground connections, overhaul switch.
Engine runs too hot, oil temperature exceeds 130 °C.	Too much oil remaining in the crankcase.	Check oil return lines for clogging, check engine for fuel mixture leakage.
	Insufficient air stream to oil cooler.	Check for free air passage, clean.
	Insufficient oil supply.	Check oil level, refill if necessary.
	Poor oil quality.	Change oil, use approved oil.
	Clogged oil filter.	Replace.

TROUBLE	POSSIBLE CAUSE	REMEDY
Knocking under load.	Octane rating of fuel too low.	Use fuel with higher octane rating.
Excessive oil consumption.	Worn, broken, or improperly installed piston rings.	Engine overhaul required.
	Poor oil quality.	Change oil, use approved oil type.
	Worn valve guides, poor condition of valve shaft seal.	Cylinder head repair required.
	Oil leaks.	Seal.
Low oil pressure.	Not enough oil in oil tank.	Check oil level, refill if necessary.
	Hot oil.	Cool down oil.
	Oil remains in the engine and does not return to the tank.	Check oil return line for clogging.
	No oil pressure, air in the oil line.	Bleed oil line.
High oil pressure.	Too cold oil.	Cover oil cooler surface.
	Wrong viscosity of oil.	Change oil to lower viscosity.
Engine hard to start at low temperature.	Starting speed too low.	Preheat engine.
	Faulty or discharged battery.	Charge or replace battery.
	High oil pressure.	At cold start a pressure reading up to around 7 bar for short period does not indicate malfunction.
	Oil pressure too low after cold start.	Too much resistance in the oil system at low temperature; stop engine and preheat oil.

NOTE

Refer to the Operators Manual for Rotax Engine Type 912 Series, Ref. No.: OM-912 for additional information.

71-10 COWLING

1. DESCRIPTION

Engine compartment is covered by upper (4, Fig. 71-2) and lower (5) cowlings. They are made of composite. Near hot areas in the engine compartment the engine cowling is locally covered by heat protection. Upper cowling is fitted with the door for easy check of oil level. There are landing lights (Chapter 33-40) installed in the lower engine cowling.

On the front part of both cowlings, on left and right side, air intakes are located. On the top of the upper cowling are located two NACA inlets. Lower cowling has one large air intake. This air intake in the towing version of aircraft is more adapted. On the left part of the lower cowling is glued the ram air tunnel.

Upper engine cowling is attached to the fuselage rim and lower engine cowling by the quick-closing locks (Camlock); lower engine cowling is attached to the fuselage rim by means of bolts.

2. MAINTENANCE PRACTICES

A. Engine cowlings

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 10	1 pc
Hex key 7	1 pc
Persons	2

Tab. 71-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF.

(1) Engine cowling removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Release all Camlocks (5, Fig. 71-2) and remove upper cowling (1).

(c) Remove safety pins (9), and unclip the clips (11) on oil cooler holder.

(d) Release the hose clamps (7; 8) and disconnect hoses (12; 13) from ram air tunnel tubes (10).

(e) Disconnect the landing light connector (Chapter 33-40).

(f) On lower cowling, unscrew bolts (3; 4) and remove washers (6) to release water radiator holder and lower cowling.

(g) Direction from bottom to top carefully remove lower cowling (2a, 2b).

(2) Engine cowlings installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Before installation check engine cowlings for cracks.

(c) Carefully put lower cowling (2a, 2b, Fig. 71-2) to appropriate position.

(d) Hold the cowling and attach water radiator holder and lower cowling using washers (6) and bolts (3; 4).

(e) Connect the landing light connector (Chapter 33-40).

(f) Connect hoses (12; 13) to the ram air tunnel tubes (10) and secure them with safety clamps (7; 8).

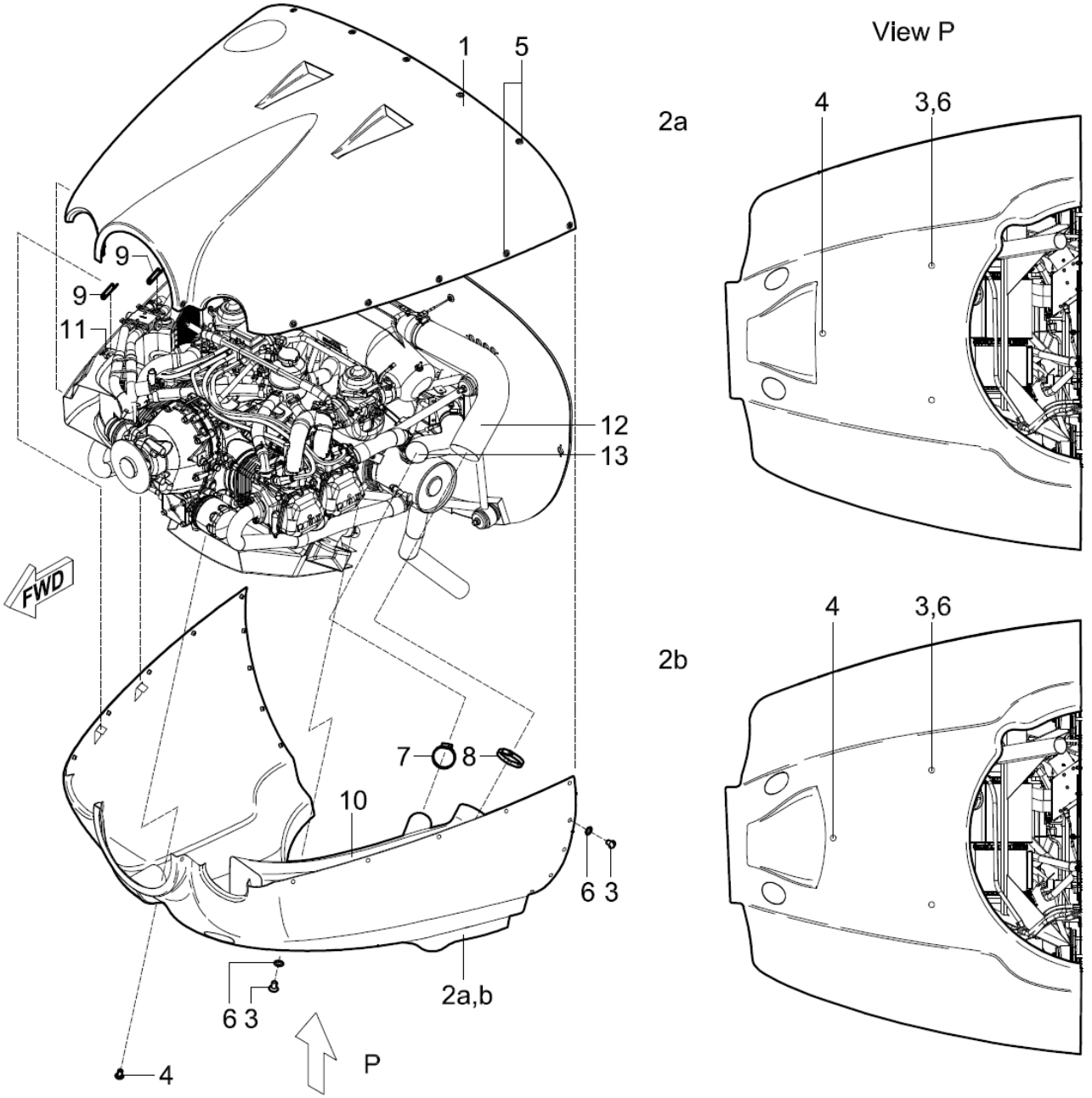
(g) Attach oil cooler holder by the clips (11) and install safety pins (9).

(h) Check that no foreign objects remain in engine compartment.

(i) Check that hose clamps, safety pins, clips and bolts are well secured.

(j) Carefully put upper cowling (1) to appropriate position and fasten it by camlocks (5).

(k) Check landing light function.



1 – Upper engine cowling
2a – Lover engine cowling
2b – Lover engine cowling (towing version)
3 – Bolt M5 x 16
4 – Bolt M4 x 12
5 – Camlock
6 – Polyamide washer ø5.3
7 – Hose clamp ø40-60
8 – Hose clamp ø50-70
9 – Safety pin ø1.4 x 20
10 – Ram air tunnel
For information:
11 – Clip
12 – Air hose ø55 x 370
13 – Air hose ø55 x 240

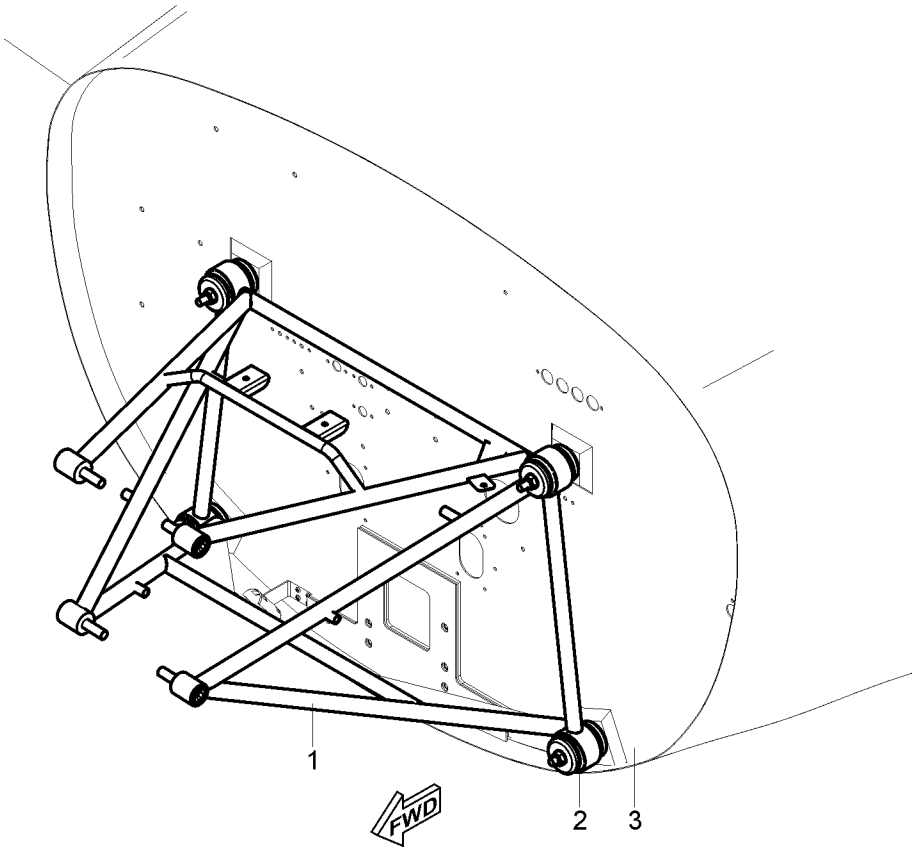
Fig. 71-2 Engine Cowlings Removal / Installation

This page is left blank intentionally

71-20 ENGINE ATTACHMENT

1. DESCRIPTION

The engine is fixed to the airframe through engine mount (1, Fig. 71-3). The engine mount is a weldment, made mostly of steel tubes. The engine mount is attached to the engine through four bolts and to the firewall (3) through four rubber silentblocks (2).



1 – Engine mount
2 – Silentblock

For information:
3 – Firewall

Fig. 71-3 Engine Mount

2. MAINTENANCE PRACTICES

A. Engine attachment

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hoist, lifting capacity 200 kg	1 pc
Wrench 19	1 pc
Wrench 13	1 pc
Wrench 12	1 pc
Wrench 10	1 pc
Wrench 8	2 pcs
Hex key 10	1 pc
Hex key 4	1 pc
Hex key 2	1 pc
Screwdriver 3	1 pc
Screwdriver 5	1 pc
Screwdriver 10	1 pc
Pin	1 pc
Knife	1 pc
Oetiker pliers	1 pc
Driller	1 pc
Drill ø1.6 mm	1 pc
Drill ø3 mm	1 pc
Stick ø13	1 pc
Heating gun	1 pc
Multimeter	1 pc
Safety clamp 14.5	1 pc
Cooper gasket ring ø14	2 pcs
Safety clamp 20.7	1 pc

Tab. 71-2 Recommended tools, materials, persons and documentation (page 1 of 2)

ITEM	QUANTITY
Spring washer ø10	1 pc
Cable ties 2.6	AR
Cable ties 4.8	AR
Rags	AR
Shrink tube 6.4 x 3.2	AR
Pyrosil tape (fire resistant end sealing tape)	AR
Lockwire ø0.8 mm	AR
Vaseline	AR
Loctite 243	AR
Loctite 270	AR
Aircraft Wiring Manual (Doc. No. AS-AWM-01-000)	-
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	2

Tab. 71-2 Recommended tools, materials, persons and documentation (page 2 of 2)

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

ALWAYS ALLOW ENGINE TO COOL DOWN TO OUTSIDE AIR TEMPERATURE BEFORE START ANY WORK.

ENSURE THAT THE EMERGENCY PARACHUTE SYSTEM HANDLE IS LOCKED.

(1) Engine removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Lift the aircraft and secure tail (Chapter 07-10).

(c) Remove the engine cowlings (Chapter 71-10).

(d) Disconnect negative terminal of battery (Chapter 24-30).

(e) Remove the propeller (Chapter 61-10).

(f) Remove the airbox (Chapter 71-60).

WARNING

DRAINING ALL FUEL FROM THE FUEL SYSTEM IS NOT POSSIBLE. BE CAREFUL DURING DISASSEMBLING FUEL SYSTEM!

(g) Drain fuel from the fuel system (Chapter 12-10).
(h) Drain oil from the oil system (Chapter 12-10).
(i) Drain the coolant from the cooling system (Chapter 12-10).
(j) Remove all cable ties in engine compartment.
(k) Disconnect the electric system.

NOTE

Use Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

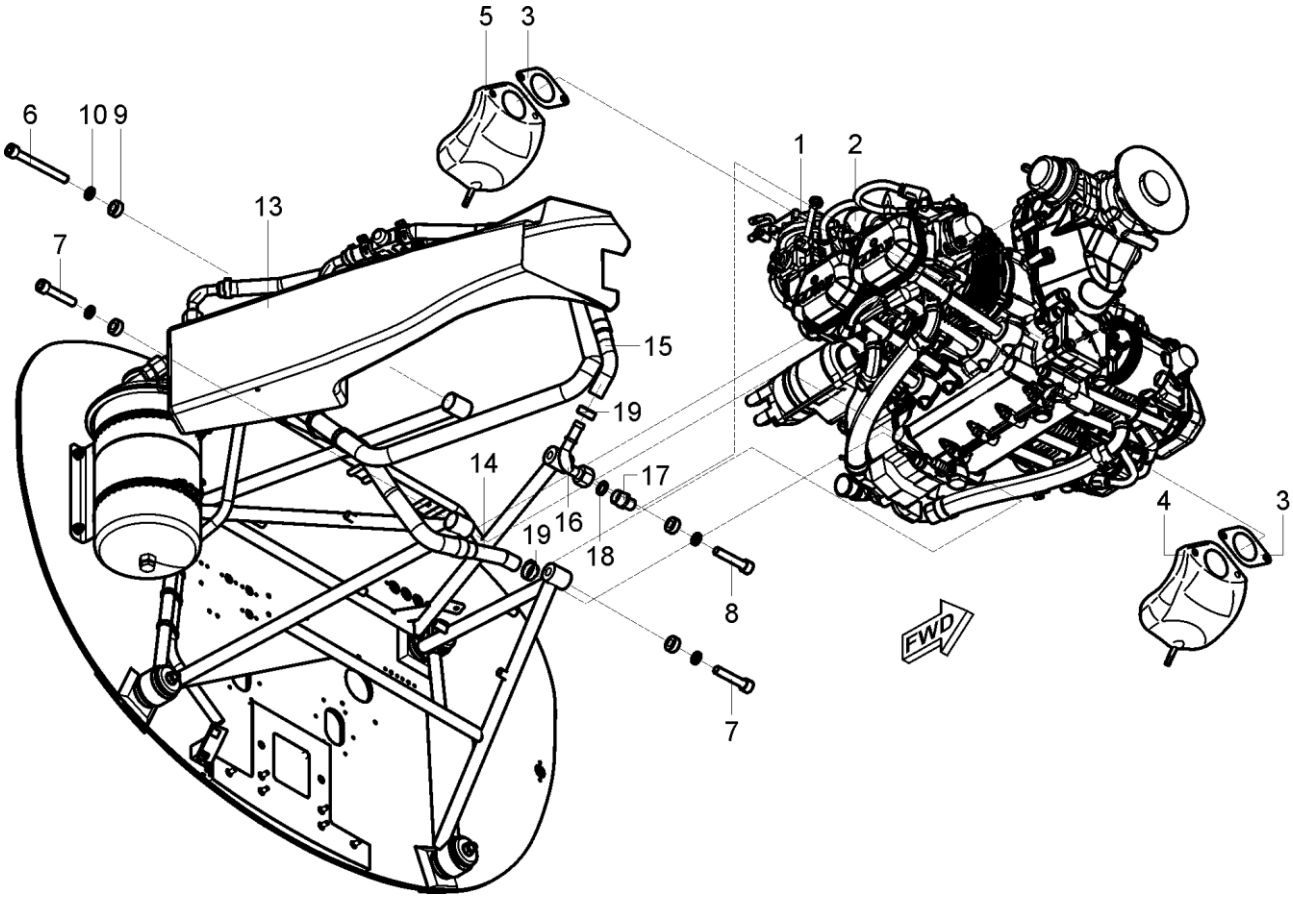
(l) On charging rectifier located on firewall, disconnect wires from generator YE-106B, YE-107B (2 pcs).
(m) On firewall disconnect connector of engine rpm indicator B28.
(n) Near engine heads No.2, No.3 and near oil filter, disconnect wires of temperature sensors M72 and M73.
(o) Near engine fuel pump, disconnect connectors of pressure oil sensor M101.
(p) On starter, disconnect wire of starter 101B.
(q) On generator, disconnect wire of generator 220A.
(r) On SMD-Electronic module, use screwdriver and pin to disconnect wires B30, WH-113B, WH-114B from connectors.
(s) On engine cylinder head No.2, disconnect the grounding wires 221A and 222A.
(t) On engine cylinder head No. 3 disconnect the grounding wire 222A.
(u) On engine mount disconnect ground wire 221A.

Remove following engine systems from engine:

(v) Remove lower exhaust tubes (2, Fig. 78-1) and loosen upper exhaust tubes (2) from engine (Chapter 78-10).
(w) Disconnect fuel hoses (1; 2; 3; 5, Fig. 28-7) from engine fuel pump and carburettors (Chapter 28-20).
(x) Disconnect control cables of throttle controller (20, Fig. 76-3) and choke (22) from carburettors (Chapter 76-10).
(y) Disconnect oil system (13, Fig. 71-4), by removing safety clamps (19) and disconnecting hoses (14; 15).
(z) Disconnect cooling system by removing air hose (22, Fig. 21-5), hose clamps (6; 27, Fig. 75-2) and water hoses (14; 17; 19) from engine. Remove the baffle for cylinders cooling for towing version of aircraft (Chapter 75-20).
(aa) Disconnect the drain hoses (3; 6, Fig. 71-14) from fuel pump and drip trays (Chapter 71-70).
(bb) Lift engine with hoist just enough to relieve weight from engine mounts.
(cc) Unscrew the bolts (6; 7; 8, Fig. 71-4), remove the washers (10) and distance rollers (9). For access to bolts (6; 8) loosen intake manifolds (2) (see Rotax Maintenance Manual).

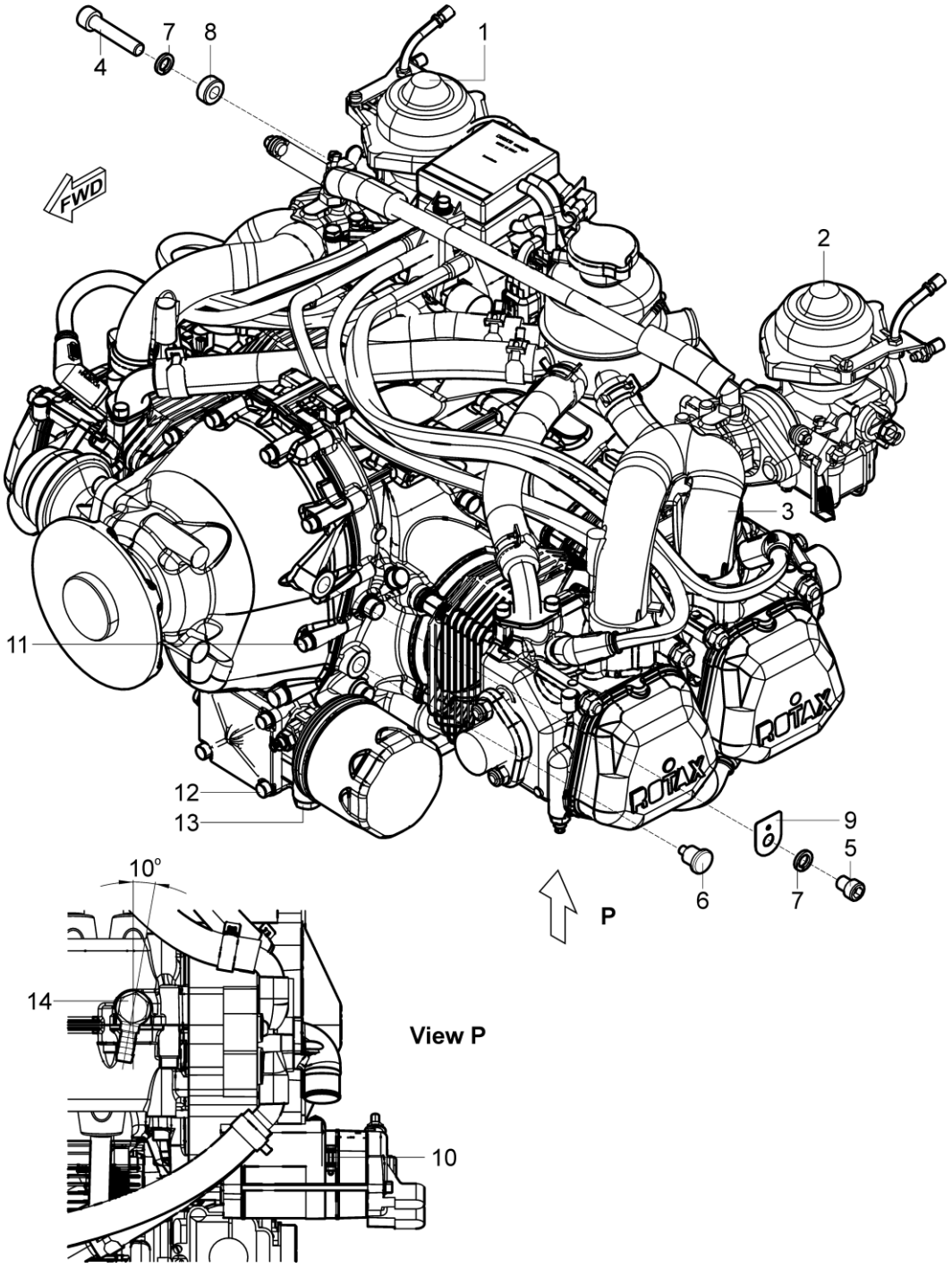
(dd) Carefully pull out engine from aircraft.

(ee) On engine unscrew the bolt (5, Fig. 71-5), remove the washer (7) and bracket (9).



1 – Carburettor
2 – Intake manifold
3 – Seal paper
4 – Left drip tray
5 – Right drip tray
6 – Bolt M10 x 110
7 – Bolt M10 x 50
8 – Bolt M10 x 46
9 – Distance roller
10 – Spring washer ø10
11 – N/A
12 – N/A
13 – Oil system
14 – Oil hose
15 – Oil hose
16 – Elbow
17 – Adapter
18 – Cooper gasket ring ø14
19 – Safety clamp 20.7

Fig. 71-4 Engine Removal / Installation



1 – Right carburettor
2 – Left carburettor
3 – Left intake manifold
4 – Bolt M10 x 110
5 – Bolt M10 x 10
6 – Magnetic plug
7 – Spring washer ø10
8 – Washer ø10.5 x 20 x 2
9 – Bracket
10 – Secure clamp
11 – Bolt
12 – Bolt
13 – Bolt of the pressure regulator
14 – Banjo fitting

Fig. 71-5 New Engine

(2) Engine installation:

Advance preparation of the new engine:

(a) Remove carburettors (1; 2, Fig. 71-5) (see Rotax Maintenance Manual).

(b) Remove left intake manifold (3) (see Rotax Maintenance Manual).

(c) Remove the bolt (4) from top right engine mount attachment point together with washers (7; 8).

(d) Drill holes ø1.6 mm for lockwire on bolts (10; 11; 12).

(e) Check magnetic plug (6) for foreign objects. Clean it and refit. Tighten it to torque 25 Nm. Secure the magnetic plug (6) with lockwire.

WARNING:

IF METAL CONTAMINATION IS FOUND ON PLUG (FIG. 12-4, CHAPTER 12-10), CONTACT AIRCRAFT MANUFACTURER!

(f) On the starter secure the clamp (10, Fig. 71-5) with lockwire.

(g) On oil pump secure the bolt of the pressure regulator (13) with lockwire.

(h) On oil pan, loosen and turn the banjo fitting (14) approximately 10° clockwise (in direction towards propeller). Tighten the banjo bolt to torque 35 Nm and secure it with lockwire.

(i) On engine gear, put the bracket (9), washer (7) and tighten bolt (5).

(j) Install the baffle for cylinders cooling on engine for towing version of aircraft (Chapter 75-20).

Connecting engine systems to engine:

(k) Lift engine with hoist, put engine on engine mount and simultaneously connect upper exhaust pipes (2; 3, Fig. 78-2) to engine.

(l) Install distance rollers (9, Fig. 71-4), washers (10) and tighten bolts (6; 7; 8) to torque 44 Nm.

(m) On drip trays (4; 5), clean holes in the hose sockets with drill ø3 mm; carefully bend hose socket, 30° to the rear, 20° to the centre as in (Fig. 71-6).

(n) Carry out the same on the right drip tray 30° to rear and 20° to the centre.

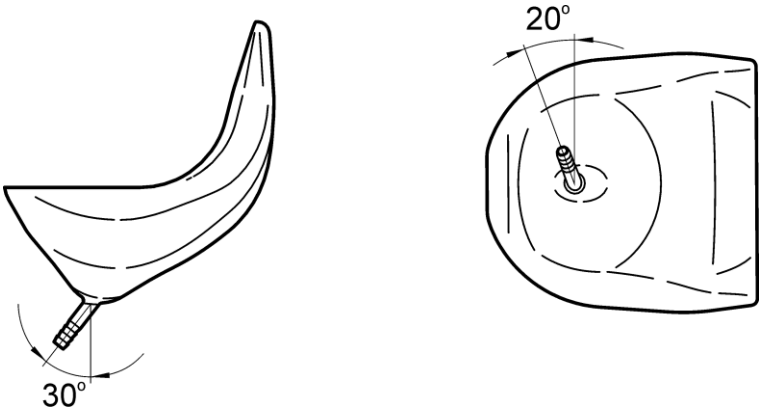


Fig. 71-6 Left drip tray

(o) Install and connect intake manifold (2, Fig. 71-4), lubricated seal papers (3); drip trays (4; 5), carburettors (1) (see Rotax Maintenance Manual), and install airbox (Chapter 71-60) for correct positioning intake manifolds with carburettors.

(p) Remove Airbox (Chapter 71-60).

(q) Install lower exhaust pipes (4; 5, Fig. 78-2) and secure upper exhaust pipes (2; 3) (Chapter 78-10).

(r) Connect oil system (13, Fig. 71-4) with oil pump and oil pan, by connecting hoses (14; 15) and securing with safety clamp (19), gasket rings (18) and elbow (16) with the adapter (17); tighten to torque moment 30 Nm and secure with lockwire.

(s) Shorten the water hose (1, Fig. 71-7) about 15 mm and water hose (2) pull out, so that the hose socket output of expansion tank was parallel with upper strut of engine mount.

(t) Connect cooling system to engine, by connecting hoses (14; 17; 19, Fig. 75-2) and securing them with hose clamps (6; 27).

(u) Install air hose (22, Fig. 21-5 (Chapter 21-40).

(v) Connect the fuel hoses (1; 2; 3; 5, Fig. 28-7) to fuel pump and carburettors (Chapter 28-20).

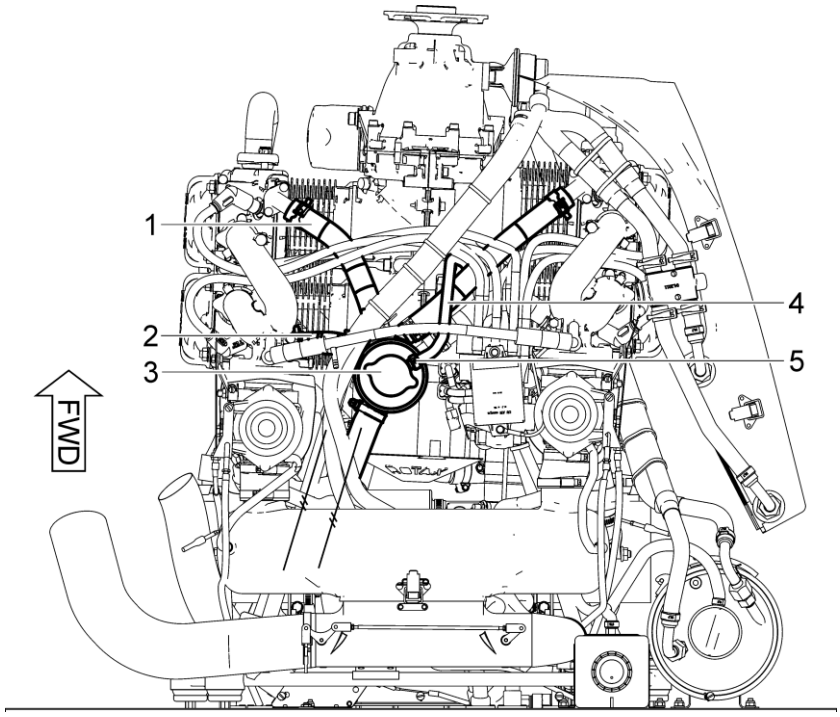
(w) Connect and adjust control cables of throttle controller (20, Fig. 76-3) and choke (22) to carburettors (Chapter 76-10).

(x) Connect drain hoses (3; 6, Fig. 71-14) to drip trays and fuel pump (Chapter 71-60).

Connecting electric system:

NOTE

See Aircraft Wiring Manual (Doc. No. AS-AWM-01-000.



1 – Hose
2 – Hose
3 – Expansion tank
4 – Hose
5 – Safety clamp 14.5

Fig. 71-7 Cooling System

(y) On engine cylinder head No.2, connect the grounding wires 221A and 222A.

