Airplane Maintenance Manual

Bristell B23

Doc. N°

ADxC-73-001-AMM Edition 1.0

The technical content of this document is approved under the authority of the DOA ref. EASA.21J.411

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Amendments

Issue	Date	Revised pages	Description
Edition 1	30-Sep-2020	-	approved Chapter 4 and 5 for initial TC
Edition 1	16-Nov-2020	[Chapter 72-30]	First issue of complete AMM incl. addition of mass ballast (DC-005)

List of Service Bulletins

SB No	Date	Title	Affected Serial no.'s	AD (EASA)

List of Effective Pages

Section	Pages	Appr.	Rev.	Date	Section	Pages	Appr.	Rev.	Date
00	1-8		1.0	30.09.2020	32	1-16		1.0	30.09.2020
01	1-4		1.0	30.09.2020	33	1-4		1.0	30.09.2020
02	1-8		1.0	30.09.2020	34	1-8		1.0	30.09.2020
03	1-4		1.0	30.09.2020	51	1-12		1.0	30.09.2020
04	1-6	x	1.0	30.09.2020	53	1-10		1.0	30.09.2020
05	1-14		1.0	30.09.2020	55	1-8		1.0	30.09.2020
06	1-6		1.0	30.09.2020	57	1-8		1.0	30.09.2020
07	1-2		1.0	30.09.2020	61	1-4		1.0	30.09.2020
08	1-6		1.0	30.09.2020	71	1-4		1.0	30.09.2020
09	1-2		1.0	30.09.2020	72	1-16		1.0	30.09.2020
10	1-2		1.0	30.09.2020	72	17-18		1.0	16.11.2020
11	1-2		1.0	30.09.2020	73	1-6		1.0	30.09.2020
12	1-10		1.0	30.09.2020	74	1-2		1.0	30.09.2020
20	1-20		1.0	30.09.2020	77	1-2		1.0	30.09.2020
21	1-6		1.0	30.09.2020	78	1-4		1.0	30.09.2020
23	1-2		1.0	30.09.2020	79	1-4		1.0	30.09.2020
24	1-8		1.0	30.09.2020	80	1-2		1.0	30.09.2020
25	1-4		1.0	30.09.2020	90	1-2		1.0	30.09.2020
27	1-28		1.0	30.09.2020	91	1-2		1.0	30.09.2020
28	1-10		1.0	30.09.2020	Appendix A	I-II		1.0	30.09.2020
31	1-4		1.0	30.09.2020	Appendix B	I-XVIII		1.0	30.09.2020

Table of Contents

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01 Introduction

Table of Contents

01-00 General

BRM Aero, s.r.o., the manufacturer of BRISTELL B23 airplanes, provides in accordance with the CS23 Amdt. 5 (AMC3 - CS-VLA) airworthiness requirements, information necessary to maintain airworthiness of BRISTELL B23 airplanes.

This Maintenance Manual contains technical description of the airplane, information on operation, maintenance, and repairs, description of airplane particular systems and their functions.

01-20 Related Publications

Information are also contained in the following documents issued by the airplane manufacturer and by manufacturers of equipment installed in individual airplane:[1]

BRM AERO

- BRISTELL B23 Aircraft Flight Manual

ROTAX

- Operator's Manual for ROTAX 912 series engine
- Maintenance Manual (line) for ROTAX 912 series engine
- Service Instruction for ROTAX 912 series engine: *SI-912-016 (Selection of suitable operating fluids for ROTAX Engine Type 912 i, 915 i, 912 and 914 (Series))*

MT-Propeller

- Technical description and operation instructions for the propeller
- MT-Propeller, Service Bulletin 1

BERINGER

- Wheels and brakes, MM-ETSO-007 Maintenance Manual
- Youtube Tutorials (Tech Tips)

[1] Always refer to the latest issue of the corresponding manual/instruction

BRS

- ADxC-73-C1-011 AEPS Parachute Installation Manual
- ADxC-73-C1-012 AEPS Instructions for Continued Airworthiness

Garmin

- **G3X System:** *190-02472-02 Revision 4* Maintenance Manual G3X Touch EFIS Part 23 AML STC
- **Transponder**: 190-01499-02 GTX 3X5 Transponder TSO Installation Manual Rev. 4
- **Radio**: 190-01182-02 GTR 225/GNC 255 TSO Installation Manual Rev. F

L-3 Communication Avionics Systems

- **ESI-500 Standby Instrument System:** *DB1502026 Revision IR* Instructions for Continued Airworthiness

PS-Engineering Inc.

- **Intercom:** 200-193-0005 Revision 9 PM3000 High-fidelity Stereo Intercom System

Orolia SAS

- **ELT:** DOC07089H Ref. 0144618H ELT KANNAD 406 AF-COMPACT Initial installation manual

Lambert Electronic

- **10-Channel Intermediate Dimmer**: *MULTIDIMMER quick manual EN Document version 2* manual
- **Flap control unit**: *Flaps V6 HBR (3P) datasheet manual EN* manual
- **Landing lights**: *Landing star T1 rel. 2* manual

TCW Technologies

- **Backup-battery:** *Integrated Back-up Battery System Model: IBBS-12v-6ah issue 1.4* manual

K&N

- Air Filter: http://kandn.com/instructions/18627C_inst.pdf

01-30 Address

BRM AERO, s.r.o.	Address:	Letecká 255 686 04 Kunovice Czech Republic
	Phone:	+ 420 773 984 338
	E-mail 1:	info@brmaero.com
	E-mail 2:	aero.brm@gmail.com
	Web:	http://www.brmaero.com

or for occurrence reporting

Aircraft Design Certification GmbH (DOA)	Address:	Reichensteinstr. 48 69151 Neckargemünd Germany
	Phone:	+49 176 322 69825
	E-mail:	info@aircraftdc.de
	Web:	http://www.aircraftdc.de

02 How to Use the Manual

Table of Contents

02-00 General

The format and contents of this manual have been prepared in accordance with the GENERAL AVIATION MANUFACTURERS ASSOCIATION (GAMA) Specification No. 2.

The contents of this manual are organized in three levels:

- Group
- System/Chapter
- Subsystem (if needed)

Group

Groups used in this manual are:

Group	Chapters	Definition / Remark
General	01 & 02	General information
Aircraft General	03 thru 12	Complete operational unit, limitations
Aircraft systems	20 thru 34 and 90	All systems except power plant
Structure	51 thru 57	Structure of fuselage, wing, stabilizers, control surfaces and canopy; procedures
Propeller	61	Propeller and controls
Power plant	71 thru 80	Engine and associated systems, controls
Miscellaneous	91	Electrical wirings

System/Chapter

Systems are arranged numerically per GAMA Specification 2 (ATA 100) recommended number assignment. The first two numbers indicate the chapter or system; the second two indicate the sub-system or section (for example Chapter **02-10**).

When a subsystem is further divided into units, a third element is added to the number sequence, e.g. **53-20-01**

The table of content lists only those chapter numbers which are used in this supplement.

02-10 Standard Elements

02-10-01 General Text Elements

The following text elements are generally used within this manual:

Normal text

- Itemization
    - ► Instructions
    - ► **Instructions within a safety note**

Head Lines

Head Lines (when referenced)

02-10-02 Notes

Notes and safety notes in this handbook are marked by the words **NOTE, NOTICE, CAUTION, WARNING or DANGER** in the left margin column. The text of the note or safety note is printed in bold. See the following definitions:

⚠ DANGER	**indicates a hazardous situation, which, if not avoided, will result in death or serious injury.**
⚠ WARNING	**indicates a hazardous situation, which, if not avoided, could result in death or serious injury.**
⚠ CAUTION	**indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.**
NOTICE	**is used to address practices not related to physical injury.**
NOTE	**represents a remarkable hint.**

02-10-03 Tables of Inspection Tasks

Tables of inspection tasks include the list of all works, which are performed during inspection.

The headlines in the first column of this Maintenance Manual correspond to the headlines of the different Chapters, where you can find more detailed information for performing individual works.

The description of works, which are to be performed during inspection, is also outlined in the first column.

The second and third column is prepared for signs of mechanic and inspector.

02-20 Terminology and Abbreviations

Term	*Meaning*
ACCU	Accumulator
AEPS	Airframe Emergency Parachute System
ALT	Altimeter
ATC	Air Traffic Control
bar	pressure unit (1 bar = 14.5037 psi)
BEACON	anti-collision beacon
°C	temperature in degree of Celsius (1°C = (°F - 32) / 1.8)
CAS	Calibrated Airspeed
CG	Centre of Gravity
COMM	Communication transmitter
EFIS	Electronic Flight Instrument System
ELT	Emergency Locator Transmitter
EMS	Engine Monitoring System
°F	temperature in degree of Fahrenheit (1°F = (°C x 1.8) + 32)
ft	foot / feet (1 ft = 12 in = 0.3048 m = 304.8 mm)
ft/min	vertical speed in feet per minute
GPS	Global Positioning System
hp	power unit (1 hp = 0.7457 kW)
HTU	Horizontal Tail Unit
IAS	Indicated Airspeed
IC	Intercom
IFR	Instrument Flight Rules
in	inch (1 in = 25.4 mm)
ISA	International Standard Atmosphere
KCAS	Calibrated Airspeed in Knots
kg	kilogram (1 kg = 2.2046 lb)
KIAS	Indicated Airspeed in Knots
km/h	speed in kilometer per hour
knot	speed in NM per hour
kW	power unit (1 kW = 1.341 hp)
l	liter (1 l = 0.22 UK gal = 0.264 US gal)
lb	pounds (1 lb = 0.4536 kg)
lbf	force unit (1 lbf = 4.45 N)
m	meter (1 m = 1000 mm = 3.28 ft = 39.37 in)
mm	millimeter (1 mm = 0.03937 in)
MAC	Mean Aerodynamic Chord

max.	maximum
min.	minimum or minute
mph	speed in statute miles per hour
MTOW	Maximum Take-Off Weight
N	Newton – force unit (1 N = 0.225 lbf)
NM	Nautical Mile (1 NM = 1852 m)
OAT	Outside Air Temperature
OFF	system is switched off or control element is in off-position
ON	system is switched on or control element is in on- position
POH	Sport pilot Operating Handbook
psi	pressure unit – pounds per square inch (1psi = 0.0689bar)
rpm	revolutions per minute
sec.	second
SM	Statute Mile (1SM = 1.609 m)
US gal	US gallon (1 US gal = 0.83 UK gal = 3.785 l)
V	Volt
VFR	Visual Flight Rules
VLA	Very Light Airplanes
VMC	Visual Meteorological Conditions
VSI	Vertical Speed Indicator
VTU	vertical tail unit
VA	maneuvering airspeed
VFE	maximum flap extended speed
VNE	never exceed speed
VNO	maximum structural cruising speed
VSO	stall speed with wing flaps in extended position
VS1	stall speed with wing flaps in retracted position
VX	best angle of climb speed
VY	best rate of climb speed
XPDR	secondary radar transponder

02-40 Safety

- Make sure that you have all necessary ratings to begin your work. These ratings may be differently regulated in different countries.
- Before you start working, always contact your respective examiner.
- Do not begin any work before completely having read and understood the contents of this manual.
- In any case of doubt or lack of information, contact the manufacturer.

02-50 Ordering Spare Parts

► Order spare parts using the following Form:

BRM AERO, s.r.o.			Letecká 255, 686 04 Kunovice, Czech Republic	
Airplane Failure Card				
Dear customer, We would like to ask you for your assistance at obtaining information for continuous increasing reliability of airplanes produced by our company. Please fill out the card in case of any failure on your airplane. After filling out, send it to the address mentioned above. By sending us the card, you provide us with valuable data, which enable us to improve reliability of your airplane as well.				
Mandatory data				
Airplane type:		Registration mark:		Airplane S/N:
1.	Flight units: flight hours – number of landing			| | | | |:| | |-| | | |
2.	Failure detection date: day – month – year (format: “dd mm yy”)			| | | | | |
3.	Failure has been detected at: (encircle appropriate number)	1. Flight 2. Taxiing 3. Take-off run 4. Take-off 5. Touch down		6. Landing run 7. Daily inspection 8. Periodical inspection 9. Other
4.	Consequences for operation: (encircle appropriate number)	1. No consequences 2. Airplane put out of operation 3. Airplane returned from take-off 4. Flight with damaged aggregates		5. Emergency landing 6. Occurrence on the ground 7. Other
5.	Failure description:			
6.	Identification of the damaged part			
	Failed part name	Catalogue number of failed part	Worked out operation units	Serial No.*
	Note: State maximum detectable data			* fill out if required
7.	Notes, additional data (kind of failure, defect, incorrect activity):			
Additional data				
8.	Claimed (encircle what applicable): YES - NO		No. of claim:	
9.	Order of spare parts (encircle what applicable):		YES - NO	
	Item	Name of part	Catalogue part No.	No. of pieces
	Owner:		Home airport:	
	Operator:		Date:	Elaborated by:

03 Description

Table of Contents

General

This chapter shows a short survey of the particular systems. A more detailed description of the systems you find in the respective chapters (refer to *Table of Contents*).

03-10 Airplane Classification

BRISTELL B23 airplane is two-seat, single engine, low-wing, all-metal airplane with fixed tricycle landing gear with steerable nose wheel.

The airplane is designed for basic and advanced training and for leisure time flying.

03-20 Airplane Description

Some of the basic characteristics of BRISTELL B23 aircraft are listed below.

Power plant - Rotax 912 S3

Without airflow cap

BRM exhaust

BRM Airbox (carbon)

BRM Engine interface ring-mount

Battery: lead acid type

Propeller MTV-34-1-A/175-200

Governor as approved with propeller (P-110-051/A)

Spinner as supplied by MT

Landing gear

Fixed tricycle

MLG composite spring type with differential braking

NLG steel tube (4130) steered (two push/pull cable on excentre) and combined gas/spring damper

Fuselage/Hull Design

All-aluminum structure design

two side-by-side seats

Wing

low-wing monoplane

Empennage

Conventional crucifix design

All-aluminum structure design

Control system

Elevator and Aileron by pushrod system

Rudder by cable / pulley system

Flap by electro-mechanic system

Fuel system

Fuel strainer

Additional electric fuel pump

Luggage

Luggage compartments in cabin (15 kg)

Luggage compartments in wings (2 x 20 kg each)

AEPS

Ballistic rescue parachute system BRS 5 (ASTM compliant) on forward RHS fuselage

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04 Airworthiness Limitations

The Airworthiness limitations Section is approved and variations must also be approved.

Table of Contents

04-10 Life Limited Components

04-10-01 Airframe Life Limitation

Airframe life is unlimited.

04-10-02 Class I Parts Limitations

The following parts must be replaced or inspected as described below at the intervals specified in Table 1.

Inspection for welded steel components must include dye-penetrant or similar method.

Inspection for aluminum structure, especially closed such as horizontal shell, must include magnifying, borescope visual inspection.

Title	Drawing N°	Defined Interval
Wing		
Rear spar attachment bolt	AN5-6A	Replace at 5,000 hours
Fuselage		
Vertical bracket bolt	AN7-3A	Replace at 1,000 hours
Horizontal Stabilizer		
Front spar assy	55B230100N	Inspect every 1,000 hours
Rear spar assy	55B230200N	Inspect every 5,000 hours
Bulkhead 12 assy	53B251200N	Inspect every 5,000 hours
Top bulkhead 13 assy	53B251310N	Inspect every 5,000 hours
Engine Mount		
Tubes	71B210000N	Inspect every 5,000 hours Replace at 18,000 hours
Bolts (to airframe)	AN5-15A	Replace at 1,000 hours
Dual Control		
Torque tube	27B260101N	Inspect every 1,000 hours
Torque tube bracket	27B260102N	Inspect every 1,000 hours
Lower control stick tube	27B260201L	Inspect every 5,000 hours
Bolt (torque tube to stick)	DIN 912	Replace at 5,000 hours
Flap Control		
Connection tube assy	27B240200N	Inspect every 5,000 hours

Table 1 *Class I Parts*

Mandatory Inspection procedure for Class I limited parts as per Table 1

Aircraft S/N.:	……	**Total flight hours:**	……
Registration mark:	……	**No. of takeoffs:**	……

Prescribed works	Made by	Checked by
Horizontal Stabilizer		
Front spar assy 55B230100N - Remove the HTU from the fuselage as described in chapter 55-10. - Inspect (magnifying glass or similar) the front spar assy for deformation/cracks, especially the hinge plates and their attachments (counterparts of the mandrels in bulkhead 12). - Inspect the part of the spar covered by the skin through the lightening holes and the inspection holes (by means of a borescope or similar) for deformation/cracks. - If a complete inspection from both sides (front and rear) is not possible remove the outer front rips (55B230050L/R) of the stabilizer and inspect through the opening. - Replace if damaged.		
Rear spar assy 55B230200N - Remove the HTU from the fuselage as described in chapter 55-10. - Inspect (magnifying glass) the rear spar assy for deformation/cracks, especially the mounting brackets and connecting rivets to the spar. - Inspect the rest of the spar through the lightening holes and the inspection holes (by means of a borescope) for deformation/damage. - If a complete inspection from both sides (front and rear) is not possible remove the outer rear rips (55B230052L/R) of the stabilizer and inspect through the opening. - Replace if damaged.		
Bulkhead 12 assy 53B251200N - Remove the HTU from the fuselage as described in chapter 55-10. - Inspect the Bulkhead 12 assy for deformation/damage, especially the mandrels and the mounting of the mandrels to the bulkhead by means of a magnifying glass or similar. - Inspect the rest of the bulkhead through the lightening holes and the inspection holes of the fuselage (by means of a borescope or similar) for deformation/damage.		
Top bulkhead 13 assy 53B251310N - Remove the HTU from the fuselage as described in chapter 55-10. - Remove the Bulkhead 13 assy and inspect for deformation/damage. - Remove any paint according ASTM E1417. - Perform dye-penetrant testing according ASTM E1417. Replace if damaged - Paint with the materials defined below* if undamaged and reinstall.		

Prescribed works	Made by	Checked by
Engine Mount		
Tubes 71B210000N - Remove engine cowlings. - Remove the engine and the engine mount. - Inspect the engine mount for deformation/damage. - Remove any paint according ASTM E1417. - Perform dye-penetrant testing according ASTM E1417. - Replace if damaged. - Paint with the materials defined below* if undamaged and reinstall.		
Dual Control		
Torque tube 27B260101N Torque tube bracket 27B260102N - Remove seat pans. - Remove the torque tube and inspect for deformation/damage (incl. left and right brackets). - Remove any paint according ASTM E1417. - Perform dye-penetrant testing according ASTM E1417. - Replace if damaged. - Paint with the materials defined below* if undamaged and reinstall.		
Lower control stick tube 27B260201L - Remove seat pans. - Remove the control stick and inspect for deformation/damage (incl. bracket). - Remove any paint according ASTM E1417. - Perform dye-penetrant testing according ASTM E1417. - Replace if damaged. - Paint with the materials defined below* if undamaged and reinstall.		
Flap Control		
Connection tube assy 27B240200N - Access the flap control connection assy as described in chapter 27-50-02. - Inspect for deformation/damage. - Replace if damaged. - Paint with the materials defined below* if undamaged and reinstall.		
*** Paint materials for steel parts:**		
1. Primer 2. Top coat	20 µm Allora 2-EP-15010-MA 2K-Epoxy-Primer-matt RAL 7035 40 – 70 µm GLASURIT, R-68, RAL9016	
Notes: Date: ..... Signature:		

04-10-03 AEPS System Limitations

AEPS rocket (BRS 601; *PN 008418-01*) life is 12 years. Replace or uninstall (see Chapter 90-10-00) after reaching lifetime.

The BRS system must be marked “Inoperative” in the case the instructions for continued airworthiness (see Chapter 90-10-00) are not followed.

05 Inspection and Maintenance

Table of Contents

05-10 Time Limits

For Information about life limitation of installed avionics/equipment not listed herein refer to Chapter *01-20 Related Publications*.

05-10-01 Overhaul Schedule

Items shown here must be overhauled at the times indicated.

Item	Overhaul
Motor ROTAX 912 S3	Refer to Maintenance Manual (Line) 912 Series, latest edition
Propeller MTV-34-1A/175-200	Refer to MT Service Bulletin No. 1
BRS-05 Ballistic recovery parachute	See ADxC-73-C1-012 AEPS Instructions for Continued Airworthiness
All other items	On condition or as stated in the respective maintenance/overhaul manual

05-10-02 Replacement Schedule

Items shown here must be replaced at the times indicated.

Item	Replacement
AEPS BRS-05 parachute repack interval	6 years
AEPS BRS 601 rocket replacement	12 years
AEPS maximum parachute service life	24 years
ELT battery	Refer to the documentation supplied with installed ELT for battery replacement interval.
Backup battery for EFIS	Refer to the documentation supplied with installed EFIS backup battery for battery replacement interval.

Item	Replacement
Back-Up battery L3-ESI	No specific replacement interval, but recalibration minimum 1time per year or on condition *(unit indicating "Battery Failed" or "EOL" (end of life) warrants battery replacement)*
air-bleeding hoses of carburettors	every 5 years
all rubber hoses of engine cooling system	every 5 years
all rubber hoses of engine oil system	every 5 years
carburettor flanges	refer to Rotax instructions (latest issue of Manufacturer´s Service Bulletin and Maintenance and Overhaul Manual)
carburettor diaphragms	refer to Rotax instructions (latest issue of Manufacturer´s Service Bulletin and Maintenance and Overhaul Manual)
rubber hoses of the compensation tube connecting carburettors	every 5 years
fuel pump including fuel hoses	every 5 years
Cooling liquid	must be exchanged every 2 years.
All other items	On condition or as stated in the respective maintenance/overhaul manual

05-20 Scheduled Maintenance

General

Maintenance system serves to maintain flight airworthiness of BRISTELL B23 airplane.

Maintenance system is composed of periodic inspections, which must be performed at least in the following intervals:

NOTE **The intervals of engine inspections and the list of works are shown in Maintenance Manual (Line Maintenance) for installed engine. The intervals of propeller inspections and the list of works are shown in Technical description and operation instructions for the installed propeller. If the periodical inspection is performed before reaching the specified time interval, then the following inspection must be performed at the latest within the specified time interval from this inspection (e.g. if the first 100-hour inspection is performed after 87 flight hours then the following 100-hour inspection must be performed at the latest after 187 flight hours).**

- Pre-flight inspection is performed within the scope given in Flight Manual, section 4.

  For MTV-34 pre-flight inspection refer to 6.1 Daily inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV

- Inspection after the first 25 flight hours - engine and propeller inspection.

  For MTV-34 refer to 6.1 Daily inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV

NOTE **Inspection after the first 25 flight hours to be performed with the new engine or with the engine after overhaul.**

- Periodical inspection after 50 flight hours - inspection of engine and propeller.

  For MTV-34 refer to 6.1 Daily inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV

- Periodical inspection after 100+5 flight hours – airframe and propeller inspections, engine inspection according to maintenance system, which is described in Maintenance Manual (Line Maintenance) for installed engine.

  For MTV-34 refer to 6.2 100 flight hours inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV

NOTE **Time limits can only be exceed in accordance with the applicable regulations.**

- Annual inspection contains works of 100-hour inspection and other specified works (inspections of airframe, engine and propeller).

NOTE **All defects found out during aircraft inspections must be eliminated!**

05-20-01 Lubrication Plan

Unit	Area of lubrication	Every 100 hours	Lubricant
Engine	Throttle control cable on the inlet into terminal (in the engine compartment).	X	Engine oil
	Choke control cable on the inlet into terminal (in the engine compartment).	X	Engine oil
Nose landing gear	Landing gear leg in the area of mounting (lubricator). Landing gear steering control cable on the inlet into terminal (in cockpit).	X	Lubrication Grease*
Main landing gear	Brake pad pins.	X	Lubrication Grease*
Ailerons	Hinges.	X	Lubrication Grease*
	Rod end bearings of the control tubes.	X	Lubrication Grease*
	Uncoated bushings in the bearings if used	X	Lubrication Grease*
	Two-arm control lever in the outer wing and control lever in the center wing.	X	Lubrication Grease*
	Torque tube bearings in center console in fuselage.	X	Lubrication Grease*
Flaps	Hinges.	X	Lubrication Grease*
	Rod end bearings on actuator.	X	Lubrication Grease*
HTU	Elevator hinges.	X	Lubrication Grease*
	Rod end bearing of the elevator control tubes.	X	Lubrication Grease*
VTU	Rudder hinges.	X	Lubrication Grease*
	Cable shackles on the rudder control cables.	X	Lubrication Grease*
Trim tab	Tab hinges.	X	Engine oil
Manual control	All movable links in the cockpit.	X	Lubrication Grease*
Foot control	All movable links in the cockpit.	X	Lubrication Grease*
	Cable shackles of rudder control.	X	Lubrication Grease*
	Locking pin for pedal adjustment	X	Lubrication Grease*

**NOTE: use general purpose grease lubrication (AeroShell Grease 22C or comparable)*

05-20-02 Periodical Inspection after the first 25 Flight Hours

Aircraft S/N.:	.....	**Total flight hours:**	.....
Registration mark:	.....	**No. of takeoffs:**	.....

Prescribed works	Made by	Checked by
Engine and Propeller		
List of performed operations for engine is shown in Maintenance Manual (Line Maintenance) for installed engine		
For MTV-34 prop perform daily inspection according to 6.1 Daily inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV		
Remove and check engine cowlings for evident signs of heat damage or cracks.		
Inspect and check tightening and securing bolts on the engine brackets and the engine mount.		
Check the engine mount for occurrence of cracks.		
Check the exhaust system (and its attachment) for occurrence of cracks on the exhaust system and welds (see Chapter 78-00 *Check*). Remove heat exchanger for full inspection of the muffler surface.		
Inspect and clean the fuel filter insert.		
Inspect and clean the fuel strainer in the fuel tank outlets		
Inspect the composite landing gear for cracks at axle connection and mounting brackets		
Check rudder cable tension is within 33 – 70 lbs (for newly installed cables 50 – 70 lbs)		

Notes:

Date: ..... Signature: .....

05-20-03 Periodical Inspection after the first 50 Flight Hours

Aircraft S/N.:	**……**	**Total flight hours:**	**……**
Registration mark:	……	No. of takeoffs:	……

Prescribed works	Made by	Checked by
Engine and Propeller		
List of performed operations for the engine is shown in Maintenance Manual (Line Maintenance) for installed engine.		
For MTV-34 prop perform daily inspection according to 6.1 Daily inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV		
Remove and check engine cowlings for evident signs of heat damage or cracks.		
Inspect and check tightening and securing bolts on the engine mount and the engine brackets.		
Check the engine mount for occurrence of cracks.		
Check the exhaust system (and its attachment) for occurrence of cracks on the exhaust system and on welds (see Chapter 78-00 *Check*). Remove heat exchanger for full inspection of the muffler surface.		
Remove and clean or replace the fuel filter insert.		
Inspect the composite landing gear for cracks at axle connection and mounting brackets		
Check cleanliness of optical components of landing lights and clean if needed		
Check rudder cable tension is within 33 – 70 lbs (for newly installed cables 50 – 70 lbs)		

Notes:

Date: ..... Signature: .....

05-20-04 Annual Periodical Inspection or Inspection after 100 Flight Hours

Aircraft S/N.:	.....	**Total flight hours:**	.....
Registration mark:	.....	No. of takeoffs:	.....

Prescribed works	Made by	Checked by
AIRFRAME		
Preparation		
Perform aircraft daily inspection and engine start up, run up and shut down per AFM. Check all related functions. Check function of fuel selector valve during run up by closing it. Engine must then stop within 30 seconds.		
Remove wing joint fairing		
Remove cowling		
Remove all access panels wing, stabilizer and fuselage		
Remove seats and open panels behind seat		
Fuselage		
Visually check surface condition including composite parts - loosened rivets, deformation, cracks and some other damage.		
Check condition of fuselage-wing fairings.		
Check condition and attachment of the tailskid.		
Check condition and attachment of the canopy.		
Check condition and functions of vents.		
Check condition and function of the canopy locks.		
Check condition and completeness of emergency equipment. (hammer in glove box)		
Check condition of rubber sealing of the cockpit.		
Check condition of canopy struts.		
Wing		
Visually check surface condition loosened rivets, deformation, cracks and some other damage.		
Check play in the wing attachments.		
Check condition and attachment of the wing tips.		
Check condition of the position lights.		
Check conductive wing-fuselage connection.		
Check wing locker box condition and drain		
Check wing locker locking mechanism		

Prescribed works	Made by	Checked by
Check cleanliness of optical components of landing lights and clean if needed; check mechanical integrity of product and replace in case the product is damaged		
Aileron		
Visually check surface condition loosened rivets, deformation, cracks and some other damage.		
Check for free travel.		
Check hinges.		
Check for conductive connection and securing control links.		
Check aileron trim tab		
Check aileron trim tab indication		
Flap		
Visually check surface condition - loosened rivets, deformation, cracks and some other damage.		
Check for free travel.		
Check hinges.		
Check condition of the control rods and servo		
Check conductive connection.		
Tail Unit		
HTU		
Check horizontal stabilizer attachment and securing.		
Visually check surface condition - deformation, cracks and some other damage.		
Check condition and attachment of the wing tips.		
Check suspension and free travel of the elevator.		
Visually check condition and suspension of the trim tab.		
Visually check condition and securing of the elevator control pull rod and the trim tab control servo.		
VTU		
Visually check surface condition -loosened rivets, deformation, cracks and some other damage.		
Check hang and securing of the rudder lower hinge.		
Check for free travel of the rudder.		
Check attachment and securing of rudder cables.		
Check conductive connection.		

Prescribed works	Made by	Checked by
Flight Controls		
Manual Control		
Check for free travel of control (see Chapter 20-60-04).		
Check plays (see Chapter 20-60-03).		
Check securing of links and conductive connection.		
Check condition of the stops.		
Foot Control		
Check free play of control (see Chapter 20-60-04).		
Check plays (see Chapter 20-60-03).		
Check securing of links and conductive connection.		
Check condition and tension of cables (see Chapter 20-60-02).		
Check condition of control cable clearance/chafing at fuel lines below fuel selector (access thru armrest)		
Flap Control		
Check for free travel of the control lever.		
Check securing of links and conductive connection.		
Check function of control servo.		
Check function of travel limit switch		
Control of the Elevator Trim Tab		
Check the control servo.		
Check plays (see Chapter 20-60-03).		
Check securing of links and conductive connection.		
Check trim tab neutral position adjustment.		
Check trim tab position indicator.		
Autopilot control (if installed)		
Check mounting of servos		
Check control links		
Equipment		
Check completeness and validity of documentation.		
Check general condition and attachment of the instrument panel.		
Check condition and attachment of instruments.		
Check function and condition of switches and circuit breakers.		

Prescribed works	Made by	Checked by
Check function and condition of throttle controller, choke, Fuel selector valve, heating and ventilation		
Check condition of labels.		
Check cleanness and condition of upholstering.		
Check condition of seats.		
Check condition, damage, function and attachment of safety harnesses.		
Landing Gear		
Main Landing Gear		
Check condition of landing gear legs and attachment points.		
Check condition and attachment of wheel pants.		
Check condition, wear and inflation of tires.		
Check condition of the wheel disk for occurrence of cracks.		
Check securing of bolts.		
Check wheels for free rotation.		
Check function of brakes and parking brake.		
Check condition and attachment of brake hoses.		
Check condition and wear of brake hoses, brake pads, (minimum admissible thickness of brake pad is 2 mm) and brake disk.		
Check brake fluid leakage - brake fluid hoses, brake pumps, brake cylinders. Replenish brake fluid as needed (see Chapter 12-10-40).		
Exchange brake fluid - **annual inspection only** (see Chapter 12-10-40).		
Nose Landing Gear		
Check condition and attachment points of landing gear leg in fuselage.		
Check condition and inflation of tire.		
Check condition of wheel disk and for occurrence of cracks.		
Check securing of bolts.		
Check for free travel of wheel rotation.		
Check continuous travel of nose landing gear control.		
Check adjustment of nose landing gear neutral position.		
Check nose wheel shock absorber condition.		
Fuel System		
Drain gascolator, remove installed fuel filter and clean it.		

Prescribed works	Made by	Checked by
Check condition and integrity of electrical fuel pump and hose sleeves in the engine compartment.		
Visually check for fuel system tightness.		
Check tightness and condition of fuel pump for occurrence of cracks on the pump body (see Chapter 28-20-01 *Check*)		
Drain fuel tanks and inspect fuel strainer filter in fuel tank by boroscope for dirt and obstructions - **every 5 years only -**.		
Engine and Propeller		
List of performed operations for the engine according to engine maintenance system, which is contained in Maintenance Manual (Line Maintenance) for installed engine.		
For MTV-34 prop perform inspection according to 6.2 100 flight hours inspection, in the Operation, Installation, and Maintenance Manual, Ground adjustable and Hydraulically Controlled Variable Pitch Propeller MTV		
Remove and check engine cowlings for evident signs of heat damage or cracks.		
Inspect and check for tightening and securing the bolts on the engine brackets and the engine bed.		
Check the engine bed for occurrence of cracks.		
Check the exhaust system (and its attachment) for occurrence of cracks on the exhaust system and on welds (see Chapter 78 *Check*). Remove heat exchanger for full inspection of the muffler surface.		
Check oil and coolant radiators for attachment, free air passage, damage or chaffing		
Check condition and attachment of fuel, oil, coolant and drain lines as well as electric wiring		
Check condition of engine mechanical controls for throttle, choke, carburetor heat and propeller.		
Electrical System		
Check attachment and condition of battery.		
Check level of battery charge.		
Check condition and integrity of wiring.		
Check condition and securing of plug/socket outlets.		
Check condition of conductive connection.		
Pitot/Static System		
Check condition (leak test) and pitot tube attachment.		
Check cleanness of air inlet holes of pitot tube.		
Check attachment and securing of hoses to the instruments.		
Check function of the pitot tube.		

Prescribed works	Made by	Checked by
Check for pitot-static system tightness (see Chapter 34-10-10 *Checks*)		
Heating and Ventilation System		
Check cleanness and passage of air inlet holes.		
Check line and integrity of the heating and ventilation system hoses.		
Check condition and attachment of the heat exchanger.		
Check condition of the cabin heat mixer mounted to the firewall.		
Check closing function secure of heat shut off valve at firewall (visual inspection with removed heating hose).		
Navigation/Communication		
Visually check condition of navigation and communication instruments.		
Check function of navigation and communication instruments - **annual inspection only**		
Check altimeter function - **annual inspection only**		
Perform L-3 Aviation Products battery calibration		
Finalization		
Close all access hatches, remount fairings and cowling		
Perform ground run and check flight		
Notes: Date: ..... Signature:		

06 Dimensions and Areas

Table of Contents

06-10 Coordinate System

The airplane is defined in metric (mm) EX, EY, EZ coordinates.

EX =0 is defined by the forward plane of the engine flange to the propeller, aft positive.

EY =0 lies in the airplane centre plane, RHS positive.

EZ =0 is defined by the forward plane of the engine flange to the propeller, upward positive.

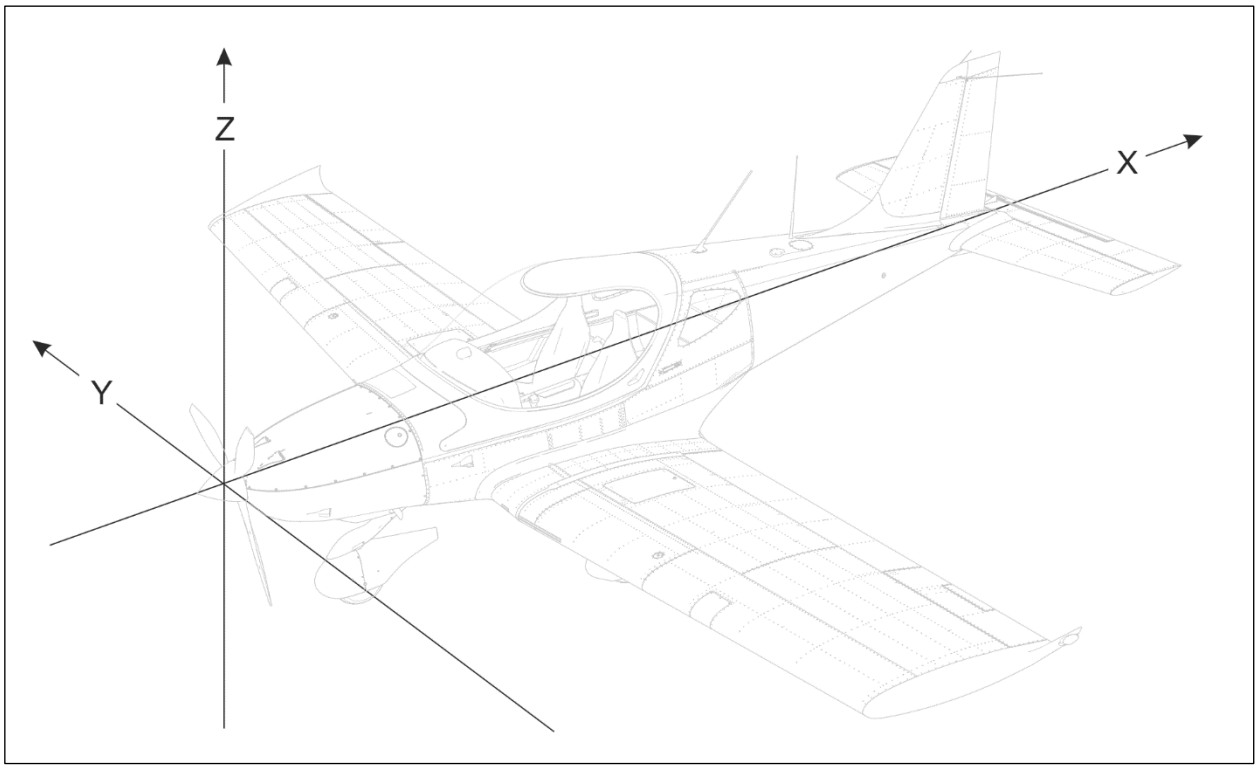

Figure 1 Coordinate System

06-20 Main Data

06-20-01 Wing

Wing span (incl. wing tips):	9.16 m
Area (projected):	11.75 m^2
Aileron span:	1.145 m
Aileron area:	(each) 0.29 m^2
Flap span:	2.3 m
Flap area:	0.828 m^2

06-20-02 Fuselage

Total length:	6.58 m
Maximum height (approx. static gear loading empty):	2.36 m
Maximum fuselage width:	1.3 m

06-20-03 Horizontal Tail

Span:	3.2 m
Area:	2.4 m^2
Elevator span	3.1 m
Elevator area	0.842 m^2

06-20-04 Vertical Tail

Height:	1.28 m
Area:	1.19 m^2
Rudder span:	1.13 m
Rudder area:	0.47 m^2

06-20-05 Landing Gear

Wheel base:	1.47 m
Wheel track:	2.04 m
Tires (tubeless):	5.00-5”

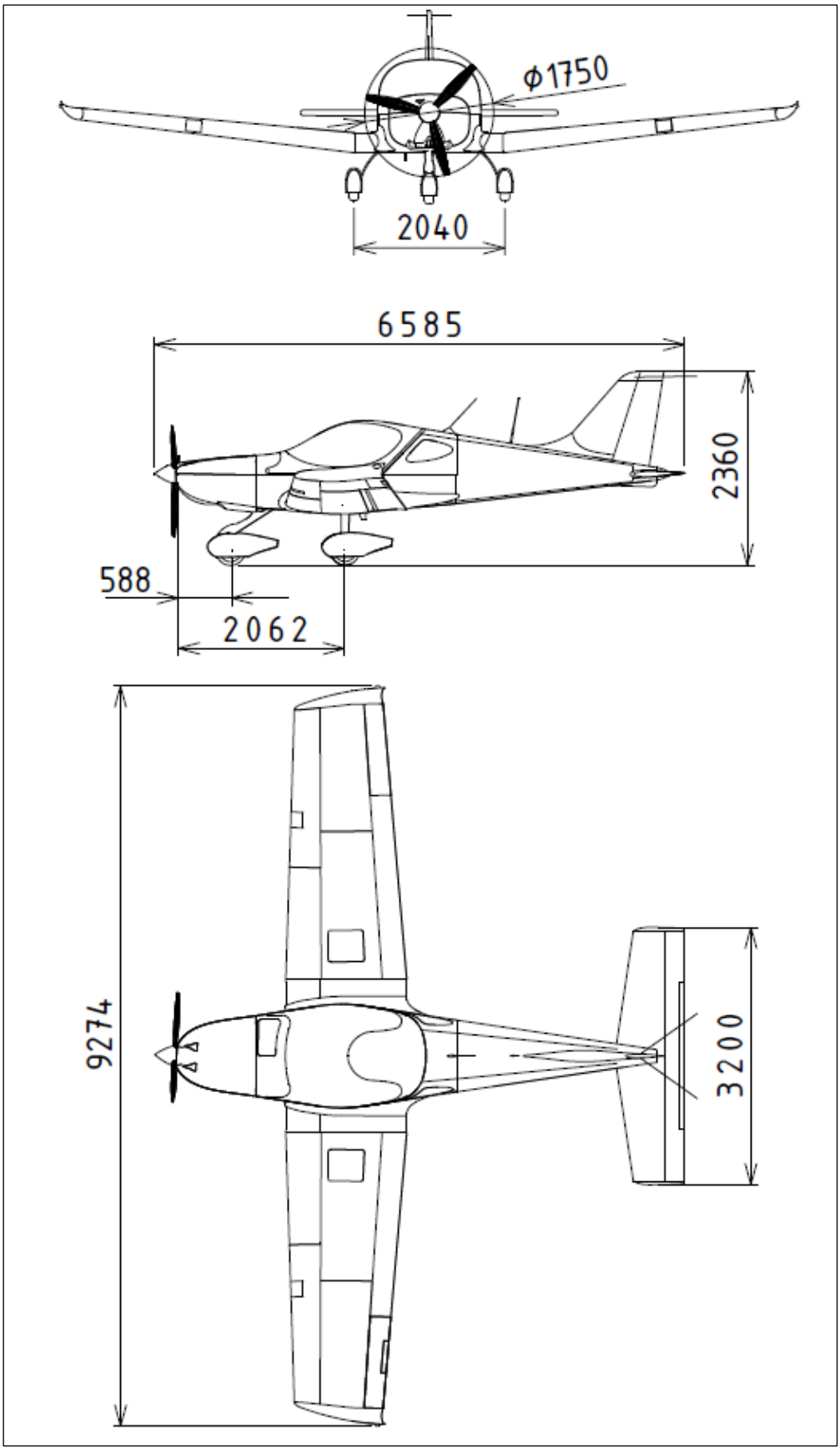

Figure 1 *Three View Drawing*

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07 Lifting and Shoring

Table of Contents

07-00 General

07-10 Jacking

The airplane jacking can be carried out by two persons due to relatively low empty weight of the airplane.

There are three jacking points (see Fig. 1), two of them are under upper ends of main landing gear legs (2) and the third one is under the nose wheel leg (1).

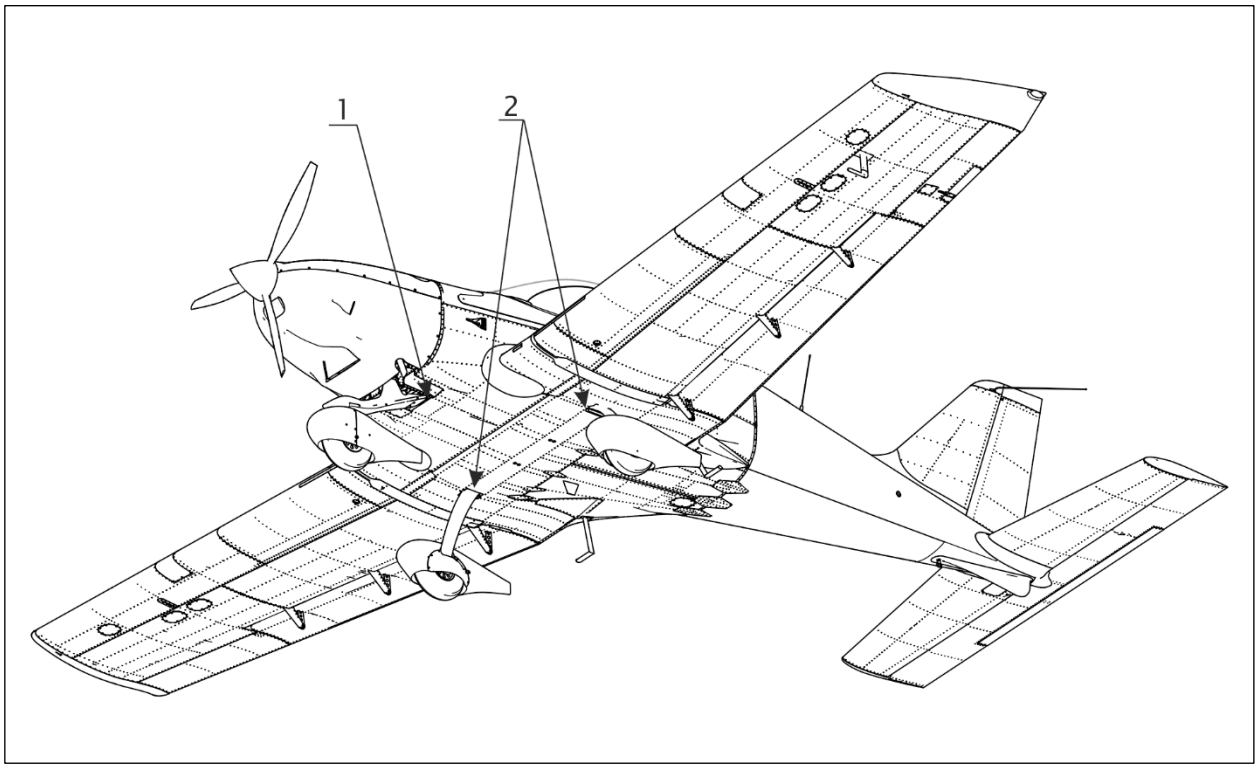


Figure 1 Airplane Jacking Points

Item	Description	Item	Description
1	Front fuselage jacking point	2	Rear fuselage jacking points

07-20 Shoring

For shoring the jacking points are used. Refer to Figure 1.

08 Leveling and Weighing

Table of Contents

08-10 Weighing and Balancing

Introduction

This section contains information about the aircraft empty weight and centre of gravity as well as the procedure for its determination.

The range within the airplane may be safely operated is defined in Chapter 08-10-02 Weight and Balance Envelope Limits.

Definitions

The basic airplane empty weight is defined as the empty aircraft with full engine operational required fluids (oil and coolant) as well as with the amount of unusable fuel in the fuel tanks (2 x 1.0 liter).

The centre of gravity lever arms relates to the airplane datum located at the plane of engine propeller flange. Airplane level attitude is defined as the fuselage top rivet row just below the canopy frame.

