# SPORTCRUISER AIRCRAFT MAINTENANCE AND INSPECTION PROCEDURES

This document contains information necessary for operation and maintenance of the airplane according to LSA regulation.


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## RECORD OF REVISIONS

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| 1 | initial | all | 01/2007 | |
| 2 | Design changes | See list of effective pages | 01/2008 | |
| 3 | Ailerons and trims deflections, coolant operation limits | See list of effective pages | 04/2008 | |
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# CHAPTER 1 - GENERAL

## Introduction

Czech Sport Aircraft a.s. as manufacturer of SPORTCRUISER airplane provides in accordance with requirements of the ASTM LSA regulations information on maintaining airworthiness of the SPORTCRUISER airplane. Information is also contained in the following manuals issued by airplane manufacturer or by manufacturers of equipment used on the airplane:

- Sportcruiser Pilot Operating Handbook
- Sportcruiser Maintenance and Inspection Procedures
- Sportcruiser Illustrated Parts Catalog
- Operator's Manual for ROTAX 912 ULS engine
- Maintenance Manual for ROTAX 912 ULS engine
- Technical description and operation instructions for the propeller

This document (Maintenance and Inspection Procedures) contains information on airplane maintenance including description of airplane structure and function.

## Airplane classification

SPORTCRUISER airplane is two-seat, single engine, low-wing, all-metal airplane with fixed three-wheel landing gear.

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

### Power unit

Power unit consists of:

- four-stroke, four-cylinder engine with opposite pistons Rotax 912 ULS with max. continuous power of 69 kW (92.5 hp) at 5500 RPM
- Three-blade, ground adjustable propeller.

## Main technical data

### Wing

- span ..... 8.81m *(28.90 ft)*
- area ..... 12.3m$^2$ *(132.3 sqft)*
- MAC ..... 1500mm *(59.1 in)*
- wing loading ..... 49kg/m$^2$ *(10.0 lb/sqft)*
- aileron area ..... 0.46m$^2$ *(4.98 sqft)*
- flap area ..... 0.65m$^2$ *(7.0 sqft)*

### Fuselage

- length ..... 6.5m *(21.33 ft)*
- width ..... 1.28m *(50.4 in)*
- height ..... 2.37m *(7.78 ft)*
- cockpit width ..... 1.17m *(46 in)*

### Horizontal tail unit

- span ..... 2.93m *(9.61 ft)*
- HTU area ..... 2.2m$^2$ *(23.7 sqft)*
- elevator area ..... 0.8m$^2$ *(8.6 sqft)*

### Vertical tail unit

- height ..... 1.07m *(3.51 ft)*
- VTU area ..... 1m$^2$ *(10.7 sqft)*
- rudder area ..... 0.4m$^2$ *(4.3 sqft)*

### Landing gear

- wheel track ..... 1.52m *(4.98 ft)*
- wheel base ..... 2.07m *(6.79 ft)*
- nose landing gear wheel diameter ..... 343mm *(13.5 in)*
- main landing gear wheel diameter ..... 343mm *(13.5 in)*

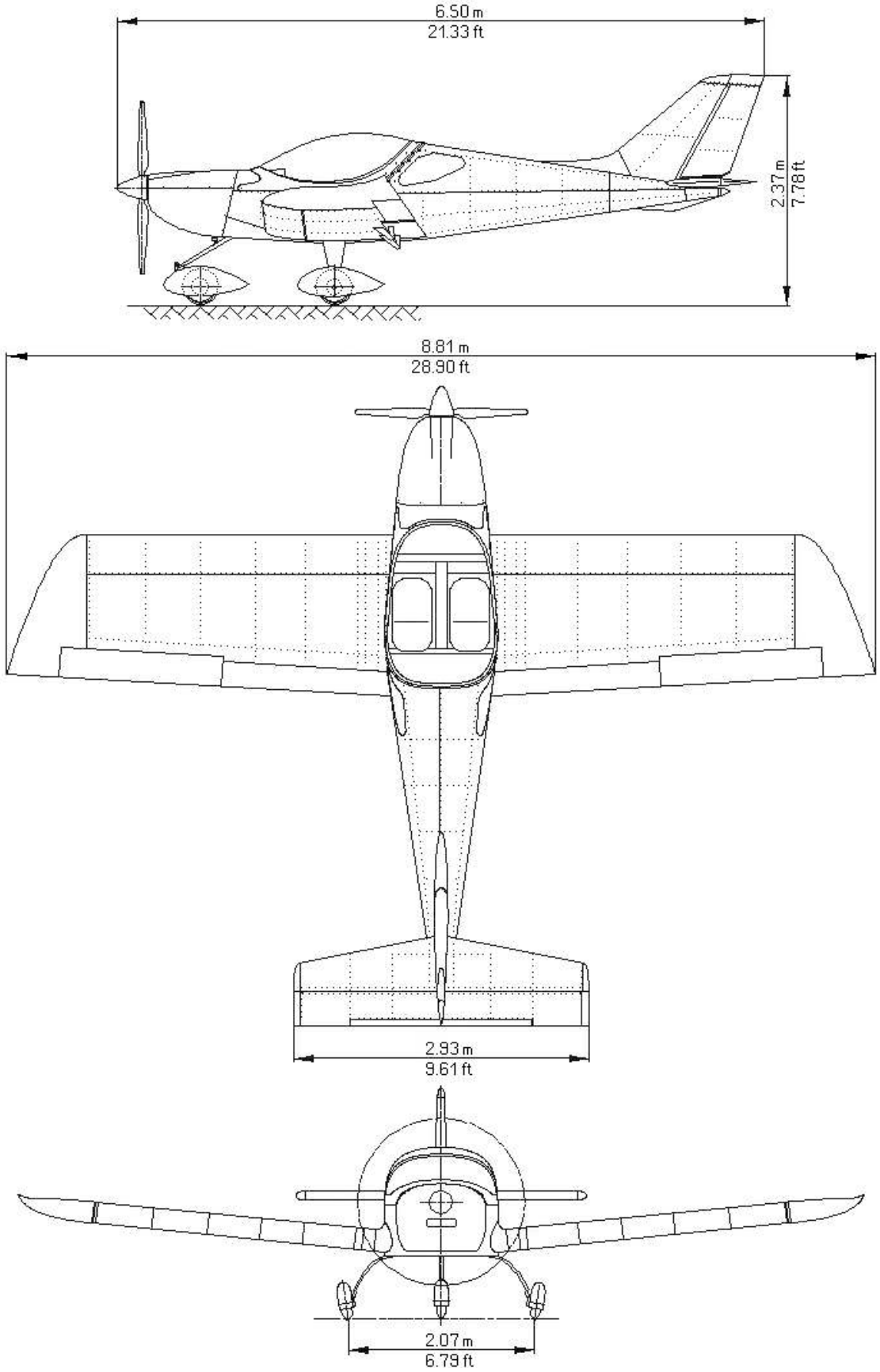


**Fig. 1-1:** Three-view drawing

## Airplane manufacturer and type certificate holder

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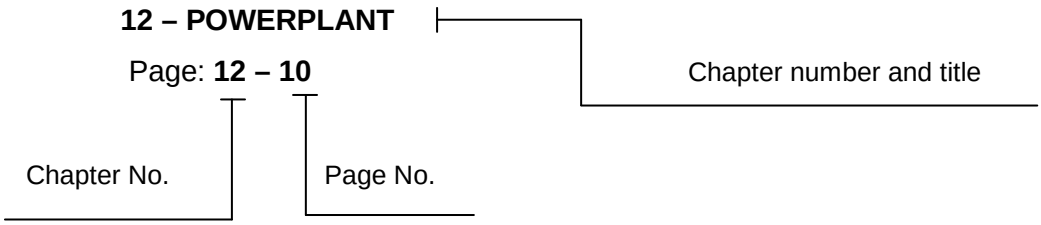
## Chapter Order

Chapters in this manual are ordered in ascending sequence from No. 1. Every chapter describes one system or assembly.

## Page numbering

Example:




## Warnings, cautions and notes

**Warning:** Means that non-observation of the corresponding operating instruction, inspection or maintenance procedure can lead to injury or death of persons.

**Caution:** Means that non-observation of the corresponding operating instruction, inspection or maintenance procedure can lead to damage or destruction of device.

**Note:** Means that the corresponding operating instruction, inspection or maintenance procedure is considered to be important.

## Definitions and abbreviations

| | |
|---|---|
| ACCU | Accumulator |
| ALT | Altimeter |
| ATC | Air Traffic Control |
| bar | pressure unit (1 bar = 14,5037 psi) |
| BEACON | anti-collision beacon |
| ℃ | temperature in degree of Celsius (1℃ = (℉ - 32 ) / 1,8) |
| CAS | Calibrated Airspeed |
| COMM | Communication transmitter |
| EFIS | Electronic Flight Instrument System |
| ELT | Emergency Locator Transmitter |
| EMS | Engine Monitoring System |
| ℉ | temperature in degree of Fahrenheit (1℉ = (℃ 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) |
| knot | speed in NM per hour |
| 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 | milimetre (1 mm = 0,03937 in) |
| MAC | Mean Aerodynamic Chord |
| max. | maximum |
| min. | minimum or minute |

| | |
|---|---|
| mph | speed in statute miles per hour |
| N | Newton - force unit (1 N = 0.225 lbf) |
| NM | Nautical Mile (1 NM = 1852 m) |
| OFF | system is switched off or control element is in off-position |
| ON | system is switched on or control element is in on-position |
| 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 | 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 |
| VMC | Visual Meteorological Conditions |
| VSI | Vertical Speed Indicator |
| VTU | vertical tail unit |
| $V_A$ | maneuvering airspeed |
| $V_{FE}$ | maximum flap extended speed |
| $V_{NE}$ | never exceed speed |
| $V_{NO}$ | maximum structural cruising speed |
| $V_{SO}$ | stall speed with wing flaps in extended position |
| $V_{S1}$ | stall speed with wing flaps in retracted position |
| $V_X$ | best angle of climb speed |
| $V_Y$ | best rate of climb speed |
| XPDR | secondary radar transponder |

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# CHAPTER 2 – TIME LIMITS/MAINTENANCE CHECKS

## General

This chapter contains information about:

- airframe life limitations
- engine life limitations
- terms and list of aircraft regular maintenance works
- lubrication plan

## Airframe life limitation

Initial airframe life is 5000 flight hours.

## Engine life limitation

Time to overhaul of ROTAX 912 ULS engine is 1500 flight hours or 10 years whichever is the sooner.

### Engine parts with limited life

The following parts must be exchanged every 5 years:

- air-bleeding hoses of carburetors
- all rubber hoses of engine cooling system
- all rubber hoses of engine oil system
- carburetor flanges
- carburetor diaphragms
- rubber hoses of the compensation tube connecting carburetors
- fuel pump including fuel hoses
- Cooling liquid must be exchanged every two years

## Ordering spare parts

Order spare parts through the Airplane failures card, see section 17.4.

## Terms and list of aircraft regular maintenance works

### General

Maintenance system serves to maintain flight airworthiness of SPORTCRUISER airplane.

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

**Caution:** 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).

(a) preflight inspection is performed within the scope given in Flight Manual, section 4

(b) propeller inspection after first 5, 20 and 50 flight hours (see Technical description of the propeller)

**Note:** To be performed with a newly installed propeller or with the propeller that was dismantled and reinstalled on the airplane.

(c) Inspection after the first 25 flight hours - engine inspection.

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

(d) Periodical inspection after 50 flight hours - inspection of engine and propeller

(e) 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.

**Caution:** 100-hour term can be exceeded max. by 5 hours providing that this exceeding will be just to finish flight which started before reacting 100-hour term or for flight with the purpose to reach a place where the inspection will be carried out. Operation time, which exceeded 100-hour interval, must be included as a time flown for determination of the next 100-hour inspection.

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

### Tables of inspection tasks

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

Number of chapter is indicated in the first column of this Maintenance Manual where you can also find more detailed information for performing individual works.

The description of works, which are performed during inspection, is indicated in the second column.

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

# PERIODICAL INSPECTION AFTER FIRST 25 FLIGHT HOURS

**Aircraft S/N:** …….. **Total flight hours:** ……

**Registration mark:** …….. **No. of takeoffs:** ……



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| **10** | **Engine and propeller** | | |
| | List of performed operations for engine is shown in Maintenance Manual (Line Maintenance) for installed engine | | |
| | List of performed operations for propeller is shown in Technical description and operation instructions for installed propeller | | |
| | 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 10.4.5). | | |
| | Inspect and clean the fuel filter insert. | | |

**Notes:**

Date: ……. Signature: …….

# PERIODICAL INSPECTION AFTER 50 FLIGHT HOURS

**Aircraft S/N:** …… **Total flight hours:** ……

**Registration mark:** …… **Total takeoffs:** ……



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| 10 | **Engine and propeller** | | |
| | List of performed operations for the engine is shown in Maintenance Manual (Line Maintenance) for installed engine. | | |
| | List of performed operations for the propeller is shown in Technical description and in operation instructions for installed propeller. | | |
| | 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 10.4.5). | | |
| | Remove and clean or replace the fuel filter insert. | | |

**Notes:**

Date: ……. Signature: …….

# ANNUAL PERIODICAL INSPECTION OR INSPECTION AFTER 100 FLIGHT HOURS

**Aircraft S/N:** …… **Total flight hours:** ……

**Registration mark:** …… **Total takeoffs:** ……

**Type of inspection:** ……



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| | **AIRFRAME** | | |
| **3** | **Fuselage** | | |
| | Visually check surface condition including fiberglass 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 of the canopy locks. | | |
| | Check condition and completeness of emergency equipment. | | |
| | Check condition of rubber sealing of the cockpit. | | |
| | Check condition of canopy struts. | | |
| **4** | **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. | | |
| | **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. | | |
| | **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 servos | | |
| | Check conductive connection. | | |
| **5** | **Tail unit** | | |
| | **HTU** | | |

# ANNUAL PERIODICAL INSPECTION OR INSPECTION AFTER 100 FLIGHT HOURS



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| 5 | Check horizontal stabilizer attachment and securing. | | |
| | Visually check surface condition - loosened rivets, 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. | | |
| 6 | **Control** | | |
| | **Manual control** | | |
| | Check for free travel of control (see 6.4.2). | | |
| | Check plays (see 6.4.1). | | |
| | Check securing of links and conductive connection. | | |
| | Check condition of the stops. | | |
| | **Foot control** | | |
| | Check free play of control (see 6.4.2). | | |
| | Check plays (see 6.4.1). | | |
| | Check securing of links and conductive connection. | | |
| | Check condition of the stops on the control cables. | | |
| | Check condition and tension of cables (see 6.4.5). | | |
| | **Flap control** | | |
| | Check for free travel of the control lever. | | |
| | Check securing of links and conductive connection. | | |
| | Check function of control servos. | | |
| | **Control of the elevator trim tab** | | |
| | Check the control servo. | | |
| | Check plays (see 6.4.1). | | |
| | Check securing of links and conductive connection. | | |
| | Check trim tab neutral position adjustment. | | |
| | Check trim tab position indicator. | | |
| 7 | **Equipment** | | |
| | Check completeness and validity of documentation. | | |
| | Check general condition and attachment of the instrument panel. | | |

## ANNUAL PERIODICAL INSPECTION OR INSPECTION AFTER 100 FLIGHT HOURS



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| 7 | Check condition and attachment of instruments. | | |
| | Check function and condition of switches and circuit breakers. | | |
| | Check function and condition of throttle controller, choke, Andair 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. | | |
| 8 | **Landing gear** | | |
| | **Main landing gear** | | |
| | Check condition of landing gear legs and attachment points. | | |
| | Check lubrication and securing of movable links. | | |
| | 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 wheel for free rotation. | | |
| | Check function of brakes and parking brake. | | |
| | Check condition and attachment of brake hoses. | | |
| | Check condition and wear of brake hoses (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 8.5.4). | | |
| | Exchange brake fluid - **applied for annual inspection only** (see 8.5.4). | | |
| | **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 depression of nose wheel absorber. (see 8.4.3) | | |
| 9 | **Fuel system** | | |
| | Drain fuel tanks and gascolator (see 9.5.2) | | |
| | Remove fuel filter inserted in gascolator and clean it. | | |

## ANNUAL PERIODICAL INSPECTION OR INSPECTION AFTER 100 FLIGHT HOURS



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| 9 | Check condition and integrity of fuel pumps 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 9.4.2) | | |
| 10 | **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. | | |
| | List of performed operations for the propeller is shown in Technical description and operation instructions for installed propeller. | | |
| | 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 10.4.5) | | |
| 11 | **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. | | |
| 12 | **Pitotstatic system** | | |
| | Check condition (at every second annual inspection) 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. | | |
| | Check for pitot-static system tightness (see 12.4.1) | | |
| 13 | **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. | | |

## ANNUAL PERIODICAL INSPECTION OR INSPECTION AFTER 100 FLIGHT HOURS



| Chpt. | Prescribed works | Made by | Checked by |
|---|---|---|---|
| | **Navigation/Communication** | | |
| | Visually check condition of navigation and communication instruments. | | |
| | Check function of navigation and communication instruments - **applied for annual inspection only** | | |
| | Check altimeter function - **applied for annual inspection only** | | |

**Notes:**

Date: ……

Signature: ……

## Lubrication plan

| Unit | Area of lubrication | After first 25 hours | Every 100 hours | Lubricant |
|---|---|---|---|---|
| Engine | Throttle control cable on the inlet into terminal (in the engine compartment). | X | X | Engine oil |
| | Choke control cable on the inlet into terminal (in the engine compartment). | X | X | Engine oil |
| Nose landing gear | Landing gear leg in the area of mounting (lubricator). | X | X | Lubrication Grease |
| Main landing gear | Brake pad pins. | X | X | Lubrication Grease |
| Ailerons | Hinges. | X | X | Lubrication Grease |
| | Rod end bearings of the control tubes. | X | X | Lubrication Grease |
| | Two-arm control lever in the center wing. | X | X | Lubrication Grease |
| | Torque tube bearings in center console in fuselage. | X | X | Lubrication Grease |
| Flaps | Hinges. | X | X | Lubrication Grease |
| | Rod end bearings on actuators. | X | X | Lubrication Grease |
| HTU | Elevator hinges. | X | X | Lubrication Grease |
| | Rod end bearing of the elevator control tubes. | X | X | Lubrication Grease |
| VTU | Rudder hinges. | X | X | Lubrication Grease |
| | Cable shackles on the rudder control cables. | X | X | Lubrication Grease |
| Trim tab | Tab hinges. | X | X | Engine oil |
| Manual control | All movable links in the cockpit. | X | X | Lubrication Grease |
| Foot control | All movable links in the cockpit. | X | X | Lubrication Grease |
| | Cable shackles of rudder control. | X | X | Lubrication Grease |

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# CHAPTER 3 FUSELAGE

## 3.1 General

SPORTCRUISER fuselage is a semimonocoque structure formed by stiffeners and aluminum sheet. The fuselage consists of the front part with the cockpit and the rear part, the integral part of which is the fin.

This chapter describes the following:

- front part of the fuselage
- rear part of the fuselage
- cockpit (crew compartment)
- baggage compartment
- cockpit canopy

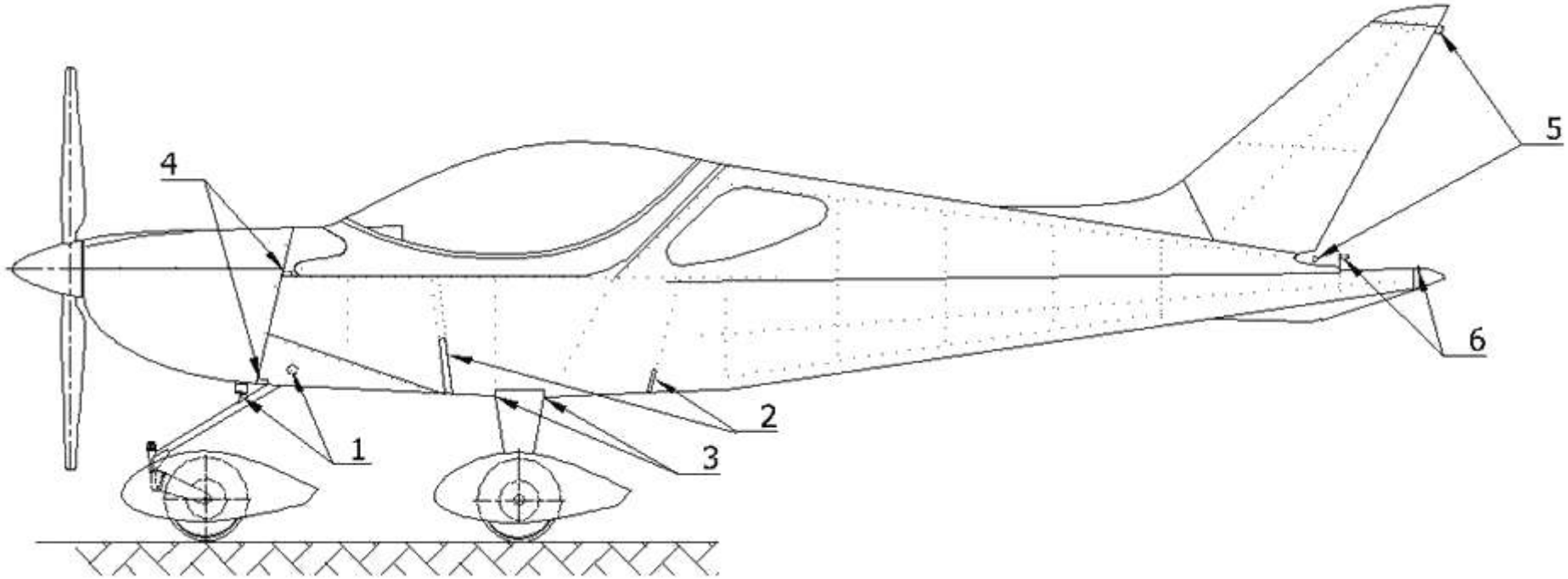
## 3.2 Description and operation

### 3.2.1 Front part of the fuselage

The front part of the fuselage consists of bulkheads No.1 to 5 (see Fig. 3-1). The nose landing gear attachments (1) are located on the bulkhead No.1, which also separate the cockpit from the engine compartment. Cockpit with fixed seats is located between bulkheads No.1 and 5. The baggage compartment is located behind the seats. Center section of wing (2) consists of the main attachments are located between bulkheads No.2 and 3 and the rear attachment is located on the bulkhead No.5, main landing gear attachment points (3) are located behind main center wing spar, the engine mount attachment points (4) are located on the bulkhead No.1, which is firewall.

### 3.2.2 Rear part of the fuselage

The rear part of the fuselage is located in the area from the bulkhead No.6 up to the bulkhead No.13 (see Fig. 3-1 ). It is a semimonocoque structure formed by stiffeners and aluminum skin. The rear part of fuselage is of elliptic section covered by aluminum sheet. The fin with rudder attachments (5) and stabilizer attachments (6) is an integral part of the rear part of the fuselage. The bulkheads No.12 and 13 form the stabilizer attachment points.




1 … Nose landing gear attachments
2 … Center section of wing
3 … Main landing ge ar attachments
4 … Engine mount attachments
5 … Rudder attachments
6 … Stabilizer attachments

**Fig. 3-1**: Fuselage monocoque

### 3.2.3 Cockpit

The cockpit (see Fig. 3-1) is located in the front part of the fuselage between the bulkheads No.1 and 5. 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 fixed seats.

### 3.2.4 Baggage compartment

Baggage compartment is located between the seats and the bulkhead No.7. Max. baggage weight transported in the baggage compartment is 18 kg (*40 lbs*).

### 3.2.5 Crew canopy

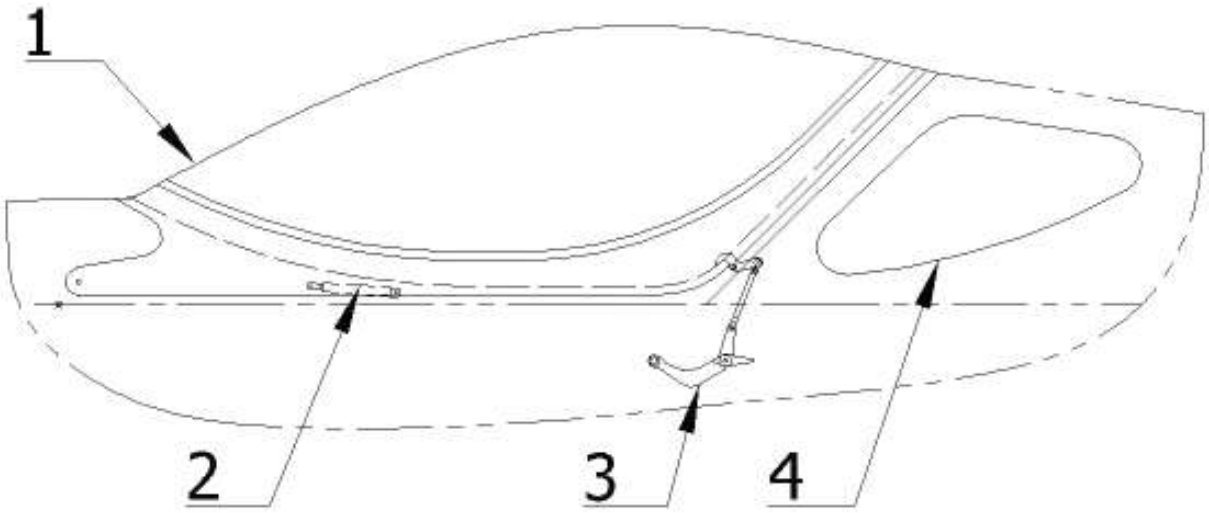
The crew canopy is produced of organic glass and consists of opening canopy and rear fixed canopy windows.

#### 3.2.5.1 Canopy

The canopy (see Fig. 3-2) has a semidrop shape and enables access to the cockpit. The canopy consists of carbon frame on which the windscreen is attached. 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 each side which keep it in the opened position. The canopy lock is placed on the left side of fuselage below the cockpit frame. The locking levers are installed inside the fixed frame. The opening lever (in cockpit) is placed between the seats backs.

#### 3.2.5.2 Rear fixed canopy windows

The rear fixed canopy windows (see Fig. 3-2) consists of two symmetrical windows (4) riveted and glued on the fuselage side skins.




1 … Canopy
2 … Gas strut
3 … Canopy lock
4 … Rear canopy window

**Fig. 3-2**: Canopy, rear canopy window

## 3.3 Removal / Installation

### 3.3.1 Canopy removal

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- socket wrench 7/16”
- screw driver
- pliers

Follow the Fig. 3-3 at removing of the canopy:

(a) Open the canopy (1).