(z) On engine cylinder head No.3 connect the grounding wire 222A.

(aa) On engine mount connect wire 221A.

(bb) On SMD-Electronic module, remove the connectors from holder and connect wires B30, WH-113B, WH-114B to connectors.

(cc) Re-route ground wire from forward grounding point on No.3 induction manifold to the inside of the ignition unit to avoid chafing. Route around the front between the inlet cables and attach to the rear mounting bolt. Apply on left side of SMD-Electronic module piece of pyrojacket (fire sleeve) and secure with cable tie (4.8 mm) as required.

(dd) On generator, connect wire of generator 220A.

(ee) On starter, connect wire of starter 101B.

(ff) Near engine fuel pump, connect the connectors of pressure oil sensor M101 (red wire with red wire and white wire with white wire). Insulate them with shrink tubes.

(gg) Near engine cylinder heads No.2, No.3 and near oil filter, connect wires of temperature sensors M72 and M73; secure wire connectors with shrink tubes.

(hh) At charging rectifier located on firewall, connect wires of generator YE-106B and YE-107B (2 pcs).

(ii) On firewall, connect connector of engine rpm indicator B28.

(jj) Insulate wires of ignition with pyro jacket (fire sleeve) coverings between intake manifolds 2-4 and 1-3. Secure them with cable ties.

(kk) Fix all hoses and cables to prevent movement and abrasion with cable ties.

(ll) Install Airbox (Chapter 71-60).

(mm) Install propeller (Chapter 61-10).

(nn) Fill with oil (Chapter 12-10).

(oo) Fill with coolant and fuel (Chapter 12-10).

(pp) Test to verify the task and check:

- If all systems are connected and secured.
- Proper connection of cables.
- Good connection of joints.
- Disconnect connector of magnetos. Use the multimeter to check if magneto switches are in OFF position, wires WH-113B, WH-114B with negative terminal, circuit is closed. When the magneto switches are in ON position, wires WH-113B, WH-114B with negative terminal, circuit is open.
- Torque moments on nuts.
- If hoses and cables are securely fixed.
- If all bolts are tight.
- That no foreign objects remained in aircraft.

(qq) Install engine cowlings (Chapter 71-10).

B. Engine mount

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hex key 7	1 pc
Wrench 13	1 pc
Persons	2

Tab. 71-3 Recommended tools, materials, persons and documentation

(1) Engine mount removal:

(a) Remove engine (Chapter 71-20).

(b) Remove drain hoses (Chapter 71-70).

(c) Remove nuts (7, Fig. 71-8), washers (8), front plates (4) and front silentblocks (2).

(d) Remove the mount (1) from the aircraft.

(e) Remove rear silentblocks (2), spacers (5) and aft plates (3) from the mount.

(f) Remove bolts (6) from the aircraft.

(2) Engine mount installation:

(a) Inspect the engine mount. Look especially for cracks.

(b) Inspect silentblocks for damage and cracks.

(c) Insert bolts (6, Fig. 71-8) to holes on the firewall.

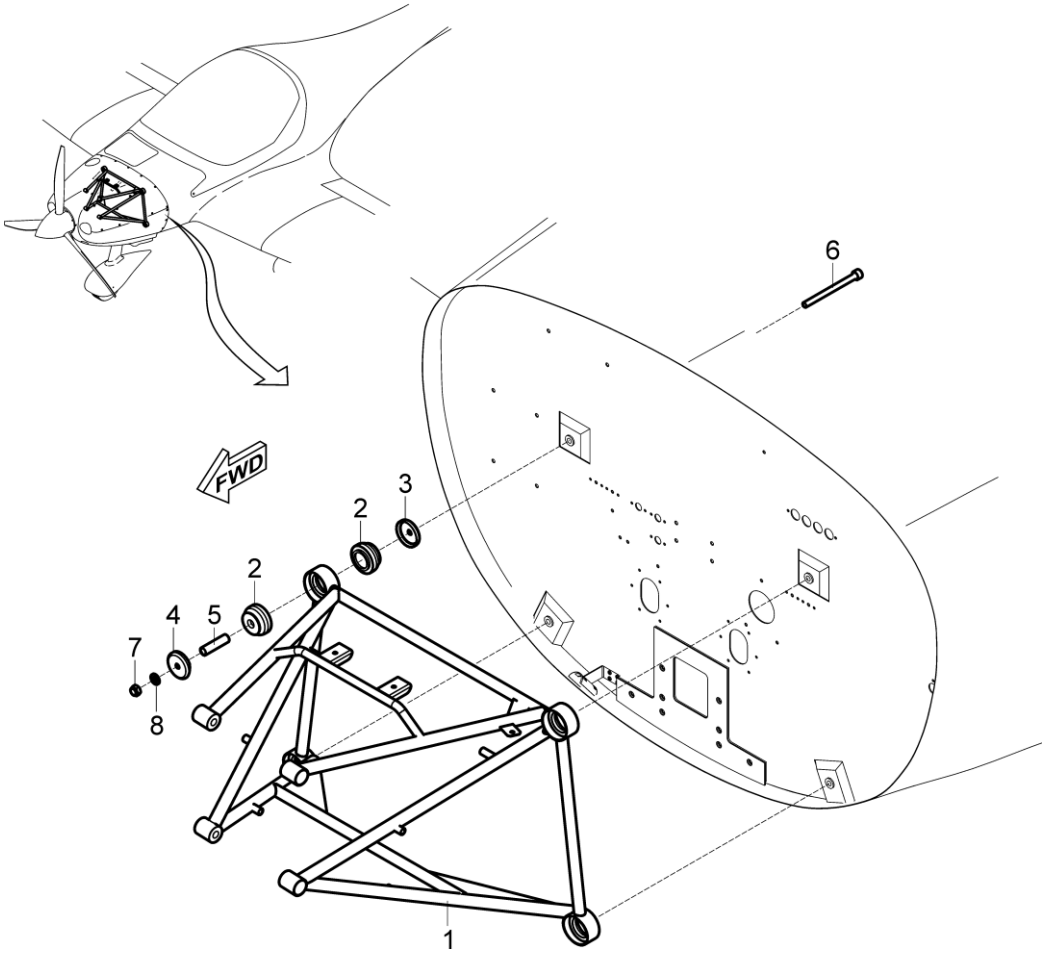
(d) Put the rear plates (3), rear silentblocks (2) and spacers (5) on the bolts (6).

(e) Put the mount (1) in position and put an appropriate support below the mount.

(f) On bolts (1) put on silentblocks (2), front plates (4), washers (8), and tighten nuts (7) to torque 22.5 Nm.

(g) Test to verify the task and check:

- Torque moments on nuts.
- That no foreign objects remained in aircraft.



1 – Engine mount
2 – Silentblock
3 – Silentblock rear plate
4 – Silentblock front plate
5 – Spacer
6 – Bolt M8 x 90
7 – Self-locking nut M8
8 – Washer ø8.4 x 16 x 1.6

Fig. 71-8 Engine Mount Removal / Installation

This page is left blank intentionally

71-40 ATTACH FITTINGS

1. DESCRIPTION

There are two attach fittings installed on the engine to which the hoses and wires are fixed.

2. MAINTENANCE PRACTICES

A. Brackets

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hex key 8	1 pc
Loctite 243	AR
Persons	1

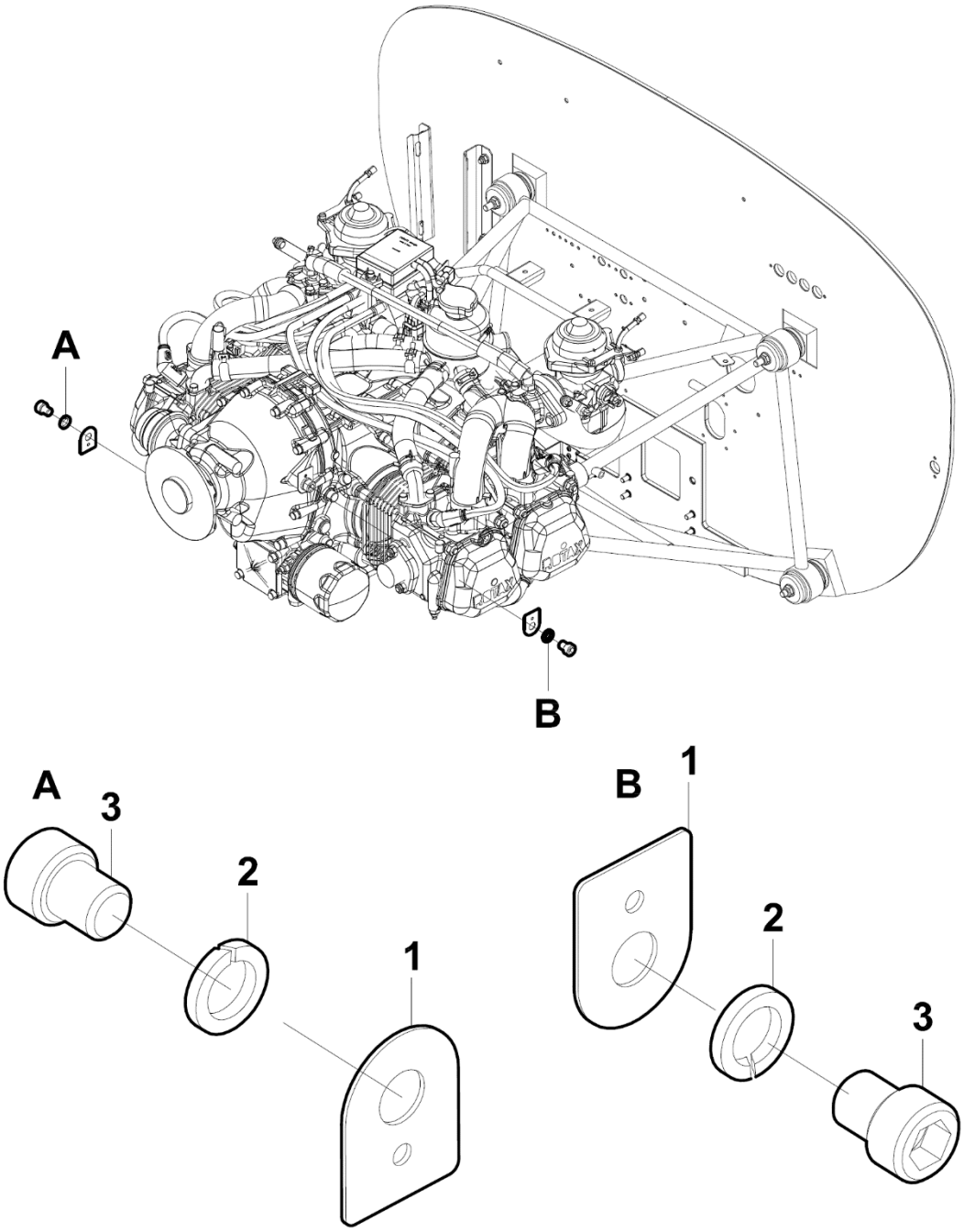
Tab. 71-4 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF.

(1) Brackets removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the upper engine cowling (Chapter 71-10).
- (c) Remove items attached to the brackets (1, Fig. 71-6)
- (d) Remove bolts (3), washers (2) and brackets (1)

(2) Brackets installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Attach brackets (1, Fig. 71-6) using washers (2), bolts (3) and secure by using Loctite 243.
- (c) Install the upper engine cowling cowling (Chapter 71-10).



1 – Bracket
2 – Spring washer ø10
3 – Bolt M10 x 16

Fig. 71-9 Engine Attach Fittings Removal / Installation

71-60 AIR INTAKES

1. DESCRIPTION

Cooling air is received through the two upper engine cowling intakes and is distributed to the engine compartment.

Air intake is located on the left side of spinner. The cold air flows through the ram air tunnel (glued at the lower engine cowling), air hose, air filter holder and air filter to the airbox. The air filter holder receives warm air from a shroud installed on the muffler (Chapter 78) and cold air from the ram air tunnel and mixes them depending on preheating control setting. **CARBUR. PREHEATING** controller is located on the instrument panel.

2. MAINTENANCE PRACTICES

A. Airbox and air filter holder

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Special wrench 14	1 pc
Screwdriver 5	1 pc
Hex key 4	1 pc
Hex key 5	1 pc
Oetiker pliers- Crimping pliers	1 pc
Knife	1 pc
Pliers	1 pc
Cable tie 2.6	7 pcs
Lockwire ø0.8 mm	AR
Loctite 243	AR
Persons	1

Tab. 71-5 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Airbox and air filter holder removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Disconnect negative terminal of battery (Chapter 24-30).

Air filter holder removal:

(d) Disconnect air hoses (4; 5, Fig. 71-10), by loosening hose clamps (13; 14).

(e) Disconnect control cable (3) from the air filter holder (2).

(f) Unplug the connector of temperature sensor (21).

(g) Remove safety pins (20) and unclip the latches on upper and lower side of air filter holder (2).

(h) Remove air filter holder (2) with air filter (6).

Airbox removal:

(i) Disconnect drain hoses (9; 10; 11; 12), by removing cable ties.

(j) Loosen hose clamps (13) on hoses (7; 8).

(k) Unscrew nuts (19), remove washers (16; 17; 18) and bolt (15).

(l) Remove the airbox (1).

(2) Airbox and air filter holder installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Thoroughly clean and lubricate all movable parts of the air induction system before each assembling (Chapter 12-20).

(c) Check and clean air filter (6, Fig. 71-10), check free operation of air filter holder (2) and check the air hoses for cracks; if cracks are found use new air hoses.

(d) Apply two layers of adhesive tape on each end of hoses.

Airbox installation:

(e) Connect airbox (1) with carburettors using hoses (7; 8).

NOTE

Hose (7) is longer than hose (8).

(f) Attach the airbox (1) to engine mount (24) by using bolts (15), washers (16; 17; 18) and nuts (19).

(g) Secure hoses (7; 8) to the airbox (1) by hose clamps (13).

(h) Slide drain hoses (9; 10; 11; 12) on airbox (1) and secure them using cable ties.

Air filter holder installation:

(i) Fit clean air filter (6) to the air filter holder (2).

(j) Attach them (2; 6) to the airbox (1), clip two latches and secure them with safety pins (20).

(k) Connect the temperature sensor connector (21).

(l) Connect the control cable (3) to the air filter holder (2).

(m) Connect air hoses (4; 5) and secure them with hose clamps (13; 14).

(n) Carry out test and check:

- If all bolts connections are tight.
- If hoses are firmly secured and sealed.
- That the latches are secured with safety pins.
- Operation of air filter holder flaps (fully open and fully close position).
- That no foreign objects remain in the aircraft or engine compartment.

(o) Install the engine cowlings (Chapter 71-10).

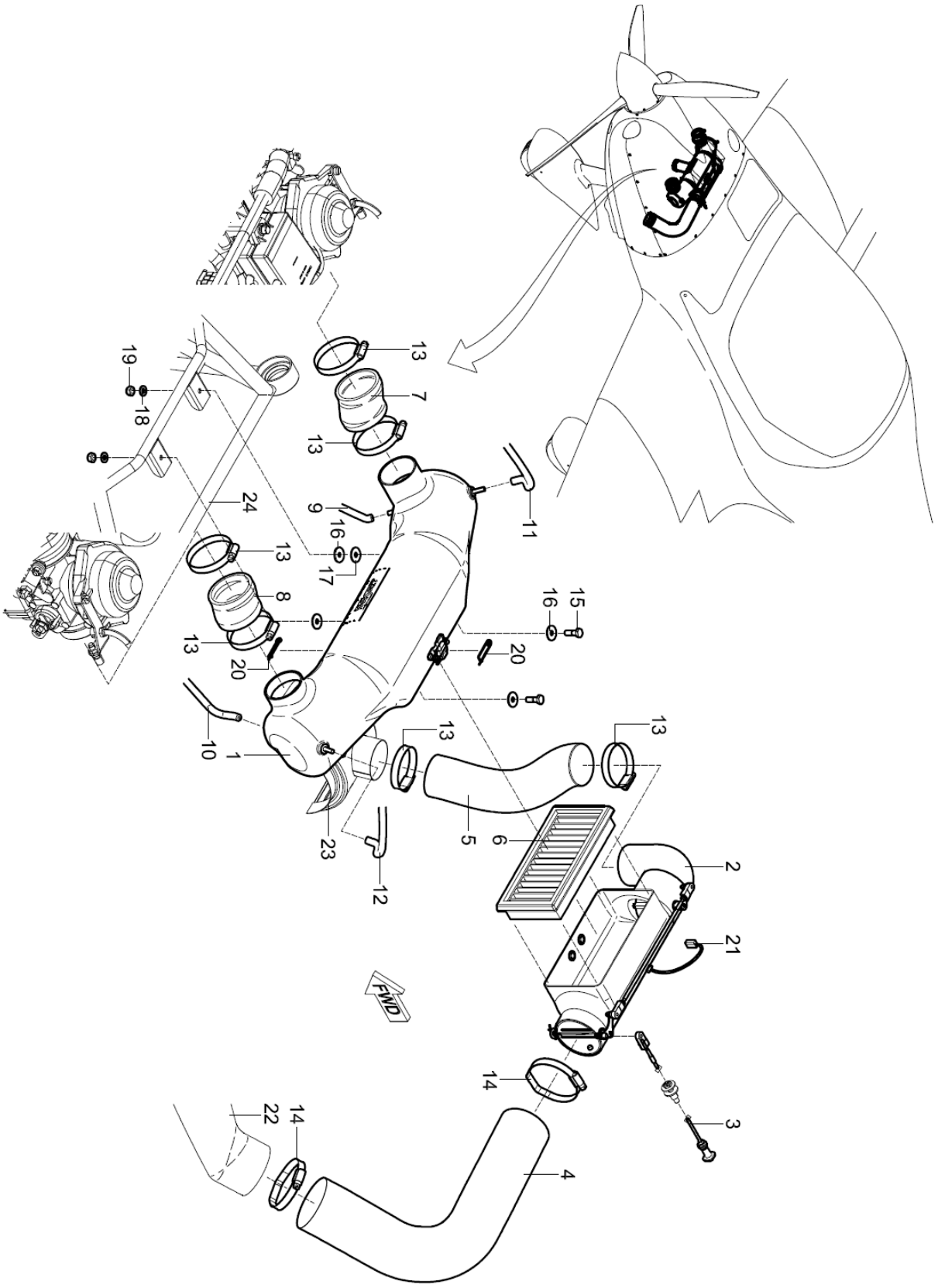


Fig. 71-10 Airbox Removal / Installation (page 1 of 2)

1 – Airbox
2 – Air filter holder
3 – Control cable
4 – Air hose ø63 x 420
5 – Air hose ø51 x 260
6 – Air filter
7 – Hose ø50 x 60
8 – Hose ø50 x 40
9 – Drain hose R
10 – Drain hose L
11 – Upper drain hose R
12 – Upper drain hose L
13 – Hose clamp ø40-60
14 – Hose clamp ø50-70
15 – Bolt M6 x 18
16 – Washer ø 6.4 x 18 x 1.6
17 – Rubber washer ø6.4
18 – Washer ø6.4 x 12 x 1.6
19 – Self-locking nut M6
20 – Safety pin ø1.4
21 – Electrical connector
For information:
22 – Ram air tunnel
23 – Airbox pre-heat exchanger
24 – Engine mount

Fig. 71-10 Airbox Removal / Installation (page 2 of 2)

B. Air filter

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Air filter	1 pc / AR
Air filter oil	AR
Persons	1

Tab. 71-5 Recommended tools, materials, persons and documentation

(1) Air filter inspection / check:

Check air filter on each inspection or annually for cleanliness. Air filter can be cleaned using compressed air and then brushed with air filter oil. Replace air filter if necessary.

C. Carburettor pre-heat control

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation

ITEM	QUANTITY
Wrench 10	1 pc
Special wrench 14	1 pc
Screwdriver 5	1 pc
Hex key 4	1 pc
Hex key 5	1 pc
Solder set	1 pc
Knife	1 pc
Pliers	1 pc
Cable tie 2.6	7 pcs
Cable tie 3.6	5 pcs
Shrink tube ø4.8 x 2.4 mm	AR
Adhesive sealing tape TESA FIX 20 mm	AR
Lockwire ø0.8 mm	AR
Loctite 243	AR
Persons	1

Tab. 71-6 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF.

(1) Carburettor pre-heat control removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Unscrew cable end fitting (1, Fig. 71-12), remove shrink tube, and unsolder thread rod (2).

(d) From the cockpit, remove the inner cable by pulling handle (14) and remove the nut (15).

(e) Remove parachute container (Chapter 25-60).

(f) In parachute compartment, remove lockwire (6) and remove the control cable (7) from firewall.

(g) Remove cable tie (9), unstick adhesive tape (10), pull green sleeve (11).

NOTE

The ball can drop from green sleeve (10).

(h) Unscrew the nut (12), remove washer (13) and pull out control cable (7) from central console.

NOTE

For easier removal use special tool (Fig. 71-11) and hex key inserted on control cable end from cockpit side.

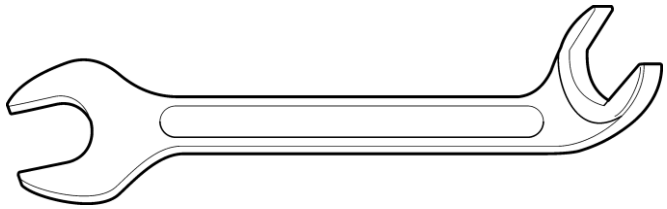


Fig. 71-11 Band Wrench Size 14

(i) In the engine compartment, unscrew nut (3, Fig. 71-12), remove washers (4) with the nut (3), screw shackle (5).

(2) Carburettor pre-heat control installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Thoroughly clean and lubricate all movable parts of the air induction system before each assembling. Refer to lubrication chart (Chapter 12-20).

(c) Control cable (7, Fig. 71-12) passes through central console (16).

(d) Rotate the control cable (7) so the ball is at the top.

(e) Slide washer (13), tighten the nut (12) and secure using Loctite 243.

NOTE

For better performance use special wrench (Fig. 71-11) and hex key inserted in control cable end from cockpit side.

(f) Insert the ball and simultaneously slide on the green sleeve (11, Fig. 71-12):

- Push the green sleeve (11) just to first indication of minimal resistance.
- Check for correct operation by pulling and pushing handle; the ball must engage with ratchet, movement must not be free.

(g) Apply two layers of textile adhesive tape (10) and lock it with cable tie (9).

(h) Assemble screw shackle (5) with nut (3), washer (4) and bowden end (8); put them on control cable (7) and secure them with lockwire (6).

(i) Insert the cable with screw shackle through hole in firewall (17), apply washer (4) and screw on the nut (3), secure with Loctite 243.

(j) Secure control cable (7) with cable ties (3.6 mm) along the length as required.

(k) Push handle (14) in, leaving a gap of 2 mm (carburettor pre-heating) and set air filter holder bellcrank (18) to position with cold air flap fully open.

(l) Cut inner wire to correct length, solder thread rod (2), slide shrink tube and screw on cable end fitting (1), and adjust end fitting to connect with nipple on bellcrank.

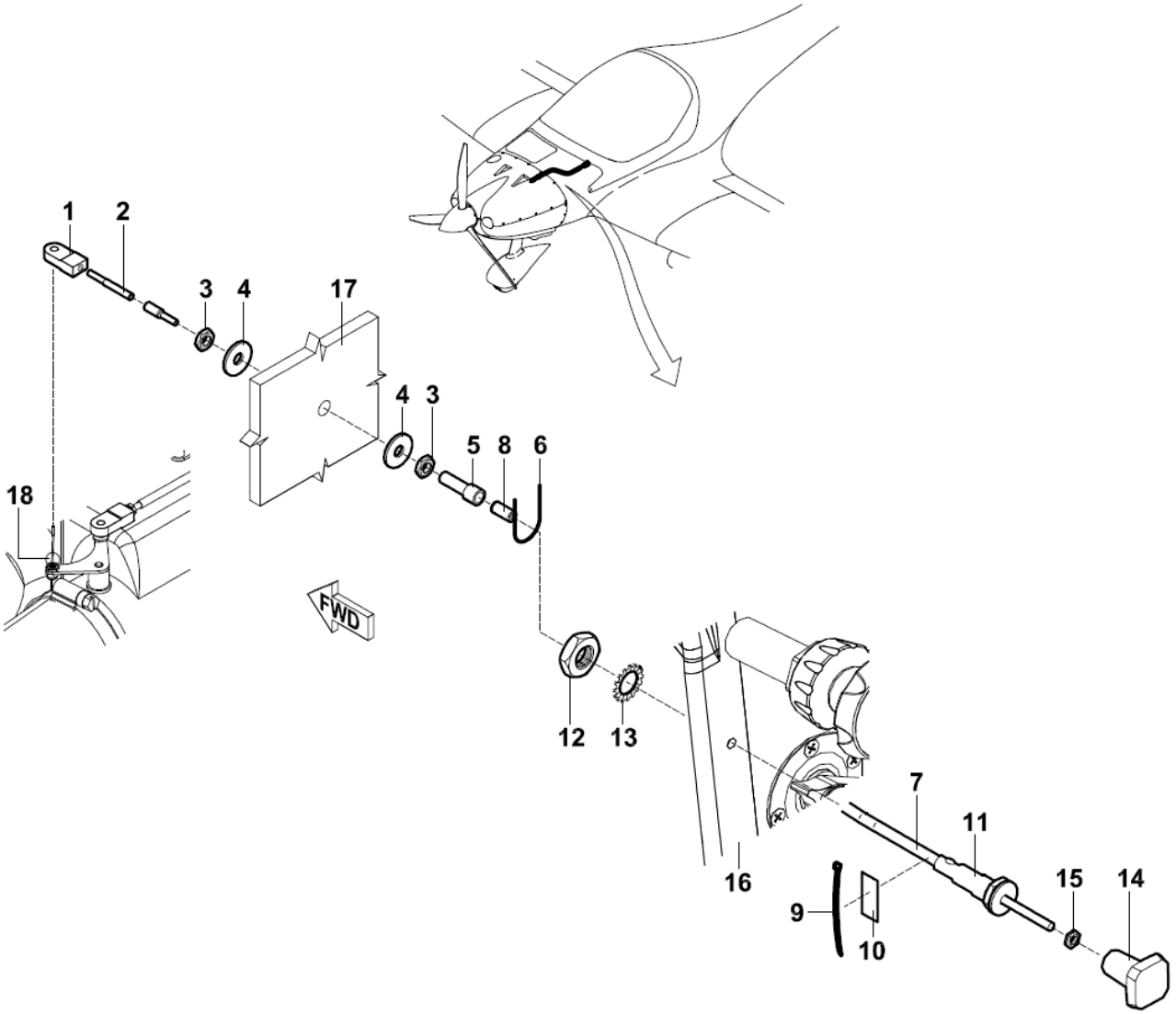
(m) Shrink the shrink tube on thread rod (3).

(n) Connect cable end fitting (1) with nipple on bellcrank (18).

(o) Carry out test and check:

- If all bolts connections are tight.
- Operation of air filter holder flaps (fully open and fully close).
- That no foreign objects remain in the aircraft or engine compartment.

(p) Install the engine cowlings (Chapter 71-10).



1 – Cable end fitting
2 – Thread rod
3 – Low nut M6
4 – Washer ø6.4x 18 x 1.2
5 – Screw shackle
6 – Lockwire ø 0.8
7 – Control cable
8 – Bowden end
9 – Cable tie 2.6
10 – Textile adhesive tape
11 – Green sleeve
12 – Low nut M10
13 – Serrated locking washer ø10.5
14 – Handle
15 – Low nut M5

For information:

16 – Central console
17 – Firewall
18 - Air filter holder bellcrank

Fig. 71-12 Carburettor Pre-Heat Control Removal / Installation

D. Airbox pre-heat exchanger

For removal / installation, see the Chapter 78-10.

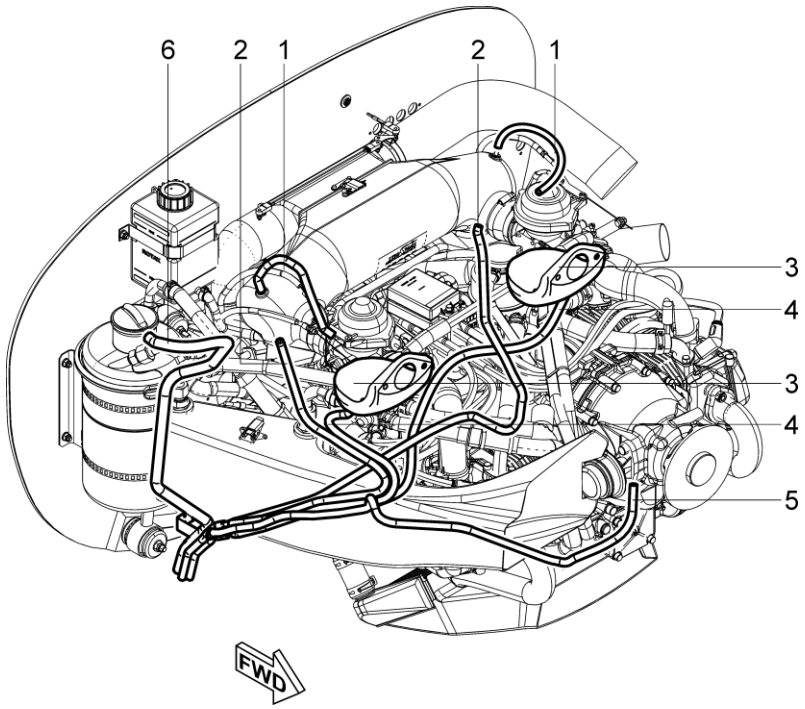
71-70 ENGINE DRAINS

1. DESCRIPTION

The engine installed in the aircraft has the following engine drains and venting (see Fig. 71-13):

- Airbox drain.
- Drip tray drain.
- Fuel drain from the fuel pump.
- Oil tank venting (Chapter 79).
- Carburettors float chamber venting.

All drains consist of the rubber hoses. Hoses from each drip tray and airbox connect to a Y piece connector. From the Y piece connector, the drain hose leads to the bottom of the firewall. All hoses discharges bellow the fuselage into the slipstream.