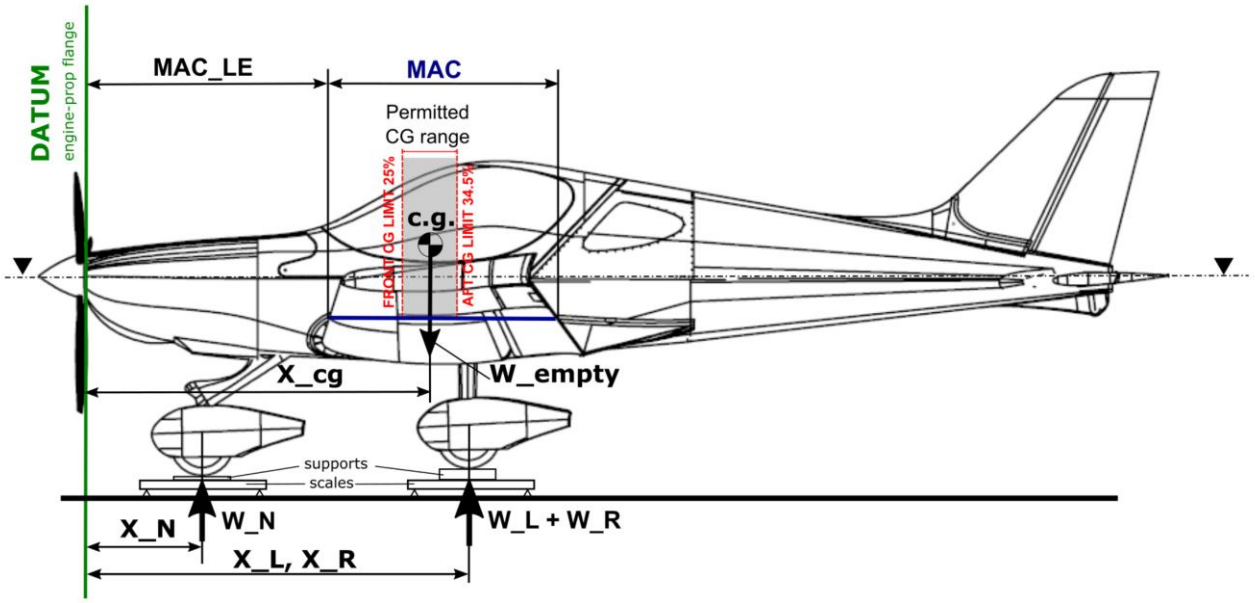


Figure 1 Weight and Balance Arms and Datum

Nominal Geometric Lever Arms and Lengths

Nose gear ground contact X_N..... 0.588 m

Main gear ground contact X_L, X_R..... 2.062 m

MAC..... 1.343 m

MAC Leading edge (MAC_{LE})..... 1.377 m

Airplane Weighing Procedure

- Prepare aircraft by off-loading any luggage and loose items which are not part of the standard equipment.
- Check coolant and oil filled, replenish if needed.
- Drain fuel.
- Replenish unusable fuel (1.0 Litre each wing tank).
- Level airplane on scales (refer to Chapter 08-20).
- Determine individual weight on all three gears (W_N, W_L, W_R).
- Check gear lever arms (X_N, X_L, X_R; reference propeller flange X=0.0m, or firewall X=0.960m).
- Calculate Empty Weight:

  W_empty = W_N+W_L+W_R

- Calculate Empty airplane moment:

  M_empty = WN*X_N + W_L*X_L + W_R*X_R

- Calculate Empty Airplane CG:

  CG_empty = M_empty/W_empty

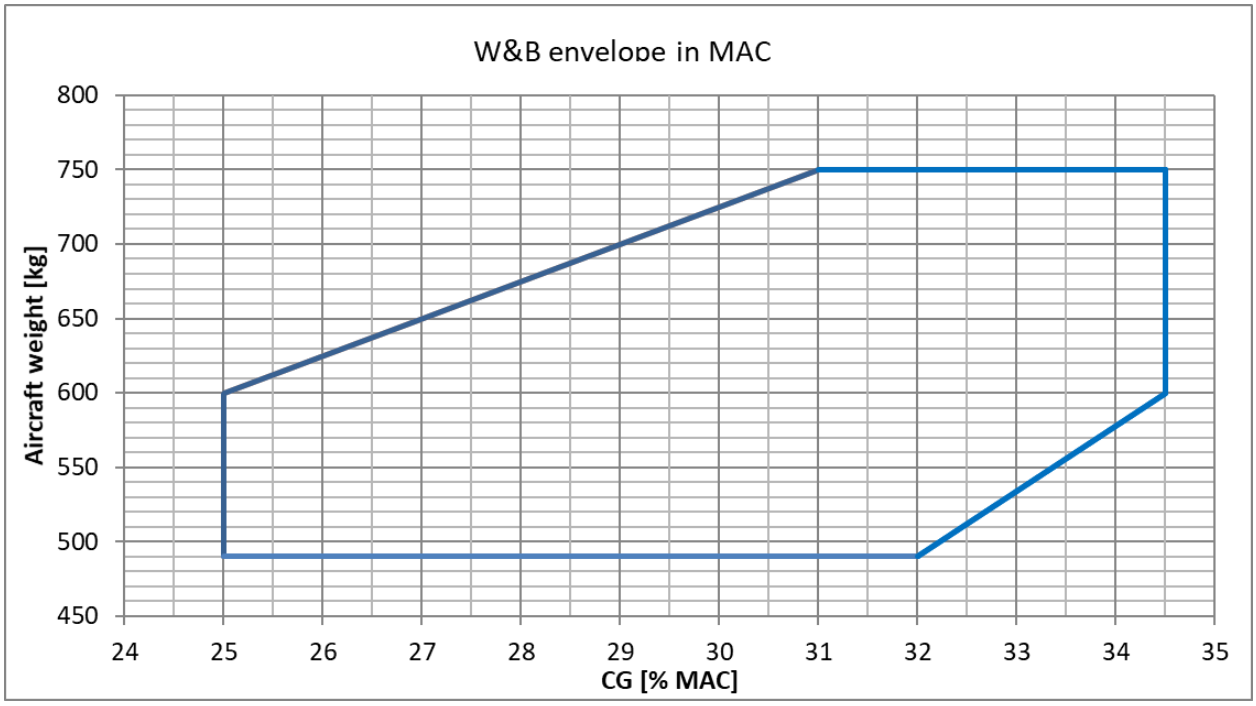
- Record date, empty weight, moment and CG in the Empty Aircraft Weight and Balance Record (see 08-10-01).
- Check aircraft is within limits given in Chapter 08-10-02 *Weight and Balance Envelope Limits*.
- If it is not contact the manufacturer.

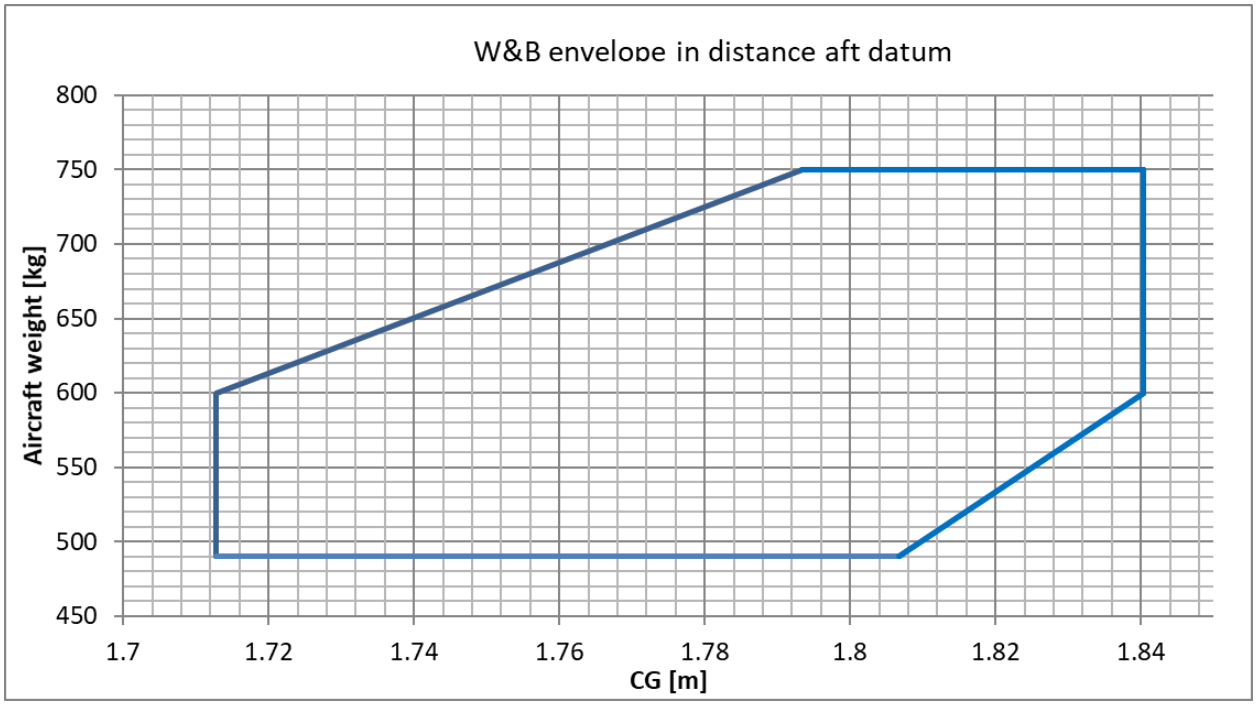
08-10-01 Empty Aircraft Weight and Balance Record

The table is intended to record continuous history of weighings and changes of equipment affecting weight and balance.

Type	BRISTELL B23	Serial. No.:																		
Date	Item No.	Description of part or modification	Manufactured airplane	Weight change																
				Basic weight of empty airplane		Removed (-)			Added (+)											
				Weight (kg)	Moment (kg.m)	Weight (kg)	Arm (m)	Moment (kg.m)	Weight (kg)	Arm (m)	Moment (kg.im									
	-																			
	+																			

08-10-02 Weight and Balance Envelope Limits





08-20 Leveling

Definitions

The reference line for longitudinal leveling is the fuselage top rivet row just below the canopy frame.

The identical distances of wing tips to an even floor are the reference for lateral leveling.

Procedure

- Place aircraft on an even floor.
- Measure distances of wing tips to an even floor.
- Align a spirit level towards the fuselage top rivet row just below the canopy frame.
- Place suitable wooden strips under the respective tires.

09 Towing and Taxiing

Table of Contents

09-00 General

09-10 Towing

⚠ DANGER **The engine could start unintentionally.**

► **Switch off ignition before handling the airplane on the ground!**

NOTICE **Damage to the airplane skin possible.**

► **Avoid excessive pressure on the airframe structure, especially on the wing ends, flaps, ailerons, HTU, VTU etc.**

The airplane may be moved by

- gripping the propeller root (never the blades!)
- gripping the main legs
- by pushing it forward with open hands on the reinforced wing root
- by using a tow bar

09-20 Taxiing

For taxiing refer to flight manual ADxC-73-001-AFM.

10 Parking, Mooring, Storage and Return to Service

Table of Contents

10-10 Parking

The airplane should be preferably placed in the hangar, possibly in another covered space with stable temperature, good ventilation, low humidity and dust free environment. In case of parking outside the hangar it is necessary to anchor the airplane and to cover the canopy or the whole airplane with suitable tarpaulins for long-term parking.

NOTICE

Allow brakes to cool down before setting the parking brake.

NOTE

Use the parking brake only for short-term parking between flights during the day.

When the flight day is over or under low air temperatures, do not use the parking brake and apply the wheel chocks instead.

10-20 Anchoring

When parking, the airplane outside the hangar after flight day, the airplane should be anchored to the ground. It is necessary to anchor the airplane in order to protect it from a possible damaging caused by wind and gusts. For this reason the airplane is equipped with anchoring eyes on the lower side of wings and on rear part of fuselage.

Procedure

- Check the FUEL valve is OFF, switch OFF all switches, ignition and master switch.
- Block the control stick, e.g. by using safety harnesses.
- Release the parking brake if it was braked.
- Close the vents.
- Close and lock the canopy.
- Park the aircraft into wind.
- Insert the airplane wheel chocks.
- Anchor the airplane to the ground by means of cables pulled through the anchoring eyes on the lower side of the wings and on the rear part of fuselage.

11 Placards and Markings

Table of Contents

11-00 General

No limitations to outer paintjob.

For placards and markings refer to flight manual ADxC-73-001-AFM.

12 Servicing

Table of Contents

12-10 Replenishing

12-10-01 Operating Liquids[2]

Brake Fluid	
Beringer brakes	**Castrol brake fluid DOT 4** Protector series SAE J1703 & J1704; FMVSS 116 DOT4; JIS K2233 Class 4; ISO 4925 Class 4
Engine Oil[3]	
	AeroShell SPORT PLUS 4 Piston Engine Oil
Coolant[4]	
Standard	**Ethylene-glycerin based coolant with 50% water dilution** acc. to Rotax Service Instruction: *SI-912-016 (Selection of suitable operating fluids for ROTAX Engine Type 912 i, 915 i, 912 and 914 (Series))*

[2] For general information, product data, and safety data refer to latest general information, product data, and safety data sheets released by manufacturer

[3] Also refer to Chapter 72-00-04.

[4] Also refer to Chapter 72-00-02

12-10-10 Fuel

Refueling

Safety Instructions

⚠ DANGER Explosion and fire hazard!

- Replenishing is only allowed to persons who are fully instructed and familiarized with safety instructions.
- Do not refuel aircraft
  during rain and storm
  in a closed space
  when the engine is operating or
  with electric system switched on
- Do not refuel aircraft nor allow any person to stay next to the aircraft, when wearing polyester clothing or any clothing from a material which creates static electricity.
- Do not smoke or handle with open fire nor allow any person to do so.
- Ensure airplane is grounded.

NOTE When filling fuel in the airplane, use only approved kinds of fuel mentioned in this Manual, Chapter 72-00-03, or in the POH Chapter 2, or in Rotax engine Operator's Manual-Section 10.2.2 and 13 or Service Instruction SI-912-016.

- Ground the airplane. The airplane ground point is located on the exhaust pipe.
- Open the fuel tank filler cap.

NOTICE Damage to the airplane surface possible.

- When filling fuel into the airplane, avoid the contact of fuel with the airplane surface.
- Fill necessary quantity of fuel.
- When the airplane is filled with fuel, wipe the filler neck of the rest of fuel and close the fuel neck filler cap.
- Remove conductive interconnection between the filling device and the airplane.
- Drain the fuel tank.

Draining

The fuel tank draining points are on bottom side of the wings, and at the gascolator on the firewall.

- ► Open the drain valve by pressing up.
- ► Drain required quantity of fuel.

NOTE **Draining serves for elimination of impurities and sediments from fuel.**

- ► **Drain so long unless clean fuel flows from the drain valve.**
- ► Close the drain valve by releasing pressure.

12-10-20 Oil

Exchange/Refilling

Refer to the Rotax engine Maintenance manual Chapter 12-00-00 para 5.

NOTE **Recommended kinds of oil are mentioned in Chapter 72-00-04, in the POH para 2.4, in the Rotax engine Operator's manual para 10.2.3, in Service Instructions SI-912-016 and SI-18-1997 R5.**
Type of oil used by aircraft manufacturer is shown in Chapter 12-10-01.

Oil Quantity

Total oil quantity in the lubrication system of Rotax 912 S3 engine is approximately 3.6 liters (1 US gal, 0.84 UK gal).

Check oil Quantity preferably after running the propeller by hand in the sense of engine rotation so that oil can fill in the engine space or operate the engine for 1 minute in idle mode.

⚠ DANGER **The engine could start unintentionally!**

- ► **Switch OFF ignition before manually turning the engine!**

The oil tank is located in the engine compartment and oil dipstick is accessible after opening the lid on the upper engine cowling (see Chapter 71-10). Oil level must lie between min and max marks (flattening) on the dipstick and must not drop below "MIN" line.

Oil Draining

Drain oil from the oil tank by unscrewing the plug (wrench size No.17) on the lower side of the oil tank. It is possible to drain oil from the engine after unscrewing the plug in the lower part of the engine at the hose of the return branch of oil flow. It is recommended to drain oil immediately after engine test or after finishing the operation when oil is sufficiently hot and better flows both from the engine and from the tank. Clean the tank before filling it with new oil – see Maintenance Manual for ROTAX Engine.

Refilling Oil

Refill oil in the oil tank that is located on the firewall.

Venting of the Lubrication System

After short idling, stop engine and replenish oil to maximum mark on dipstick. Never overfill, otherwise oil would escape through the vent tube during operation. At oil level inspect, do not exceed the maximum mark.

12-10-30 Coolant

Refer to the Rotax engine Maintenance manual chapter 12-10-00, para 3.

NOTE

Recommended types of coolant are shown in Chapter 12-10-01, in the POH para 2.4 or in the Rotax engine Operator's manual para 10.2.1, Installation manual chapter 75-00-00 and Service Instruction SI-912-016.

Type of coolant used by aircrafts manufacturer is shown in Chapter 12-10-01.

Coolant Quantity

Total quantity of coolant in the engine is approximately 2.5 liters (0.7 US gal).

Drainage of Coolant

Disconnect the hose supplying liquid from the radiator to the pump (at the lowest point of the system) and drain cooling liquid into the prepared vessel.

Refilling Coolant

Refill coolant into the expansion tank in the engine compartment. In addition to this there is an overflow bottle which collects coolant in case of engine overheating and is attached to the firewall.

12-10-40 Brake Fluid

Refilling/Bleeding

NOTE **Refer to Chapter 12-10-01 for brake fluid recommended by the airplane manufacturer.**

- Use BERINGER Pressure Bleeder (PN: ONC01) and follow the BERINGER “Tech Tip #9 – How to bleed your brakes?” to be found on BERINGER Youtube Tutorials.
- If there is no need to change brake fluid and brake fluid reservoir is not below minimum, simply refill the reservoir.

12-20 Scheduled Servicing

12-20-21 Oil Filter

Exchange/Check

Refer to the Rotax engine Maintenance Manual Chapter 12-10-00 para 4.

NOTE **Carry out at every oil exchange.**

- Remove the oil filter.
- Remove the filter insert, cut of the upper and the lower lid of the insert. Remove the middle part of the insert,

disassemble and check for metal chips, foreign corpuscles and contamination.

NOTE **If you detect an increased quantity of metal particles (brass or bronze chips or bearing abrasive), find out the reason and eliminate it.**

- Install the new oil filter. Slightly lubricate the sealing ring of the new filter with engine oil and tighten it up manually by a hand force.

12-20-61 Battery

Charging

NOTE **Observe the instructions supplied by the charger manufacturer.**

- If the charger curve is unknown, it can be assumed that charging will be unregulated, i.e. voltage monitoring via a Voltmeter and manual disconnection at 14.4 V are required.
- The nominal charger current should be 1/10 of the nominal capacity in Ampere
- When charging, connect the battery to the charger before switching on the charger.
- Ensure sufficient ventilation when charging in closed areas.

12-30 Unscheduled Servicing

12-30-31 Air Filter

Cleaning

- Remove safety wire on airbox lock
- Open airbox lock
- Take out air filter
- Clean according K&N instructions (refer to Chapter 01-20).

12-30-41 Nose Gear Shock Absorber

Replacement

Tools needed:	wrench size: 1/2 in

See Figure 1.

- Jack and support the airplane (see Chapter 07).
- Use wrench size ½ in to release both upper and lower self-locking nut (1).
- Remove bolts (2) and distance washers (5).
- Remove the shock absorber.
- Install a new shock absorber in reverse steps.

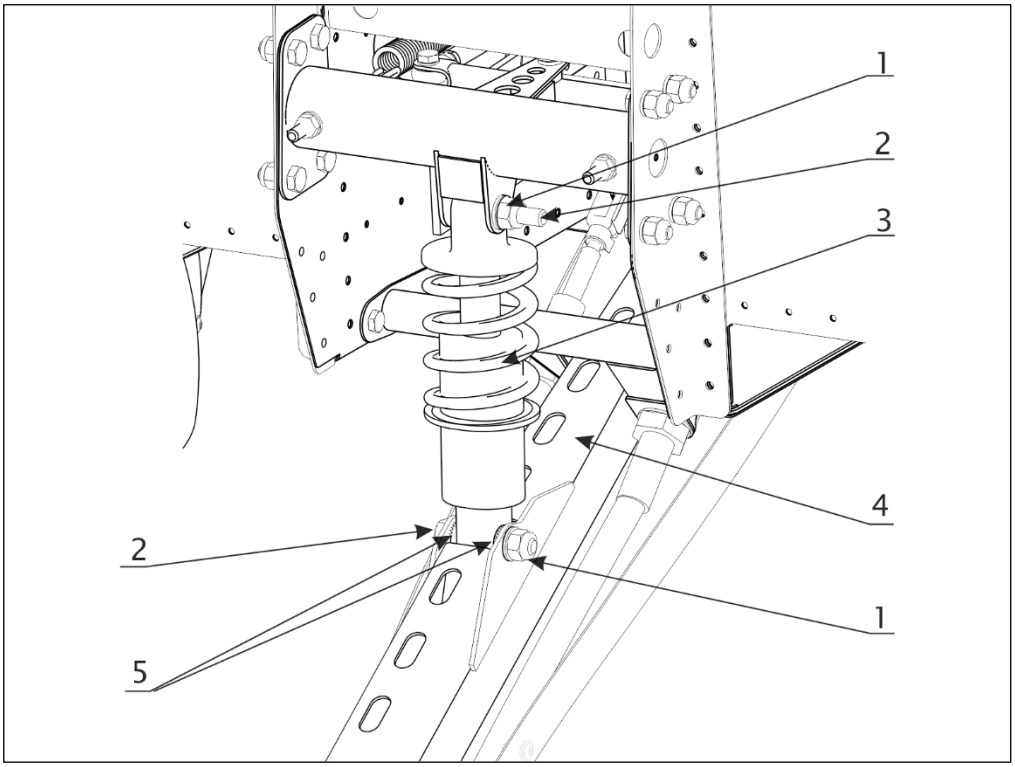


Figure 1 *Nose Gear Shock Absorber Replacement*

Item	Description	Item	Description
1	Nut	2	Bolt
3	Shock absorber	4	Nose leg
5	Distance washers		

12-30-42 Tires

Change

Refer to BERINGER Instructions (see Chapter 01-20).

12-30-43 Brake Pads

Replacement

Tools needed:	Allen wrench size: T40

See Figure 2.

NOTE **Always replace both brake pads!**

- Jack and support the airplane (see Chapter 07).
- Demount the main wheel (see Chapter 32-40-10) if needed.
- Unscrew the bolts holding the brake pads (2) on the brake caliper (3) a remove the brake pads and brake disc.
- Insert new pads, insert the brake disc and screw it down to the caliper (3).
- Re-install main wheel if demounted (see Chapter 32-40-10).
- Check brake function.

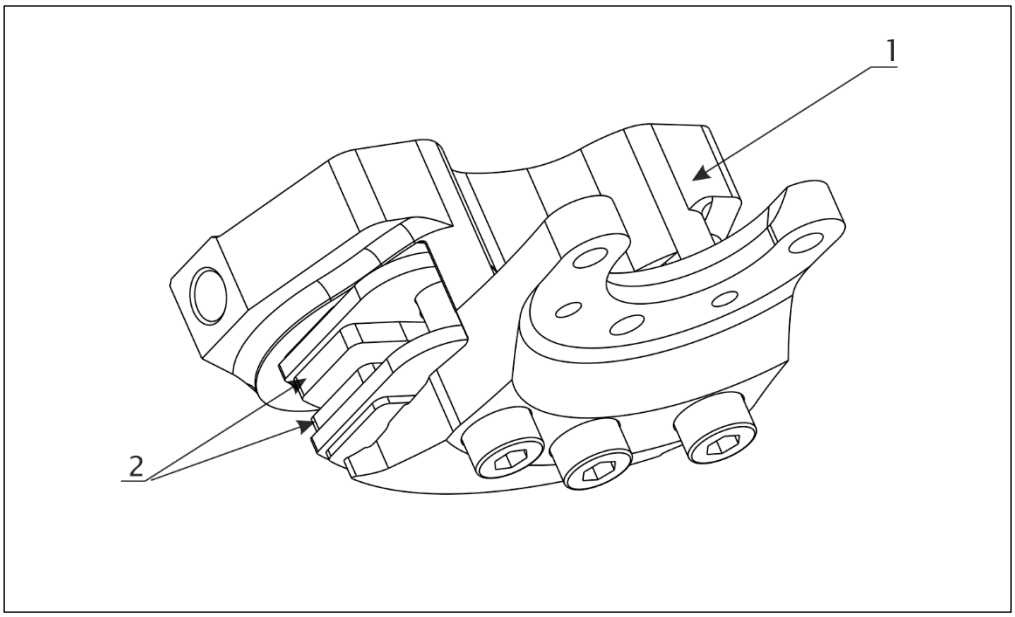


Figure 2 *Brake Pads Replacement*

Item	Description	Item	Description
1	Brake caliper	2	Brake pads

20 Standard Practices – Airframe

Table of Contents

20-10 Bolt Joints

20-10-01 Torque Moments

Unless otherwise prescribed, the torque moments shown in the following table can be used. When tightening follow several rules:

- Unless specifically stated do not grease neither nut nor bolt.
- If possible, always tighten the nut. If for some space reasons it is necessary to tighten the bolt head and the scope of tightening moment is defined. Use higher moment for tightening.
- Maximum moments are used only for the materials and surfaces, which have a sufficient thickness, area and strength resistant to bursting, warping or other damage. Maximum tightening moments must not be exceeded.

Bolt size	Torque limits recommended		Max. allowable torque limits	
	Nm	in lb	Nm	in lb
AN3	2.3 - 2.8	20 - 25	4.5	40
AN4	5.7 - 7.9	50 - 70	11.3	100
AN5	11.3 - 15.8	100 - 140	25.4	225
AN6	18.1 - 21.5	160 - 190	44.1	390
AN7	50.9 - 56.5	450 - 500	94.9	840
AN8	54.2 - 78	480 - 690	124.3	1100
AN9	90.4 - 113	800 - 1000	180.8	1600

Tab. 1 *Recommended Torque Values for Oil-free, Cadmium-plated Threads*

20-10-02 Orientation of Bolts and Cotter Pins

Put the bolts to the joint on the basis of “top-down” rule or “From the front to the back" with regard to the flight direction. This rule decreases possibility of spontaneous bolt falling out of the clamp joint in case that nut unlocking and falling out occurs in the course of operation. Follow the same rule also in case of securing nuts by securing pins or by cotter pins, with the exception of those cases when it is not possible to install the bolt for design or operation limitation reasons.

20-10-03 Securing the Bolt Joints

General

Bolt joint securing is used in order to prevent from their loosening due to vibration or force action on the connected parts, which could result in the damage of the connected parts. Three ways of bolt joint securing are used on the airplane: locking wire, cotter pin and locking washer.

Securing Bolt Joints by Locking Wire

Procedure of bolt joint securing is shown on Fig. 1 and Fig. 2. The zinc-coated or stainless steel wire having diameter of 0.8 mm (0.032in) is used for securing.

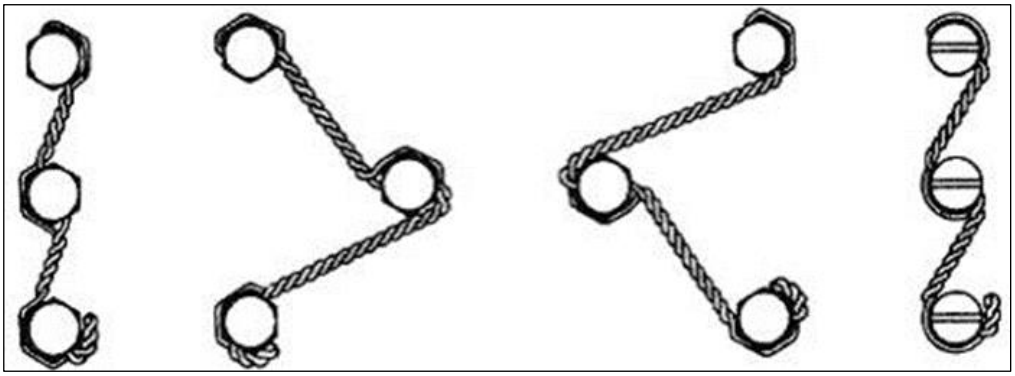


Figure 1 *Ways of Bolt Joint Securing*

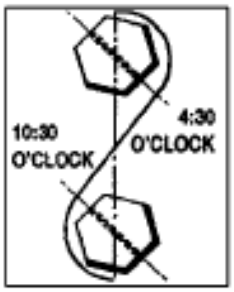
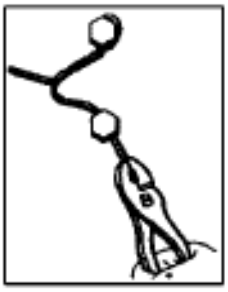
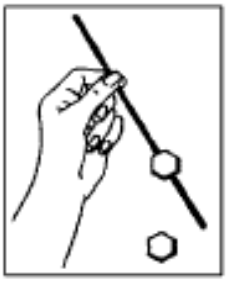
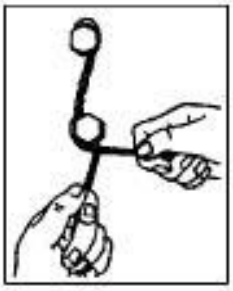
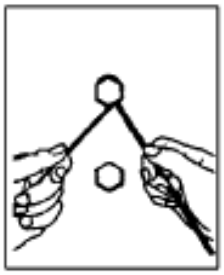
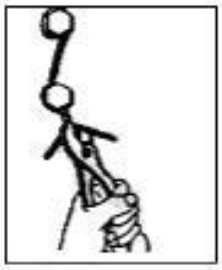
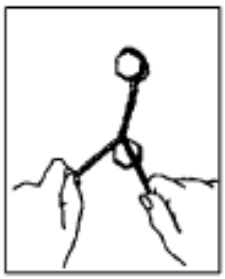
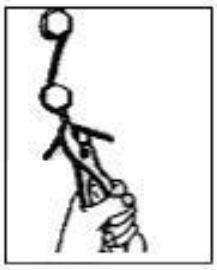
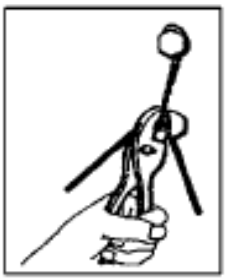
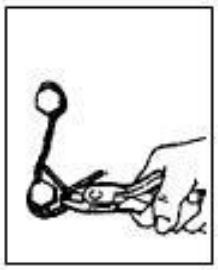
	1. Adjust the correct position of holes for locking wire.		6. Pull the upper wire through the hole in the other bolt. Hold the wire end by pliers tighten it firm.
	2. Pull the locking wire through the hole in one bolt to be secured.		7. Hold the free end of wire by hand, bend it around the bolt head and along with the other end twist it counterclockwise.
	3. Hold the upper end of the wire and wind it around the bolt head and then by the other end of the wire. Make sure that the wire is properly tightened around the head.		8. Hold the twisted end by pliers and twist it tight.
	4. Twist the wire to the hole in the next bolt as tight as possible.		6. Pull the upper wire through the hole in the other bolt. Hold the wire end by pliers tighten it firm.
	5. Tighten the wire and at the same time continue its twisting unless perfectly tightened. The twisted wire can have approximately from 3 to 4 threads on the length of 10 mm (0,4 in).		7. Hold the free end of wire by hand, bend it around the bolt head and along with the other end twist it counterclockwise.

Fig. 2 Procedure for Securing the Bolt Joint with Locking Wire

Securing Bolt Joint by Cotter Pin

Securing by cotter pin is used for independent bolt joints where securing by locking wire could not be used. It is used for securing castle nuts. Cotter pin removal is very easy: by means of a flat screwdriver straighten up the bent ends of the cotter pin and take out the cotter pin of the hole by means of pliers.

NOTICE **When securing joints always use new cotter pins.**

Shift the new cotter into the hole in the bolt and bent the cotter pin ends according to Fig. 3.

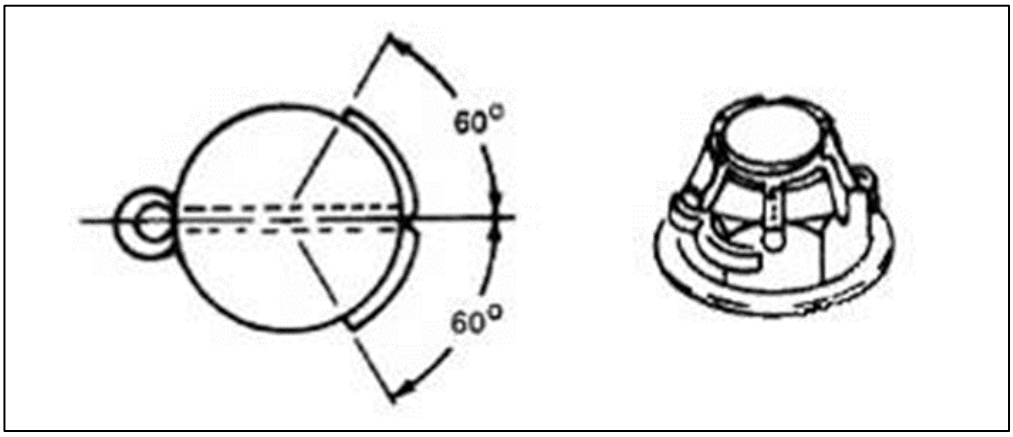


Fig. 3 *Securing the Castle Nut by Using the Cotter Pin*

20-20 Rivet Joints

General

Riveted parts are used in design of BRISTELL B23 airplane for whole fuselage, wings, flaps, ailerons and tail unit.

In the following table there is a survey of rivets that are used on BRISTELL B23 airplane structure.

Type of rivets	Designation	Use
AVEX 01604, 01661, 01691	Aluminum rivet on steel stem	Fuselage, wing, stabilizer, elevator , rudder, flaps, ailerons
MS20426AD	Aluminum rivet with countersunk head	
MS20470AD	Aluminum rivets with dome head	

Tab. 2 Survey of Rivets Used in Airplane Structure

Removal of Rivets

Remove rivets from the side of the rivet, which is more accessible. Drill out the rivet head and drive out the shank.

NOTE **Center-dot heads of solid rivets, which shall be drilled off.**

Use a drill bit of 0.5 mm (0.025 in) smaller diameter than the rivet shank and drill up to the depth of 2/3 of the total depth riveted parts. Remove the drilled heads with a sharp cuter. Drive out the shank with the soft material mandrel of 0.1 mm (0.004 in) smaller diameter than rivet shank. The rivets, which cannot be driven out should be drilled out full depth. When removing rivets be careful that chips and rivets do not fall down to areas were sensitive mechanisms are located, e.g. guides, control bearings etc.

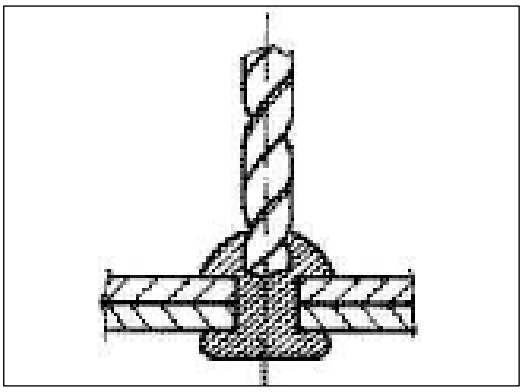


Fig. 4 *Drilling of Rivets (solid rivet shown)*

Riveting

- Fit the parts being connected and drill them together. Hole diameter must be of 0.1 mm (0.004 in) bigger than rivet shank.

NOTICE **When drilling, fix by clamps or clecos mutual position of assembled parts. Holes of higher diameters predrill with a drill bit of smaller diameter and then redrill them to the final size.**

- Disassemble the parts and deburr the holes.

NOTICE **For sunk rivets perform conical countersinking of the rivet head by 5° smaller apex angle (e.g. the head with angle of 100° will have countersinking of 95°±1°). After countersinking, the cylindrical part of hole with min. length of 0.3 mm (0.012 in) must remain in material. Countersinking must be performed in such a way that the rivets head overruns the area before riveting max. by 0.2 mm (0.008 in), the rivet head must not be under the surface level (sunk).**

- Before applying the bonding sealant carefully clean the connected parts of impurities and degrease contact surfaces by appropriate agent, e.g. industrial spirit.

NOTICE **For cleaning and degreasing use a clean paper towel or cloth. After wiping, the towel or cloth must not show any contamination. For perfect degreasing the whole surface, clean always smaller part of surface, after its perfect clean continue on. Cleaning liquid always**

apply on the cloth only and wipe it off from the surface before its evaporating.

- Apply bonding sealant on one of the surfaces, which should be sealed together. Apply the adhesive directly from the packing by means of the extrusion gun, plastic spatula or paintbrush in such a way that the layer of sealant is equally thick and integral, without bubbles or uncovered areas. The optimum thickness of the applied coat is 0.3 mm (0,01 in).

NOTICE **The surfaces that are to be connected must be dry and clean before application of bonding sealant.**

- After applying bonding sealant connect both parts together, fix them by clecos and rivet them.

NOTICE **After proper riveting the continual bur of adhesive is created on the edge of connected surfaces. If this bur is big, it is possible to wipe it off with the plastic spatula and finally with cloth dipped in degreasing agent.**

- After riveting, seal rivet heads, there, where pop rivets are used (see Chapter 51-73-02 *Bonding Rivet Heads, Big Irregularities and Material Transitions)*.

20-30 Nicopress Clamps

Installing Clamps by Nicopress Pliers

Procedure of clamp installation by Nicopress pliers is shown on Fig. 5.

First pull the cable through the clamp, make a loop around the thumb and pull the cable end back through the clamp. The cable end should overlap by about 32 mm (1.25 in) from the clamp after its puling through. The overlapping will ensure that the cable end will not be pulled back into the clamp during the clamp squeezing. Before actual squeezing the clamp it is also necessary to verify which cable terminal will be used, whether thimble or suspension eye, because some terminals must be put into the cable before actual clamp squeezing.

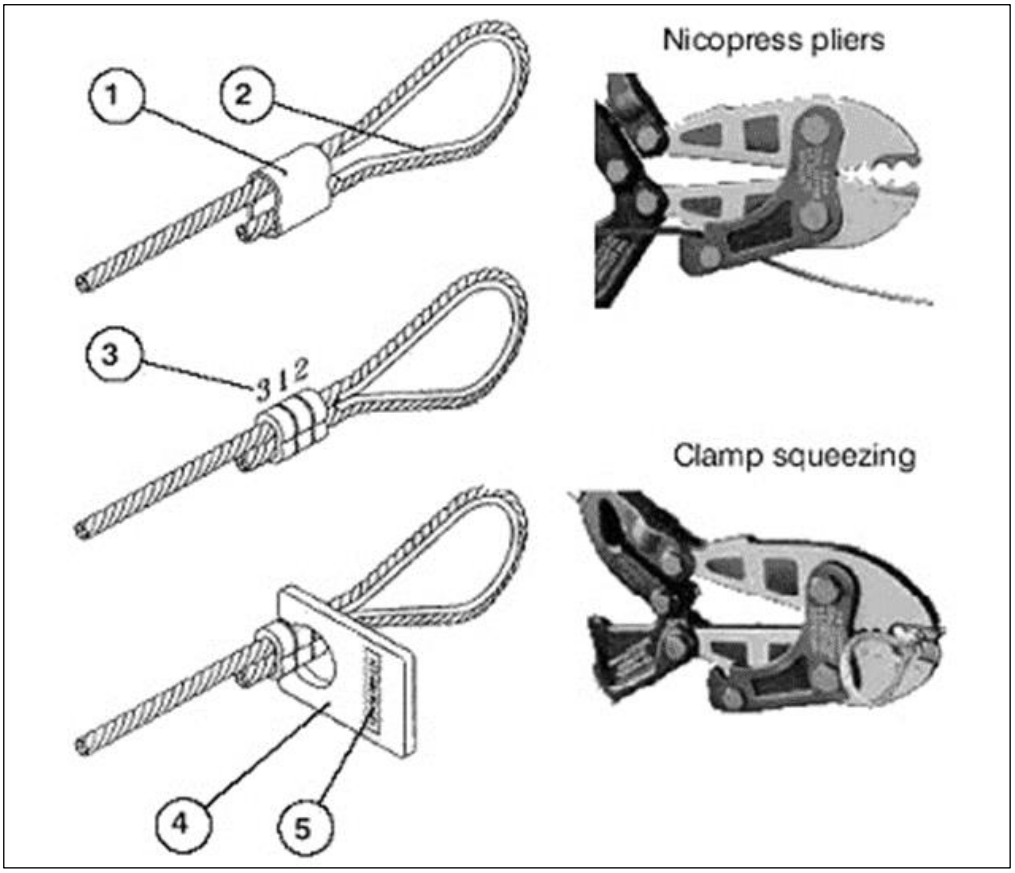


Fig. 5 *Installation of Clamps by Nicopress Pliers*

Item	Description	Item	Description
1	Clamp	2	Eye
3	Sequence of squeezing	4	Inspection gauge
5	Gauge No.		

20-40 Lubrication

At assembling parts grease al joints and friction surfaces (bolts, pins, and threads) after mechanical or chemical cleaning by lubricant grease.

20-50 Adjustments and Tests

20-50-01 Control Surface Deflections

The control surface deflections are shown in the following table:

Aileron	24° ± 2° up
	16° ± 3° down
Rudder	30° ± 2° right
	30° ± 2° left
Elevator	19° ± 1° up
	15° ± 2° down
Wing flap	0° ± 2°
	10° ± 2°
	25° ± 2°
Difference between L/R flap deflections	- 1.2°
Elevator trim tab	15° ± 2° up
	25° ± 2° down
Aileron trim tab	15° ± 2° up
	20° ± 2° down

Table 3 Control Surface Deflections

- Adjust control surface deflections to the values shown in the Table 3. When adjusting the airplane control, neutral position of the control surfaces is taken as the starting point.

NOTE **After adjustment of control surface deflections, ensure push rod terminals overreach the inspection hole in the push rod.**

Adjusting Aileron Deflections

- Adjust range of deflections by means of rod adjustable ends.
- Adjust aileron neutral position by setting the terminal of the push rod in the center wing or outer wing.

It is possible to adjust the aileron differentiation, i.e. difference in the lower and the upper deflection of the aileron, by means of the terminal on the push rod leading from the control lever in the fuselage to the bell crank in the wing or by means of the terminal of the push rod leading from bell crank to the control lever on the aileron. The terminal is accessible on the aileron lower side after lifting the aileron.

Adjusting Wing Flap Deflections

Wing flap deflections are given by the torque tube and actuator positioning in the fuselage. It is possible to adjust flap deflection by means of the terminals on push rods connected flaps with control torque tube. The terminal is accessible on fully deployed flaps.

Adjusting Elevator Deflections

Range of elevator deflections is given by setting the push rod terminals in the fuselage. For adjusting elevator deflections, proceed as follows:

- Remove the chosen push rod from the bell crank.
- Adjust the upper deflection as needed by means of the push rod terminal (or by means of push rod terminal on the elevator lever).
- Put push rod end back and check if the deflections corresponds to the values mentioned in the Table 3.

Adjusting Rudder Deflections

- Carry out correction of rudder deflection setting by adjusting the turnbuckles on the foot pedal side in the cockpit.

Adjusting Trim Tab Deflections

Trim tab deflections are given by control actuator and they are fixed.

20-60 Inspections and Checks

20-60-01 Control Surface Deflections

For measuring deflections use protractor with deflecting pointer that will be attached to an appropriate control surface by means of the clamp.

Measuring Aileron Deflections

- Attach the protractor with the deflecting pointer on the upper skin of the aileron by means of the clamp.
- Set the aileron to neutral position.
- Set the protractor to 0° – starting value for measuring.
- Deflect aileron to the lower (possibly upper) extreme position and read the deflection value.
- Check deflection values according to the Tab. 3.

Measuring Wing Flap Deflections

- Attach the protractor with the deflecting pointer on the upper flap skin by means of the clamp.
- Set the wing flap to the 0°position.
- Set the protractor to 0° – starting value of measuring.
- Extend the flaps by means of the flap actuator to individual positions and read the deflection.
- Check deflection values according to the Tab. 3.

Measuring Elevator Deflections

- Set the protractor with the deflecting pointer on the trailing edge of the elevator by means of the clamps.
- Set the elevator to neutral position.
- Set the protractor to 0° – starting value of measuring.
- Deflect the elevator to extreme positions by means of the control stick and read the deflection.
- Check values of deflections according to the Tab. 3.

Measuring Rudder Deflections

- The airplane manufacturer uses a special jig for measuring rudder deflections that is slid on the vertical tail unit and it is possible directly to read the rudder deflection. If you do not have this special jig, use the alternative procedure:
- Set the rudder to neutral position.
- Put the rod to the trailing edge of the rudder and mark the lower margin of the rudder trailing edge.
- Deflect the rudder to extreme positions and with the rule measure distance from the sign to the lower margin of the rudder trailing edge.
- Calculate angle and compare it with the value mentioned in Tab. 3.

Measuring Trim Tab Deflections

- Set the protractor with the deflecting pointer to the trailing edge of the trim tab by means of the clamp.
- Set the trim tab to neutral position.
- Set the protractor to 0° – starting value of measuring.
- By means of the trim control actuator deflect the trim tab to extreme positions and read the deflection.
- Check values of deflections according to the Tab. 3.

20-60-02 Condition and Tension of Rudder Control Cables

- Carefully inspect the control cable especially on the following areas:

in the area of cable attachment on the rudder control pedals

in the area of cable attachment on rudder lever

in the area of cable inlet on rear fuselage

- ► Check for the following defects on the cable:

burst cable wires

evidence of sleeves deformation and damage on cable surface

evidence of cable corrosion

cable distortion

- ► Check cable tension by cable tensioner

NOTICE **Set cable stress according to the need by adjustable turnbuckles on the side of the rudder pedals.**

Prescribed cable stress:
maximum: 70 lbs (32 kg)
minimum: 50 lbs (23 kg)
cable stress in the operation is: 33 lbs. (15 kg).

- ► Exchange the cable in cases as follows:

broken any wire

wear of cable surface resulted in permanent deformation of cable section.

it is not possible to tension the cable to the prescribed value (see above).

it is not possible to set the rudder to neutral position (see Chapter 20-50-01 *Adjusting Rudder Deflections*)

- ► Check rudder deflections (See Table 3).

20-60-03 Play in Control System

Admissible plays in control are mentioned in the following Table 4:

Control	Admissible plays	Area to measure play
longitudinal	max. 4 mm (*5/32 in*)	at the end of the control stick in longitudinal axis of the airplane
lateral	max. 4 mm (*5/32 in*)	at the end of the control stick in lateral axis of the airplane

directional	max. 5 mm (*3/16 in*)	on pedals in longitudinal axis of the airplane
trim tabs	max. 3 mm (*1/8 in*)	at the end of the trim tab
wing flaps	max. 5 mm (*3/16 in*)	at the end of the wing flap

Table 4 *Admissible Plays in Control System*

- If the measured plays exceed values mentioned in the table then eliminate the cause of it and repeat measuring.

Measuring Procedure

- Measure all plays three times and write down average values.
- Perform measuring with the blocked control surfaces.
- Push on the control stick or the pedal by force of 3 kg (6,6 lbs.).
- Push the controlling element to one side and read the deflection.
- Then push the controlling element to the other side and read the deflection.

The sum of deflections represents the total play in the respective control system.

Longitudinal Control

Measure play at the end of the control stick at the blocked elevator in the neutral position. The total play must not exceed 4 mm (5/32 in) at the top end of the control stick (see Fig. 6).