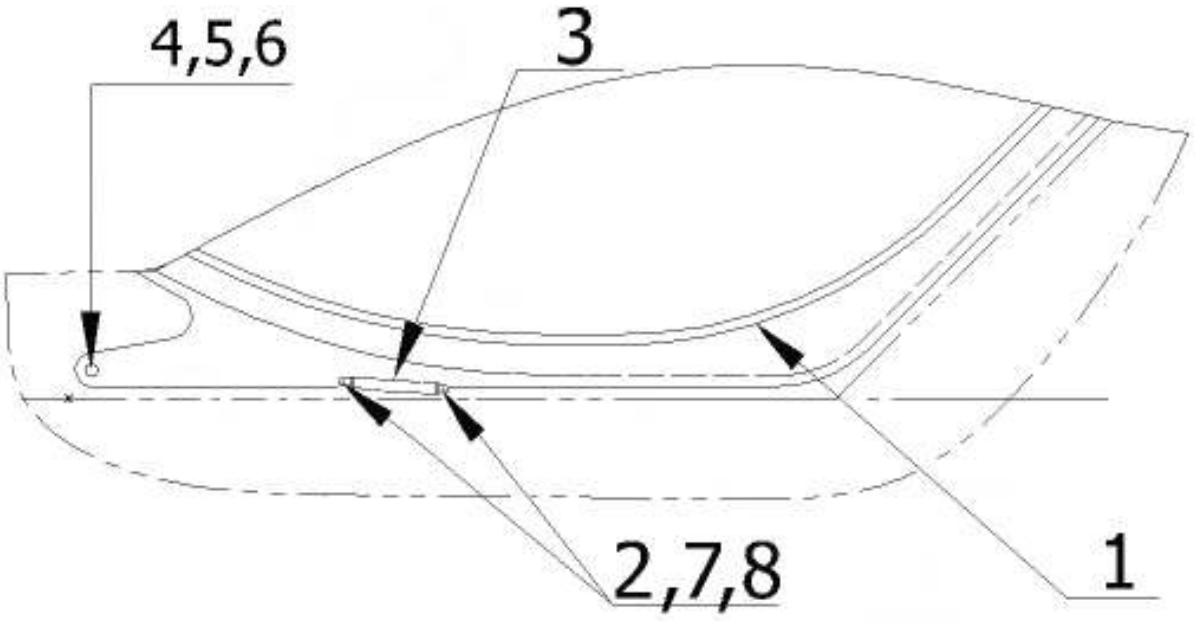
(b) Remove securing wires from the gas strut rod ends (2)

(c) Disconnect gas struts (3) on both sides of canopy (1).

(d) Disconnect hinge bolt nuts (4).

(e) Remove the hinge bolts (5).

(f) Remove the canopy (1) and store it in a safe place so that windscreen damage cannot occur.




1 … Canopy
2 … Gas strut rod end
3 … Gas strut
4 … Hinge bolt nut
5 … Hinge bolt with bushing and washers
6 … Canopy hinge
7 … Gas strut pin
8 … Securing wire

**Fig. 3-3**: Removal of the foldable canopy

### 3.3.2 Canopy installation

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- Socket wrench size 7/16
- screw driver
- pliers

At installation of the canopy, follow the Fig. 3-3:

(a) Set the canopy on the airplane.

(b) Insert the bolts and the nuts into the hinges (6) of the canopy (1). Tighten up the joint.

(c) Insert ends of gas strut in to the pin (7) in the fix frame of the canopy and on the foldable frame, secure it with the securing wire (8).

### 3.3.3 Gas strut removal

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

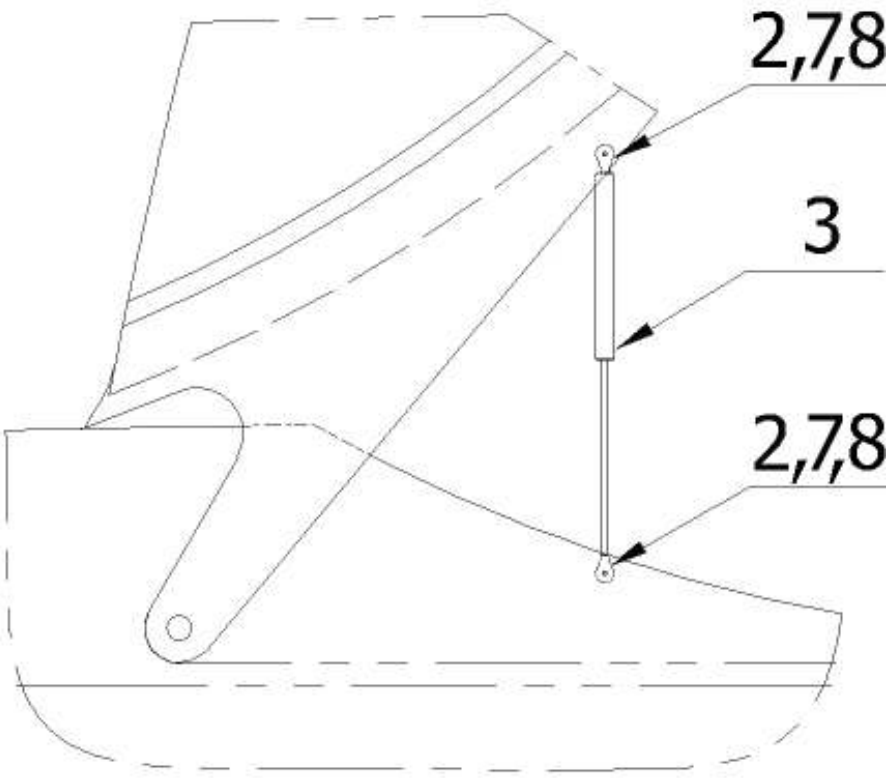
- screw driver
- pliers

At removing of the gas strut, follow the Figs. 3-4:

(a) Open the canopy.

(b) Remove the securing wire (8) from the gas strut pin (7) on foldable canopy frame and on the fixed frame.

(c) Remove the gas strut.




2 … Gas strut rod end
3 … Gas strut
7 … Gas strut pin
8 … Securing wire

**Fig. 3-4**: Removal of the gas strut

### 3.3.4 Gas strut installation

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- pliers

At installation of the gas strut follow the Figs. 3-4 and 3-3:

(a) Inspect the strut whether it is not damaged.

(b) Insert top rod end on the gas strut pin (7), bottom rod end on the pin on the fixed frame and secure it with securing wires (8).

### 3.3.5 Removal of the cabin lock

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

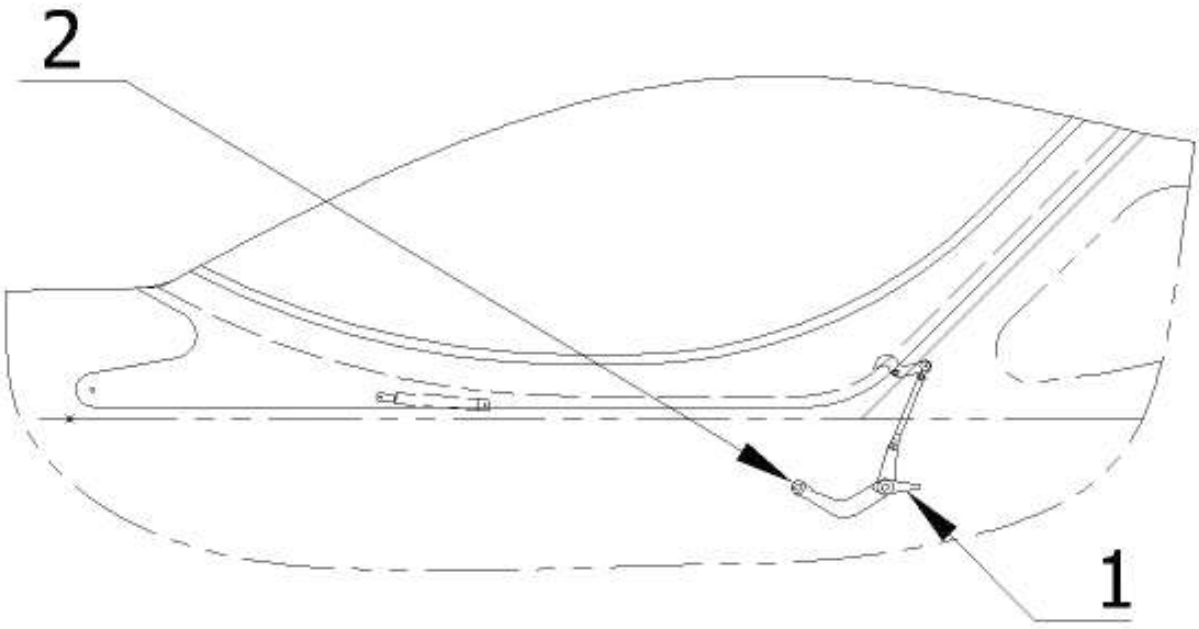
Tools needed:

- screw driver

At removing of the cabin lock follow the Fig. 3-5 and 3-6:

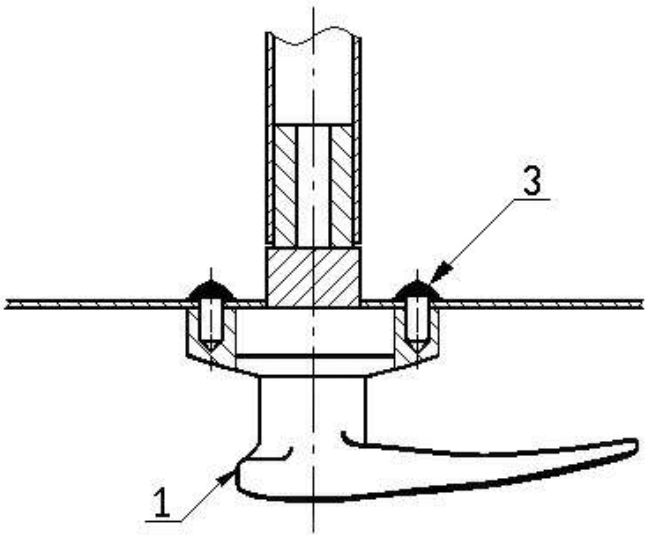
(a) Unscrew the screw (3) attaching the lock (1) to the fuselage wall .

(b) Remove out the lock (1).




1 … Lock 2 … Centering pin

**Fig 3-5**: The lock of the canopy (position “Closed”)




1 … Lock 3 … Screw

**Fig 3-6**: The cabin lock

### 3.3.6 Cabin lock installation

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- screw driver

At installation of the cabin lock follow the Fig. 3-5 and 3-6:

(a) Put the lock (1) in to the hole in the fuselage wall.

(c) Screw the screw (3) attaching lock to the fuselage wall.

## 3.4 Check / Adjustment

No procedures included.

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# CHAPTER 4 - WING

## 4.1 General

Sportcruiser wing is an aluminum structure and is equipped with flaps, ailerons and fuel tanks.

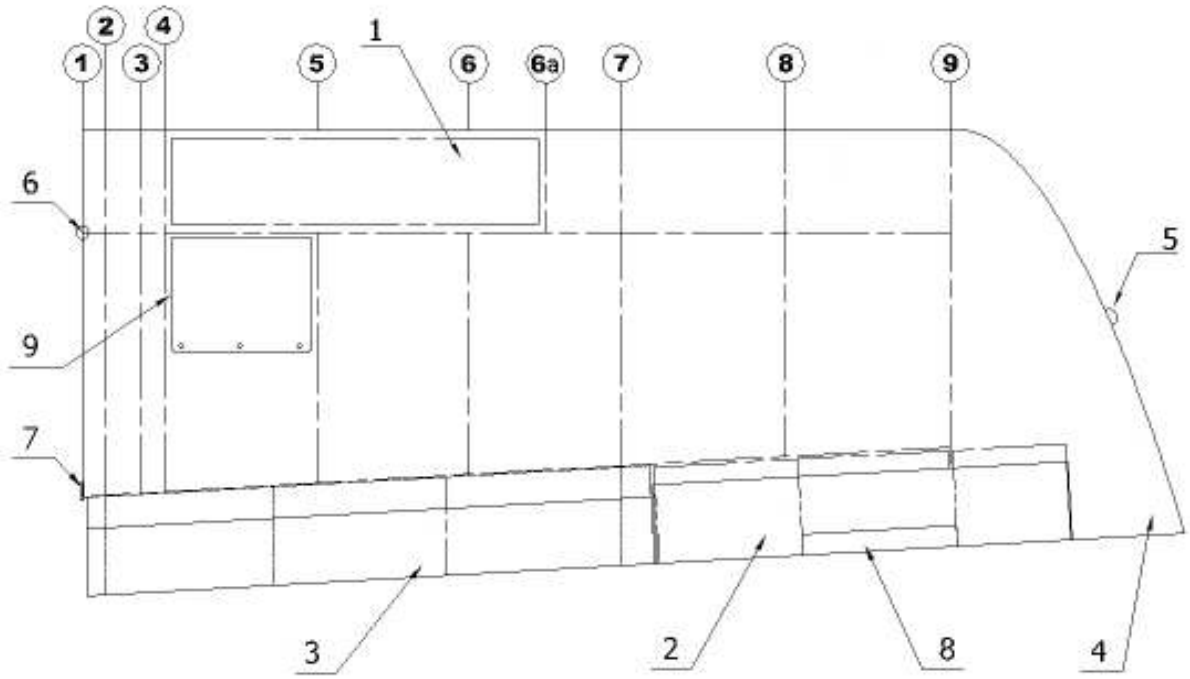
This chapter describes the structure of:

- wings
- wing flaps
- ailerons
- fuel tanks

## 4.2 Description and operation

### 4.2.1 Wing

The wing of the airplane is formed from center section of wing made as main and rear spar, which is integrated part of fuselage (Fig. 3-1), and from outer wings placed between ribs No.1 and 9, which have trapezoid shape (Fig. 4-1). The wing is of all-metal main spar structure with a rear spar. In the outer wings are installed between ribs No.4 and 6a leading edge fuel tanks (1), on the rear spar there are hinged ailerons (2) and flaps (3). The winglets (4), produced from fibreglass, are riveted on the wing ribs No.9. On winglets are installed the position lights and anticollision beacons (5). The outer wing is attached to the center section by means of two main attachments (6) (positioned on the main spar) and the rear attachment (7) (positioned on the rear spar). The aileron control push rods are lead between the spars. The aileron trim tab (8) is installed on the right aileron. The trim tab actuator is installed inside of right aileron. The flap control actuator is installed in the fuselage behind left seat under floor of baggage space.The landing light can be, as option, positioned in the left outer wing in the leading edge between ribs No.8 and 9.

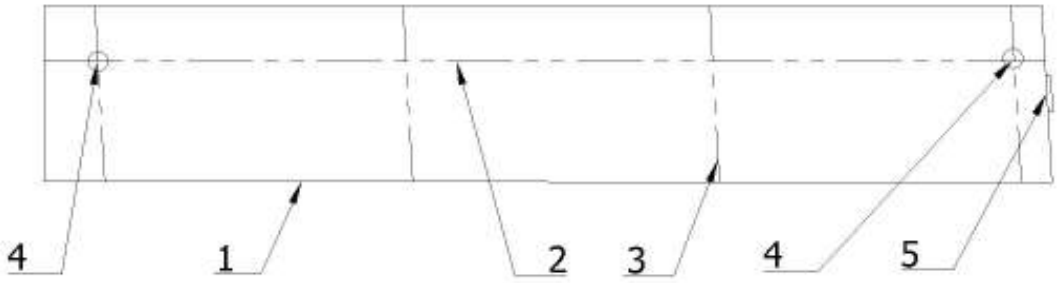



1 …Fuel tank
2 ... Aileron
3 ... Flap
4 ... Winglet
5 … Position/strobe light
6 ... The main upper and lower attachments of the wing
7 ... Rear attachment of the wing
8 ... Aileron trim tab
9 ... Wing locker

**Fig. 4-1**: Wing (right)

### 4.2.2 Wing flaps

Flaps (Fig. 4-2) are of all-metal structure consisting of the skin (1) aluminum sheet metal, spar (2) and ribs (3) which are connected by means of riveting. Flaps are suspended on the rear spar by means of two hinges (4). There is a control plate (5) on flap root rib where is the flap control pin connected.

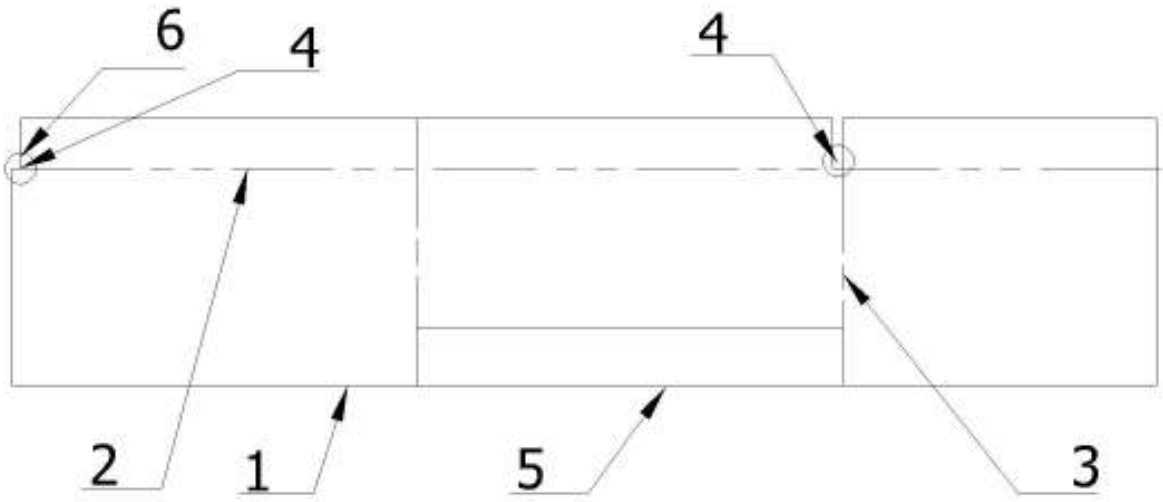



1 ... Flap skin
2 ... Flap spar
3 … Flap ribs
4 ... Flap hinges
5 … Control plate

**Fig. 4-2**: Wing flap (left)

### 4.2.3 Ailerons

Ailerons (Fig. 4-3) are of aluminum structure consisting of the skin (1) aluminum sheet metal, spar (2) and ribs (3) which are connected by means of riveting. Ailerons are suspended on the rear spar by means of two hinges (4). Moreover the trim tab (5) is installed on the right aileron serving the lateral balance of airplane. Control lever (6) is installed on the root aileron rib.




1 ... Aileron skin
2 ... Aileron spar
3 … Aileron ribs
4 ... Aileron hinges
5 ... Aileron trim tab
6 … Aileron control lever

**Fig. 4-3**: Aileron (right)

### 4.2.4 Fuel tanks

Fuel tanks (Fig. 4-4) are of welded all-metal structure consisting of aluminum sheet metal skin (1) and two ribs (2). There are on each tank filler neck (3), fuel level sender (4), ventilating tube (5) and finger screen (6).

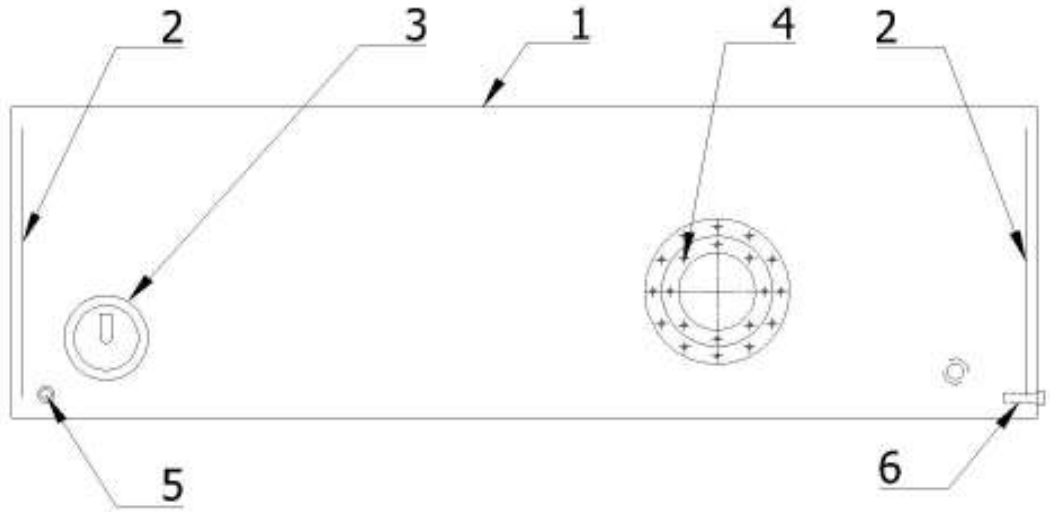



**Fig. 4-4**: Fuel tank (left)

### 4.2.5 Wing lockers

Wings are equiped with wing locker (9) (Fig. 4-1) placed between ribs No.4 and 5 behind main spar. Capacity of each wing locker is 20 kg (*44 lbs*). Access doors installed on piano hinge are locked per dzus fasteners.

## 4.3 Removal / Installation

### 4.3.1 Wing removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in, 1/2 in
- phillips #2 screw driver
- cutting pliers
- hammer

Removal of the wing according to the following procedure:

(a) Remove the access cover plates on the seats floor.

(b) Disconnect whole 6 nuts from the attachment bolts on the main spar and remove two outer attachment bolts on the top and bottom spar doublers.

(c) Disconnect aileron control push rod on the control lever in fuselage behind the seats.

(d) Remove access cover on the bottom wing root.

(e) Disconnect rear attachment bolts on rear spar.

(f) The first person will hold the wing on the wing tip,

(g) One person hold the wing on the winglet side, the second person by the root on the leading edge side remove first bottom attachment bolt from the main spar, the third person by the root on the trailing edge.

(h) One person hold the wing on the winglet side, the second person by the root on the leading edge side and remove top attachment bolt from the main spar, the third person by the root on the trailing edge.

(h) Move the wing about 200 mm (*8 in*) out from the fuselage and disconnect fuel lines, cable plugs, sockets of electrical systems and on left wing also pitot-static tubes.

(i) Release the wing by slight lifting the wing tip upwards.

(j) By pulling the wing in direction from the fuselage, disconnect the outer wing from the fuselage.

(k) Position the disconnected wing in such a way that its damaging cannot occur.

### 4.3.2 Wing installation

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in, 1/2 in
- phillips #2 screw driver
- pliers
- hammer

Install the wing according to the following procedure:

(a) Before installation clean the attachments and bolts of the outer and center wing from dirt. Preserve bolts and attachments by means of lubricating grease.

(b) Set the wing about 200 mm (*8 in*) to the fuselage side. 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.

(c) Connect wiring.

(d) Connect fuel hoses and pitot-static hoses on the left wing.

(e) Set the outer wing carefully with the wing attachments on the center wing so that the attachments on the wing and on the fuselage are concentric and flap control pin placed in the flap control plate.

(f) The person keeping the wing on the leading edge will insert the first bolt into the upper main attachment (the bolt head is in flight direction) and shift it by means of slight hammering to the stop (shifting can be facilitated by slight moving the wing tip up and down). Then insert the bolts into the lower main attachment and shift them by slight hammering to the stop.

(g) Insert the bolt into the rear attachment of the wing and screw it to the stop.

(i) Put the washers on all of 6 attachment bolts of the wing and screw the nuts on them.

(j) Connect the aileron control push rod on control lever behind the seats.

(k) Perform check the trim tab operation, flaps and ailerons deflections (see 6.4.3), possibly adjusting of theirs deflections (see 6.4.4).

(l) Install access cover plates on the seats floor and access cover on the bottom wing root.

### 4.3.3 Wing flap removal

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size 7/16 in

Removal of the wing flap according to the following procedure:

(a) Open the flap in full position.

(b) Disconnect both flap hinges.

(c) Remove the flap from the wing.

(d) Store the removed flap on a safe place and prevent it from damage.

### 4.3.4 Wing flap installation

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size 7/16 in

Install the wing flap according to the following procedure:

(a) Set the flap in to the hinges and control pin in to the control plate.

(b) Insert the bolts in to the hinges and screw the nuts on them.

(c) Close the flap in the zero (up) position.

(d) Perform check the wing flaps operation and their deflections (see 6.4.3).

### 4.3.5 Aileron removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- cutting pliers

Removal of the aileron according to the following procedure:

(a) Disconnect the control rod with control lever.

(b) Remove the cover (1) from the hole (2) for access to trim tab actuator (6) on right aileron (see Fig. 6-8).

(c) Disconnect (on right aileron) trim tab actuator wires (3) (Fig. 6-8).

(d) Disconnect both aileron hinges.

(e) Remove the aileron from the wing.

(f) Store the removed aileron on a safe place so that it cannot be damaged.

### 4.3.6 Aileron installation

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P).

Tools needed:

- wrench size 7/16 in
- pliers

Install the wing flap according to the following procedure:

(a) Set the aileron on the wing in to the both hinges.

(b) Insert trim tab actuator wires (3) (see Fig. 6-8) going out from wing to the aileron.

(c) Insert both bolts in the aileron hinges and screw the nuts on them.

(d) Connect the control rod with aileron control lever.

(e) Connect trim tab actuator wires (3) on the right aileron (see Fig. 6-8).

(f ) Close the access hole (2) with cover.

(g) Perform check the trim tab operation and aileron deflections (see 6.4.3), possibly adjusting of aileron deflections (see 6.4.4).

## 4.4 Check / Adjustment

No procedures included.

## 4.5 Exchanges / Service information

No procedures included.

# CHAPTER 5 – TAIL UNIT

## 5.1 General

Tail unit of SPORTCRUISER airplane is of all-metal structure and is composed of:

- horizontal stabilizer
- elevator with trim tab
- fin surface
- rudder

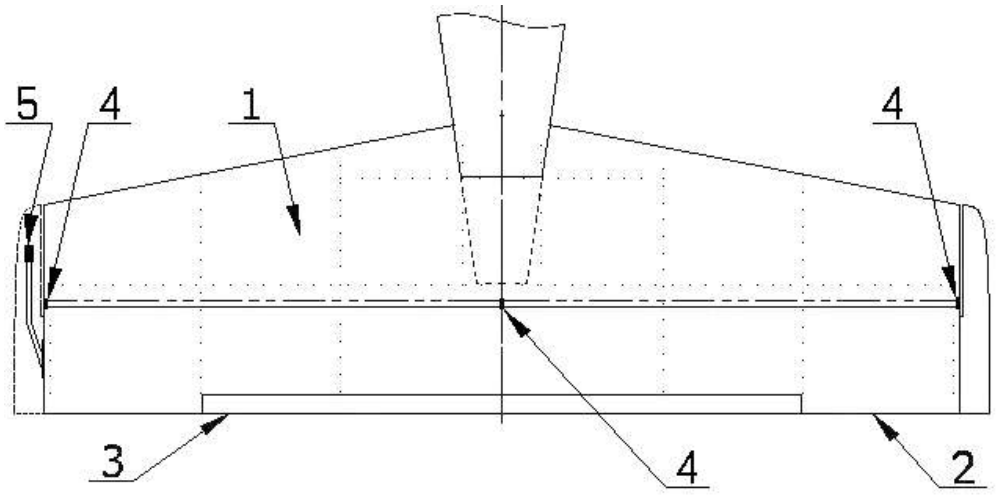
## 5.2 Description and operation

### 5.2.1 Horizontal stabilizer

Horizontal stabilizer (1) (see Fig. 5-1) is of the all-metal structure consisting of the two spars, ribs and aluminum skin. Individual parts are assembled by riveting. The elevator is attached to the rear spar by means of three hinges (4). The horizontal stabilizer is mounted on the fuselage by means of front and rear attachments (5) (see Fig. 5-2). The front attachments consist of two pins, which are riveted on bulkhead No. 12 and bushings riveted on front stabilizer spar. The rear attachments consist of two hinges bolted on sides of bulkhead No. 13.

### 5.2.2 Elevator with trim tab

Elevator (2) (see Fig.5-1) is of all-metal structure and consists of aluminum skin, spar and ribs. Individual parts are assembled by riveting. Control lever is riveted on middle elevator rib. Mass ballances (5) are riveted at the both elevator ends and covered composite tips. The elevator is equipped with the trim tab (3), which is hinged by means of the piano hinge on the rear spar close to the trailing edge of the elevator. The trim tab is made of aluminum sheet.