1 – Carburettor's float chamber venting
2 – Airbox drain
3 – Drip tray
4 – Drip tray drain
5 – Fuel pump drain
6 – Oil tank venting

Fig. 71-13 Engine Drains

2. MAINTENANCE PRACTICES

A. Drains

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 2	1 pc
Wire nippers	1 pc
Cable tie 2.6	AR
Cable tie 4.8	AR
Persons	1

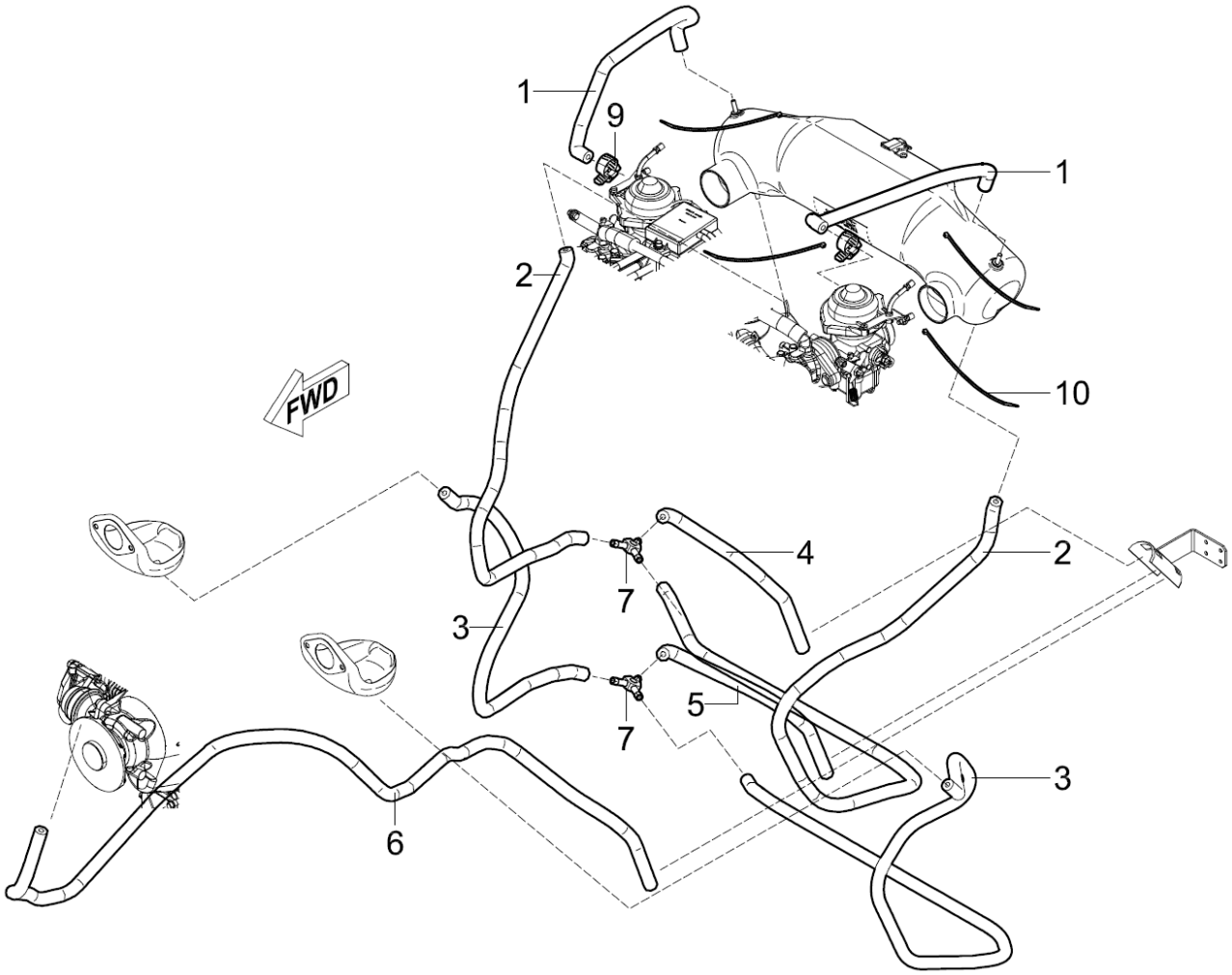
Tab. 71-7 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Drains removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the engine cowlings (Chapter 71-10).
- (c) Disconnect negative terminal of battery (Chapter 24-30).
- (d) Remove all cable ties (10, Fig. 71-14) on length of drain hoses (1; 2; 3; 4; 5; 6) and safety clamps (8; 9).
- (e) Disconnect and remove drain hoses.

(2) Drains installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Route the drain hoses (1; 2; 3; 4; 5; 6, Fig. 71-14).
- (c) Connect drain hoses with 3-way distributors (7) and secure drain hoses with cable ties (10) and safety clamps (8; 9).
- (d) Secure drain hoses (3, 4) with necessary amount of cable ties.
- (e) Check if all hoses are well secured.
- (f) Install the engine cowlings (Chapter 71-10).



1 – Draining hose
2 – Draining hose
3 – Draining hose
4 – Draining hose
5 – Draining hose
6 – Draining hose
7 – 3-way distributor
8 – N/A
9 – Safety clamp 10.9
10 – Cable tie 2.6
11 – Holder
12 – Bolt ø3x10
13 – Hose clamp ø20-32
14 – Cable tie 4.8

Fig. 71-14 Engine Drains

This page is left blank intentionally

73 ENGINE – FUEL AND CONTROL

CONTENTS

Chapter	Description	Page
73-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	4

This page is left blank intentionally

73-00 GENERAL

1. INTRODUCTION

This chapter describes those units and components which deliver metered fuel to the engine. Components covered the standby fuel pressure indicator, fuel pressure sensor and fuel flow transducer that part of aircraft manufacturer installation.

Fuel is supplied to the engine in dependence from **FUEL** selector valve position (**LEFT** - **RIGHT** - **OFF**). From both fuel tanks the fuel flows through the fuel filters to the **FUEL** selector valve inlets. From the **FUEL** selector valve the fuel flows through the electric fuel pump (by-passed with check valve) to engine driven fuel pump and then to distributor inlet.

One of distributor's outlets is connected to carburettors through the fuel flow meter sensor and 3-way distributor. Second one is fitted with restrictor jet to which return line is connected. Return line leads back to the left fuel tank.

Fuel flow transducer is installed the way to measure only the fuel consumed by engine.

Fuel pressure sensor and standby fuel pressure indicator are installed in the fuel system and connected through the 3-way distributor with restrictor jets in its outlets to the 4-way distributor. Both check the actual pressure in the fuel supply line.

Scheme of fuel system is stated in Chapter 28.

Wiring diagram of fuel pressure sensor and fuel flow transducer is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Insufficient fuel pressure.	Clogged strainer.	Clean strainer.
	Defective mechanical fuel pump.	Replace fuel pump.
	Defective fuel pressure sensor.	Replace the fuel pressure sensor.
	Defective fuel pressure indicator.	Replace the fuel pressure indicator.
Fluctuating fuel flow indications.	Defective fuel flow indicator/transducer.	Replace fuel flow indicator/transducer
	Vapor in fuel lines.	Turn on electric fuel pump.

74 IGNITION

CONTENTS

Chapter	Description	Page
74-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	4
74-10	**ELECTRICAL POWER SUPPLY**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
74-20	**DISTRIBUTION**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	7
74-30	**SWITCHING**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	10
	A. Ignition switches	10
	B. Keyed ignition switch	10

This page is left blank intentionally

74-00 GENERAL

1. INTRODUCTION

This chapter describes those units and components which furnish, distribute, and control an electrical current to ignite the fuel-air mixture in the engine cylinders. The ignition components include coils, electronic modules, ignition harness, spark plugs, and ignition switches.

Wiring diagram of sensor ignition is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Engine does not start/not easy to start.	Ignition switch/switch cable defective.	Carry out the ignition switch test. If necessary replace the ignition switch or ignition switch cables.
	Defective ignition spark-plug leads.	Replace the spark-plug leads.
	Low battery voltage.	Charge / replace battery.
	Fouled spark plugs.	Clean spark plugs according to manufacturer's specifications.
	Incorrect spark plug gap.	Re-gap spark plugs to engine manufacturer's specifications.
Rough running.	Fouled spark plugs.	Clean spark plugs according to manufacturer's specifications.
	Incorrect spark plug gap.	Re-gap spark plugs to engine manufacturer's specifications.
	Ignition switch/switch cable defective.	Carry out the ignition switch test. If necessary replace the ignition switch or ignition switch cables.
Excessive RPM drop during ignition test.	Fouled spark plugs.	Clean spark plugs according to manufacturer's specifications.
	Incorrect spark plug gap.	Re-gap spark plugs to engine manufacturer's specifications.
	Faulty spark plug.	Test spark plug in accordance with manufacture's specifications.

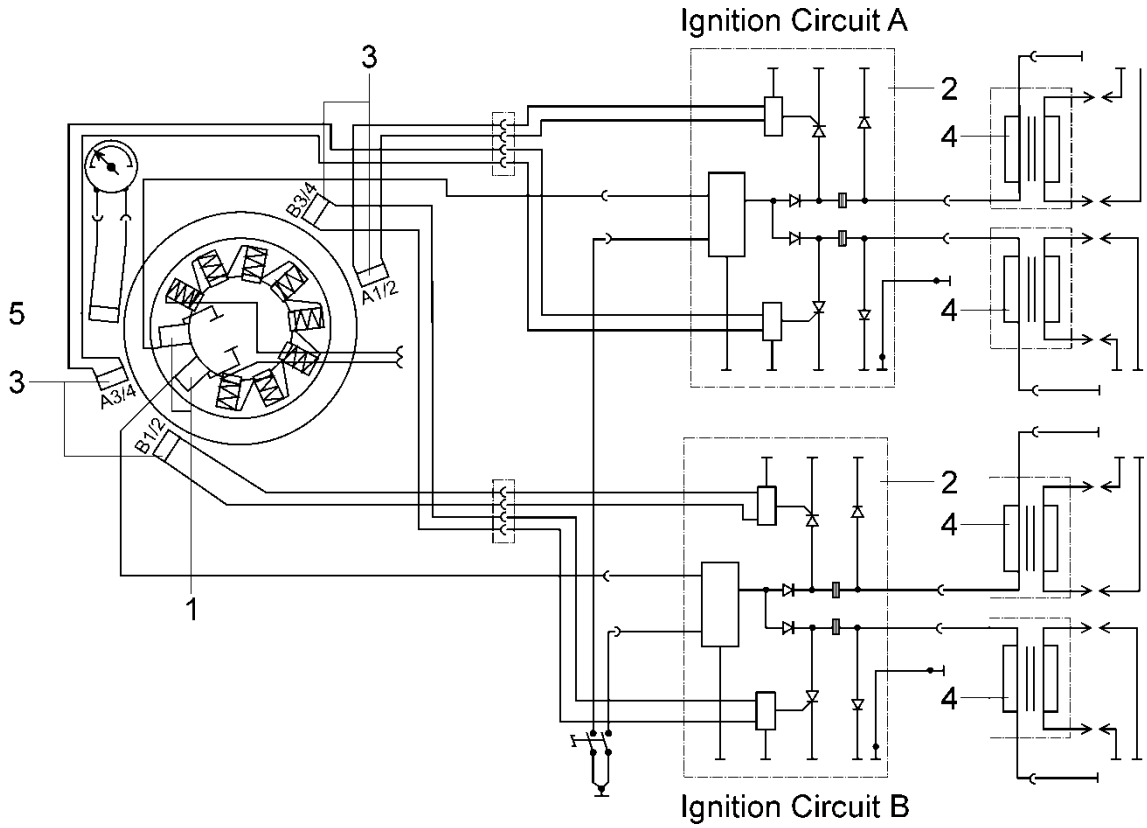
74-10 ELECTRICAL POWER SUPPLY

1. DESCRIPTION

The engine Rotax 912 ULS2 engine is equipped with a dual ignition unit of a breakerless, capacitor discharge design, with an integrated generator (Chapter 24-10).

The ignition unit needs no external power supply.

Two independent charging coils (1) located on the generator stator supply one ignition circuit each. The energy is stored in capacitors of the electronic modules (2, Fig. 74-1). At the moment of ignition 2 each of the 4 external trigger coils (3) actuate the discharge of the capacitors via the primary circuit of the ignition coils (4). The trigger coil (5) is provided for rpm indicator signal (Chapter 39-10).



1 – Charging coils
2 – Electronic modules
3 – Trigger coils for ignition signal
4 – Dual ignition coils
5 – Trigger coils for speed signal

Fig. 74-1 Ignition System

Firing order: 1-4-2-3 (see Fig. 74-2).

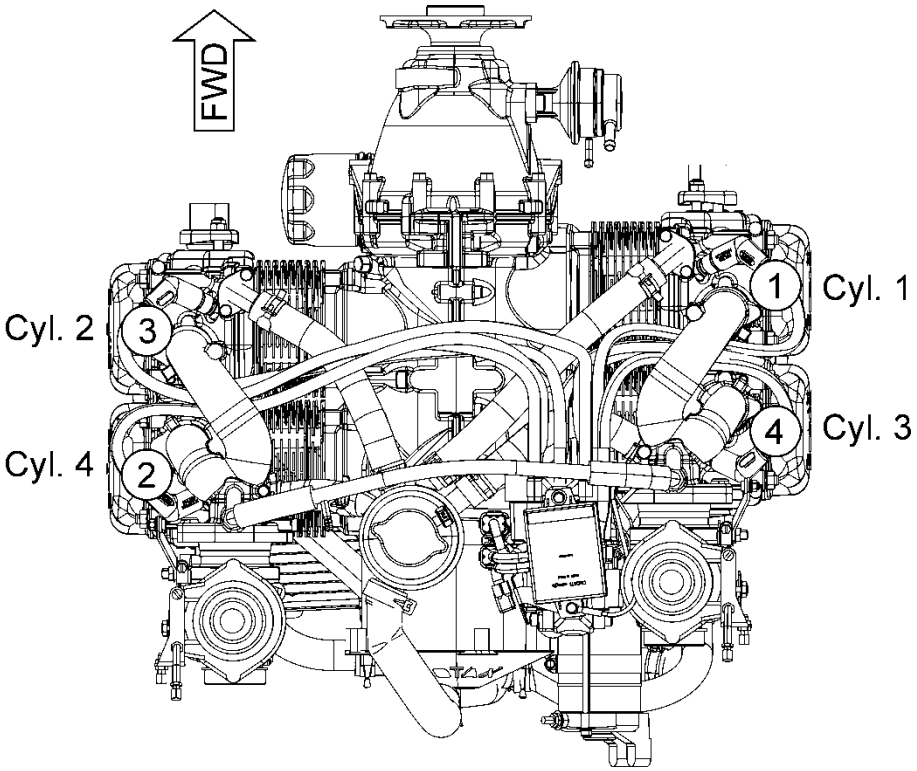


Fig. 74-2 Firing Order

2. MAINTENANCE PRACTICES

Refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for maintenance practices information.

74-20 DISTRIBUTION

1. DESCRIPTION

This chapter describes that portion of the ignition system which conducts high-voltage electricity from the electronic modules to the spark plugs. Shielded leads connect the electronic modules to the spark plugs.

Two spark plugs in each cylinder give ignition to the engine. Ignition circuit A controls top spark plugs of cylinder 1 and 2; lower spark plugs of cylinder 3 and 4. Ignition circuit B controls top spark plugs of cylinder 3 and 4; lower spark plugs of cylinder 1 and 2.

2. MAINTENANCE PRACTICES

Refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for maintenance practices information.

This page is left blank intentionally

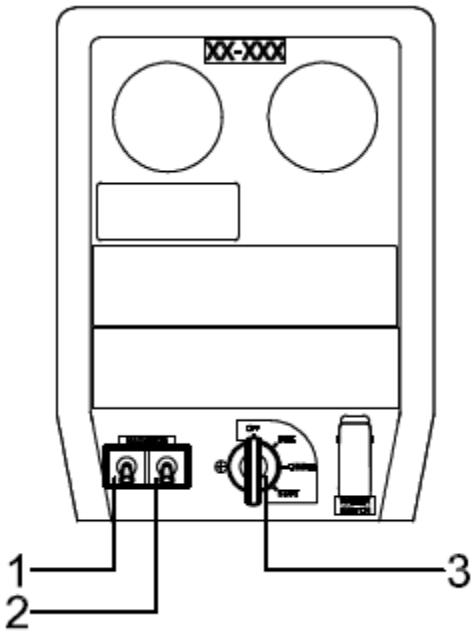
74-30 SWITCHING

1. DESCRIPTION

Ignition circuits are controlled independently by switches on the instrument panel labelled **IGNITION**. The left switch controls the ignition circuit A; the right switch controls the ignition circuit B. Starter is controlled by a keyed ignition switch installed in the instrument panel. Keyed ignition switch is labeled clockwise:

- **OFF** Off-state.
- **INST.** Instrument connection.
- **CHARGE** Charging.
- **START** The starter is energized and will crank the engine, when the key is released, it will automatically return to the **CHARGE** position.

Activation of the ignition circuit A and ignition circuit B is signalized on the SV-D1000 EMS screen (Chapter 77-00).



1 – Left ignition circuit switch
2 – Right ignition circuit switch
3 – Keyed ignition switch

Fig. 74-3 Ignition Controls

2. MAINTENANCE PRACTICES

A. Ignition switches

For removal / installation procedures refer to Chapter 39-10.

B. Keyed ignition switch

For removal / installation procedures refer to Chapter 39-10.

75 ENGINE COOLING

CONTENTS

Chapter	Description	Page
75-00	**GENERAL**	**3**
	1. INTRODUCTION	3
75-20	**ENGINE COOLING**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	7
	A. Water radiator	7
	B. Water thermostat	8
	C. Overflow bottle	9
	D. Cooling air distributor	11

This page is left blank intentionally

75-00 GENERAL

1. INTRODUCTION

This chapter describes the data for the engine cooling system.

This page is left blank intentionally

75-20 ENGINE COOLING

1. DESCRIPTION

Engine has combined air and water cooling system.

Water cooling system consists of water thermostat (5, Fig. 75-1) and water radiator (3) through which the coolant flows to the water pump (4) and then is distributed to the water-cooled engine parts inside of engine. Water radiator (3) is attached in the holder fixed in the middle of lower engine cowling. Overflow bottle (2) is attached at firewall and connected by a hose with the expansion tank (1). Expansion tank located on top of the engine allows coolant expansion. The overflow bottle accumulates the coolant in the case of engine overheating.

Cooling air is received through the two upper engine cowling intakes and is baffled to the engine compartment. Towing version of aircraft has installed in addition cooling air distributor on the top of the engine that baffles the cooling air directly to the cylinders (12, Fig. 75-3).

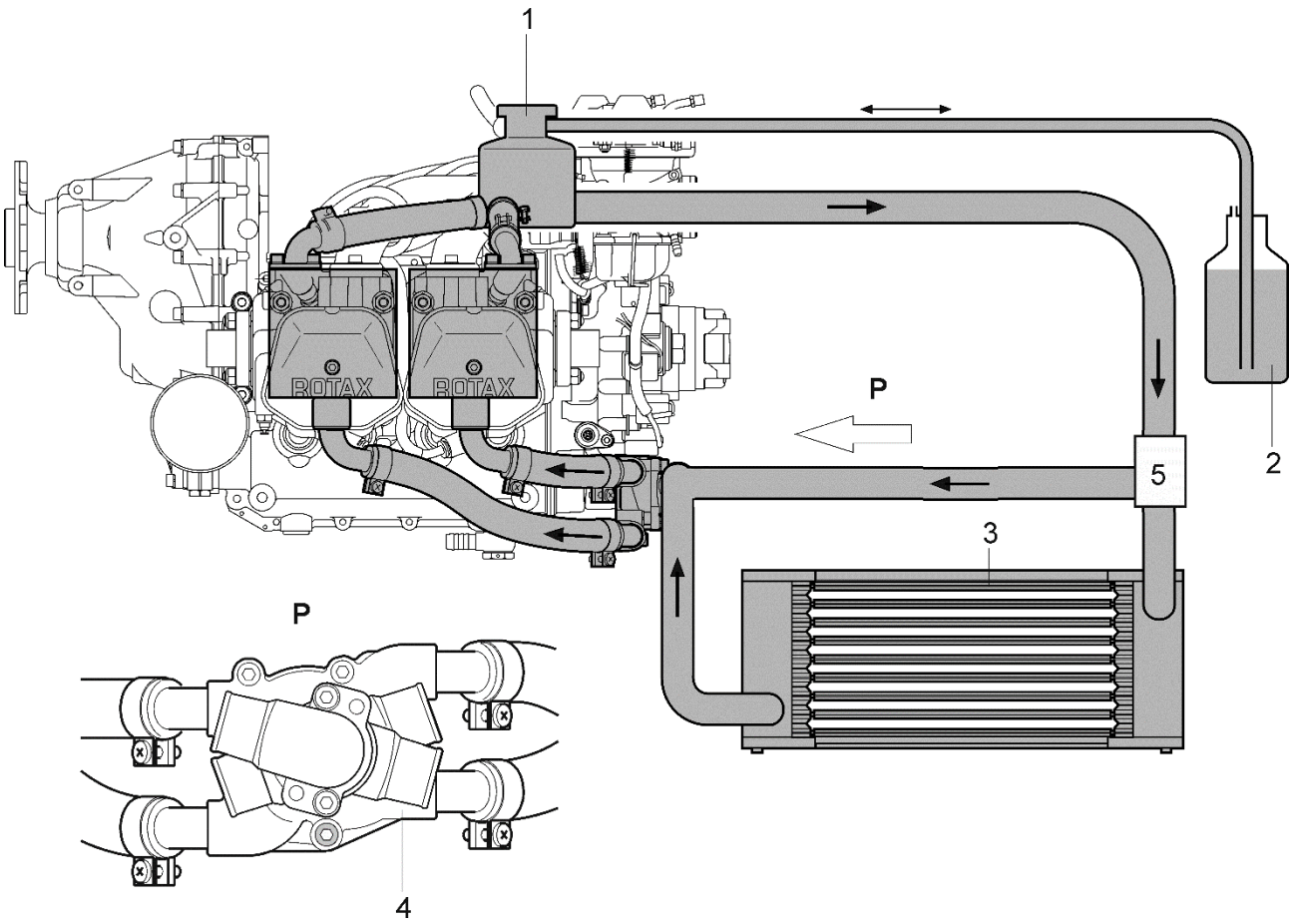
The coolant temperature sensor is installed at the cylinder head of right rear cylinder (in flight direction) (Chapter 77).

Total coolant volume is about 2.5 liters. Information about used coolant by manufacturer is recorded on a placard at firewall in the engine compartment.

Maintenance practices and procedures concerning coolant volume check/replenishing and coolant change are mentioned in Chapter 12-10.

NOTE

Recommended coolants are mentioned in the Operators Manual for Rotax Engine Type 912/914 Series, Ref. No.: OM-912/914.



1 – Expansion tank
2 – Overflow bottle
3 – Water radiator
4 – Water pump
5 – Water thermostat

Fig. 75-1 Cooling System Scheme

2. MAINTENANCE PRACTICES

A. Water radiator

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 5	1 pc
Hex key 5	1 pc
Pliers	1 pc
Persons	1

Tab. 75-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

ALWAYS ALLOW ENGINE TO COOL DOWN TO OUTSIDE AIR TEMPERATURE BEFORE START OF ANY WORK.

(1) Water radiator removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Remove the edge protection (31, Fig. 75-2) – towing version only.

(d) Drain the coolant from the cooling system (Chapter 12-10).

(e) Disconnect air hose from the heating deflector (30) (Chapter 21-40).

(f) Hold the radiator (1); remove hoses (8; 9) from the radiator (1), by loosening hose clamps (6, 27). Remove the radiator (1) with the holder (2).

(g) Remove holder (2), by unscrewing bolts (3) and removing washers (4; 5).

(2) Water radiator installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Check condition of the water radiator and hoses for cracks, cleanliness.

(c) Assemble the holder (2, Fig. 75-2) and heating deflector (30) and water radiator (1) with washers (4; 5) and bolts (3).

(d) Slide the radiator (1) with the holder (2) on the hoses (8; 9) and secure with hose clamps (6, 27).

(e) Connect air hose to the heating deflector (30) (Chapter 21-40).

(f) Check if hoses are firmly secured and sealed.

(g) Replenish the cooling system (Chapter 12-10).

(h) Install the engine cowlings (Chapter 71-10).
(i) Install the edge protection (31) to holder (2) - towing version only.
(j) Carry out engine ground test; check cooling system for leaks and cooling system indication.

B. Water thermostat

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pliers	1 pc
Persons	1

Tab. 75-2 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

ALWAYS ALLOW ENGINE TO COOL DOWN TO OUTSIDE AIR TEMPERATURE BEFORE START OF ANY WORK.

(1) Water thermostat removal:
(a) Make sure that the **IGNITION** switches are set to **OFF**.
(b) Remove the engine cowlings (Chapter 71-10).
(c) Drain the coolant from the cooling system (Chapter 12-10).
(d) Remove the water radiator (see par. 2 A. (1)).
(e) Hold the thermostat (7, Fig. 75-2); remove hoses (11; 12; 15) from the thermostat (7), by loosening hose clamps (6).
(f) Remove the thermostat (7).

(2) Water thermostat installation:
(a) Make sure that the **IGNITION** switches are set to **OFF**.
(b) Check condition of the water thermostat and hoses for cracks, cleanliness.
(c) Slide the thermostat (7) on the hoses (11; 12; 15) and secure with hose clamps (6).
(d) Check if hoses are firmly secured and sealed.
(e) Install the water radiator (see par. 2 A. (2)).
(f) Replenish the cooling system (Chapter 12-10).
(g) Install the engine cowlings (Chapter 71-10).
(h) Install the edge protection (31) to holder (2) - towing version only.
(i) Carry out engine ground test; check cooling system for leaks and cooling system indication.

C. Overflow bottle

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 5	1 pc
Phillips screwdriver 2	1 pc
Wrench 10	2 pcs
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 75-3 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

ALWAYS ALLOW ENGINE TO COOL DOWN TO OUTSIDE AIR TEMPERATURE BEFORE START OF ANY WORK.

(1) Overflow bottle removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the upper engine cowling (Chapter 71-10).
- (c) Drain the coolant from the cooling system (Chapter 12-10).
- (d) Remove the hose clamp (20, Fig. 75-2) and hose (19) from bottle (18).
- (e) Unscrew nuts (24) and remove washers (25).
- (f) Remove the bracket (22) and bottle (18).

(2) Overflow bottle installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Put overflow bottle (18, Fig. 75-2) on the appropriate place on the firewall (29).
- (c) Attach the bottle (18) with the bracket (22), nuts (24) and washers (25).
- (d) Connect hose (19) to bottle (18) and secure hose clamp (20).
- (e) Replenish the cooling system (Chapter 12-10).
- (f) Carry out engine ground test; check cooling system for leaks and cooling system indication.
- (g) Install the upper engine cowling (Chapter 71-10).

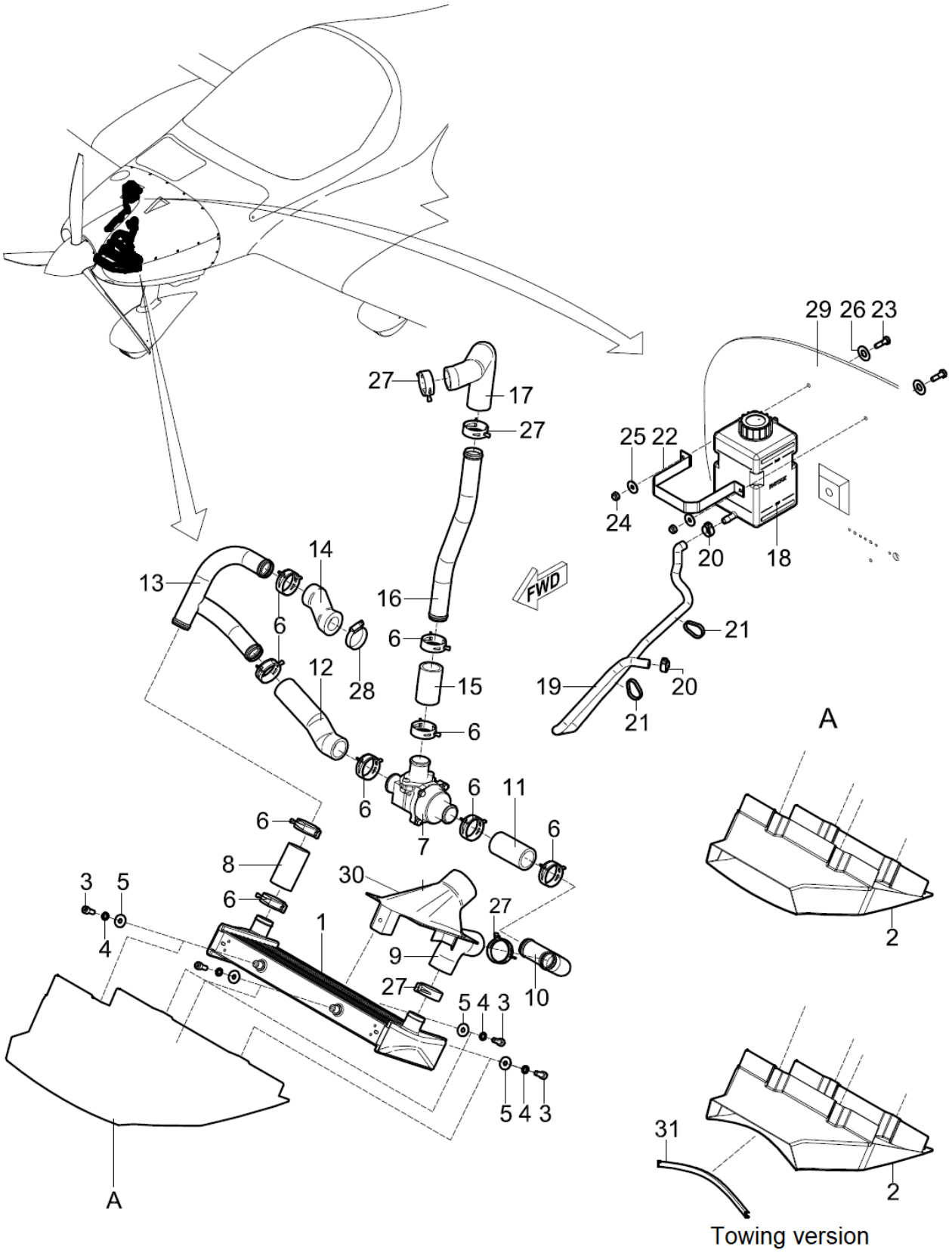


Fig. 75-2 Cooling System Removal / Installation (page 1 of 2)

1 – Water radiator
2 – Radiator holder
3 – Allen bolt M6 x 20
4 – Serrated locking washer ø6.4
5 – Washer ø6.4 x 18 x 1.6
6 – Hose clamp ø32 - 12
7 – Water thermostat
8 – Hose
9 – Hose elbow
10 – Tube elbow
11 – Hose
12 – Hose
13 – Triple tube
14 – Hose
15 – Hose
16 – Tube
17 – Tube elbow
18 – Overflow bottle
19 – Hose
20 – Hose clamp ø15.5 - 6
21 – Clip
22 – Bracket
23 – Bolt M6 x 20
24 – Self-locking nut M6
25 – Washer ø6.4 x 12 x 1.6
26 – Washer ø6.4 x 18 x 1.6
27 – Hose clamp ø35-12
28 – SK clamp 25-40x9

For information:

29 – Firewall
30 – Heating deflector
31 – Edge protection

Fig. 75-2 Cooling System Removal / Installation (page 2 of 2)

D. Cooling air distributor

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Hex key 5	1 pc
Hex key 6	1 pc
Wrench 10	1 pc
Torque wrench	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Cable ties (as appropriate)	AR
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Installation Manual for Rotax Engine Type 912 Series (Ref. No. IM-912, Part. No. 898643)	-
Persons	1

Tab. 75-4 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

ALWAYS ALLOW ENGINE TO COOL DOWN TO OUTSIDE AIR TEMPERATURE BEFORE START OF ANY WORK.