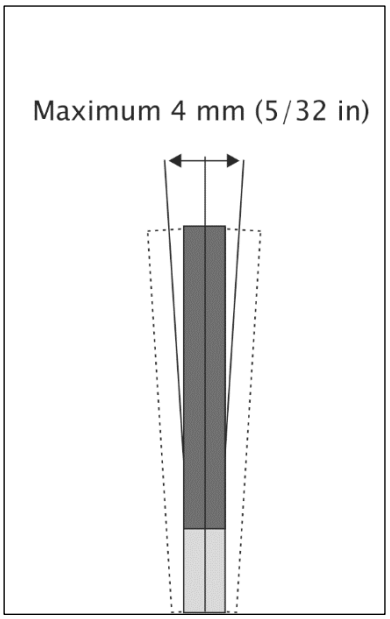


Figure 6 *Control Stick Play*

Lateral Control

Measure total play at the end of the control stick with ailerons blocked in the neutral position. First block the right aileron and measure total play on the control stick, then measure total play at the blocked left aileron. Each total play must not exceed 4 mm (5/32 in) at the top end of the control stick (see Fig. 6).

Plays in Foot Control Pedals

Measure play at the end of pedals with the blocked nose landing gear wheel against lateral slewing. Mutual total play between pedals must not exceed 5 mm (3/16 in) on the pedal end.

Play in Trim Tab Control

Measure play in elevator neutral position. Set the balance tab to neutral position and measure play at the end of the trim tab. Max total play of the trim tab measured at the end of the trailing edge must not exceed 3 mm (1/8 in).

Play in Wing Flap Control

Measure play in individual position of wing flaps (0°, 10°, and 25°). Set the flap actuator to individual positions. Measure play in wing flap

control on the wing flap trailing edge. Max play of the wing flap measured on the trailing edge must not exceed 5 mm (3/16 in).

20-60-04 Friction in Control System

Control system must function smoothly within the whole scope of deflections. There must not be excessive friction or hitching in the control system. Always measure in two opposite directions and note the higher value.

- In case of failure detection, find out the cause and eliminate the defect.

Friction in the Longitudinal Control System

Prior to friction measurement the elevator down spring must be deactivated.

Refer to Figure 7.

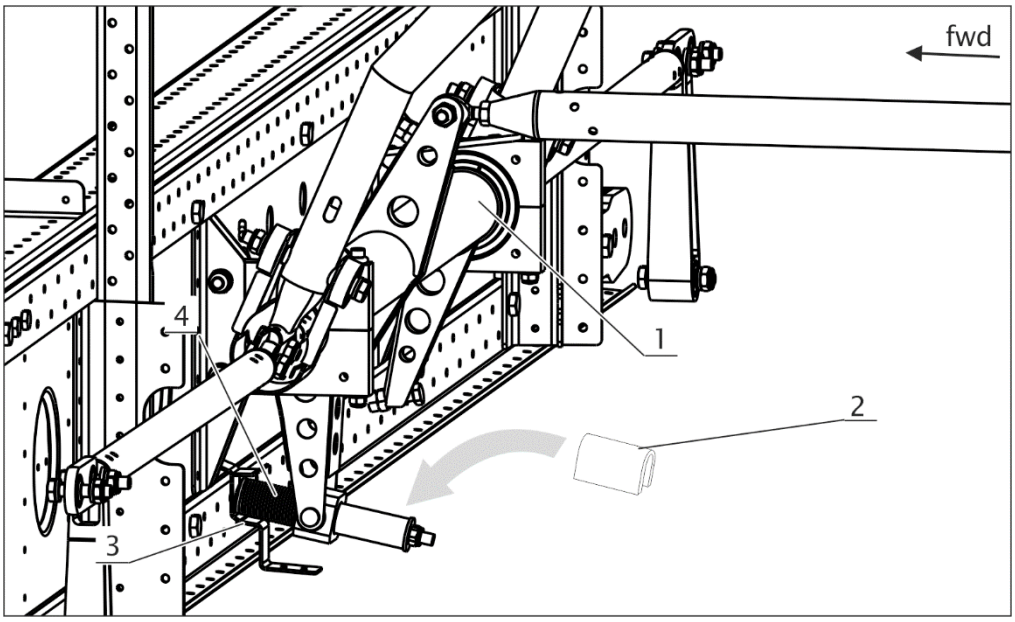


Figure 7 *Elevator Down Spring*

Item	Description	Item	Description
1	Torque tube	2	Spacer
3	Bracket	4	Elevator down spring

- Pull control stick fully aft and hold.
- Place a spacer (2) as shown in Figure 7 to fix elevator down spring (4) in compressed position.

- Place control stick in neutral position. The down spring is thus released from the bracket (3).
- Measure force by a dynamometer attached on the end of the control stick. Maximum force limit is 0.1 kg (0.2 lbs.).
- After measurement place compressed elevator down spring (4) in bracket (3) as shown in Figure 7.
- Pull control stick aft and hold and remove spacer (2).
- Carefully release control stick to neutral position.
- Check function of elevator control.

Friction in Lateral Control System

- Set ailerons to neutral position.
- Measure force at the moment of aileron deflection from neutral position by the dynamometer attached on the end of the control stick. Maximum force limit is 0.1 kg (0.2 lbs.).

Friction in Directional Control System

- Raise nose wheel over the ground by pushing down the aircraft tail and hold.
- Set rudder by hand to maximum deflection.
- Release rudder.
- Rudder shall move to neutral position (tolerance ±5°).
- Repeat procedure in opposite direction.
- Release nose wheel to ground.

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21 Air Conditioning

Table of Contents

21-00 General

21-20 Distribution

Cockpit ventilation is ensured by two eyeball air vents located in the cockpit on side panels of the instrument panel (see 2, Fig. 1). Air inlets – Naca scoops (1) are located on both fuselage sides in front of the canopy. There is a composite part connected to the Naca scoop from inside the cockpit and a flexible hose is used to connect the air vent with the composite part.

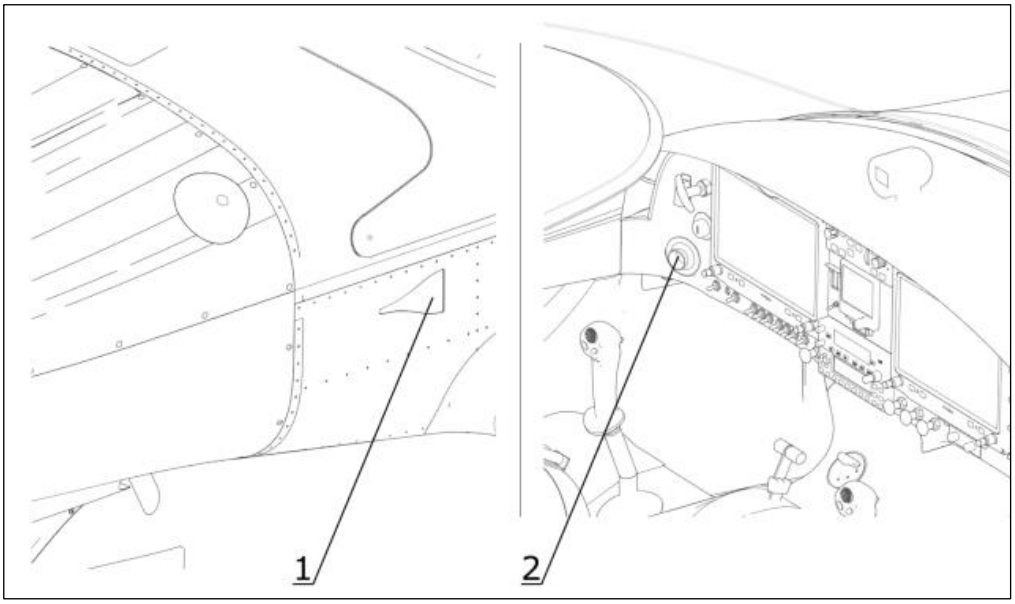

Fig. 1 *Venting System*

Item	Description	Item	Description
1	Naca scoop	2	Eye ball vent

21-20-01 Eye Ball Vent

Removal

see Fig. 2.

- Remove glare shield (1) from the instrument panel.
- Remove hose (2) from the vent (3).
- Unscrew securing nut (4) from the vent (3).
- Remove the vent (3) from the instrument panel (5).

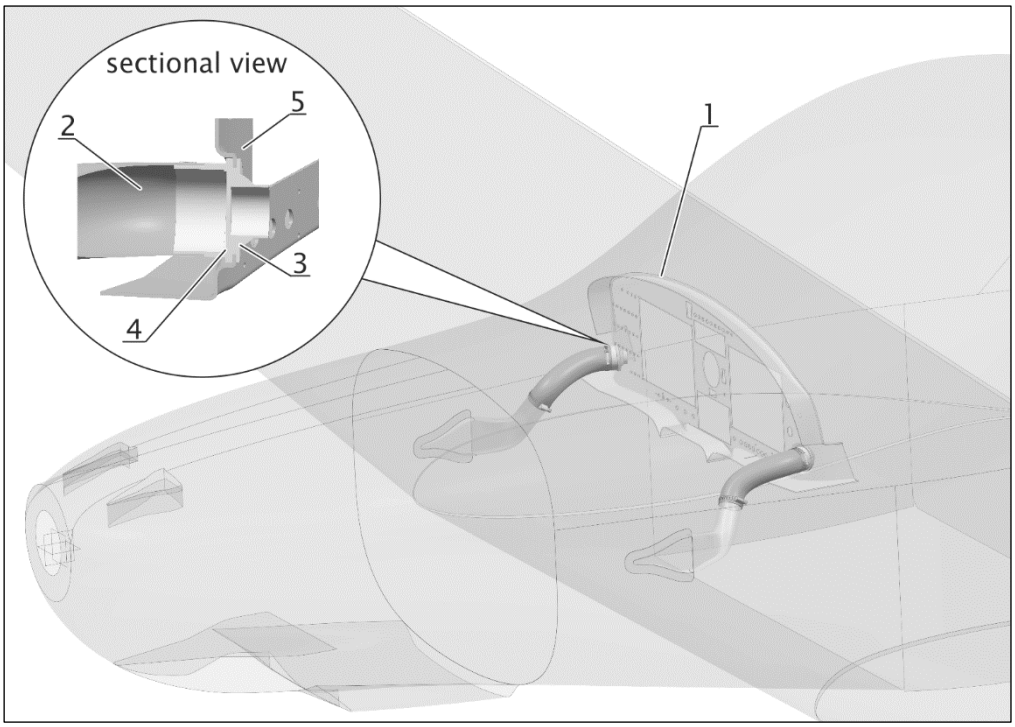

Fig. 2 *Removal / Installation of the Vents*

Item	Description	Item	Description
1	Glare shield	2	Hose
3	Vent	4	Securing nut
5	Instrument panel		

Installation

see Fig. 2.

- Insert the vent (3) into the instrument panel (5).
- Screw securing nut (4) on the vent (3).
- Plug the hose (2) into the vent (3)
- Install glareshield (1).

21-40 Heating

Cockpit heating is ensured by hot air from the heat exchanger (see Fig. 3). The heat exchanger (4) is located on the muffler (5). Ambient inlet air (3) taken by the muffler is heated in the heat exchanger and supplied through heating flap (3) located on the firewall into the cockpit by air hose (2). Quantity of hot air is regulated by HEATING knob (10) on the instrument panel. Behind the firewall a mixture flap

(7) is located, which splits hot air flow into the canopy bubble outlet (1) and into the crew legs outlet (8). The mixture flap is controlled by the MIXTURE knob (9).

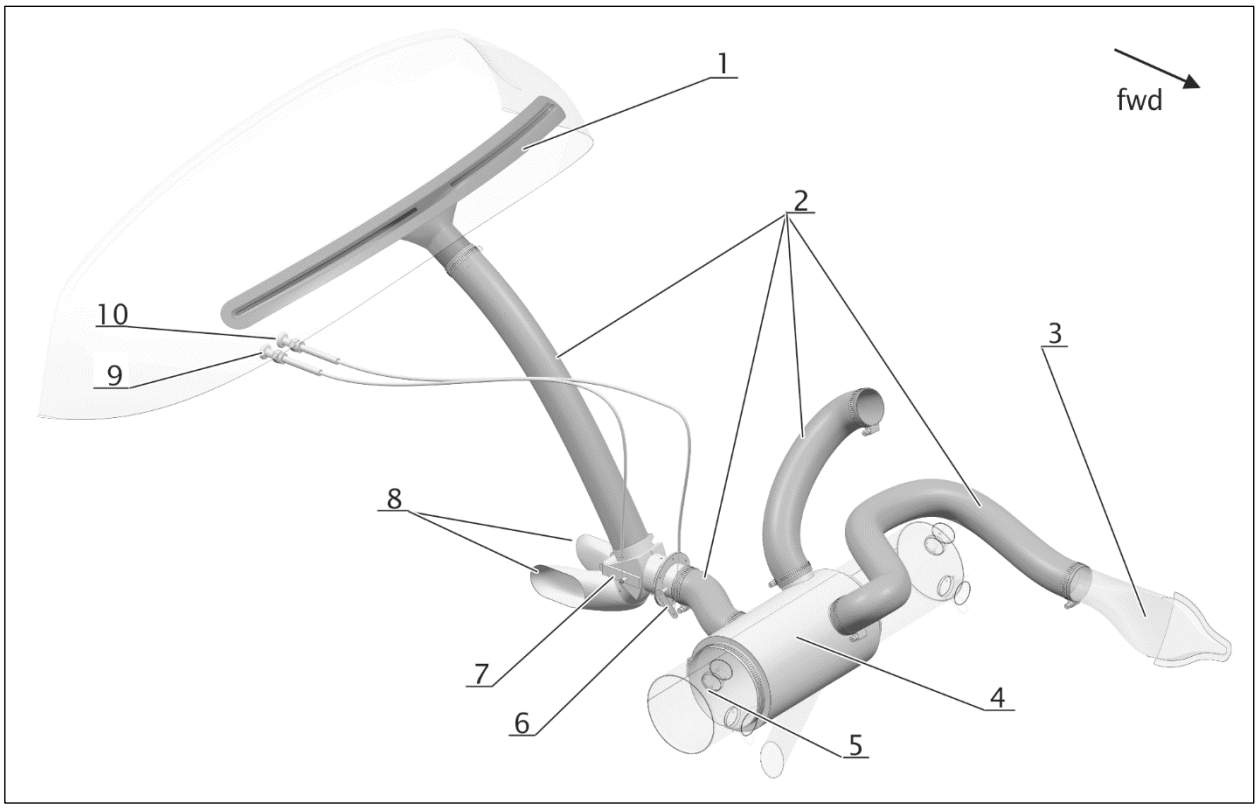

Fig. 3 Heating System

Item	Description	Item	Description
1	Canopy bubble outlet	2	Air hose
3	Air inlet	4	Heat exchanger
5	Muffler	6	Heating flap
7	Mixture flap	8	Crew legs outlet
9	Mixture knob	10	Heating knob

21-40-01 Control Knobs

Removal

Tools needed:	wrench size ½ in, 9/16 in pliers, cutting pliers

See Fig. 4

- ► Disconnect the control cable on the heating flap lever (6, Fig. 3) and mixture flap lever (7, Fig. 3).
- ► Remove the nuts (1) thus releasing the flexible housing (3) with the control knob (2).
- ► Remove the control knob with cable from the flexible housing (3).

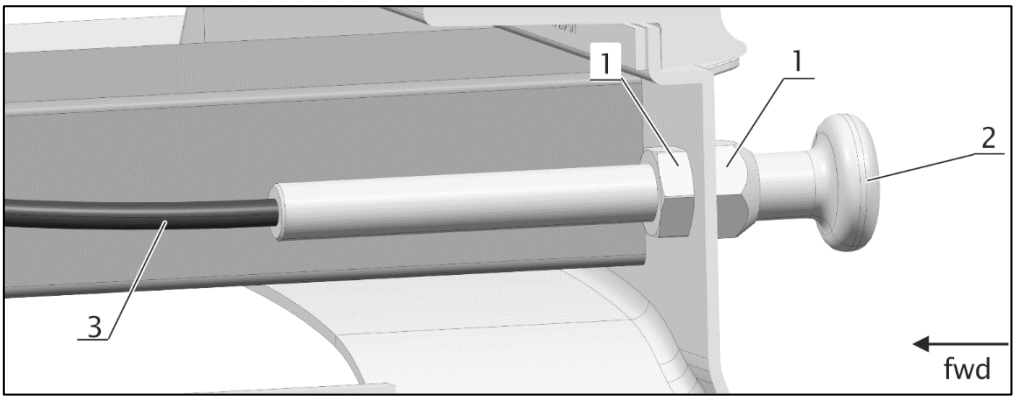

Fig. 4 *Control Knob – typical*

Item	Description	Item	Description
1	Nut	2	Control knob
3	Bowden cable		

Installation

Tools needed:	wrench size 14, 9/16 in pliers, cutting pliers

See Fig. 4.

- ► Insert the control knob (2) into the flexible housing and fasten it from both sides of the instrument panel by means of nuts (1).
- ► Connect the control cable with flap control levers (6 and 7, Fig. 3).
- ► Adjust fresh air, hot air and mixture control (see next paragraph).

Adjustment

- ► Adjust the control by the conventional adjustment bolt at the flap side of the Bowden cable.

- After adjustment of the control, mark the mutual position of the Bowden cable terminal and the flap controller with red color.

23 Communication

Table of Contents

23-00 General

The communication system consists of:

- Transponder
- Radio communication
- Intercom
- ELT

Additionally, the powered headsets plugs of the Bose system are installed:

- Bose headset power supply

Maintenance for these parts are “on condition”, for detailed maintenance instructions refer to the respective manufacturer manuals (see Chapter 01-20).

For Bose headset power refer to wiring diagrams (Chapter 91)

24 Electrical Power

Table of Contents

24-00 General

The airplane is equipped with 14V DC electrical installations with grounded negative pole. The primary DC electrical sources are an AC alternator in combination with an external electronics full-wave rectifier regulator and an auxiliary generator. The secondary source of electrical energy is the 12V battery, which is located on the firewall. It is used for starting the engine and in the case of generator failure as a back-up source of electric energy. An additional backup battery supplies the ADAHRS, PFD and EIS, the glare shield and flap position lights.

DC voltage is distributed to the individual systems by means of the main bus bar. Systems are protected by circuit breakers which are permanently ON and switches-circuit breakers which may be turned to ON as needed. If one of the circuits is overloaded, then the circuit breaker disconnects the circuit.

After switching the MASTER SWITCH ON and by turning the ignition key to the position START the starter is activated. The starter is supplied from the battery before starting the engine. After starting up the engine and reaching the idle RPM, the generator starts supplying current to the electrical network.

Information about voltage in the main bus bar is indicated by low voltage red light on the instrument panel.

24-30 DC Generation

24-30-01 Generator

The generator is a part of the engine which supplies electric current through the rectifier. Regulator supplies electric current of 14V voltage to onboard network.

Technical parameters of generator:

Maximum output power:	12V/20A at 5000 rpm

Technical parameters of rectifier – regulator:

Type:	electronic
Output voltage:	14 ± 0.3 V (from 1000 ± 250 rpm)
Range of operation temperatures:	min. – 25° C (–13 °F) max. +90° C (+194 °F)
Weight:	0.3 kg (0.66 lbs.)

24-30-02 Auxiliary Generator

The auxiliary generator is mounted to the LHS of the engine and supplies electric current through the rectifier. Regulator supplies electric current of 14V voltage to onboard network.

Technical parameters of generator:

Maximum output power:	14V/30A DC

Technical parameters of rectifier – regulator:

Same as above

24-30-03 Battery

There is installed VARTA YTX20L-4 battery in a steel box on the firewall, inside engine compartment.

- Dry charged battery delivered in Freshpack version (with acid pack)
- Maintenance free – no topping up necessary

- Fulfils JIS standard
- Spill and leak-proof at angles up to 45°
- Features Absorbent Glass Mat (AGM) technology, enabling the battery to be repeatedly charged and discharged without affecting performance

Removal

Tools needed:	screwdriver wrench size according to installed battery connectors wrench size 8

- ► Remove engine cowlings
- ► Disconnect the contacts from the battery.
- ► Disconnect the draw band of the battery and remove the battery from the airplane.

Installation

Tools needed:	screwdriver wrench size according to installed battery connectors wrench size 8 size 8

- ► Install the battery into the metal box on the firewall.
- ► Fasten it with draw band so that the battery cannot move in the bracket.
- ► Grease the battery contacts with lubricating grease and install the clamps on them from the onboard electrical network.
- ► Install the engine cowlings.

24-30-04 External Power

Description

NOTE

The functionality of the external power is limited to supply the engine starter motor and the indication light. The external power cannot be used for re-charging.

The external power plug is located on the lower side of the firewall on the engine side left of the nose landing gear. It is accessible through the large air-dump opening of the lower cowling.

The voltage supplied to the external power must be in the range of 12 to 14Volt for correct operation. Incorrect polarity of the external power supply is protected by a control diode.

The continuous current capacity of the external power plug is 50 Amps which is usually exceeded during engine start attempts. Therefore, even with unlimited electric supply the time of start attempts must be in accordance with the AFM.

Procedure

The procedure can be performed by a single person or with an additional helping person connecting and disconnecting external power.

In case of a helping person the external power connection and disconnection is only possible with the outside person temporarily out of sight from pilot station. If an outside person is used a clear coordination before the operation between the pilot and the outside help is mandatory. The outside person is advised to always keep one hand on the left wing leading edge as visible sign to the pilot of a save position.

⚠ DANGER **Death or serious injury possible due to propeller strike.**

- **Never start the engine if a person is next to the propeller working area.**
- **Never connect or disconnect external power when the engine is running.**
- **One hand of a helping person must always have contact to the left wing leading edge when connecting or disconnecting external power.**
- Connect external power to the external power plug.

NOTICE **Starter overheating possible due to start attempts.**

- **Activate the starter for a maximum of 10 sec., followed by 2 min. pause for starter, starter circuit and external power connection cooling.**
- Start engine.
- Run engine as long as necessary to allow a restart without external power.
- Shut-down engine.
- Disconnect external power.
- Restart engine without external power.

24-60 DC Electrical Load Distribution

24-60-01 Switches and Circuit Breakers

The switches serve for switching ON/OFF individual electrical circuits. There are two kinds of switches:

Switches-Circuit Breakers

- switching ON/OFF and protecting the electrical circuit from overloading together

Switches

- the classical for avionics circuit (no circuit breakers)
- the turn knob for flaps
- the buttons for trims

Every switch is marked with a placard with designation of the circuit (see following Table). The switches are located on the instrument panel and on the middle channel. The buttons for ailerons and elevator trim are on the grip of control stick. Wiring diagrams are shown in Chapter 91.

Switches		Switch-Breaker
Designation	**Description**	
MASTER	Main switch	-
ALT-1	Alternator 1 (internal alternator)	-
ALT-2	Alternator 2 (external alternator)	-
AVIONICS	G3X system, NAV/COM, Transpoder, intercom	x
EFIS-L3	ESI-500	x
PITOT H.	Pitot heat	x
STROBE	Strobe light	x
NAV-L	Navigation/position lights	x
LDG | WIGWAG	Landing light and wigwag light	-
FUEL PUMP	Electric fuel pump switch	x
DAY/NIGHT	Preset for LED brightness	-
BCK-BAT	Backup Battery for G3X system	-
Dimmer	Rotating knob dimming int. light	-

24-60-02 Fuses

Fuses serve for protecting individual electrical circuits from overloading. Every fuse is marked by the placard with a fuse designation (see following Table). Fuses are located on the right instrument panel. Wiring diagrams are shown in CHAPTER 91 – WIRING DIAGRAMS.

Switches		
Designation	**Description**	**Rating**
ALT-1	Alternator 1 (internal alternator)	25
ALT-1 CTRL	ALT-1 Overvoltage Protection	5
BCK-BAT	Backup Battery	5
BUS TIE	Connecting ALT-1 and ALT-2	20
ALT-2	Alternator 2 (external alternator)	30
ALT-2 CTRL	ALT-2 Overvoltage Protection	5
START	Starter	5
BATTERY	Battery	30
PFD	Left hand side G3X screen	5
TRIM	Trim system	2
LDG	Landing Light	5
FLAPS	Flap motor and control	5
ADAHRS	G3X system component	2
NAV	NAV module	5
COM	Radio module	10
USB-1	USB plug (PED power)	3
EIS	Engine data module part of G3X	2
DIMMER	Dimmer	2
IC	Intercom	1
AP	Autopilot control interface	2
AP SERVO	Autopilot servos	5
MFD	Right hand side G3X screen	5
GPS	GPS modul of G3X	3
XPDR	Transponder	3
USB-2	USB plug (PED power)	3
HEADSET	Headset power supply (Bose)	1

25 Equipment/Furnishings

Table of Contents

25-00 General

The Bristell B23 airplane features a two-seat cockpit with the side-by-side seat arrangement. The seats are adjustable and are equipped with safety harnesses. The luggage compartment is located behind the seats.

25-10 Flight Compartment

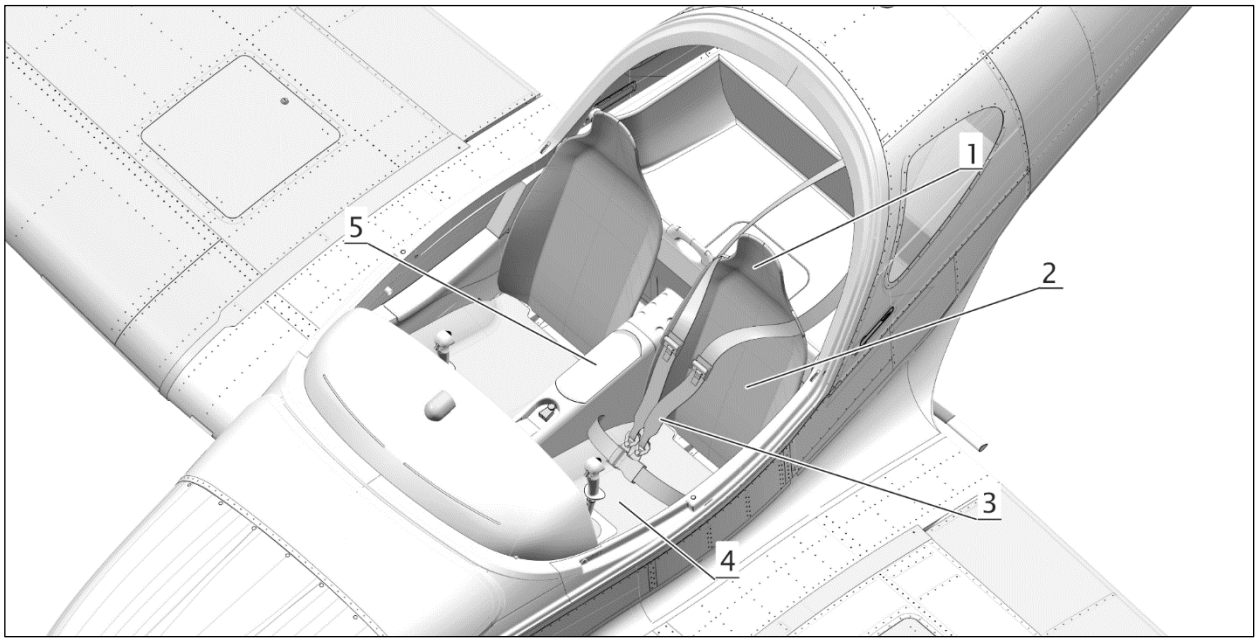

Figure 1 Seats and Safety Harness

Item	Description	Item	Description
1	Integrated head rest	2	Seat back
3	Safety harness	4	Seat
5	Arm rest with a box		

25-10-01 Seats

Seats (4) of the BRISTELL B23 airplane are attached to the gear channel on Velcro and are equipped with an upholstered cushions. The seat backs (2) are attached by means of hook and loop fasteners (Velcro) to the bulkhead No.5. For adjusting of seats and seat backs cushions, which can be inserted behind backrest and under seats are used.

Servicing

Cleaning Seat Covers and Upholstery

- Take upholstered seats and seat backs out of the airplane.
- Brush impurities, possibly clean with warm water with addition of a suitable detergent.
- Before reinstalling upholstered seats in the airplane, let it thoroughly dry.

25-10-02 Safety Harness

Seats are equipped with safety harnesses (Fig. 1). Safety harnesses consist of two lap straps, two shoulder straps and a safety harness lock. Length of the lap straps and the shoulder straps is adjustable.

Removal

Tools needed:	wrench size: 17

See Figure 2.

- Remove shoulder harnesses from the top attachment brackets (1) in luggage compartment. Remove the nut with distance washer and the bolt (2).
- Remove the side harnesses from the side attachment brackets (3) Remove the nut with distance washer and the bolt (2).

Installation

Tools needed:	wrench size: 17

See Figure 2.

- Install the side harnesses. Install the bolt (2) and the nut with distance washer to the side attachment brackets (3).
- Install the shoulder harnesses. Install the bolt (2) and the nut with distance washer to the top attachment bracket (1) in luggage compartment and screw the nut.

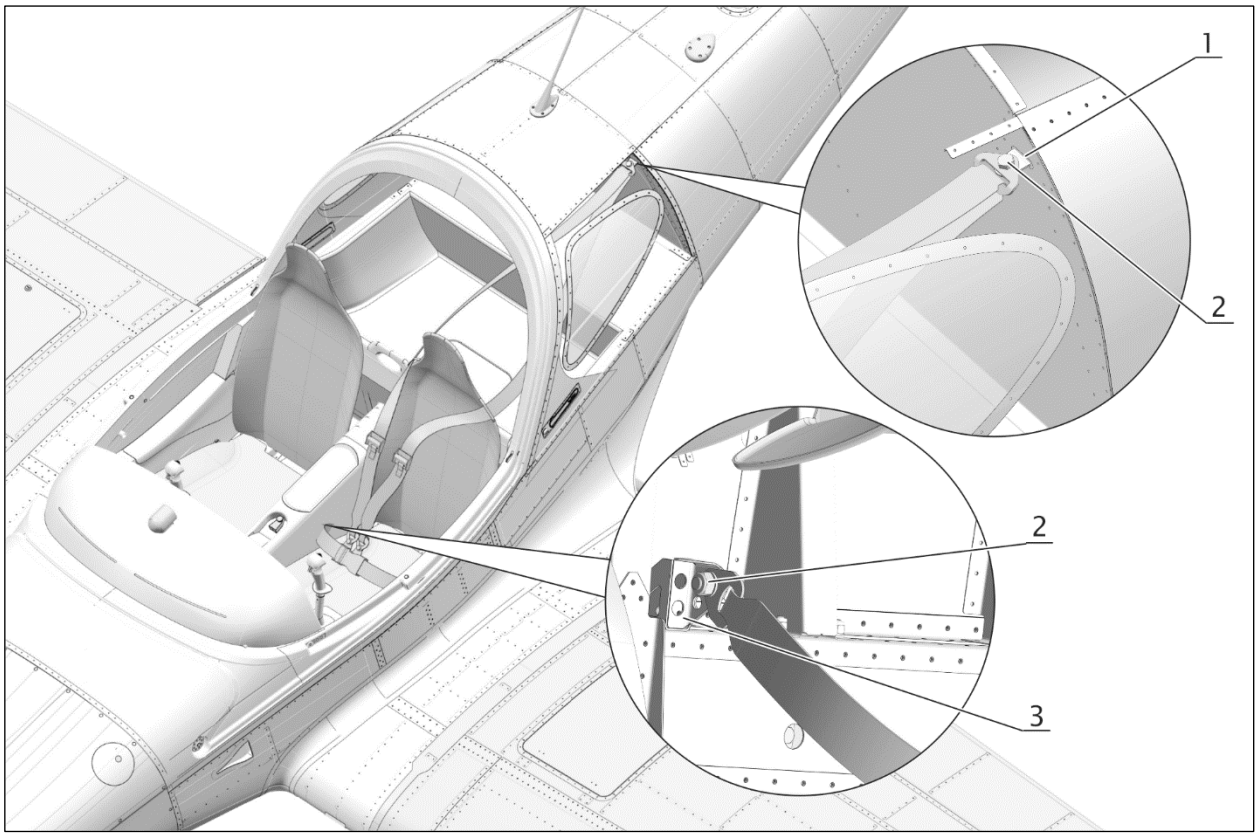

Figure 2 Safety Harness Removal/Installation

Item	Description	Item	Description
1	Top attachment bracket	2	Bolt
3	Side attachment bracket		

Check

- Check harnesses surface for any damages.
- Check the lock system function.
- Check the attachment points of shoulder and side harnesses for any damages or corrosion.

27 Flight Controls

Table of Contents

27-00 General

The airplane is equipped with dual controls. Airplane control includes:

- lateral control (aileron & trim tab control)
- directional control (rudder control)
- longitudinal control (elevator & trim tab control)
- wing flap control

27-00-01 Push-pull Rods

Adjustment

Tools needed:	wrench size: 7/16 in

► Set the push rods to the prescribed length before assembling, tighten the nuts slightly, and do not secure them for the time being. (Final tightening and securing is done after setting of neutral position)

It is necessary to keep the following principles:

- Thread must overlap the inspection hole in the push rod end
- Thread in rod end of all push rods must be uniformly screwed for setting the neutral position.
- Final tightening and securing after setting of neutral position

► Grease bearings with lubricant grease before installing the push rods into airplane unless otherwise stated by the bearing manufacturer.
► Do not grease nor rinse the bearings with permanent filing that are covered by metal or plastic covers.
► Do not rinse bearings and articulated joints with technical gasoline.
► Mechanically remove contaminated lubricant grease carefully and refill the clean one.

27-00-02 Control Sticks

Removal

Tools needed:	wrench size: 7/16 in, 3/8 in wire nippers

Refer to Figure 1.

- Disconnect electric wire (2) for trim tab switches and PTT.
- Disconnect elevator control rod (5) from torque tube (10).
- Disconnect aileron control rods (3) from control sticks (1).
- Disconnect connection rod (9) from control stick(s).
- Remove the control stick(s) from the torque tube by removing the control stick bearing bolts (6).

Installation

Tools needed:	wrench size: 7/16 in, 3/8 in pliers

Refer to Figure 1.

- Install the control stick(s) to the torque tube by installing the control stick bearing bolts (6).
- Connect connection rod (9) to control stick(s).
- Connect aileron control rods (5) to control sticks (1).
- Connect elevator control rod (7) to torque tube (10).
- Connect electric wire (2) for trim tab switches and PTT.
- Check aileron deflections (see Chapter 20-50-01) and check plays in control (see Chapter 20-60-03).
- Check elevator deflections (see Chapter 20-50-01) and check plays in control (see Chapter 20-60-03).

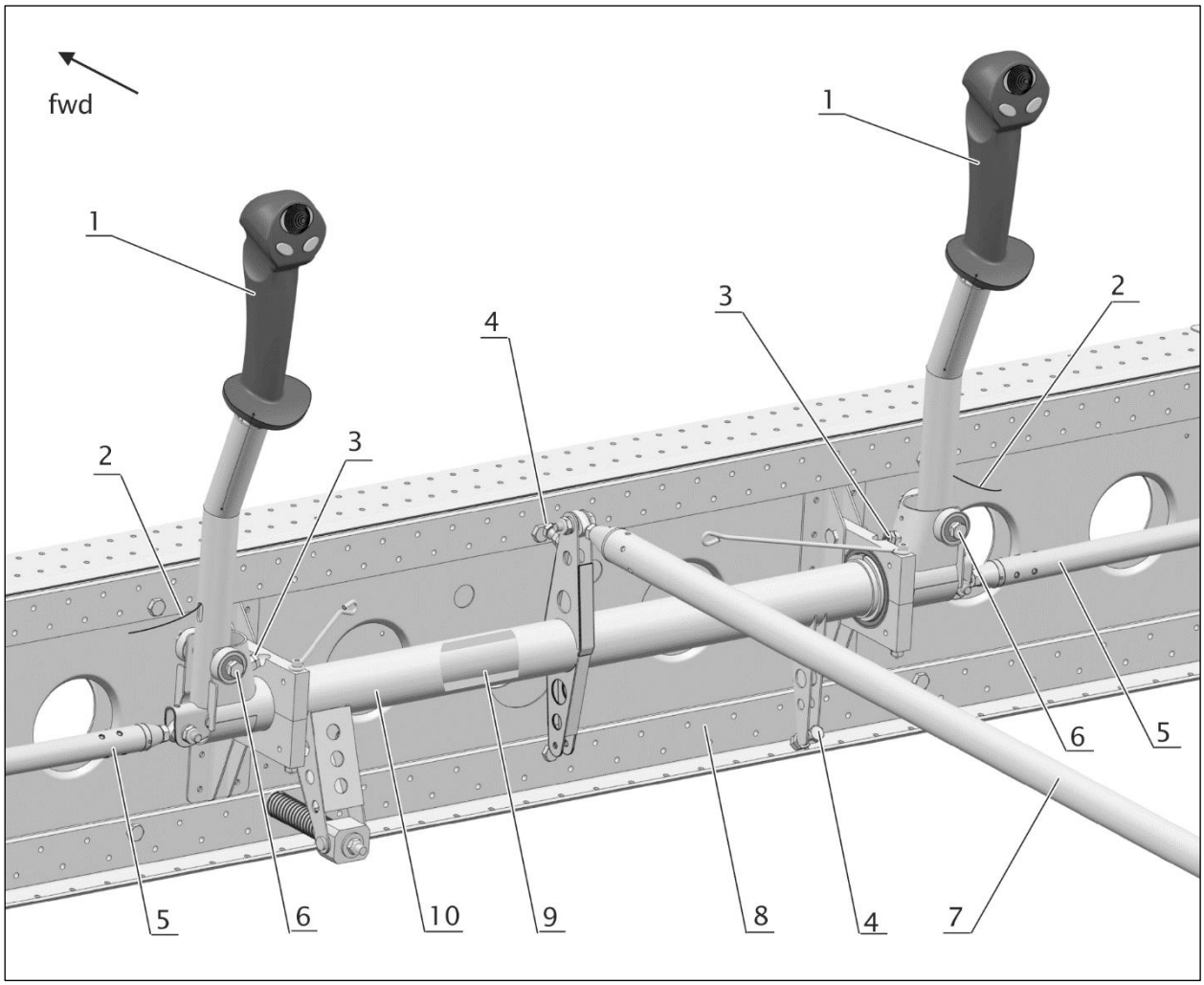

Figure 1 Control Sticks and Torque Tube

Item	Description	Item	Description
1	Control stick	2	Electric wire
3	Aileron travel stops	4	Elevator control stops
5	Aileron control rods	6	Control stick bearing bolts
7	Elevator control rod	8	Main center wing spar
9	Connection rod	10	Torque tube

27-00-03 Trim Tab Control Actuator

The trim tab control actuator is located in the elevator and the left aileron.

Removal

Tools needed:	wrench size: 5 screwdriver wire nippers, pliers

- Place trim tab to neutral position.
- Remove the cover (2) from the access hole (3).
- Disconnect the trim tab actuator wires (1).
- Disconnect the actuator rod end (4) from the trim tab lever (5).
- Disconnect the actuator (6) from elevator or aileron reinforcement angle by removing the attachment nuts.
- Remove the actuator (6) from the elevator or aileron through access hole (3).

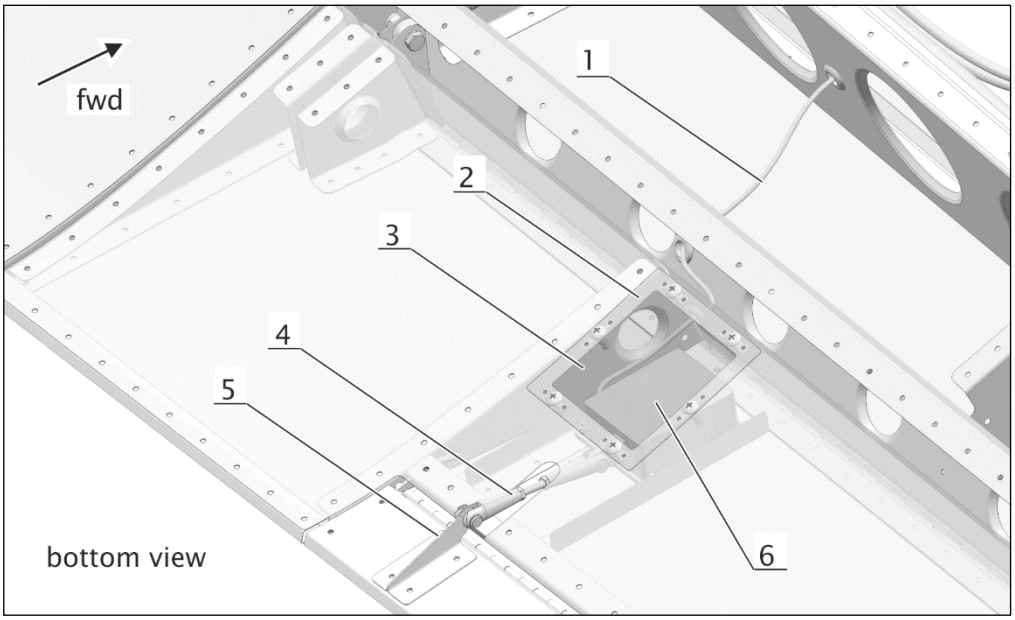

Figure 2 *Trim Tab Control Actuator Removal/Installation*

Item	Description	Item	Description
1	Trim tab actuator wires	2	Cover
3	Access hole	4	Actuator rod end
5	Trim tab lever	6	Trim tab actuator

Installation

Tools needed:	wrench size: 5 screwdriver pliers

- Insert trim tab actuator (6) in to the elevator or aileron through access hole (3).
- Connect the actuator (6) to the elevator or aileron reinforcement angle.
- Connect the rod end (4) with the trim tab lever (5).
- Connect the actuator wires (1).
- Check correct trim tab operation and adjustment of trim tab deflections (see Chapter 20-50-01).
- Close the access hole with cover (3).

27-10 Aileron Control

Ailerons are actuated with 2 control sticks located between the pilot's and co-pilot's legs. Movement of the control sticks is synchronized via pushrod lead between them inside of the elevator control torque tube. Two pushrods installed behind the main wing spar lead from control sticks to the control levers - installed on the main centre wing spar. Deflection from the control lever is transferred by means of the pushrods to the bell crank installed on the main wing spar next to rib No. 7 in the outer wing. A pushrod connects bell crank with aileron control lever. The pushrods have adjustable rod-ends with spherical bearings at the ends enabling aileron deflection adjustment.

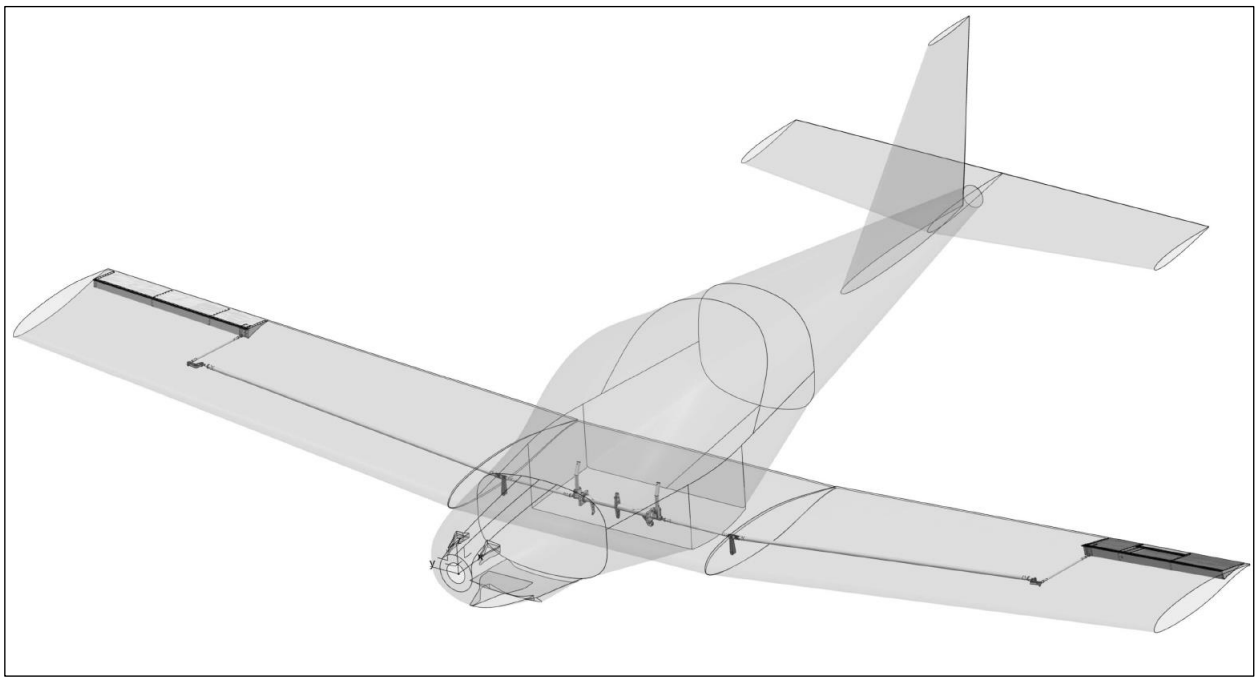

Figure 3 Aileron Control System

Lateral control stops are located on the torque tube in the cockpit. A control stop consist of a headless screw, which is screwed down to a welded nut in the control stick bracket and fixed with a counter nut.

The aileron trim tab is installed on the left aileron. It is controlled by the actuator located inside of the left aileron. The trim tab and the actuator are connected via rod (see also Chapter 27-00-03). Control switches are integrated part of grip on the control stick.

27-10-01 Aileron

Removal

Tools needed:	wrench size: 7/16 in cutting pliers

- Disconnect the control rod with control lever.
- Remove the cover (2) from the hole (3) for access to trim tab actuator (6) on left aileron (see Fig. 2).
- Disconnect (on left aileron) trim tab actuator wires (1) (Fig. 2).
- Remove piano hinge pin.
- Remove the aileron from the wing.
- Store the removed aileron on a safe place so that it cannot be damaged.

Installation

Tools needed:	wrench size: 7/16 in pliers

- Set the aileron on the wing in to the piano hinge.
- Insert trim tab actuator wires (3) (see Fig. 2) going out from wing to the aileron.
- Insert piano hinge pin.
- Connect the control rod with aileron control lever.
- Connect trim tab actuator wires (1) on the left aileron (see Fig. 2).
- Close the access hole (3) with cover (2).
- Perform check of the trim tab operation (see Chapter 20-60-01), check aileron deflection (see Chapter 20-50-01), adjust if needed.

27-10-02 Aileron Control Lever

The aileron control lever is installed behind the main center wing spar.

Removal

Tools needed:	wrench size: 7/16 in

See Figure 4.

- Remove access hole cover on bottom skin.
- Disconnect both push rods (1) from the control lever (2) by unscrewing the bolts.
- Remove the cotter pin – unscrew the nut (3).
- Remove bolt
- Remove control lever

Installation

Tools needed:	wrench size: 7/16 in

See Figure 4

- Insert the control lever (2) in bracket.
- Insert bolt
- Tighten castle nut by hand on bolt and secure with cotter pin (3).
- Connect control push rods (1) with control lever.
- Close access hole cover.