1 ... Horizontal stabilizer
2 ... Elevator
3 ... Trim tab
4 ... Hinges
5 ... Mass ballance

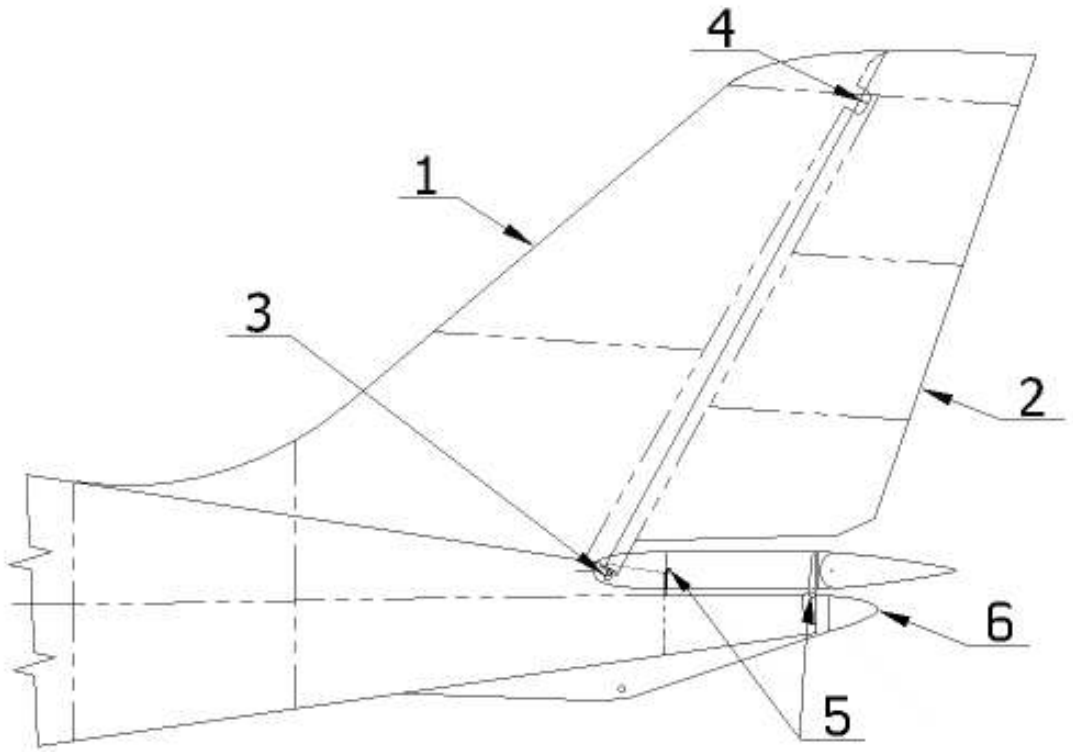
**Fig. 5-1**: Horizontal stabilizer with elevator

### 5.2.3 Fin

The vertical fin (1) is of an aluminum structure and is an integral part with the rear part of the fuselage. The fin consists of stiffeners, spar, ribs and aluminum skin. Individual parts are assembled by riveting. The fin tip is made of fibreglass. On the spar are two rudder hinges, lower one (3) and upper one (4).

### 5.2.4 Rudder

The rudder (2) is of aluminum structure and consists of spar, ribs and aluminum skin. Individual parts are assembled by riveting. On the spar are two attachments lower one (3) and upper one (4) for the rudder suspension on the fin. Control lever is riveted on root rib.




1 ... Fin
2 ... Rudder
3 ... Bottom rudder hinge
4 ... Upper rudder hinge
5 ... Stabilizer attachments
6 ... Fibreglass cover

**Fig. 5-2**: Fin with rudder

## 5.3 Removal / Installation

### 5.3.1 Horizontal stabilizer removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screw driver
- cutting pliers

(a) Remove the screws from top side of composite cover between fuselage and stabilizer.
(b) Remove bolts connecting the rear side attachments on the bulkhead No. 13.
(c) Disconnect the trim tab actuator wires (3) (see Fig.6-8) located between the stabilizer and fuselage.
(d) Remove fibreglass cover (6) (see Fig.5-2).
(e) Disconnect elevator control rod end.
(f) Put out the stabilizer horizontal direction of the attachments and store it in such a way that a damage cannot occur.

### 5.3.2 Horizontal stabilizer installation

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screw driver
- pliers

(a) Clean attachments on the fuselage and apply lubricant grease on it.
(b) Put the horizontal stabilizer from behind to the fuselage so that it slides on two pins on bulkhead No. 12 and in the rear part on two bolts.
(c) Connect the trim tab actuator wires (3) (see Fig.6-8) located between the stabilizer and fuselage.
(d) Put washers on bolts and screw the nuts.
(e) Connect the elevator control rod with the control lever.
(f ) Install the fibreglass cover (6) on bulkhead No.13 (see Fig.5-2).
(g) Screw back the screws on top side of fibreglass cover between fuselage and stabilizer.
(h) Perform check the trim tab operation and elevator deflections (see 6.4.3), possibly adjusting of elevator deflections (see 6.4.4).

### 5.3.3 Elevator removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- cutting pliers

(a) Remove the cover (1) from the access hole (2) (see Fig.6-8).
(b) Disconnect the trim tab actuator wires (3).
(c) Remove the fibreglaas cover (6) (see Fig.5-2).
(d) Disconnect the elevator control rod.
(e) Disconnect the bolts from all three hinges (4) (see Fig.5-1).
(f ) Remove the elevator from the stabilizer.
(g) Store the elevator so that its damage cannot occur.

### 5.3.4 Elevator assembly

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- pliers

(a) Put the elevator in all three hinges on the stabilizer.
(b) Insert the trim tab actuator wires (3) (see Fig.6-8) going from the stabilizer to the elevator.
(c) Insert all three bolts and nuts in the hinges (4) (see Fig.5-1).
(d) Connect elevator control rod with control lever.
(e) Connect the trim tab actuator wires (3).
(f ) Install the fibreglaas cover (6) (see Fig.5-2).
(g) Perform check the trim tab operation and elevator deflections (see 6.4.3), possibly adjusting of elevator deflections (see 6.4.4).

### 5.3.5 Trim tab removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- pliers, cutting pliers
- electric drill, drill diam. 3.2 mm (1/8 in)

(a) Disconnect control rod end from the trim tab.
(b) Drill out the rivets conecting the piano hinge with elevator.
(c) Remove the trim tab with piano hinge from elevator.

### 5.3.6 Trim tab installation

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- pliers, cutting pliers
- pliers for riveting

(a) Insert the trim tab with piano hinge to the elevator.
(b) Rivet the piano hinge into the elevator.
(c) Check for free rotation of the trim tab.
(d) Connect control rod end to the trim tab lever. Secure the pins with cotter pin. At installation follow instructions in 6.3.1.
(e) Perform check (see 6.4.3), possibly adjustment (see 6.4.4) of trim tab deflections.

### 5.3.7 Rudder removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 3/8 in, 7/16 in

(a) Disconnect control cables from the rudder. Remove two bolts connecting cable ends to the control lever on the root rudder rib.
(b) Remove the nuts from bolts on both hinges of the rudder.
(c) Remove top bolt from the hinge and lift the rudder from lower hinge.
(d) Remove the rudder and store it in such a way that the damage cannot occur.

### 5.3.8 Rudder installation

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools neded:

- wrench size 3/8 in, 7/16 in

(a) Inspect the attachments on the rudder, clean them and apply lubricant grease on them. Do the same for the attachments on the fin.
(b) Set the rudder to the hinges on the fin.
(c) Put the bolt on top hinge and screw the nuts.
(d) Connect rudder cable ends to the rudder control lever.
(e) Perform check (see 6.4.3), possibly adjustment (see 6.4.4) of rudder deflections.

## 5.4 Check / Adjustment

No procedures included.

## 5.5 Exchanges / Service information

No procedures included.

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# CHAPTER 6 - CONTROLS

## 6.1 General

SPORTCRUISER airplane is equipped with dual controls which enables pilot training. Airplane control includes:

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

## 6.2 Description and operation

### 6.2.1 Lateral control (aileron control)

Ailerons are controlled by control sticks. Movement of control sticks is transferred by two push rods lead from the control stick to the transmission tube which transmit the movement to two push rods installed behind bulkhead No. 5 behind the seats. This two push rods lead to the control levers installed in the fuselage. Deflection from the control lever is transferred by means of the push rods to the bellcrank installed on rear rib No. 7 in outer wing. Bellcrank is connected per push rod with aileron control lever. Push rods have adjustable terminals with spherical bearings on the ends enabling aileron deflection adjustment. Lateral control stops are located on the aileron hinges.

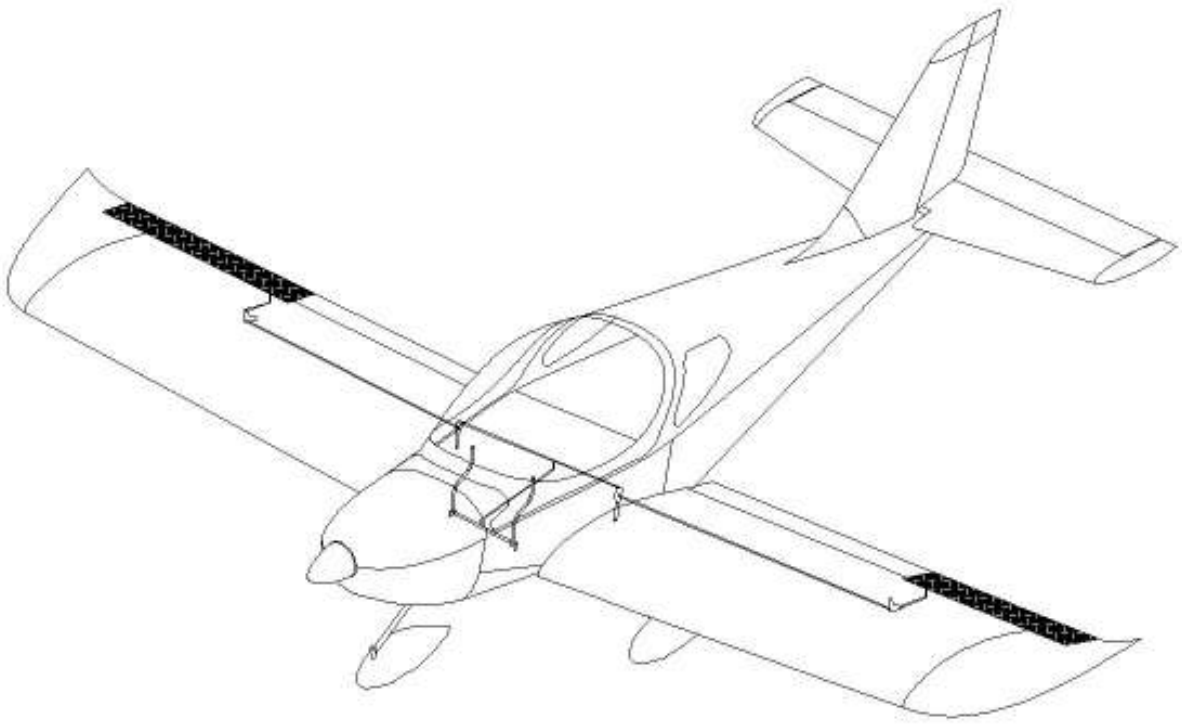


**Fig. 6-1**: Lateral control scheme

### 6.2.2 Longitudinal control (elevator control)

The elevator is controlled by control sticks. Movement of control sticks is transferred by system of transmission levers and push rods to the elevator. Forward and backward movement of the control stick is transferred by the push rod lead through the central channel between seats to the two-arm lever which is located under the baggage floor. Lever deflection is transferred to the movement of the push rods in the rear part of fuselage to the elevator. Push rods have adjustable terminals with spherical bearings on the ends enabling elevator deflection adjustment.

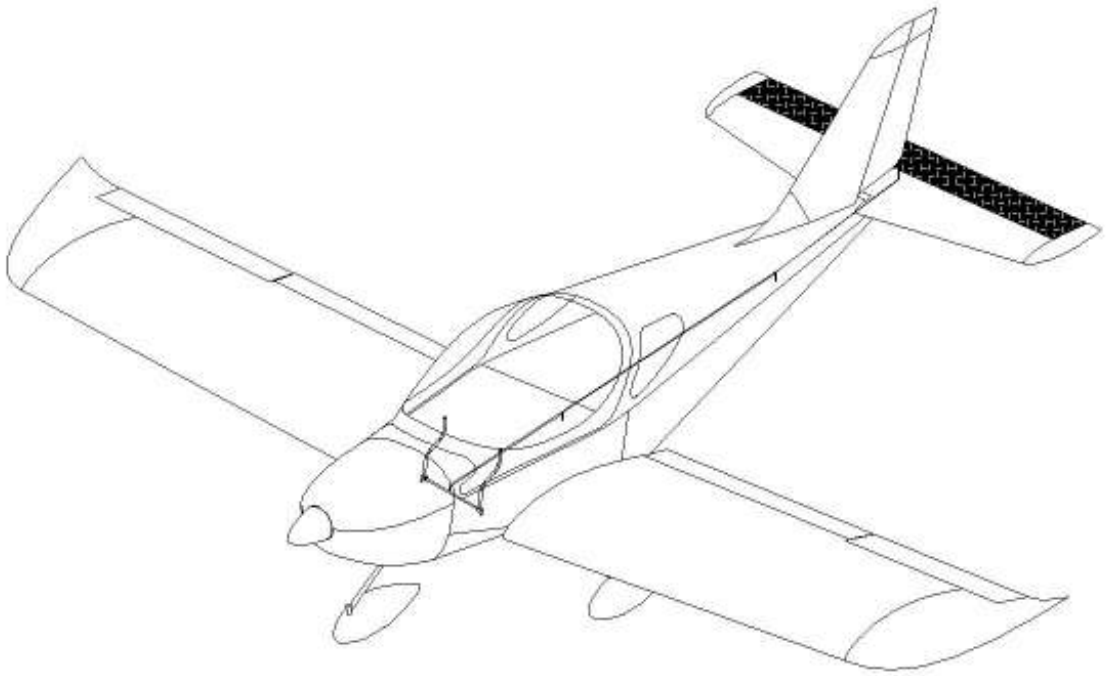


**Fig. 6-2**: Longitudinal control scheme

### 6.2.3 Directional control (rudder control)

The rudder control is controlled by means of foot control pedals. Pedal deflections of foot control are transferred by means of steel cables to the rudder. Steel cables are lead through middle channel of the fuselage. Cable ends are bent over the pulleys installed on bulkhead No. 12 and attached to the rudder control lever installed on root rudder rib. Other cable end is connected with foot control pedals.

Foot control pedals are setting to three positions (back,middle and front) by means of control lever located on the side wall of fuselage under instrument panel.

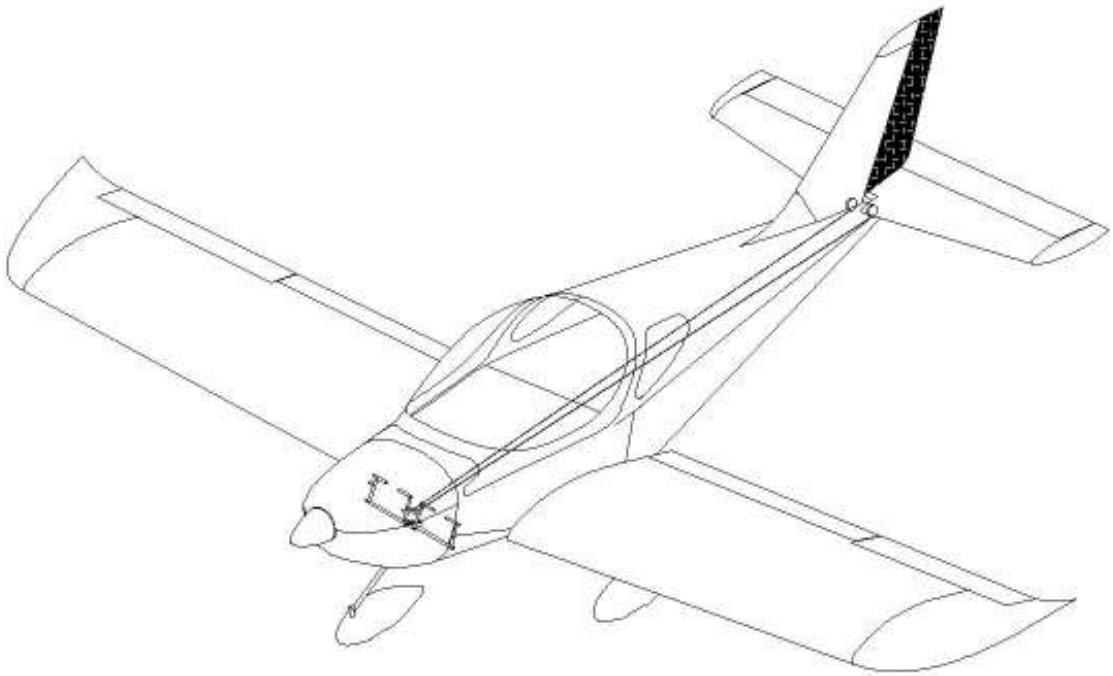


**Fig. 6-3**: Directional control

### 6.2.4 Elevator trim tab control

The elevator trim tab is controlled by the electrical actuator installed in elevator and connected per threaded rod with trim tab. Control switches are integrated part of grip on the left control stick (option on both control sticks). A LED position indicator is installed on the instrument panel.

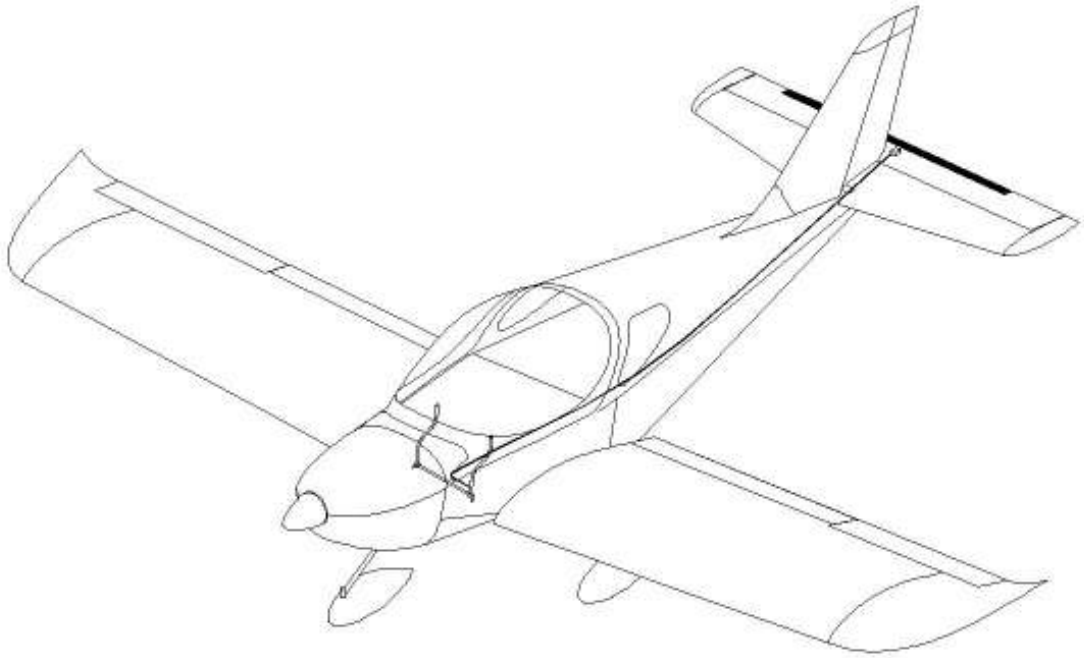


**Fig. 6-4**: Trim tab control

### 6.2.5 Wing flap control

Wing flaps are controlled by an electric flaps actuator connected with flaps per torque tube with control pins on each end. The flaps actuator located in fuselage under floor of baggage space and is controlled by a rocker switch located in cockpit. A LED position indicator is installed together with the rocker swich on the middle channel under instrument panel. It is possible to set the wing flaps to whatever position from 0° to 30°.

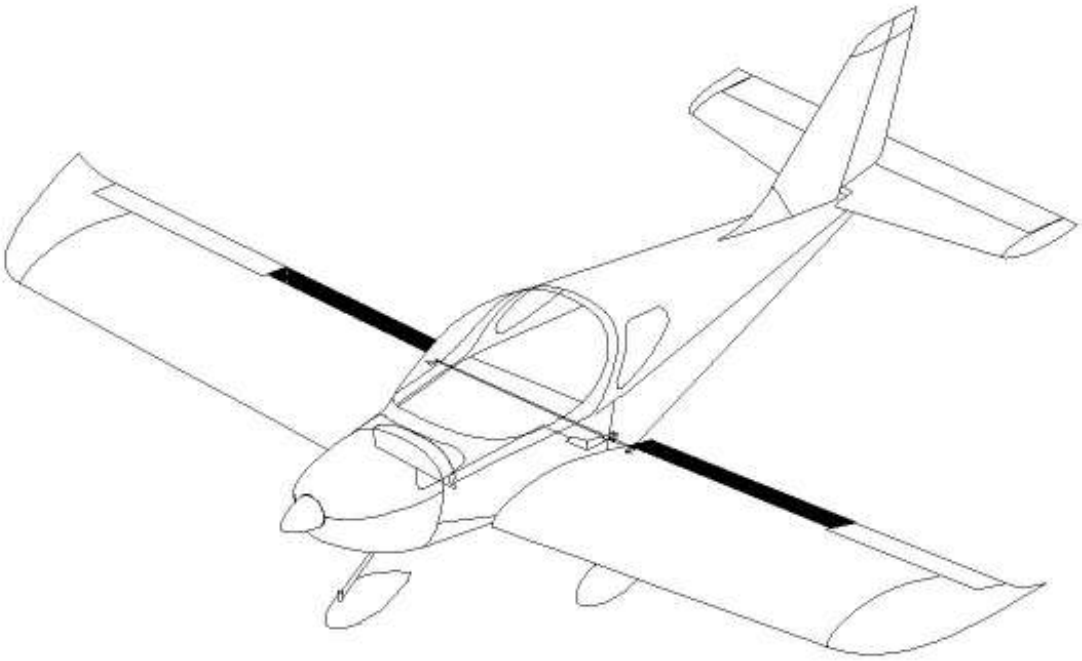


**Fig. 6-5**: Wing flap control

## 6.3 Removal / Installation

### 6.3.1 General principles for work on control system

### Push rod assembly

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in

Set the push rods to the prescribed length before assembling, tighten the nuts slightly, do not secure them for the time being. It is necessary to keep the following principles:

(a) Terminal thread must overlap the inspection hole in the push rod

(b) Terminals of all push rods must be uniformly screwed for setting the neutral position that serve for adjustment of control.

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.

### 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.

### Lubrication

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

## 6.3.2 Control sticks removal

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in, 3/8 in
- cutting pliers

Removal of the control sticks of manual control is shown on Fig. 6-6.

(a) Disconnect push rod (1) of elevator control tube and fork on torque tube (2).
(b) Disconnect push rods (3) of aileron control tubes on sticks (4).
(c) Disconnect electric wire (5) for trim tab switches and PTT on the sticks.
(d) Remove bolts (6) of torque tube hinges (7) on the cabin floor (8).
(e) Remove the control sticks assembly (9) from the cockpit.
(f) Remove the bolt (10) from the stick (4).
(g) Turn the stick (4) 90 degree and remove it from the torque tube (2).

## 6.3.3 Control sticks installation

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in, 3/8 in
- pliers

Installation of the control sticks is shown on Fig. 6-6.

(a) Put the stick (4) in the torque tube (2).

(b) Turn the stick (4) 90 degree and insert the bolt (10) in to the torque tube and stick.

(c) Put the control stick assembly (9) in the hinges (7) on the cabin floor (8).

(d) Insert the bolts (6) in to the torque tube hinges (7).

(e) Connect electric wire (5) for trim tab switches and PTT.

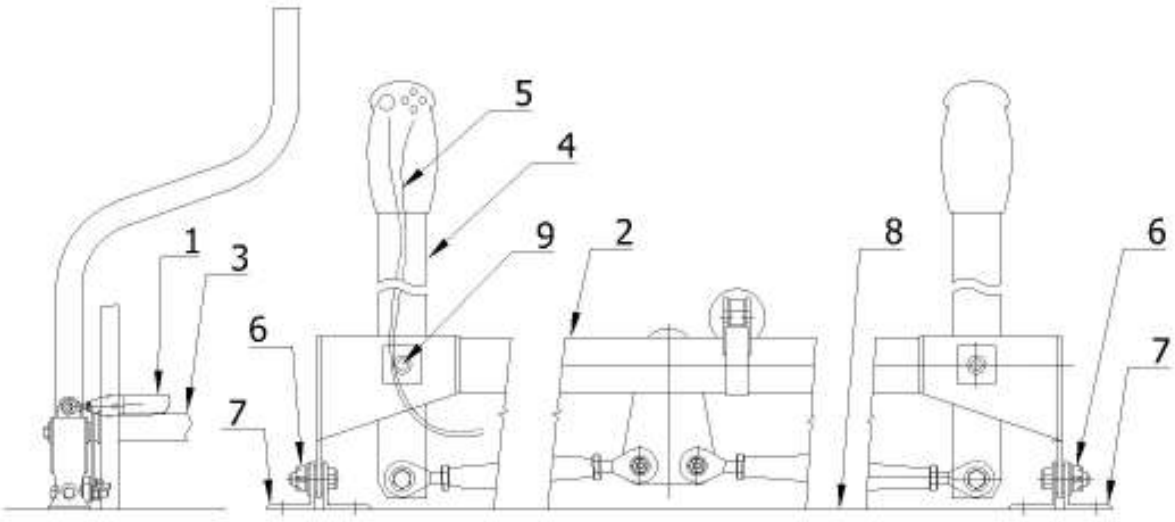
(f) Put aileron control tube push rods (3) on the sticks (4).

(g) Put elevator control tube push rod (1) in to the torque tube fork (2).

(h) Insert bolt in the control tube fork (2) and screw the nut.

(i) Check aileron deflections (see 6.4.3) and check plays in control (see 6.4.1).

(j) Check elevator deflections (see 6.4.3) and check plays in control (see 6.4.1).




View against the flight direction

1 ... Elevator control rod
2 ... Transmission tube
3 ... Aileron control torgue tube
4 ... Control stick
5 ... Electric wire
6 ... Bolt connection of control body and hinge on the floor
7 ... Control body hinge
8 ... Cabin floor
9 ... Bolt connection of control stick and transmission tube

**Fig. 6-6**: Removal/Installation of the control stick

### 6.3.4 Removal of wing flap control actuator

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size 7/16 in, 1/2 in,
- screwdriver

Removal of the flap control actuator is shown on Fig. 6-7.

(a) Open the cover behind the left seat (1) on the floor of baggage space.