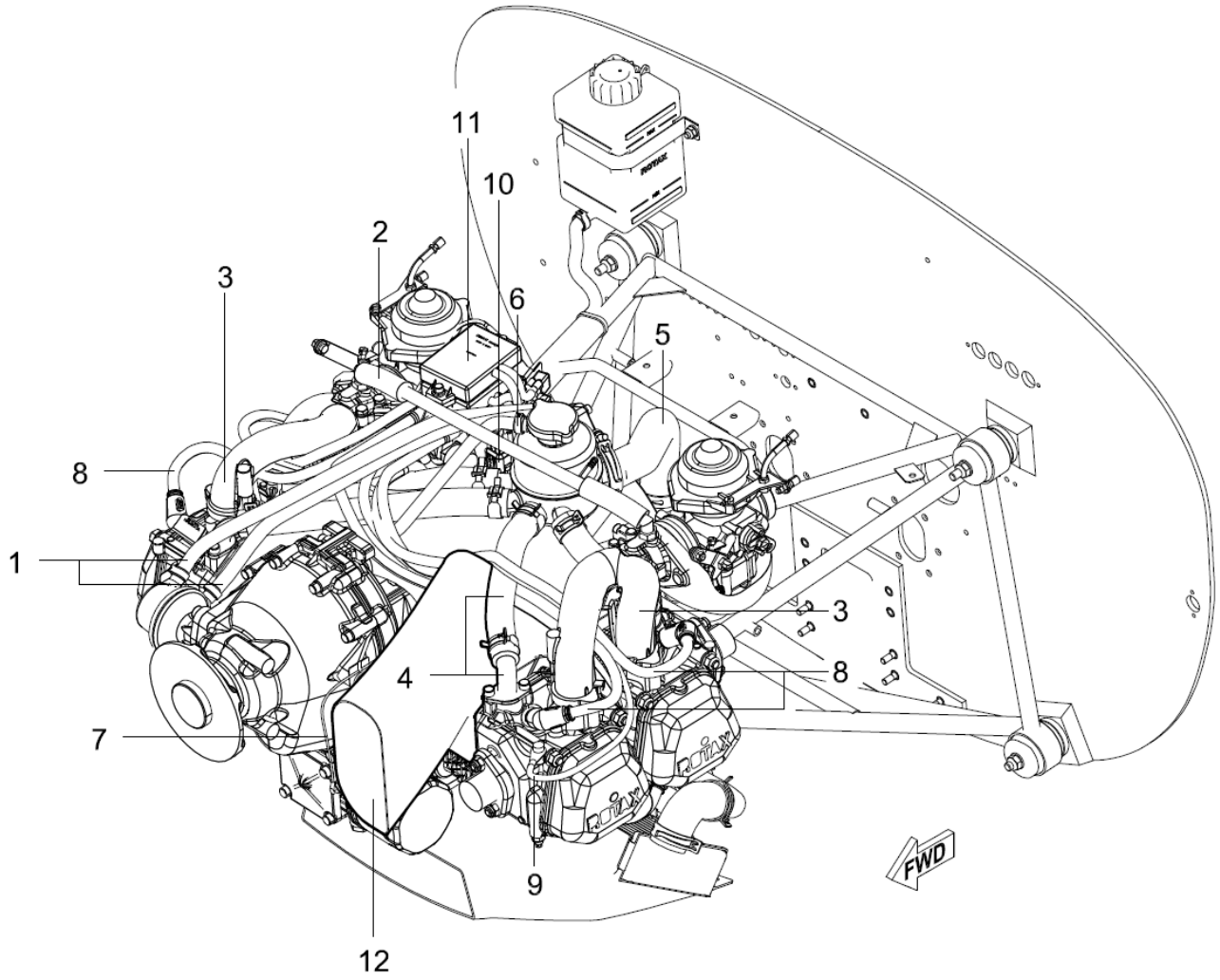
NOTE

The following procedure for Removal / installation is used for a towing version of aircraft. Before Removal / installation review the Installation Manual and Maintenance Manual for Rotax Engine Type 912 series.

(1) Cooling air distributor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Remove the upper engine cowling (Chapter 71-10).
- (c) Drain the coolant from the cooling system (Chapter 12-10).
- (d) Drain the fuel from the fuel system (Chapter 12-10).
- (e) Disconnect the fuel hoses (1, Fig. 75-3) from the engine fuel pump (Chapter 28-20).
- (f) Remove the compensating tube assy (2).
- (g) Remove the air intake manifolds (3).
- (h) Remove the water hoses (4) with sockets.
- (i) Disconnect the hoses (5, 6) from the expansion tank.
- (j) Disconnect the cable (7) from the oil temperature sensor.
- (k) Disconnect and remove the cables (8, 9).
- (l) Disconnect the connector (10) from the electronic module (11).
- (m) Remove the electronics module (11).
- (n) Remove the cooling air distributor (12).

(2) Cooling air distributor installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Install the cooling air distributor (12, Fig. 75-3) on engine in the correct position.
- (c) Attach the water hoses (4) with sockets.
- (d) Install the electronics module (11).
- (e) Connect the connector (10) to electronic module (11).
- (f) Install and connect the cables (8, 9)
- (g) Connect the cable (7) to the oil temperature sensor.
- (h) Connect the hoses (5, 6) to expansion tank.
- (i) Install the air intake manifolds (3).
- (j) Install the compensating tube assy (2).
- (k) Connect the fuel hoses (1) to engine fuel pump (Chapter 28-20).
- (l) Secure the hose clamps.

(m) Check if all hoses are well sealed and secured.
(n) Check if all bolts are tightened.
(o) Replenish the fuel system (Chapter 12-10).
(p) Replenish the cooling system (Chapter 12-10).
(q) Install the upper engine cowling (Chapter 71-10).
(r) Carry out engine ground test; check cooling and fuel system for leaks, and cooling system indication.



1 – Fuel hoses
2 – Compensating tube assy
3 – Intake manifolds
4 – Water hoses with sockets
5 – Hose to water thermostat
6 – Hose to overflow bottle
7 – Cable
8 – Ignition cables
9 – Engine ground wires
10 – Connector
11 – Electronics module
12 – Cooling air distributor

Fig. 75-3 Cooling Air Distributor Removal / Installation

This page is left blank intentionally

76 ENGINE CONTROLS

CONTENTS

Chapter	Description	Page
76-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	3
76-10	**POWER CONTROL**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Throttle control	6
	B. Choke control	10

This page is left blank intentionally

76-00 GENERAL

1. INTRODUCTION

This chapter describes the aircraft engine control. The engine has following controls:

- Throttle
- Choke (starting carburetor).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Engine will not start.	Choke control not correctly adjusted.	Adjust the choke control.
Cannot control the engine.	Broken throttle bowden cable.	Replace the broken bowden cable.
	Throttle control not adjusted correctly.	Carry out a range of movement check. Adjust the throttle control.
	Bowden cable not free to move.	Replace the bowden cable.
Engine does not get to maximum RPM.	Throttle control not adjusted correctly.	Carry out a range of movement check. Adjust the throttle control.
Engine does not get to idle.	Throttle control not adjusted correctly.	Carry out a range of movement check. Adjust the throttle control.

This page is left blank intentionally

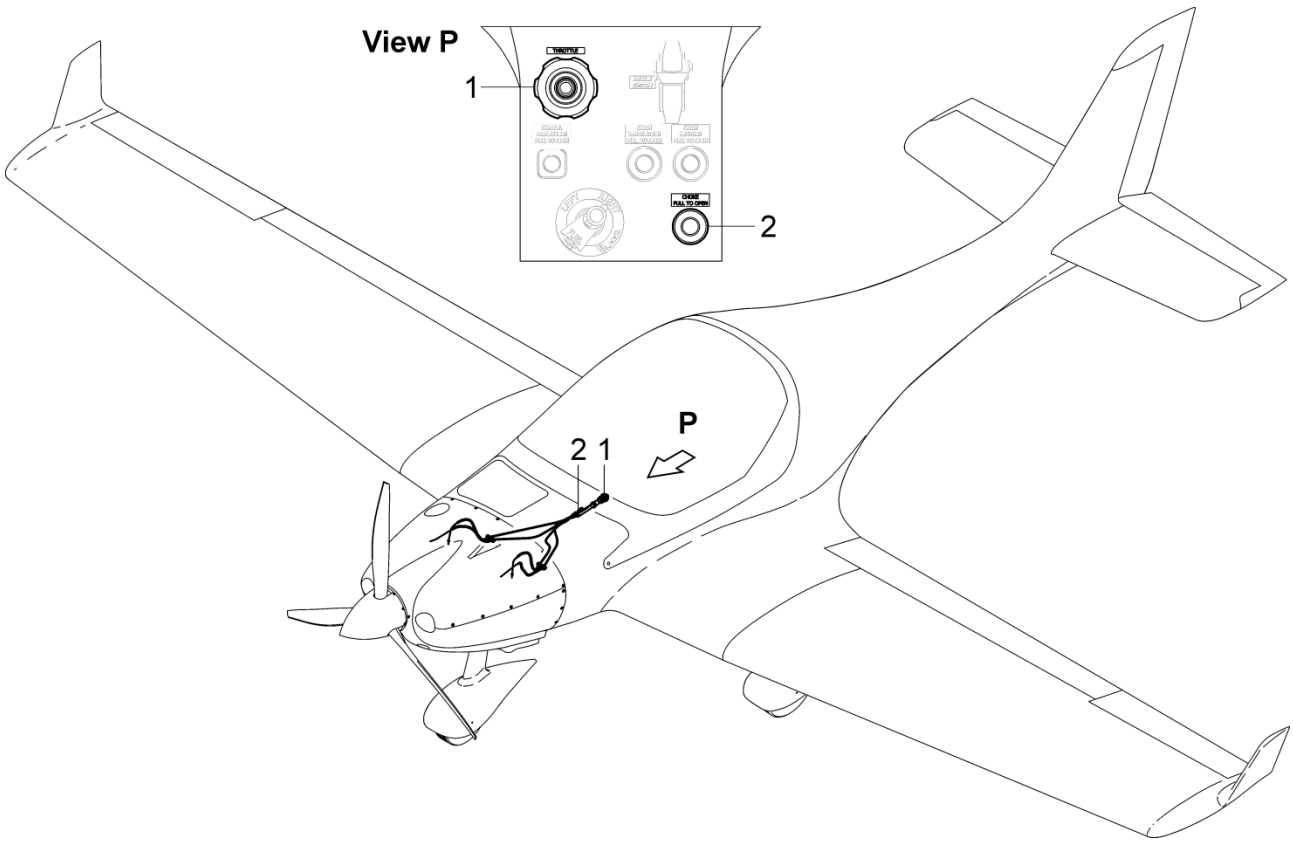
76-10 POWER CONTROL

1. DESCRIPTION

Engine power is set using the throttle control (1, Fig. 76-1) from idle up to max. power. A bowden cables connect between the throttle control in the cockpit and the carburetors on the engine. The **THROTTLE** control is a black knob installed in the central console. It is configured so that the max. power is open in the forward position and idle in the full aft position. Throttle control is operated by rotating the knob in clockwise direction for increase or counter clockwise for decrease of engine power. For rapid or large adjustments the knob may be moved forward or aft by depressing the lock button in the end of the throttle control and then positioning the throttle control as desired.

The bowden cable goes from the central console through the firewall to the engine compartment and to the carburetors.

Engine fuel mixture during engine starting is controlled by the choke control (2). The **CHOKE** control is a grey round knob located in the central console. The rich mixture is full aft and the weak mixture is full forward position of choke knob.



1 – Throttle control 2 – Choke control

Fig. 76-1 Power Control

2. MAINTENANCE PRACTICES

A. Throttle control

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 10	1 pc
Screwdriver 5	1 pc
Phillips screwdriver	1 pc
Hex key 2	1 pc
Hex key 3	1 pc
Hex key 4	1 pc
Wrench 8	1 pc
Wrench 9	1 pc
Special wrench 29	1 pc
Cable tie 2.6	AR
Cable tie 4.8	AR
Lockwire ø0.8 mm	AR
Loctite 243	AR
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 76-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF!

(1) Throttle control removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Remove the airbox (Chapter 71-60).

(d) Disconnect throttle controller´s inner cables (20, Fig. 76-3) on both carburetors, by releasing the nuts (24).

(e) Remove lockwire (7) and remove spiral hoses (10).

(f) Remove cable ties from the bowdens (18; 19).

(g) Behind central console, remove lockwire (7) and pull out the bowdens (18; 19); coil the inner cables (20).

(h) Release the nut (13), fix the leading bracket (17) (plug the screwdriver into the groove), and rotate the throttle controller (14) until the leading bracket (17) is unscrewed.

(i) Pull out the ring (15) from throttle controller (14) and disconnect leading bracket (17).

(j) Remove the nut (13), remove the washer (12) and pull out throttle controller.

NOTE

For better performance use band wrench (Fig. 76-2).



Fig. 76-2 Band Wrench Size 29

(2) Throttle control installation:

(a) Insert the throttle controller (14, Fig. 76-3) with distance tube (11) to the central console (26) from the cockpit.

(b) From the rear side put on washer (12) and screw the nut (13), but do not finalize the nut.

NOTE

For better performance use special wrench (Fig. 76-2).

(c) Put the safety clamp (16) on the leading bracket (17) at the end of groove.

NOTE

After engine test, safety clamp defines idle RPM.

(d) Grease with Vaseline and connect the leading bracket (17) and throttle controller (14). Slide the ring (15) on the jont.

(e) Apply the Loctite 243 on the thread of throttle controller (14) and screw it fully with leading bracket (17). Tighten the nut (13).

NOTE

The groove of leading bracket (17) must be at the top.

(f) Put bowdens (18; 19) onto inner cables (20) and route them through firewall and screw shackle to carburetors.

(g) Secure bowdens (18; 19) with lockwire (7) to leading bracket (17) and the screw shackle.

(h) Cover bowdens (18; 19) with spiral hoses (10) in engine compartment.

(i) Secure control cables along length with necessary amount of cable ties (4.8 mm).

(j) Adjust throttle control (see 2.A.(3)).

(3) Throttle control adjusting:

(a) Push throttle controller fully in and then pull out for 4 mm.

(b) Connect inner cable (20, Fig. 76-3) with throttle lever through perforated screw (25), strain inner cable (20) at 30 N and tighten the nut (24).

(c) Cut unnecessary control cable and solder end.

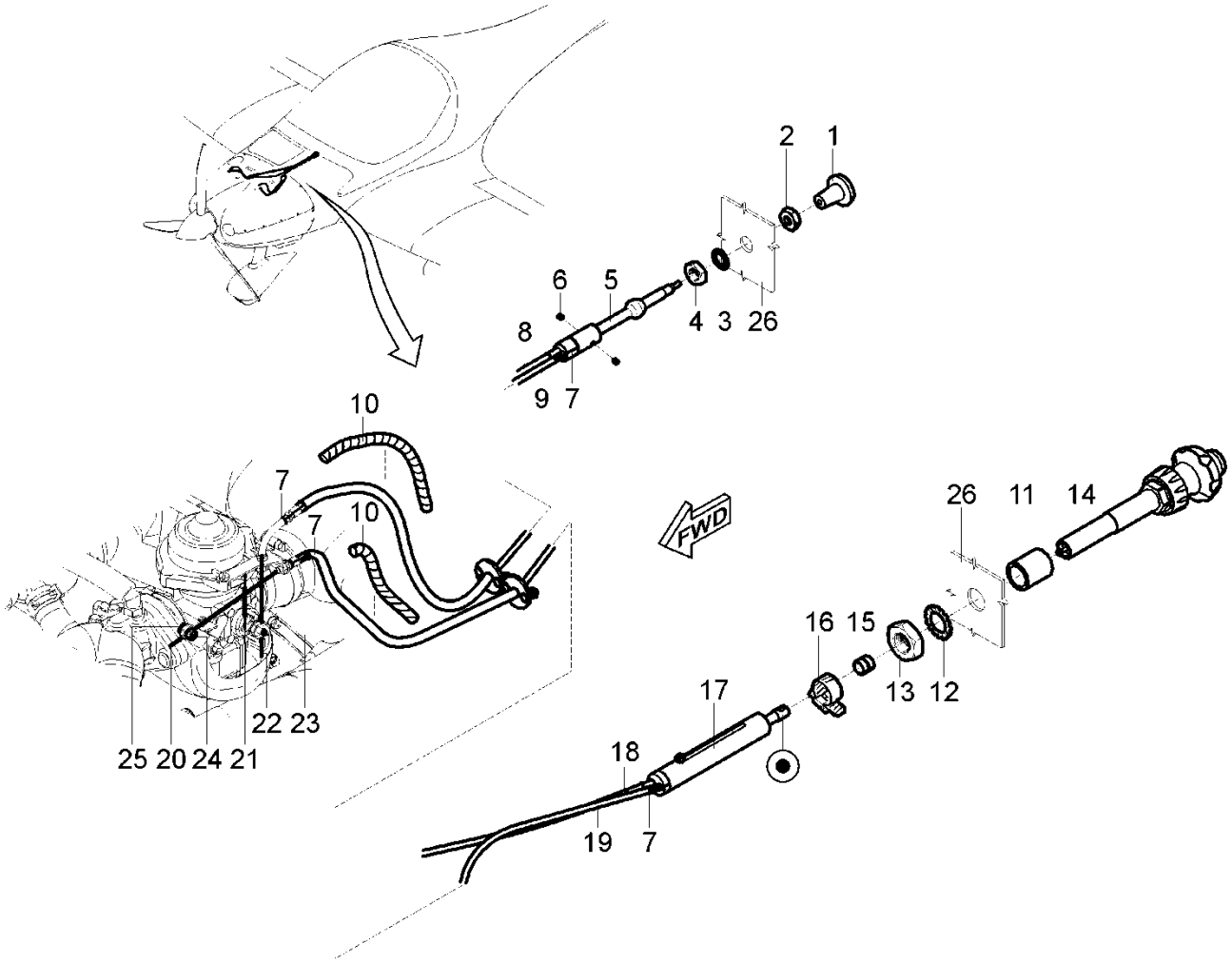
(d) Connect and adjust second inner cable.

(e) Carry out test and check:

- If all screw connections are tight.
- Operating of throttle.
- That no foreign objects remain in the aircraft.

(f) Install the airbox (Chapter 71-60).

(g) Install the engine cowlings (Chapter 71-10).



1 – Handle
2 – Cover nut
3 – Serrated locking washer ø10
4 – Nut M10
5 – Choke controller
6 – Hex head bolt M4 x 5
7 – Lockwire ø0.8 mm
8 – Right bowden
9 – Left bowden
10 – Spiral hose ø6
11 – Distance tube
12 – Serrated locking washer ø19
13 – Nut M19
14 – Throttle controller
15 – Ring
16 – Hose clamp ø16 - 27
17 – Leading bracket
18 – Right bowden
19 – Left bowden
20 – Throttle controller inner cable
21 – Spring
22 – Choke controller inner cable
23 – Hex head bolt
24 – Self-locking nut
25 – Perforated screw

For information:

26 – Central console

Fig. 76-3 Throttle and Choke Control Light Removal / Installation

B. Choke control

Type of maintenance: Heavy

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Screwdriver 10	1 pc
Screwdriver 5	1 pc
Phillips screwdriver	1 pc
Hex key 2	1 pc
Hex key 3	1 pc
Hex key 4	1 pc
Wrench 8	1 pc
Wrench 9	1 pc
Wrench 17	2 pcs
Cable tie 2.6	AR
Cable tie 4.8	AR
Lockwire ø0.8 mm	AR
Loctite 243	AR
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 76-2 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF!

(1) Choke control removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Remove the airbox (Chapter 71-60).

(d) On carburetors, release the hex head bolts (23, Fig. 76-3) and disconnect choke´s inner cables (22).

(e) Remove lockwire (7) and remove the spiral hoses (10).

(f) Behind central instrument panel, remove lockwire (7) and pull out the bowdens (8; 9), coil the inner cables (22).

(g) Unscrew choke handle (1).

(h) Unscrew the nut (2) and remove the choke controller (5).

(2) Choke control installation:
- (a) Secure the bolts (6, Fig. 76-3) with Loctite 243.
- (b) Behind the central console (26) slide the choke (5) with the nut (4) and the washer (3).
- (c) From front side of central instrument panel fully screw the cover nut (2) and then tighten the nut (4).
- (d) Screw the handle (1) secured with Loctite 243.
- (e) Slide bowdens (8; 9) on inner cables (22) and secure them with lockwire (7).
- (f) Direct the bowdens with inner cables (22) through firewall and band tubes to choke levers on carburetors.
- (g) Cover bowdens (8; 9) with the spiral hoses (10) in engine compartment and secure bowdens (8; 9) with lockwire (7) to band tube.
- (h) Secure control cables along length with necessary amount of cable ties (4.8 mm).
- (i) Adjust choke control (see 2.B. (3)).

(3) Choke control adjusting:
- (a) Pull choke handle to open position (approximate 20 mm).
- (b) At carburetors disconnect the springs (21, Fig. 76-3), turn up choke lever (open choke).
- (c) Connect inner cables (22) with the choke lever; secure bolt (23) with Loctite 243.
- (d) Cut unnecessary inner cable and solder the ends.
- (e) Put on the springs (21) back.
- (f) Connect and adjust second inner cable.
- (g) Carry out test and check:
  - If all screw connections are tight.
  - Operating of choke.
  - That no foreign objects remain in the aircraft.
- (h) Install the airbox (Chapter 71-60).
- (i) Install the engine cowlings (Chapter 71-10).

This page is left blank intentionally

77 ENGINE INDICATING

CONTENTS

Chapter	Description	Page
77-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	5
77-10	**POWER**	**7**
	1. DESCRIPTION	7
	2. MAINTENANCE PRACTICES	7
	A. SV-D1000 display	7
	B. SV-EMS-220 module	7
	C. Standby RPM indicator	7
	D. Propeller regulator Flybox PR1-P	7
	E. MAP sensor	7
77-40	**ENGINE SENSORS**	**9**
	1. DESCRIPTION	9
	2. MAINTENANCE PRACTICES	9
	A. Coolant temperature sensor	9
	B. EGT sensors	12
	C. Airbox temperature sensor	14
	D. Oil temperature sensor	16
	E. Oil pressure sensor	18
	F. MAP sensor	19
	G. Ammeter shunt	21
	H. SV-EMS-220 module	23

This page is left blank intentionally

77-00 GENERAL

1. INTRODUCTION

This chapter describes those components that indicate engine operation.

Engine instruments function fulfils the SV-D1000 EMS multifunction display of the Dynon SkyView system.

The sensors that sense the engine parameters, transmits the information to the SV-EMS-220 module. Information after processing is sent to the SV-D1000 EMS.

The SV-EMS-220 Module provides the interface between the SV-D1000 EMS and the engine sensors. It allows the SkyView System to continuously monitor all power plant systems in a highly automated manner. Any parameter falling outside its predefined limits are automatically brought to the attention of the pilot for immediate remediation.

Following engine parameters are displayed on the screen of SV-D1000 EMS (see Fig. 77-1):

- Engine RPM
- Coolant temperature
- EGT temperature
- Airbox temperature
- Oil temperature (Chapter 79-30)
- Oil pressure (Chapter 79-30)
- Manifold pressure
- Current
- Voltage

Exceeding of engine parameters is signalized with the **EMS** warning lamp (Chapter 31-50).

In case of SV-EMS-220 module failure, the engine rpm are displayed by standby RPM indicator or propeller regulator (towing version).

NOTE

Refer to “Dynon Avionics SkyView System Installation, Document 101320-022, Revision Q” or later for additional information.

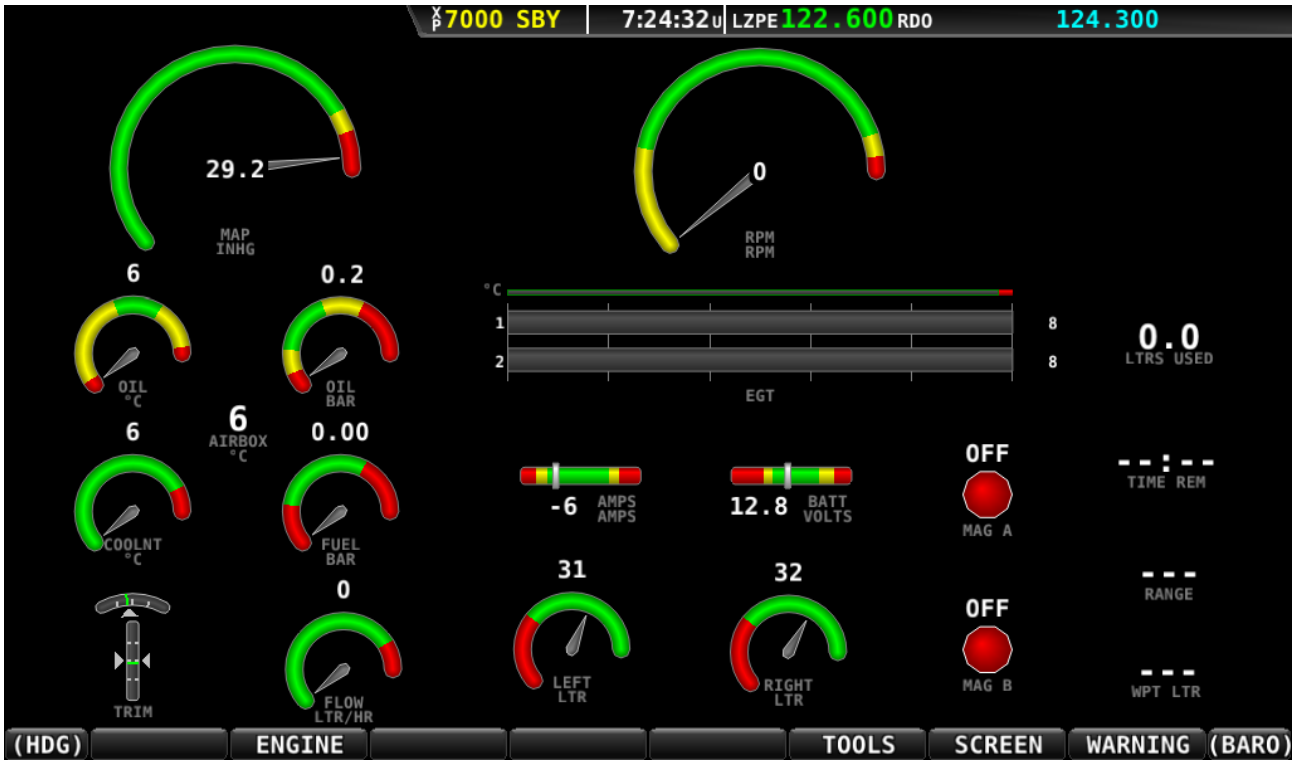


Fig. 77-1 SV-D1000 EMS Screen

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
No RPM indication.	Defective RPM indicator.	Replace the RPM indicator.
Incorrect RPM indication.	Defective RPM indicator.	Replace the RPM indicator.
No coolant temperature indication.	Defective coolant sensor.	Replace the sensor.
	Defective electrical cable.	Repair the defective electrical cable.
	Defective coolant temperature indicator.	Replace the defective coolant temperature indicator.
High coolant temperature indication.	Defective engine.	Refer to the Rotax Maintenance Manual.
	Defective coolant temperature indicator.	Replace the defective coolant temperature indicator.
No exhaust gas temperature indication.	Defective EGT sensor.	Replace the EGT sensor.
	Defective electrical cable.	Repair the defective electrical cable.
	Defective EGT indicator.	Replace the defective EGT indicator.
High exhaust gas temperature indication.	Defective engine.	Refer to the Rotax Maintenance Manual.
	Defective EGT indicator.	Replace the defective EGT indicator.

This page is left blank intentionally

77-10 POWER

1. DESCRIPTION

This section describes that portion of the engine indicating system which indicates the engine power. Included are the RPM indicating components and MAP indicating components.

The generator trigger coil is provided for RPM indicator signal. Signal from the coil is carried to the engine monitoring system unit Dynon EMS 220 and from there to the Dynon SkyView SV-D1000.

The MAP sensor is attached on the firewall in the engine compartment.

SV-EMS-220 Module is located in front of the instrument panel on the left instrument floor.

On the centre section of the instrument panel is mounted standby RPM indicator ROAD IF61.2B35.2301 or propeller regulator Flybox PR1-P (towing version).

Wiring diagram of engine parameters indicating is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. MAINTENANCE PRACTICES

A. SV-D1000 display

For removal / installation procedures refer to Chapter 39-10.

B. SV-EMS-220 module

For removal / installation procedures refer to Chapter 77-40.

C. Standby RPM indicator

For removal / installation procedures refer to Chapter 39-10.

D. Propeller regulator Flybox PR1-P

For removal / installation procedures refer to Chapter 39-10.

E. MAP sensor

For removal / installation procedures refer to Chapter 77-40.

This page is left blank intentionally

77-40 ENGINE SENSORS

1. DESCRIPTION

This section describes that portion of the engine indicating system which indicates engine parameters:

- Coolant temperature
- EGT temperature
- Airbox temperature
- Oil. temperature
- Oil pressures
- Manifold pressure
- Current

Signal from the sensors is carried to the engine monitoring system unit Dynon EMS 220 and from there to the Dynon SkyView SV-D1000.

All the engine parameters are displayed on the SV-D1000 EMS.