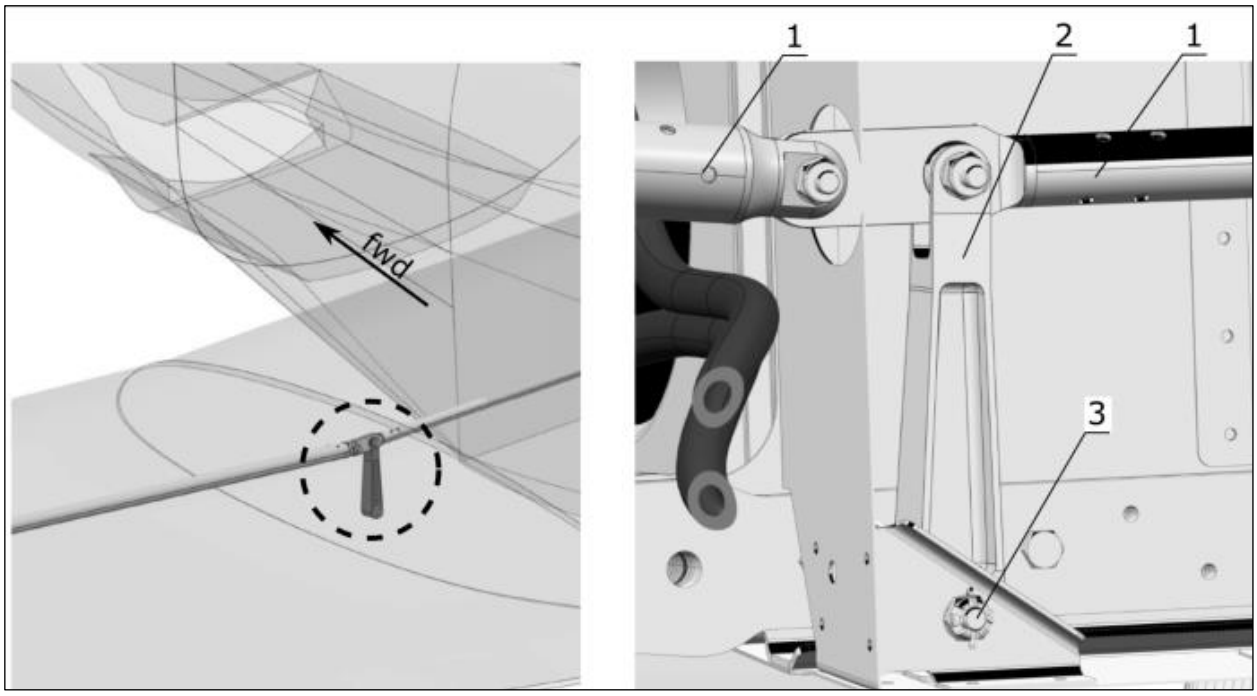

Figure 4 Aileron Control Lever Removal/Installation

Item	Description	Item	Description
1	Push rods	2	Control lever
3	Cotter pin & castle nut		

27-10-03 Aileron Control Bell Crank

The bell crank is located on the bracket in the position of the wing main spar next to the rear rib No. 9.

Removal

Tools needed:	wrench size: 7/16 in

The procedure is identical for the left and the right wing (see Fig. 5).

- Remove the cover (1) from access hole on the lower side of the wing.
- Remove the rods (2) from the bell crank arm – unscrew the nuts and remove the bolts (3).
- Remove the bell crank (5) from the wing – unscrew the nut and remove the bolt (4).

Installation

Tools needed:	wrench size: 7/16 in

The procedure is identical for the right and the left wing (see Fig. 5).

- Check condition and lubrication of bell crank bearings. If the bearings are contaminated, then carefully eliminate the contamination.

NOTICE **Do not grease nor rinse the bearings with permanent filing that are covered by metal or plastic covers (Prelubricated for life).**

- If not pre-lubricated for life, grease the bearings with lubricant oil.
- Set the bell crank (5) to the position (see Fig. 5), insert the bolt (4) to the hole in the bell crank and brackets and secure it with self-locking nut.

NOTE **The bell crank must not show axial play after installing and its travel must be continuous without dragging.**

- According to the Fig. 5 connect push rods (2) to the bell crank.
- Check aileron deflections (see Chapter 20-50-01) and check plays in the control (see Chapter 20-60-03).

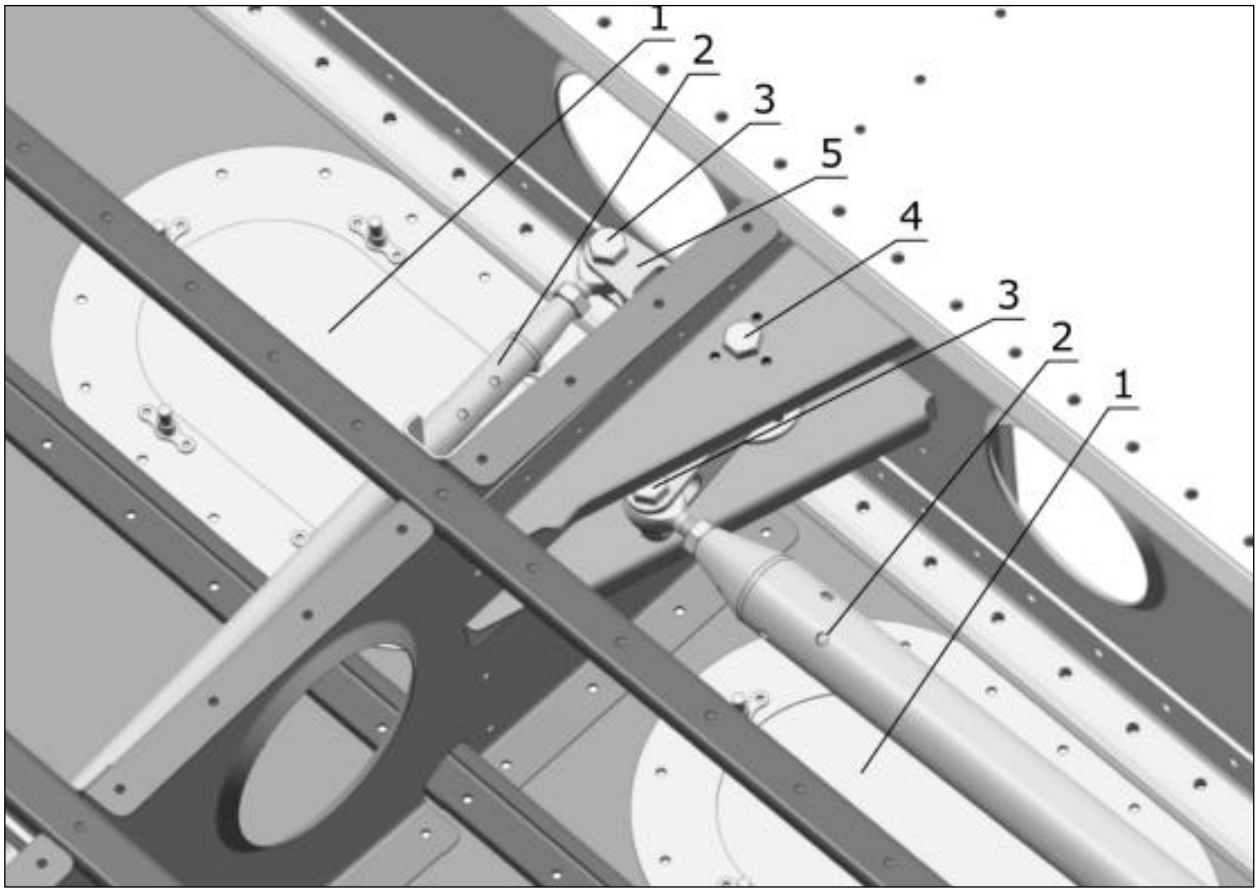

Figure 5 Aileron Control Bell Crank Removal/Installation

Item	Description	Item	Description
1	Covers	2	Push rods
3	Rod end bolts	4	Bell crank bolt
5	Bell crank		

27-10-04 Aileron Travel Stops

A bolt with counter nut is screwed to each inboard side of the torque tube brackets supporting the control sticks. The control sticks' travel is thus limited at their bottom end (refer to Figure 1).

27-20 Rudder Control

The rudder is controlled by means of foot control pedals. Pedal deflections are transferred to the rudder by a cable-pulley system.

Foot control pedals can be set individually to two positions by means of a lock-pin mechanism on the side wall of fuselage under the instrument panel.

The pedals also control the nose gear steering (see Chapter 32-20).

The forward end of the cable is connected to the foot control pedals. The steel cables are led through the middle channel of the fuselage. The cables are guided by pulleys in the aft part of the forward fuselage section to a pulley block installed on the fin spar riveted to bulkhead No. 11 and attached to the rudder control lever installed on the fin spar back. The rudder deflection is limited by travel stops (See Chapter 27-20-03).

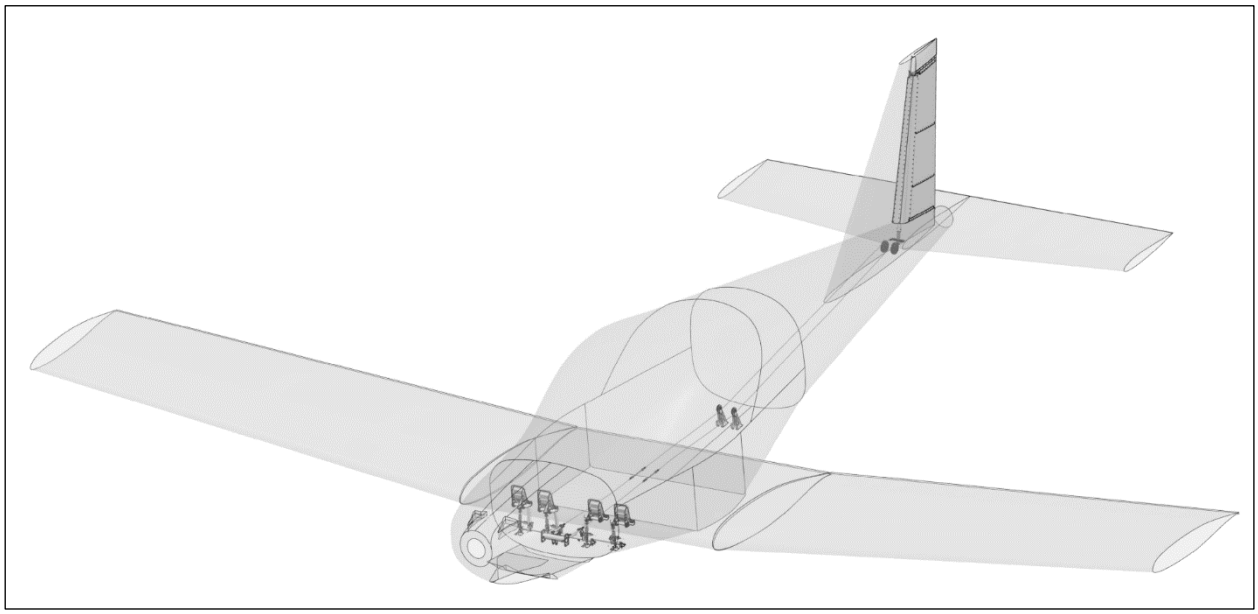

Figure 6 Rudder Control System

27-20-01 Rudder

Removal

Tools needed:	wrench size: 3/8 in, 7/16 in

- Remove horizontal stabilizer (see Chapter 55-10).
- Remove the nuts from bolts on both hinges of the rudder.
- Remove top bolt from the hinge and lift the rudder from lower hinge.
- Remove the rudder and store it in such a way that the damage cannot occur.

Installation

Tools needed:	wrench size: 3/8 in, 7/16 in

- Inspect the attachments on the rudder, clean them and apply lubricant grease on them. Do the same for the attachments on the fin.
- Set the rudder to the hinges on the fin.
- Put the bolt on top hinge and screw the nut.
- Connect bottom hinge to the rudder control lever.
- Perform check (see Chapter 20-60-01), and adjustment of deflections if needed (see Chapter 20-50-01).
- Install horizontal stabilizer (see Chapter 55-10).

27-20-02 Rudder Control Cable

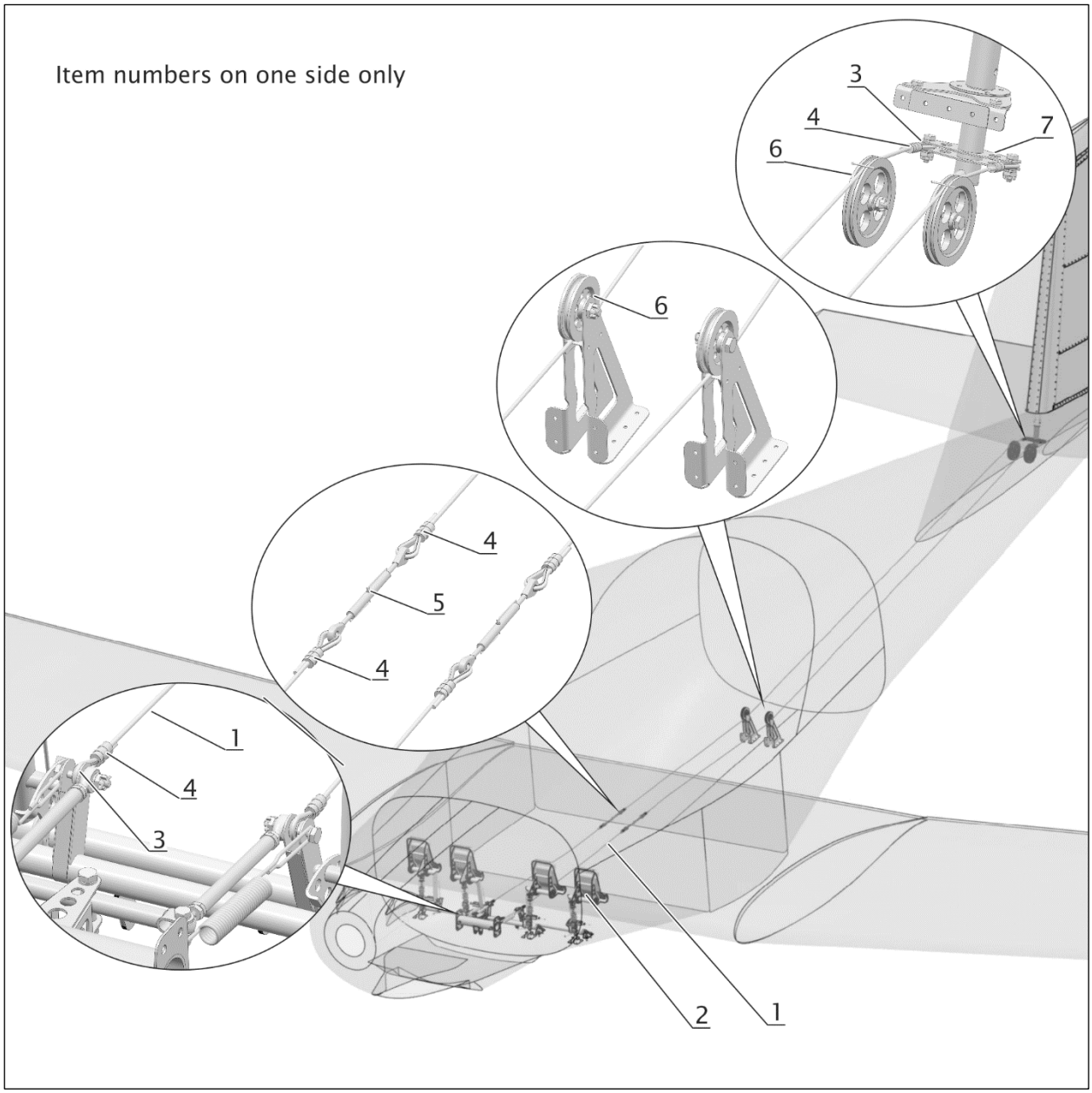

Figure 7 Rudder Control Cables

Item	Description	Item	Description
1	Control cable	2	Rudder pedal
3	Cable thimble	4	Nicopress sleeve
5	Turnbuckle	6	Pulley
7	Rudder control lever		

Removal

See Figure 7.

- Remove rudder as per Chapter 27-20-01 to get access to the aft control cable attachment.

Access to the front control cable attachment is possible through the front gear channel.

- Remove seat backrests and seats (Velcro straps).
- Remove middle console (Allen screws).
- Cut the control cable (1) in the cockpit in front of and aft the turnbuckle (5) with Nicopress sleeves (4).
- Remove turnbuckle with Nicopress sleeves.
- Attach an auxiliary wire to the aft part of the control cable for later installation of new cable.
- Disconnect the aft part of the control cable from rudder control lever (7).
- Pull out aft part of the control cable rearward and thus provisionally installing the auxiliary wire.
- Disconnect control cable from auxiliary wire.
- Disconnect the front part of the control cable from rudder torque tube lever.
- Pull out the forward part of the control cable to the front.

Installation

See Figure 7.

- Pre-install cable thimble with Nicopress sleeve to one end of the forward and aft part of the new control cable.
- Grease the new cable with lubricant grease before installing it to the fuselage.
- Connect the free forward end of the aft control cable to the provisionally installed auxiliary wire.
- Insert the new cable from the rudder side into the fuselage by pulling the auxiliary wire forward.
- Remove the auxiliary wire.
- Connect the aft control cable to the rudder control lever (7).
- Connect the free end of the aft cable with the turnbuckle (5) by making a Nicopress joint (4).

- Connect the forward part of the control cable to the rudder torque tube lever.
- Thread the forward part of the control cable through the main spar lead-through.
- Secure the rudder and the pedal in neutral position.
- To receive the correct cutting length of the forward control cable, provisionally connect its free end to the turnbuckle (5) using the cable thimble. Observe desired cable tension (see Chapter 20-60-02).
- Connect the free end of the forward cable with the turnbuckle (5) by making a Nicopress joint (4).
- Check and adjust the cable tension, see Chapter 20-60-02.
- Check (see 20-60-01) and adjust (see 20-50-01) rudder deflections.

27-20-03 Rudder Travel Stops

Rudder travel stops (2, Figure 8) are made of a bolted spacer, limiting the travel of the tube (1), which is welded on the rudder bottom tube.

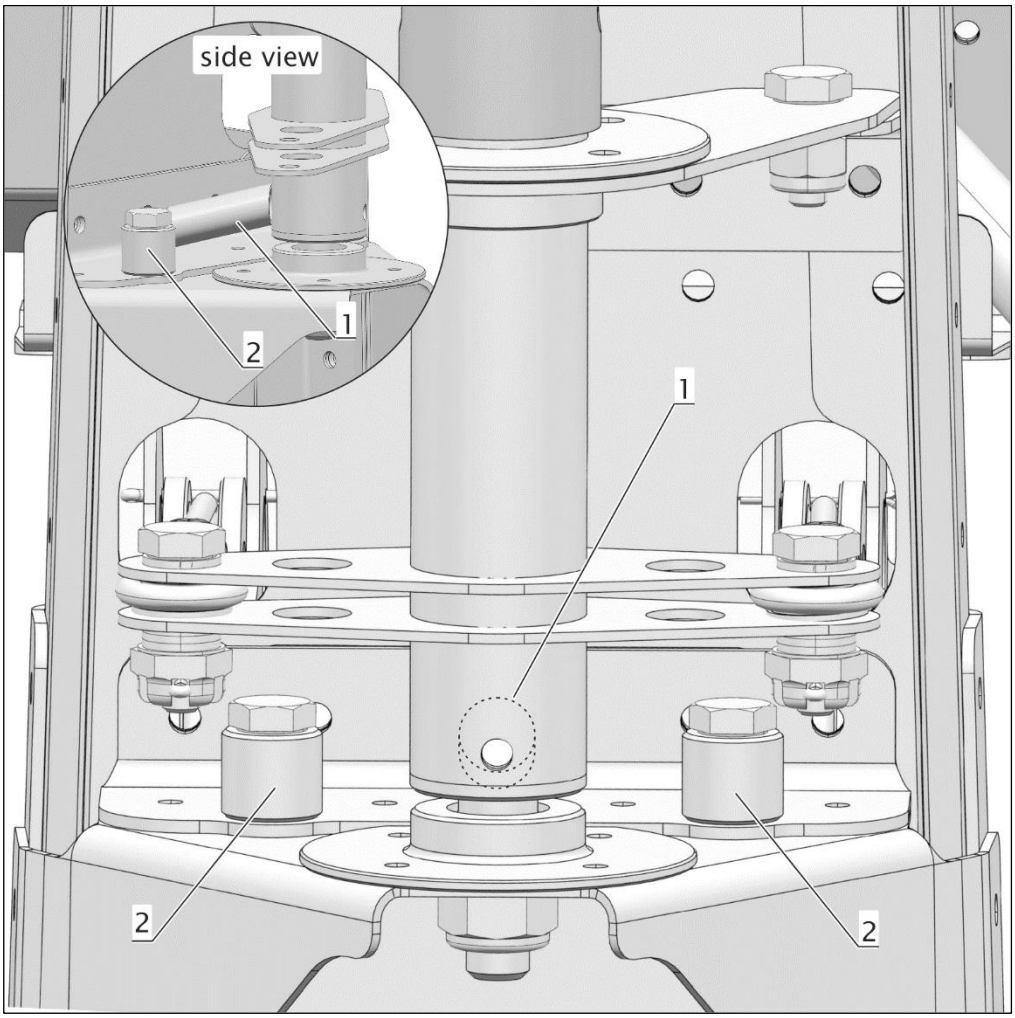

Figure 8 *Rudder Stops*

Item	Description	Item	Description
1	Tube	2	Travel stop

27-30 Elevator Control

The elevator is controlled by moving the control sticks forward and aft. A system of transmission levers and pushrods transfers the movement of control sticks to the elevator. Pushrods are led through the central channel between the seats to the two-arm lever which is located on the fin spar. Lever deflection is transferred to the elevator. Pushrods have adjustable rod-ends with spherical bearings at the ends, enabling elevator deflection adjustment. The elevator deflection is limited by travel stops (See Chapter 27-30-05).

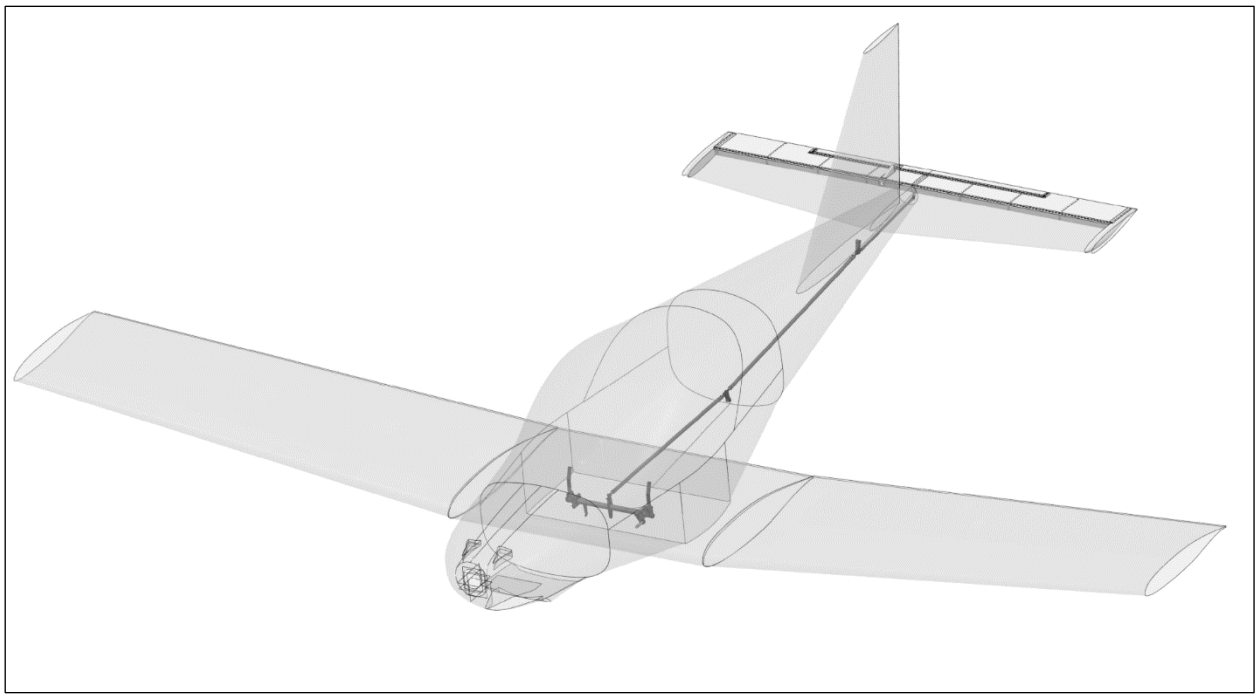

Figure 9 Elevator Control

An electric actuator is installed in the horizontal stabilizer. It is used to control the elevator trim tab (also working as anti-servo tab) to which it is connected via a threaded rod (see also Chapter 27-00-03). Control switches are integrated part of grip on the left control stick (optional on both control sticks). A LED position indicator is installed on the instrument panel in the pilot's view field (independent from EFIS).

27-30-01 Elevator

Removal

Tools needed:	wrench size: 7/16 in wire nippers

- Remove the cover (2) from the trim tab access hole (3, Fig. 2).
- Disconnect the electrical trim tab actuator wires (1).
- Disconnect the control rod from the elevator control lever.
- Disconnect piano hinge (5, Fig. 1, Ch. 55) by pulling the wire.
- Remove the elevator (2, Fig. 1, Ch. 55) from the stabilizer.
- Store the elevator so that its damage cannot occur.

Installation

Tools needed:	wrench size: 7/16 in pliers

- Put the elevator (2, Fig. 1, Ch. 55) in the piano hinge on the stabilizer.
- Insert wire in piano hinge (5, Fig. 1, Ch. 55).
- Insert electrical trim wires and connect to the trim tab actuator (1, Fig. 2, Ch. 27).
- Connect control rod with elevator control lever.
- Check proper trim tab operation and elevator deflections (see 20-50-01), adjust elevator deflections if necessary.

27-30-02 Trim Tab

Removal

Tools needed:	pliers wire nippers electric drill, drill bit diam. 3.2 mm (1/8 in)

- Disconnect control rod end from the trim tab.

- Drill out the rivets connecting the piano hinge with elevator.
- Remove the trim tab with piano hinge from elevator.

Installation

Tools needed:	pliers wire nippers riveting pliers

- Insert the trim tab with piano hinge into the elevator.
- Rivet piano hinge into the elevator (rivet type 01691-0412 Avdel Avex 3.2 x 9.6 mm).
- Check for free rotation of the trim tab.
- Connect control rod end to the trim tab lever. Secure the pins with cotter pin. At installation follow instructions in Chapters 20-10 and 20-40).
- Perform check (see Chapter 20-50-01), adjust trim tab deflections if needed.

27-30-03 Bail Arm lever (front)

The front bail arm lever is located under the luggage compartment.

Removal

Tools needed:	wrench size: 7/16 in screw driver pliers

Refer to Figure 13.

- Remove the access hole cover on the bottom fuselage skin under the luggage compartment (1).
- Disconnect push rod ends (2) from the lever (3).
- Disconnect lever (3) from lever hinge; remove the cotter pin, unscrew the castle nut, put out the bolt.
- Remove the bail arm lever (3).

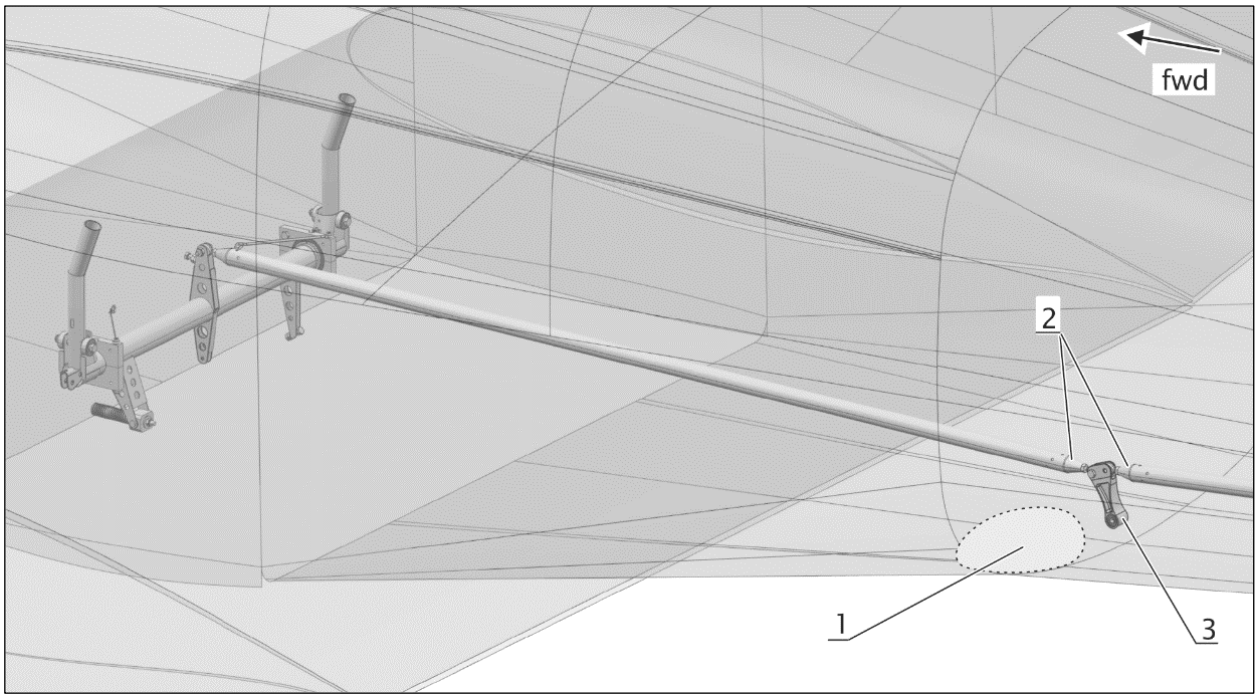

Figure 10 Bail Arm (front) Removal/Installation

Item	Description	Item	Description
1	Cover on the bottom skin	2	Push rod end
3	Bail arm lever		

Installation

Tools needed:	wrench size: 7/16 in screw driver pliers

Refer to Figure 10.

- Check condition and lubrication of bail arm lever bushings. If the bushing is contaminated, then carefully remove contamination.

NOTICE

Do not grease nor rinse the bearings with permanent filling that are covered by metal or plastic covers (Prelubricated for life).

- If not pre-lubricated for life, grease the bearings with lubricant oil.
- Install the bail arm lever (3) to the lever hinge; insert the bolt into the hole in the lever and the hinge and secure it with the castle nut and cotter pin. Tighten the nut slightly.

NOTE **The lever after installing must not show axial play and its travel must be smooth without hitching.**

- Connect both push rod ends (2) with the bail arm lever (3).
- Close the access hole (1) on the bottom skin under the luggage compartment.
- Check elevator deviations (see Chapter 20-50-01) and check control plays (see Chapter 20-60-03).

27-30-04 Bail arm lever (rear)

The rear lever is located in the rear fuselage.

Removal

Tools needed:	wrench size: 7/16 in (11) Phillips screw driver pliers

Refer to Figure 11.

- Unscrew the access hole cover (1) attachment screws on the starboard side of the fuselage in front of the fin spar.
- Disconnect push rod ends (2) from the lever (3) – unscrew the nuts and remove the bolts .
- Remove bail arm lever (3) by- removing cotter pin, unscrewing the castle nut and removing the bolt (4).

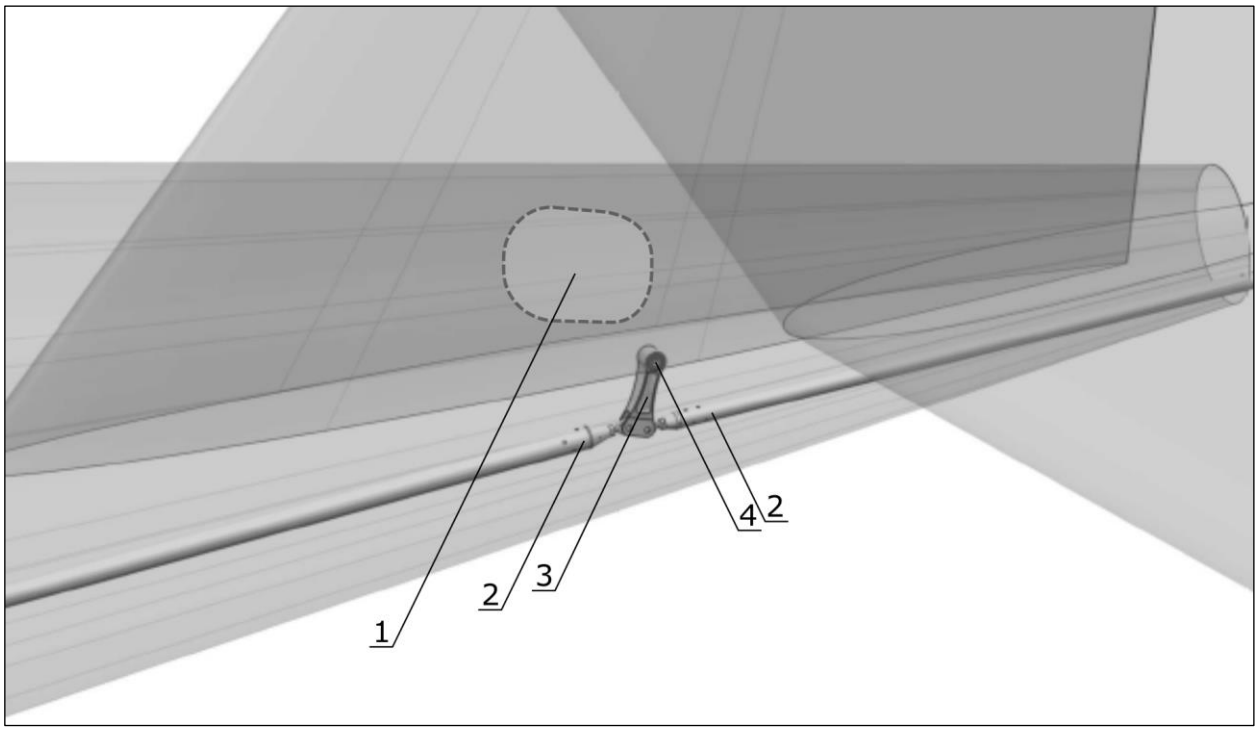

Figure 11 Bail Arm (rear) Removal/Installation

Item	Description	Item	Description
1	Cover	2	Push/Pull rods
3	Bail arm lever	4	Lever bolt

Installation

Tools needed:	wrench size: 7/16 in (11) screw driver pliers

Refer to Figure 11.

- ► Check condition of the lever (3). Grease bearings if necessary and assemble installing the bolts, nuts and cotter pins. Tighten the nut slightly and secure it with the cotter pin.

NOTE **The arm must not show after installing any axial play and its travel must be continuous without hitching.**

- ► Connect both push rod ends (2) with the lever (3).
- ► Close the access hole by cover (1).

- Check elevator deflections (see Chapter 20-50-01) and check plays in control (see Chapter 20-60-03).

27-30-05 Elevator Travel Stops

See Items 4 in Figure 1.

Nuts are welded to the upper and lower elevator control arms (positioned on the torque tube) and bolts are screwed down to these nuts. Counter nuts fix the bolts in the desired position.

The push stop's travel (upper bolt's head) is limited by a bolt head screwed in the upper wing spar cap.

The pull stop's travel (lower bolt's end) is limited by a bolt head screwed in the lower wing spar cap.

27-50 Flaps

Wing flaps are controlled by one central electric actuator connected to the flaps by a lateral torque tube with transfer pushrods on each side of the wing. The flap actuator is located in the centre channel of fuselage between the seats and is controlled by programmable control unit with three positions switch (including “up”) located on the centre console. An LCD indicator is integrated to the control unit for confirmation of the positions (and transition – blinking). Wing flaps deflection can be 0°, 10°, and 25°.

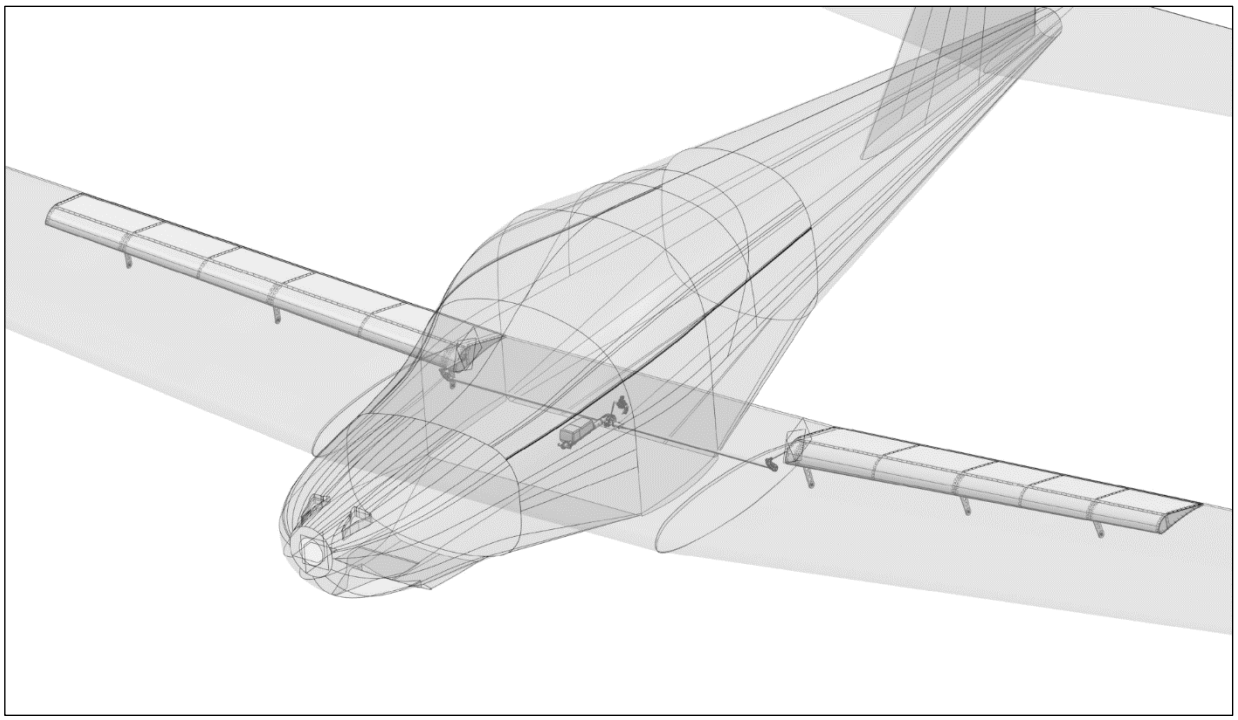

Figure 12 Flap Control System

27-50-01 Wing Flaps

Removal

Tools needed:	wrench size: 7/16 in

- Open the flap in full position.
- Disconnect control push rod on the flap side
- Disconnect all three flap hinges.
- Remove the flap from the wing.
- Store the removed flap on a safe place and prevent it from damage.

Installation

Tools needed:	wrench size: 7/16 in

- Set the flap in to the hinges.
- Insert the bolts in to the hinges and screw the nuts on them.
- Connect control push rod.
- Close the flap in the zero (up) position.
- Perform check of the wing flaps operation and their deflections (see Chapter 20-50-01).

27-50-02 Wing Flap Control Actuator

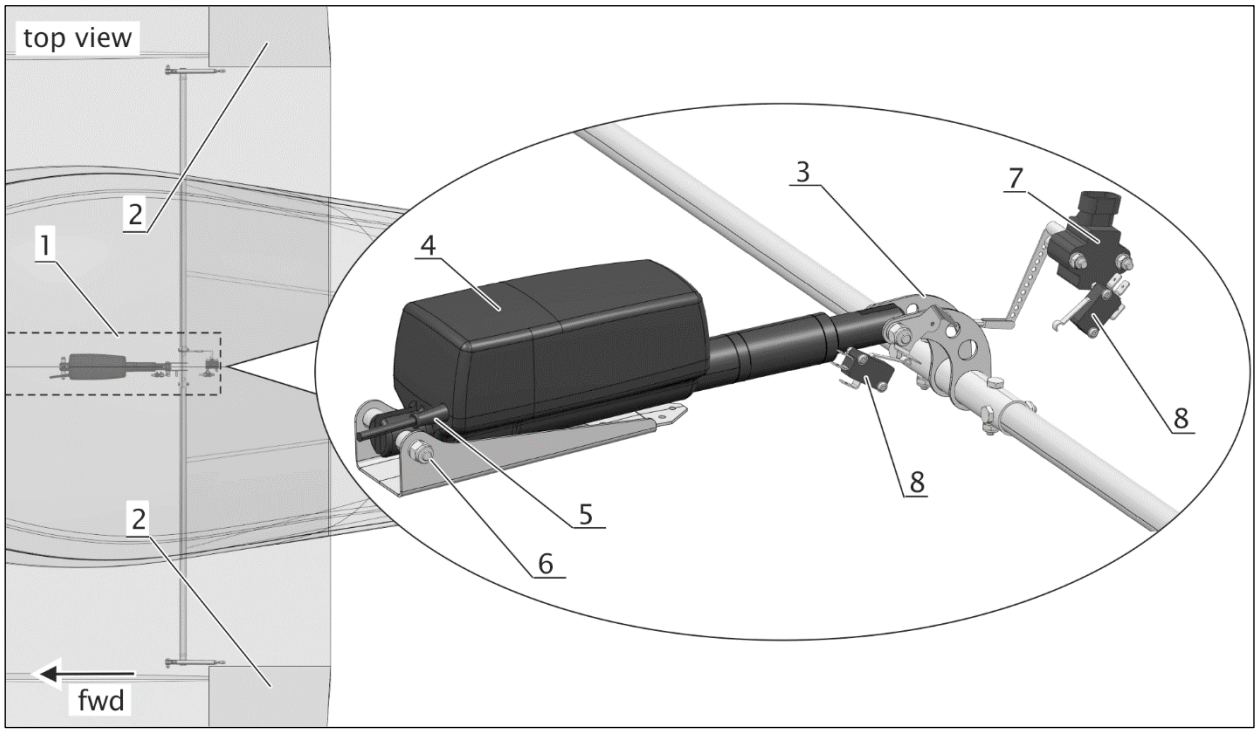

Figure 13 Wing Flap Control Actuator

Item	Description	Item	Description
1	Center console	2	Flap
3	Flap lever	4	Flap actuator
5	Actuator wire	6	Actuator hinge
7	Flap position sender	8	Limit switches

Removal

Tools needed:	wrench size: 7/16 in, 172 in. screw driver

Refer to Figure 13.

- Open the glove box cover on center console (1) between the seats.
- Disconnect flap lever (3) from the flap actuator (4).
- Disconnect flap actuator wire (5).
- Disconnect the flap actuator (4) from the actuator hinge (6).
- Remove flap actuator (4).

Installation

Tools needed:	wrench size: 7/16 in, 172 in. screw driver

Refer to Figure 13.

- Insert flap actuator (4) in to the actuator hinge (6).
- Connect actuator wire (5).
- Connect the flap actuator (4) with the flap lever (3).
- Check the flap operation and deflections (see Chapter 20-50-01).
- Insert glove box in the center console.

28 Fuel

Table of Contents

28-00 General

The fuel system of Bristell B23 airplane consists of the following parts: two fuel tanks, fuel tubing, selector valve, gascolator with integrated fuel filter, mechanical fuel pump (located on the engine), and back up electrical fuel pump, fuel level gauges, fuel pressure gauge and drain valves on the fuel tanks.

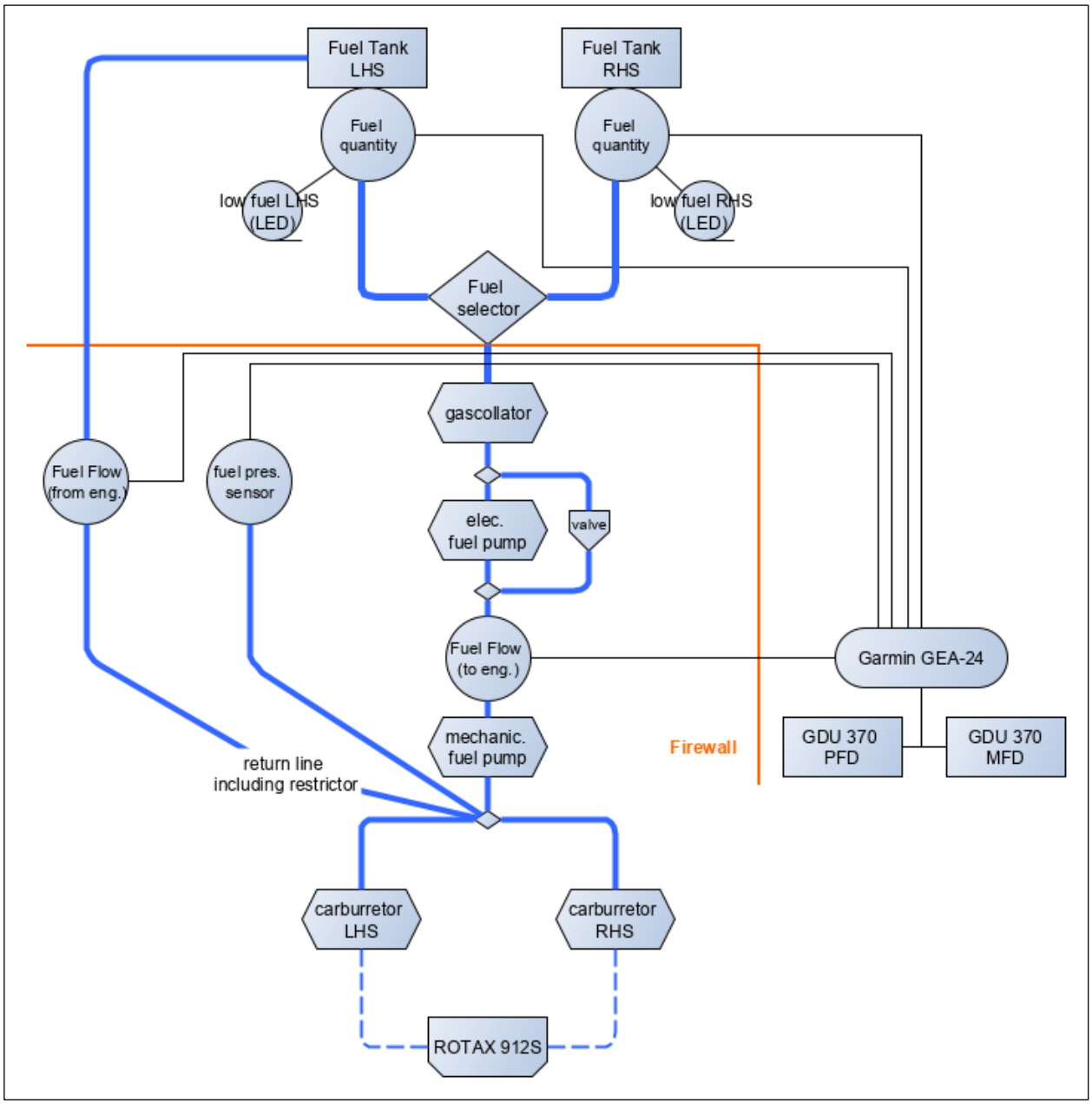

Figure 1 *Fuel System Scheme*

Checking Fuel System Tightness

NOTE **Tightness is checked by pressurized air or fuel. When performing a specific tightness check, outside temperature fluctuations must not be bigger than ±13°C (8°F). Reseal found out leakage by a suitable method – by tightening, by using a suitable sealing.**

Checking Airplane Fuel System Tightness by Air

⚠ DANGER **Explosion and fire hazard!**

- **Working on the fuel system is only allowed to persons who are fully instructed and familiarized with safety instructions.**
- **Do not work on the fuel system**
  during rain and storm
  in a closed space
  when the engine is operating or
  with electric system switched on.
- **Do not work on the fuel system nor allow any person to stay next to the aircraft, when wearing polyester clothing or any clothing from a material which creates static electricity.**
- **Do not smoke or handle with open fire nor allow any person to do so.**
- **Ensure airplane is grounded.**
- Drain fuel system.
- Disconnect fuel line from mech. Fuel pump (1)
- Disconnect fuel return line from fuel manifold(2)
- Close the fuel return line; the fuel filler neck and the fuel vent line with appropriate plugs
- Choose the correct tank to test and select with the fuel selector valve.
- Pressurize the system at the fuel feed line (at the mech. Fuel pump) with 2 psi.
- Shut the air pressure supply. During 15 minutes there must not be any loss in pressure. Find out leakage by listening to and by soap water.
- Fuel selector valve – OFF position.