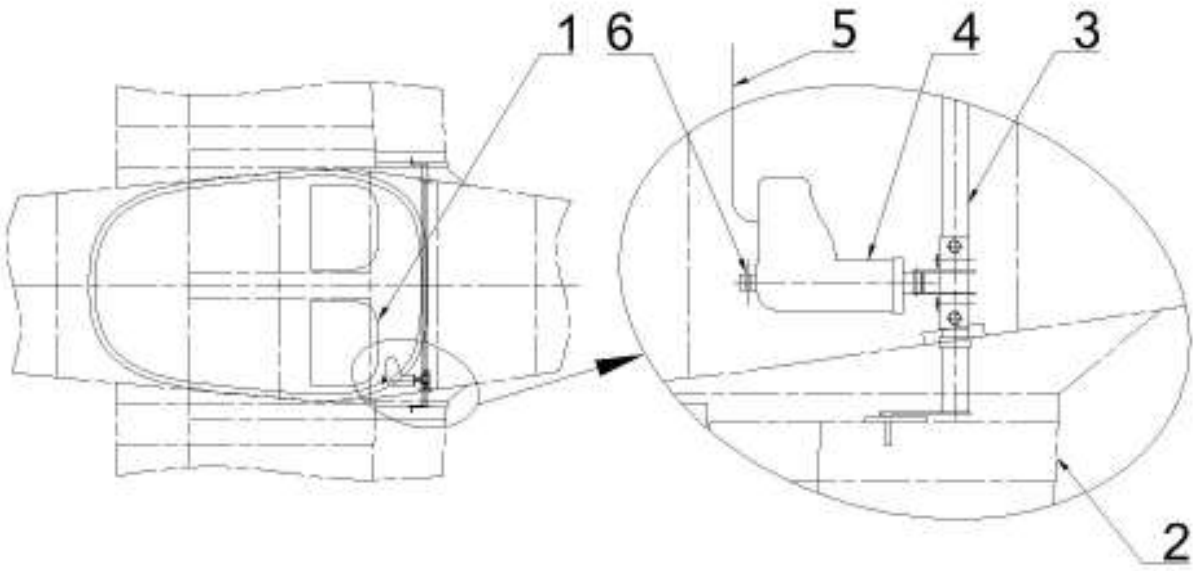
(b) Move the flap (2) to the landing position.

(c) Disconnect flap lever (3) from the flap actuator (4).

(d) Disconnect flap actuator wire (5).

(e) Disconnect the flap actuator (4) from the actuator hinge (6).

(g) Remove flap actuator (4).




1 ... Seat back
2 ... Flap
3 ... Flap lever
4 ... Flap actuator
5 ... Actuator wire
6 ... Actuator hinge

**Fig. 6-7**: Disassembly/Assembly of wing flap control actuator

### 6.3.5 Installation of wing flap control actuator

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size 7/16 in, 1/2 in,
- screwdriver

Installation of flap control lever is shown on Fig. 6-7.

(a) Insert flap actuator (4) in to the actuator hinge (6).

(b) Connect actuator wire (5).

(c) Connect the flap actuator (4) with the flap lever (3).

(d) Check the flap operation and deflections (see 6.4.3).

(e) Close the cover on the floor of baggage space.

### 6.3.6 Removal of the trim tab control actuator

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size No.5
- screwdriver
- cutting pliers, pliers

The trim tab control actuator is located in the elevator and the right aileron (see Fig. 6-8).

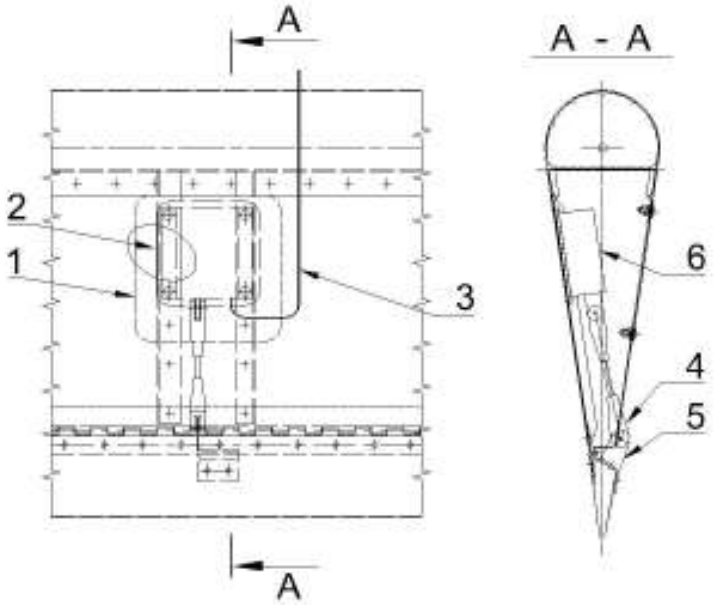
(a) Remove the cover (1) from the access hole (2).

(b) Disconnect the trim tab actuator wires (3).

(c) Disconnect the actuator rod end (4) from the trim tab lever (5).

(d) Disconnect the actuator (6) from the elevator or aileron skin.

(f) Remove the actuator (6) from the elevator or aileron through access hole (2).




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

**Fig. 6-8**: Trim tab control actuator

### 6.3.7 Installation of the trim tab control actuator

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size No.5
- screwdriver
- pliers

(a) Insert trim tab actuator (6) in to the elevator or aileron through access hole (2).
(b) Connect the actuator (6) from the elevator or aileron skin.
(c) Connect the rod end (4) with the trim tab lever (5).
(d) Connect the actuator wires (3).
(e) Check correct trim tab operation and adjustment of trim tab deflections (see 6.4.4).
(f ) Close the access hole with cover (1).

### 6.3.8 Removal of aileron control lever behind the seats

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in

(a) Tilt the seat backs.
(b) Disconnect both push rod (5) from the control lever (1) (see Fig. 6-9).
(c) Disconnect the control lever – unscrew the nut, remove the bolt (3).
(d) Remove control lever from the bracket (4).

### 6.3.9 Installation of aileron control lever behind the seats

Type of maintenance: heavy

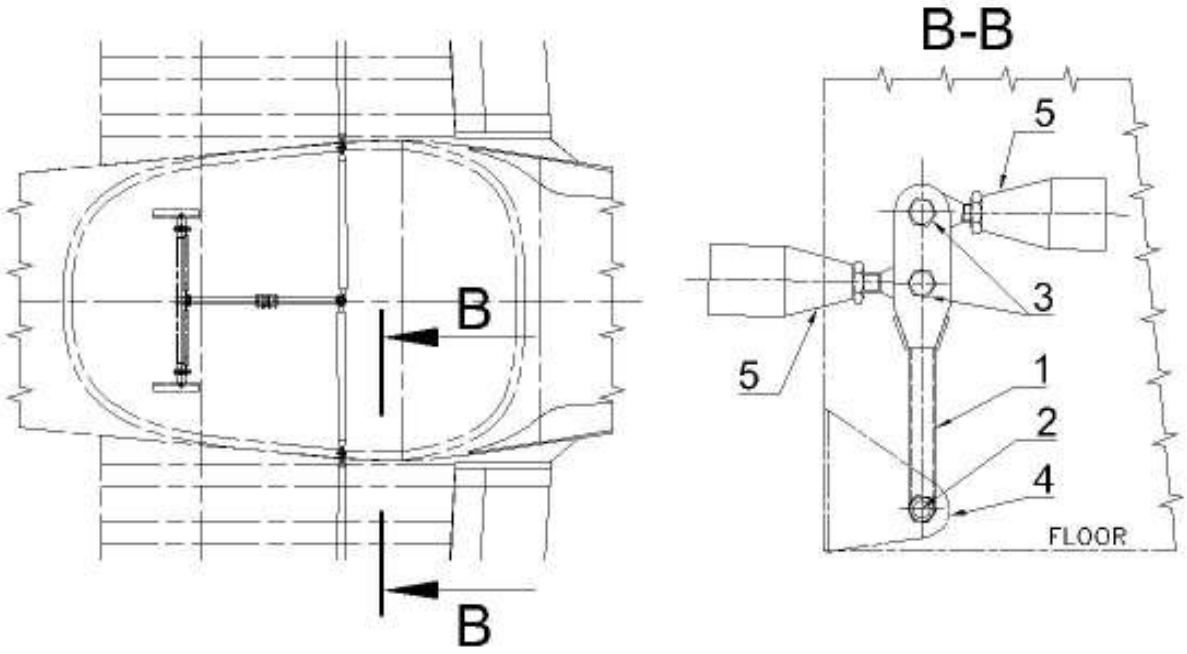
Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in

(a) Insert the control lever (1) to the bracket (4) (see Fig. 6-9).
(b) Connect the bolt (2) and nut.
(c) Connect control push rod (5) with control lever.
(d) Tilt the seat backs to backwards.




1 … Control lever 2 … Bolt 3 … Bolt 4 … Lever bracket 5 … Rod

**Fig. 6-9**: Control lever of aileron control behind the seats

### 6.3.10 Removal of aileron control bellcrank in the wing

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screwdriver

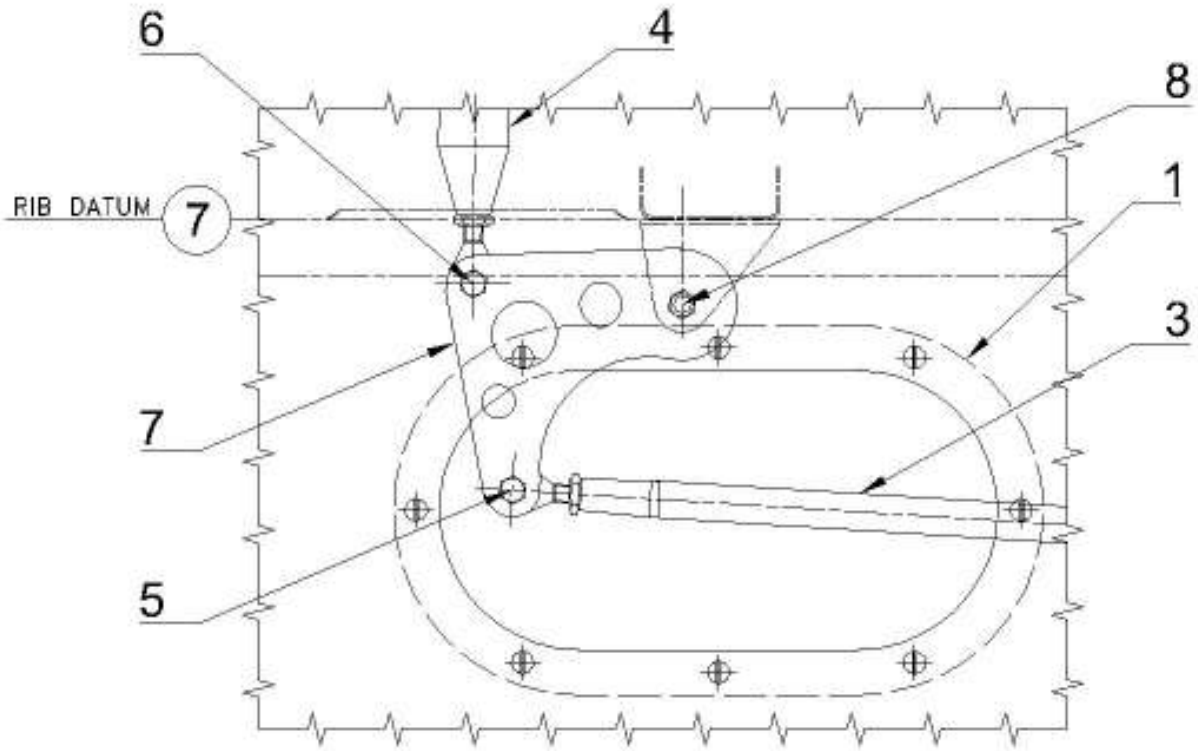
The bellcrankis located on the bracket in the position of the rear rib No. 7 between the spars.

Disassembly is identical for the left and the right wing (see Fig. 6-10).

(a) Remove the cover (1) and from both access holes on the lower side of the wing side by side the rib No.7.

(b) Remove the rods (3) and (4) from the bellcrank arm - unscrew the nuts and remove the bolts (5) and (6).

(c) Remove the bellcrank (7) from the wing - unscrew the nut and remove the bolt (8).




1 ... Cover 3,4 ... Rods 5,6 ... Rod bolts 7 ... Bellcrank 8 ... Bellcrank bolt

**Fig. 6-10**: Bellcrank of aileron control

### 6.3.11 Installation of aileron control bellcrank in the wing

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screwdriver

Installation of the aileron control bellcrank (7) is identical for the right and for the left wing.

(a) Check condition and lubrication of bellcrank bearings. If the bearings are contaminated, then carefully eliminate the contamination and grease them with lubricant oil.

(b) Set the bellcrank (7) to the position (see Fig. 6-10), insert the bolt (8) to the hole in the bellcrank and brackets and secure it with self locking nut.

**Note:** The bellcrank must not show axial play after installing and its travel must be continuous without dragging.

(c) According to the Fig.6-10 connect push rods (3) and (4) to the bellcrank.

(d) Check aileron deflections (see 6.4.3) and check plays in the control (see 6.4.1).

### 6.3.12 Removal of two-arm levers in front fuselage

Attachments of the two-arm levers are shown on Fig. 6-11.

#### 6.3.12.1 Removal of front two-arm lever

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screwdriver
- pliers

(a) Remove the cover on the floor of baggage compartment (1).

(b) Disconnect push rod ends (2) from the two-arm lever (3).

(c) Disconnect two-arm lever (3) and lever hinge (4) – remove the cotter pin, unscrew the castle nut, put out the bolt.

(d) Remove the two-arm lever (3).

#### 6.3.12.2 Removal of rear two-arm lever

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

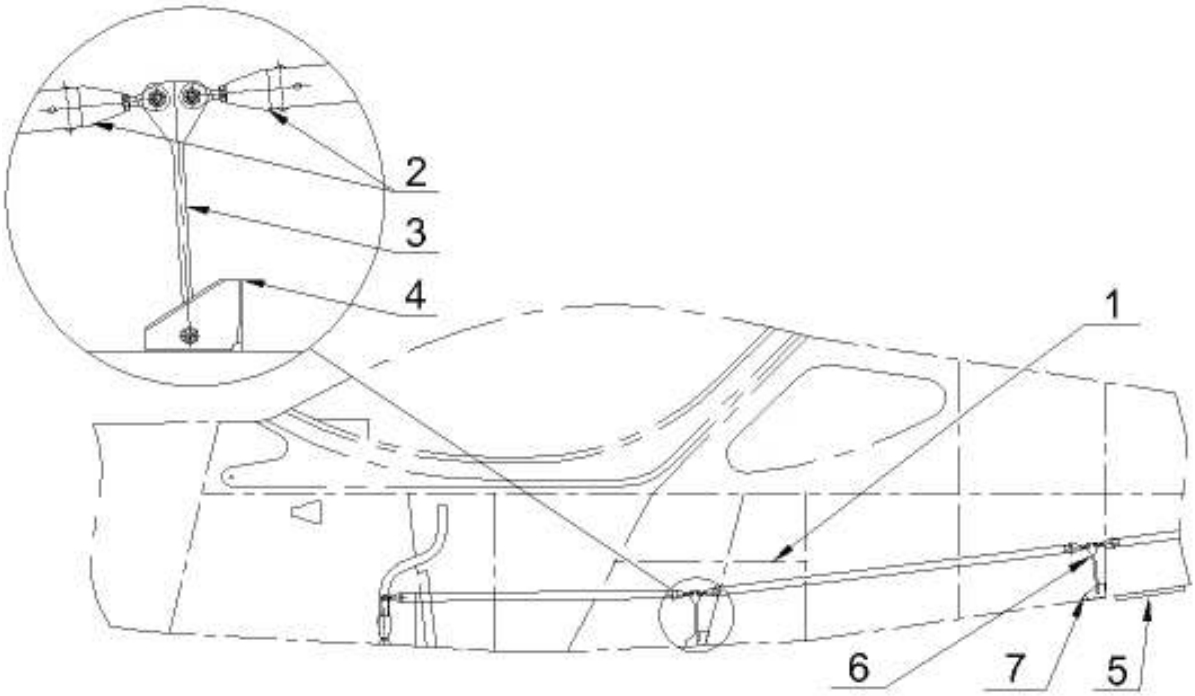
- wrench size 7/16 in
- screwdriver
- pliers

(a) Remove the middle channel rear cover (5).

(b) Disconnect push rod ends (2) from the two-arm lever (6).

(c) Disconnect two-arm lever (6) and lever hinge (7) – remove cotter pin, unscrew the castle nut, put out the bolt.

(d) Remove the two-arm lever (6).




1 ... Cover on the floor of bagg. comp.
2 ... Push rod end
3 ... Front two-arm lever
4 ... Front two-arm lever hinge
5 ... Rear middle channel cover
6 ... Rear two-arm lever
7 ... Rear two-arm lever hinge

**Fig. 6-11**: Two-arm levers – front fuselage

### 6.3.13 Installation of two-arm levers in front fuselage

Attachments of the two-arm levers are shown in Fig. 6-11.

#### 6.3.13.1 Installation of front two-arm lever

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screwdriver
- pliers

(a) Check condition and lubrication of two-arm lever bushings. If the bushing is contaminated, then carefully remove contamination and grease it with lubricant grease.

(b) Set the two-arm lever (3) to the position (see the Fig. 6-11), insert the bolt into the hole in the lever and the hinge (4) 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.

(c) Connect both push rod ends (2) with the two-arm lever (3).

(d) Close the access hole on the baggage compartment floor by cover.

(e) Check elevator deviations (see 6.4.3) and check control plays (see 6.4.1).

#### 6.3.13.2 Installation of rear two-arm lever

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screwdriver
- pliers

(a) Check condition and lubrication of two-arm lever bushings. If the bushing is contaminated, then carefully remove contamination and grease it with lubricant grease.

(b) Set the lever (6) to the position (see the Fig. 6-11), insert the bolt into the hole in the lever and the hinge (7) 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.

(c) Connect both push rod ends (2) with the two-arm lever (6).

(d) Close the middle channel hole by cover (5).

(e) Check elevator deviations (see 6.4.3) and check control plays (see 6.4.1).

### 6.3.14 Removal of two-arm lever in rear fuselage

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

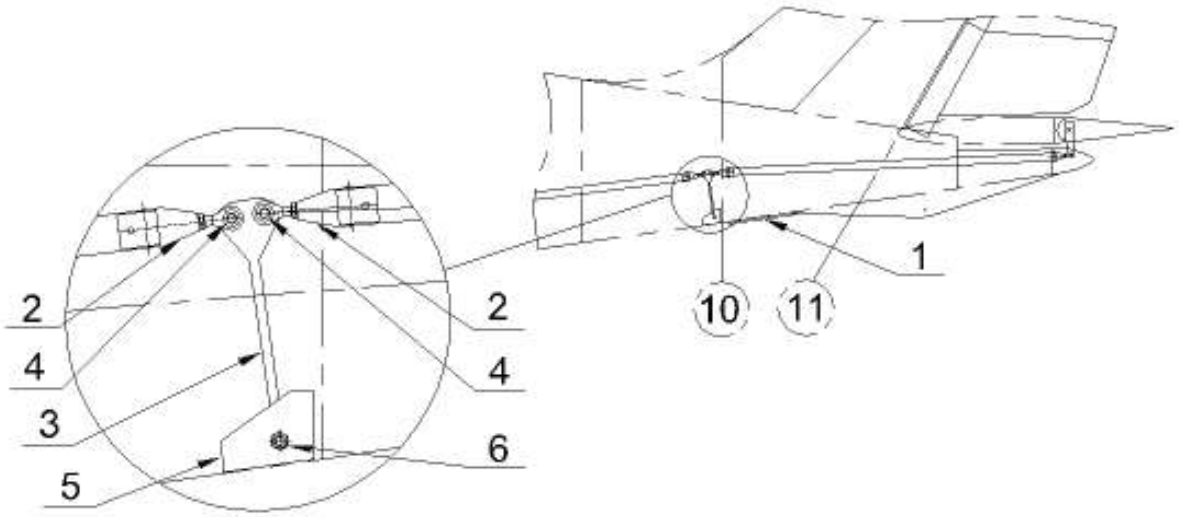
- wrench size 7/16 in
- screwdriver
- pliers

Attachment of two-arm lever is shown in Fig. 6-12.

(a) Remove the cover (1) between bulkheads No.10 and 11.

(b) Disconnect push rod ends (2) from the lever (3)
– unscrew the nuts and remove the bolts (4).

(c) Remove the lever (3) from the bracket (5) – remove cotter pin, unscrew the castle nut and remove the bolt (6).




1 ... Cover
2 ... Push rod end
3 ... Two-arm lever
4 ... Bolt
5 ... Lever bracket
6 ... Bolt

**Fig. 6-12**: Two-arm lever – rear fuselage

### 6.3.15 Installation of the two-arm lever in rear fuselage

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 7/16 in
- screwdriver
- pliers

Attachment of the two-arm lever is shown in Fig. 6-12.

(a) Check condition of the lever (3). Clean the bushing, grease it with lubricant grease and assemble the lever with lever bracket (5). Tighten the nut slightly and secure it with the cotter pin.

**Note:** The lever must not after installing show axial play and its travel must be continuous without hitching.

(b) Connect both push rod ends (2) with the lever (3).

(c) Close the access hole by cover (1).

(d) Check elevator deflections (see 6.4.3) and check plays in control (see 6.4.1).

## 6.4 Check / Adjustment

### 6.4.1 Check of plays in control

Admissible plays in control are mentioned in the following table:

| Control | Admissible play | Area to measure play |
|---|---|---|
| longitudinal | max 4mm *(5/32 in)* | at the end of the control stick in longitudinal axis of the airplane |
| lateral | max 4mm *(5/32 in)* | at the end of the control stick in lateral axis of the airplane |
| directional | max 4.8mm *(3/1 in)* | on pedals in longitudinal axis of the airplane |
| trim tabs | max 3.2mm *(1/8 in)* | at the end of the trim tab |
| wing flaps | max 3.2mm *(1/8 in)* | at the end of the wing flap |

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

**Measuring procedure**

(a) Measure all plays three times and write down average values.

(b) Perform measuring with the blocked control surfaces. Before measuring it is necessary to push down the control surface by hand several times (max force of 5 kg (*11 lbs*) in the direction of the control surface deflection, so that the control system is unblocked and plays can be more easily identified.

(c) Push on the control stick or the pedal by force of 3 kg (*6,6 lbs*). Deflect the controlling element to one side and read the deflection. Then push the control stick to the other side and read the deflection. Sum of deflections presents plays in control.

**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 end of the control stick (see Fig. 6-13).

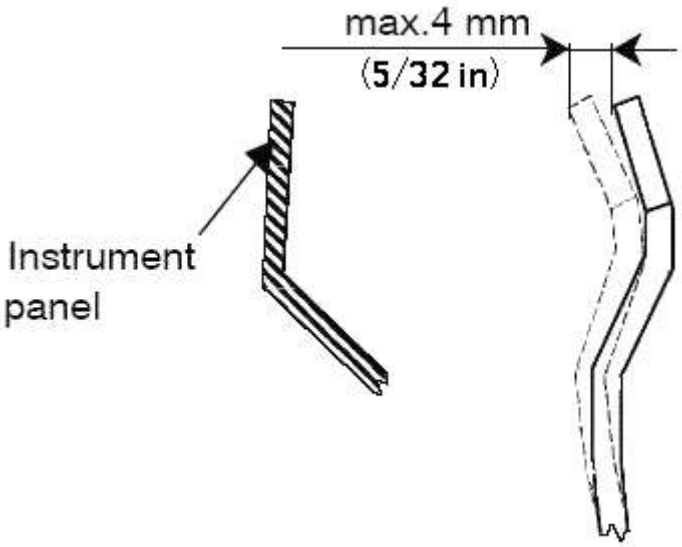



**Fig. 6-13**: Play in longitudinal control

**Lateral control**

Measure play at the end of the control stick by the measuring instrument from the fuselage side at blocked ailerons in the neutral position. First block the right aileron and measure play on the control stick, then measure play at the blocked left aileron. Total play of the control stick must not exceed 4 mm (*5/32 in*) at the end of the control stick.

**Plays in foot control pedals**

Measure play at the end of pedals by the measuring instrument from the inner wall of the bulkhead No.1 at the blocked rudder at neutral position and with the blocked nose landing gear wheel against lateral slewing. Mutual total play between pedals must not exceed 4.8 mm (*3/16 in*) on the pedal tube.

**Play in trim tab control**

Measure play in elevator neutral position. Set the balance tab to position “max on head" and measure play at the end of the trim tab. Max play of the trim tab measured at the end of the trailing edge must not exceed 3.2 mm (*1/8 in*).

**Play in wing flap control**

Measure play in individual position of wing flaps (0°, 10°, 20° and 30°). 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 4.8 mm (*3/16 in*).

### 6.4.2 Check for 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. In case of failure detection, find out the cause and eliminate the defect.

**Friction in the longitudinal control system**

(a) Balance elevator through the pulley to get it to neutral position.

(b) Measure force at the moment of elevator deflection from neutral position by the dynamometer attached on the end of the control stick. Max force can be 1.5 kg (*3,3 lbs*).

**Friction in lateral control system**

(a) Set ailerons to neutral position.

(b) Measure force at the moment of aileron deflection from neutral position by the dynamometer attached on the end of the control stick. Max force can be 1.5 kg (*3,3 lbs*).

**Friction in directional control system**

(a) Unload the nose landing gear.

(b) Set rudder to neutral position.

(c) Act in direction of control force (pilots feet) by means of the spring scale attached to the foot control pedal. Measure force at the moment of rudder deflection from the neutral position. Max force can be 4 kg (*8,8 lbs*).

### 6.4.3 Checking control surface deflections

Control surface deflections of SPORTCRUISER are shown in the following table:

| | Valid for S/N 06SC001 up to 08SC138 and all QBK, except of 08SC134 | Valid for S/N 08SC134 and from 08SC139 further, except of QBK |
|---|---|---|
| Aileron | 28°± 2°up<br>18°± 2°down | 20°± 2°up<br>15°± 2°down |
| Rudder | 30°± 2°right<br>30°± 2°left | 30°± 2°right<br>30°± 2°left |
| Elevator | 28°± 2°up<br>25°± 2°down | 28°± 2°up<br>25°± 2°down |
| Wing flap | 0°to 30° | 0°to 30° |
| Difference between L/R flap deflections | ± 0.5° | ± 0.5° |
| Elevator trim tab | 22°± 2°up<br>22°± 2°down | 22°± 2°up<br>28°± 2°down |
| Aileron trim tab | 20°± 2°up<br>20°± 2°down | 20°± 2°up<br>20°± 2°down |

**Tab. 6-1**: Deflections of control surfaces

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**

(a) Attach the protractor with the deflecting pointer on the upper skin of the aileron by means of the clamp.
(b) Set the aileron to neutral position.
(c) Set the protractor to 0°- starting value for m easuring.
(d) Deflect aileron to the lower (possibly upper) extreme position and read the deflection value.
(e) Check deflection values according to the tab. 6-1.

**Measuring wing flap deflections**

(a) Attach the protractor with the deflecting pointer on the upper flap skin by means of the clamp.
(b) Set the wing flap to the 0°position.
(c) Set the protractor to 0°- starting value of me asuring.
(d) Extend the flaps by means of the flap actuator to individual positions and read the deflection.
(e) Check deflection values according to the tab. 6-1.

**Measuring elevator deflections**

(a) Set the protractor with the deflecting pointer on the trailing edge of the elevator by means of the clamps.
(b) Set the elevator to neutral position.
(c) Set the protractor to 0°- starting value of me asuring.
(d) Deflect the elevator to extreme positions by means of the control stick and read the deflection.
(e) Check values of deflections according to the tab. 6-1.

**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:
(a) Set the rudder to neutral position.
(b) Put the rod to the trailing edge of the rudder and mark the lower margin of the rudder trailing edge.
(c) Deflect the rudder to extreme positions and with the rule measure distance from the sign to the lower margin of the rudder trailing edge.
(d) Calculate angle and compare it with the value mentioned in the tab. 6-1.

**Measuring trim tab deflections**

(a) Set the protractor with the deflecting pointer to the trailing edge of the trim tab by means of the clamp.

(b) Set the trim tab to neutral position.

(c) Set the protractor to 0°- starting value of me asuring.

(d) By means of the trim control actuator deflect the trim tab to extreme positions and read the deflection.

(e) Check values of deflections according to the tab. 6-1.

### 6.4.4 Adjustment of control surface deflections

Adjustment of control surface deflections to be made to the values shown in the tab. 6-1. At adjusting the airplane control, neutral position of the control surfaces is taken as the starting point.