Wiring diagram of engine sensors is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. MAINTENANCE PRACTICES

A. Coolant temperature sensor

The coolant temperature sensor is screwed into the cylinder head No. 2.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 12	1 pc
Wrench 18	1 pc
Screwdriver 5	1 pc
Pliers	1 pc
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 77-1 Recommended tools, materials, persons and documentation

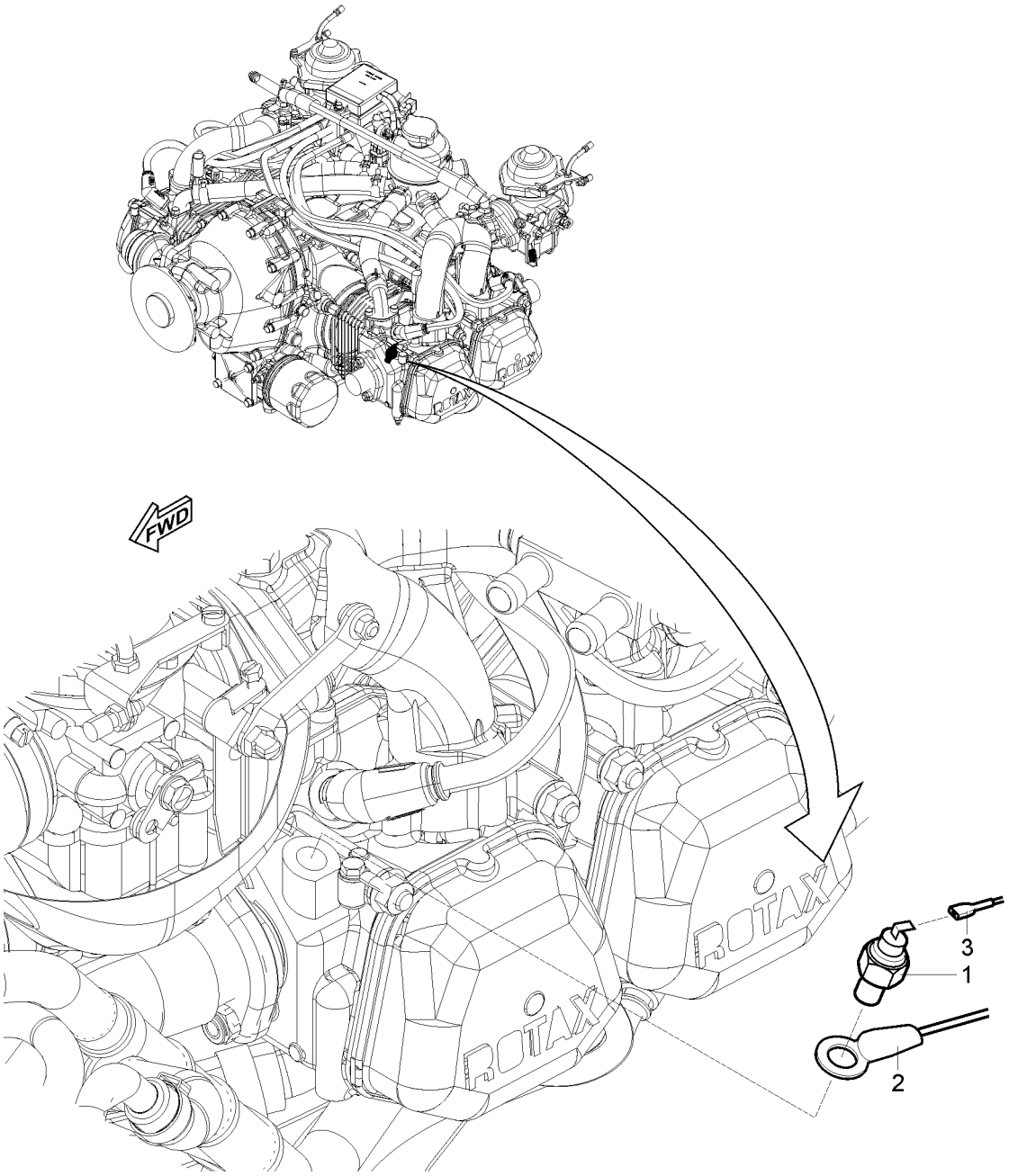
WARNING

ALWAYS ALLOW ENGINE TO COOL DOWN TO AMBIENT TEMPERATURE BEFORE START OF ANY WORK.

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Coolant temperature sensor removal:
  (a) Make sure that the **IGNITION** switches are set to **OFF**.
  (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
  (c) Remove the engine cowlings (Chapter 71-10).
  (d) Drain the coolant from the cooling system (Chapter 12-10).
  (e) Disconnect negative terminal of battery (Chapter 24-30).
  (f) Disconnect wire (3, Fig. 77-2) from the sensor (1).
  (g) Remove sensor (1) and ground wire (2) from the engine fitting.
  (h) Install protective plug on the engine fitting.

(2) Coolant temperature sensor installation:
  (a) Make sure that the **IGNITION** switches are set to **OFF**.
  (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
  (c) Remove protective plug from the engine fitting.
  (d) Install sensor (1, Fig. 77-2) with ground wire (2) to the engine fitting.
  (e) Connect wire (3) to the sensor (1).
  (f) Check if sensor is firmly secured and sealed.
  (g) Replenish the cooling system (Chapter 12-10).
  (h) Connect negative terminal of the battery (Chapter 24-30).
  (i) Carry out engine ground test; check cooling system for leaks and coolant temperature indication.
  (j) Install the engine cowlings (Chapter 71-10).



1 – Temperature sensor
2 – Ground wire
3 – Wire

Fig. 77-2 Coolant Sensor Removal / Installation

B. EGT sensors

The EGT sensors are installed in the rear exhaust tubes.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 9	1 pc
Screwdriver	1 pc
Persons	1

Tab. 77-2 Recommended tools, materials, persons and documentation

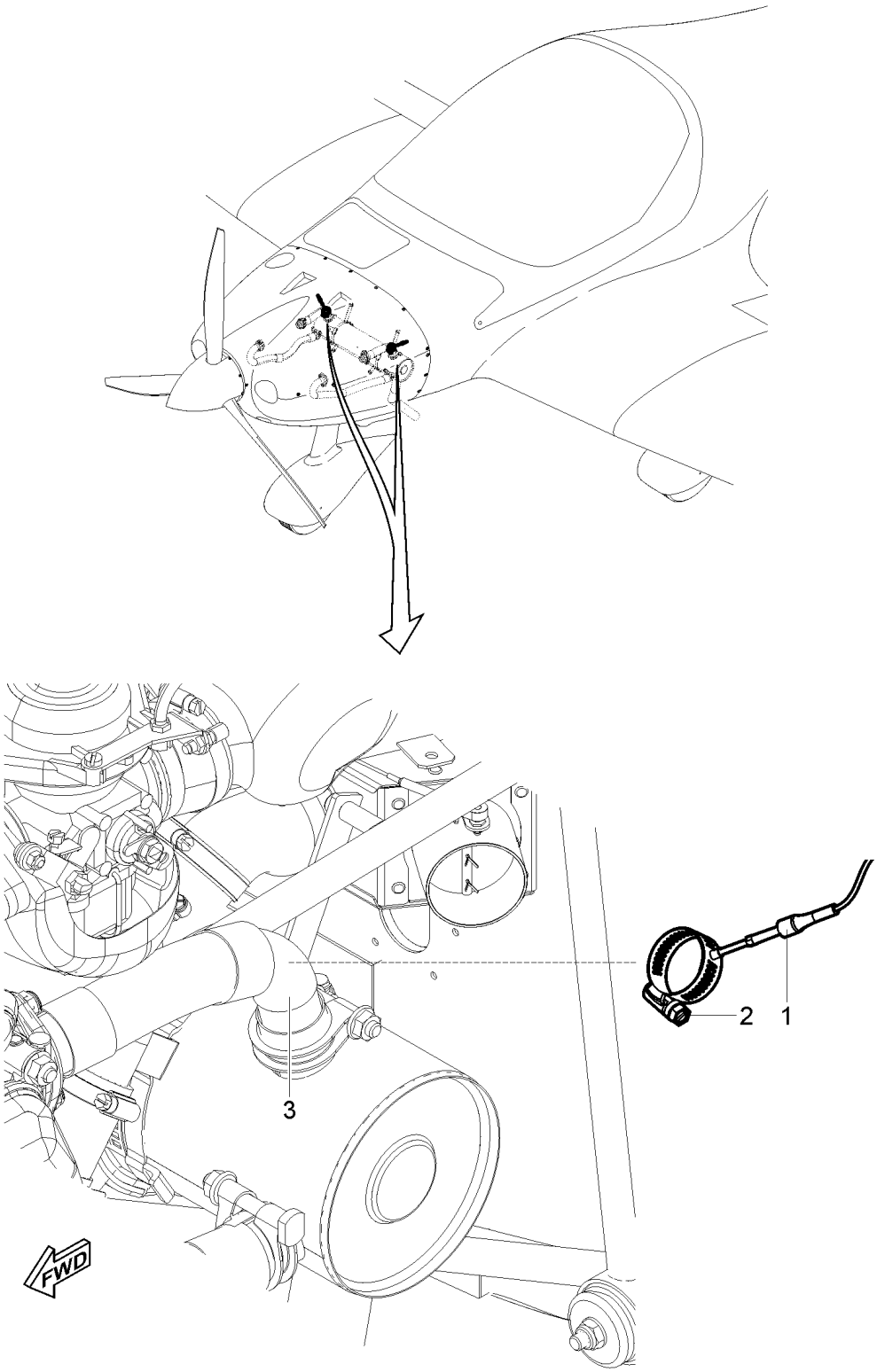
WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

MAKE SURE THE EXHAUST SYSTEM IS COOL BEFORE YOU TOUCH IT. THE EXHAUST SYSTEM CAN BE HOT. THIS CAN CAUSE INJURY TO PERSONS.

(1) EGT sensor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove the engine cowlings (Chapter 71-10).
- (d) Disconnect negative terminal of battery (Chapter 24-30).
- (e) Disconnect EGT sensor electrical cable.
- (f) Loose screw (2, Fig. 77-3) and disconnect EGT sensor (1) from exhaust tube (3).
- (g) Remove the sensor (1).

(2) EGT sensor installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Install EGT sensor (1, Fig. 77-3) into holes in elbows of exhaust tube (3); tighten the screw (2).
- (d) Connect EGT sensor electrical cable.
- (e) Check if sensor is firmly secured.
- (f) Connect negative terminal of the battery (Chapter 24-30).
- (g) Carry out engine ground test; check EGT indication.
- (h) Install the engine cowlings (Chapter 71-10).



1 – EGT sensor
2 – Screw

For information:
3 – Rear exhaust tube

Fig. 77-3 EGT Sensor Removal / Installation

C. Airbox temperature sensor

The airbox temperature sensor is screwed into the air filter holder.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

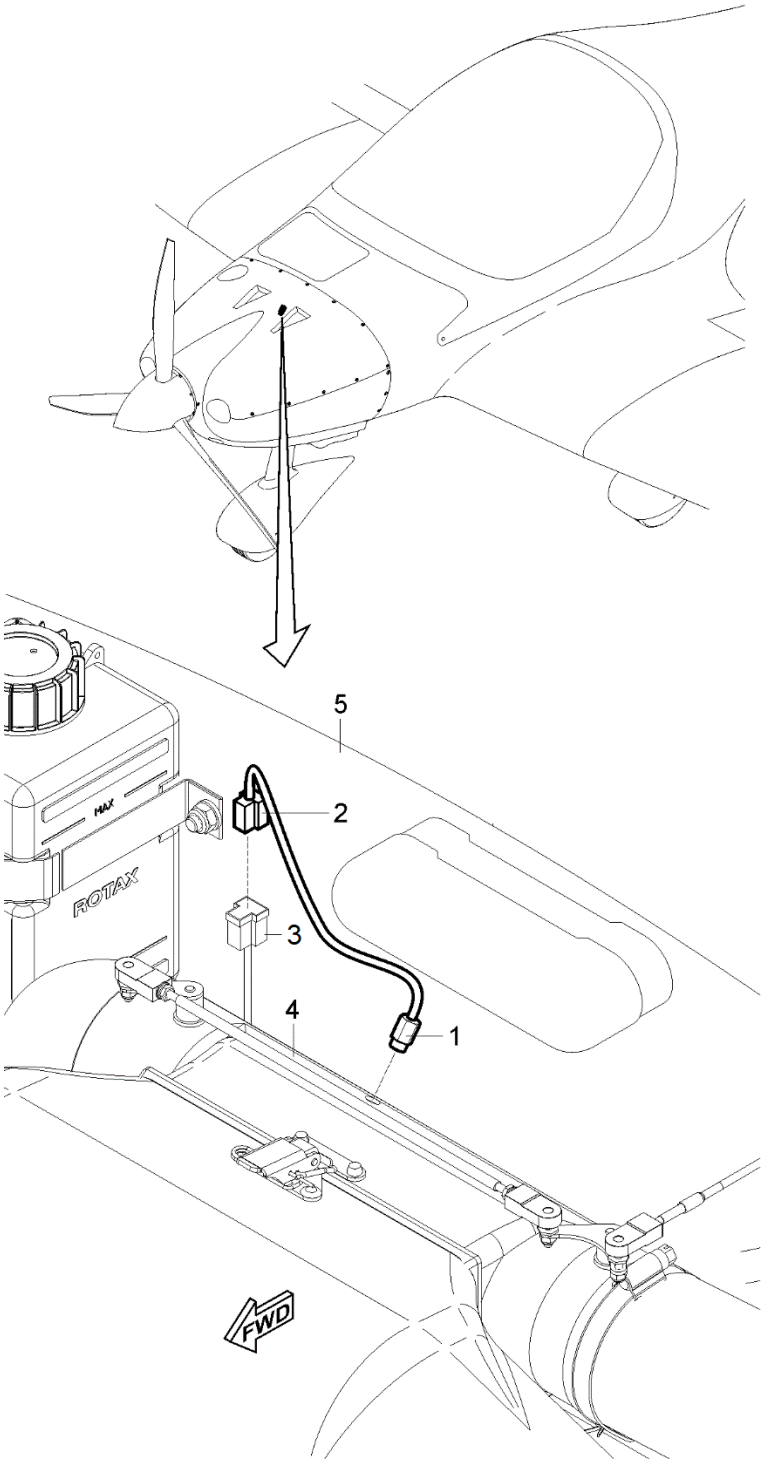
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Persons	1

Tab. 77-3 Recommended tools, materials, persons and documentation

(1) Airbox temperature sensor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove the engine cowlings (Chapter 71-10).
- (d) Disconnect connectors (2; 3, Fig. 77-4) from each other.
- (e) Unscrew sensor (1) and from air filter holder (4).
- (f) Install protective plug on the air filter holder fitting.

(2) Airbox temperature sensor installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove protective plug from the air filter holder fitting.
- (d) Install sensor (1, Fig. 77-4) to the fitting of air filter holder (4).
- (e) Connect connectors (2; 3) together.
- (f) Check if sensor is firmly secured and sealed.
- (g) Carry out engine ground test; check airbox temperature indication.
- (h) Install the engine cowlings (Chapter 71-10).



1 – Airbox temperature sensor
2 – Electrical connector
3 – Electrical connector

For information:
4 – Air filter holder
5 – Firewall

Fig. 77-4 Airbox Temperature Sensor Removal / Installation

D. Oil temperature sensor

The oil temperature sensor is screwed into the oil pump body.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 12	1 pc
Pliers	1 pc
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 77-4 Recommended tools, materials, persons and documentation

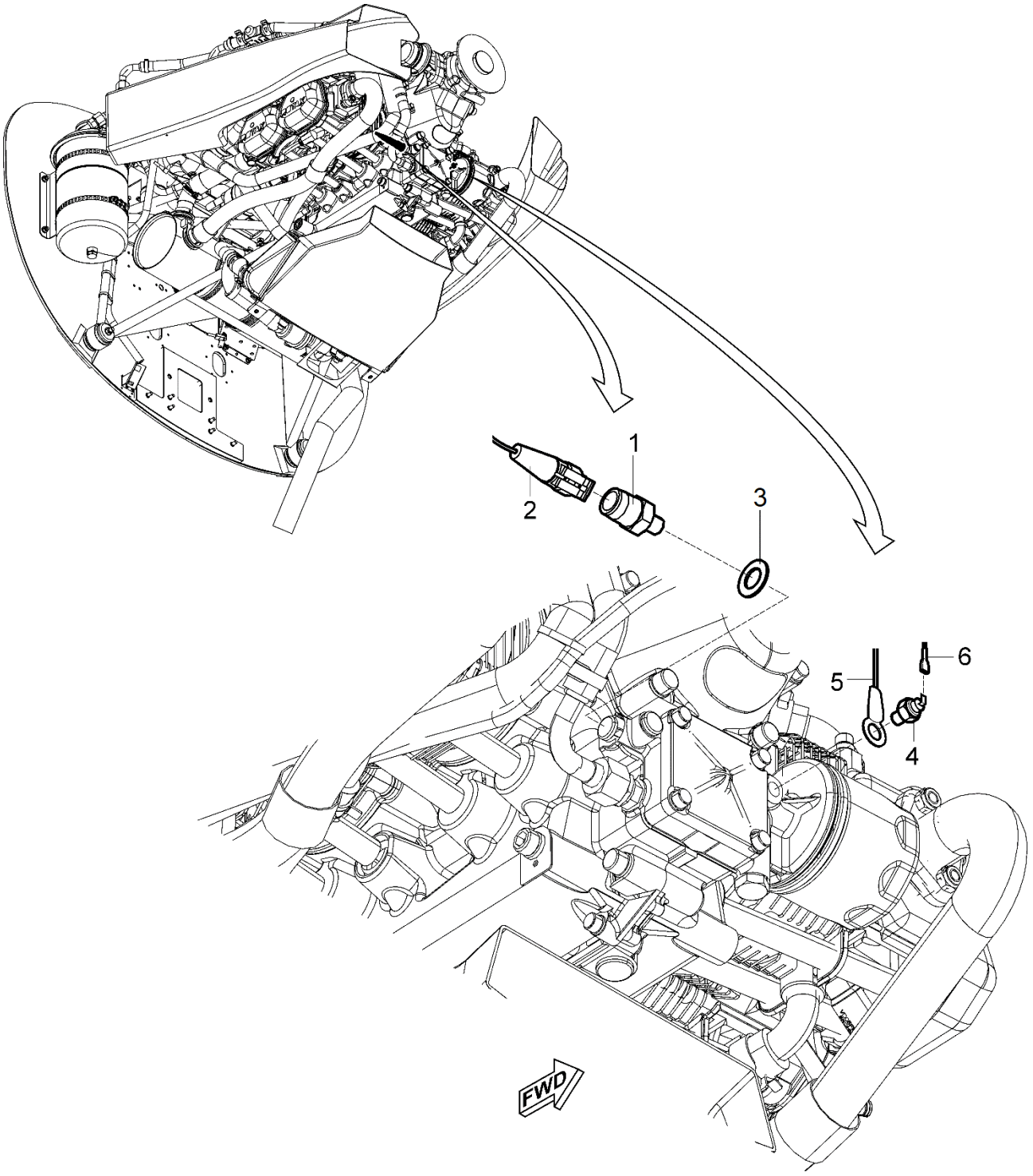
WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

CARELESS DRAINING OF HOT ENGINE OIL MAY CAUSE SCALDS. DISPOSE OF USED OIL AND FILTERS RESPECTING THE ENVIRONMENTAL AND SAFETY REGULATIONS.

(1) Oil temperature sensor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove the engine cowlings (Chapter 71-10).
- (d) Disconnect negative terminal of battery (Chapter 24-30).
- (e) Disconnect wire (6, Fig. 77-5) from sensor (4).
- (f) Remove sensor (4) and ground wire (5) from the engine fitting.
- (g) Install protective plug on the engine fitting.

(2) Oil temperature sensor installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove protective plug from the engine fitting.
- (d) Install sensor (4, Fig. 77-5) with ground wire (5) to the engine fitting.
- (e) Connect wire (6) to the sensor (4).
- (f) Check if sensor is firmly secured and sealed.
- (g) Connect negative terminal of the battery (Chapter 24-30).
- (h) Carry out engine ground test; check oil system for leaks and oil system indication.
- (i) Install the engine cowlings (Chapter 71-10).



1 – Oil pressure sensor
2 – Electrical connector
3 – Cooper gasket ring ø14.2 x 20 x 2
4 – Oil temperature sensor
5 – Ground wire
6 – Wire

Fig. 77-5 Oil Temperature and Pressure Sensor Removal / Installation

E. Oil pressure sensor

The oil pressure sensor is screwed into the oil pump body.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 12	1 pc
Wrench 14	1 pc
Screwdriver 5	1 pc
Pliers	1 pc
Cable tie 2.6	1 pc
Cooper gasket ring ø14.2 x 20 x 2	1 pc
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 77-5 Recommended tools, materials, persons and documentation

WARNING

CARELESS DRAINING OF HOT ENGINE OIL MAY CAUSE SCALDS. DISPOSE OF USED OIL AND FILTERS RESPECTING THE ENVIRONMENTAL AND SAFETY REGULATIONS.

(1) Oil pressure sensor removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove the engine cowlings (Chapter 71-10).
- (d) Cut cable tie and disconnect electrical connector (2, Fig. 77-5) from sensor (1).
- (e) Remove the sensor (1) and gasket ring (3).
- (f) Install protective plugs on the engine fitting.

(2) Oil pressure sensor installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove protective plugs from the engine fitting.
- (d) Install the sensor (1, Fig. 77-5) and gasket ring (3) to the engine fitting.
- (e) Connect electrical connector (2) to the sensor (1) and fasten wire with cable tie.
- (f) Check if sensor and reducer are firmly secured and sealed.

(g) Carry out engine ground test; check oil system for leaks and oil system indication.

(h) Install the engine cowlings (Chapter 71-10).

F. MAP sensor

The MAP sensor is installed at firewall.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	2 pcs
Screwdriver	1 pc
Oetiker pliers	1 pc
Persons	1

Tab. 77-6 Recommended tools, materials, persons and documentation

(1) MAP sensor removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Make sure that the **MASTER SWITCH** is set to **OFF**.

(c) Remove the engine cowlings (Chapter 71-10).

(d) Disconnect the connector (2, Fig. 77-6) from the sensor.

(e) Remove the clamp (4).

(f) Disconnect the hose (3) from the port of the sensor.

(g) Remove the mounting nuts (6), washers (7; 8) and bolts (5).

(h) Remove the sensor (1).

(i) Put the caps on the hose and sensor port.

(2) MAP sensor installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Make sure that the **MASTER SWITCH** is set to **OFF**.

(c) Remove the caps from the sensor port and hose.

(d) Put the sensor (1, Fig. 77-6) in position on the firewall (9).

(e) Hold the sensor and attach it with bolts (5), washers (7; 8) and nuts (6).

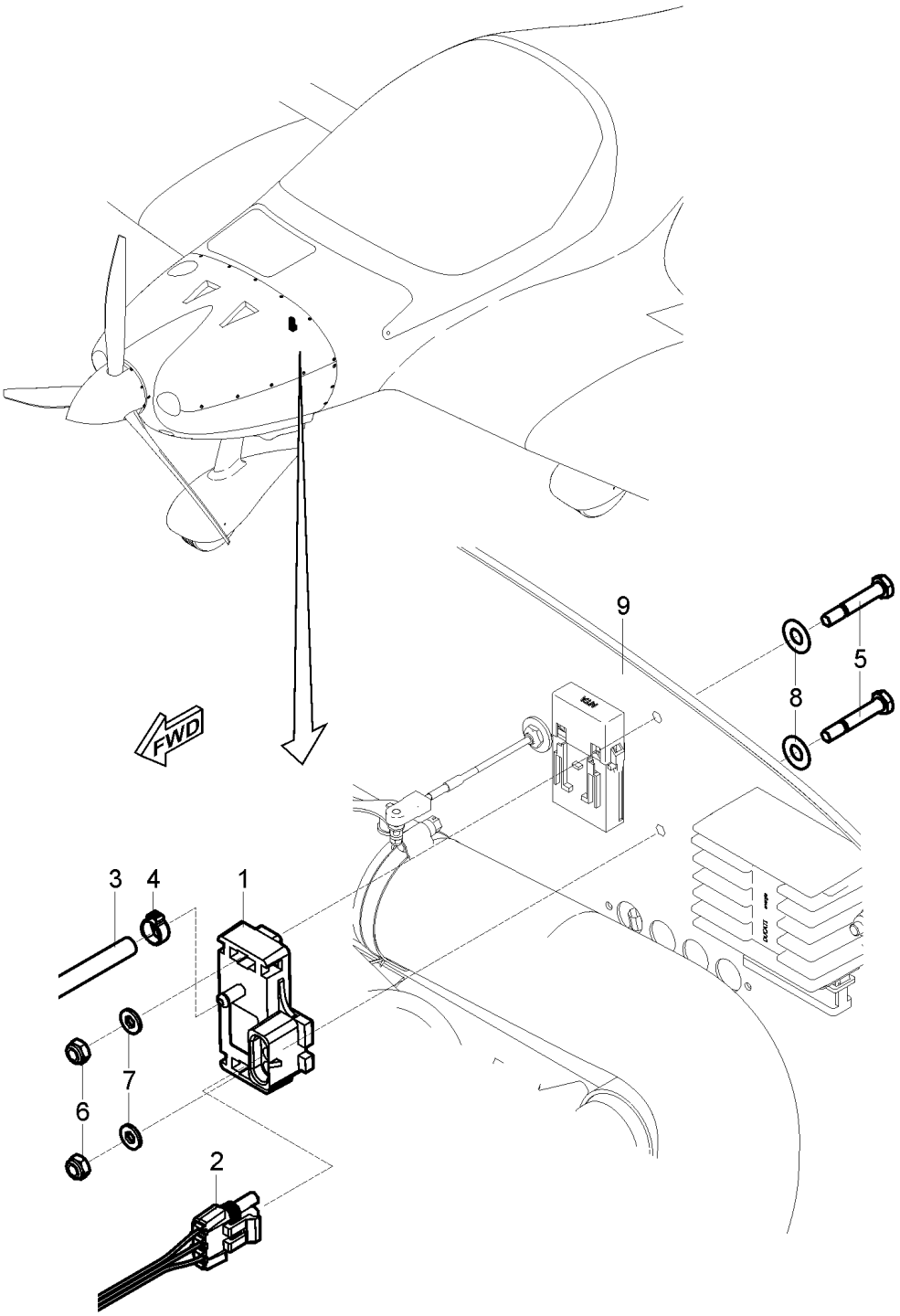
(f) Connect the hose (3) to the port of the sensor (1) and secure it with clamp (4).

(g) Connect the connector (2) to the sensor (1).

(h) Check if sensor is firmly secured.

(i) Install the engine cowlings (Chapter 71-10).

(j) Carry out an operational test; check MAP indication.



1 – MAP sensor
2 – Electrical connector
3 – Hose
4 – Hose clamp 14.5
5 – Bolt M6 x 36
6 – Self-locking nut M6
7 – Washer ø6.4 x 12 x 1.6
8 – Washer ø6.4 x 18 x 1.6
For information:
9 – Firewall

Fig. 77-6 MAP Sensor Removal / Installation

G. Ammeter shunt

The ammeter shunt is installed at firewall.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Flat screwdriver	1 pc
Cross screwdriver	1 pc
Cutting pliers	1 pc
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

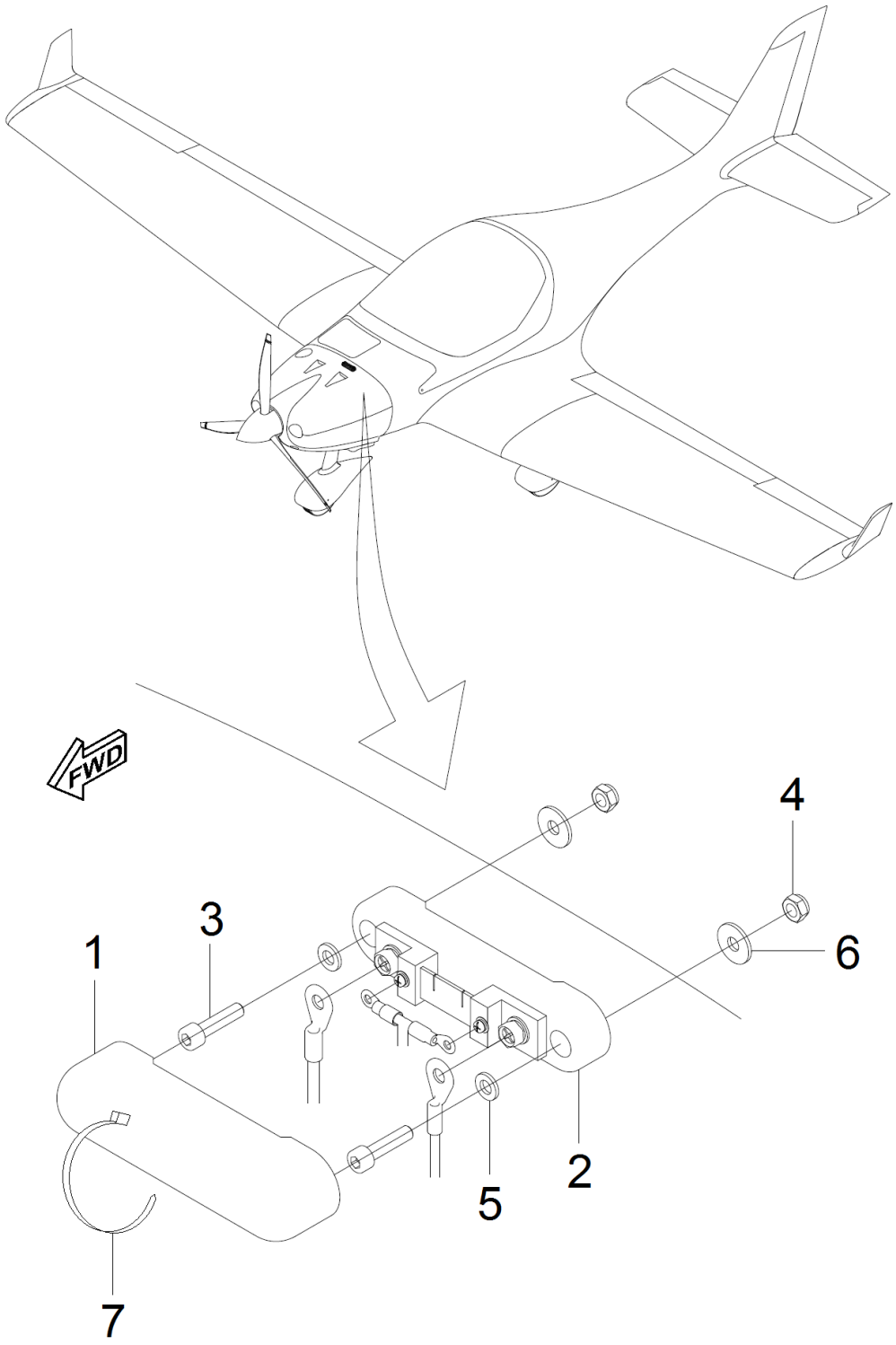
Tab. 77-7 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF. DISCONNECT NEGATIVE TERMINAL OF AIRCRAFT BATTERY.