28-10 Storage

Fuel is stored in airplane in two fuel tanks. The fuel tanks are integrated part of the wing from Aluminum sheet and their volume is standardly 60 liters (15.85 US gal, 13.2 UK gal) each.

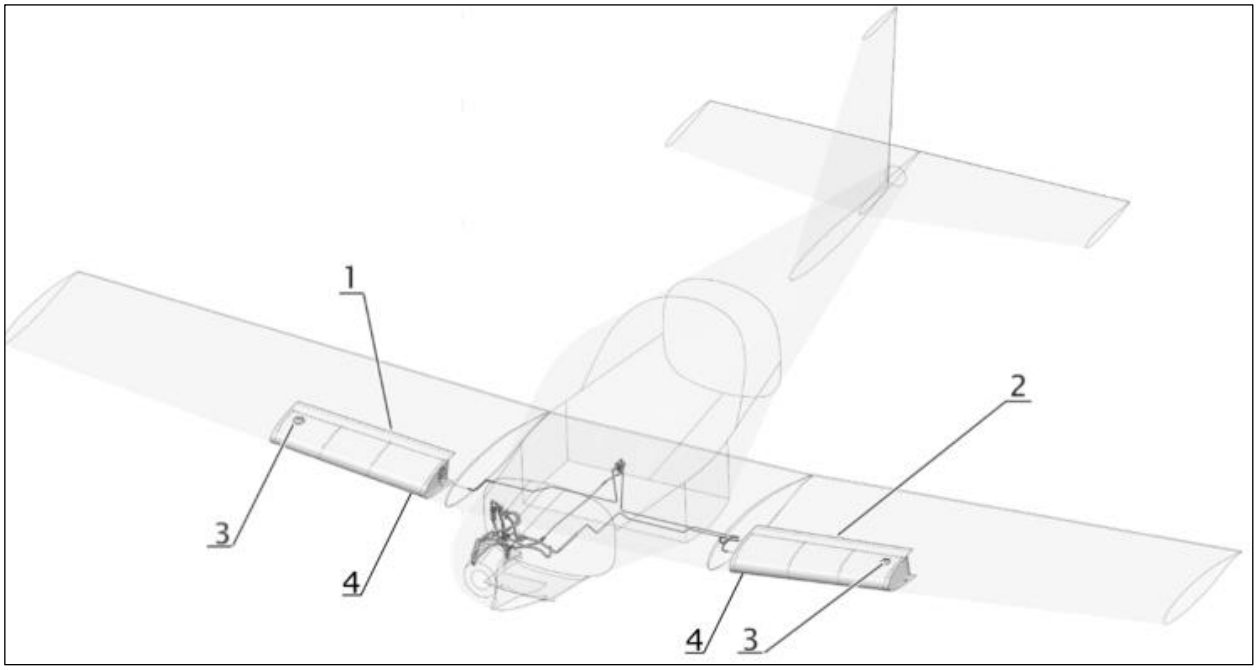

Figure 2 Storage

Item	Description	Item	Description
1	Fuel tank right	2	Fuel tank left
3	Filler caps	4	drain valve *(lower skin; not visible)*

28-10-01 Fuel Tank

The tanks (1 + 2, Figure 2) are located in the outer wings between ribs No.2 and 5 in front of the main spar. Each fuel tank has a filler neck with flush head filler cap (3), fuel level sender (2, Figure 3), venting tube, finger screen (1, Figure 3) and drain valve (4). Fuel is filled into the each tank through the filler neck, which is located on the top skin close to rib No.5. Fuel drain from the tank is possible through the drain valve (4) located in the rear corner of bottom skin close to the root fuel tank rib.

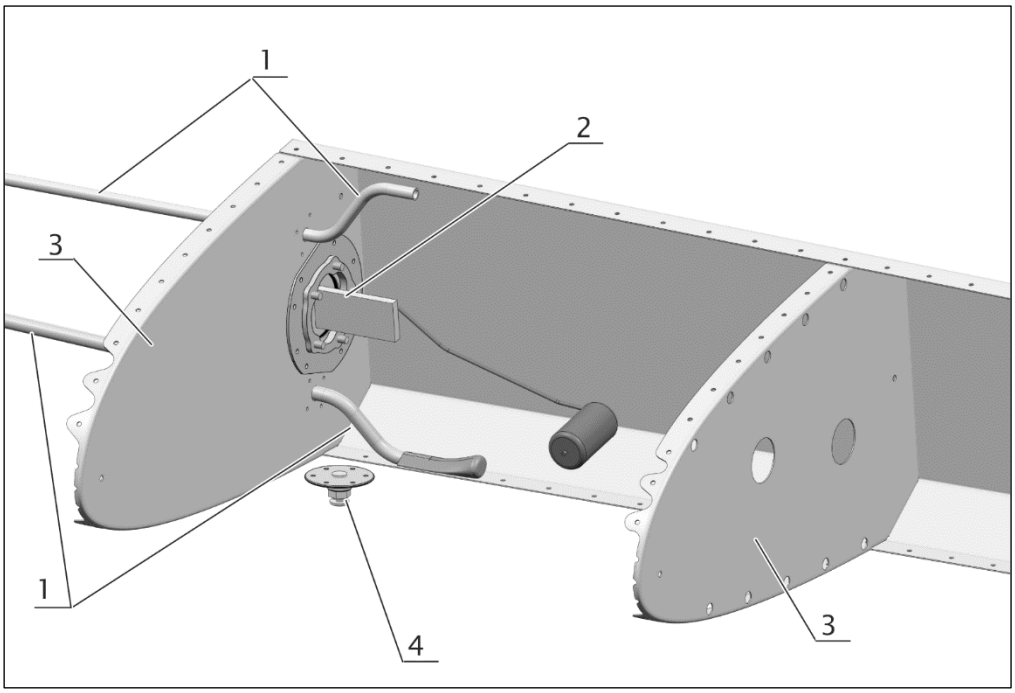

Figure 3 *Fuel Tank (left)*

Item	Description	Item	Description
1	Pick-up line	2	Fuel level sender
3	Rib	4	Drain valve

28-20 Distribution

Fuel flows from the tanks through the pick-up line (3, Figure 4) and fuel lines (4, 10) to the fuel selector valve (1) and from there to the gascolator (7), electrical fuel pump (9) to the mechanical fuel pump (6) located on the engine. From there it is supplied through the fuel distributor lines to carburetors. The fuel selector valve (1) works also for interruption of fuel supply in case of engine fire or for airplane long-time parking. The fuel selector is located on the middle console between the seats in the cockpit. The gascolator (7) is located on the firewall in lowest point of fuel system. The electrical fuel pump (9) is located on the firewall above the gascolator.

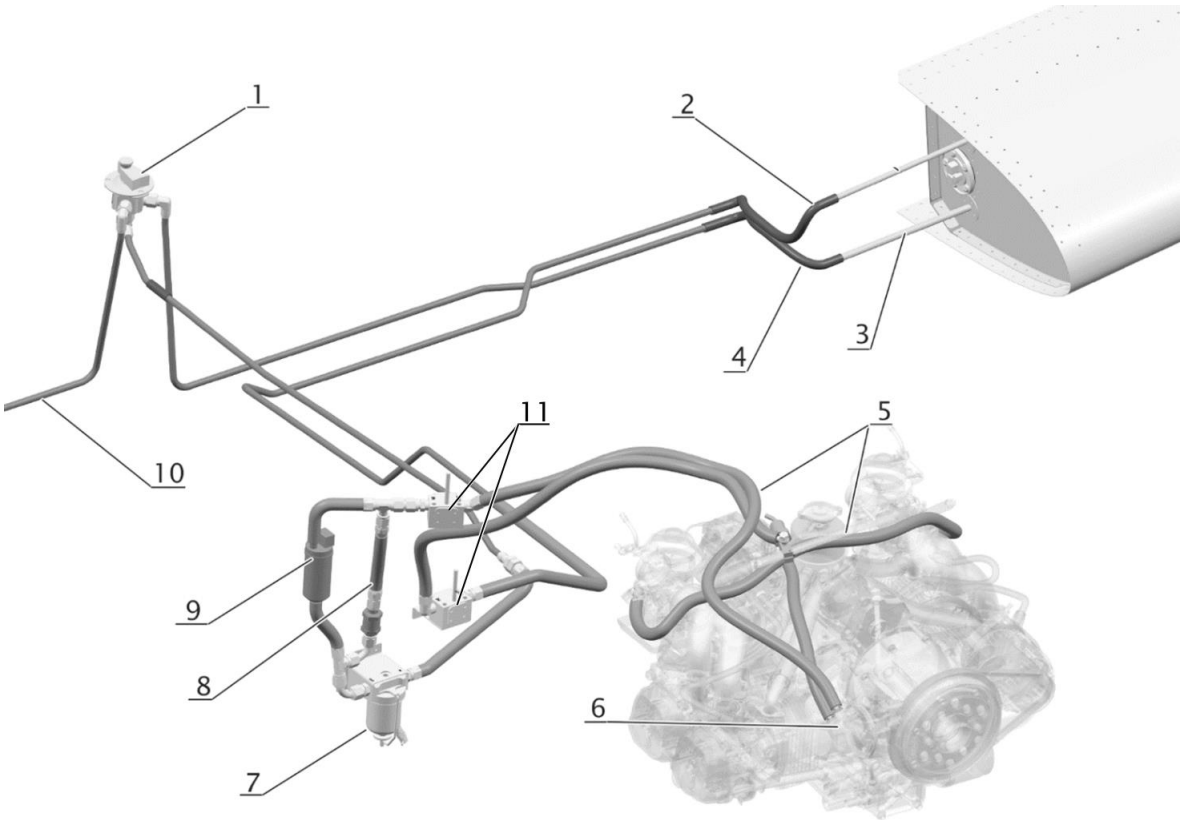

Figure 4 Distribution

Item	Description	Item	Description
1	Fuel selector valve	2	Fuel return line
3	Fuel pipes	4	Fuel line left wing
5	Fuel lines	6	Mechanical fuel pump
7	Gascolator	8	Bypass with check valve
9	Electrical fuel pump	10	Fuel line right wing
11	Fuel flow sensors		

28-20-01 Electric Fuel Pump

Check

Check for Cracks

- Check the fuel pump body for cracks, including the inlet and the outlet hose.
- If cracks are detected, immediately exchange the fuel pump with new pump.

Checking Fuel Leakage

- Perform engine inspection and visually inspect the fuel pump body, including inlet and outlet hose, for fuel leakage (e.g. droplets, “wet-spots”).
- In case of fuel leakage, find out the reason and if necessary exchange the fuel pump for the new pump.

28-20-02 Pick-up Line

The pick-up line is located on the feed line on root tank rib. It isn`t removable.

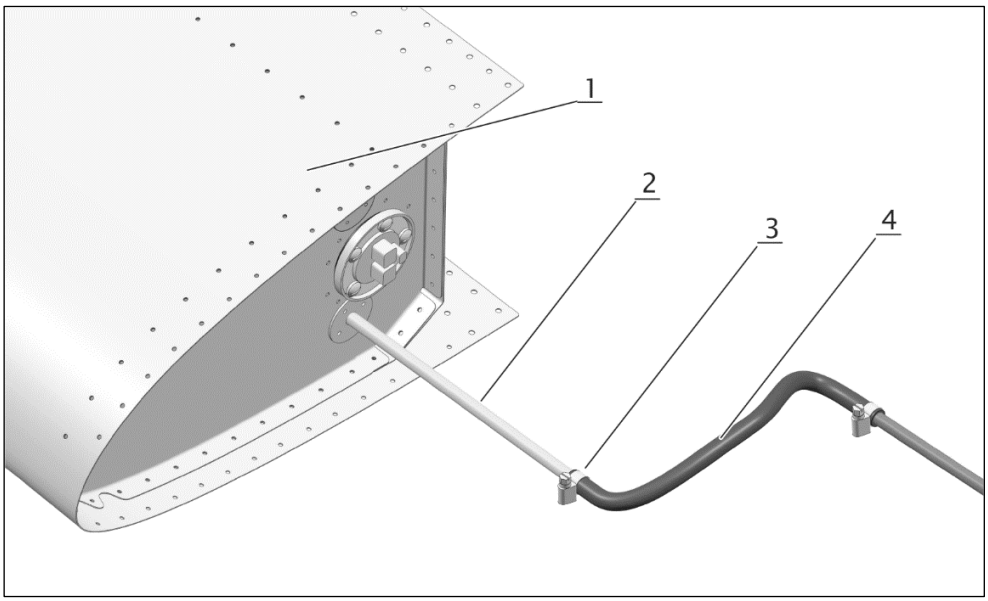

Figure 5 *Pick-up Line*

Item	Description	Item	Description
1	Fuel tank	2	pickup-line
3	Clamp	4	Fuel hose

28-20-03 Fuel Drain

Removal

Tools needed:	wrench size: 1/2 in

- Drain the fuel from the tank or gascolator.
- Unscrew the drain valve from the tank or gascolator and remove it.
- Check “O” ring and the spring.

Installation

Tools needed:	wrench size: 1/2 in

- Set drain valve in the tank or gascolator – use LOCTITE 565 or equivalent sealant.
- Fill the tank with fuel and check drain valve tightness.

28-40 Indicating

Fuel quantity is measured by the fuel float gauges (also refer to Fig. 3). The float position is converted to an electrical signal and fuel quantity in the tank is indicated on the GDU370 (G3X) screen. The fuel system provides a hard-wired low fuel warning light in the instrument panel (LED).

28-40-01 Fuel Level Sender

Removal

Tools needed:	screwdriver

- Remove the wing (see Chapter 57-20).
- Disconnect fuel level sender wire.
- Unscrew bolts and remove fuel level sender from root fuel tank rib.

Installation

Tools needed:	screwdriver

- Set sealing on the fuel tank flange.
- Set position and length of the fuel level sender lever according to Fig. 5.
- Carefully put the fuel level sender into the tank and attach it using bolts with washers – use LOCTITE 565 or equivalent sealant on bolts thread.
- Connect electrical wires to the fuel level sender (electrical connection – see Chapter 91).
- Install the wing (see Chapter 57-20).
- Check fuel system tightness (see Chapter 28-00).
- Connect the battery, switch on the master and avionics switch
- Check if fuel level is correctly indicated on the Garmin system (red range and additional alert from low fuel level sender) for quantities below 3l.

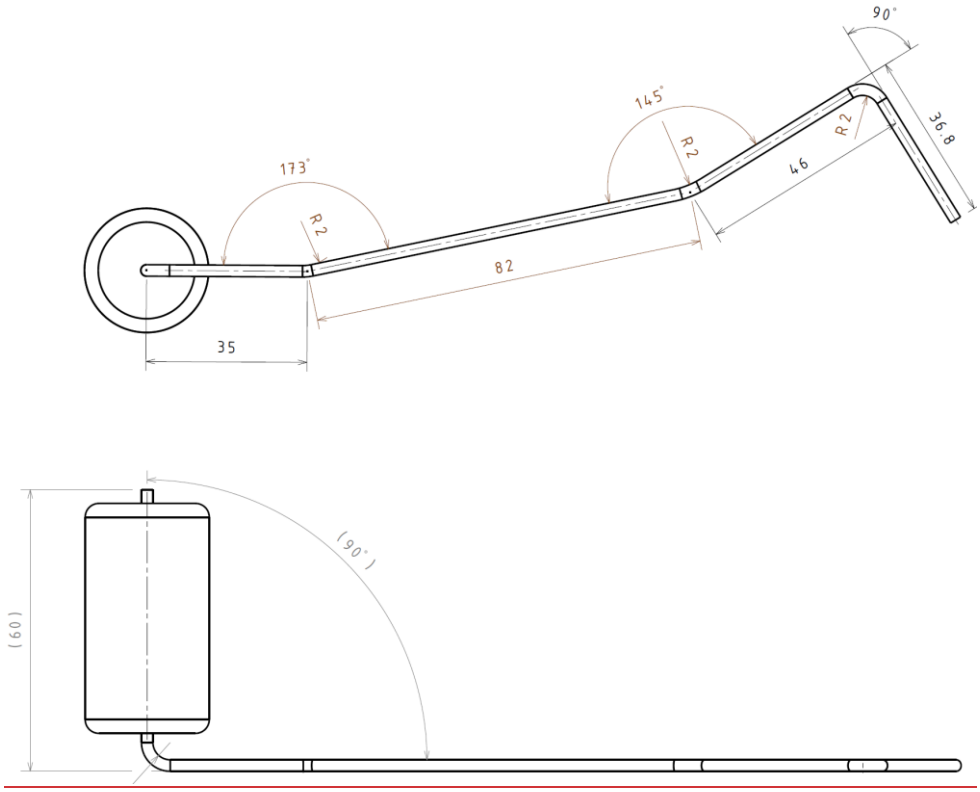

Figure 5 *Float Mechanism*

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31 Indicating/Recording System

Table of Contents

31-00 General

31-10 Instrument & Control Panels

The compass rose is positioned on the rotary and swinging pivot inside the compass (if installed / compass optional).

31-40 Garmin G3X system

For servicing/repair/replacing of components of the Garmin G3X system (excl. TSO'ed parts: NAV/COM and XPDR) uninstall the equipment and send to aircraft manufacturer **BRM AERO s.r.o.** . The reinstallation process with the corresponding Form1 ("spare part" from aircraft manufacturer) is done acc. Garmin manual ref. chapter 01-20.

For software update contact **BRM AERO s.r.o.** , do not install public downloadable software versions, an aircraft TC-holder approved Service Bulletin is required for software updates.

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32 Landing Gear

Table of Contents

32-00 General

The Bristell B23 airplane has tricycle landing gear which consists of the main landing gear and the nose landing gear. The nose landing gear is steerable. The main landing gear wheels are equipped with hydraulic disk brakes.

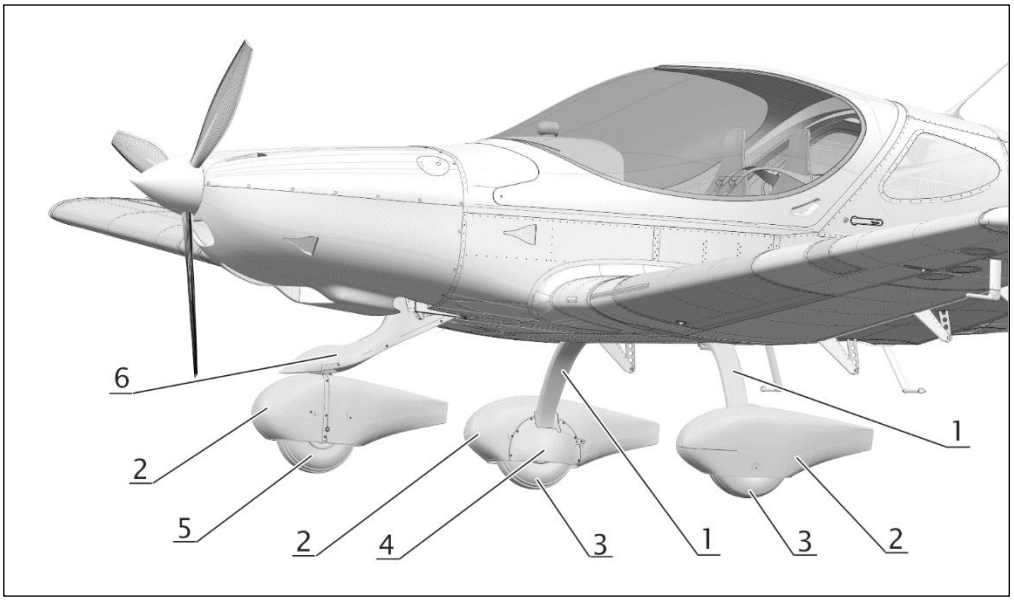


Figure 1 *Landing Gear*

Item	Description	Item	Description
1	Main landing gear leg	2	Wheel pants
3	Main wheels	4	Disc brake
5	Nose wheel	6	Nose gear leg

Type and dimension of main wheels:

- Wheel rim: Beringer 5.00-5”
- Tire (tubeless): Michelin aviator 5.00-5/8/160.

Type and dimension of nose wheel:

- Wheel rim: Beringer 5.00-5”
- Tire (tubeless): Michelin aviator 5.00-5/8/160.

This Chapter provides information on:

- main landing gear
- nose landing gear
- brake system
- wheel pants

32-10 Main Gear

The main landing gear (see Fig. 1) consists of the composite landing gear legs (1), wheel axle and wheel (3) equipped with disc brakes (4).

32-10-01 Main Gear Leg

The landing gear legs (1, Figure 2) are inserted in the gear channel (4) under the seats, where they are attached by two bolts (3) and stirrup (2).

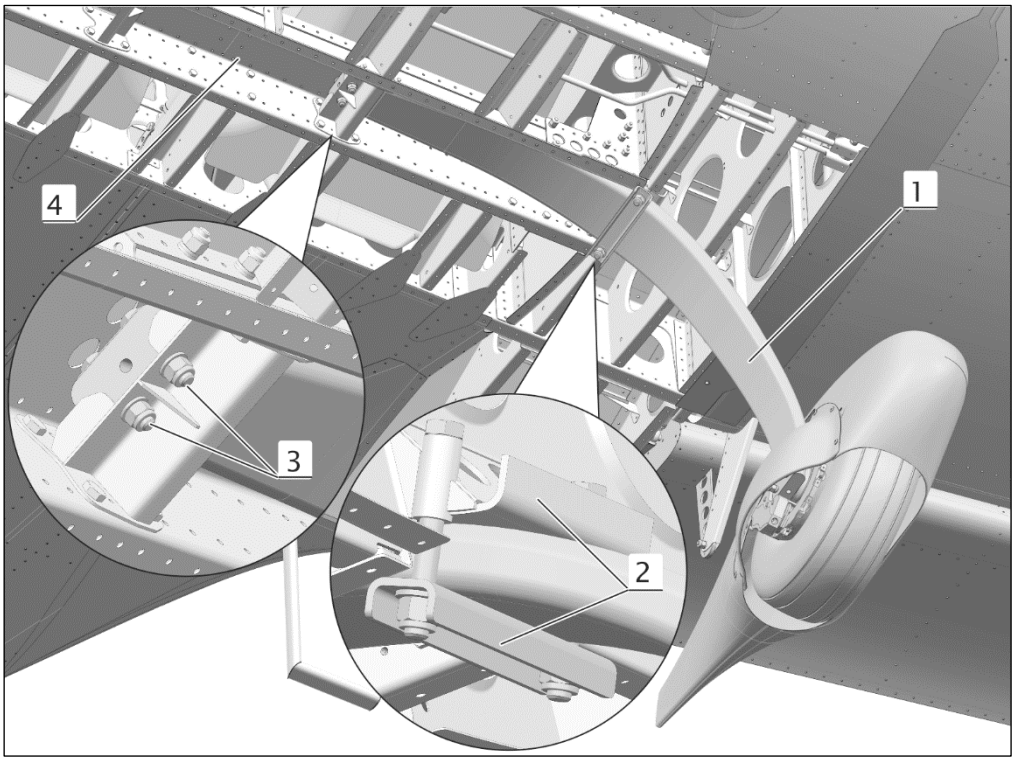


Figure 2 *Main Gear Leg*

Item	Description	Item	Description
1	Main gear leg	2	Stirrup
3	Attachment bolt	4	Gear channel

Removal

Tools needed:	wrench size 9/16 in, 1/2 in

See Figure 2.

- Jack and support the airplane (see Chapter 07).
- Disconnect the brake line.

- Disconnect main gear leg (1), stirrup (2) and attachment bolts (3).
- Remove the bolts (3) and stirrup (2) from the gear channel (4).
- Remove the landing gear leg (1) from the attachment channel and put it on a suitable place.

Installation

Tools needed:	wrench size 9/16 in, ½ in

See Figure 2.

- Check outer surface of the composite landing gear leg for occurrence of cracks and whether the axle connection is not damaged before installing the landing gear leg.
- Insert the landing gear leg (1) into the gear channel (4) on fuselage.
- Put the bolts (3) and stirrup (2) in gear channel, tighten the bolts slightly (no clamping force on composite leg AND no appreciable play).
- Connect the brake lines.
- Fill brake system with brake liquid and bleed it (see Chapter 12-10-40)

32-20 Nose Gear

See Figure 3.

The nose landing gear is steerable and consists of 4130 steel welded landing gear leg (2) with cover (3), 4130 steel welded fork, shock absorber and the wheel (4). The landing gear is attached to brackets installed in the nose gear channel (1) located between bulkhead No. 1 and main center wing spar.

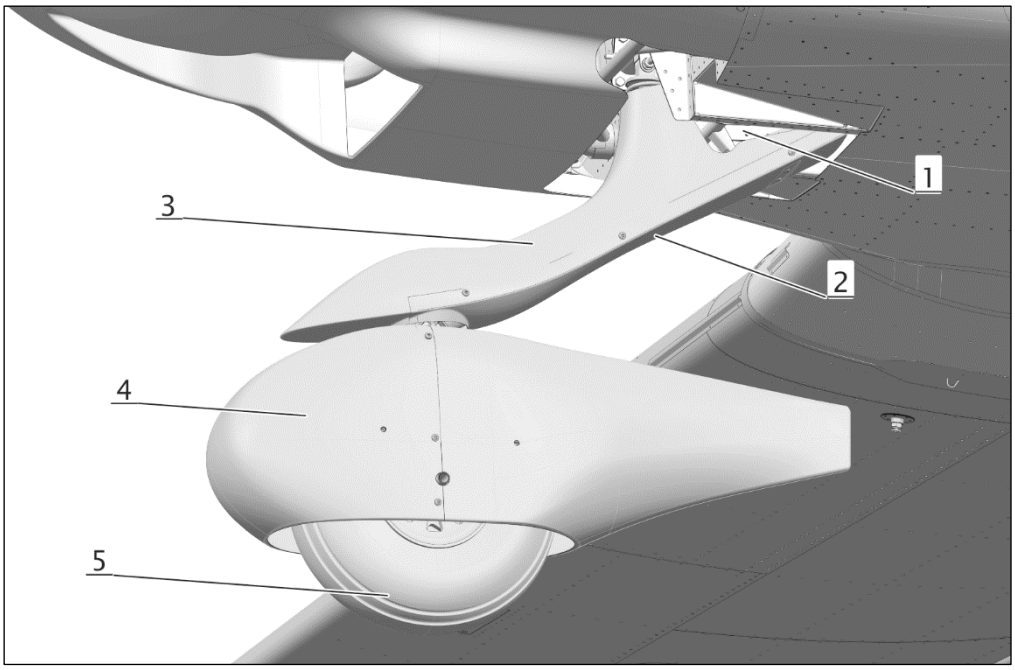


Figure 3 *Nose Gear*

Item	Description	Item	Description
1	Nose gear channel	2	Landing gear leg
3	Landing gear leg cover	4	Nose wheel pant
5	Nose landing gear wheel		

32-20-01 Nose Gear Leg

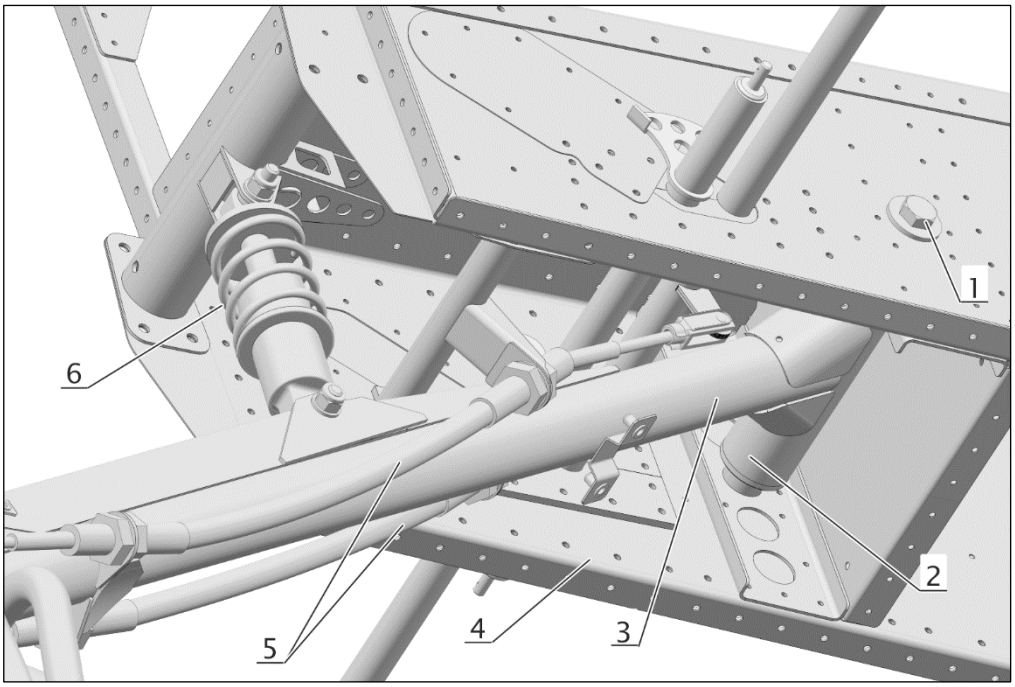


Figure 4 *Nose Gear Leg*

Item	Description	Item	Description
1	Gear leg attachment bolt	2	Nose gear leg axle
3	Nose gear leg	4	Nose gear channel
5	Teleflex	6	Shock Absorber

Removal

Tools needed:	wrench size 1/2 in, No. 17 wrench size 10 and 20

See Figure 4.

- Jack and support the airplane, (see Chapter 07).
- Disconnect the Teleflex rods (5) from the nose wheel fork (use wrench size 10 to unscrew the self-locking nut at rod bottom end) and then use wrench size 22 to release bottom nut at Teleflex attachment to the nose leg. Remove Teleflex from the nose leg.
- Disconnect shock absorber (6) from the shock absorber attachment.
- Remove the bolts (1) from the leg axle (2).
- Remove leg axle (2) from the gear channel (4).

- Remove the gear leg (3) from the fuselage and put it on a suitable place.

Installation

Tools needed:	wrench size 1/2 in, No. 17 wrench size 10 and 22

See Figure 4.

- Check the welds of the gear leg for occurrence of cracks and corrosion and whether the bearings are not damaged before installing the gear leg.
- Insert the gear leg (3) into the attachment brackets in gear channel (4).
- Put the leg axle (2) into the brackets, insert bolts (1) and tighten them slightly.
- Connect shock absorber (6) with the shock absorber attachments.
- Pull the bottom end of the Teleflex rods through the hole on the nose leg lever, put on it the nut and use wrench size 22 to tight the nut. Then attach the bottom end of Teleflex rod to the nose wheel fork. Use wrench size 10 to tight the self-locking nut.
- If necessary adjust the Teleflex rod lenghts by screwing/unscrewing the fork ends
- Secure by tightening the counter nuts

32-40 Wheels and Brakes

Refer to applicable BERINGER documentation and instructions for further detailed information about wheels and brakes used on the Bristell B23 airplane (see Chapter 01-20).

32-40-01 Wheel Pants

The airplane is equipped with composite wheel pants which reduce air drag and improve aerodynamic properties of the airplane. The wheel pants are installed on the brackets per bolts.

Removal

Tools needed:	screw driver

- Remove bolts attaching the wheel pants to the brackets.
- Remove wheel pants.

Installation

Tools needed:	screw driver

- Position the wheel pants on the brackets and screw them down to the brackets by bolts.

32-40-10 Main Wheel

See Figure 5. Also refer to BERINGER documents (refer to Chapter 01-20).

Main landing gear wheel rims (1, 2) are machined of aluminum. Wheel rims are split in order to facilitate assembly and disassembly of tires. Both halves are joined by bolts (5). Main landing gear wheels are equipped with the brake discs (3) which are attached to the inner half of the wheel rims. Wheels are equipped with tubeless tires.

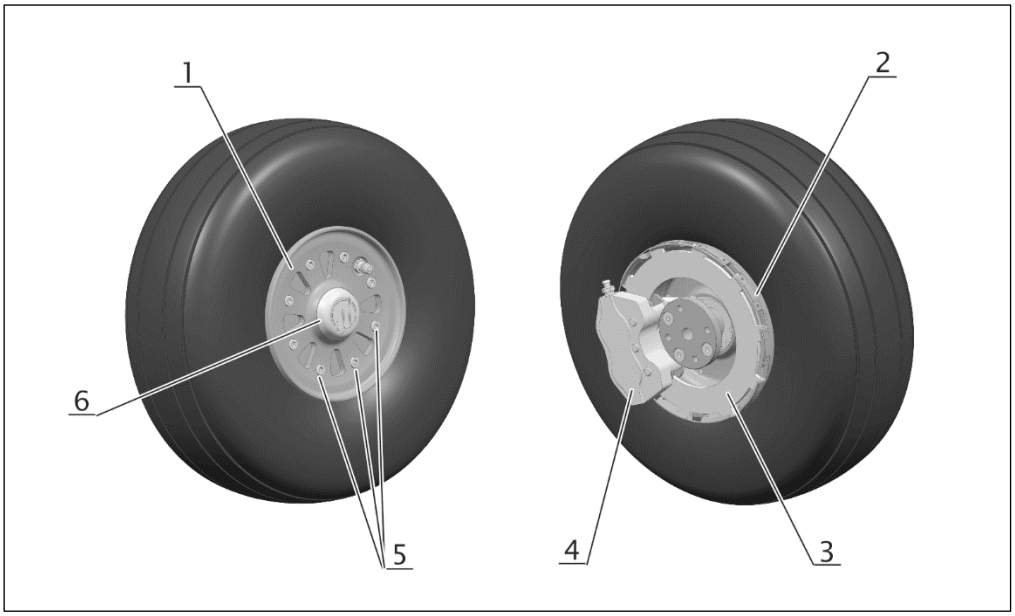


Figure 5 *Main Wheel*

Item	Description	Item	Description
1	Outer rim	2	Main inner rim
3	Brake disc	4	Brake calliper
5	Bolts	6	Axle cover

Removal

Tools needed:	socket wrench size 32 mm Allen wrench size 4 mm pliers

See Figure 5.

- Jack and support the airplane (see Chapter 07)
- Disassemble wheel pant (see Chapter 32-40-01) and remove the wheel pant bracket.

- Disconnect the brake disc from the wheel rim (Refer to Chapter 01-20).
- Remove the cover (6) and the behind nut from wheel axle.
- Remove the wheel from the wheel axle.

Installation

Tools needed:	socket wrench vel. 1 1/2 in Allen wrench size 3/16 in pliers

See Figure 5.

- Clear the wheel axle of impurities and apply slight layer of grease on it.
- Put the wheel on the axle.
- Apply securing liquid (blue Loctite 243) on the screw threads and attach with it the wheel rim and brake disc (Refer to Chapter 01-20).
- Screw and tighten the nut on the wheel axle.
- Install axle cover (6).
- Install the bracket and then wheel pant (see Chapter 32-40-01).

32-40-20 Nose Wheel

The nose landing gear wheel rim is machined of aluminum. In order to facilitate assembly and disassembly of tires, the rim is split. Both halves are connected by bolts. The wheel is equipped with a tubeless tire.

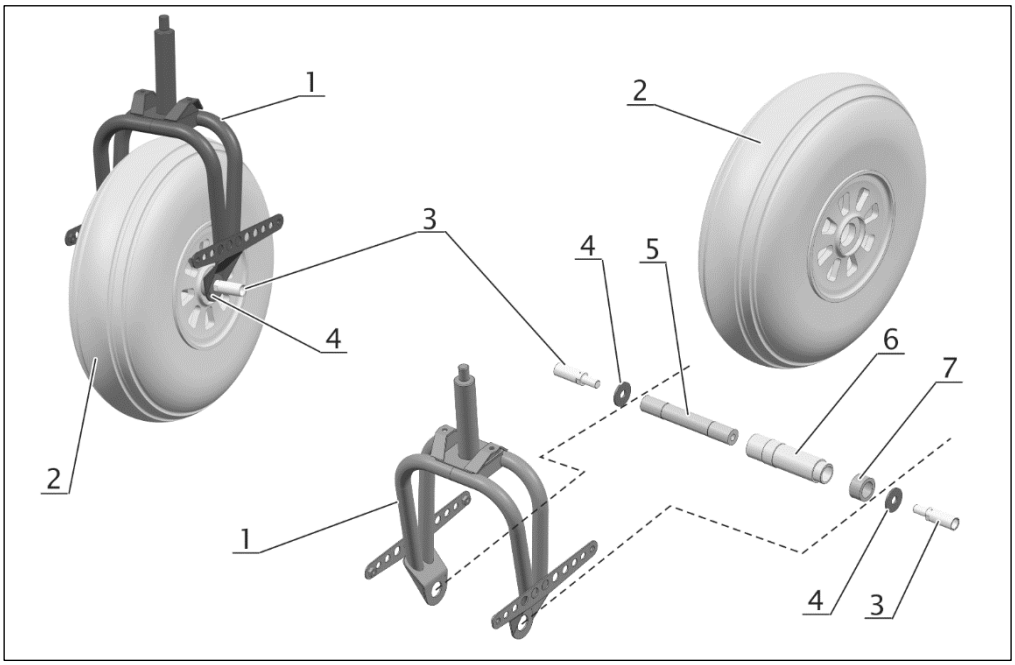


Figure 6 *Nose Wheel*

Item	Description	Item	Description
1	Wheel fork	2	Wheel
3	Bolt	4	Washer
5	Wheel axle	6	Hub
7	Bushing		

Removal

Tools needed:	wrench size 9/16 in pliers

See Figure 6.

- Jack and support the airplane (see para Chapter 07)
- Disassemble wheel pants (see Chapter 32-40-01)
- Remove the bolts (3) and washers (4) from wheel axle (5).
- Release the wheel axle (5) from the wheel hub (6), bushing (7) and the wheel fork.

Installation

Tools needed:	wrench size 9/16 in

See Figure 6.

- Clear the wheel axle (5) of impurities and grease it slightly.
- From one side shift the axle into the wheel fork eye (8).
- Gradually put on first hub (6), nose wheel rim (2) and bushing (7) on the wheel axle (5) according to the Figure.
- From both sides install washers (4) and screw and tighten bolts (3) on the wheel axle (5).
- Check for free turning of the nose wheel (turning must be continual without catching).

32-40-30 Brake System

The Bristell B23 airplane is equipped with hydraulic disc brakes on the main landing gear wheels. Brake system consists of the brake pedals (part of rudder control pedals, see Fig. 7), master brake cylinder, hoses for brake fluid supply, brake calipers and brake pads. By applying force on the pedal, the master brake cylinder is compressed and pressure is generated in the brake circuit and the caliper pushes the brake pads onto the brake disks. Braking pressure can be controlled by force of brake pedal depressing.

32-40-31 Parking Brake

Airplane is equipped with the hydraulic manually controlled parking brake. The **PARKING BRAKE** controller is located on the middle channel in the cockpit. The parking brake controller is mechanically connected with a closing valve. By pressing the brake pedals and by pulling the parking brake handle the brake system is closed and the main wheels are kept braked.

32-40-32 Brake Pump

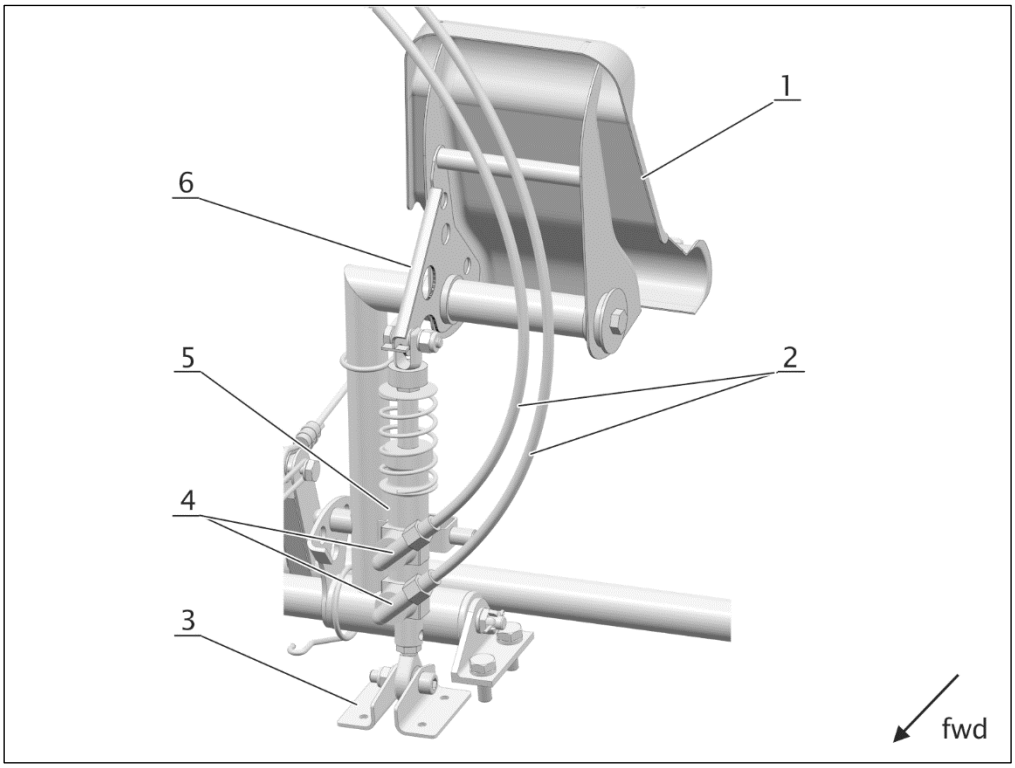


Figure 7 *Brake Pump Removal/Installation*

Item	Description	Item	Description
1	Rudder pedal	2	Brake hoses
3	Bracket on cross channel	4	Fittings
5	Brake master cylinder	6	Rudder pedal bracket

Removal

Tools needed:	wrench size 3/8 in, 10 mm, Allan wrench 5 mm

See Figure 7.

- Drain brake fluid from the respective brake system side by disconnecting the brake hose from the main gear wheel brake and allowing brake fluid to spill to a previously prepared can.
- Disconnect the brake hoses (2) from the brake master cylinder fittings (4).
- Disconnect the master cylinder (5) from the rudder pedal bracket (6).

- Remove the master cylinder (5) from the bracket (3) on the cross channel by unscrewing nut and removing the bolt.
- Remove fittings (4) if applicable.

Installation

Tools needed:	wrench size 3/8 in, 10 mm, Allan wrench 5 mm

See Figure 7.

- Install fittings (4) to the brake pump if applicable.
- Install the brake pump (5) to the bracket (3) on the cross channel by inserting the bolt and screwing the nut on.
- Connect the brake pump (1) to the rudder pedal bracket (6).
- Connect brake hoses (2) to the fittings (4) on the brake pump (5).
- Re-fill the brake system with brake liquid and bleed the system (see Chapter 12-10-40).

32-50 Steering

32-50-01 Nose Wheel Control

The NLG / Rudder control has a closed loop system with centring springs (3, Figure 8) located in the nose gear channel (also see Item 2 in Figure 9).

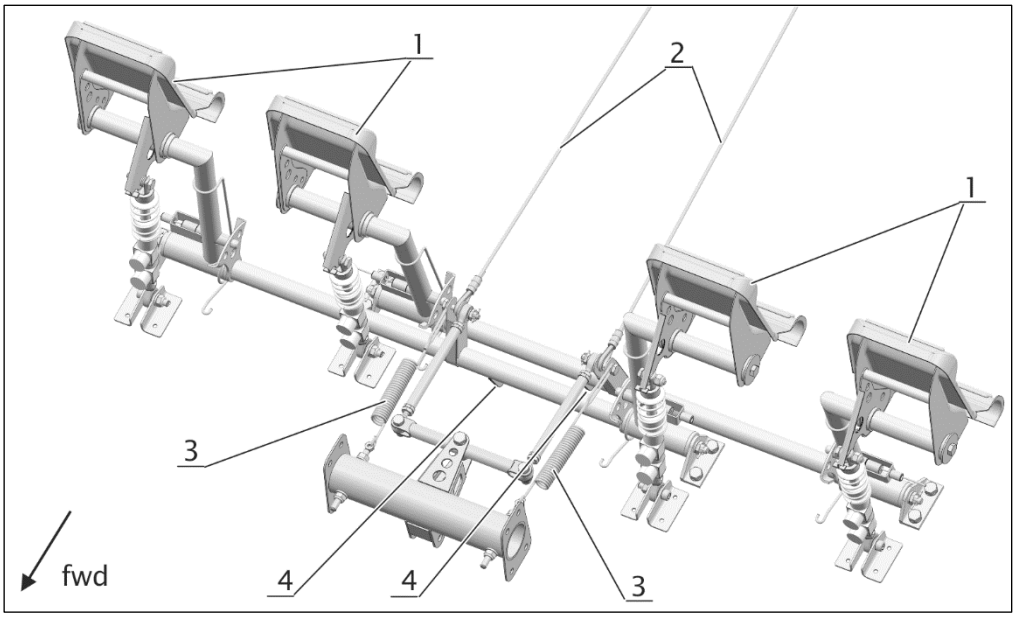


Figure 8 *Rudder Pedals*

Item	Description	Item	Description
1	Rudder pedals	2	Control cable
3	Centring springs	4	Steering levers

The movements of the rudder pedals (1, Figure 8) are transferred to the nose wheel fork (8, Figure 9) by means of steering levers (1) welded to the rudder control system and Teleflex cables (5). The Teleflex rods are attached to the nose gear leg (4) by brackets (3 + 6). The rod attachment to the steering levers is made by fork ends, the one to the steering brackets (7) at the nose wheel fork (8) by ball ends.