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

**Adjusting aileron deflections**

(a) Range of deflections is adjusted by means of aileron hinges.

(b) Adjust aileron neutral position by setting the terminal of the push rod in the center wing or outer wing.

(c) 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 of the push rod leading from the control lever in the fuselage to the bellcrank in the wing or by means of the terminal of the push rod leading from bellcrank 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 not possible to adjust flap deflection outside manufacturing company.

**Adjusting elevator deflections**

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

(a) Remove the choosed push rod from the bellcrank.

(b) Adjust the upper deflection as needed by means of the push rod terminal (or by means of push rod terminal on the elevator lever).

(c) Put push rod end back and check if the deflections corresponds to the values mentioned in the tab. 6-1.

**Adjusting rudder deflections**

Rudder deflections are given by setting the stops on the rudder control lever installed on root rudder rib.

(a) Set the foot control pedals to neutral position and check if the rudder is in the neutral position.

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

**Adjusting trim tab deflections**

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

### 6.4.5 Checking condition and tension of rudder control cables.

(a) 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

(b) 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

(c) Check cable tension by cable tensioner

- prescribed cable stress in the operation is 15 ± 0.5 kg (*33 ± 1 lbs*).

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

(d) 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 (c))
- it is not possible to set the rudder to neutral position (see 6.4.4)

(e) Check rudder deflections (see 6.4.3).

## 6.5 Exchanges / Service information

### 6.5.1 Exchange of rudder control cable

(a) Cut the control cable (1) in the cockpit behind the rudder pedals.

(b) Remove the cable shackles (2) from the rudder lever (3).

(c) Remove cables on the rudder side from the fuselage.

**Note:** Grease the new cable with lubricant grease before installing it to the fuselage.

(d) Insert the new cable from the rudder side into the fuselage.

(e) Set nicopress sleeve (5) on the cable end in cockpit.

(f) Bend the cable end in cockpit around the cable thimble (6), insert the turnbuckle eye to the cable thimble, set nicopress sleeve (5) close to the cable thimble and press nicopress sleeve by Nicopress pliers (see 15.10).

(g) Connect new cable with turnbuckle (7) installed on rudder pedal (8).

(h) Set the rudder and the pedal and secure them in neutral position.

(i) Set on rear end of cable thimble (6) and cable shackle (2) and connect cable shackle with rudder lever (3).

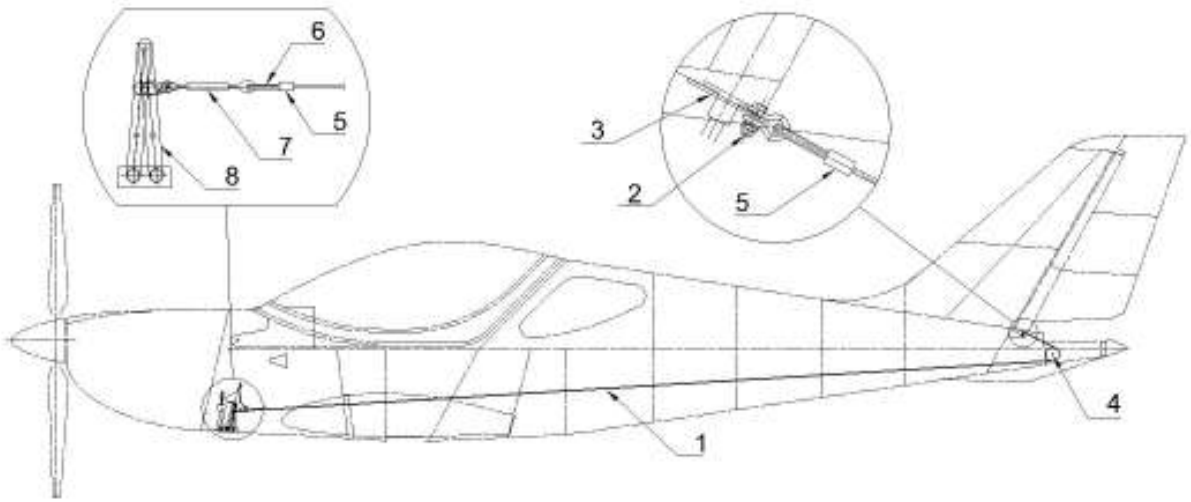
(j) Fit the clamp on the cable end and stretch the cable by force of 15±0.5 kg (*33±1 lbs*). Mark on the cable the position of its free end with an felt marking pen.

(k) Remove the cable from the rudder lever, cut the cable end to fit to the marked length and by means of Nicopress pliers (see 15.10) install the nicopress sleeve (5).

(l) Connect the cable with rudder lever and secure it with the bolt and nut with the cotter pin.

(m) Check and adjust the cable tension, see 6.4.5.

(n) Check (see 6.4.3) and adjust (see 6.4.4) rudder deflections.




1 ... Control cable
2 ... Cable shackle (washer, nut, cotter pin)
3 ... Rudder lever
4 … Pully
5 ... Nicopress sleeve
6 … Cable thimble
7 ... Turnbuckle
8 ... Rudder pedal

**Fig 6-14**: Rudder control

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# CHAPTER 7 - EQUIPMENT

## 7.1 General

This is a two-seat cockpit with the side-by-side seat arrangement. The seats are fixed, the rudder control pedals are fixed. The seats are equipped with safety harnesses. The baggage compartment is located behind the seats.

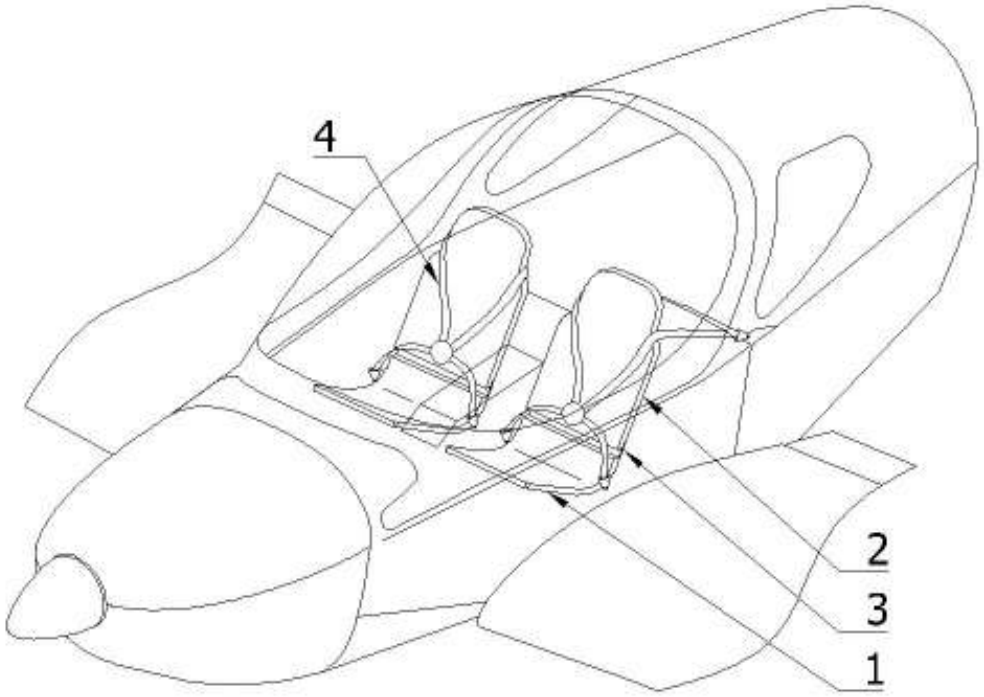
The equipment of SPORTCRUISER airplane includes:

- seats
- safety harnesses

## 7.2 Description and operation

### 7.2.1 Seats

Seats (1) of the SPORTCRUISER airplane are fixed and are equipped with an upholstered removable cushions attached on Velcro. The seat backs (2) are attached to the bulkhead No.4 per piano hinge (3).




1 ... Seat
2 ... Seat back
3 ... Piano hinge
4 … Safety harnesses

**Fig. 7-1**: SPORTCRUISER cockpit

### 7.2.2 Safety harnesses

Seats are equipped with safety harnesses (4). 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.

## 7.3 Removal / Installation

### 7.3.1 Removal of seats

(a) Remove the seats from the velcro,

(b) Seat back is not removable.

### 7.3.2 Removal of safety harnesses

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools neded:

- wrench size 1/2 in

(a) Remove shoulder harnesses from the attachment brackets (1) in luggage compartment (see Fig. 7-2). Remove the nut with washer and the bolt (2).

(b) Remove the side harnesses from the side attachment brackets (1) - remove the nut, the washer and the bolt (2) from each side.

### 7.3.3 Installation of safety harnesses

Type of maintenance: line

Authorization to perform:

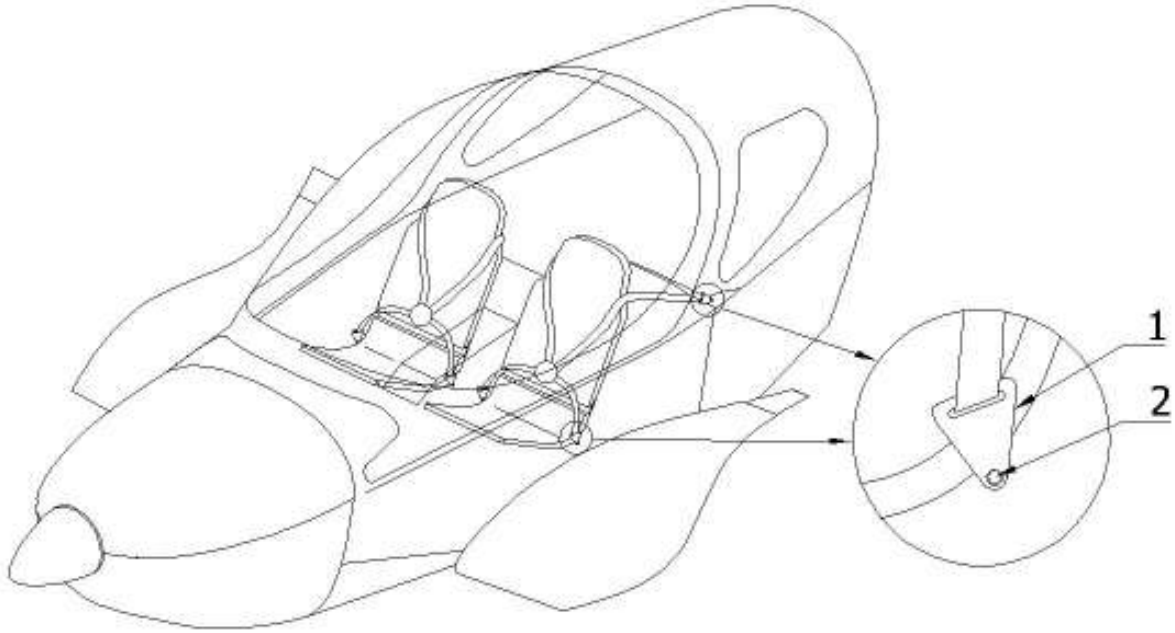
- Sport pilot or higher

Tools neded:

- wrench size 1/2 in

(a) Install the side harnesses (see Fig. 7-2) - put on the bolt (2) the washer and attachment brackets (1) and insert the bolt into the seat angle and screw the nut.

(b) Install the shoulder harnesses - put on the bolt (2) the washer and the attachment brackets (1) and insert the bolt (2) into the bracket in luggage compartment and screw the nut.




1 ... Attachment bracket
2 ... Bolt

**Fig. 7-2**: Removal/Installation of safety harnesses

## 7.4 Check / Adjustment

### 7.4.1 Checking of safety harnesses

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.

## 7.5 Exchanges / Service information

### 7.5.1 Cleaning seat covers and upholstery

(a) Take upholstery and covers out of the airplane.

(b) Brush impurities, possibly clean with warm water with addition of a suitable detergent.

(c) Before reinstalling upholstery and seats in the airplane, let it thoroughly dry.

# CHAPTER 8 – LANDING GEAR

## 8.1 General

SPORTCRUISER airplane landing gear is of three-wheel fixed design and consists of the main landing gear and the nose landing gear. The nose landing gear is not steerable. The main landing gear wheels are equipped with hydraulic disk brakes.

Type and dimension of wheels :

- wheel rim - Matco mfg MHE51B - 5 inch
- tyre and tube - Air Trac - 5,00-5 inch

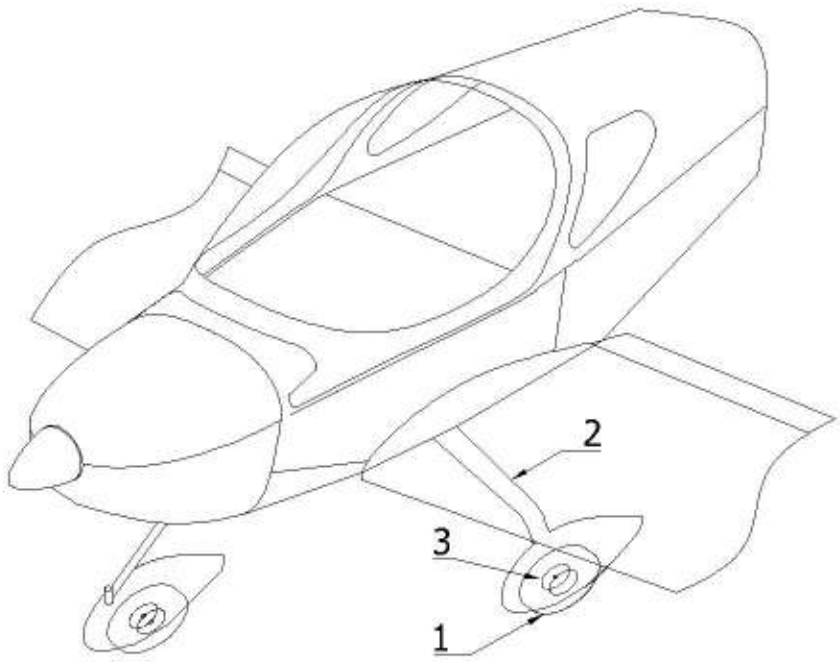
This chapter provides information on:

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

## 8.2 Description and operation

### 8.2.1 Main landing gear

The main landing gear (see Fig. 8-1) consists of the composite landing gear legs (2), wheel axle and wheel (1) equiped with disc brakes (3). The landing gear legs are inserted in the gear channel under the seats, where they are attached by two bolts (4) and stirrup (3) (see Fig. 8-7).

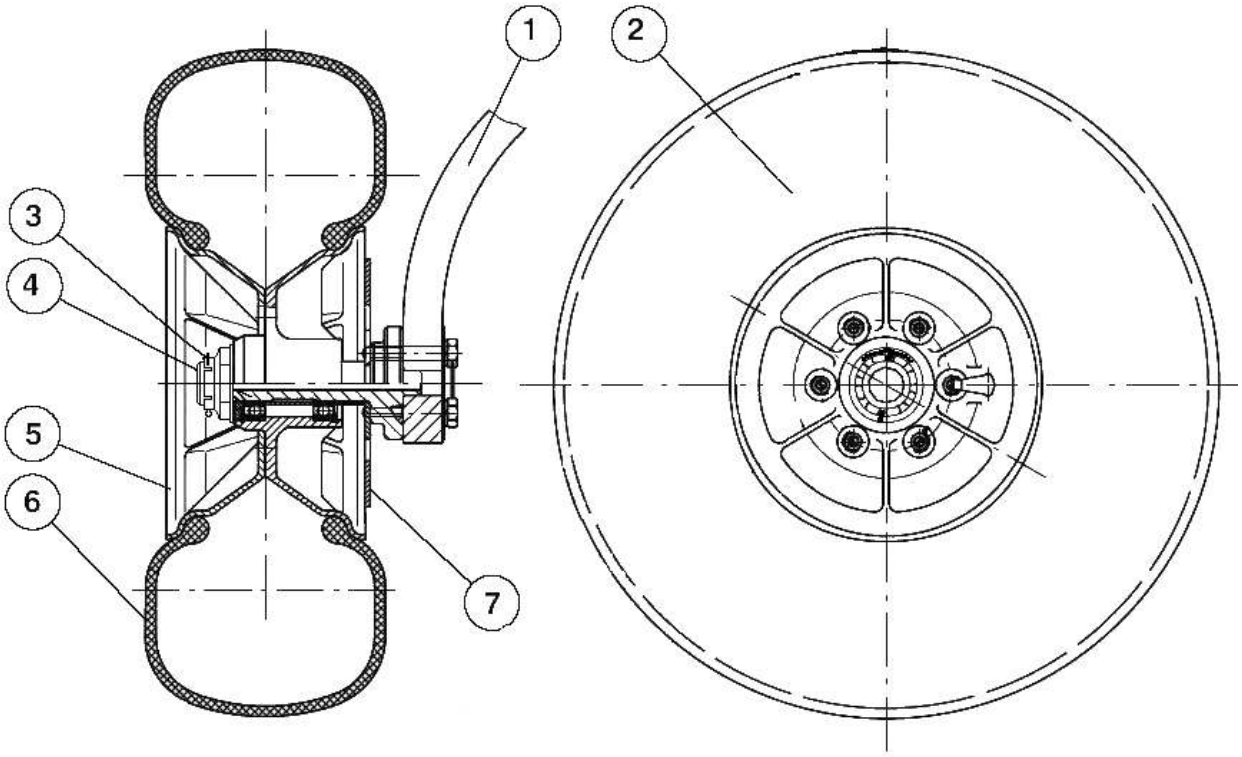



1 ... Wheel 2 ... Landing gear leg 3 ... Disc brake

**Fig. 8-1**: Main landing gear scheme

### 8.2.1.1 Main landing gear wheel (see Fig. 8-2)

Main landing gear wheel rims (5) are pressed of aluminum. Wheel rims are split in order to facilitate assembly and disassembly of tires (6). Both halves are joined by bolts. Main landing gear wheels are equipped with the brake discs (7) which are attached to the inner half of the wheel rims. Wheels are equipped with tires and tubes.

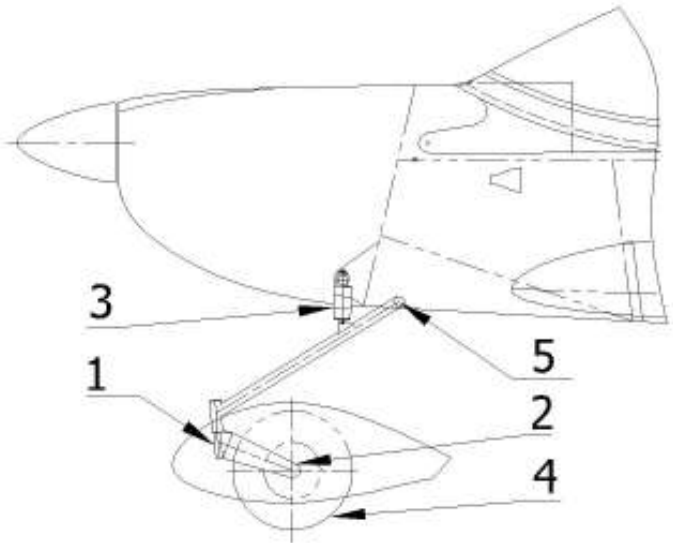



1 ... Landing gear leg
2 ... Main landing gear wheel
3 ... Nut and cotter pin
4 ... Wheel axle
5 ... Wheel rim
6 ... Tire with air tube
7 ... Brake disc

**Fig. 8-2**: Landing gear wheel

## 8.2.2 Nose landing gear

The nose landing gear of SPORTCRUISER airplane is not steerable and consists of 4130 steel welded landing gear leg (1), aluminum fork with doubler (2), shock absorber (3) and the wheel (4). The landing gear is attached to the brackets (5) installed on the bulkhead No. 1.

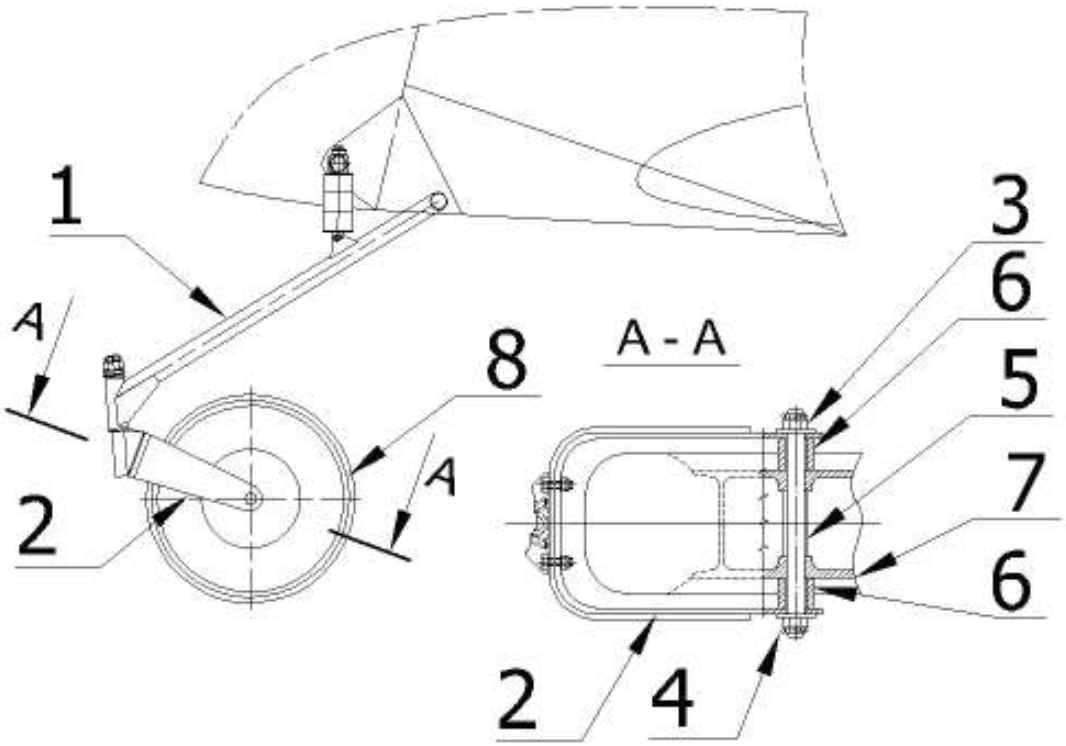



1 ... Landing gear leg
2 ... Wheel fork with doubler
3 ... Shock absorber
4 ... Nose landing gear wheel
5 ... Attachment brackets

**Fig. 8-4**: Nose landing gear scheme

### 8.2.2.1 Nose landing gear wheel

The nose landing gear wheel rim is pressed 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 tire and tube.




1 ... Landing gear leg
2 ... Wheel fork with doubler
3 ... Nut
4 ... Cotter pin
5 ... Wheel axle
6 ... Bushing
7 ... Wheel rim
8 ... Tire and air tube

**Fig. 8-5**: Nose landing gear wheel

### 8.2.3 Brake system

SPORTCRUISER 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. 8-7), brake pumps, hoses for brake fluid supply, brake calipers and brake pads. By depressing pedals, brake pumps are compressed and pressure generated in the brake circuit and the calipers pushes the brake pads onto the brake disks. Braking pressure can be controlled by force of brake pedal depressing.

#### 8.2.3.1 Parking brake

Airplane is optionally 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 the stop valve. By depressing the brake pedals and by turning the controller from “OFF” to “ON” position the brake hoses are locked and the pressure hold brake pads pressed on brake discs.

### 8.2.4 Wheel fairings

Airplane is equipped with composite wheel fairings that decrease air drag and improve aerodynamic properties of the airplane. The wheel fairings are installed on the brackets per bolts.

## 8.3 Removal / Installation

### 8.3.1 Removal of wheel fairings

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- screwdriver

Wheel fairings are attached on the brackets by means of bolts.

(a) Remove bolts attaching the wheel fairing on the brackets.

(b) Remove the fairings.

### 8.3.2 Installation of wheel fairings

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- screwdriver

(a) Set wheel fairings to position and attach them with bolts to the brackets.

### 8.3.3 Removal of main landing gear wheel

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- socket wrench size 1 1/2 in
- allen wrench size 3/16 in
- pliers

The main landing gear wheel assembly consists of the wheel rim, the tube, the tire, the brake disc and the brake.

At removing proceed according to Fig. 8-2:

(a) Jack and support the airplane (see section 14.2)

(b) Disassemble wheel fairing (see 8.3.1) and remove the wheel fairing bracket.

(c) Unscrew three bolt attaching the wheel rim with breake disc .

(d) Remove the cotter pin securing nut (3) on wheel axle.

(e) Remove the wheel (2) from the wheel axle (4).

### 8.3.4 Installation of main landing gear wheel

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- socket wrench size 1 1/2 in
- allen wrench size 3/16 in
- pliers

At installing proceed according to Fig. 8-2:

(a) Clear the wheel axle (4) of impurities and apply slight layer of grease on it.

(b) Put the wheel (2) on the axle.

(c) Apply the securing liquid (blue Loctite 243) on the screw threads and attach with it the wheel rim and breake disc .

(d) Screw and tighten the nut (3) on the wheel axle. Secure the nut (3) with the new cotter pin.

(e) Secure the nut (3) with the new cotter pin.

(f) Install the wheel fairing bracket and wheel fairing (see 8.3.2).

### 8.3.5 Removal of nose landing gear wheel

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1 1/8 in
- pliers

At removing proceed according to Fig. 8-5:

(a) Jack and support the airplane (see 14.2)

(b) Disassemble wheel fairing (see 8.3.1)

(b) Remove the cotter pins (4) securing nuts (3) on wheel axle (5).

(c) Remove the nuts (3) from wheel axle (5).

(d) Release the wheel axle (5) from the wheel hub, bushings (6) and the wheel fork eyes.

### 8.3.6 Installation of nose landing gear wheel

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1 1/8 in
- pliers

At installing proceed according to Fig. 8-5:

(a) Clear the wheel axle (5) of impurities and grease it slightly.

(b) From one side shift the axle into the wheel fork eye (2)

(c) Gradually put on first bushing (6), nose wheel rim (7) and second bushing (6) on the wheel axle (5) according to the figure.

(d) From both sides screw and tighten nuts (3) on the wheel axle (5).

(e) Check for free turning of the nose wheel (turning must be continual without catching).

(f) Secure nuts (3) with cotter pins (4).