(1) Ammeter shunt removal:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (c) Remove the engine cowlings (Chapter 71-10).
- (d) Disconnect negative terminal of battery (Chapter 24-30).
- (e) Remove cable tie (7, Fig. 77-7) and remove the cover (1).
- (f) Disconnect wires from shunt.
- (g) Remove the shunt (2) unscrewing bolts (3), nuts (4) and washers (5) and (6).

(2) Ammeter shunt installation:
- (a) Make sure that the **IGNITION** switches are set to **OFF**.
- (b) Make sure that the **MASTER SWITCH** is set to **OFF**..
- (c) Install the shunt (2, Fig. 77-7) using bolts (3), nuts (4) and washers (5) and (6).
- (d) Connect wires to the shunt.
- (e) Check if shunt is firmly secured and sealed.
- (f) Install the shunt cover (1) and cable tie (7).
- (g) Connect negative terminal of the battery (Chapter 24-30).
- (h) Carry out engine ground test.



1 – Shunt cover
2 – Shunt
3 – Bolt M6 x 25
4 – Nut M6
5 – Washer 6.4 x 12 x 1.6
6 – Washer 6.4 x 18 x 1.6
7 – Cable tie

Fig. 77-7 Ammeter Shunt Removal / Installation

H. SV-EMS-220 module

The SV-EMS-220 module is installed at left instrument floor behind the instrument panel.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

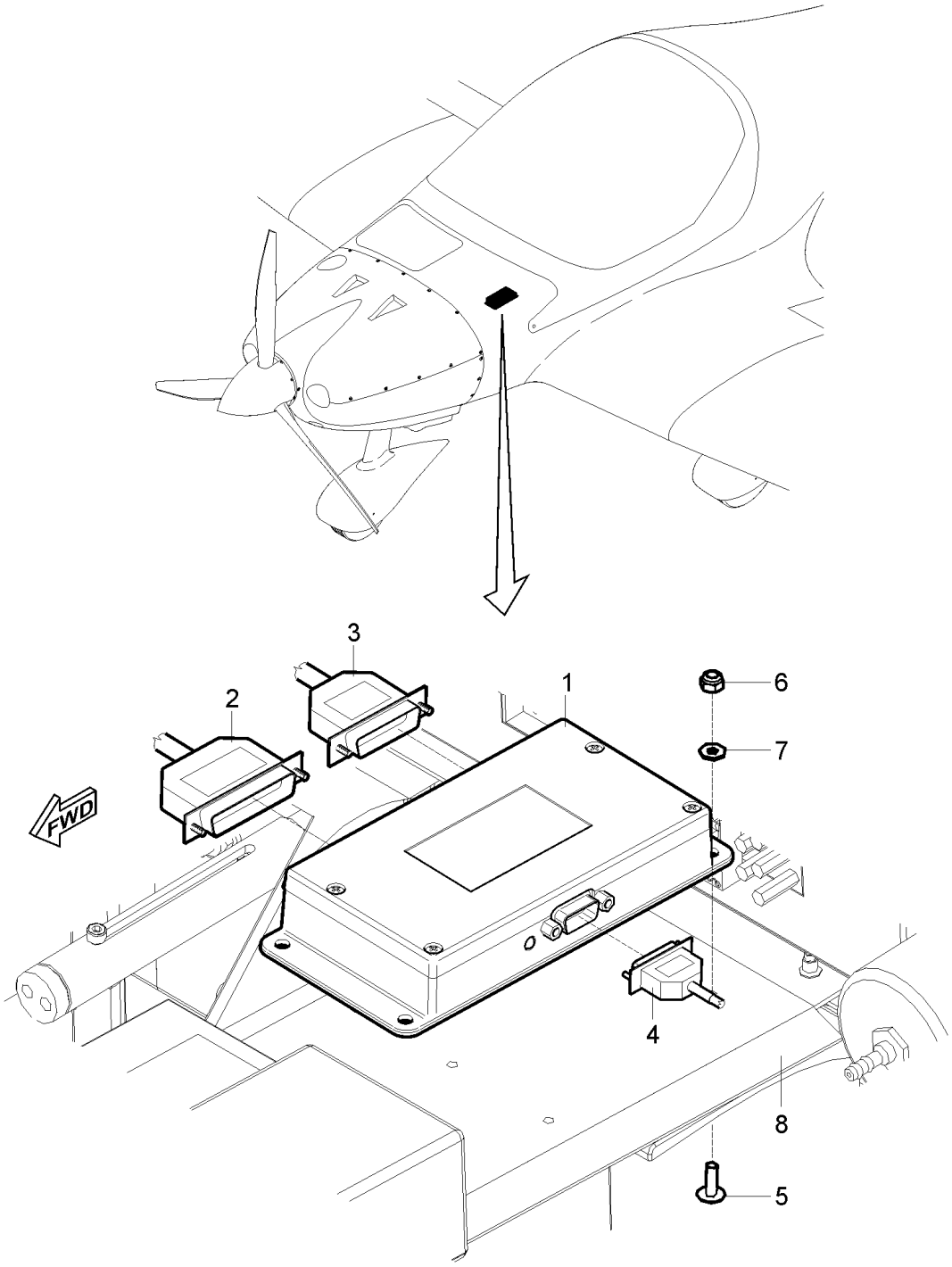
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	1 pc
Screwdriver	1 pc
Philips screwdriver	1 pc
Persons	1

Tab. 77-4 Recommended tools, materials, persons and documentation

(1) SV-EMS-220 module removal:
- (a) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (b) Remove the instrument panel cover (Chapter 39-10).
- (c) Disconnect the connectors (2; 3; 4, Fig. 77-8) from the EMS module (1).
- (d) Remove the mounting nuts (6), washers (7) and screws (5).
- (e) Remove the EMS module (1) from the floor (8).

(2) SV-EMS-220 module installation:
- (a) Make sure that the **MASTER SWITCH** is set to **OFF**.
- (b) Put the EMS module (1, Fig. 77-8) in position on the instrument floor (8).
- (c) Hold the module and attach it with screws (5), washers (7) and nuts (6).
- (d) Connect the connectors (2; 3; 4) to the module.
- (e) Install the instrument panel cover (Chapter 39-10).
- (f) Carry out setting (as required) and operational test – refer to the Dynon Avionics SkyView System Installation, Doc. No. 101320-022, Revision Q" or later.



1 – SV-EMS-220 Module
2 – DB37 main sensor connector
3 – DB25 CHT/EGT sensor connector
4 – SkyView network connector
5 – Screw M4 x 12
6 – Self-locking nut M4
7 – Washer ø4 x 9 x 1

For information:

8 – Left instrument floor

Fig. 77-8 SV-EMS-220 Module Removal / Installation

78 EXHAUST

CONTENTS

Chapter	Description	Page
78-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	3
78-10	**EXHAUST SYSTEM**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Exhaust system	6

This page is left blank intentionally

78-00 GENERAL

1. INTRODUCTION

This chapter describes the engine exhaust system. The exhaust system consists of the exhaust tubes, muffler and the exhaust pipe. On the muffler are installed airbox pre-heat exchanger (Chapter 71-60) and heat exchanger (Chapter 21-40).

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
The exhaust system makes too much noise.	A damaged muffler.	Replace the exhaust system.
Too much vibration.	Cracks in the exhaust tube.	Replace the exhaust system/ weld the crack.
Exhaust gas leaks into the cockpit.	Cracks in the muffler.	Replace the exhaust system.
Indication of exhaust gas leaks on the engine cowling.	Defective exhaust tube gaskets.	Replace defective gaskets. The nuts that attach the exhaust tubes to the cylinder head are loose. Torque to 12 – 20 Nm.

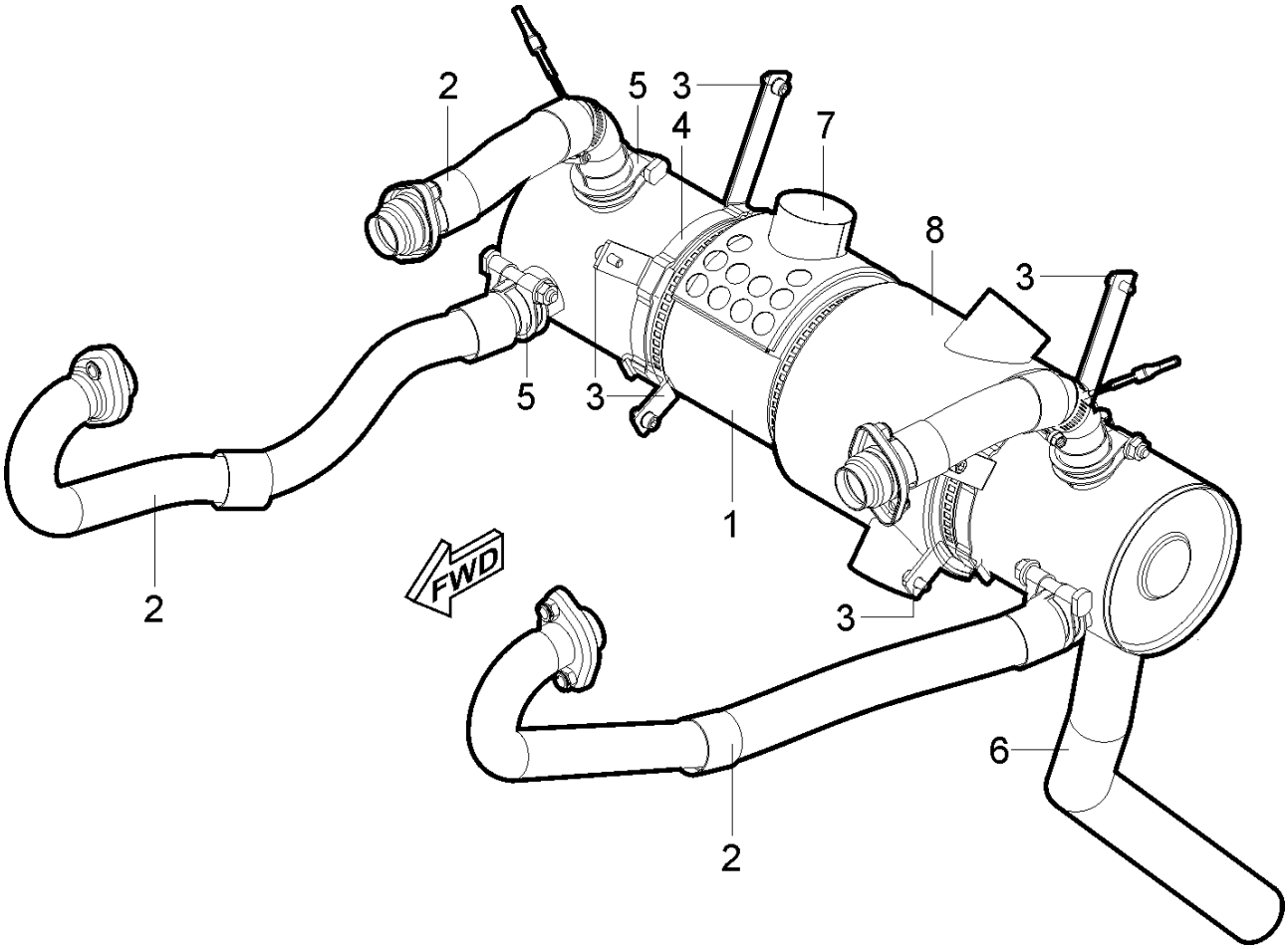
This page is left blank intentionally

78-10 EXHAUST SYSTEM

1. DESCRIPTION

The exhaust gases from each cylinder pass through the exhaust tubes (2, Fig. 78-1) to the muffler (1) which is attached to the engine mount by holders (3) and clamps (4). The exhaust tubes are connected to the muffler inlets and are fixed by clamps (5). The exhaust gases discharge through the exhaust pipe (6) on the left side.

The two-piece heat exchanger (8) and the airbox pre-heat exchanger (7) are attached to the muffler (1).



1 – Muffler
2 – Exhaust tube
3 – Holder
4 – Clamp
5 – Clamp
6 – Exhaust pipe
7 – Airbox pre-heat exchanger
8 – Heat exchanger

Fig. 78-1 Exhaust System

2. MAINTENANCE PRACTICES

A. Exhaust system

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 7	2 pcs
Wrench 10	1 pc
Wrench 13	1 pc
Socket 5	1 pc
Socket 12	1 pc
Screwdriver 5	1 pc
Pliers	1 pc
Serrated locking washer ø6.4	6 pcs
Loctite 243	AR
Lockwire ø0.8 mm	AR
Persons	1

Tab. 78-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF!

MAKE SURE THE EXHAUST SYSTEM IS COOL BEFORE YOU TOUCH IT. THE EXHAUST SYSTEM CAN BE HOT. THIS CAN CAUSE INJURY TO PERSONS.

(1) Exhaust system removal:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Disconnect the battery and remove the upper line of spark plugs from the engine (Refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for maintenance practices information).

(d) Remove the airbox (Chapter 71-60).

(e) Disconnect the EGT sensors (22, Fig. 78-02) from the exhaust tubes (2, 3) (Chapter 77-40).

(f) Disconnect the air hose (13) from the airbox pre-heat exchanger (11) and the air hoses (14; 15) from the heat exchanger (12), by removing the hose clamps (16).

(g) Unscrew all nuts (20) and release the clamps (17).

(h) Remove the clamps (6).

(i) Slightly shift the muffler (1) backward and remove the exhaust tubes (2; 3; 4; 5).

(j) Unscrew the bolts (18), remove the washers (19) and brackets (7; 8; 9; 10). Carefully remove the muffler (1) with the assembled heat and airbox pre-heat exchangers (11; 12).

(k) On the muffler (1), remove the lockwire, release and remove the universal clamps (21) and remove the exchangers (11; 12).

(2) Exhaust system installation:

(a) Make sure that the **IGNITION** switches are set to **OFF**.

(b) Make sure that the battery is disconnected and the upper line of spark plugs is removed from the engine.

(c) Before installation check the exhaust parts for burns and cracks.

WARNING

CHECK THE EXHAUST SYSTEM VERY CAREFULLY. A DEFECTIVE MUFFLER WILL LET THE EXHAUST GASES INTO THE COCKPIT. THIS CAN CAUSE DEATH OR INJURY TO PERSONS OR CAN RESULT IN ENGINE POWER LOSS, POSSIBLY FIRE.

(d) Install the heat exchanger (12, Fig. 78-02) and the airbox pre-heat exchanger (11) on the muffler (1) according to Fig. 78-03. Secure them with the universal clamps (21, Fig. 78-02); secure the universal clamps (21) with the lockwire (see Chapter 20-20).

(e) Install the muffler (1) between the engine mount struts, slide the short air hose (14) into the heat exchanger (12) and secure it with the hose clamp (16).

(f) Install proper brackets (7; 8; 9; 10) (one bracket consists of two parts) using new washers (19) and the bolts (18); do not tighten them.

(g) Connect the exhaust tubes (2; 3) with the engine and muffler (1) and secure them with clamps (17).

(h) Slide on and screw the clamps (6); do not tighten them.

(i) Unscrew the bolts (18), apply Loctite 243 on the bolts (18) threads and tighten them.

(j) Tighten the clamps (6) and secure them with lockwire (see Chapter 20-20).

(k) Install the exhaust tubes (4; 5), secure them with the clamps (17) and gradually tighten the nuts (20) on all exhaust tubes (2; 3; 4; 5) – tightening torque 12 – 20 Nm.

(l) Slide the air hose (13) on the airbox pre-heat exchanger (11) and the air hose (14, 15) on the heat exchanger (12); secure them with the clamps (16).

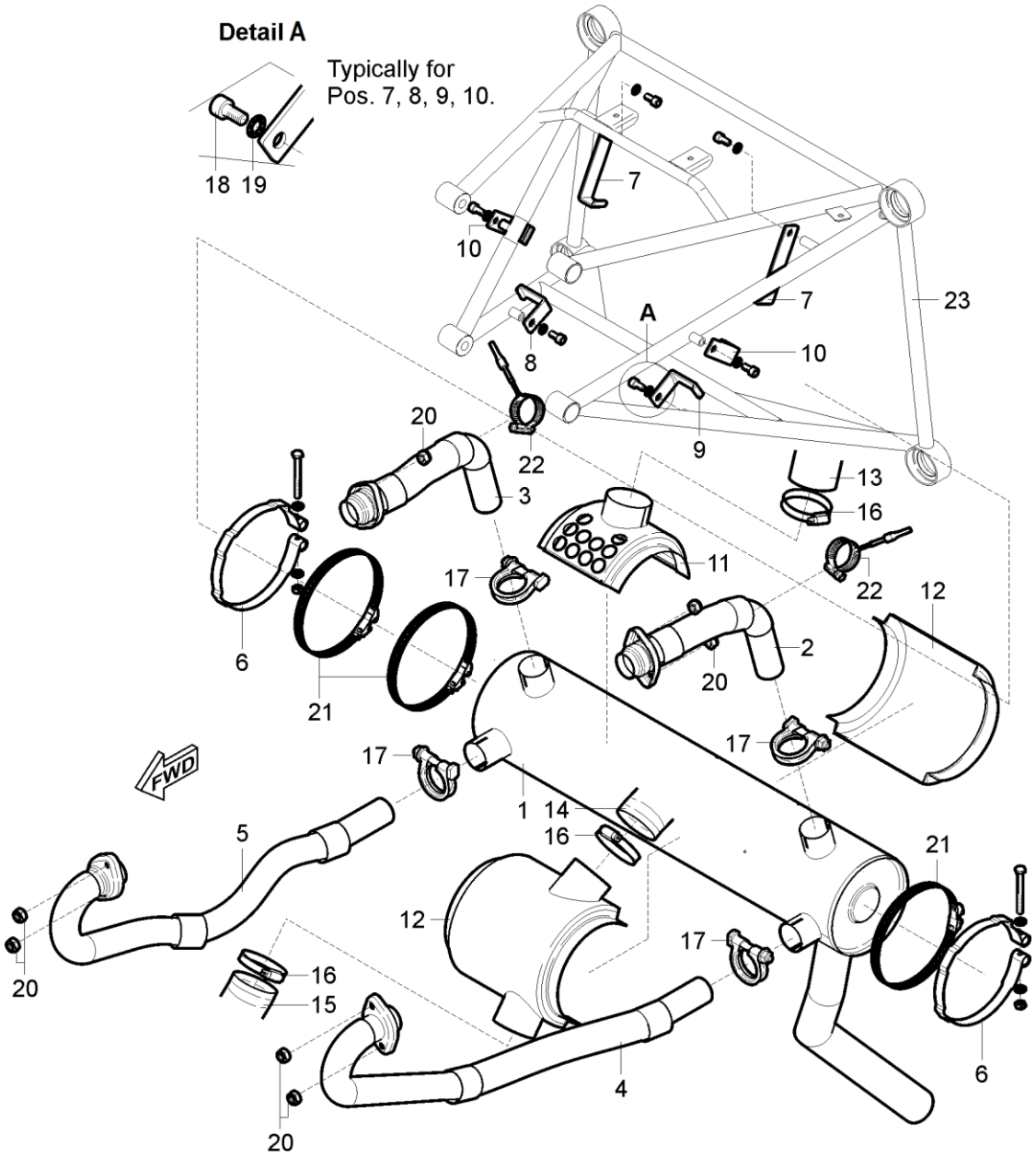
(m) Install the EGT sensors (22) (Chapter 77-40).

(n) Install the airbox (Chapter 71-60).

(o) Connect the battery.

(p) Carry out an engine ground test; check the exhaust system for leaks and EGT system indication.

(q) Install the engine cowlings (Chapter 71-10).



1 –	Muffler	9 –	Lower left holder 46 x 41	17 –	Clamp 8.8
2 –	Exhaust tube U L	10 –	Middle holder 46 x 25	18 –	Allen bolt M6 x 12
3 –	Exhaust tube U R	11 –	Airbox pre-heat exchanger	19 –	Locking washer ø6.4
4 –	Exhaust tube B L	12 –	Heat exchanger	20 –	Self-locking nut M8
5 –	Exhaust tube B R	13 –	Airbox hose	21 –	Universal clamp ø120
6 –	Clamp ø120	14 –	Heating hose 1	22 –	EGT sensor
7 –	Upper holder 86 x 24	15 –	Heating hose 2	For information:	
8 –	Lower right holder 43 x 41	16 –	Hose clamp ø40 x 60	23 –	Engine mount

Fig. 78-2 Exhaust System Removal / Installation

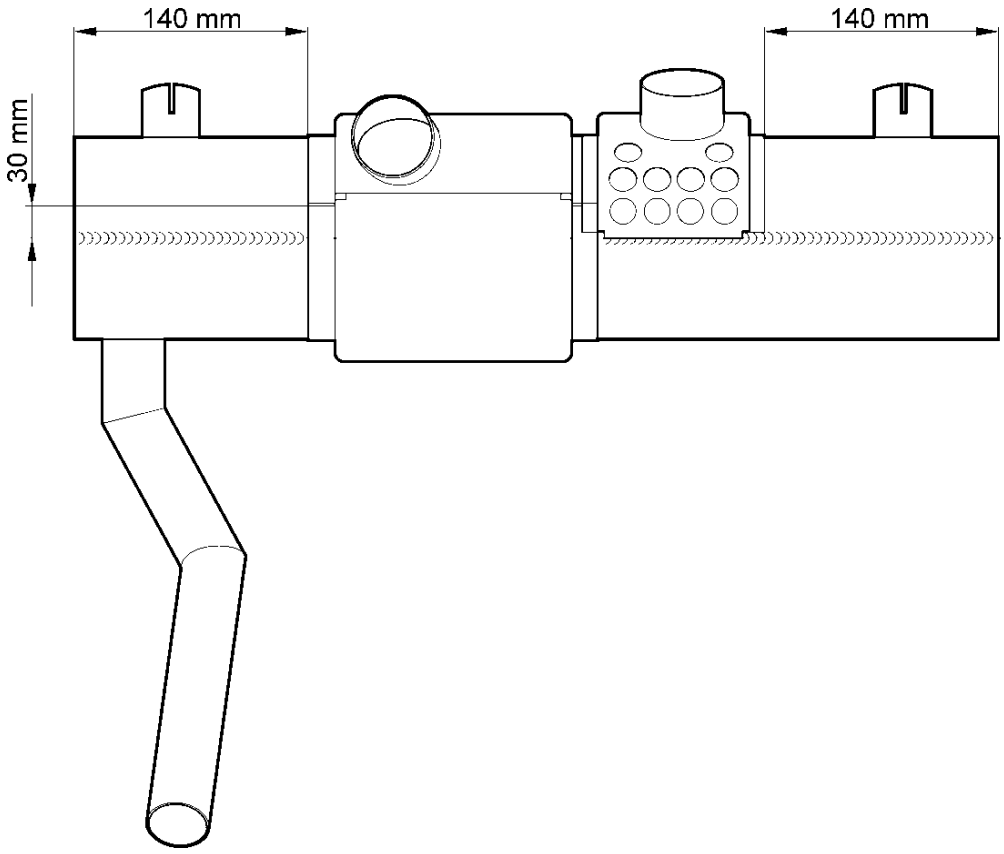


Fig. 78-3 Correctly assembled exchangers

79 OIL

CONTENTS

Chapter	Description	Page
79-00	**GENERAL**	**3**
	1. INTRODUCTION	3
	2. TROUBLESHOOTING	4
79-20	**OIL SYSTEM**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Oil tank	6
	B. Oil cooler	8
	C. Oil thermostat	12
79-30	**INDICATING**	**13**
	1. DESCRIPTION	13
	2. MAINTENANCE PRACTICES	14
	A. SV-D1000 display	14
	B. SV-EMS-220 module	14
	C. Low value warning unit	14
	D. Oil pressure sensor	14
	E. Oil temperature sensor	14

This page is left blank intentionally

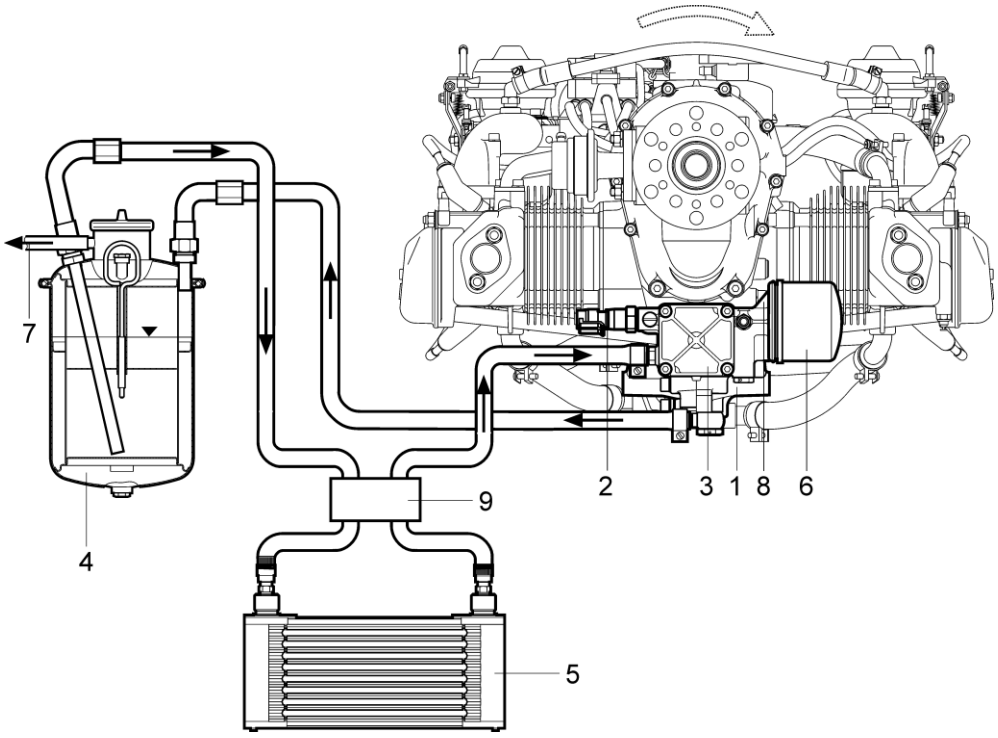
79-00 GENERAL

1. INTRODUCTION

The engine Rotax 912 ULS2 has a dry sump forced lubrication system. The oil pump (3, Fig. 79-1) is driven by means of camshaft. The oil accumulates at the bottom of crankcase and it is forced back to the oil tank (4) by energy of gassed in the crankcase. The oil pump sucks the engine oil from the oil tank, through the oil thermostat (9) and oil filter (6) and ensures the engine lubrication. In dependence of temperature, the oil thermostat opens the circuit of oil cooler (5). The oil tank is equipped with a venting hose (7).

NOTE

Refer to the Maintenance Manual for Engine Type 912 Series, Ref. No.: MML-912 for additional information.



1 – Pressure relief valve
2 – Oil pressure sensor
3 – Oil pump
4 – Oil tank
5 – Oil cooler
6 – Oil filter
7 – Oil tank venting
8 – Oil temperature sensor
9 – Oil thermostat

Fig. 79-1 Oil System

2. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
High oil temperature indication.	Thermostat damaged or held open by solid matter.	Replace thermostat.
	Oil viscosity too high.	Drain and refill with correct oil grade (Chapter 12-00).
	Prolonged ground operation.	Limit ground operation to a minimum.
	High power, low airspeed.	Adjust power - flight altitude.
	Low oil supply.	Replenish oil supply.
	Cooler air passages clogged.	Clean cooler thoroughly.
	Malfunctioning sensor.	Check sensor. Replace if required.
Low oil pressure indication.	Low oil supply.	Replenish oil supply. (Chapter 12-10)
	Oil viscosity too low	Drain and refill with correct oil grade (Chapter 12-00).
	Pump producing low pressure.	Replace pump.
	Malfunctioning sensor.	Check sensor. Replace if required.

79-20 OIL SYSTEM

1. DESCRIPTION

This chapter describes storage of oil and portion of the oil system that is used to conduct oil from and to the engine. These items include the oil tank, oil cooler and oil thermostat.

Oil tank is attached at firewall on the right side and for oil level check is available through the door on the upper engine cowling.

Max. oil system capacity: Approx. 3.5 liters

Oil consumption: Max. 0.06 l/h

Maintenance practices and procedures concerning oil volume check/replenishing and oil change are mentioned in Chapter 12-10.

NOTE

Recommended oils are mentioned in the Operators Manual for Rotax Engine Type 912/914 Series, Ref. No.: OM-912/914.

Oil cooler (5, Fig. 79-1) is attached in the ram air tunnel on the right side of lower engine cowling. For oil temperature regulation the oil thermostat (9) is installed. Depending on oil temperature oil flows to the oil pump (3) directly or through the oil cooler (5). Oil thermostat is installed between the oil tank (4), oil cooler (5) and oil pump (3).

2. MAINTENANCE PRACTICES

A. Oil tank

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 4	1 pc
Screwdriver 5	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Lockwire ø0.8 mm	AR
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 79-1 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF.

CARELESS DRAINING OF HOT ENGINE OIL MAY CAUSE SCALDS. DISPOSE OF USED OIL AND FILTERS RESPECTING THE ENVIRONMENTAL AND SAFETY REGULATIONS.

(1) Oil tank removal:

(a) Make sure that the **IGNITION** switches are set **OFF**.