Adjustment of Nose gear steering

- hold the rudder in neutral position
- check if the rudder pedals are in neutral position
- by mounting the tow bar to the Nose landing gear check if a parallel orientation of the tow bar with the flight direction axis is present

- if necessary, adjust the Teleflex rod lenghts by screwing/unscrewing the fork ends on the upper end (connected to the rudder pedal torque tubes)
- Secure by tightening the counter nuts at the fork ends

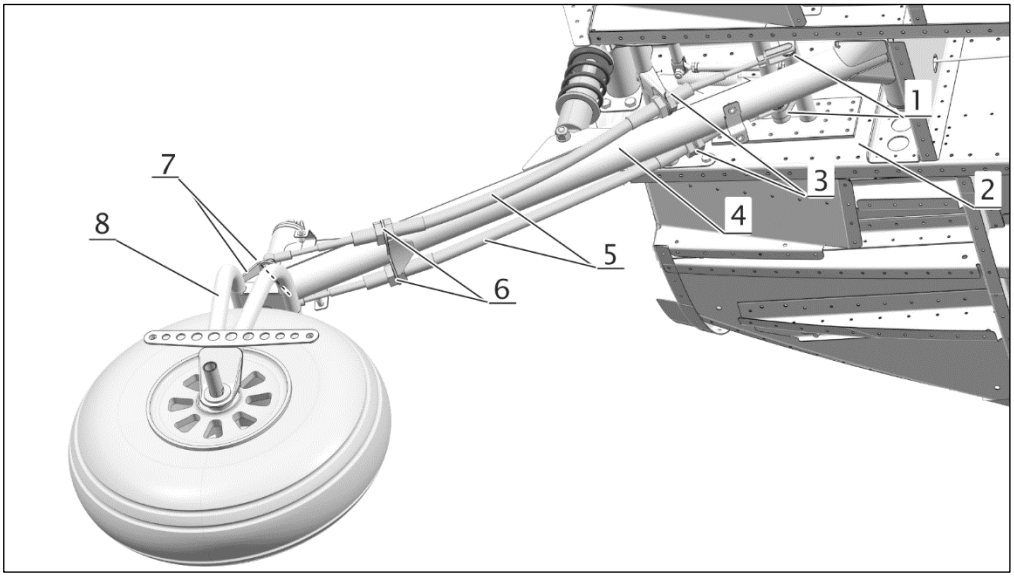


Figure 9 *Nose Gear Steering*

Item	Description	Item	Description
1	Steering levers	2	Nose gear channel
3	Brackets (upper)	4	Nose gear leg
5	Teleflex cable	6	Brackets (lower)
7	Steering brackets	8	Nose wheel fork

33 Lights

Table of Contents

33-00 General

Airplane lighting consists of instrument lighting and external lighting.

33-10 Flight Compartment

33-10-01 Interior Lights

Displays, autopilot control, transponder, trim indicator have their own illumination. The Garmin system related brightness can be dimmed manually or automatic by a light sensor (pilot choice).

The trim indications can be dimmed by switching on the DAY/NIGHT-switch. To allow clearly readable inscription at night, a strip of red LEDs on the bottom side of the glareshield is installed. The light intensity is adjustable by rotating the dimming knobs.

33-40 Exterior

External lighting consists of position and strobe lights and of landing lights.

33-40-01 Strobe/Position Lights

Navigation LED-type lights are located in the wing tips and are switched by the switch NAV-L and strobe lights are switched by the switch STROBE. Wiring diagram of external lighting is shown in Chapter 91.

Removal

Tools needed:	screwdriver

- ► Remove bolts attaching the strobe/position lights to the wing tip, thus releasing the lights.
- ► Remove strobe/position light and disconnect the wire.

Installation

Tools needed:	screwdriver

- ► Connect the strobe/position lights wire.
- ► Set the strobe/position light to the wing tip and fasten it with bolts.

NOTE **Before installing the strobe/position light thoroughly clean the contacting surfaces on the light and on the wing tip of the putty residues.**

- ► Seal the position light edges by PU 50 Emfimastic sealer to prevent water from in leaking under the position light.

33-40-02 Landing Light

The LED-type landing lights installed in the leading edge of each wing are switched by the switch LDG/WIGWAG. Wiring diagram of external lighting is shown in Chapter 91.

Removal

Tools needed:	Allan wrench size 3 mm Screwdriver

- Remove acryl cover bubble from the landing light box by unscrewing the screws on top and bottom of the bubble
- Unscrew the 4 screws on the light panel
- Disconnect the wires on the rear side of the light panel

Installation

Tools needed:	Allan wrench size 3 mm screwdriver

- Reconnect the wires to the light panel
- Push cables through the corresponding opening in the landing light box
- Secure with 4 screws
- Install acryl cover glass

34 Navigation

Table of Contents

34-00 General

34-10 Flight Environment Data

34-10-10 Pitot/Static System

The Pitot tube to sense total pressure is located under left wing. The total pressure is sensed through the hole in the pitot-tube face. Static pressure ports are located on both sides of the fuselage, at the tail. The pitot tube also contains a second hole for AOA sensing by the G3X system. Pressure distribution to individual instruments is performed by means of flexible plastic hoses.

Static pressure and the total pressure are lead to the GSU73 ADAHRS and to the L3 ESI-500 for independent indication.

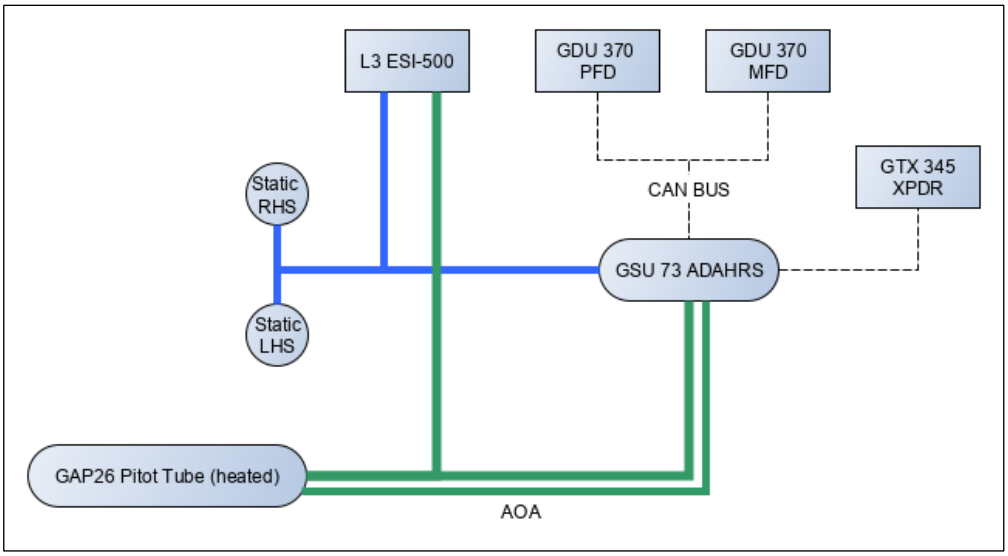


Fig. 1 *Scheme of Pitot-Static System*

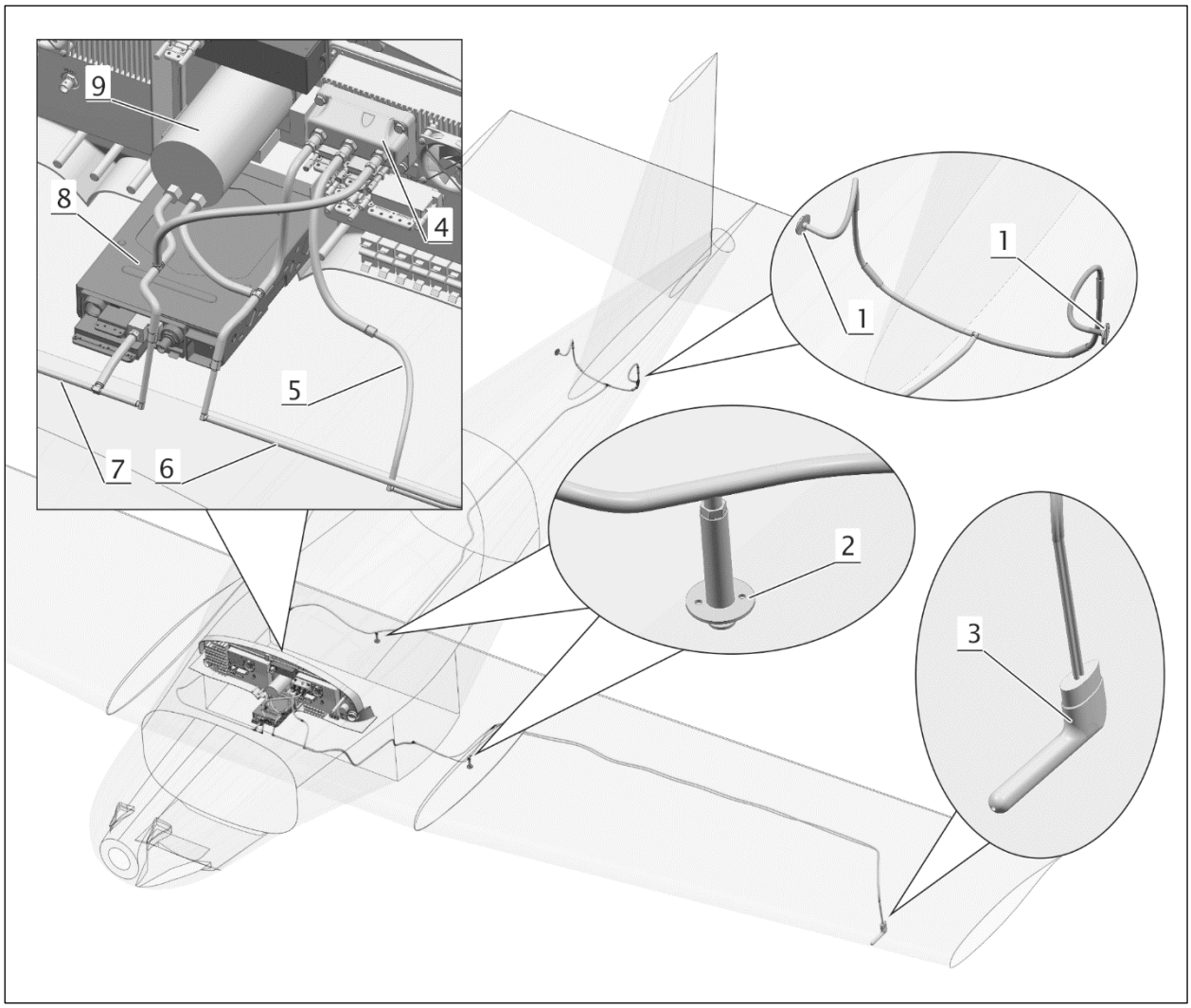


Fig. 2 Pitot-Static System

Item	Description	Item	Description
1	Static pressure port	2	Drains
3	GAP 26 Pitot tube	4	GSU 73 ADAHRS
5	AOA sense line	6	Total pressure line
7	Static pressure line	8	Transponder
9	L3 ESI-500		

Checks

System Tightness Test

Static system

- Seal the one static port
- On the other connect airtight a tube/hose.

- Create an under pressure by sucking on the tube/hose corresponding to altitude of 1000 ft
- Seal the tube/hose
- Drop in the indicated altitude per one minute must not exceed 100 ft.

Pitot system

- Put a hose on the pitot tube and seal airtight
- Put pressure on the system corresponding to a speed of 100 knots
- Seal the hose
- Drop in speed for 1 minute must not exceed 5knots

34-10-11 Pitot Tube

Removal

Tools needed:	Electric drill drill bit diam. 1/8 in pliers, cutting pliers

- Drill out rivets attaching the bracket with the Pitot tube to the wing and pull out a bit the Pitot tube with hose from hole in wing.
- Remove the tightening strip from hose.
- Disconnect the red hose for total pressure from the Pitot tube.
- Disconnect the green hose for AOA sensor from the Pitot tube.
- Disconnect wires for Pitot tube heating.

Installation

Tools needed:	Hand riveter pliers, cutting pliers

- Connect wires for Pitot tube heating.
- Connect the hoses to the outlet of the Pitot tube and secure it with tightening strips.
- Insert the Pitot tube in the bracket.

- Attach the bracket by means of rivet (poprivet 3,2x6,0 type 10013206) to the lower skin of the wing
- Carry out check of pitot-static system tightness (see 12.4.1).
- Check, that pitot-tube is parallel to bottom wing skin.

34-20 Attitude & Direction

34-20-11 Electronic Magnetometers

Two electronic magnetometers are installed to the aircraft. One on each wing side. The RHS magnetometer is the Garmin GMU22 and the LHS is L3 MAG-500. Both do not require compensation. The access to the magnetometers is provided by hatches close to the wing tips on the lower side of the wing.

NOTICE

Damage to electronic parts possible!

- **Do not use magnetic tools to open the access hatch.**

34-20-12 Magnetic Compass (if installed)

The magnetic compass is designed to determine magnetic course of the airplane. The magnetic compass is positioned on the upper edge of the instrument panel and consists of the vessel filed with non-freezing liquid with the little window in the front wall. The compass rose is positioned on the rotary and swinging pivot inside the compass.

Compensation

Rules for doing compensation of the magnetic compass

- Compass compensation must be performed on the approved compass bases, which are at least 100 m (300 ft) from steel structures, electric leading or other over ground or underground steel equipment or objects.
- 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.

Compensation Procedure

- Turn the airplane to "N" heading, eliminate the deviation by "N-S" screw.

- Turn the airplane to "S" heading, reduce the found out deviation to the half-value by "N-S" screw and write down the rest of the deviation.
- Turn the airplane to "E" heading, eliminate the deviation by "E-W" screw.
- Turn the airplane to "W" heading, reduce the found out deviation to the half-value by "E-W" screw and write down the rest of the deviation.
- Turn the airplane by grades indicated in the compensation report (see Table 1) and write down individual deviations in the table.
- After finishing compensation of the magnetic compass fill out the deviation card (see Fig. 3) and place it near the magnetic compass in the airplane.

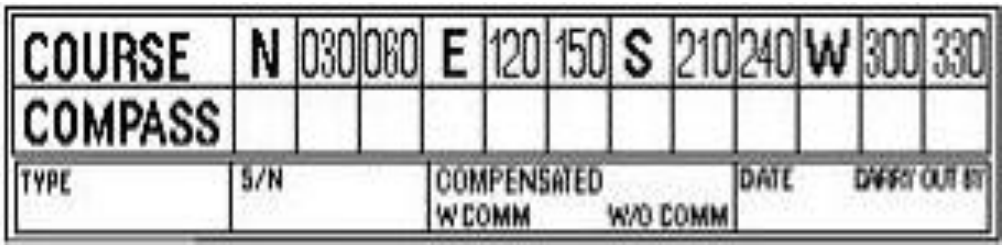


Figure 3 *Example of the Deviation Card*

REPORT OF MAGNETIC COMPASS COMPENSATION					
Aircraft		**Registration mark**		Serial No.	
Compass Type:					
Compass Serial No.:					
All instruments switched on to achieve simulated flight conditions					

Course	**Engine running (throttle in cruise position)**	
	Measured	**Deviation**
N		
030		
060		
E		
120		
150		
S		
210		
240		
W		
300		
330		

Date:		**Time:**	
Compensation conforming:		YES – NO	
Note:			
Elaborated by:	**Signature:**		**Date:**
Checked by:	**Signature:**		**Date:**

Table 1 Compensation Report

51 Standard Practices and Structures – General

Table of Contents

51-00 General

51-00-01 Access Panel Identification

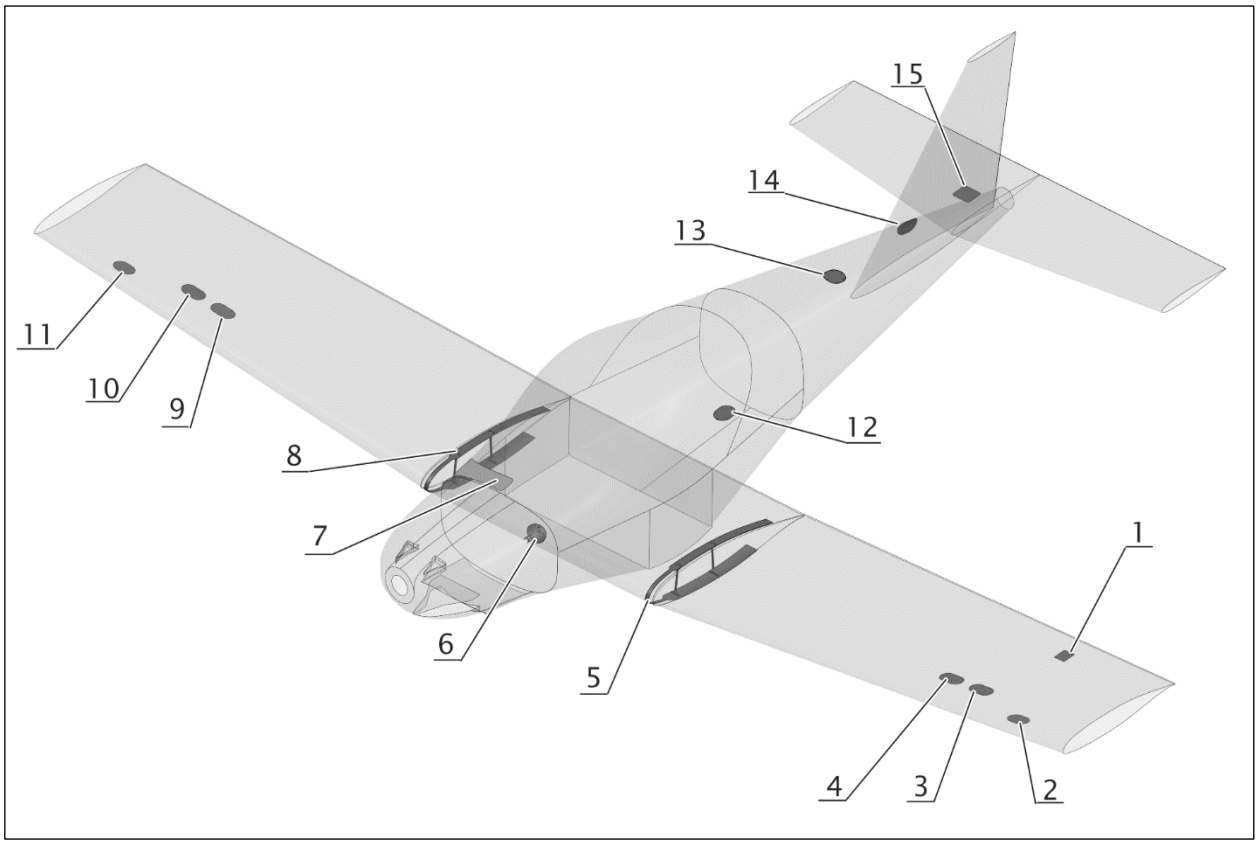


Fig. 1, Sheet 1 Access Panel Identification (outside)

Item	Description	Item	Description
1	Aileron trim access panel	2-4	LH wing access panels
5	LH wing gap cover	6	Oil hatch
7	AEPS (egress) panel	8	RH wing gap cover
9-11	RH wing access panels	12	Bottom fuselage access panel
13	Top fuselage access panel	14	Stabilizer access panel
15	Elevator trim access panel		

Except from the oil hatch, which has a latching mechanism, all access panels are attached to the aircraft skin by means of AN526C832R8 bolts screwed into MS21047L08 anchor nuts.

The wing gap covers are attached to the wing by means of M4x12 ISO 7380-2 A2 bolts with 5,3 DIN 6798 ZN serrated lock washers screwed into 9407-40300 nuts.

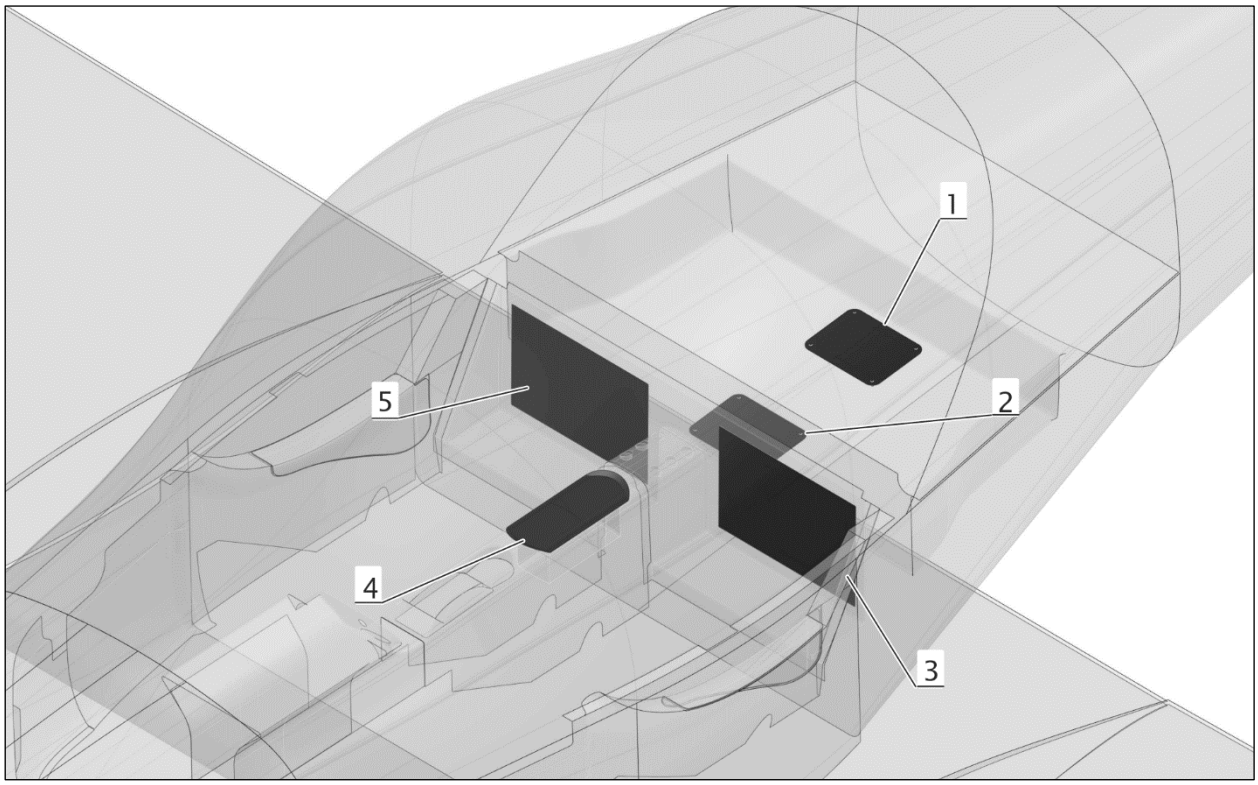


Fig. 1, Sheet 2 Access Panel Identification (inside)

Item	Description	Item	Description
1	Aft cabin floor access panel	2	Forward cabin floor access panel
3	LH cabin access panel (ELT)	4	Armrest cover (flap actuator)
5	RH cabin access panel		

All inside access panels allow access to the elevator and rudder control. Item 3 additionally allows access to the ELT; item 4 to the wing flap control actuator; item 5 to parts of the static system.

Except from the armrest cover all inside access panels are attached by means of M4x12 ISO 7380-2 A2 bolts screwed into 9407-40300 nuts.

51-30 Materials

51-30-01 List of Used Materials for Airframe Production

Prescribed Material		
Designation	Material	Used in … *(example)*
6061 T6	Aluminium	Fuselage structure, skin
7075-T651	Aluminium	Bellcranks in control system
4130 N	Steel	Welded steel parts: engine mount, flap lever assy
1.4301	Stainless steel	Firewall sheet

51-60 Control-Surface Balancing

General

The weight and balance of control surfaces needs to be determined after execution of work on the surface with (potential) change of total mass and/or balancing (example: new paint or other repair).

Refer to the Chapters 51-60-01 thru 51-60-04 for limits of the respective control surfaces.

Procedure

NOTE

Check weighing scale currency of calibration.

- If required: Remove the respective control surfaces from the aircraft.
- Determine total weight of the control surface and enter in respective column of record form.
- Use balancing support mandrels as shown in the following Figure 1:

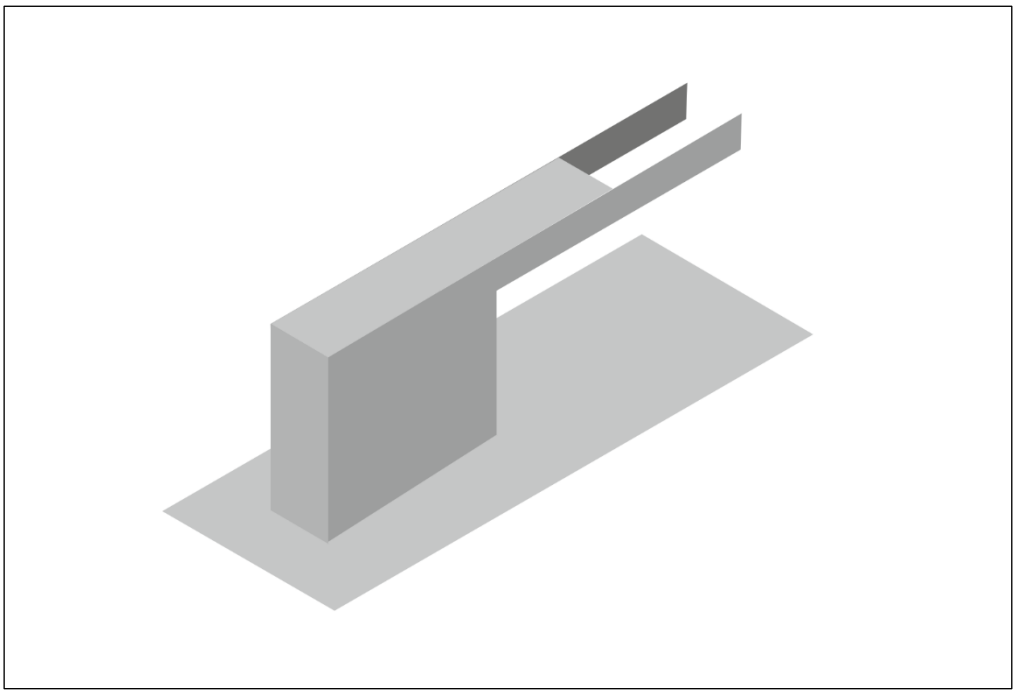


Figure 1 *Balancing Support Mandrel*

- Level the balancing support mandrels to a horizontal attitude.

- Install bolts in two control surface ball bearings (flap, rudder).
- Install a wire in the piano hinges (aileron, elevator, trim tabs).
- Place control surfaces friction free on two mandrels. Bolts in ball bearings need to be in line and aligned horizontally.
- Check that the mandrels do not interfere with the control surfaces.
- Determine control surface support weight at the point of longest moment arm (weighing point) with the surfaces in level attitude. Use a conventional spring balance or table balance.
- Enter the support weights in the table and enter in respective column of record form.
- Measure distances of hinge center line to weighing points and enter the values in record form.
- Calculate the control surface moments and note in record sheet

NOTE

Limits given in the result form are for the finished part with mass balancing weights, trim tabs and surface treatment.

Check that weight and balance are within limits. If rework is required, contact BRM Aero.

(Re-) Install the control surfaces only if the weight and moment values fall within limits.

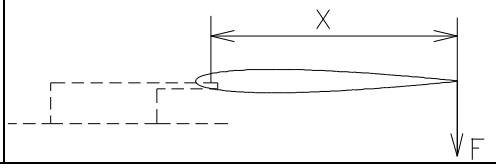
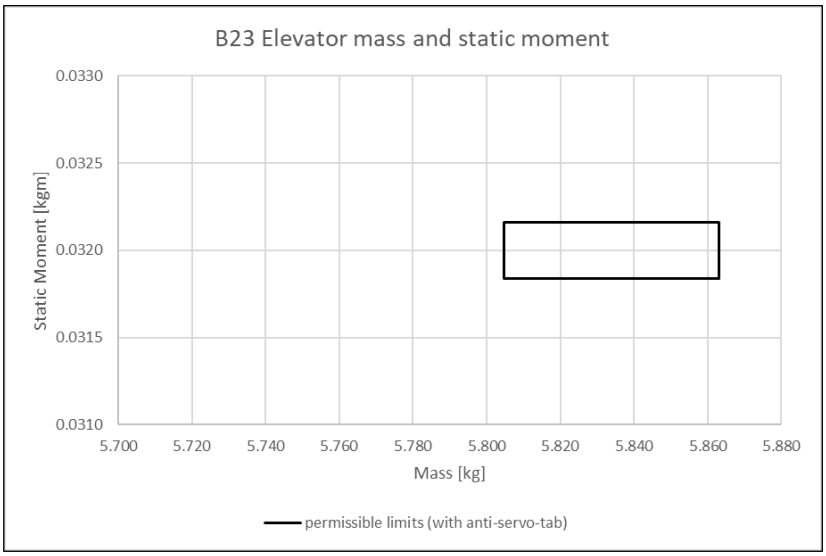
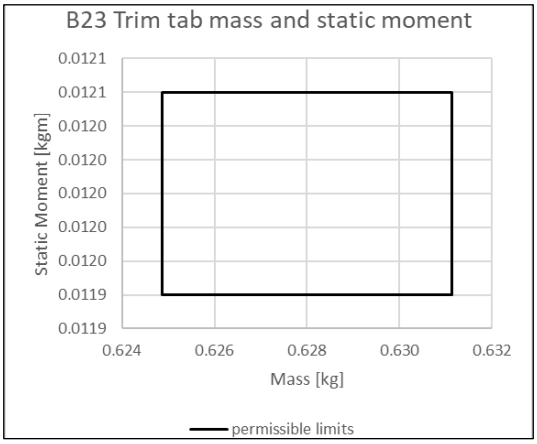
Bristell B23					Registration No:		
		Serial number:			Reason:		
	Mass W [kg]	Limit W_{limit} [kg]	Indicated value F [kg]	Lever arm X [m]	Resulting moment M [kgm]	Limit M_{limit} [kgm]	OK Y/N
Rudder							
Rudder							
Elevator (RH elevator weighing including trim tab)							
Elevator LH							
Elevator RH							
Elevator compl.							
Aileron (RH aileron weighing including trim tab)							
Aileron LH							
Aileron RH							
Flaps							
Flap LH							
Flap RH							
Moments:	M[kgm]= F[kg] * X[m]						
Weighing done by: Name/Date							

Table 1 Record Sheet

51-60-01 Elevator and Tab Limits

	Elevator: (both sides together WITH trim tab; Without trim tab actuation rod)	**Trim tab** (co-acting as anti-servo tab)
Max mass	5.863 kg	0.631 kg
Min mass	5.805 kg	0.625 kg
Max static moment	0.0322 kgm	*0.0119 kgm* [1]
Min Static moment	0.0318 kgm	*0.0121 kgm*



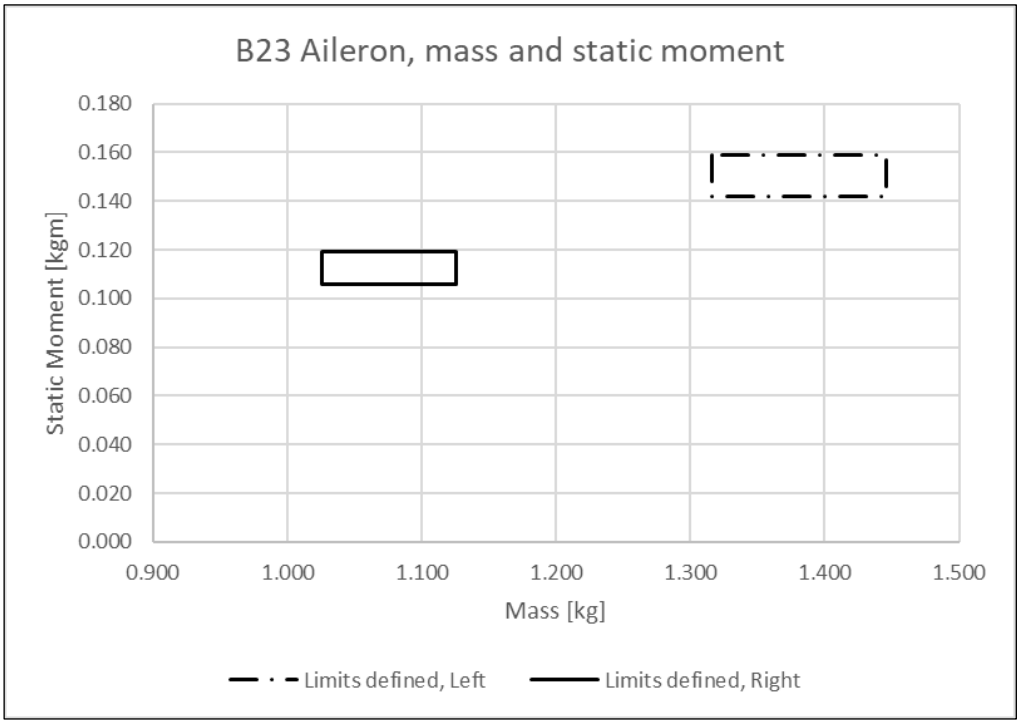


[1] The effect of the trim tab mass on the elevator static moment is significant and can "eat up" the selected permissible tolerance range quite fast. Therefore, the selected tolerances are tight.

On the other side the static moment of the trim tab itself is almost exclusively driven by the surface (CG at half chord) and is not required to be measured.

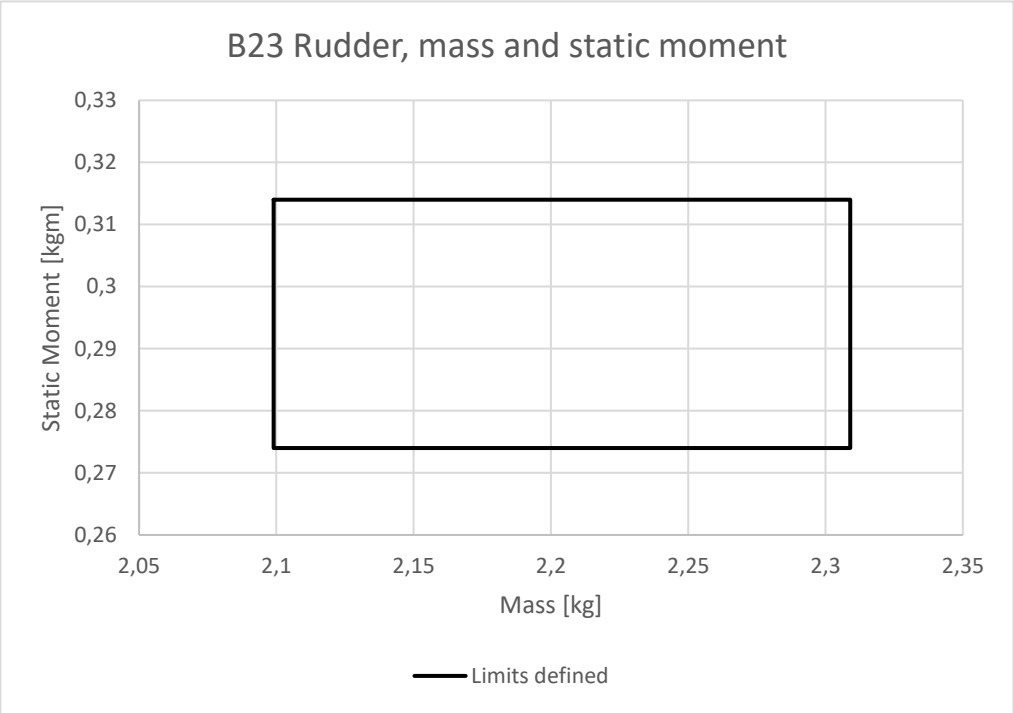
51-60-02 Aileron and Tab Limits

	Left aileron (with trim tab, actuator and actuation rod)	**Right aileron**
Max mass	1.446 kg	1.126 kg
Min mass	1.316 kg	1.026 kg
Max static moment	0.159 kgm	0.119 kgm
Min Static moment	0.142 kgm	0.106 kgm



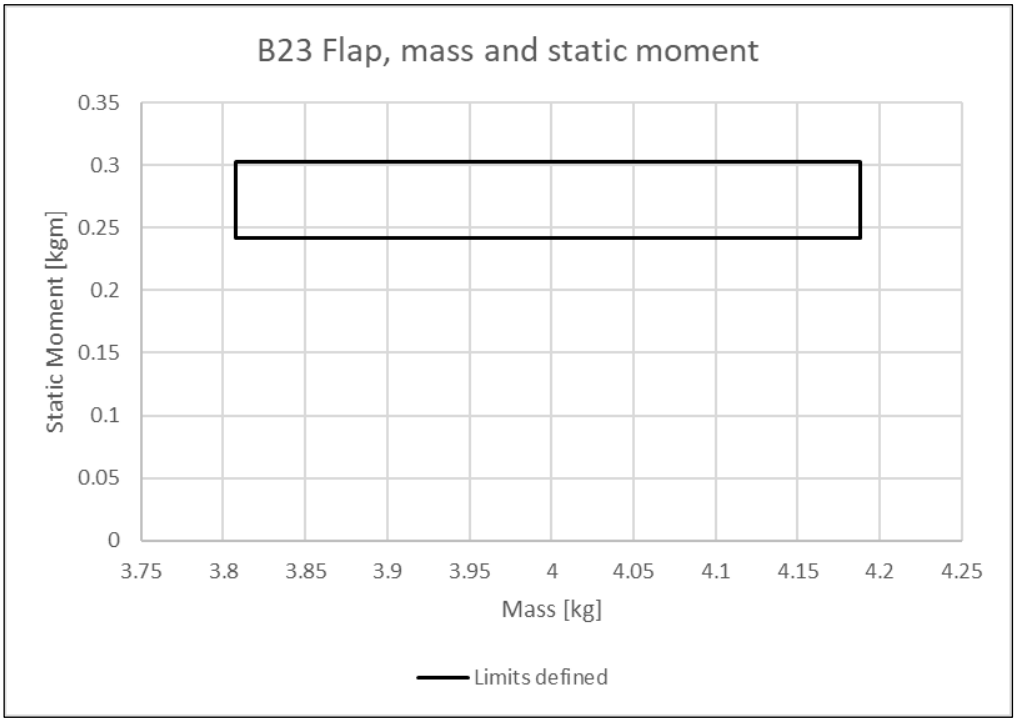
51-60-03 Rudder Limits

	Rudder (including horn and mass balance in horn)
Max mass	2.309 kg
Min mass	2.099 kg
Max static moment	0.274 kgm
Min Static moment	0.314 kgm



51-60-04 Flap Limits

	Flap (each side)
Max mass	4.188 kg
Min mass	3.808 kg
Max static moment	0.303 kgm
Min Static moment	0.242 kgm



51-80 Electrical Bonding

Refer to the following drawings presented in Chapter 91 Charts:

34B220000N_1 and _4

34B240000N_1 thru _6

53 Fuselage

Table of Contents

53-00 General

The fuselage is an all-aluminium structure design formed by bulkheads, stiffeners and surface sheets. The fuselage consists of the front part (between bulkheads No.1 and 6) and the rear part (aft of bulkhead No.6), for bulkhead locations see Figure 1 (circled numbers).

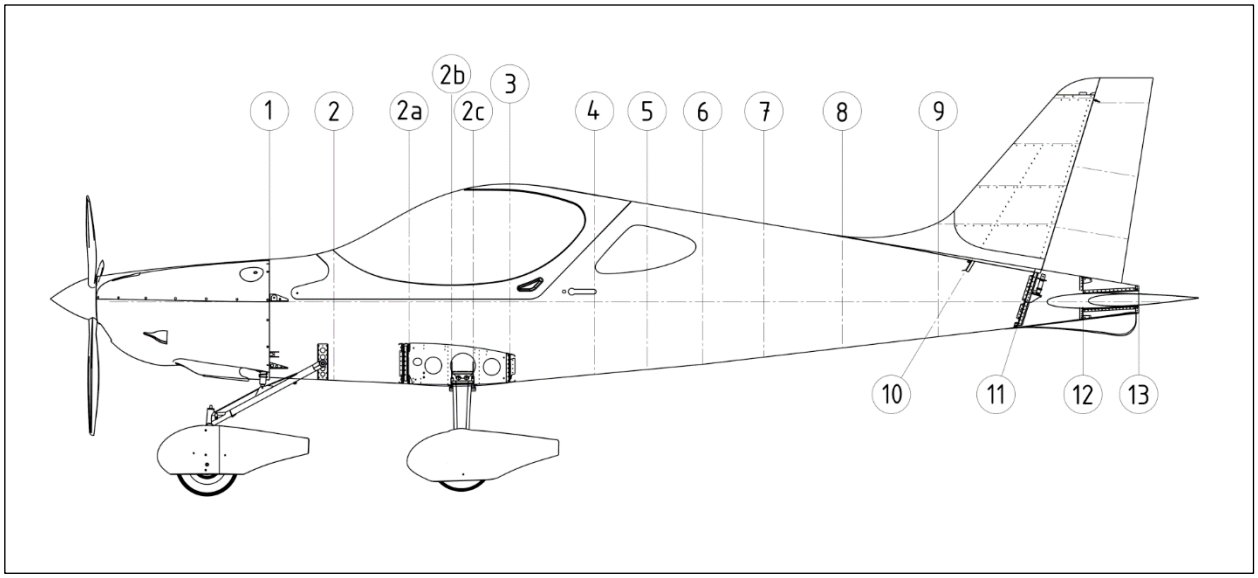


Figure 1 *Fuselage Monocoque with Bulkhead Numbering*

NOTE **Wing & fuselage are not interchangeable hardware; replacing the wings or the fuselage has to be completed in BRM AERO s.r.o. facilities, where the main joints are reamed together in the corresponding jig.**

53-10 Front Part of the Fuselage

53-10-10 Cockpit

The cockpit (see Figure 1) is located in the front part of the fuselage between the bulkheads No.1 and 6. The instrument panel is located on the bulkhead No.2. In the middle of the cockpit there is a middle console with control elements. The cockpit is equipped with two carbon/aramid composite seats.

53-10-11 Luggage Compartment

The luggage compartment is located behind the seats.

53-10-20 Canopy

The canopy (see Figure 2) has a semi drop shape and enables access to the cockpit. The canopy consists of composite structure frame. The canopy is suspended in two swivel hinges on front sides of the composite fixed frame. The canopy can be opened forward and is lightened by a gas strut (6) each side which keep it in the opened position. The canopy outside handles (2) are placed on the fuselage sides below the rear cockpit windows (3). The inside handles (5) are installed inside the fixed frame.

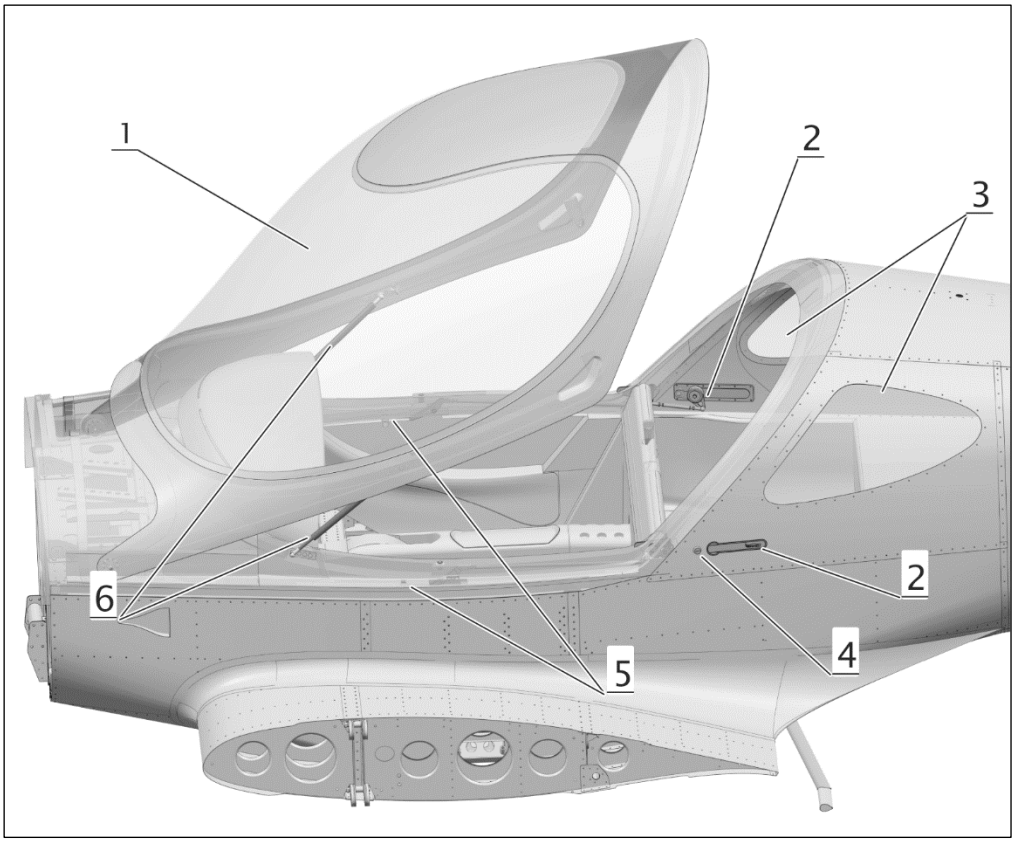


Figure 2 *Canopy and Rear Windows*

Item	Description	Item	Description
1	Canopy	2	Canopy handle outside (left and right)
3	Canopy rear window (left and right)	4	Canopy key lock
5	Canopy handle inside (left and right)	6	Gas strut (left and right)

Removal

Tools needed:	socket wrench 10 mm Allan wrench size 5 screwdriver pliers

Refer to Figure 3.

- Open the canopy (2).
- Remove securing springs (3) from the gas strut rod ends (1)
- Disconnect gas struts (5) on both sides of canopy.
- Disconnect hinge bolt nuts (9) and washer (8).
- Remove the hinge bolts (6) and bushing (7).
- Remove the canopy and store it in a safe place so that windscreen damage cannot occur.

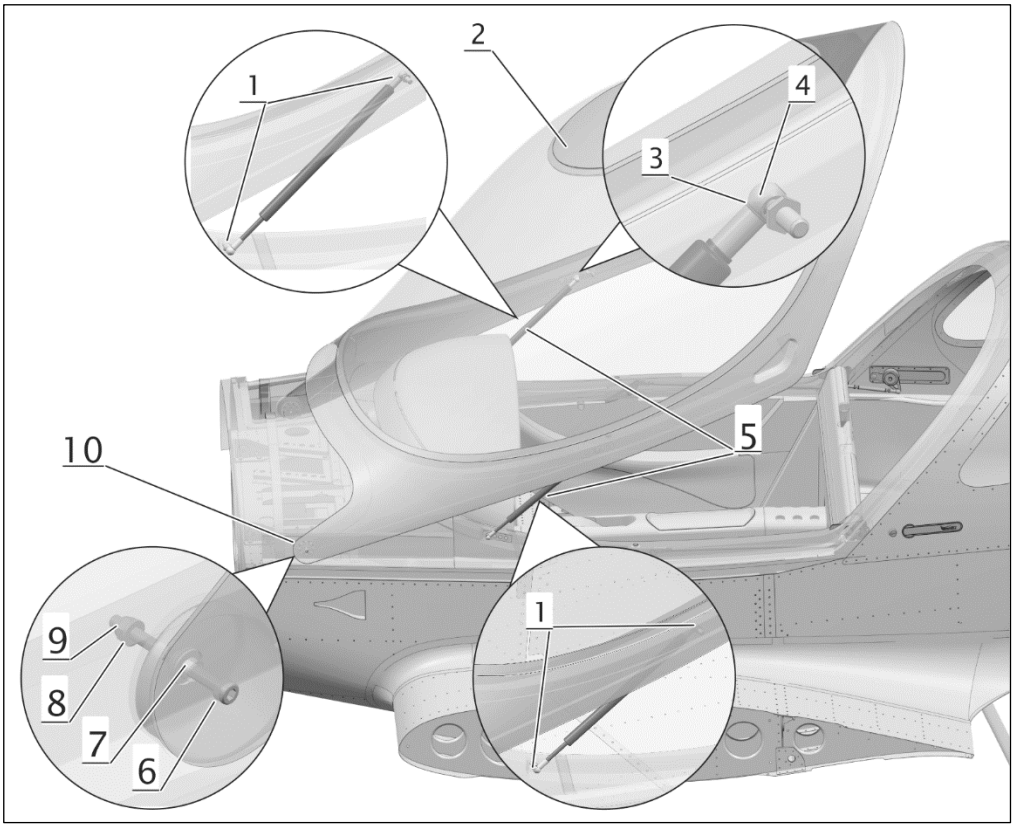


Figure 3 *Canopy Removal/Installation*

Item	Description	Item	Description
1	Gas strut rod end	2	Canopy
3	Securing spring	4	Gas strut ball joint
5	Gas strut	6	Hinge bolt

Item	Description	Item	Description
7	Bushing	8	Washer
9	Hinge bolt nut	10	Canopy hinge

Installation

Tools needed:	socket wrench 10 mm Allan wrench size 5 screwdriver pliers

Refer to Figure 3.