### 8.3.7 Removal of the main landing gear leg

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 9/16 in, 1/2 in

At removing proceed according to Fig. 8-7:

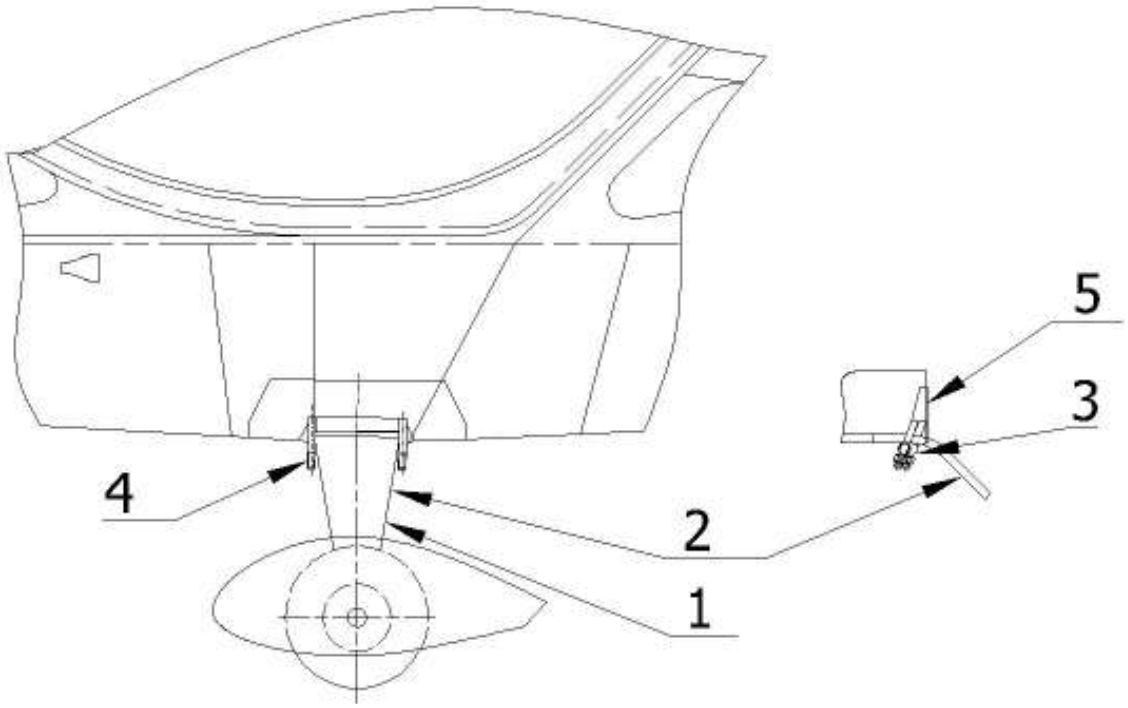
(a) Jack and support the airplane (see 14.2).

(b) Disconnect the brake line (1).

(c) Disconnect main gear leg (2), stirrup (3) and attachment bolts (4).

(d) Remove the bolts (4) and stirrup (3) from the attachment channel (5).

(e) Remove the landing gear leg (2) from the attachment channel and put it on a suitable place.




1 ... Brake line
2 ... Main gear leg
3 ... Stirrup
4 ... Bolt
5 … Attachment channel

**Fig. 8-7**: Removal / Installation of the main landing gear leg

### 8.3.8 Installation of the main landing gear leg

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 9/16 in, 1/2 in

At installing proceed according to Fig. 8-7:

(a) 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.

(b) Insert the landing gear leg (2) into the attachment channel (5) on fuselage.

(c) Put the bolts (4) and stirrup in attachment channel, tighten the bolts slightly.

(d) Connect the brake lines (1).

(e) Fill brake system with brake liquid and air-bleed it (see 8.5.4)

### 8.3.9 Removal of nose landing gear leg

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 1/2 in, No.17

At removing proceed according to Fig. 8-8.

(a) Jack and support the airplane, (see section 14.2).

(b) Remove the bolts (3) from the leg brackets.

(c) Disconnect shock absorber from the shock absorber attachments (2).

(d) Remove the gear leg (1) from the fuselage and put it on a suitable place.

### 8.3.10 Installation of nose landing gear leg

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 1/2 in, No.17

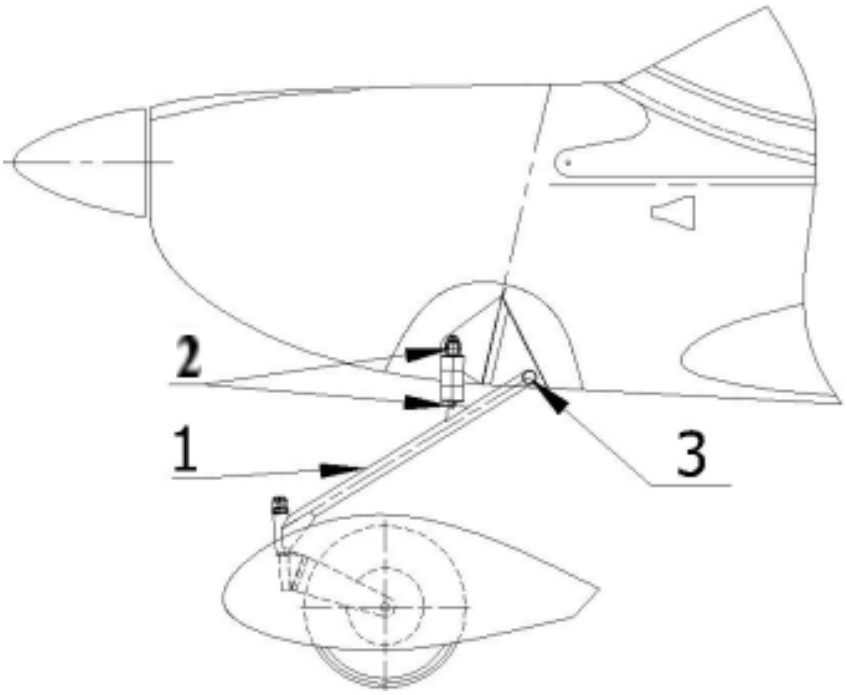
At installing proceed according to Fig. 8-8.

(a) 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.

(b) Insert the gear leg (1) into the brackets.

(c) Put the bolts (3) into the brackets, tighten the bolts slightly.

(d) Connect shock absorber with the shock absorber attachments (2).




1 ... Nose gear leg
2 ... Shock Absorber Attachments
3 ... Gear leg attachment bolts

**Fig. 8-8**: Removal / Installation of the nose landing gear leg

### 8.3.11 Removal of brake pumps

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1/2 in, 3/8 in

At removing proceed according to Fig. 8-9.

(a) From the brake system drain brake fluid. Disconnect the brake system hose from the brake cylinder on the main landing gear wheel and let brake fluid drain to a previously prepared can from that system line in which you want to remove the brake pump.

(b) Disconnect the brake system hose (2) from the brake pump (1).

(c) Remove bolts (3) from the brake pump and rod end eye.

(d) Release the pump from the bracket (4) on the floor.

### 8.3.12 Installation of brake pumps

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1/2 in, 3/8 in

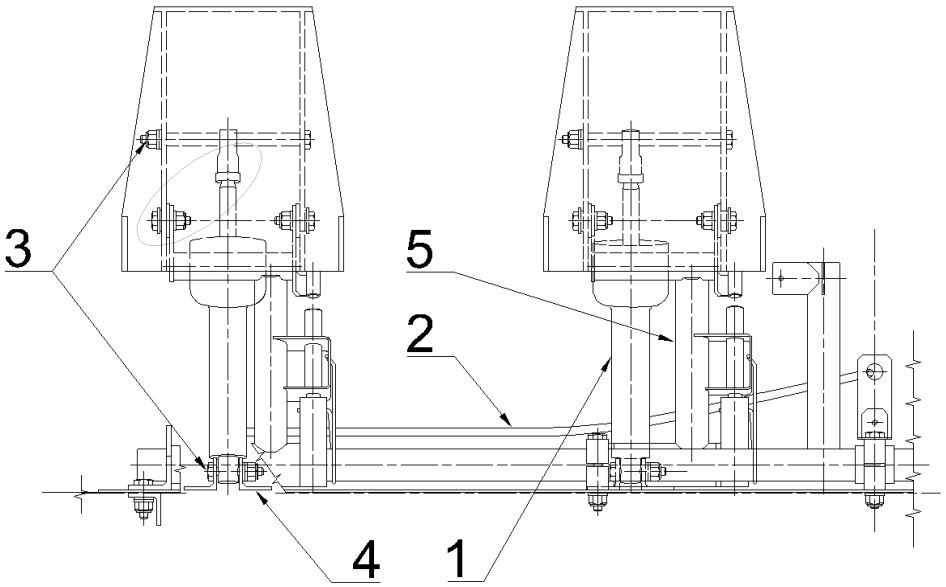
At installing proceed according to Fig. 8-9.

(a) Insert the brake pump (1) according to the figure to the floor bracket and assemble the bolted joint (3). Secure the nut by means of the cotter pin.

(b) Connect brake pump rod end eye with pedal (5) by means of bolt (3). Secure the nut by means of the cotter pin.

(c) Reinstall the brake system hose (2) on the brake pump (1) and on the brake cylinder on main landing gear.

(g) Fill the brake system with brake fluid and air-bleed it. (see 8.5.4.)




1 ... Brake pump
2 ... Brake hose
3 ... Bolts, nuts, washers
4 ... Bracket
5 ... Rudder pedal

**Fig. 8-9**: Removal / Installation of brake pumps

## 8.4 Check / Adjustment

### 8.4.1 Check of nose landing gear shock absorber

(a) Several times hoist and lower the nose landing gear of the airplane.

(b) Measure value of absorber and nose landing gear compression according to Fig. 8-10. Perform measuring in vertical direction between bottom part of engine cowl and the lover shock absorber attachment. The minimum value of **X** dimension is 50 mm (*2 in*). If this value is lower then exchange the springing elements (see paragraph 8.5.2).

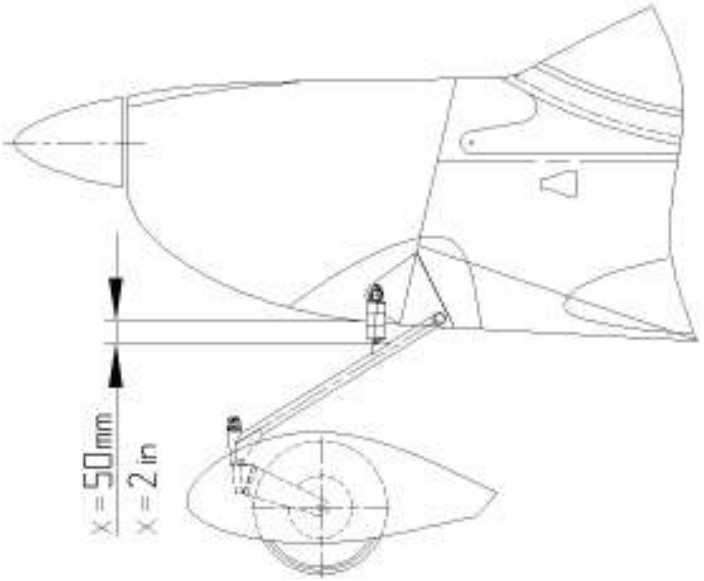



**Fig. 8-10**: Check of nose landing gear shock absorber

## 8.5 Changes / Service information

### 8.5.1 Tire change

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1/2 in
- Allen wrench size 1/4 in

(a) Jack and support the airplane (see section 14.2).

(b) Remove the wheel fairing (see 8.3.1).

(c) Remove the main landing gear wheel (see 8.3.3) or the nose landing gear wheel (see 8.3.5).

(d) Deflate the tire.

(e) Unscrew bolts (1) (see Fig. 8-11).

(f) Set apart both halves of the rim and remove the tire with the air tube.

(g) Exchange the air tube or the tire as necessary.

(h) Put the air tube into the tire and inflate it slightly.

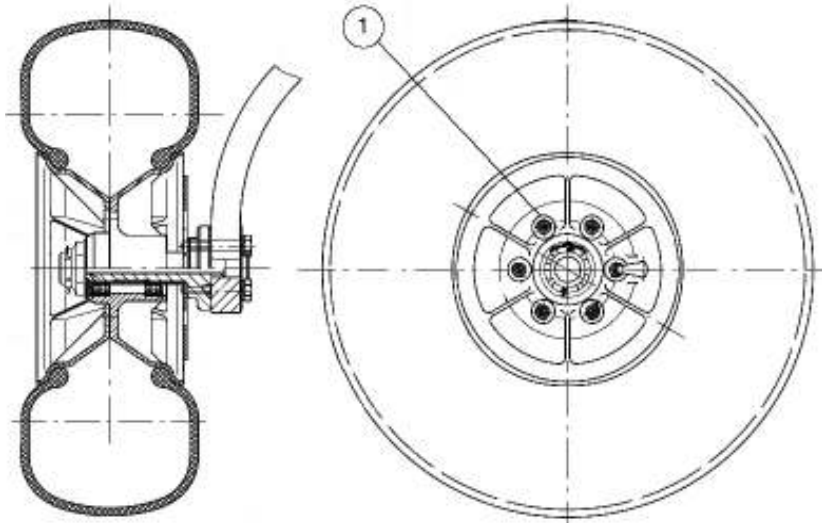
(i) Put the inner tube on that half of the rim, which has the hole for the valve.

(j) Put the other half of the rim on this unit. Join both halves of the rim with bolts – torque value 11.3 Nm (*100 in lbs*).

(k) Inflate tires to the prescribed pressure:

- nose wheel 0.8 + 0.2 bar (*11,6 + 2,9 psi*)
- main wheel 1.8 + 0.2 bar (*26.1 + 2.9 psi*)

(l) Mark position of the rim and the tire by redline overreaching about 10 mm (3/8 in) to the rim and the tire (serves for checking the tire slewing against the wheel rim in operation).




1 … Rim bolts

**Fig. 8-11**: Tire change

### 8.5.2 Change of nose landing gear springing elements

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size 1/2 in

At changing proceed according to Fig. 8-12.

(a) Disconnect shock absorber (1) from the bracket (2) on the firewall.

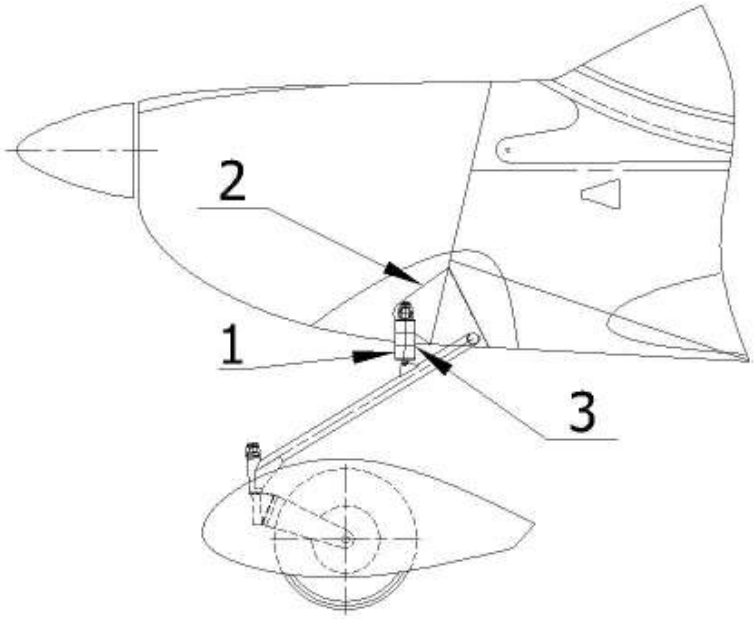
(b) Jack and support the airplane (see section 14.2)

(c) Turn shock absorber (1) forward and remove springing elements (3).

(d) Replace springing elements in the leg.

(e) Finally put the shock absorber (1) back in the position on firewall.

(f) Rejack the plane.




1 ... Shock absorber 2 ... Shock absorber bracket 3 ... Springing elements

**Fig. 8-12**: Exchange of the springing elements in the nose landing gear

### 8.5.3 Exchange of brake pads

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 7/16 in

**Caution:** Exchange always both brake pads!

At changing proceed according to Fig. 8-13.

(a) Jack and support the airplane (see section 14.2)

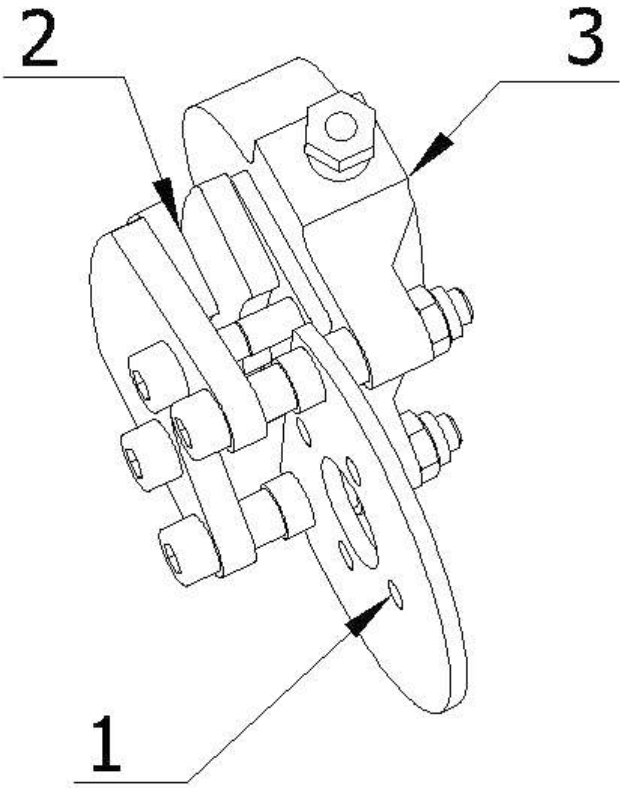
(b) Remove the main landing gear wheel (see 8.3.3)

(c) Remove bolts holding the pads (2) on the caliper (3) and pull out the brake pads (2) and brake disc.

(d) Insert new pads into the brake, insert the brake disc and screw them with the caliper (3).

(e) Reinstall the main landing gear wheel (see 8.3.4).

(f) Check the brake function.




1 ... Attaching holes
2 ... Brake pads
3 ... Caliper

**Fig. 8-13**: Exchange of brake pads

## 8.5.4 Refilling / exchanging brake fluid

**Draining brake fluid from brake system**

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 7/16”

(a) Disconnect the brake hose from the brake cylinder and let brake fluid drain into the previously prepared can.

(b) You can accelerate brake fluid draining by compressing the relevant brake pedal.

**Filing brake fluid into brake system**

**Note:** Brake fluids used by aircrafts manufacturer is shown in section 17.5

(a) Reconnect the brake hose to the brake cylinder.

(b) Turn the air bleeding bolt on the brake cylinder 1 turn out. Put the plastic hose on the air bleeding bolt and by means of a compressive brake liquid reservoir fill the brake system. At filing brake fluid this way, the danger of brake system air in taking is minimized.

(c) After brake fluid refilling, carry out air bleeding of brake system.

**Refilling brake fluid into brake system**

(a) Refill brake fluid into system through the hole on the brake pump (on the foot control pedals). With this method be careful that air intake into brake system does not occur.

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# CHAPTER 9 – FUEL SYSTEM

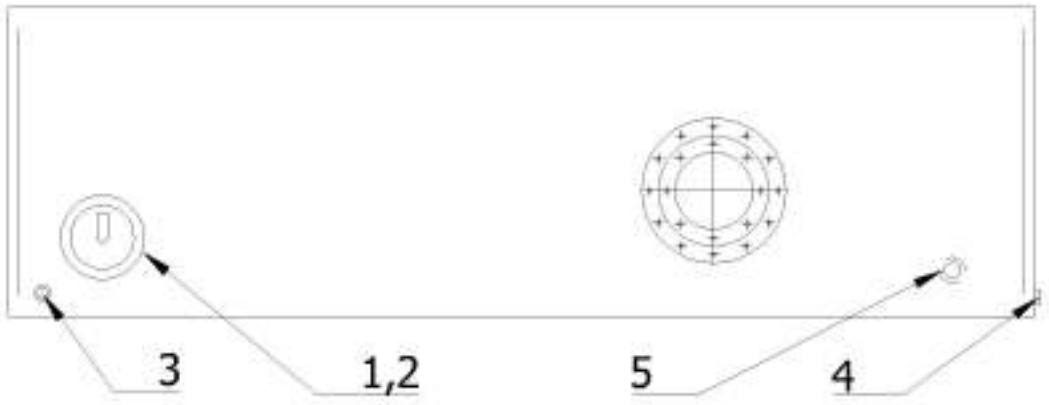
## 9.1 General

Fuel system serves for storing fuel in the airplane and its delivering to the engine. The fuel system of SPORTCRUISER airplane consists of the following parts: two fuel tanks, fuel tubing, selector valve, fuel filter, gascolator, mechanical fuel pump (located on the engine), electrical fuel pump, fuel gauge, fuel pressure gauge and drain valves of the fuel tanks.

## 9.2 Description and operation

### 9.2.1 Fuel storage

Fuel is stored in airplane in the fuel tanks. The fuel tanks are welded from Al-alloy sheet and their volume is 57 litres (*15 US gallons*) each. The tanks are located in the outer wings between ribs No.4 and 6a in front of the main spar. Their shape fits with 3.2 mm (*1/8 in*) offset with outer wing shape. The gap is filled with cork strips glued on the fuel tank. Cork strips protect the tank from touching the skin and the wing spar. Each fuel tank has a filler neck (1) with flush head filler cap (2), venting tube (3), finger screen (4) and drain valve (5). Fuel is filled into the each tank through the filler neck (1), which is located on the top skin close to rib No.6a. Fuel drain from the tank is possible through the drain valve (5) located in the rear corner of bottom skin close to the root fuel tank rib.



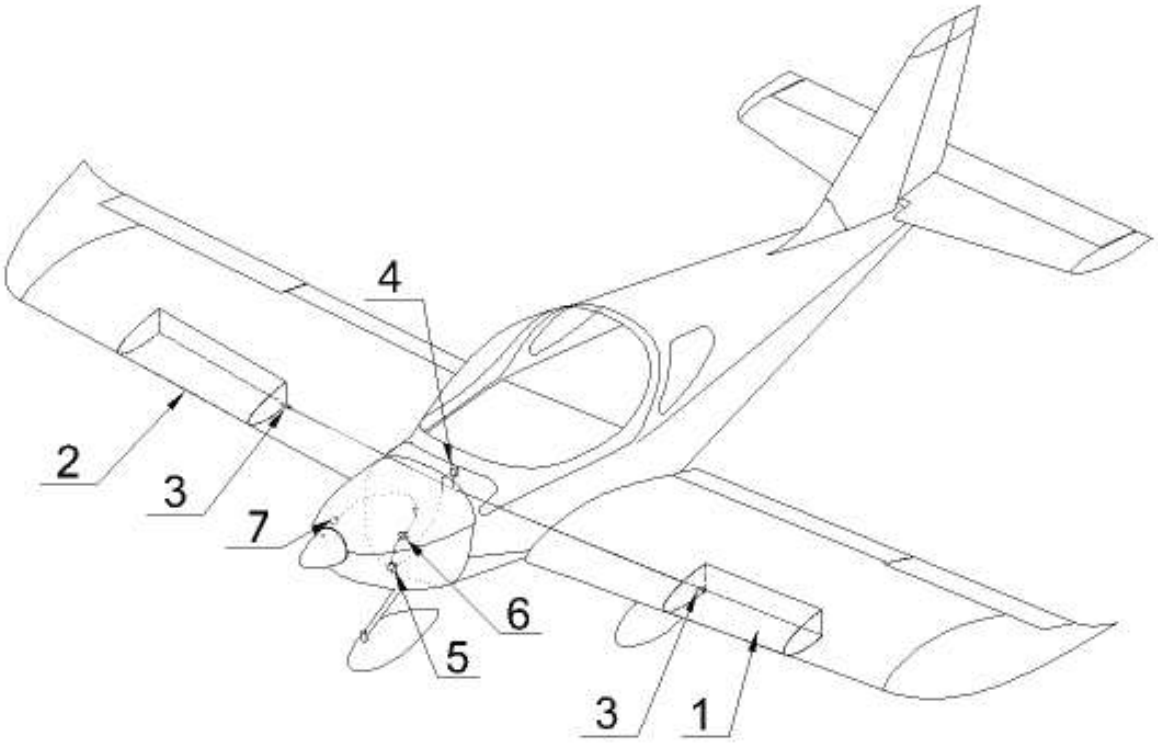

1 ... Filler neck
2 ... Filler cap
3 ... Venting tube
4 ... Finger screen
5 ... Drain valve

**Fig. 9-1**: Fuel tank

### 9.2.2 Fuel distribution

Fuel flows from the tank (1) and (2) through finger screens (3) to the ANDAIR selector valve (4) and from there to the gascolator (5), electrical fuel pump (6) and fuel filter to the mechanical fuel pump (7) located on the engine. From there it is supplied through the fuel distributor to carburetors.

The ANDAIR selector valve (4) served also for interruption of fuel supply in case of engine fire or after long-time parking airplane. The ANDAIR selector is located on the middle console between the seats in the cockpit. The gascolator (5) is located on the firewall in lowest point of fuel system. The electrical fuel pump (6) is located on the firewal above the gascolator. The fuel filter eliminates all mechanical impurities.




1 ... Fuel tank left
2 ... Fuel tank right
3 ... Finger screen
4 ... Andair selector valve
5 ... Gascolator
6 ... Electrical fuel pump
7 ... Mechanical fuel pump

**Fig. 9-2**: Fuel system installation diagram

### 9.2.3 Indication of fuel quantity and pressure

Scheme of fuel quantity is shown in the Fig. 9-5.

Fuel quantity is measured by the fuel float gauge. The float position is converted to an electrical signal and fuel quantity in the tank is indicated on the fuel indicator on the instrument panel.

## 9.3 Removal / Installation

### 9.3.1 Fuel tank removal

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No. 8, 1/2 in,
- screwdriver
- drill diam. 3.2 mm (1/8 in), 4.1 mm (5/32 in)
- electric drill
- cutting pliers, pliers

(a) Disconnect the battery.
(b) Drain fuel from the fuel system by the tank drain valve.
(c) Unscrew the filler cap.
(d) Remove the wing (see 4.3.1) and put it on the table.
(e) Drill out the top half of the leading edge skin.
(f) Disconnect wiring from fuel level sender.
(g) Disconnect fuel line.
(h) Carefully remove the tank and store it. Seal the tank holes as needed.

### 9.3.2 Fuel tank installation

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No. 8, 1/2 in,
- screwdriver
- rivetting pliers
- cutting pliers, pliers

(a) Remove any hole seals from the tank.
(b) Set the tank to the position between the ribs No.4 and 6a. Before installing the tank, check the cork bands for completeness and damage. Change them as needed.
(c) Connect fuel level sender wire, insert the finger screen – use LOCTITE 565 or equivalent sealant.
(d) Close the leading edge skin on the wing and fit it to the spars and ribs per clecos each second hole with help of securing harnesses.
(e) Rivet the skin on the ribs and spar.
(f) Screw back filler cap - use silicon to make connection of filler cap flange and wing skin watertight.
(g) Install the wing (see 4.3.2).
(h) Check the fuel system (see 9.4.1).
(i ) Connect the battery ground.

### 9.3.3 Removal of the finger screen

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- screwdriver

At removing proceed according to Fig. 9-4.

The finger screen is located in the root tank rib.

(a) Drain fuel from the fuel system.

(b) Remove the wing – see 4.3.1.

(c) Disconnect the fuel hose (3).

(d) Remove the finger screen (2).

### 9.3.4 Installation of the finger screen

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools neded:

- screwdriver

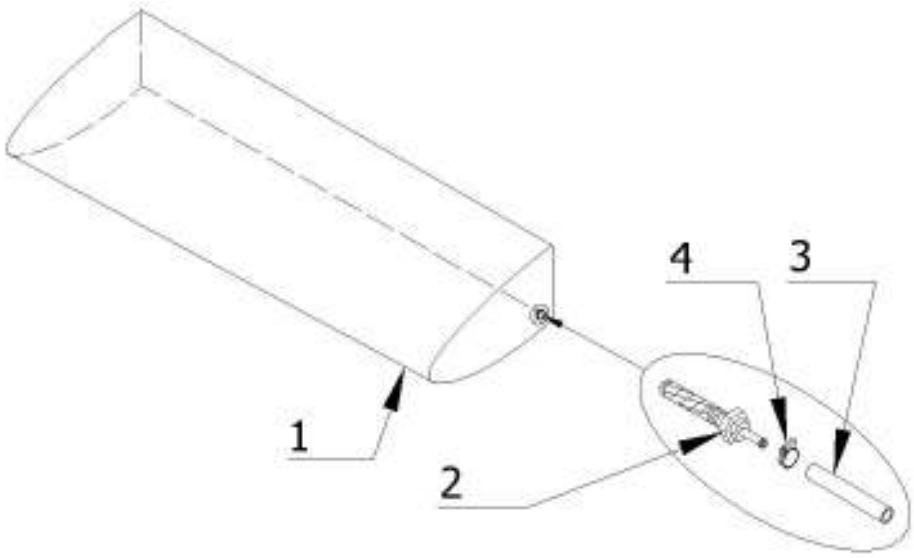
At installing proceed according to Fig. 9-4.