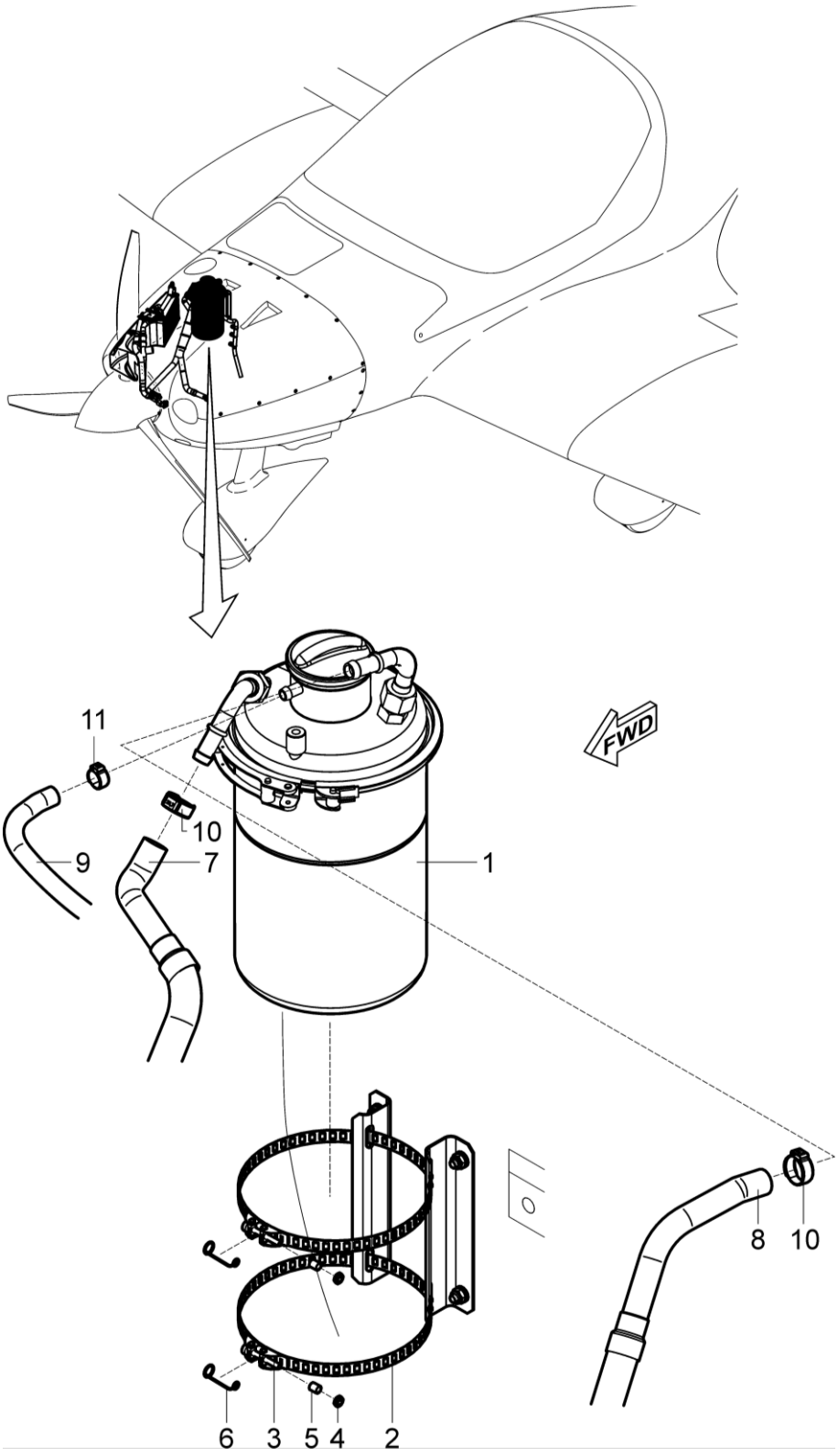
(b) Remove the engine cowlings (Chapter 71-10).

(c) Drain the oil from the oil system (Chapter 12-10).

(d) Disconnect hoses (7; 8; 9, Fig. 79-2) from tank (1) by removing safety clamps (10; 11).

(e) Remove lockwire (6), release universal clamps (2) and remove tank (1).

(f) Install protective plugs on the hoses and oil tank elbows.



1 –	Oil tank	5 –	Distance tube	9 –	Venting hose
2 –	Universal clamp ø136	6 –	Lockwire	10 –	Safety clamp 20.7
3 –	Screw of lock	7 –	Inlet hose	11 –	Safety clamp 17.5
4 –	Nut M4	8 –	Outlet hose		

Fig. 79-2 Oil Tank Removal / Installation

(2) Oil tank installation:

(a) Make sure that the **IGNITION** switches are set **OFF**.

(b) Put oil tank (1, Fig. 79-2) to the appropriate position in the holder and secure it with universal clamps (2); secure universal clamps (2) with lockwire (6) (see Chapter 20-20).

(c) Remove protective plugs from the hoses and oil tank elbows.

(d) Slide hoses (7; 8; 9) on the appropriate elbows on the oil tank (1); secure them with safety clamps (10; 11).

(e) Check if hoses are firmly secured and sealed.

(f) Replenish the oil system (Chapter 12-10).

(g) Carry out engine ground test; check oil system for leaks and oil system indication.

(h) Install the engine cowlings (Chapter 71-10).

B. Oil cooler

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 12	1 pc
Wrench 14	1 pc
Wrench 18	1 pc
Screwdriver 5	1 pc
Pliers	1 pc
Oetiker pliers	1 pc
Lockwire ø0.8 mm	AR
Cooper gasket ring ø14.2 x 20 x 2	2 pcs
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 79-2 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF.

CARELESS DRAINING OF HOT ENGINE OIL MAY CAUSE SCALDS. DISPOSE OF USED OIL AND FILTERS RESPECTING THE ENVIRONMENTAL AND SAFETY REGULATIONS.

(1) Oil cooler removal:

(a) Make sure that the **IGNITION** switches are set **OFF**.

(b) Remove the engine cowlings (Chapter 71-10).

(c) Drain the oil from the oil system (Chapter 12-10).

(d) As necessary, disconnect hose (7, Fig. 79-2) from the nipple on the oil tank.

(e) Disconnect hoses (9; 10, Fig. 79-3) from oil cooler (1) by removing safety clamps (14).

(f) Suck oil from oil thermostat (2).

(g) Loose nuts (7) and remove the oil cooler (1).

(h) As necessary, unscrew and remove elbows (3), reducers (4), gasket rings (5), nuts (7) and washers (6).

(i) Install protective plugs on the hoses and oil cooler screw couplings.

(2) Oil cooler installation:

(a) Make sure that the **IGNITION** switches are set **OFF**.

(b) Remove protective plugs from the hoses and oil cooler screw couplings.

(c) As necessary, on the oil cooler screw couplings install washers (6, Fig. 79-3), slightly screw nuts (7), install new gasket rings (5), screw and tighten reducers (4) and slightly screw elbows (3).

(d) Put oil cooler (1) to the tunnel and tighten nuts (7).

(e) Slide hoses (9; 10) on the appropriate elbows on the oil cooler (1); secure them with safety clamps (14); tighten elbows (3).

(f) Check if hoses are firmly secured and sealed.

(g) Replenish the oil system (Chapter 12-10).

(h) Carry out engine ground test; check oil system for leaks and oil system indication.

(i) Install the engine cowlings (Chapter 71-10).

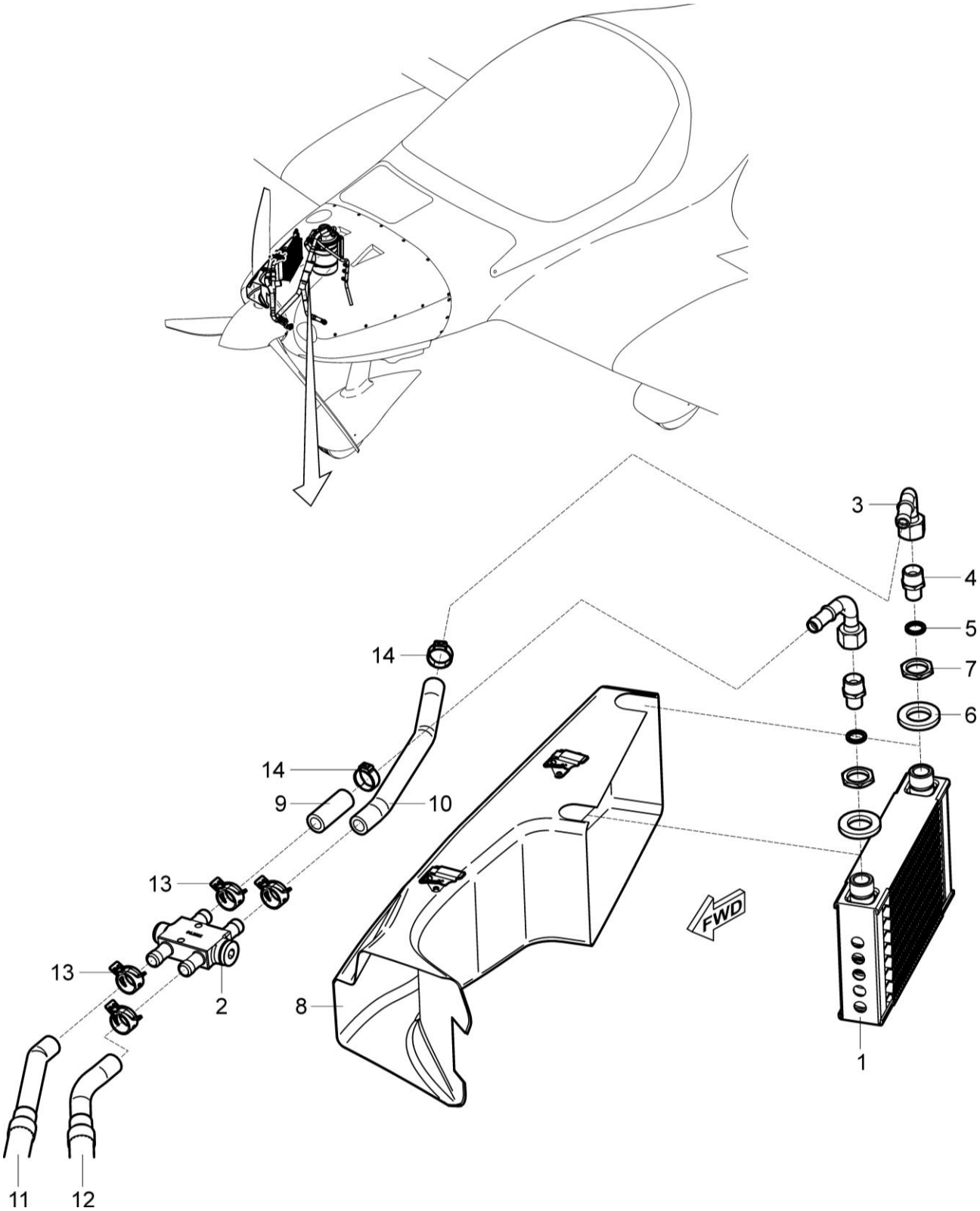


Fig. 79-3 Oil Cooler and Thermostat Removal / Installation (page 1 of 2)

1 – Oil cooler
2 – Oil thermostat
3 – Elbow
4 – Reducer
5 – Cooper gasket ring ø14.2 x 18 x 2
6 – Washer ø22.5 x 40 x 6
7 – Nut
8 – Ram air tunnel
9 – Oil hose
10 – Oil hose
11 – Oil hose
12 – Oil hose
13 – Hose clamp ø19-12
14 – Safety clamp 20.7

Fig. 79-3 Oil Cooler and Thermostat Removal / Installation (page 2 of 2)

C. Oil thermostat

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Pliers	1 pc
Lockwire ø0.8 mm	AR
Maintenance Manual (Line Maintenance) for Rotax Engine Type 912 Series, Ref. No.: MML-912	-
Persons	1

Tab. 79-3 Recommended tools, materials, persons and documentation

WARNING

ENGINE IGNITION MUST BE SWITCHED OFF.

CARELESS DRAINING OF HOT ENGINE OIL MAY CAUSE SCALDS. DISPOSE OF USED OIL AND FILTERS RESPECTING THE ENVIRONMENTAL AND SAFETY REGULATIONS.

(1) Oil thermostat removal:
- (a) Make sure that the **IGNITION** switches are set **OFF**.
- (b) Remove the engine cowlings (Chapter 71-10).
- (c) Drain the oil from the oil system (Chapter 12-10).
- (d) Disconnect hoses (9; 10; 11; 12, Fig. 79-3) from thermostat (2) by removing safety clamps (13) and remove thermostat (2).
- (e) Install protective plugs on the hoses and oil thermostat necks.

(2) Oil thermostat installation:
- (a) Make sure that the **IGNITION** switches are set **OFF**.
- (b) Remove protective plugs from the hoses and oil thermostat necks.
- (c) Slide hoses (9; 10; 11; 12, Fig. 79-3) on the appropriate necks on the oil thermostat (2); secure them with safety clamps (13).
- (d) Check if hoses are firmly secured and sealed.
- (e) Replenish the oil system (Chapter 12-10).
- (f) Carry out engine ground test; check oil system for leaks and oil system indication.
- (g) Install the engine cowlings (Chapter 71-10)

79-30 INDICATING

1. DESCRIPTION

The oil temperature sensor (8, Fig. 79-1) for reading of the oil inlet temperature is screwed into the oil pump housing. Signal from the sensor is carried to the engine monitoring system unit Dynon EMS 220 (Chapter 77-40) and from there to the Dynon SkyView SV-D1000 (Chapter 39-10).

The oil pressure sensor (2) is screwed into the crankcase on the right side of engine. Signal from the sensor is carried to the engine monitoring system unit Dynon EMS 220 (Chapter 77-40) via low value warning unit (Chapter 31-50) and from there to the Dynon SkyView SV-D1000. Low oil pressure (less than 2 bar / 29 psi) is signalized with the **OIL PRESS** warning lamp (Chapter 39-10) controlled by low value warning unit.

Wiring diagram of sensors connection is described in the Aircraft Wiring Manual (Doc. No. AS-AWM-01-000).

2. MAINTENANCE PRACTICES

A. SV-D1000 display

For removal / installation procedures refer to Chapter 39-10.

B. SV-EMS-220 module

For removal / installation procedures refer to Chapter 77-40.

C. Low value warning unit

For removal / installation procedures refer to Chapter 31-50.

D. Oil pressure sensor

For removal / installation procedures refer to Chapter 77-40.

E. Oil temperature sensor

For removal / installation procedures refer to Chapter 77-40.

95 OPTIONAL EQUIPMENT

CONTENTS

Chapter	Description	Page
95-00	**GENERAL**	**3**
	1. INTRODUCTION	3
95-10	**TOWING EQUIPMENT**	**5**
	1. DESCRIPTION	5
	2. MAINTENANCE PRACTICES	6
	A. Towing equipment preparation	6
	B. Tow release handle	8
	C. Tow release equipment	11
	D. Rear-view mirror	18
	E. Voltage converter	20
	F. Weak links in tow rope	22

This page is left blank intentionally

95-00 GENERAL

1. INTRODUCTION

This chapter describes preparation for future installation of towing equipment and contains information about installation of towing equipment (towing version).

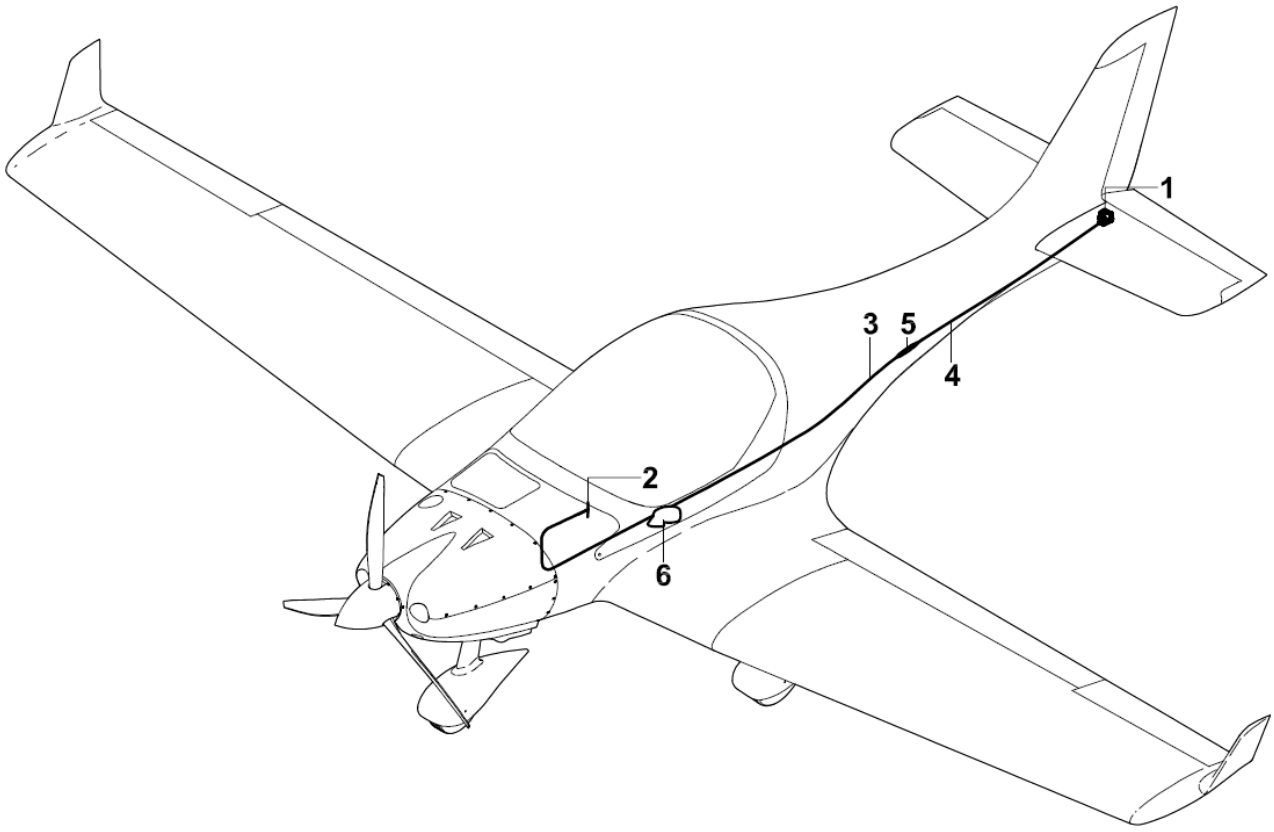
This page is left blank intentionally

95-10 TOWING EQUIPMENT

1. DESCRIPTION

Aircraft without towing equipment is prepared for future installation of tow release mechanism in the aft section of fuselage under the rudder. Until the towing equipment is not installed, the tow release mechanism holder has blended holes for bolts and tow release mechanism.

Aircraft with towing equipment has installed tow release mechanism (1, Fig. 95-1). It is operated by a tow release handle (2) installed on the left side of central tunnel. Tow release handle is connected with the tow release mechanism by steel ropes (3, 4) that are connected by means of turnbuckle (5). Rear-view mirror (6) is installed on the left side of canopy frame.



1 – Tow release mechanism and rear-view camera
2 – Tow release handle
3 – Steel rope
5 – Turnbuckle
4 – Steel rope
6 – Rear-view mirror

Fig. 95-1 Towing Equipment Installation

2. MAINTENANCE PRACTICES

A. Towing equipment preparation

NOTE

Towing equipment preparation is used for that aircraft in which the towing equipment is not installed.

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

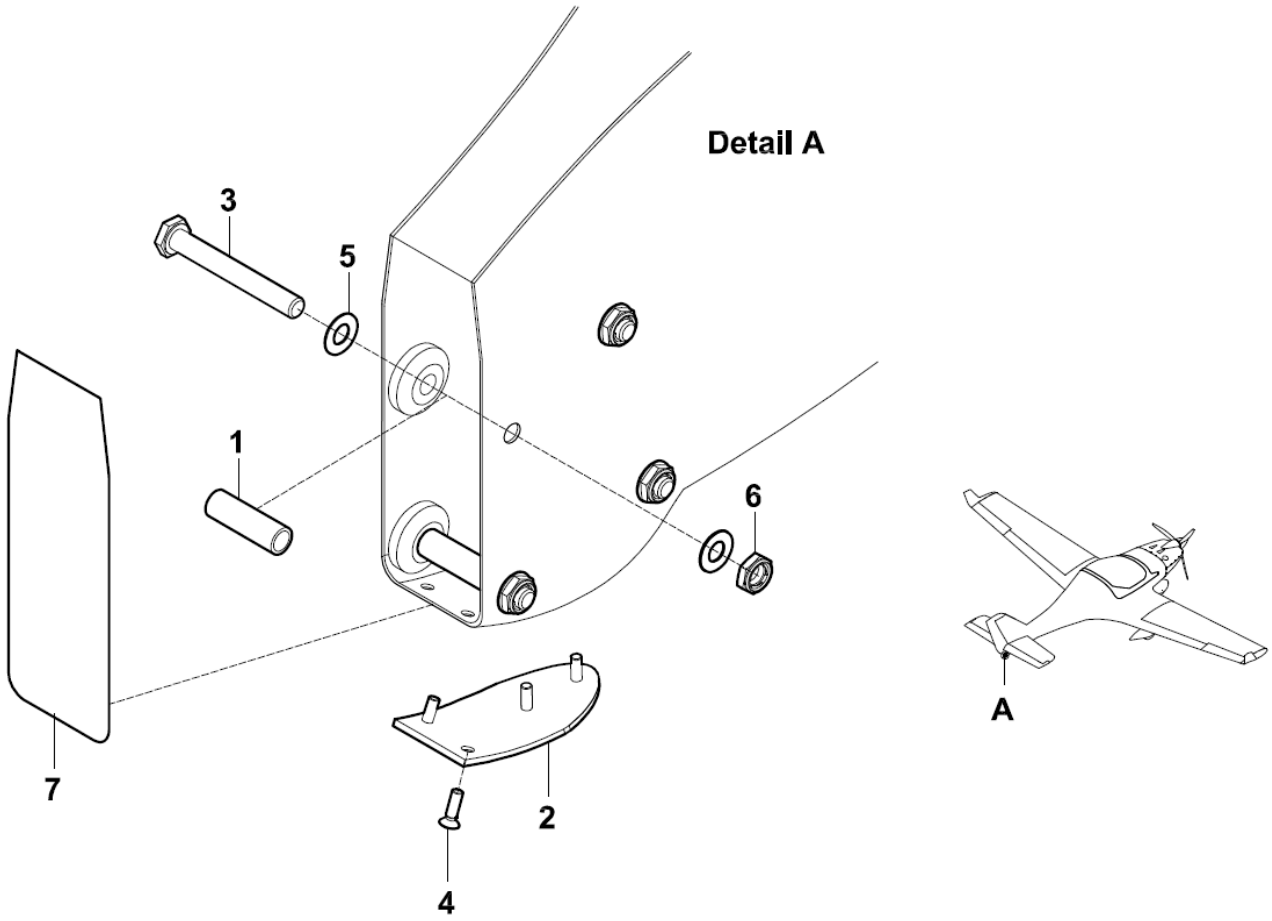
Recommended tools, materials, persons and documentation:

ITEM	QUANTITY
Wrench 10	1 pc
Socket 10	1 pc
Phillips screwdriver	1 pc
Persons	1

Tab. 95-1 Recommended tools, materials, persons and documentation

(1) Towing equipment preparation removal:
   (a) Remove the covering sticker (7, Fig. 95-2).
   (b) Remove the nuts (6), washers (5), tubes (1), bolts (3) from the fuselage.
   (c) Remove the bolts (4) and protective plate (2).

(2) Towing equipment preparation installation:
   (a) Mount the protective plate (2, Fig. 95-2) using bolts (4) to the fuselage.
   (b) Mount the bolts (3), tubes (1), washers (5) and nuts (6) to the fuselage.
   (c) Apply covering sticker (7).



1 – Distance tube
2 – Protective plate
3 – Bolt M6 x 50
4 – Screw M3 x 10
5 – Washer ø6 x 12 x 0.5
6 – Nut M6 Flat
7 – Sticker

Fig. 95-2 Towing Equipment Preparation Removal / Installation

B. Tow release handle

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation

ITEM	QUANTITY
Wrench 9	1 pc
Wrench 10	2 pcs
Combination pliers	1 pc
Nicopress tool	1 pc
Vaseline	AR
Persons	1

Tab. 95-2 Recommended tools, materials, persons and documentation

(1) Tow release handle removal:

(a) Release the front control cable (6, Fig. 95-3) by removing the nut (4), washers (2, 3), distance tube (5) and bolt (1).

(b) Release the short control cable (11) by removing the nut (4), washers (2, 3, 10), distance tubes (8, 9) and bolt (7).

(c) Remove the nuts (4), washers (10), ground wire (14), levers (15 and 19), bolts (12) and remove the tow release handle (13) from the central tunnel left side; cut short control cable (11) and pull it out.

(d) Disassemble the levers assembly (15, 19) by removing cotter pin (18), nut (17), washers (2, 3) and bolt (16).

(2) Tow release handle installation:

(a) Make an eye on one end of new control cables (6, 11, Fig. 95-3) according to 2.C.(2)(c).

NOTE

Lubricate steel control cables with vaseline on entire length.

(b) Assemble the control handle console (13) with handle (20), washer (21), sleeve (22) and short control cable (11) before the installation to the aircraft. Press the sleeve with Nicopress tool at 3 points.

NOTE

At fully opened tow release there must be a 5 mm reserve prior to end position of short control cable.

(c) Assemble the levers (15, 19) with the bolt (16), washers (2, 3), nut (17), and secure with cotter pin (18) before the installation to the aircraft.

(d) Slide free end of front control cable (6) through a plastic tube to the aft section of fuselage.

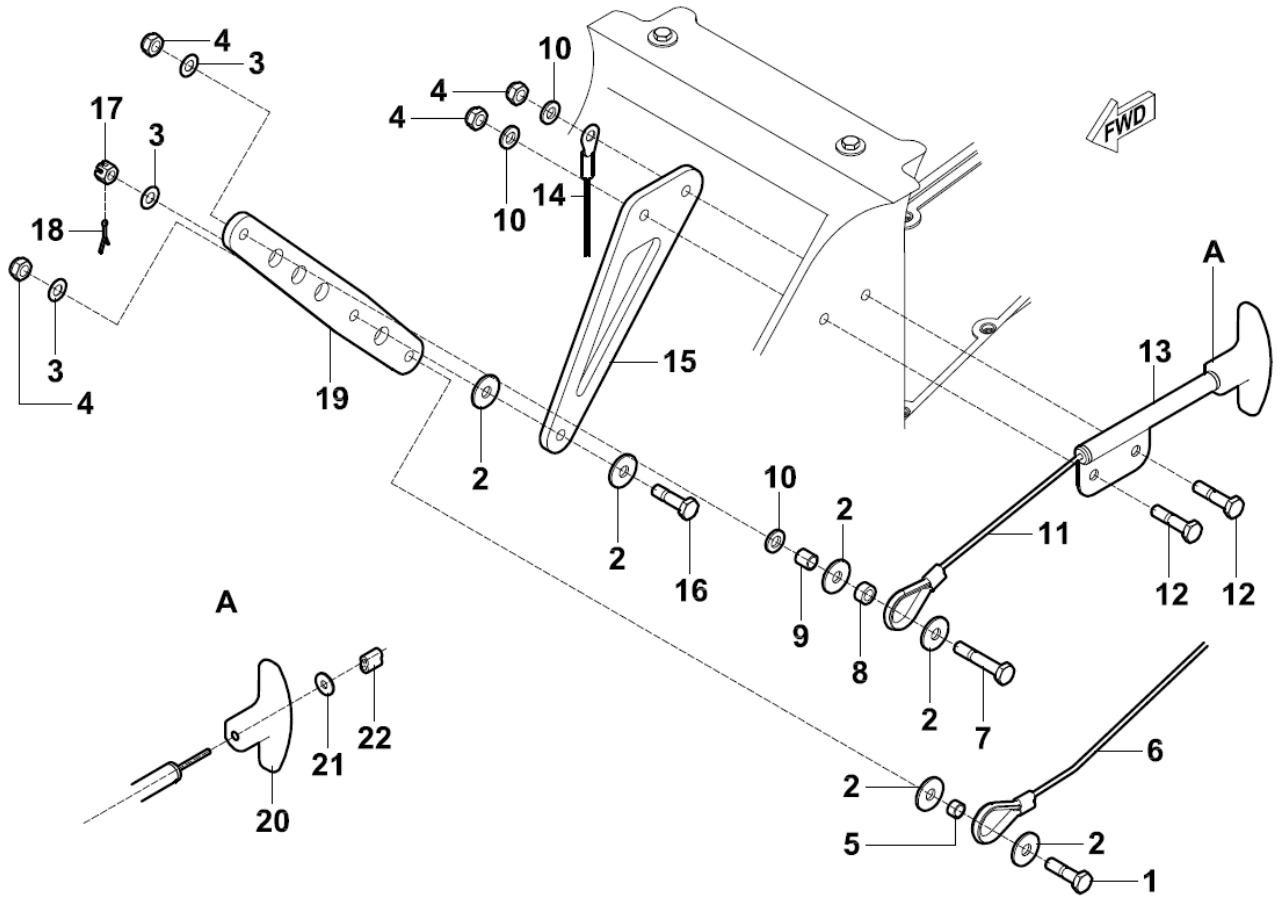
NOTE

Plastic tube is located in central tunnel.

(e) Install the assembled levers (15, 19) with control handle console (13) on the central tunnel left side using bolts (12), ground wire (14), washers (10) and nuts (4).

(f) Connect the short control cable (11) to lever 2 (19) using bolt (7), distance tubes (8, 9), washers (2, 3, 10) and nut (4).

(g) Connect the front control cable (6) to lever 2 (19) using bolt (1), distance tube (5), washers (2, 3) and nut (4).



1 –	Bolt M6 x 22	12 –	Bolt M6 x 25
2 –	Washer ø6 x 18 x 1.6	13 –	Control handle console
3 –	Washer ø6 x 12 x 0.5	14 –	Ground wire
4 –	Self-locking nut M6	15 –	Lever 1
5 –	Distance tube 8 x 1	16 –	Bolt M6 x 22
6 –	Front control cable	17 –	Castle nut M6
7 –	Bolt M6 x 32	18 –	Cotter pin ø1.6 x 12
8 –	Distance tube 10 x 1	19 –	Lever 2
9 –	Distance tube	20 –	Handle
10 –	Washer ø6 x 12 x 1.6	21 –	Washer ø4 x 12 x 1
11 –	Short control cable	22 –	Sleeve 2.4 - 2.6

Fig. 95-3 Tow Release Handle Removal / Installation

C. Tow release equipment

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation

ITEM	QUANTITY
Wrench 8	1 pc
Socket 10	1 pc
Pliers	1 pc
Screwdriver	1 pc
Steel wire cutter	1 pc
Nicopress tool	1 pc
Lockwire ø0.8 mm	AR
Vaseline	AR
Persons	1

Tab. 95-3 Recommended tools, materials, persons and documentation

(1) Tow release mechanism removal:

(a) Remove the baggage bulkhead cover (13, Fig. 06-4, Chapter 06).

(b) Remove the ground wire (9, Fig. 95-4) by removing the nuts (11), washers (12), clamps (13) and bolts (10).

(c) Remove the lockwire (1) from turnbuckle (2) and release the turnbuckle.

(d) Remove the nuts (4), washers (5), bolts (3) and distance tubes (6) from turnbuckle (2) to release the control cables (7, 8).

(e) Disconnect the camera wire (25) from the voltage converter (26)

(f) Remove the nuts (16), washers (17), bolts (14, 15), rear-view camera (19) and tow release mechanism (20).

(g) Remove the nut (4), washer (5), spacer (21) and bolt (3) from tow release mechanism lever (20) to release the rear control cable (8).

(2) Tow release mechanism installation:

(a) Check condition of the tow release mechanism and control cables.

(b) Install the front control cable (7, Fig. 95-4) to fuselage (see 2.B.(2)).