- Set the canopy (2) on the airplane fuselage.
- Insert the bolts (6), bushings (7), washers (8) and the nuts (9) into the hinges (10) of the canopy. Tighten up the joint.
- Insert ends of gas strut (1) in to the pins in the fix frame of the canopy and on the foldable frame, secure the ball joints (4) with the securing spring (3).

53-10-21 Gas Strut

Removal

Tools needed:	screwdriver pliers

Refer to Figure 3.

- Open the canopy and fix it against closing after gas strut removal.
- Remove the securing spring (3) from the gas strut pin on foldable canopy frame and on the fixed frame.
- Remove the gas strut. Beware of canopy closing!

Installation

Tools needed:	pliers

Refer to Figure 3.

- Ensure the strut is not damaged.
- Insert top rod end (1) on the gas strut pin, bottom rod end (1) on the pin on the fixed frame and secure it with securing springs (3).

53-10-22 Canopy Lock

There are two locks, on the left, and on the right side of the canopy.

Removal

Tools needed:	Allen wrenches screw driver wrench size 8mm

Refer to Figure 4.

- Remove the seat backrest on the cockpit side you intend to remove the lock as per Chapter 25-10-01.
- Use Allen wrench to unscrew the screws and remove the access hole cover.
- Put your hand inside the access hole and disconnect the safety wire of the ball joint connected to the outer handle lever
- Disconnect the aft rod (8) by disconnecting the ball joint
- Use wrench to remove the bolt on the cover of the control handle assembly
- Remove the lock mechanism cover and lock mechanism through access hole

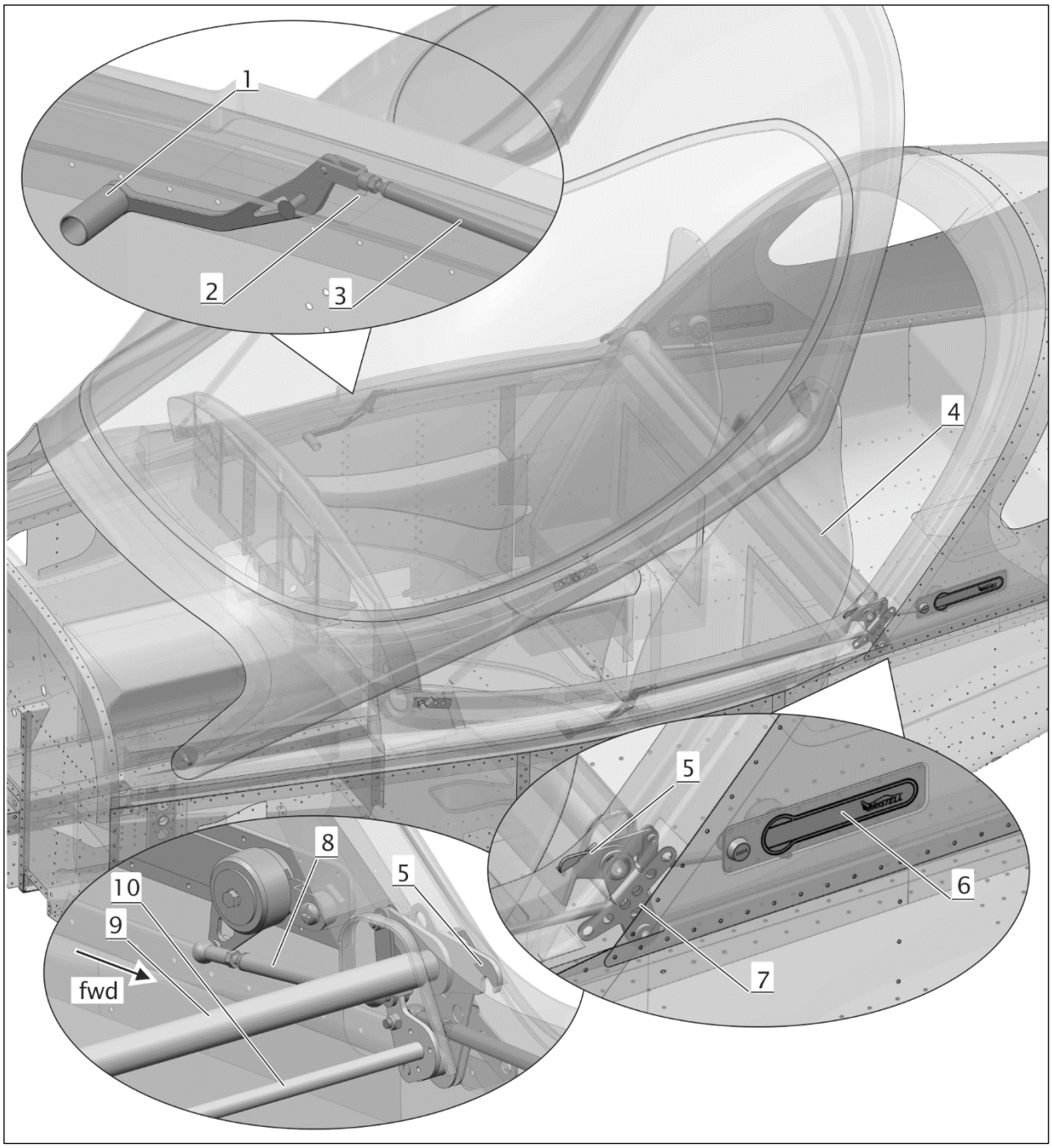


Figure 4 Canopy Lock, Removal/Installation

Item	Description	Item	Description
1	Inner handle	2	Rod pin safety spring
3	Forward rod	4	Cover
5	Lock	6	Outer handle
7	Bracket	8	Aft rod
9	Lock torque tube	10	Handle torque tube

Installation

Tools needed:	screw driver Allen wrenches wrench size 8mm

Refer to Figure 4.

- Insert the lock mechanism and lock mechanism cover through the access hole
- Install the lock mechanism and lock mechanism cover
- Secure with bolt
- Install the aft rod (8) by pushing on the ball joint
- Secure with ball joint safety wire
- Close the access hole cover.
- Install the seat backrest

53-10-23 Rear Canopy Windows

The fixed rear canopy windows (see 3, Figure 2) are riveted and glued (SCS2000E Silpruf) on the fuselage side skins.

53-10-30 Wing Centre Section

The centre section of the wing is an integral part of the fuselage and contains the main spar attachments located at bulkhead No.3 and the rear spar attachments located on the bulkhead No.5. Main landing gear attachment points are located behind the main spar.

53-10-40 Engine Mounts

Top engine mount attachment points are located on the cross channel behind bulkhead No.1. Bottom attachment points are located on the cockpit floor and connected with reinforcement channels under the floor.

53-20 Rear Part of the Fuselage

The rear part of the fuselage is located between bulkheads No.6 and No.13. It has an elliptic cross section. The fin with rudder attachments

and stabilizer attachments is an integral part of the fuselage. The bulkheads No.12 and 13 form the stabilizer attachment points.

55 Stabilizers

Table of Contents

55-00 General

The BRISTELL B23 tail unit generally is an all metal design (riveted aluminium). Elevator tips and fuselage/tail cover are composite parts.

55-10 Horizontal Stabilizer

The horizontal stabilizer (1) (see Figure 1) is an all-metal structure consisting of two aluminum spars, eight ribs and aluminum skins. The tips are made from composite. The horizontal stabilizer is mounted to the fuselage by means of front and rear attachments (see Figure 2). The front attachments consist of two mandrels (2), which are riveted on bulkhead No. 12 and bushings riveted on front stabilizer spar. The rear attachments consist of two brackets (5) riveted on rear stabilizer spar, which is bolted on top and bottom part of bulkhead No. 13.

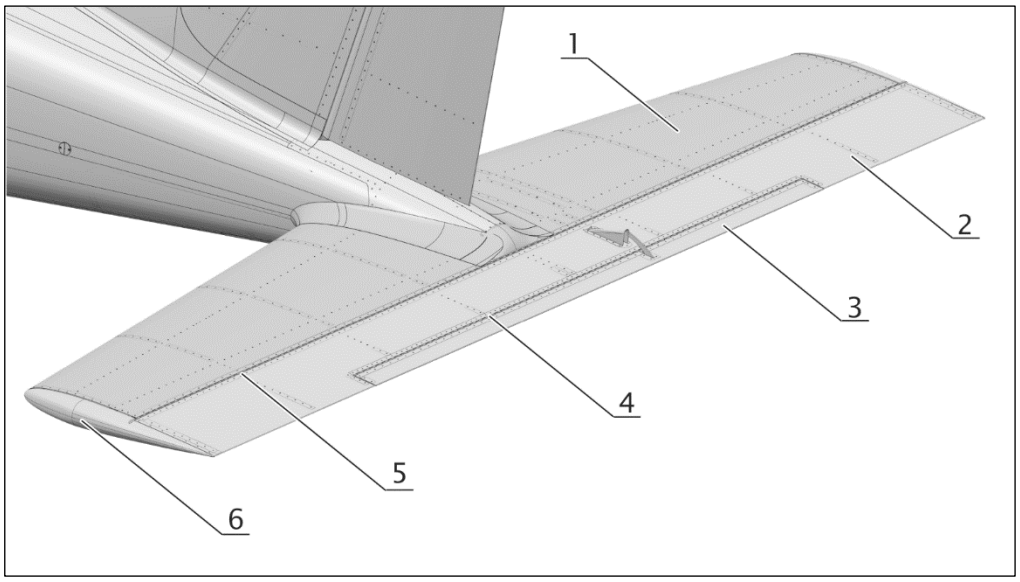


Figure 1 *Horizontal Stabilizer with Elevator*

Item	Description	Item	Description
1	Horizontal stabilizer	2	Elevator
3	Trim tab	4	Piano hinge trim tab
5	Piano hinge elevator	6	Elevator tips with mass balance

Removal

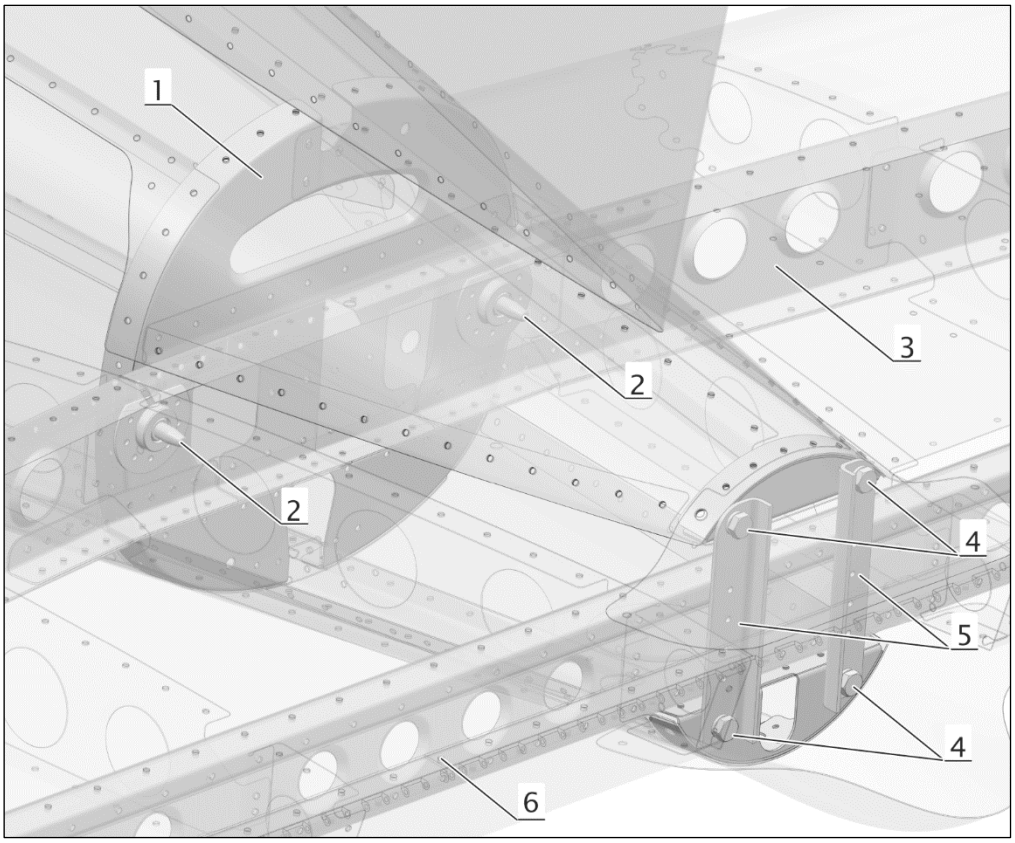


Figure 2 *Horizontal Stabilizer Removal/Installation*

Item	Description	Item	Description
1	Bulkhead 12	2	Mandrel
3	Stabilizer front spar	4	Bolts
5	Brackets	6	Stabilizer rear spar

Tools needed:	wrench size: 7/16 in screwdriver wire nippers

- Remove the screws from top and bottom side of composite cover between fuselage and stabilizer.
- Remove the composite covers (top and bottom)
- Remove bolts (4) , washer and nuts and afterwards the brackets (5) on the bulkhead No. 13.
- Disconnect trim tab actuator wires (see Chapter 27-00-03) located between stabilizer and fuselage.
- Disconnect elevator control rod end.

- Pull out the stabilizer in horizontal direction off the mandrels (2) and store it in such a way that a damage cannot occur.

Installation

Tools needed:	wrench size: , 7/16 in screwdriver pliers

- Clean mandrels on the fuselage and apply lubricant grease on it.
- Put the horizontal stabilizer from behind to the fuselage so that it slides on two mandrels on bulkhead No. 12
- Install the brackets (5) and secure with the 4 bolts (4), install washers and secure with nuts.
- Connect the trim tab actuator wires (see Chapter 27-00-03) located between the stabilizer and fuselage.
- Connect the elevator control rod with the control lever.
- Install the composite covers on bulkhead No.13.
- Screw back the screws on covers
- Check proper trim tab operation and elevator deflections (see Chapter 20-60-01), adjust elevator deflections if necessary as per Chapter 20-50-01).

55-20 Elevator

The elevator (2) (see Figure 1) is an all-metal structure and consists of aluminum skin, spars and ribs riveted together. The control lever is riveted between the middle elevator ribs. Elevator composite tips (horns) with mass balance inside (6) are riveted to the outboard ribs. The elevator is attached to the rear spar by means of piano hinge (5).

55-20-01 Trim Tab

The elevator is equipped with a trim tab (3), made from aluminum sheet. It is attached to the elevator rear spar by means of a piano hinge (4).

55-30 Vertical Stabilizer

The vertical stabilizer (see Figure 2) is an aluminum structure and is an integral part of the fuselage. The vertical stabilizer consists of stiffeners, spar, ribs and aluminum skin. The Individual parts are riveted together. The tip is made from fiberglass.

The vertical stabilizer spar features to hinges (3 and 5) for rudder attachment.

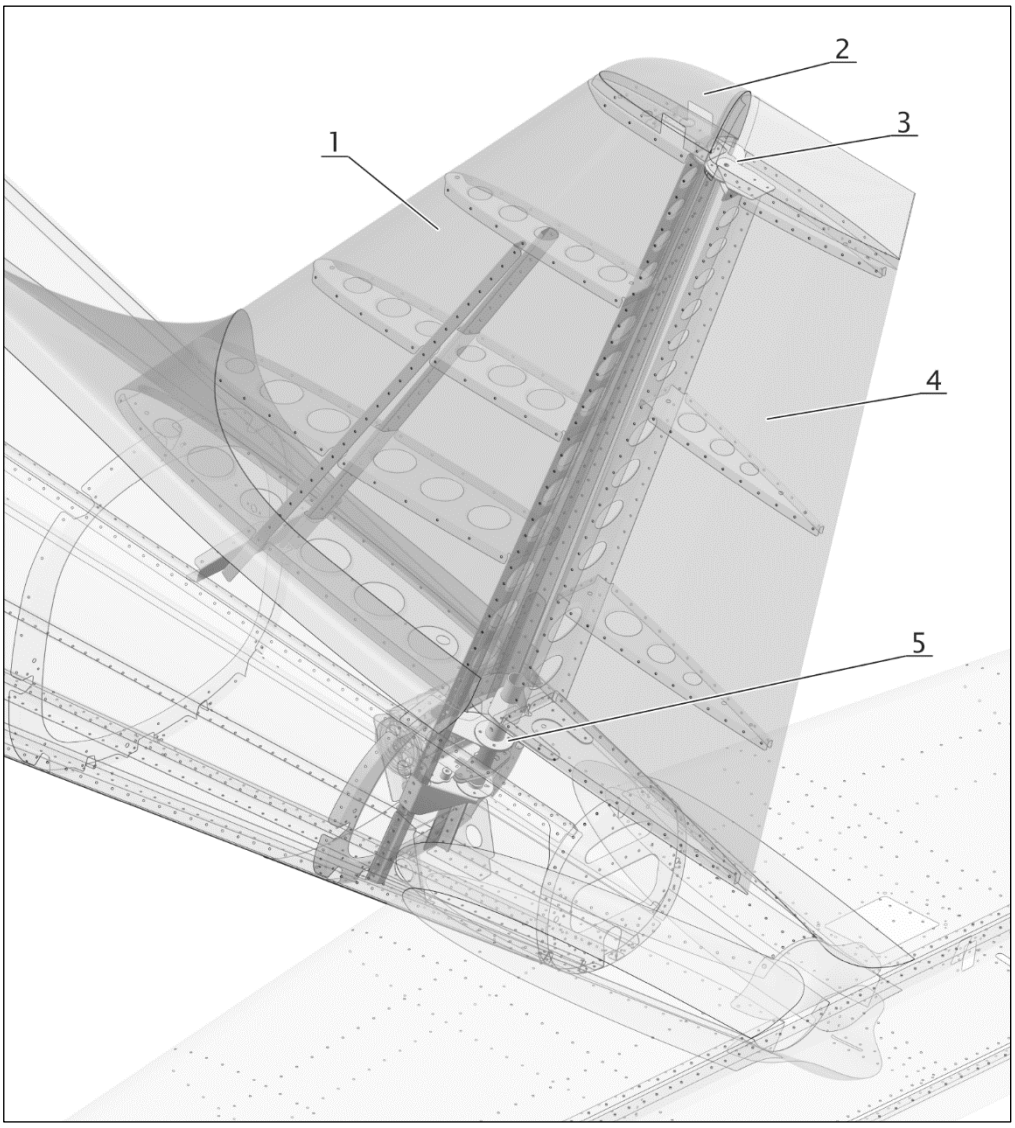


Figure 2 *Vertical Stabilizer with Rudder*

Item	Description	Item	Description
1	Fin	2	Fin tip
3	Top rudder hinge	4	Rudder
5	Bottom rudder hinge		

55-40 Rudder

The rudder (4) is a riveted aluminium structure and consists of a spar, ribs and skin.

The rudder is attached to the vertical stabilizer by two hinges (3 and 5). Bottom hinge (5), which is integral part of control lever is riveted on the root rudder rib. The top attachment (3) is located on the spar.

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57 Wing

Table of Contents

57-00 General

The wing is an all-metal structure with 2 spars and is equipped with flaps, ailerons, fuel tanks and wing lockers.

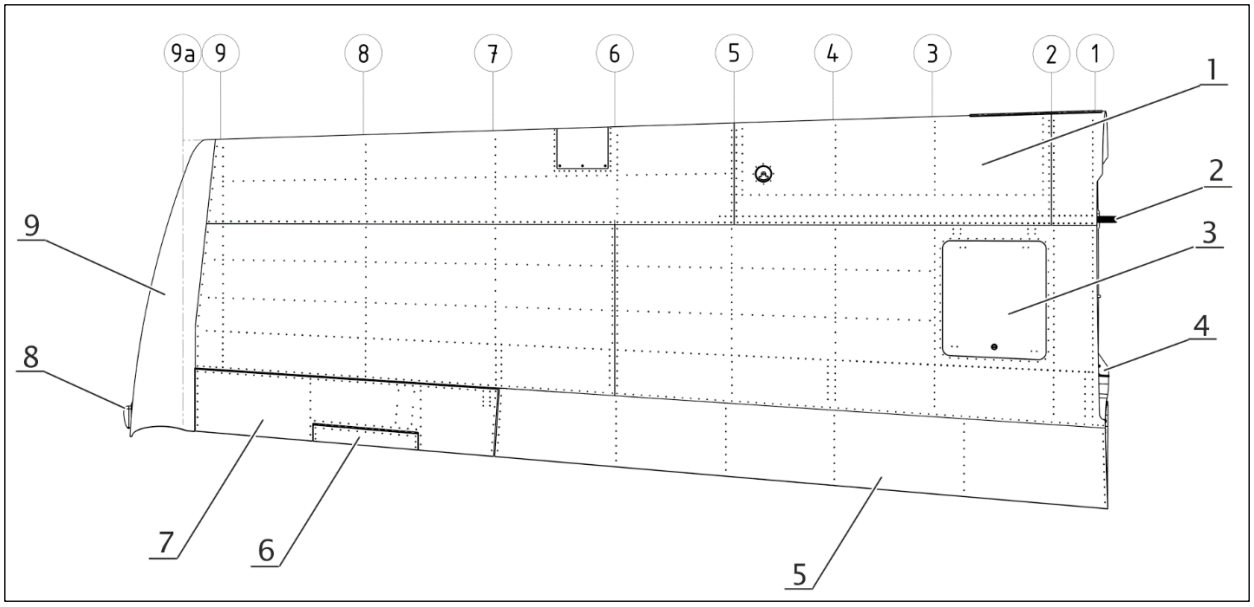

Figure 1 Wing (left)

Item	Description	Item	Description
1	Fuel tank	2	Main upper and lower attachments of the wing
3	Wing locker	4	Rear attachment of the wing
5	Flap	6	Aileron trim tab
7	Aileron	8	Position/strobe light
9	Winglet	①-⑨	Rib numbering

NOTE **Wing & fuselage are not interchangeable hardware; replacing the wings or the fuselage has to be completed in BRM AERO s.r.o. facilities, where the main joints are reamed together in the corresponding jig.**

57-10 Centre Wing

Centre section of the wing is an integrated part of the fuselage and consist of three ribs per side (also refer to Chapter 53-10-30Wing Centre Section).

57-20 Outer Wing

Outer part of the wing consists of 9 ribs and has trapezoid shape (see Figure 1). There are 3 main attachments (positioned on the main spar; one upper & two lower) and one rear attachment (positioned on the rear spar) where outer wing is joined with the center section.

The fuel tanks are integrated part of the wing made from aluminium sheet and their volume is 60 litres each. The tanks are located in the outer wings between ribs No. 2 and 5 in front of the main spar. The ribs and rear tank wall are structurally independent from the main spar and wing ribs.

Removal

Tools needed:	wrench size: 7/8 in, 3/4 in, 1/2 in, 7/16 in screwdriver cutting pliers hammer

- Remove the access cover plates between outer and center wing.
- Disconnect aileron control push rod on the control lever between center wing tip rib and root outer wing rib.
- Extend the flaps to maximum and disconnect rear attachment bolts on rear spar and flap control push rods.
- Disconnect fuel lines, wiring and on left wing also pitot tube hoses and trim tab wire.
- Remove all 4 nuts of main and rear attachments
- One person holds the wing on the winglet side, the second person by the root on the leading edge side and the third person holds the wing by the root on the trailing edge
- Remove all 4 bolts of main and rear attachments, starting by the bottom attachment bolt from the main spar
- Release the wing by slight lifting the wing tip upwards.
- By pulling the wing away from the fuselage, disconnect the outer wing from the center wing.
- Position the disconnected wing in such a way that its damaging cannot occur.

Installation

Tools needed:	wrench size: 7/8 in, 3/4 in, 1/2 in, 7/16 in screwdriver pliers hammer

- Before installation clean the attachments and bolts of the outer and center wing from dirt. Preserve bolts and attachments by means of lubricating grease.
- The first person will hold the wing on the wing tip, the second person near the root on the leading edge and the third person near the root on the trailing edge.
- Set the outer wing carefully with the wing attachments on the center wing so that the attachments on the outer wing and on the center wing are centric.
- The person keeping the wing on the leading edge will insert the first bolt into the upper main attachment (the bolt head is on the flight direction side) and shift it by means of slight hammering until the bolt is completely inserted (shifting can be facilitated by slight moving the wing tip up and down)
- Insert the bolts (2x) into the lower main attachment and shift them by slight hammering until the bolts are completely inserted.
- Insert the remaining bolt into the rear attachment
- Put washers on all attachment bolts and screw nuts on (tightening torque according chapter 20-10-01)
- Connect wiring, fuel hoses and trim tab wire and pitot hoses on the left wing.
- Connect the aileron control push rod on control lever
- Connect flap control push rods
- Install access cover plates between outer and center wing.
- Perform check of the trim tab operation, flaps and ailerons deflections (see Chapter 20-50-01), adjust if needed.

57-20-01 Wing Lockers

Wings are equipped with wing lockers placed between ribs No.2 and 3 aft of the main spar. Capacity of each wing locker is 20 kg. Access doors are suspended on two hinges. They can be locked with a latch.

57-30 Wing Tip

Winglets are produced from composite and are partially enclosed by and riveted to the wing skin. Position lights and anti-collision beacons are installed on the winglets.

57-50 Wing Flaps

The wing flaps (Figure 2) are all-metal structures consisting of the skin (1) aluminum sheet metal, spar (2) and ribs (5) riveted together. The flaps are suspended on the rear spar by means of three hinges (4). There is a control plate (3) on the flap root rib where the flap control pin is connected.

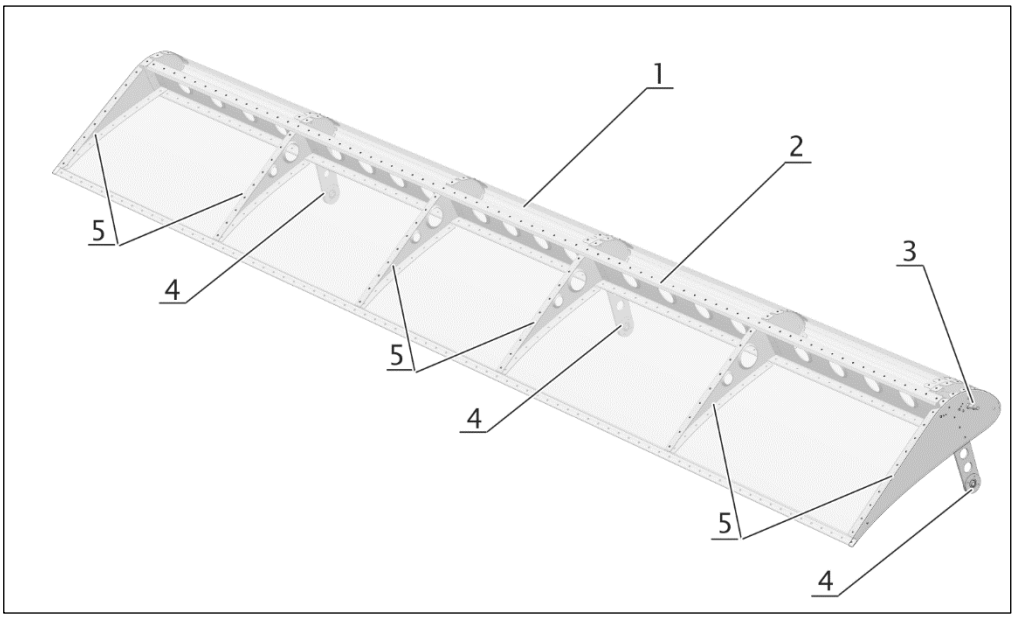

Figure 2 *Wing Flap (left)*

Item	Description	Item	Description
1	Flap	2	Flap spar
3	Control pin	4	Flap hinges
5	Flap ribs		

57-60 Ailerons

The ailerons (Figure 3 and 4) are of aluminum structure consisting of the skin (1) and ribs (4) riveted together. Ailerons are suspended on the rear spar by means of piano hinges (2). A trim tab (5) is installed on the left aileron. Control lever (3) is installed on the root aileron rib.

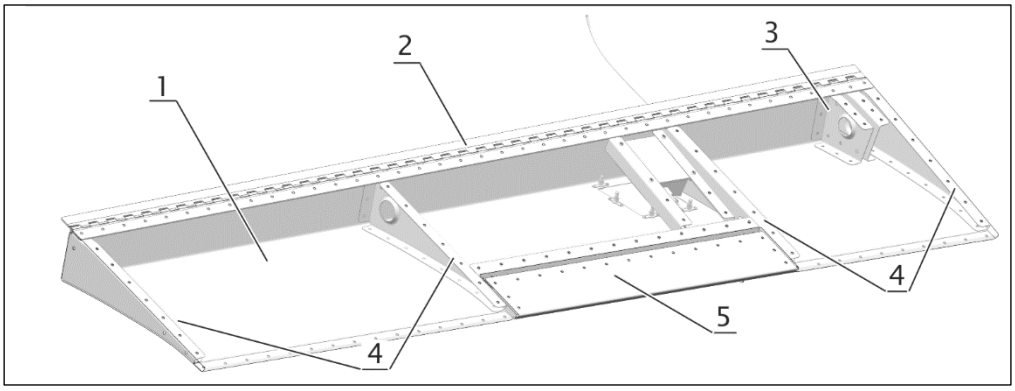

Figure 3 *Aileron (left)*

Item	Description	Item	Description
1	Aileron skin	2	Aileron piano hinge
3	Aileron control lever	4	Aileron ribs
5	Aileron trim tab		

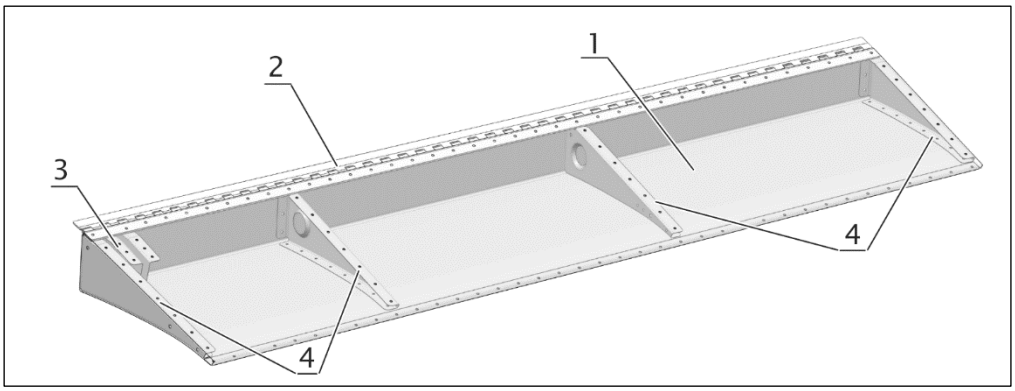

Figure 4 *Aileron (right)*

Item	Description	Item	Description
1	Aileron skin	2	Aileron piano hinge
3	Aileron control lever	4	Aileron ribs

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61 Propeller

Table of Contents

61-00 General

The MTV-34-1-A/175-200 is a new high performance, low weight 3 bladed hydraulic constant speed composite propeller for the ROTAX 912series engine.

The new MTV-34-1-A/175-200 feature the following:

- Low Propeller weight - 9 kg (19,8 lbs) for the 3-blade plus Governor P-110-051/A (1 kg / 2,2 lbs)
- Scimitar blade shape for high performance and noise reduction
- Stainless steel leading edge for all weather operation
- Latest high efficiency airfoils
- Smooth run due to close manufacturing tolerances (CNC machined)
- Vibration approved on the ROTAX 912 series
- EASA certified
- Refer to the documentation supplied with the propeller for more details.

Removal

Tools needed:	wrench size No. 16 (5/8 in)

Refer to Fig. 2.

- ► Disconnect the board battery and remove spark plugs from the engine.
- ► Loosen the bolt (1) from the tension bar (2) and the upper connecting bolt (1) of the external alternator
- ► Remove V-belt (3)
- ► Unscrew the self-locking nuts (4) using nut wrench size 16, remove the washers and take out the propeller along with other parts from the flange.
- ► Put the washers and screw the nuts (4) back on the bolts, securing the pulley carrier (5) and pulley (6) on the propeller flange
- ► Put the protective covers on the propeller blades
- ► Store the propeller on a safe place so that no damage can occur.

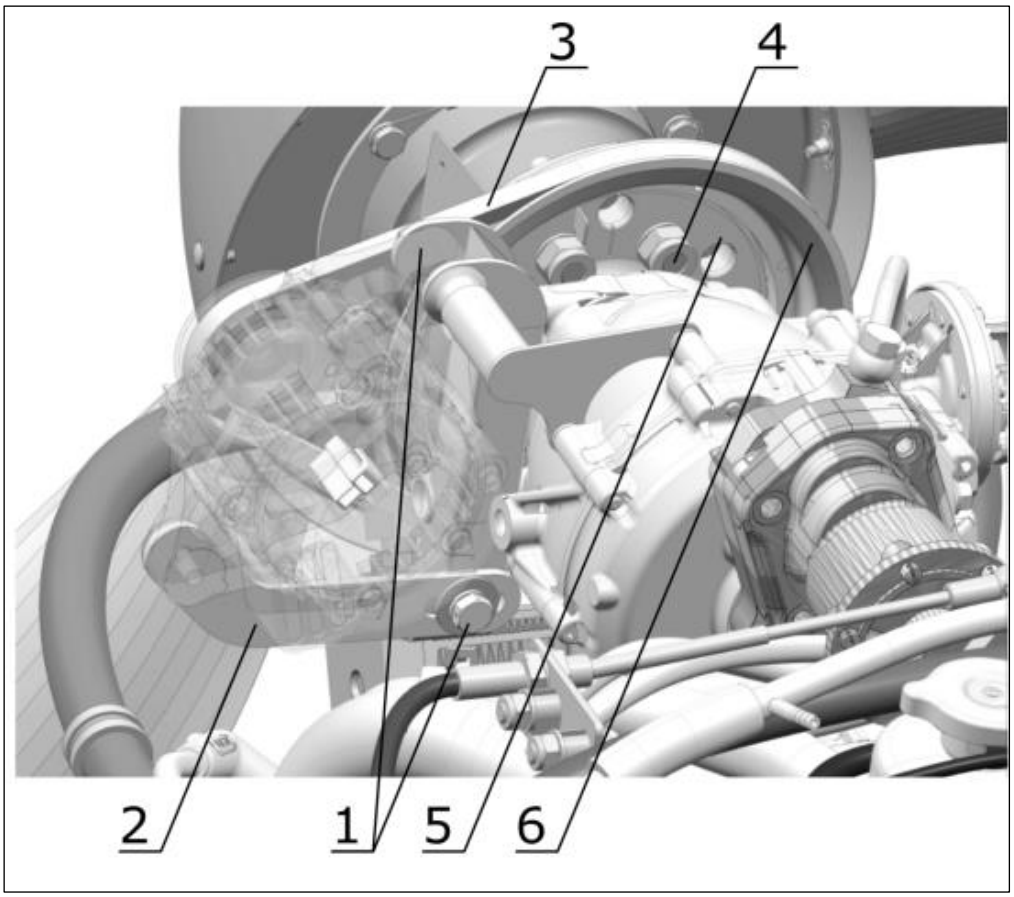

Fig. 2 *Removal/Installation of Propeller*

Item	Description	Item	Description
1	Alternator Bolts	2	Tension bar
3	V-belt	4	Propeller Bolts
5	Pulley carrier	6	Pulley

Installation

Tools needed:	wrench size No. 16 (5/8 in)

NOTE

Follow the instructions in the Operation, Installation, and Maintenance Manual, Section 5. Installation and Operation Instructions to install the MTV propeller.

61-20 Controlling

MTV-34-1-A/175-200 propeller control lever (1) is located together with the throttle control on a quadrant between seats. Propeller control lever is connected through a Teleflex cable (2) with the propeller hydraulic governor (3). Once an engine rpm is selected it will be held constant at variations of airspeed and power.

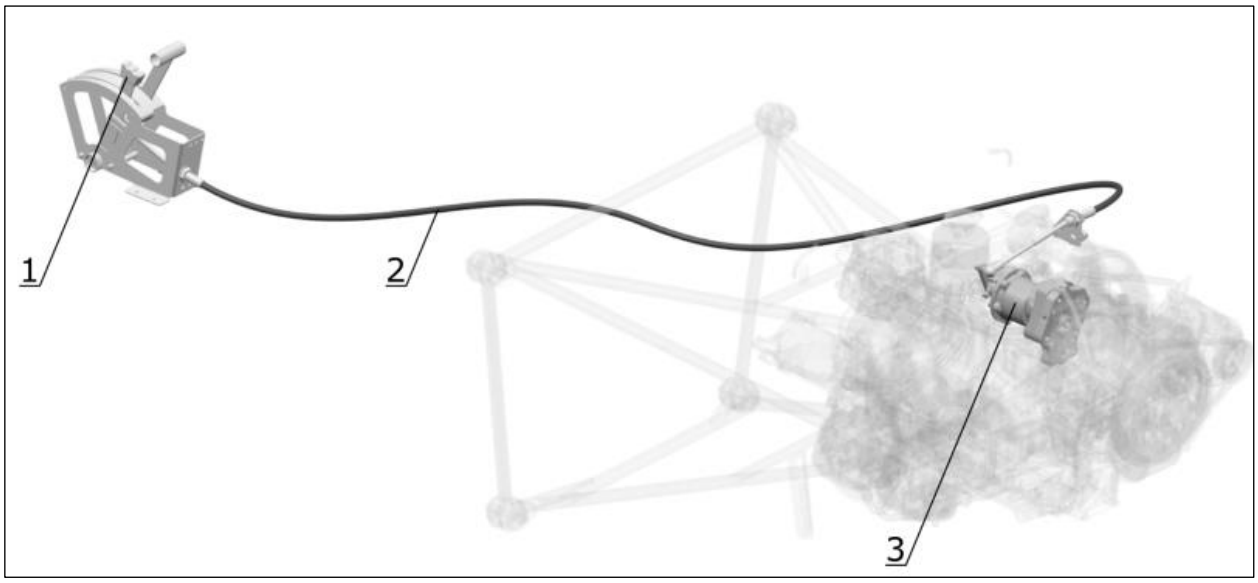

Fig. 3 *Propeller control*

Item	Description	Item	Description
1	Propeller control lever	2	Teleflex cable
3	hydraulic governor		

NOTE **Follow the instructions in the Installation Manual, Chapter 61-00-00 Section 3 for installation and removal.**

71 Power Plant

Table of Contents

71-00 General

Standard power unit of BRISTELL B23 airplane is the ROTAX 912 S3 engine and MTV 34 1 A/175-200 in flight adjustable 3-blade propeller. Both, engine (EASA-TCDS E.121) and propeller (EASA-TCDS P.049) are certified.

ROTAX 912 S3 is a 4 stroke, 4 opposed - cylinder engine, central cam shaft and OHV - mechanism with maximal power of 73.5 kW (98.6 hp) at 5800 RPM.

71-10 Cowling

Engine cowling (Fig. 1) consists of two parts: upper cowling and lower cowling. The upper cowling (1) is attached by means of quick fasteners – Camlocks (4) to the firewall and to the lower cowling (2). Unlock the quick fasteners by turning the bolt by 90° counter-clockwise. The access cover (5) which is located on the upper cowling on the left side in front of the firewall enables to check oil quantity in the oil tank without removing the upper cowling and without the use of tools.

The lower cowling (2) is attached by means of quick fasteners to the firewall and to the upper cowling (1). In the front part of the lower cowling (2) there is an oval hole (3) for air inlet to the oil radiator. In the bottom part of the lower cowling (2) is NACA scoop for air intake to the water cooler (7).

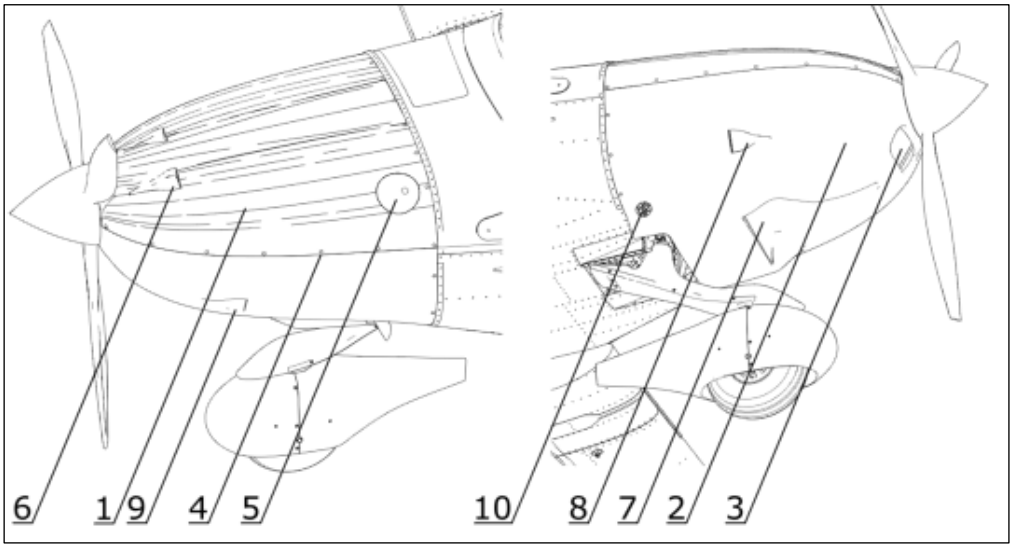

Fig. 1 *Engine Cowling*

Item	Description	Item	Description
1	Engine upper cowling	2	Engine lower cowling
3	Air inlet hole for oil radiator	4	Quick fasteners – Camlocks
5	Access cover to oil tank	6	Ram air NACA scoops
7	Water cooler NACA scoop	8	Ram air to airbox NACA scoop
9	Ram air to heating system NACA scoop	10	Gascolator hole

71-20 Mounts

The engine mount connects the power unit to the airplane. It is welded from 4130 steel tubes and is attached to the firewall and to the engine by means of bolts. The engine mount is installed on the firewall by four attachments through rubber shock absorbers. The scheme of engine mount attachment to the firewall and to the engine is shown in the Fig. 2.

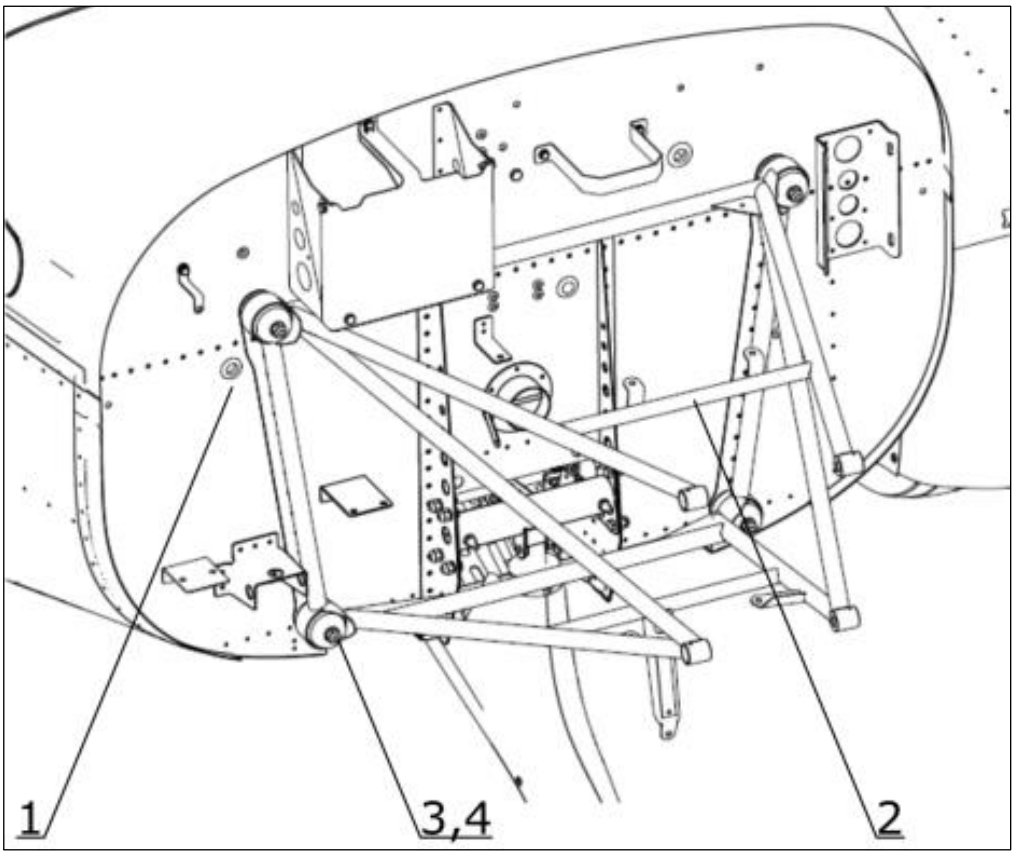

Fig. 2 *Rotax Engine Mount*

Item	Description	Item	Description
1	Firewall	2	Engine mount
3	Attachment bolts with shock absorbers	4	Nyloc nut

72 Engine

Table of Contents

72-00 General

ROTAX 912 S3 is a four-stroke, four-cylinder, opposed - cylinder engine, central cam shaft and OHV - mechanism with maximal power of 73.5 kW (98.6 hp) at 5 800 RPM.

Technical Data

Engine Model:		**ROTAX 912 S3**
Engine Manufacturer:		**Bombardier-Rotax GMBH**
Power	***Max Take-off:***	**100 hp at 5800 rpm, max.5 min.**
	Max. Continuous:	**92.5 hp at 5500 rpm**
	Cruising:	**68.4 hp at 5000 rpm**
Engine RPM	***Max. Take-off:***	**5800 rpm, max. 5 min.**
	Max. Continuous:	**5500 rpm**
	Cruising:	**5000 rpm**
	Idling:	**~1400 rpm**
Cylinder head temperature (CHT) Older engines S/N without Suffix -01	***Minimum:***	**50 °C (122 °F)**
	Maximum:	**135 °C (275 °F)** **conventional coolant** - permanent monitoring of coolant temperature and CHT is necessary **Waterless coolant** - permanent monitoring of CHT is necessary
	Optimum:	**80 – 110 °C (176-230 °F)**
Coolant temperature (CT) New engines S/N with Suffix -01	***Minimum:***	**50 °C (122 °F)**
	Maximum:	**120 °C (248 °F)** only conventional coolant allowed
	Optimum:	**80 – 110 °C (176-230 °F)**
Oil temperature	***Minimum:***	**50 °C (122 °F)**
	Maximum:	**130 °C (266 °F)**
	Optimum:	**90 – 110 °C (190-230 °F)**
Oil pressure:	***Minimum:***	**0.8 bar (12 psi) - *below 3500 rpm***
	Maximum:	**7 bar (102 psi) - cold engine start**
	Optimum:	**2 - 5 bar (29 – 73 psi) - *above 3500 rpm***
Exhaust gases temp.	***Maximum:***	***880 ° C* (1616 °F)**

Coolant Type

Ethylene-glycol based with 50% water dilution acc. current version of Rotax Service Instruction SI-912-016.