(a) Screw the finger screen (2) into the root tank rib – use LOCTITE 565 or equivalent sealant.

(b) Connect fuel hose (3) on the finger screen.

(c) Install the wing - see 4.3.2.

(d) Check fuel system tightness (see 9.4.1).




1 ... Fuel tank
2 ... Fingers creen
3 ... Fuel hose
4 ... Clamp

**Fig. 9-4**: Removal / Installation of the finger screen

### 9.3.5 Fuel level sender removal

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- electric drill
- drill diam. 3.2 mm (1/8 in)
- screwdriver
- cutting pliers, pliers

(a) Remove (drill off) the fuel level sender cover plate.

(b) Disconnect fuel level sender wire.

(c) Unscrew bolts and remove fuel level sender.

### 9.3.6 Fuel level sender installation

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size No.8
- screwdriver
- rivetting pliers (rivetter)
- cutting pliers, pliers

(a) Set sealing on the fuel tank flange.

(b) Set position and length of the fuel level sender lever according to the Fig. 9-5.

(c) 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.

(d) Connect electrical wires to the fuel level sender (electrical connection - see section 16 Wirings diagrams).

(e) Check fuel system tightness (see 9.4.1).

(f) Connect the battery and check fuel gauge function.

(g) Install (rivet) the cover plate.

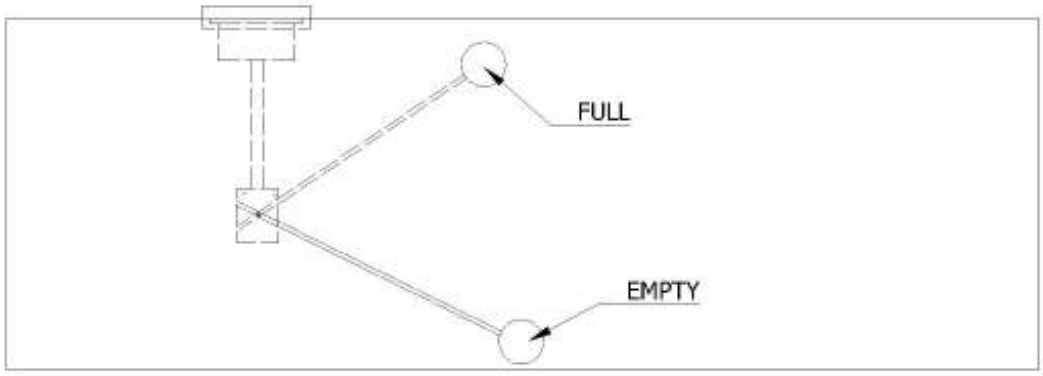



**Fig. 9-5**: Float mechanism

### 9.3.7 Fuel drain valve removal

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1/2 in

(a) Drain the fuel from the tank or gascollator.

(b) Remove drain valve from the tank or gascollator - unscrew it.

(c) Check “O” ring and the spring.

### 9.3.8 Fuel drain valve installation

Type of maintenance: line

Authorization to perform:

- Sport pilot or higher

Tools needed:

- wrench size 1/2 in

(a) Set drain valve in the tank or gascollator – use LOCTITE 565 or equivalent sealant.

(b) Fill the tank with fuel and check drain valve tightness.

## 9.4 Check / Adjustment

### 9.4.1 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 ± 5℃ ( ± 9℉ ). Reseal the found out leakage by a suitable method - by tightening, by using a suitable sealing.

**Checking airplane fuel system tightness by air**

(a) Connect an appropriate device to the filing neck for pressurizing.

(b) Blind the fuel filter by plugs. Blind the fuel tank venting with the rubber plug (or from a similar material) and secure it with locking wire.

(c) ANDAIR selector valve - **ON** position – choose the tank.

(d) Supply air pressure of 0.24 bar (*3,48 psi*) to the system by means of the pressurization equipment.

(e) 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.

(f) ANDAIR selector valve - **OFF** position.

**Checking airplane fuel system tightness by fuel**

(a) Fill up the fuel tanks with fuel.

(b) Connect the pressurization equipment to the filler neck.

(c) Blind the fuel filter and the fuel return line bushing by plugs - or interconnect it with the fuel hose. Blind the fuel tank venting by rubber plug (or from another suitable material) and secure it with locking wire.

(d) ANDAIR selector valve - **ON** position – select the tank.

(e) Supply air pressure of 0.24 bar (*3,48 psi*) to the system by means of the pressurization.

(f) During 15 minutes the must not be any loss in pressure. There must not be any leakage. The checked joint is considered hermetic unless any evidence of fuel leakage is detected on the checked surface during tests.

(g) ANDAIR selector valve - **OFF** position.

### 9.4.2 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 for the new pump.

**Checking fuel leakage**

Perform engine inspection and check the fuel pump body, including inlet and outlet hose, for fuel leakage. In case of fuel leakage, find out the reason and if necessary exchange the fuel pump for the new pump.

## 9.5 Exchanges / Service information

### 9.5.1 Fuel tank filling

**Caution:** When filling fuel in the airplane, use only approved kinds of fuel mentioned in this manual in 10.2.1, in the POH section 2.4, in the Rotax Operator's manual section 10.2.2 Fuel, in the Rotax Service Instructions SI-912-016.

**Safety instructions for filling fuel into the airplane tanks**

(a) The fuel tanks can be filed with fuel only by persons who are fully instructed and familiarized with safety instructions.

(b) It is prohibited to fill the fuel tank:

- during rain and storm
- in a closed space
- when the engine is operating or with electric system switched on

(c) A person filling the fuel tank must not be wearing polyester clothing or any clothing from a material which creates static electricity.

(d) It is prohibited to smoke or handle with open fire.

**Procedure of fuel tank filing**

(a) Ground the airplane. The airplane ground point is located on the main landing gear leg.

(b) Open the fuel tank filler cap.

(c) Fill necessary quantity of fuel.

**Caution:** When filling fuel into the airplane, avoid the contact of fuel with the airplane surface – it would cause damage to surface treatment of the airplane.

(d) When the airplane is filled with fuel, wipe the filler neck of the rest of fuel and close the fuel neck filler cap.

(e) Remove conductive interconnection between the filling device and the airplane.

(f) Drain the fuel tank.

## 9.5.2 Draining fuel system

Perform draining the fuel tanks and gascolator after every filling the tank with fuel before the first flight of the day. The fuel tank draining points are on bottom side of the wings and on the firewall.

**Draining procedure**

(a) Open the drain valve by pressing up.

(b) 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.

(c) Close the drain valve by releasing pressure.

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# CHAPTER 10 – POWER UNIT

## 10.1 General

Standard power unit of SPORTCRUISER airplane is the ROTAX 912ULS engine and Woodcomp Klassic 170/3/R in ground adjustable 3-blade propeller.

## 10.2 Description and operation

### 10.2.1 Engine

The engine ROTAX 912 ULS 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 of the engine:**

| | | | |
|---|---|---|---|
| **Engine manufacturer:** | Bombardier-Rotax GMBH | | |
| **Engine type:** | ROTAX 912 ULS | | |
| **Power:** | max. take-off | 73,5 kW | (*98.6 hp)* |
| | max. continuous | 69,0 kW | (*92.5 hp)* |
| **RPM:** | max. take-off | 5 800 RPM max. 5 minutes | |
| | max. continuous | 5 500 RPM | |
| | idle | 1 400 RPM | |
| **Cylinder head temperature:** | max. | 135°C | ( *275°F)* * |
| **Oil temperature:** | max. | 130°C | ( *266°F)* |
| | optimum operation | 90 - 110°C | ( *194 - 230°F)* |
| **Oil pressure:** | max. | 7 bar | (*102 psi)* |
| | min. | 0.8 bar | (*12 psi)* |
| | optimum operation | 2 - 5 bar | (*29 - 73 psi)* |
| **Fuel pressure:** | max. | 0.4 bar | (*5.8 psi)* |
| | min. | 0.15 bar | (*2.2 psi)* |

**Coolant type:**

* (refer to the Rotax Operator's manual section 10.1.2 Operating speeds and limits and section 10.2.1 Coolant, the Rotax Installation manual section 12 Cooling system, the Rotax Service Instruction SI-912-016)

In principle, 2 different types of coolant are permitted:

- Conventional coolant based on ethylene glycol
- Waterless coolant based on propylene glycol

**WARNING:** The coolant concentrate *(propylene glycol)* may not be mixed with conventional *(glycol/water)* coolant or with additives!
Non observance can lead to demages to the cooling system and engine!

**CAUTION:** The conventional *glycol/water* coolant reduce to apply maximum permissible coolant exit temperature.

Type of coolant used by aircrafts manufacturer is shown in section 17.5.

**Fuel type:**

(refer to the Rotax Operator's manual section 10.2.2 Fuel, Rotax Service Instructions SI-912-016)

**MOGAS**

European standard - min. RON 95, EN 228 Super, EN 228 Super plus
US standard - ASTM D4814
Canadian standard - min. AKI 91, CAN/CGSB-3.5 Quality 3

**AVGAS**

US standard - AVGAS 100 LL (ASTM D910)

AVGAS 100 LL 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. Thus it should only be used in case of problems with vapor lock or when other types of gasoline are unavailable.

**Oil type:**

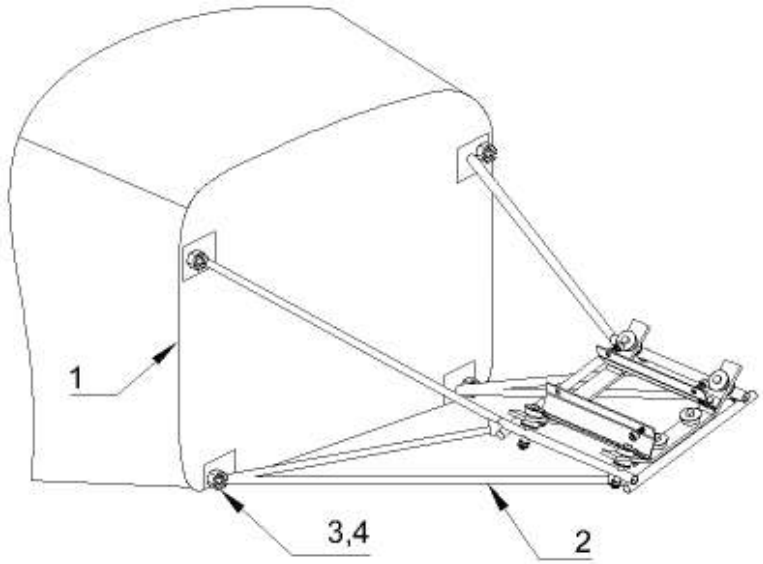
(refer to the Rotax Operator's manual section 10.2.3 Lubricants,
Rotax Service Instruction SI-912-016)

Motorcycle 4-stroke engine oil of registered brand with gear additives.
Use only oil with API classification „SG" or higher!
Use of multi-grade no mineral oils is recommended.

Type of oil used by aircraft manufacturer is shown in section 17.5.

### 10.2.1.1 Engine mount

The engine mount serves for mounting 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. The scheme of engine mount attachment to the firewall and to the engine is shown in the Fig. 10-1.



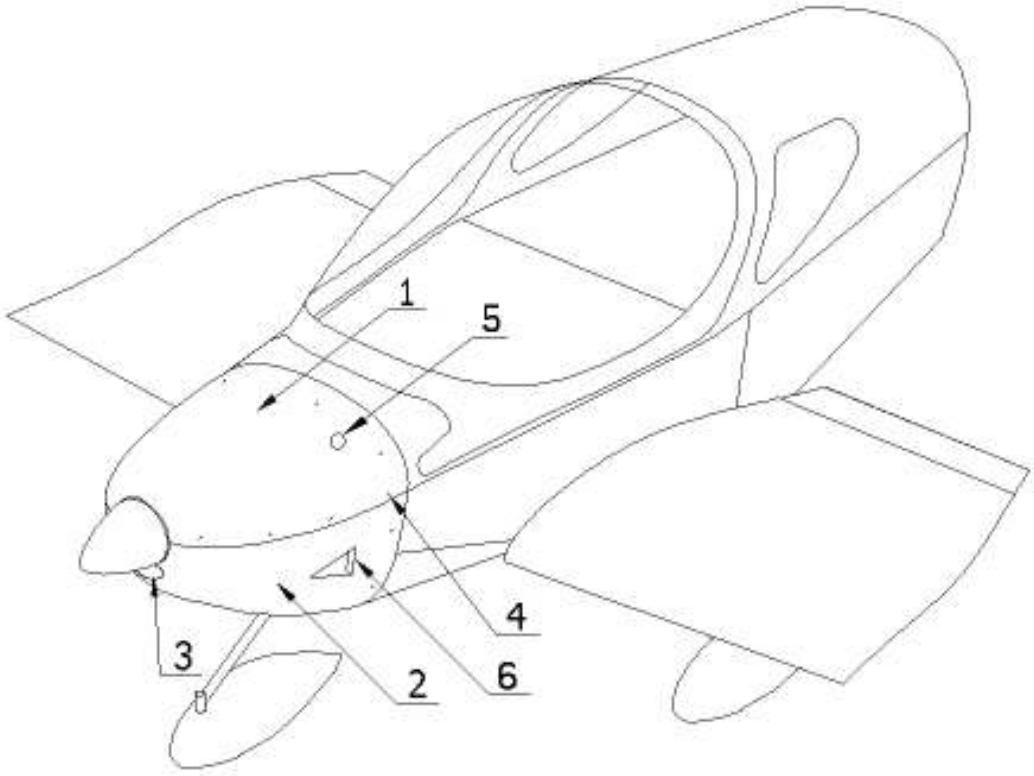

1 ... Firewall
2 ... Engine mount
3 ... Attachment bolt
4 ... Nyloc nut

**Fig. 10-1**: Engine mount

### 10.2.1.2 Engine cowling

The engine cowling (Fig. 10-2) consists of two parts: upper cowling and lower cowling. The upper cowling (1) is attached by means of quick fasteners (4) to the fire wall 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 in front of the fire wall enables to check oil quantity in the oil tank without removing the upper cowling.

The lower cowling (2) is attached by means of quick fasteners (4) to the fire wall 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 radiator. In the bottom part of the lower cowling (2) there is a hole for air inlet to the oil cooler. On the left side in the lower cowling (2) there is a hole (6) for air inlet to the air filter to the engine inlet system.




1 ... Upper engine cowling
2 ... Lower engine cowling
3 ... Air inlet hole for radiator
4 ... Quick fasteners
5 ... Acces cover
6 ... Air inlet hole for engine inlet system

**Fig. 10-2**: Engine cowlings

### 10.2.1.3 Engine control

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-of 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-of 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 forward and backward.

### 10.2.1.4 Engine instruments

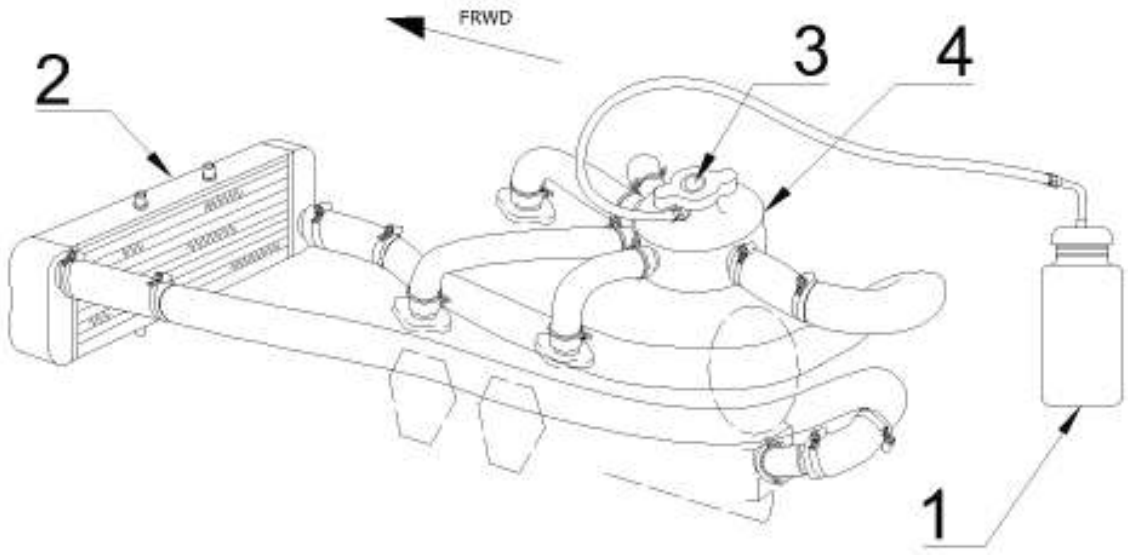
The engine manufacturer recommended following instruments for engine run checking:

- RPM indicator, Cylinder head thermometer, Oil thermometer, Oil pressure gauge, option - Fuel pressure gauge.

Instruments colour marking and description is mentioned in 12.2.3.

### 10.2.1.5 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 (4) with the pressure cap (3), radiator (2) and the overflow bottle (1). The scheme of cylinder head cooling system is shown in the Fig. 10-3.




1 ... Overflow bottle
2 ... Cooler
3 ... Pressure cap
4 ... Expansion tank

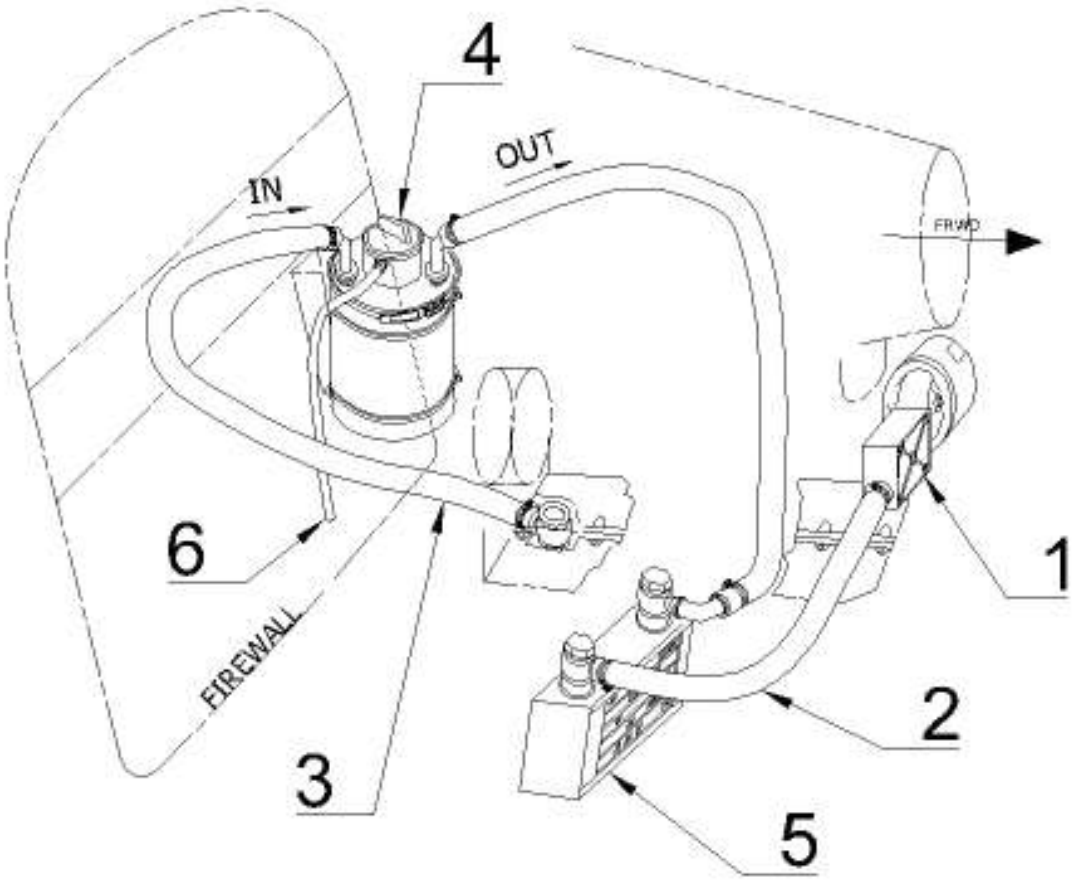
**Fig. 10-3**: Cooling system

### 10.2.1.6 Engine lubrication system

Engine lubrication system (see Fig. 10-4) is made with the dry sump. Engine lubrication system is equipped with the mechanically driven oil pump (1) which ensures oil supply

from the oil tank (4) located on the fire wall through the oil cooler (5) and the oil pump with oil filter (1) 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 is led under the airplane. Oil pressure and temperature are indicated on the round analalog instruments in the right section of the instrument panel.

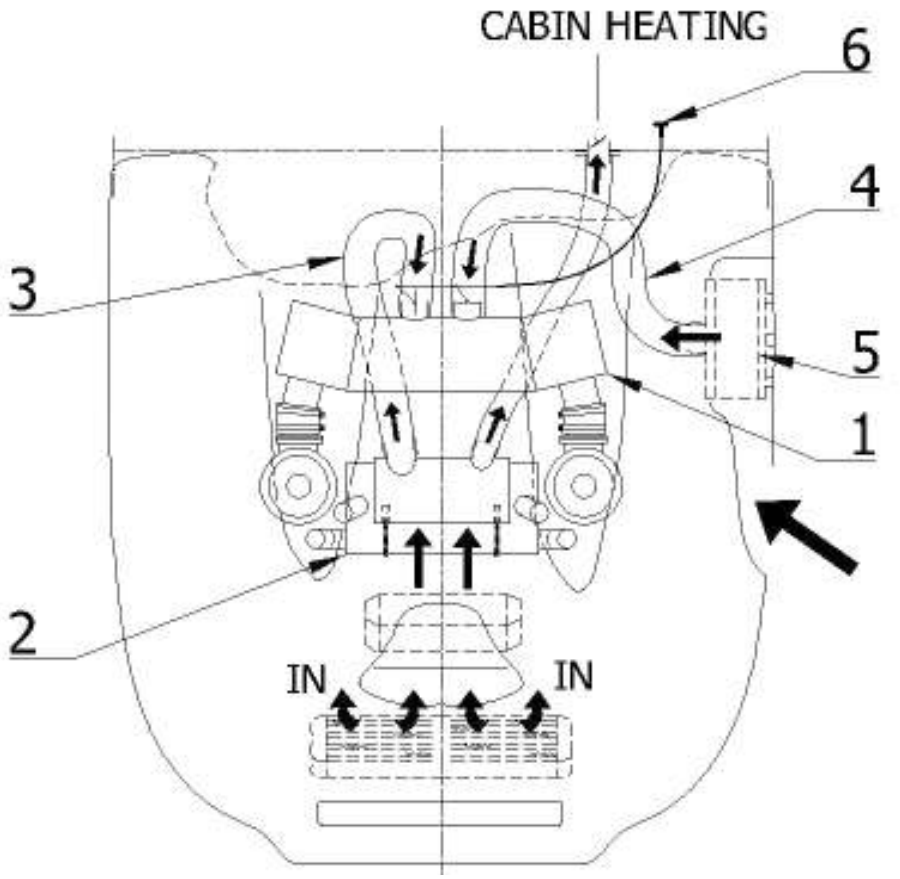



1 ... Oil pump with oil filter
2 ... Oil inlet into the oil pump
3 ... Oil outlet from the engine
4 ... Oil tank
5 ... Oil cooler
6 ... Oil tank venting

**Fig. 10-4**: Oil cooling system

### 10.2.1.7 Air inlet system of the engine

Engine air inlet system ensures supply of sufficient air volume to the engine. Air is supplied to the engine by the NACA type inlet (left on the engine cowling) through the air filter (5) to the airbox (1). Heated air from the heat exchanger (2), which is attached to the muffler is controlled by flap on the firewall. The heating control flap is controlled by CARB HEAT knob (6) on the instrument panel.




1 ... Airbox
2 ... Heat exchanger
3 ... Hot air inlet hose
4 ... Cold air inlet hose
5 ... Air filter
6 ... CARB HEAT knob

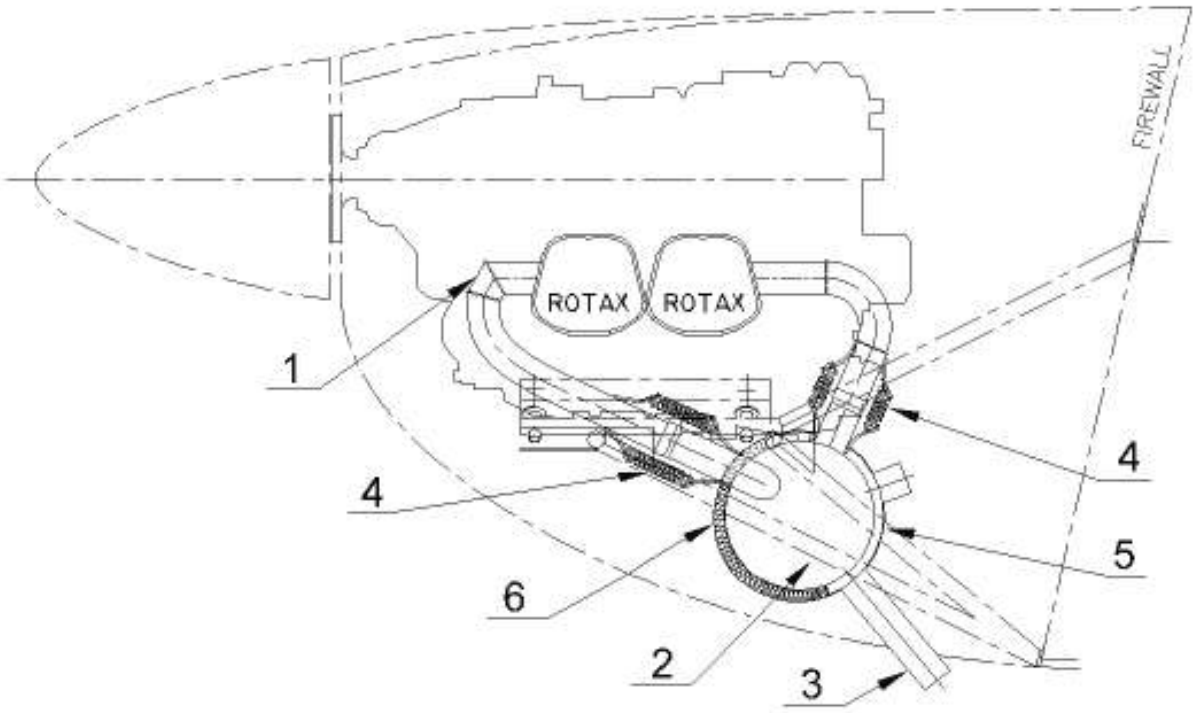
**Fig. 10-5**: Air inlet system

### 10.2.1.8 Exhaust system

Exhaust system of SPORTCRUISER airplane consist of four exhaust pipe (1) branches which lead exhaust gases from individual cylinders to the muffler (2). The muffler serves at the same time as a silencer. Exhaust gases are led from there by the exhaust pipe (3) down the airplane.

On the muffler there is a heat exchanger (5) from which is taken the warm air for the carburetor preheating and for the cockpit.

The whole exhaust system is manufactured by welding from the stainless sheet.




1 ... Exhaust pipes
2 ... Muffler
3 ... Outlet exhaust pipe
4 ... Spring
5 ... Heat exchanger
6 ... Spring

**Fig. 10-6**: Exhaust system

### 10.2.1.9 Ignition system

The 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.