(c) Make an eye on the end of front control cable (7) with thimble (22), sleeve (23). Press sleeve (23) closely to thimble with Nicopress tool at 3 points. Cut unnecessary end of steel cable.

(d) Make an eye on end of rear control cable (8) with thimble (22), sleeve (23). Press sleeve (23) closely to thimble with Nicopress tool at 3 points. Cut unnecessary end of steel cable.

(e) Lubricate entire length of rear control cable (8) with vaseline.

(f) Slide free end of rear control cable (8) through plastic tube to fuselage from the rear.

NOTE

Plastic tube is located in the aft section of fuselage.

(g) Connect the rear control cable to the tow release mechanism (20) using bolt (3), spacer (21) washer (5) and nut (4).

(h) Put the tow release mechanism (20) into the fuselage, slip the camera's wiring into installation tube in the rear section of fuselage, place the rear-view camera (19) to correct position and attach the tow release mechanism and rear-view camera using bolts (14, 15), washers (17), spacers (18) and nuts (16).

(i) Connect the camera wires (25) to voltage converter (26) according to Aircraft Wiring Manual (Doc. NO. AS-AWM-01-000)

(j) Make an eye on the other end of rear control cable (8) with thimble (22), sleeve (23). Press sleeve (23) closely to thimble with Nicopress tool at 3 points. Cut unnecessary end of steel cable.

(k) Connect the control cables (7, 8) to the turnbuckle (2) using bolts (3), distance tubes (6), washers (5) and nuts (4).

(l) Stretch the control cables by turnbuckle (2) to eliminate dead travel, but the tow release mechanism cannot start to open.

NOTE

Distance the axle of turnbuckle first bolt must be 320 mm from the baggage bulkhead.

(m) Lock the turnbuckle (2) by locking wire (1).

(n) Install the ground wire on control cables using bolts (10), clamps (13), washers (12) and nuts (11).

(o) Install the baggage bulkhead cover (13, Fig. 06-4).

(p) Carry out test and check:

- If all bolt connections are tight
- Plays
- Tension of control cable (no dead travel)
- That no foreign objects remain in the aircraft
- 5 mm reserve of short control cable of tow release handle at fully opened tow release mechanism
- Check if tow release mechanism is fully closed when the control handle is released
- Operation of tow release mechanism

(3) Rear-view camera visibility test:

(a) Level the aircraft (Chapter 08-10).

(b) Place the template (Fig 95-6) behind the aircraft in the required position (Fig 95-5).

(c) Set the template reference point (1, Fig 95-6) exactly in relation to the tow release mechanism center line (3, Fig. 95-5). The template must be set in lateral and vertical direction perpendicular to the tow release mechanism centerline (3, Fig. 95-5).

(d) Display the rear-view camera on RH SV-D1000 and check that entire visibility area is displayed.

NOTE

The rear-view camera must be set that the entire visibility area is displayed on RH SV-D1000. This ensure unrestricted view of towed glider in the required range.

(e) If the visibility area is not fully displayed on the RH SV-D1000, screen, release the nuts (16, Fig. 95-4) of bolts (15). Adjust the rear-view camera position until entire visibility area is displayed on the RH SV-D1000.

(f) Check the min. 4 mm gap between the rear-view camera and rudder. Tighten the nuts (16) on the bolts (15).

(g) After adjusting of rear-view camera check:

- If all bolt connections are tight.
- That no foreign objects remain in the aircraft.
- Gap between the rear-view camera and rudder
- Rear-view camera visibility check

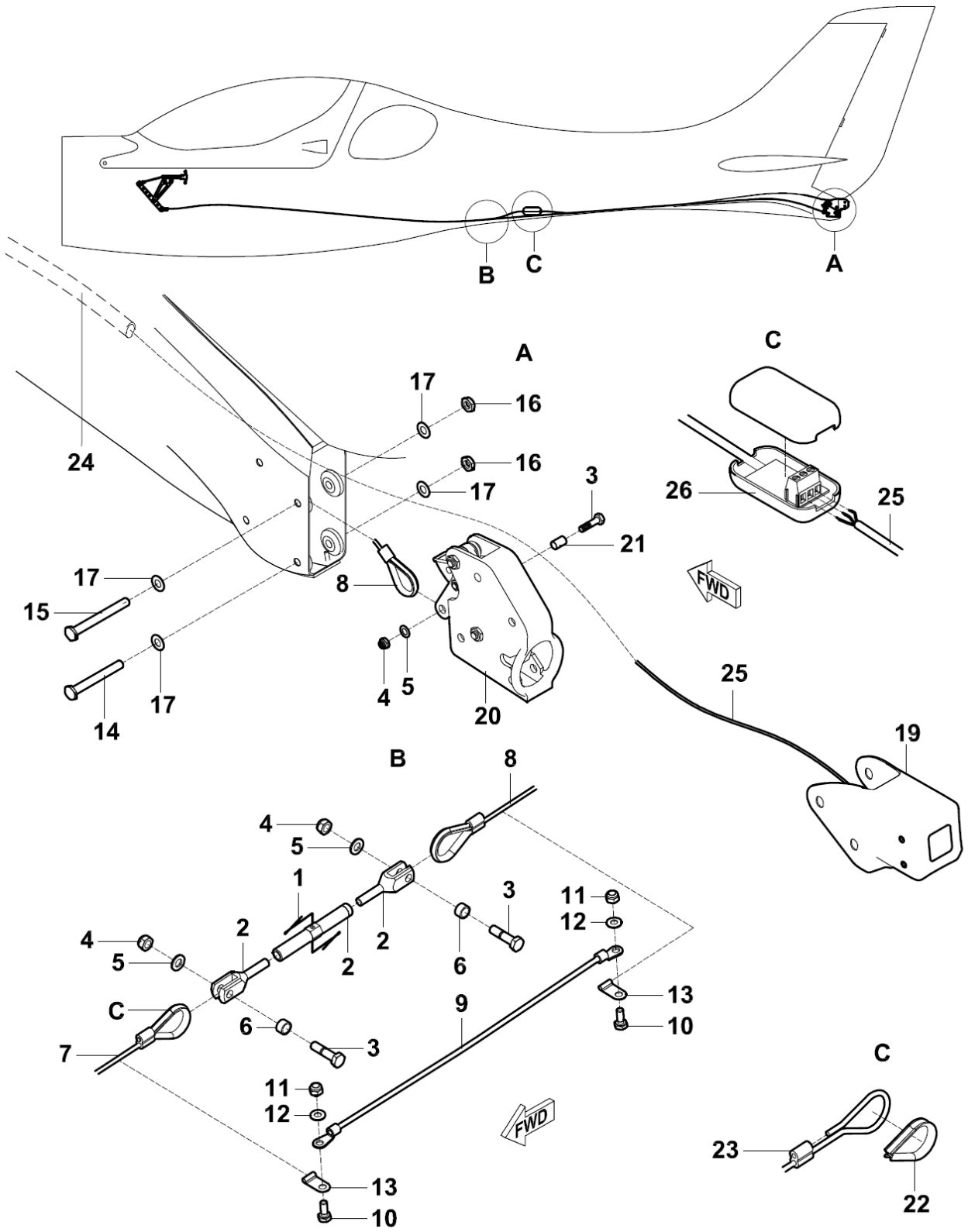
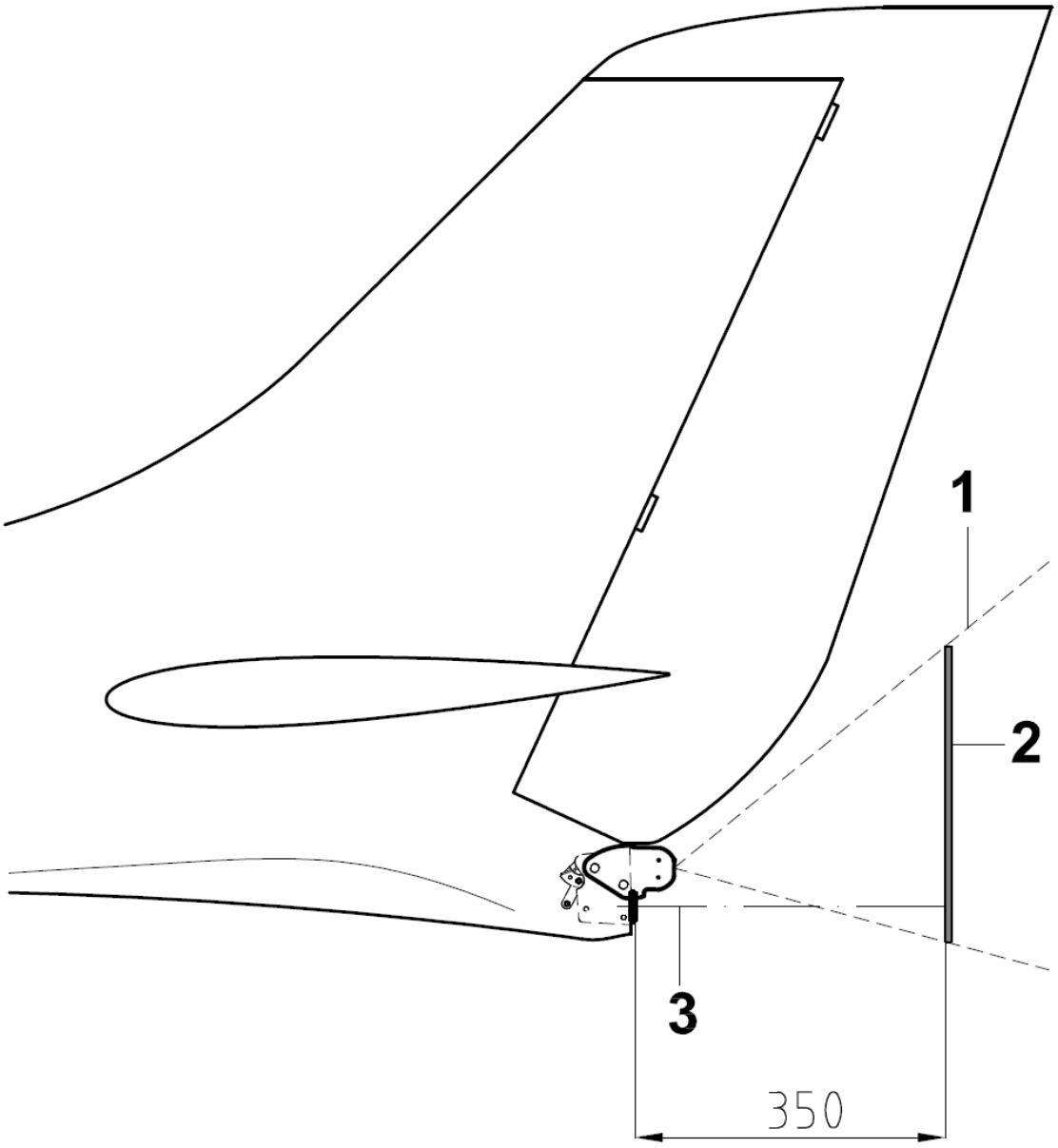


Fig. 95-4 Tow Release Mechanism Removal / Installation (page 1 of 2)

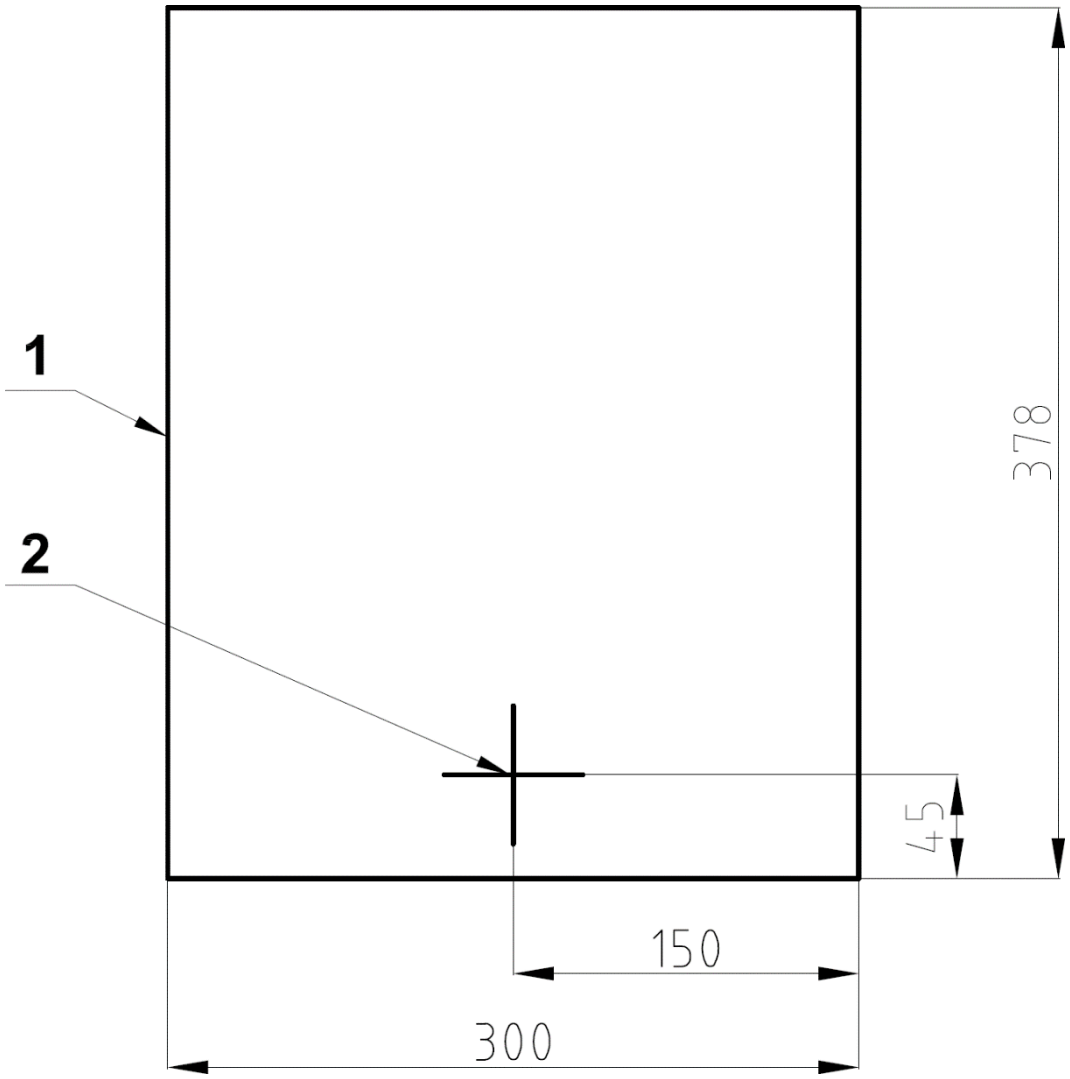
1 – Lockwire
2 – Turnbuckle
3 – Bolt M5 x 20
4 – Self-locking nut M5
5 – Washer ø5.3 x 10 x 1
6 – Distance tube 8 x 1
7 – Front control cable
8 – Rear control cable
9 – Ground wire
10 – Bolt M4 x 10
11 – Self-locking nut M4
12 – Washer ø4 x 12 x 1
13 – Clamp
14 – Bolt M6 x 50
15 – Bolt M6 x 54
16 – Self-locking nut M6
17 – Washer ø6 x 12 x 0.5
18 – N/A
19 – Rear-view camera
20 – Tow release mechanism
21 – Spacer
22 – Thimble 2.1 - 3.0
23 – Sleeve 2.4 - 2.6
24 – Installation tube
25 – Camera wire
26 – Voltage converter

Fig. 95-4 Tow Release Mechanism Removal / Installation (page 2 of 2)



1 – Camera visibility area
2 – Template
3 – Tow release mechanism center line

Fig. 95-5 Rear-View Camera Visibility Test



1 – Visibility area (template border) 2 – Reference point

Fig. 95-6 Camera Visibility Template

D. Rear-view mirror

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation

ITEM	QUANTITY
Screwdriver	1 pc
Hex key 3	1 pc
Loctite 243	AR
Persons	1

Tab. 95-4 Recommended tools, materials, persons and documentation

(1) Rear-view mirror removal:

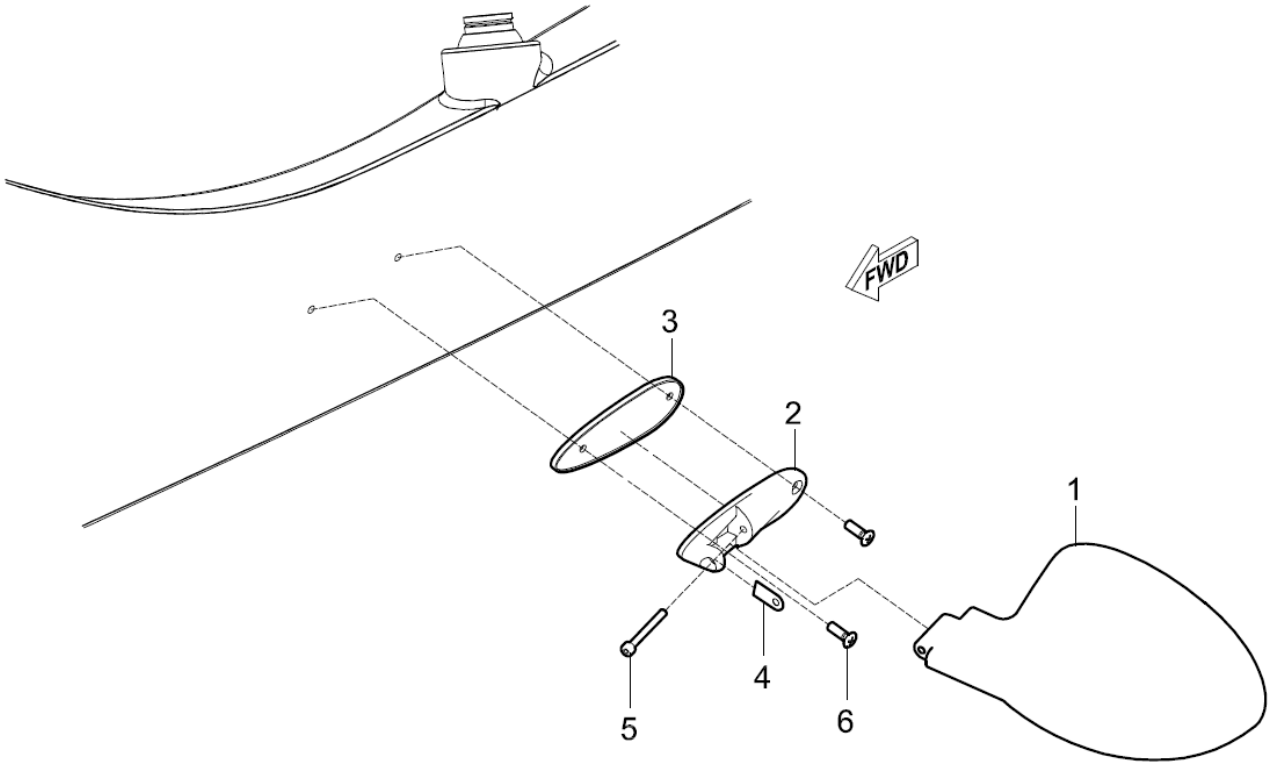
(a) Remove the bolt (5, Fig. 95-7) and pull out the rear-view mirror (1) with washer (4).

(b) Unscrew the bolts (6) and remove the mirror base (2) with seal (3).

(2) Rear-view mirror installation:

(a) Install the mirror base (2, Fig. 95-7) and seal (3) on canopy frame; apply Loctite 243 on the bolts (6) and attach the base.

(b) Put the rear-view mirror (1) with washer (4) to mirror base (2); apply Loctite 243 on the bolt (5) and attach the mirror.



1 – Rear-view mirror
2 – Mirror base
3 – Seal
4 – Washer
5 – Bolt M4 x 40
6 – Bolt M5 x 12

Fig. 95-7 Rear-View Mirror Removal / Installation

E. Voltage converter

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation

ITEM	QUANTITY
Soldering iron	1 pc
Flathead screwdriver	1 pc
Soldering tin	AR
Persons	1

Tab. 95-5 Recommended tools, materials, persons and documentation

(1) Voltage converter removal:

(a) Set **MASTER SWITCH** to **OFF** position.

(b) Remove the baggage bulkhead cover (13, Fig. 06-4, Chapter 06).

(c) Cut the cable ties to release the voltage converter (1, Fig. 95-6).

(d) Open the voltage converter covering (1).

(e) Loose screws on terminal and disconnect the camera wires (2).

(f) Unsolder wires (3) and remove the voltage converter (1).

(2) Voltage converter installation:

(g) Set **MASTER SWITCH** to **OFF** position.

(a) Before assembling check the condition of wires (2; 3, Fig. 95-6).

(b) Solder wires (3) to voltage converter (1) according to Aircraft Wiring Manual (Doc. NO. AS-AWM-01-000).

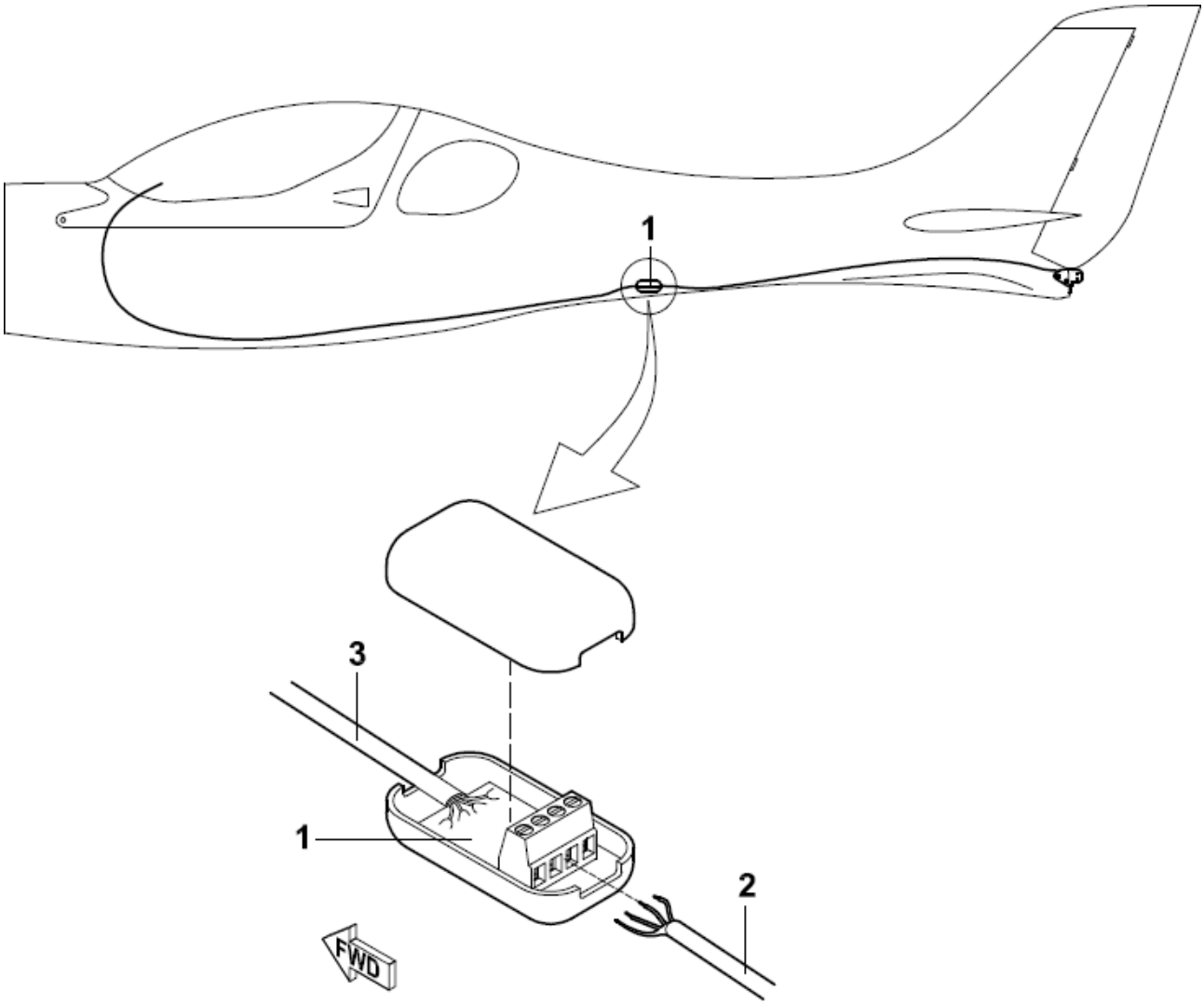
(c) Connect the camera wires (2) to the terminal of voltage converter (1) according to Aircraft Wiring Manual (Doc. NO. AS-AWM-01-000).

(d) Install the cover of voltage converter (1).

(e) Attach the voltage converter (1) to the aircraft by means of cable ties.

(f) Install the baggage bulkhead cover (13, Fig. 06-4, Chapter 06).

(g) Set **MASTER SWITCH** to **ON** position and carry out an operational test.



1 – Voltage converter
2 – Covering
3 – Camera wire
4 – Wire

Fig. 95-8 Voltage converter Removal / Installation

F. Weak links in tow rope

Type of maintenance: Line

Personnel qualification: Independent certifying staff qualified in accordance with Part-66 or higher.

Recommended tools, materials, persons and documentation

ITEM	QUANTITY
Hex key 10	2 pcs
Persons	1

Tab. 95-6 Recommended tools, materials, persons and documentation

WARNING

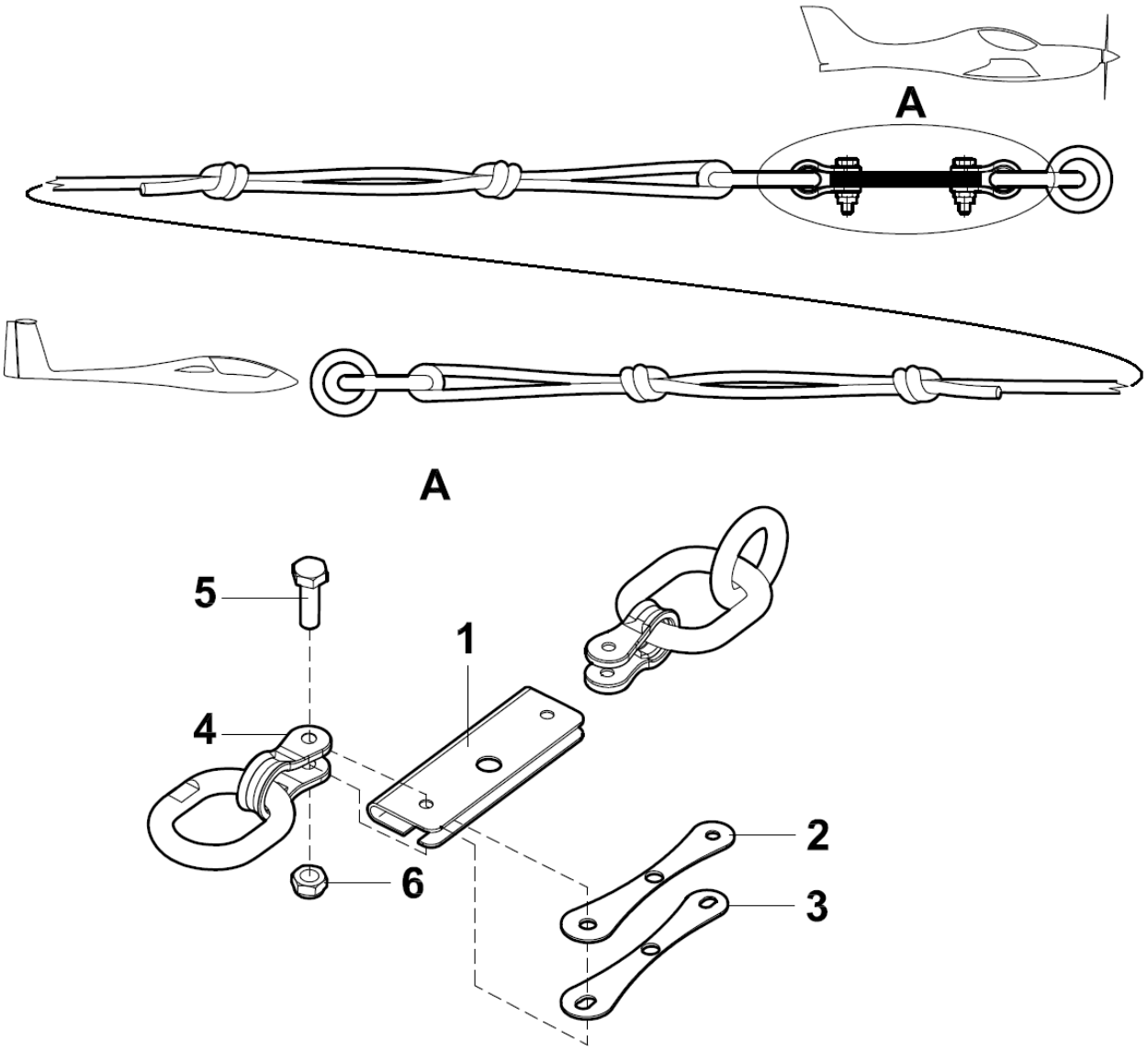
NEVER USE TWO WEAK LINKS WITH ROUND HOLES OR TWO WEAK LINKS WITH OVAL HOLES DUE TO DOUBLE BREAKING LOAD. DO NOT USE COMBINATION OF WEAK LINKS FROM DIFFERENT MANUFACTURERS DUE TO POSSIBLE DIFFERENT ELONGATION OF WEAK LINKS BEFORE BREAKING.

CAUTION

IT IS RECOMMENDED TO REPLACE THE WEAK LINKS AFTER 200 STARTS. WEAK LINK EXCHANGE IN TIME IS SAFER THAN A RISK OF UNWANTED BREAK DURING TAKEOFF OR TOW IN LOW ALTITUDE.

(1) Weak links removal:
- (a) Unscrew nuts (5, Fig. 95-9) and pull out the bolts (5).
- (b) Remove the primary weak link with round holes (2) and secondary weak link with oval holes (3) from the protective sleeve (1).

(2) Weak links installation:
- (a) Before assembling check weak links for cracks and condition.
- (b) Install the primary weak link with round holes (2, Fig. 95-9) and secondary weak link with oval holes (3) into the protective sleeve (1).
- (c) Put bolts clamps (4) on protective sleeve, align all holes and insert bolts (5).
- (d) Tighten the nuts (6) adequately to not deform the protective sleeve (1).



1 – Protective sleeve
2 – Primary weak link (round holes)
3 – Secondary weak link (oval holes)
4 – Clamp
5 – Bolt M6 x 22
6 – Self-locking nut M6

Fig. 95-9 Weak Links Removal / Installation

This page is left blank intentionally