NOTICE

The conventional (glycol/water) coolant may not be mixed with coolant concentrate (propylene glycol) or with additives.

Type of coolant used by aircraft manufacturer is shown in Chapter 12-10-01.

Fuel Type

General note

NOTICE Obey the local codes and the latest edition of Service Instruction SI-912-016 for the selection of the correct fuel.

NOTICE Use only fuel suitable for the respective climatic zone.

NOTE: Risk of vapour formation if using winter fuel for summer operation.

Knock resistance

The fuels with following specifications can be used:

Fuel specifikationen		
	Usage/Description	
Knock resistance	**912 A/F/UL**	**912 S/ULS**
	Min. RON 90 (min. AKI* 87)	Min. RON 95 (min. AKI* 91)

* Anti Knock Index (RON+MON)/2

MOGAS

	Usage/Description	
Mogas	**912 A/F/UL**	**912 S/ULS**
European standard	EN 228 Normal	
	EN 228 Super	EN 228 Super
	EN 228 Super plus	EN 228 Super plus

AVGAS

AVGAS 100LL places greater stress on the valve seats due to its high lead content and forms increased deposits in the combustion chamber and lead sediments in the oil system.

	Usage/Description	
AVGAS	**912 A/F/UL**	**912 S/ULS**
Aviation Standard	AVGAS 100 LL (ASTM D910)	AVGAS 100 LL (ASTM D910)

Oil Type

General note

NOTICE

Obey the manufacturers instructions about the lubricants.
If the engine is mainly run on AVGAS more frequent oil changes will be required. See Service Information SI-912-016, latest edition.

Oil type

For the selection of suitable lubricants refer to the Service Information SI-912-016, latest edition.

Oil consumption

Max. 0.06 l/h (0.13 liq pt/h).

Oil specification

- Use only oil with API classification **"SG"** or higher!
- Due to the high stresses in the reduction gears, oils with gear additives such as high performance motor cycle oils are required.
- Because of the incorporated overload clutch, oils with friction modifier additives are unsuitable as this could result in a slipping clutch during normal operation.
- Heavy duty 4-stroke motor cycle oils meet all the requirements. These oils are normally not mineral oils but semi- or full synthetic oils.
- Oils primarity for Diesel engines have **insufficient high temperature properties and additives which favour clutch slipping, and are generally unsuitable.**

Oil viscosity

Use of multi-grade oils is recommended.

NOTE: Multi-viscosity grade oils are less sensitive to temperature variations than single grade oils.

They are suitable for use throughout the seasons, ensure rapid lubrication of all engine components at cold start and get less fluid at higher temperatures.

Type of oil used by aircraft manufacturer is shown in Chapter 12-00-01.

Removal

Tools needed:	wrench size 8, 9, 10, 12, 17, 9/16 in Allen wrench size 8 screwdriver cutting pliers, pliers Cobra pliers (for clamps)

- Remove engine cowling.
- Disconnect and remove the board battery.
- Remove the propeller (see Chapter 61-00 *Removal*).
- Disconnect all electrical system wires and bondings between the engine mount and the firewall.
- Shut the fuel selector valve (possibly drain fuel from the fuel installation).
- Drain oil from the engine (see Chapter 12-10-20) and cooling liquid (see Chapter 12-10-30).
- Disconnect hoses of the oil and the cooling system.
- Remove the oil cooler (see Chapter 79-20-01 *Removal*) and the radiator Chapter 72-20-11 *Removal*).
- Disconnect control of carburetors and carburetors heating.
- Remove air intake (see Chapter 72-20 *Removal*)).
- Remove the exhaust system (see Chapter 78-00 *Removal*)).
- Blind all the holes on the engine so that no impurity can get into the engine.
- Cut off the cotter pin securing the bolt heads (1, Fig. 2).
- Remove screws (2, Fig. 2) and washers (3, Fig. 2) attaching the engine to the engine mount.
- Take the engine away from the engine mount by the crane or with help 2 assistants.
- Store the removed engine on a safe place on a suitable support and prevent it from damage.

Installation

Tools needed:	wrench size 8, 9, 10, 12, 17, 9/16 in Allen wrench size 8 screwdriver cutting pliers, pliers Cobra pliers (for clamps)

Install the engine on the engine mount according to Fig. 1:

- Put the engine on the engine mount by the crane or with 2 assistants and attach it by the screws (2, Fig. 2) with washers (3, Fig. 2). Tighten up applying torque moment 4.146 kg.m (30 lbf).
- Secure the screw heads by cotter pins (1, Fig. 2).

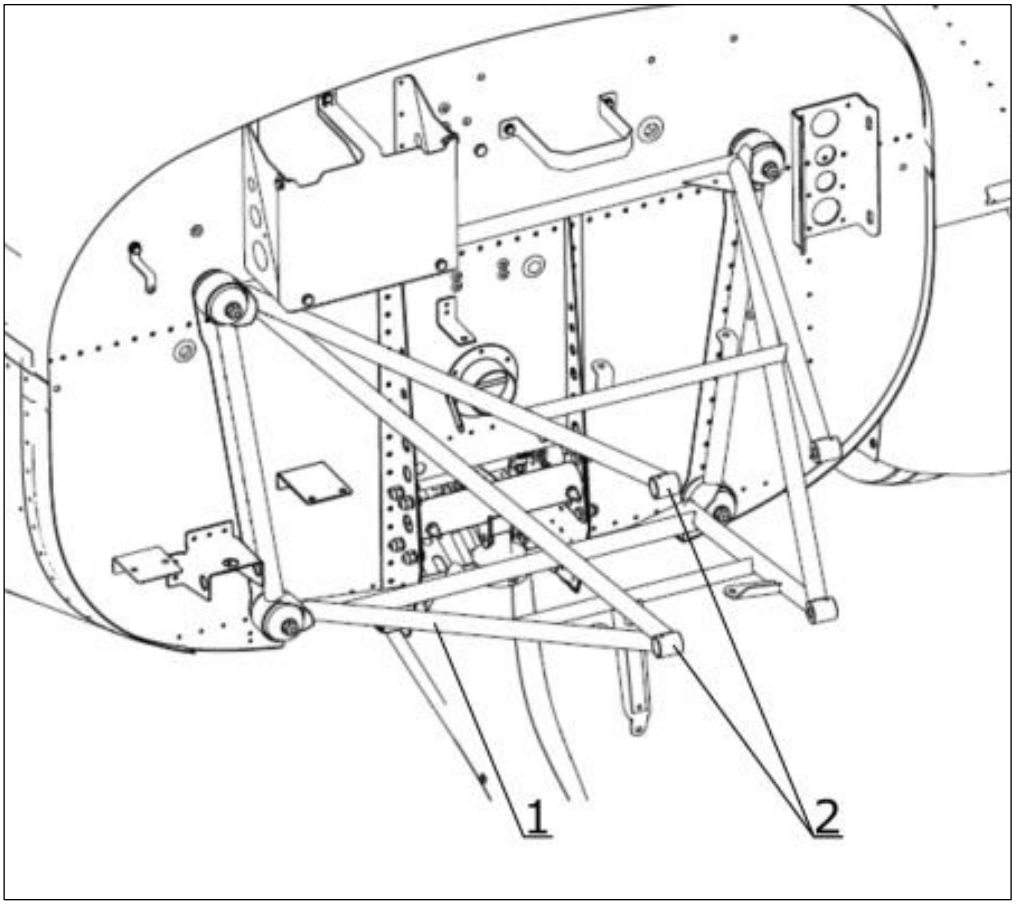

Fig. 1 *Engine Mount Attachment to the Engine and Firewall*

Item	Description	Item	Description
1	Engine mount	2	Screws (holes for screws)

- Install the exhaust system (see Chapter 78-00 *Installation*).

- Connect wiring according to the wiring diagrams (see Chapter 78).
- Install oil cooler (see Chapter 79-20-01 *Installation*).
- Install water radiator (see Chapter 72-20-11 *Installation*).
- Connect and secure oil system hoses.
- Connect and secure fuel system hoses.
- Install air intake of the engine (see Chapter 72-20 *Installation*).
- Connect control cable of the carburetor preheating flap.
- Connect control cables of the choke and the throttle on the carburetor control levers according to the Fig. 2. Adjust the throttle control (see Chapter 73-20-01 *Adjustment*) and the choke control (see Chapter 73-20-02 *Adjustment*).
- Connect air hose from the heat exchanger for heating of the airplane cockpit.
- Fill the prescribed amount of oil and cooling liquid quantity.
- Check fuel system tightness (see Chapter 28-00 *Checking Fuel System Tightness*).
- Install the propeller (see Chapter 61-00 *Installation*).
- Install and connect the battery.
- Install engine cowlings.
- Perform engine test (see *Checks*).

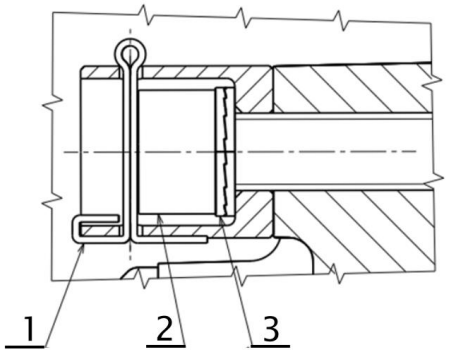

Fig. 2 *Installation and securing of engine mount bolts*

Item	Description	Item	Description
1	Cotter pin	2	Bolt
3	NORD-LOCK washer pair		

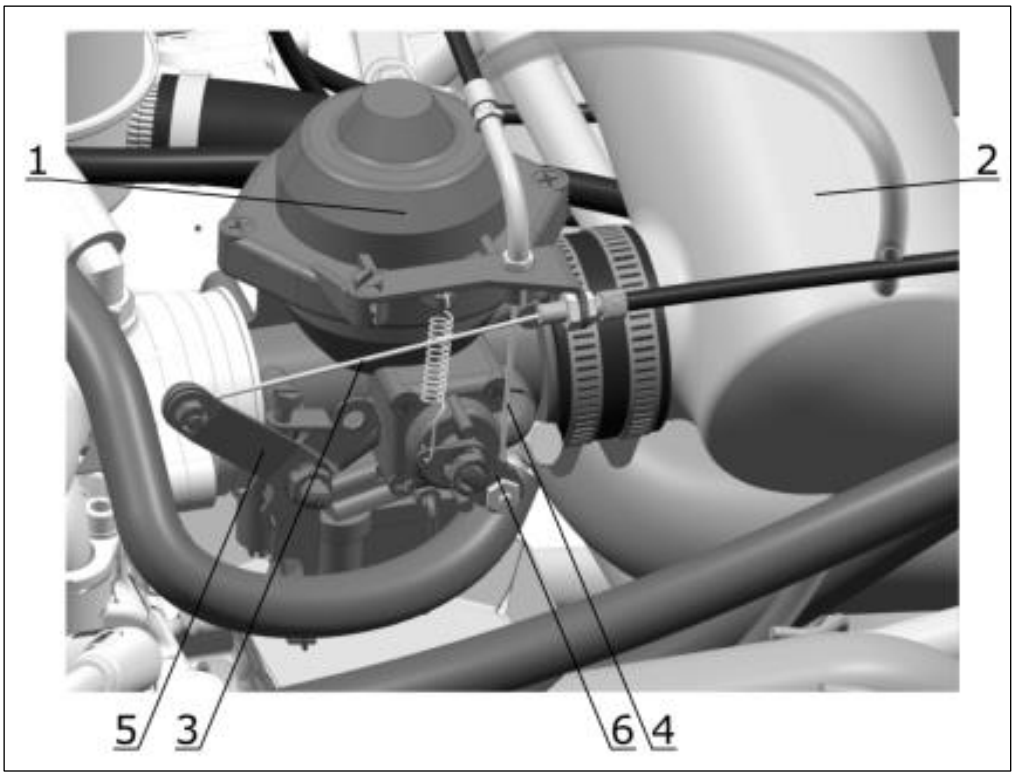

Fig. 3 *Throttle and Choke Control*

Item	Description	Item	Description
1	Carburetor	2	Airbox
3	Throttle control cable	4	Choke control cable
5	Throttle control lever	6	Choke control lever

Checks

Engine Check

NOTE

The person performing the engine test must have the corresponding approvals and be familiarized with the aircraft type BRISTELL B23.

- Perform the test out of the buildings at the place assigned for performing engine tests in broad daylight.
- Test place must be equipped with extinguisher which is suitable for extinguishing burning liquids and electrical installation.
- Brake the airplane and put chocks under the landing gear wheels.

- Before performing engine test carry out preflight check of the engine and the propeller in the range shown in the AOI of Bristell B23 (Par. 4.3) and Rotax engine Operator's manual (Chapter 10.3).
- Start the engine according to the AOI of Bristell B23 (Par. 4.4) and Rotax engine Operator's manual (Chapter 10.3).:
- Activate starter for max.10 sec. only, followed by a cooling period of 2 min.
- As soon as engine runs, adjust throttle to achieved smooth running at approximate 2500 rpm.
- Check if oil pressure has risen within 10 sec. and monitor oil pressure

NOTE **If oil pressure does not rise within 10 sec. above min. pressure 0.8 bar (12 psi), switch off the engine. Is admissible max. oil pressure 7 bar (102 psi) for a short period at cold start. Fuel pressure has to be in range from 0.15 to 0.4 bar (2.2 to 5.8 psi).**

- Engine warm up according to the AOI of Bristell B23 (Par. 4.4) and Rotax engine Operator's manual (Chapter 10.3).

As soon as oil pressure will be in range from 2 to 5 bar (29 to 73 psi) start warming up period at 2000 rpm for approx. 2 minutes, continue at 2500 rpm, duration depending on ambient temperature, until oil temperature reaches 50°C (122°F).

- Choke – during engine warm up – SWITCH OFF

NOTE **Watch engine instruments and record the values of oil pressure, oil temperature and head cylinder temperature into the Engine test report, see the Tab. 10-1.**

- Perform ignition check:

Engine speed: 4000 RPM

Ignition switch switch from position BOTH to L, record RPM drop

Ignition switch switch from position BOTH to R, record RPM drop

NOTE **RPM drop between position BOTH and L or R must not exceed 300 RPM. Mutual difference between ignition circuits L and R must not**

exceed 115 rpm. Write down results into the engine test report, see the Tab.10-1.

- Test of max. RPM on the ground:

Throttle lever fully forward for maximum power

NOTE **Record max. RPM into the engine test report, see the Table 1.**

ENGINE TEST REPORT					
Aircraft	***Bristell B23***	**Registration**		**S/N**	
Engine	***ROTAX***	**Type**	***912 S3***	**S/N**	

	Activity	Set down values	Measured values
	Starting up the engine		
1.	Min. oil pressure up to 10 sec.	0.8 bar (12 psi)	
2.	Max. oil pressure*	7 bar (102 psi)	
3.	Min. fuel pressure	0.15 bar (2.2 psi)	
4.	Increase RPM as soon as oil pressure reaches	2 bar (29 psi)	
5.	Warming up the engine at 2000 – 2500 RPM	smooth running	
6.	Voltage	12.4 – 15.1 V	
	Engine test		
7.	Min. oil temperature	50°C (122°F)	
8.	Oil pressure	2–5 bar (29–73 psi)	
9.	Max. cylinder head temperature ***	120/135°C (248/275°F)	
10.	RPM drop between ignition position **BOTH** and **L**/**R** at 4000 RPM	max. 300 (115 RPM **)	
11.	Acceleration	2 – 3 sec.	
12.	Max. RPM on the ground	5200 ± 100 RPM	
13.	Idle	Approx. 1400 RPM	

Defects:

*	During cold start for a short term only
**	RPM drop between ignition position **BOTH** and position **L** or **R** must not exceed 300 RPM. Mutual difference between left (**L**) and right (**R**) ignition circuit must not exceed 115 RPM.
***	Max. cylinder head temperature depend on the type of coolant used in the engine – see Rotax engine Operato's manual para 10.2.1, Installation manual para 11.6.1 and 11.6.2, Service Instruction SI–912–016

Conclusion	**Complying – Noncomplying** Complying if the measured values are not out of the range of the prescribed values.

Elaborated by:	Signature:	Date:
Checked by:	Signature:	Date:

Table 1 Engine Test Report

72-20 Air Inlet Section

Engine air inlet system ensures supply of sufficient air volume to the engine. Air is supplied to the engine through the NACA inlet (5, Figure 4), the air filter and the airbox (1, 2). Heated air (11) from the heat exchanger, which is attached to the muffler is controlled by flap on the firewall. The heating control flap is controlled by CARB HEAT knob (13) on the instrument panel.

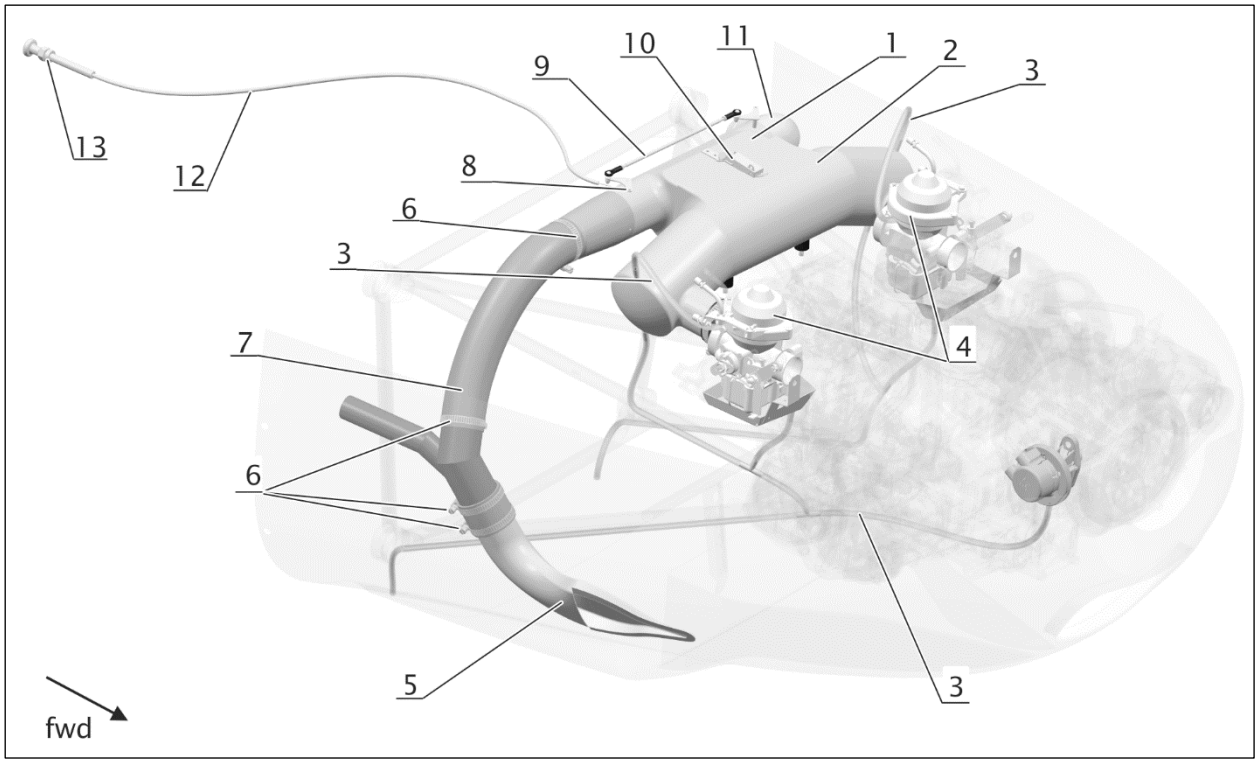

Fig. 4 Removal/Installation of Air Intake System

Item	Description	Item	Description
1	Airbox (rear half)	2	Air box (front half)
3	Drain hoses	4	Carburettors
5	Naca scoop	6	Hose fastener
7	Air hose - cold air	8	Air intake changeover lever
9	Interconnecting rod	10	Airbox halves connecting clip
11	Air hose - preheated air	12	Control cable
13	CARB HEAT knob		

Removal

Tools needed:	Wrench size 8, 10 Screwdriver

See Fig. 4.

- Remove the upper engine cowling.
- Disconnect the control cable (12) from the air intake changeover lever (8) and from the holder.
- Disconnect hoses connecting airbox with the carburettors (4), drain hoses (3), air hoses (7) and (11). Note correct position of hoses.
- Remove mounting strut and silentblock.
- Remove the hose fastener between carburettors and the airbox.
- Remove the airbox from the engine and store it.

Installation

Tools needed:	Wrench size 8, 10 Screwdriver

see Fig. 4.

- Attach the outlet pipe of the airbox (1, 2) to the carburettor (4) inlet necks by means of hose fasteners.
- Fix the airbox by means of the strut and the silentblock to the engine mount.
- Connect the air intake hoses to the airbox rear half (1), cold air hose (7) to the NACA scoop (5), and hot air hose (11) to the heat exchanger. Ensure correct position.
- Connect drain hoses (3) to the airbox and the drain hoses to the trays under carburettors – lead them on the engine mount in direction down the airplane (fix them by draw band on the engine mount).
- Connect the cable of carburettor heating flap control (12) adjust function of carburettor heating knob.
- Install the upper engine cowling.

72-20-10 Engine Cooling System

Engine cooling is combined, cylinder heads are liquid cooled, cylinders are air cooled. Cooling circuit of cylinder heads is made as a closed system containing the pump, expansion tank with the pressure cap, radiator and the overflow bottle. The cylinder head cooling system is shown in Fig. 5.

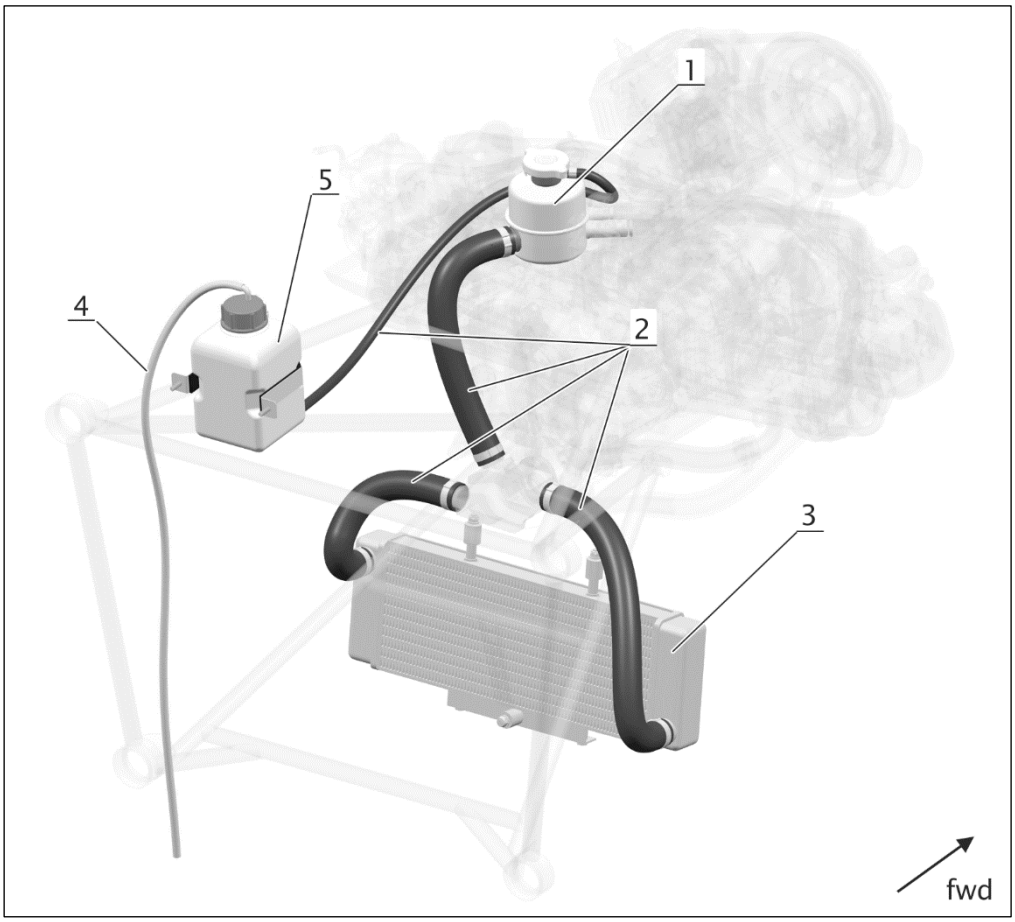

Fig. 5 *Engine Cooling System*

Item	Description	Item	Description
1	Expansion tank	2	Hoses
3	Water Radiator	4	Overflow hose
5	Overflow bottle		

72-20-11 Radiator

Removal

Tools needed:	wrench size 10, screwdriver

See Fig. 5.

- Remove the upper and lower engine cowling.
- Drain the cooling liquid from the cooling system (see Chapter 12-10-30).
- Disconnect hoses from the radiator outlets.
- Remove four bolts attaching the radiator to the upper and lower brackets.
- Remove the radiator.

Installation

Tools needed:	wrench size 10, screwdriver

See Fig. 5.

- Install the radiator on upper and lower brackets.
- Install hoses on the outlets from the radiator and secure them with hose fasteners.
- Fill the cooling system with cooling liquid (see Chapter 12-10-30) and check system tightness.
- Install the lower and upper engine cowling.

72-30 Mass ballast

On the two front bottom attachments point of the engine a mass ballast of ~8kg is installed. This mass ballast consists of a close-welded steel tube filled with lead.

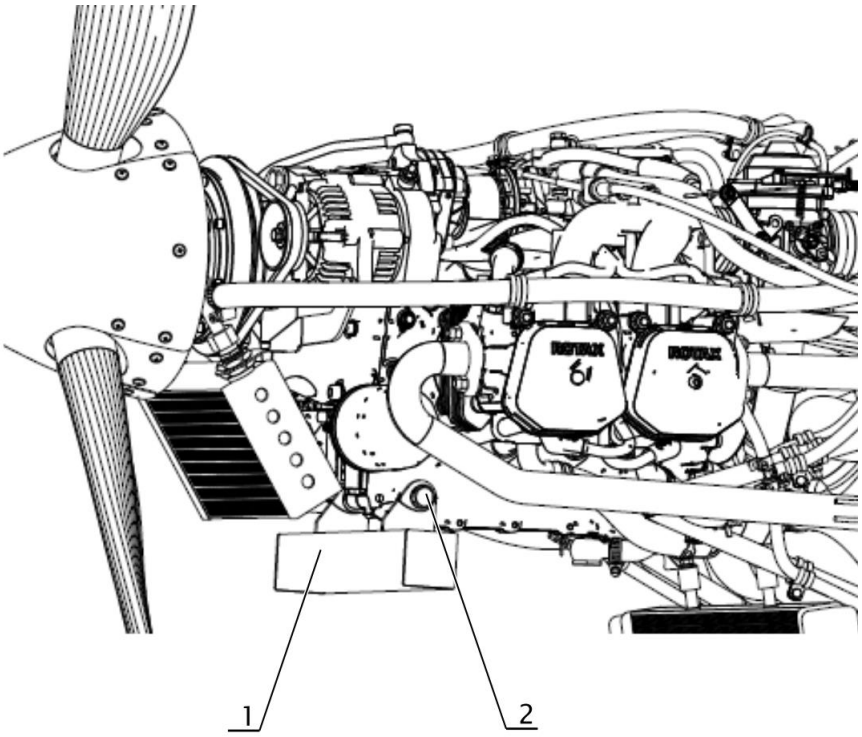

Fig.6 *Installation of mass ballast on the engine*

Item	Description	Item	Description
1	Mass ballast	2	bolt

Removal

Tools needed:	wrench size 16, pliers

- ► Cut the safety wire
- ► Unscrew the two bolts

Installation

Tools needed:	wrench size 16, safety wire tools pliers

- Install the mass ballast
- Tighten the bolts
- Secure with safety wire

73 Engine Fuel and Control

Table of Contents

73-20 Controlling

Engine power is controlled by means of the THROTTLE control lever which is positioned on the middle channel between the seats and which controls engine power from idle up to max. take-off power. Engine power control lever is mechanically connected (by cable) to the carburetors.

If the control lever is fully pushed, this position corresponds to max. take-off power of the engine. If the control lever is fully pulled, this position corresponds to idle. Changes in the engine power setting can be made by moving of the control lever forwards and backwards.

73-20-01 Throttle Control

Removal

Tools needed:	wrench size 19 Allen wrench size 2,5 Screwdriver Cutting pliers

see Fig. 1.

- ► Remove the cover of the throttle (1) control lever from the middle channel.
- ► Remove the upper engine cowling.
- ► Disconnect the throttle (3) and choke (4) cables from carburetors and from the throttle (1) and choke (2) control lever/handle.
- ► Remove the throttle and choke control levers from the middle channel.

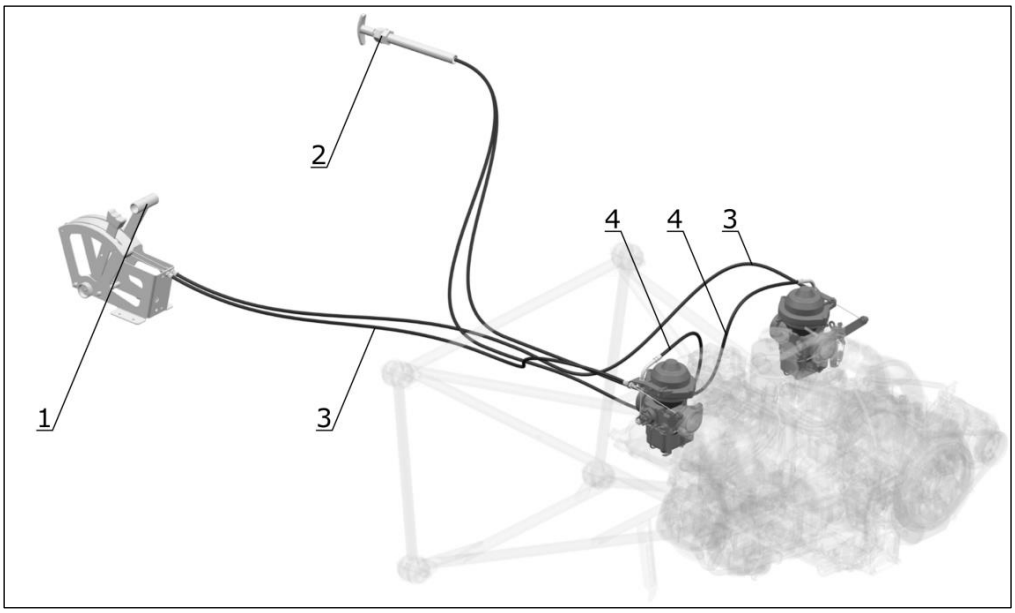

Fig. 1 *Throttle Control Lever*

Item	Description	Item	Description
1	Throttle control lever	2	Choke control handle
3	Throttle cable	4	Choke cable

Installation

Tools needed:	wrench size 14 Allen wrench size 2 Screwdriver Cutting pliers

See Fig. 1.

- ► Install the throttle (1) control lever into the middle channel.
- ► Connect the throttle (3) and choke (4) cables to the throttle (1) and choke (2) control levers and to the carburetors.
- ► Install the cover of throttle and choke on the middle channel.
- ► Install the upper engine cowling.
- ► Check for continuous travel of the throttle and choke control lever.
- ► Adjust the throttle control (see *Adjustment*) and/or the choke control Chapter 73-02-02 *Adjustment*).

Adjustment

- Pull the throttle control to the stop. The throttle lever on the carburetor (5) must be on the stop (see Chapter 72-00, Figure 2). The Bowden cables must be supported in the terminals.
- Release the nut on the control lever (5) and take up any slack on the cable and tighten up the nut.

NOTICE **Possible deformation of the control lever on the carburetor.**

- **Control cable should not be too tight.**
- Check again whether the controller and the lever on the carburetor are on the stops. If not, perform adjusting by means of adjustable terminals on Bowden cables.
- In order to prevent the Bowden cables at the carburetor from shifting out from the terminals, secure the Bowden cables with locking wire.
- Mark all bolted joints with red paint.

73-20-02 Choke Control

The choke control lever is installed next to the switch box key.

Removal/Installation

Refer to the procedure outlined in Chapter 73-20-01.

Adjustment

- Set the choke lever to the stops position and put it back about 3 mm (1/8 in). The lever of choke control on the carburetor (6) must be on the stop (see (see Chapter 72-00, Figure 2)). The Bowden cable must rest on the terminals.
- Release the bolt on the lever of choke control (6), slightly loosen the cable and tighten up the bolt.
- Check again if the choke lever and the lever on the carburetor are on the stops. If not, carry out adjustment by adjustable Bowden terminals.

- To prevent the Bowden cables at the carburetor from shifting out of the terminal, secure the Bowden cables with locking wire. Mark al bolted joints with red paint.

73-20-03 Carburetor Heating Knob

Removal

Tools needed:	Wrench size 8, 14 Screwdriver Cutting pliers

see Fig. 2.

- Remove the upper engine cowling.
- Disconnect the control cable on the changeover lever of the air intake (4) (see Chapter 72-00, Figure 3).
- Remove the inner nut (1) and pull out the knob (2) with the flexible housing (3) from the firewall and instrument panel.

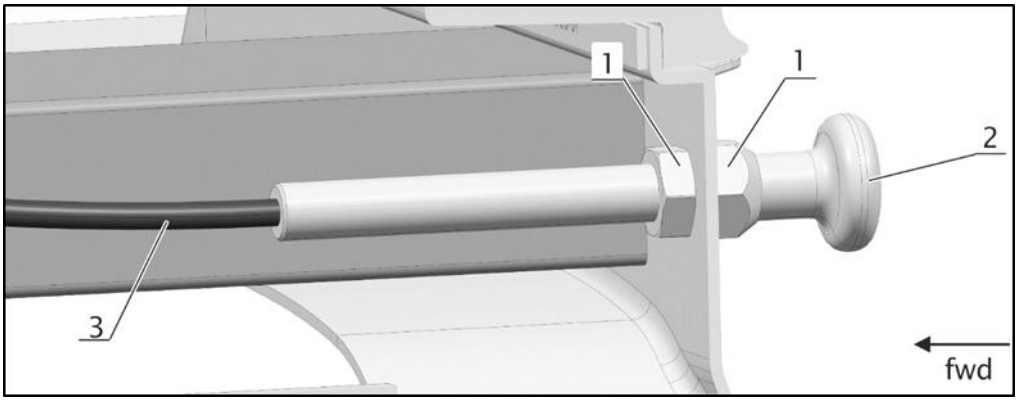

Fig. 2 *Carburetor Heating Knob*

Item	Description	Item	Description
1	Nut	3	Flexible housing
2	Knob		

Installing

Tools needed:	Wrench size 8, 14 Screwdriver Cutting pliers

see Fig. 2.

- Put the flexible housing (3) with knob (2) into the hole in the instrument panel and firewall from behind and fasten it from both sides of the instrument panel by the nuts (6).
- Fasten the knob from both sides of the instrument panel by the nuts (1).
- Connect the control cable with the changeover lever of the air intake (4) (see Chapter 72-00, Figure 3).
- Adjust carburetor heating control (see *Adjustment*).

Adjustment

- Push in the carburetor heating knob to the stop and pull it out by about 3 mm (1/8 in). The changeover lever (4) on the air intake must be on the stop (see Fig. Chapter 72-00, Figure 3). The Bowden cable must rest on the terminal.
- Release the bolt on the changeover lever (4), slightly stretch the cable and tighten up the bolt.
- Check again whether the knob and the lever on the air intake are on the stops. If not, carry out adjustment by adjustable Bowden terminals.
- To prevent the Bowden cables from shifting out of the terminal, secure the Bowden cable with locking wire.
- Mark bolted joints with red paint.

73-30 Indicating

73-30-01 Fuel Quantity

Fuel quantity in the fuel tank is measured by the fuel level sender with float. Float position is converted to the electrical signal and fuel quantity in the tank is indicated on the Garmin System.

73-30-01 Fuel Pressure

Fuel pressure on the outlet from the fuel pump can be checked by the Garmin System. Range of measure is 0 to 2 bar (0 to 29 psi).

74 Ignition

Table of Contents

74-00 General

Engine is equipped with the double contactless ignition system. Every ignition circuit has its source of energy, control unit, 2-ignition coils and 4-spark plugs. It is fully independent on the other circuit and battery. High voltage current is distributed to the spark plugs by means of high voltage cables. The sequence of individual cylinder ignition of the engine is as follows: 1-4-2-3.

Ignition circuits are controlled by the ignition switch on the instrument panel.

There are the following positions of the switch box key:

Position	Description
OFF	Engine ignition is OFF
R	Only Right ignition circuit ON
L	Only Left ignition circuit ON
BOTH	Both circuits ON
START	Both circuits ON and the starter is running up the engine

Fig. 1 *Ignition box*

77 Engine Indicating

Table of Contents

77-00 General

The engine instruments are included in the Garmin system

77-10-01 Tachometer

The RPM indicator is digital (Garmin System) and is controlled by the signal from the RPM sensor on the generator. Working range of the RPM indicator is from 0 to 7000 RPM.

77-20-01 Cylinder Head Thermometer

Cylinder head temperature sensor measures temperature of the cylinder No.3. Working range of the cylinder head thermometer is 50 to 150 °C (120 to 300 °F). Indication is by the Garmin System.

78 Exhaust

Table of Contents

78-00 General

Exhaust system of Bristell B23 airplane consist of four exhaust pipes (2) which lead exhaust gases from individual cylinders to the muffler (1). The muffler works at the same time as a silencer. Exhaust gases lead from there by the exhaust end pipe (4) down the airplane.

On the muffler is heat exchanger from which is taken warm air for the carburetor preheating and for the cockpit.

The whole exhaust system is welded from the stainless steel sheets and pipes.

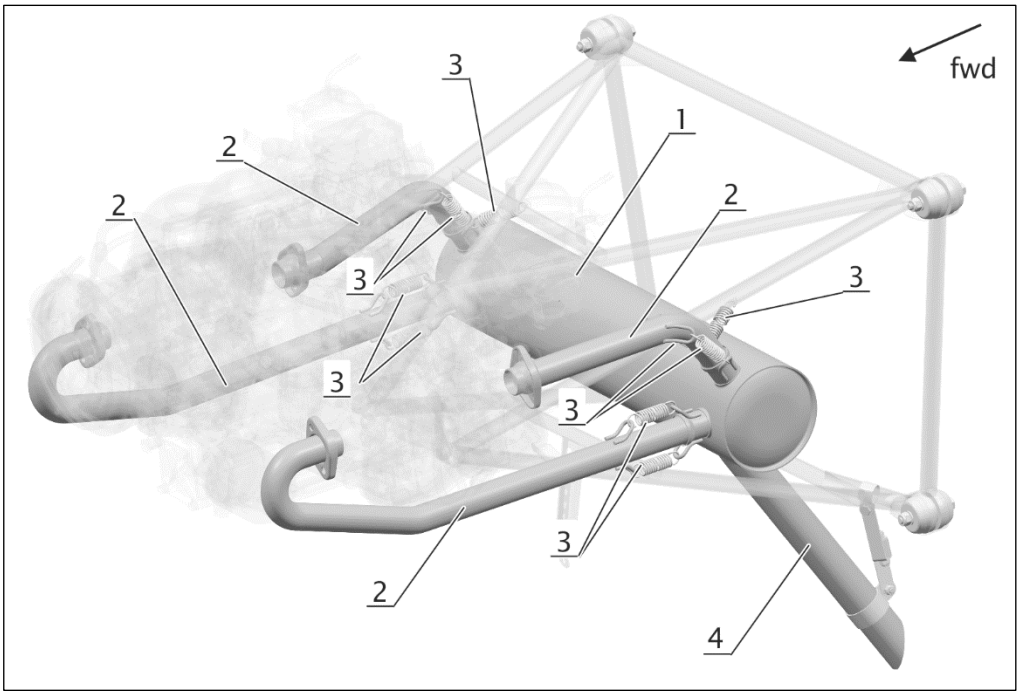

Fig. 1 *Exhaust System*

Item	Description	Item	Description
1	Muffler	2	Exhaust pipes
3	Spring	4	End pipe

Removal

Tools needed:	wrench size 10, 12 pliers small wire hook (spring removal/assembly jig)

See Fig. 1

- ► Remove the springs (3) from the exhaust pipes (2) attaching to the muffler (1).
- ► Remove individual pipes from the necks on the engine.
- ► Remove springs (3) and release the heat exchanger from the muffler (1).

Installation

Tools needed:	wrench size 10, 12 pliers small wire hook (spring removal/assembly jig)

See Fig. 1.

- ► Install the exhaust pipes (2) to the engine necks. Mind a proper arrangement, each pipe is designed for specific necks. Put the washers and screw the nuts on the bolts of the engine exhaust necks, do not tighten the nuts.
- ► Install the muffler (1) to the exhaust pipes (2) and secure the tubes by means of springs (3).
- ► Gradually tighten all nuts of the flanges on the engine necks.

NOTE **Ensure the sufficient space between the exhaust pipes and the other installed parts.**

Check

⚠ WARNING **A burst or leaky exhaust can expose the crew to danger presented by carbon monoxide or can result in engine power loss and possibly fire.**

- ► **Check the exhaust system very carefully.**
- ► Check the exhaust system for cracks. Pay special attention to the following areas:

- muffler in the area of the input and the output pipe and the collector head
- all welds and their immediate surrounding

- ► Carefully check all areas showing local overheating caused by exhaust gases.

- Remove the heat exchanger and check muffler area located under it.
- Check the whole exhaust pipe between the engine and the muffler including its attachment to the engine.
- Check outlet pipe from the muffler.

79 Oil

Table of Contents

79-00 General

Engine lubrication system (see Fig. 1) is made with the dry sump. Engine lubrication system is equipped with the mechanically driven oil pump (3) which ensures oil supply from the oil tank (1) located on the firewall through the oil cooler (4) and the oil pump (5) with oil filter to the lubricated points on the engine. The oil pump is equipped with the pressure regulator and with the pressure transmitter. The oil tank is ventilated by the hose (6) which leads under the airplane. Oil pressure and temperature are indicated on the Garmin System.

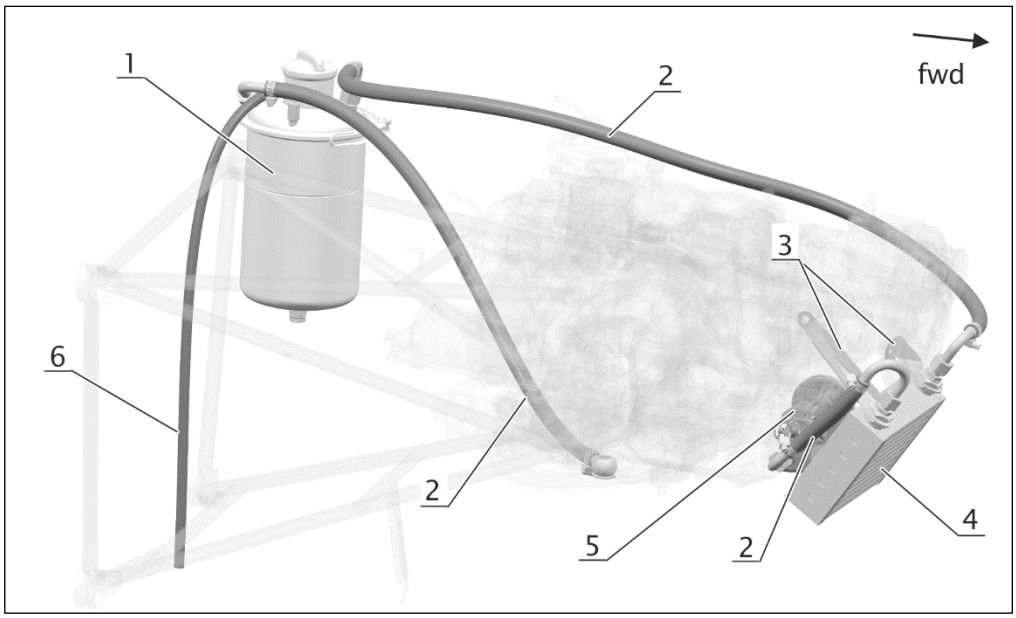

Fig. 1 *Oil Cooling System*

Item	Description	Item	Description
1	Oil tank	2	Oil hoses
3	Brackets	4	Oil cooler
5	Oil pump with oil filter	6	Oil tank venting

79-20 Distribution

79-20-01 Oil Cooler

Removal

Tools needed:	wrench size 22, 30

See Fig. 1.

- Remove the upper and lower engine cowling (see Chapter 71-10).
- Drain oil from the oil system (see Chapter 12-10-20).

NOTE

It is also possible to pump oil from the cooler to the oil tank. You can do it by manual running the engine by means of the propeller, whereas from the oil tank you will remove the hose leading to the oil cooler. Engine ignition must be switched off!

- Remove hose fittings from the oil cooler necks. After that it is possible to remove nuts from the cooler necks attaching the cooler to the brackets (3) on the engine.

Installation

Tools needed:	wrench size 22, 30

See Fig. 1.

- Set the oil cooler (4) to the bracket (3) on the engine and on the cooler necks gradually install and tight the nuts. Install the fittings with oil hoses, screw the fitting nuts.
- Fill the oil system with oil (see Chapter 12-10-20) and check oil system tightness.
- Install the lower and upper engine cowling (see Chapter 71-10).

79-30 Indicating

79-30-01 Oil Thermometer

Oil temperature on the inlet to the engine is measured by the sensor which is located behind the oil pump. Working range of the oil thermometer is 50 to 150 °C (120 to 300 °F).

79-30-02 Oil Pressure Gauge

Oil pressure on the inlet to the engine is measured by the sensor which is located behind the oil filter. Oil pressure gauge measure range is 0 to 10 bar (0 to 150 psi).

80 Starting

Table of Contents

80-00 General

Description

The ROTAX engine is equipped with a 12V, 0.6 kW electric starter.

The airframe mounted/supplied system consists of the following parts:

- Ignition switch
- starter relay
- related wiring

Refer to the ROTAX documentation for detailed information about starting system (see Chapter 01-20).

80-10 Cranking

Cranking is initiated by placing the ignition switch located on the instrument panel to the START position (also refer to Chapter 74-00).

For detailed procedures refer to the aircraft AFM and to the *External Power* Chapter 24-30-04.

90 Emergency Equipment

Table of Contents

90-10-00 BRS-05 AEPS System

Refer to Appendix B of this manual for removal and installation instructions of the parachute and the rocket of the AEPS system. If additional information is required contact **BRM aero s.r.o** requesting further instructions.

For servicing components of the AEPS system (rocket/parachute) the parts have to be send to the aircraft manufacturer **BRM aero s.r.o**.. The reinstallation with the corresponding Form1 ("spare part"), provided by the aircraft manufacturer, is done acc. Appendix B.

NOTE

The aircraft is airworthy without the AEPS being operational (not part of MEL). It must be marked "Inoperative" visible to the pilot in accordance with Chapter 04-10-03 AEPS System Limitations when it is not operational. When items are removed (rocket/parachute) for servicing the weight and balance must be corrected accordingly.

91 Charts

General

Typical wiring diagrams of BRISTELL B23 airplane systems, navigation and communication means are found here (refer to the Table of Content presented below).

Further wiring diagrams, relating to additional equipment of the airplane are included in the documentation supplied with the airplane. Compass und autopilot are optional equipment.

Table of Contents