Positions of ignition switch:

| | |
|---|---|
| **OFF** | Engine ignition of |
| **R** | Only ignition circuit B on |
| **L** | Only ignition circuit A on |
| **BOTH** | Both circuits on |
| **START** | Both circuits on and the starter is running up the engine |


**Fig. 10-7**: Ignition selection switch

### 10.2.2 Propeller

The propeller WOODCOMP KLASSIC 170/3/R is a three-blade ground adjustable composite propeller designed for the airplanes with piston engines with power up to 73.5 kW (98.6 hp) and max. propeller speed up to 2360 rpm.

The leading edge of the propeller blades is protected from damaging on the outer side by polyurethane tape. In order to increase service life the propeller surface is provided with a sprayed-on coat of resistant polyurethane varnish. The composite propeller spinner is a part of the propeller.

The propeller is attached to the engine by means of bolts.

## 10.3 Removal / Installation

### 10.3.1 Removal of the engine from the airplane

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

Tools needed:

- wrench size No.8, No.9, 3/8”, 7/16”, 9/16”
- Allen wrench size No.4
- screwdriver
- cutting pliers, pliers
- Cobra pliers (for clamps)

(a) Remove engine cowling.

(b) Disconnect and remove the board battery.

(c) Remove the propeller (see 10.3.3).

(d) Disconnect all electrical system wires and bondings between the engine mount and the fire wall.

(e) Shut the fuel selector valve (possibly drain fuel from the fuel installation).

(f) Drain oil from the engine (see 10.5.1) and cooling liquid (see 10.5.2).

(g) Disconnect hoses of the oil and the cooling system.

(h) Remove the oil cooler (see 10.3.9) and the radiator (see 10.3.11).

(i) Disconnect control of carburetors and carburetors heating.

(j) Remove air intake (see 10.3.5).

(k) Remove the exhaust system (see 10.3.7).

(l) Blind all the holes on the engine so that no impurity can get into the engine.

(m) Cut of the wire securing the screw heads (3).

(n) Remove screws (3) and washers (4) attaching the engine to the engine mount.

(o) Take the engine away from the engine mount by the crane or with help 2 assistants.

(p) Store the removed engine on a safe place on a suitable support and prevent it from damage.

### 10.3.2 Installation of the engine on the airplane

Type of maintenance: heavy

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P) .

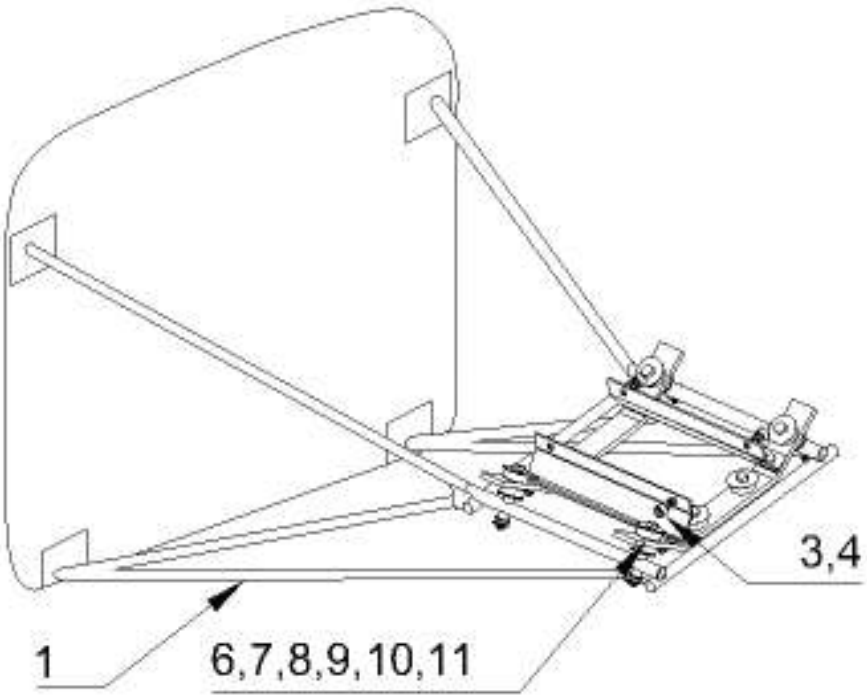
Tools needed:

- wrench size No.8, No.9, 3/8", 7/16", 9/16"
- Allen wrench size No.4
- screwdriver
- cutting pliers, pliers
- Cobra pliers (for clamps)

According the Fig. 10-8 the engine install on the engine mount:

(a) Put the engine on the engine mount by the crane or with 2 assistants and attach it by the screws (3) with washers (4). Tighten up to a torque of 40 Nm (*30ft lb )*.

(b) Secure the screw heads by locking wire (see 15.8.2).




| | | |
|---|---|---|
| 1 ... Engine mount | 6 ... Cotter pin | 9 ... Silentblock |
| 3 ... Screw | 7 ... Bolt | 10 ... Spacer |
| 4 ... Washer | 8 ... Dynafocal bracket | 11 ... Washer |

**Fig. 10-8**: Engine mount attachment to the engine and to the firewall

(c) Install the exhaust system (see 10.3.8).

(d) Connect wiring according the wiring diagrams (see section 16).

(e) Install the oil cooler (see 10.3.10).

(f) Install the radiator (see 10.3.12).

(g) Connect and secure oil system hoses.

(h) Connect and secure fuel system hoses.

(i) Install air intake of the engine (see 10.3.6).

(j) Connect control cable of the carburetors preheating flap.

(k) According to the Fig. 10-9 connect control cables of the choke and the throttle on the carburetors control levers. Adjust throttle control (see 10.4.2) and the choke (see 10.4.3).

(l) Connect the air hose from the heat exchanger for heating the airplane cockpit.

(m) Fill the prescribed amount oil and cooling liquid quantity.

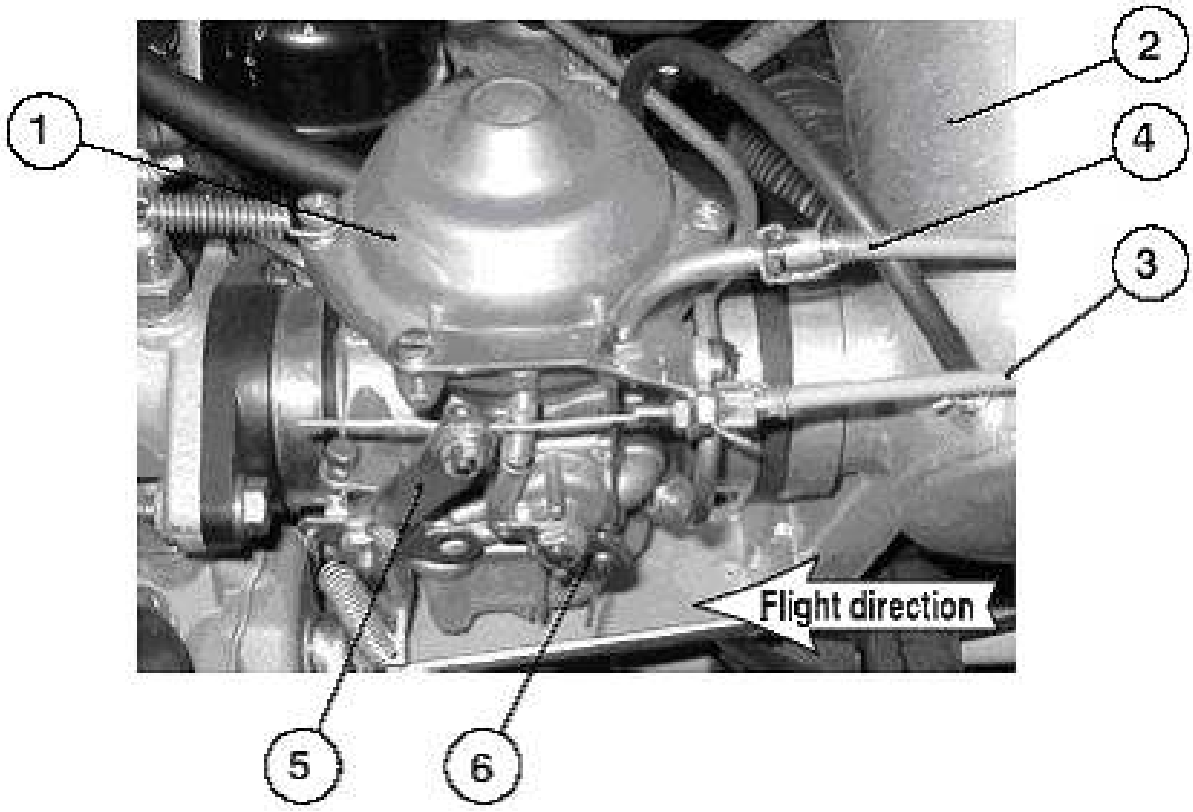
(n) Check fuel system tightness (see 9.4.1).

(o) Install the propeller (see 10.3.4).

(p) Install and connect the battery.

(q) Install engine cowlings.

(r) Perform engine test (see 10.4.1).




1 ... Carburetor
2 ... Mixing chamber
3 ... Throttle control cable
4 ... Choke control cable
5 ... Throttle control lever
6 ... Choke control lever

**Fig. 10-9**: Choke and throttle control connection

### 10.3.3 Removal of the propeller

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No.13, No. 16 (5/8")
- Allen wrench size No.6
- Screwdriver
- Cutting pliers, pliers

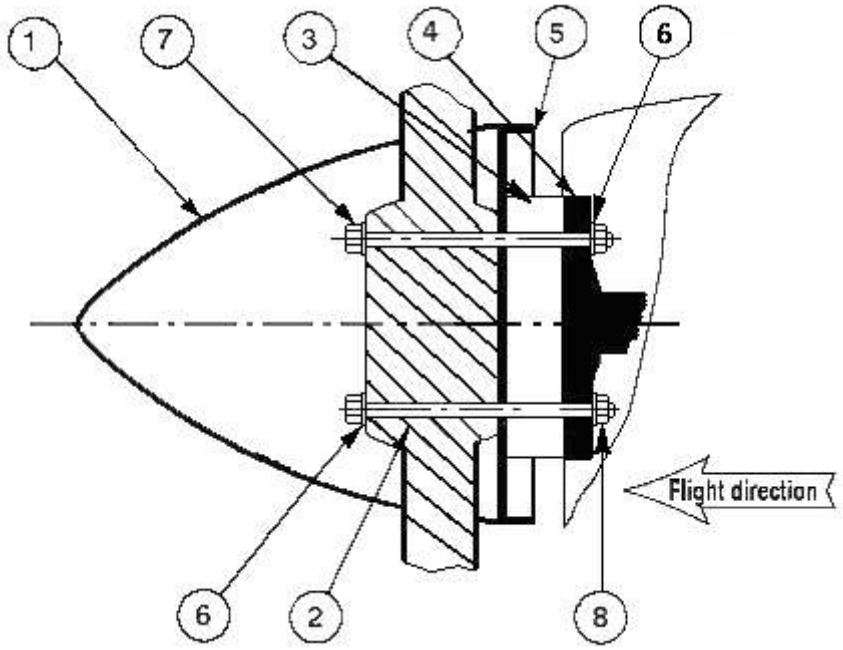
(a) Disconnect the board battery and remove upper line of spark plugs from the engine.

(b) Remove the propeller spinner (1).

(c) Cut of the wire securing the bolt heads (7).

(d) Unscrew nuts (8), remove bolts (7) and take out the propeller along with other parts from the flange.

(e) Put the protective covers on the propeller blades and store the propeller on a safe place so that no damage can occur.




1 ... Propeller spinner
2 ... Propeller hub
3 ... Spacer
4 ... Propeller flange on the engine
5 ... Propeller spinner flange
6 ... Washer
7 ... Bolt
8 ... Nut

**Fig. 10-10**: Propeller removal / installation

### 10.3.4 Installation of the propeller

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No.13, No. 16 (5/8")
- Allen wrench size No.6
- Screwdriver
- Cutting pliers, pliers

(a) Check the contacting areas of the flange of the reducer propeller shaft and the propeller. Clear of all impurities.

(b) Remove protective covers from the propeller blades and carry out visual check of the propeller integrity.

(c) Attach the propeller hub (2) and spinner flange (5) to the propeller flange on the engine (4) by bolts (7), washers (6) and nuts (8).

(d) Tighten bolts (7) gradually according to the Fig.10-11:

- 1st step - by toque of 5 Nm (*3.7 ft.lb.*)
- 2nd step - by torque of 10 Nm (*7.4 ft.lb.*)
- 3rd step - by torque of 16 Nm (*11.8 ft.lb.*)

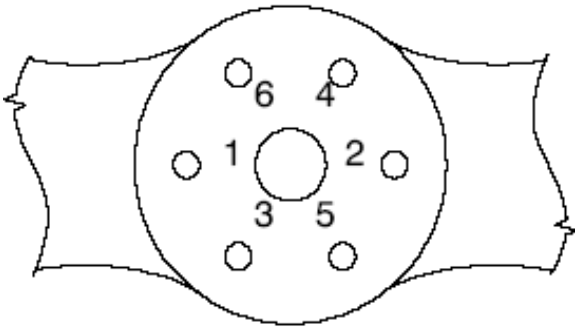


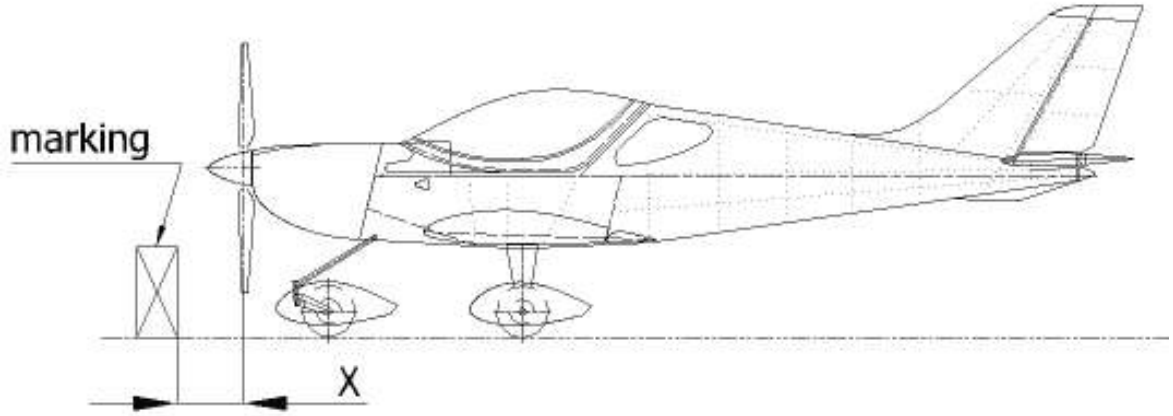

**Fig. 10-11**: Bolt tightening sequence

(e) Remove spark plugs of the engine and secure the airplane against its movement (see 14.5).

(f) Check out, possibly adjust the blades pitch of propeller according to the propeller manual.

(g) Tighten up bolts (7) gradually according to the Fig.10-11 with torque 22 Nm (16.2 ft.lb.) and measure the difference in distance of individual blade tips from marking (see the Fig. 10-12).

The difference can be max. 1.5 mm (*0.06 in*). Possible bigger differences can be corrected by repetition the procedure from point (d) or (f).




X ... distance of the propeller tip from the marking

**Fig. 10-12**: Check of axial propeller running-out

(h) Secure bolt heads (7) by locking wire (see 15.8.2).

(i) Put the propeller spinner (1) on the propeller and attach it with bolts.

(j) Install spark plugs to the engine. Tigten up with torque 20 Nm (*15 ft.lb.*).

### 10.3.5 Air intake system removal

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No.8, No.10
- Screwdriver

See the Fig. 10-13.

(a) Remove the upper engine cowling.

(b) Disconnect the control cable (6) from the air intake changeover lever (4) and from the holder.

(c) Disconnect hoses connecting the mixing chamber with the carburetors (7), drain hoses, air hoses (9) and (10).

(d) Remove the strut.

(e) Remove the hose fastener between carburetors and the airbox.

(f) Remove the airbox from the engine and store it.

### 10.3.6 Air intake system installation

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No.8, No.10
- screwdriver

See the Fig. 10-13.

(a) Attach the outlet pipe of the airbox (1) to the carburetor inlet necks by means of hose fasteners.

(b) Fix the airbox by means of the strut and the silentblock to the firewall.

(c) Connect the air intake hoses to the airbox, one from the air filter (9) on the engine lower engine cowling and the other one from the heat exchanger (10).

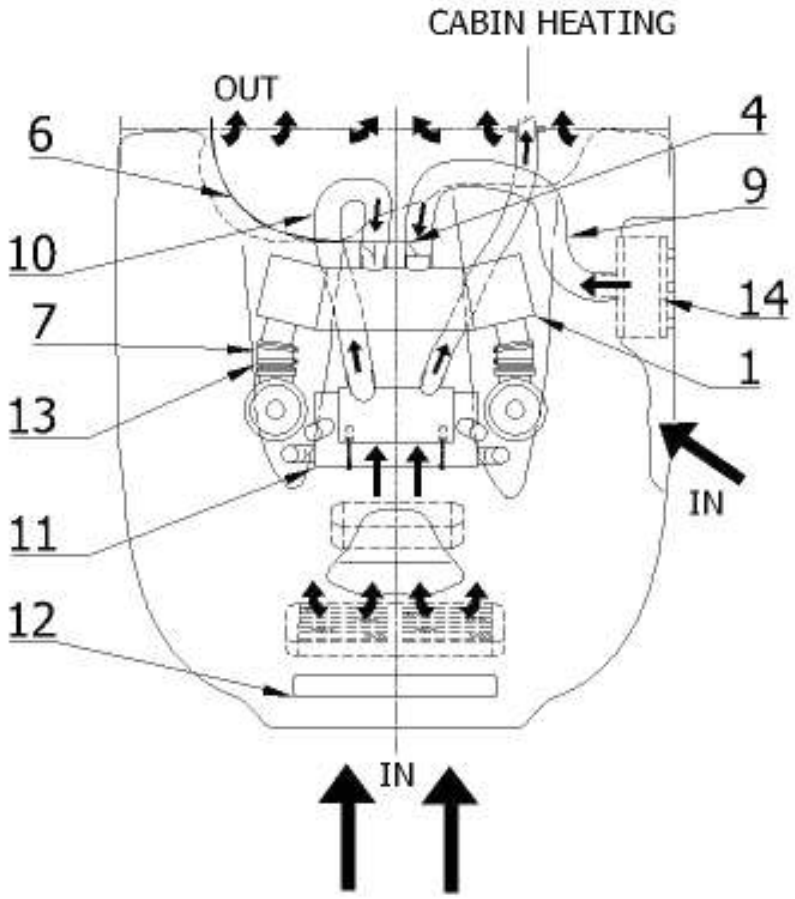
**Caution:** Do not confuse these hoses!

(d) Connect drain hoses to the airbox and the drain hoses to the trays under carburetors - lead them on the engine mount in direction down the airplane (fix them by draw band on the engine mount).

(e) Connect up the airbox by means of hoses (7) with carburetors.

(f) Connect the cable of carburetors heating flap control (6) adjust function of carburetors heating knob.

(g) Install the upper engine cowling.




1 ... Airbox
4 ... Air intake changeover lever
6 ... Control cable
7 ... Hose interconnecting airbox and the carburetor
9 ... Air hose - cold air
10 ... Air hose - preheated air
11 ... Muffler
12 ... Lower engine cowling
13 ... Hose fastener
14 ... Air filter

**Fig. 10-13**: Removal / Installation of air intake system

### 10.3.7 Exhaust system removal

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No.13
- pliers
- small wire hook (spring removal/assembly jig)

See the Fig. 10-6.

(a) Remove the springs (4) from the individual branches of the exhaust attaching the exhaust pipe (1) to the muffler (2).

(b) Remove individual branches of the exhaust pipe from the necks on the engine.

(c) Remove springs (6) and released the heat exchanger (5) from the muffler (2).

### 10.3.8 Exhaust system installation

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No.13
- pliers
- small wire hook (spring removal/assembly jig)

See the Fig. 10-6.

(a) Install the exhaust pipes (1) 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.

(b) Install the muffler (2) to the exhaust pipes (1) and secure the tubes by means of springs (4).

(c) 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.

### 10.3.9 Oil cooler removal

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No.19, No.30

See the Fig. 10-4.

(a) Remove the upper and lower engine cowling.

(b) Drain oil from the oil system (see 10.5.1).

**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!

(c) Remove banjo bolts from the oil cooler necks. After that it is possible to remove nuts from the cooler necks attaching the cooler to the brackets on the engine mount.

### 10.3.10 Oil cooler installation

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No.19, No.30

See the Fig. 10-4.

(a) Set the oil cooler to the bracket on the engine mount and on the cooler necks gradually install and tight the nuts. Install the banjo with oil hoses, screw the banjo bolts and secure this bolts with the locking wire (see 15.8.2).
(b) Fill the oil system with oil (see 10.5.1) and check oil system tightness.
(c) Install the lower and upper engine cowling.

### 10.3.11 Removal of the radiator

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No.10, No.17
- screwdriver

See the Fig. 10-14.

(a) Remove the upper and lower engine cowling.
(b) Drain the cooling liquid from the cooling system (see 10.5.2).
(c) Disconnect hoses from the radiator uotlets.
(d) Remove four bolts attaching the radiator to the upper and lower brackets.
(e) Remove the radiator.

### 10.3.12 Installation of the radiator

Type of maintenance: line

Authorization to perform:

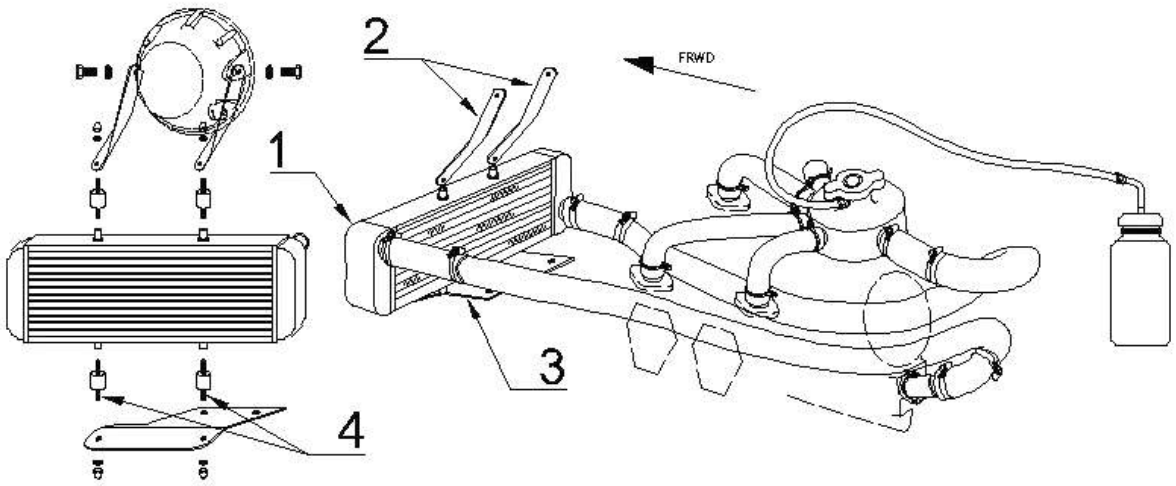
- Sports pilot or higher

Tools needed:

- wrench size No.10, No.17
- screwdriver

See the Fig. 10-14.

(a) Install the radiator on upper and lower brackets.
(b) Install hoses on the outlets from the radiator and secure them with hose fasteners.
(c) Fill the cooling system with cooling liquid (see 10.5.2) and check system tighteness.
(d) Install the lower and upper engine cowling.




1 ... Radiator
2 ... Upper brackets
3 ... Lower bracket
4 ... Shock absorbers

**Fig. 10-14**: Attachment of the radiator on the engine

### 10.3.13 Removal of the throttle and choke control levers

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No.14
- Allen wrench size No. 2
- Screwdriver
- Cutting pliers

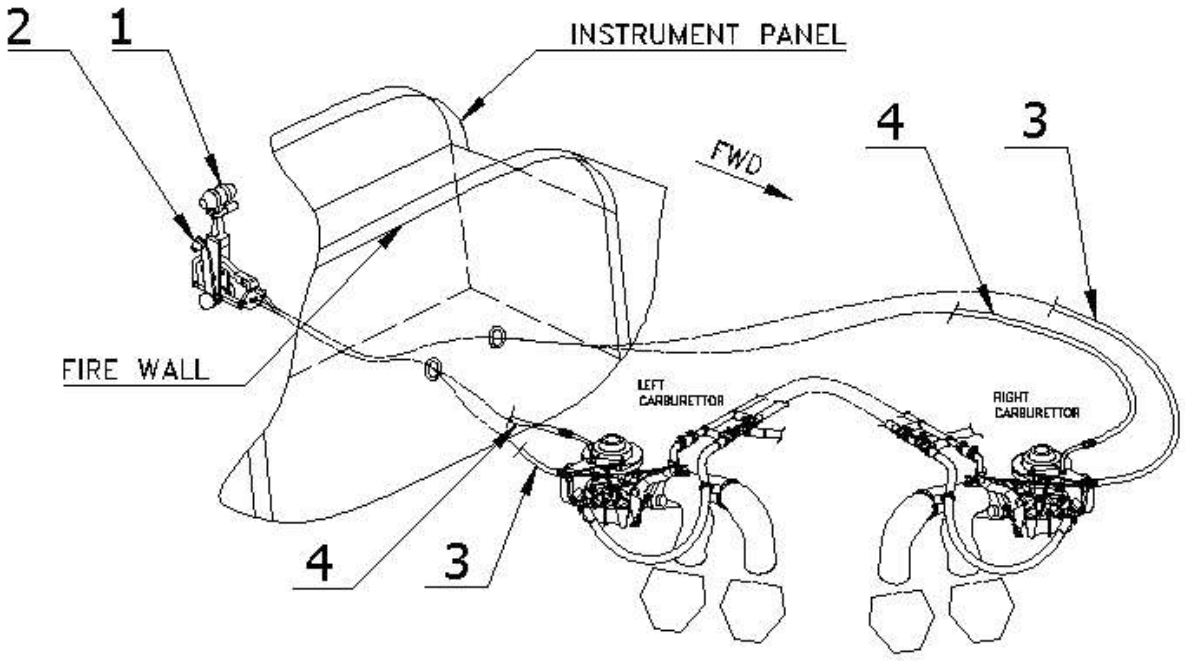
See the Fig. 10-15.

(a) Remove the cover of the throttle (1) and choke (2) control levers from the middle channel.

(b) Remove the upper engine cowling.

(c) Disconnect the throttle (3) and choke (4) cables from carburetors and from the throttle (1) and choke (2) control levers.

(d) Remove the throttle and choke control levers from the middle channel.




1 ... Throttle handle
2 ... Choke handle
3 ... Throttle cable
4 ... Choke cable

**Fig. 10-15**: Throttle control lever

### 10.3.14 Installing of the throttle and choke control levers

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- wrench size No.14
- Allen wrench size No. 2
- Screwdriver
- Cutting pliers

See the Fig. 10-15.

(a) Install the control levers of throttle (1) and choke (2) into the middle channel.

(b) Connect the throttle (3) and choke (4) cables to the throttle (1) and choke (2) control levers and to the carburetors.

(c) Install the cover of throttle and choke on the middle channel.

(d) Install the upper engine cowling.

(f) Check for continuous travel of the throttle and choke control lever.

(g) Adjust the throttle control (see 10.4.2).

### 10.3.15 Removal of the carburetors heating knob

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

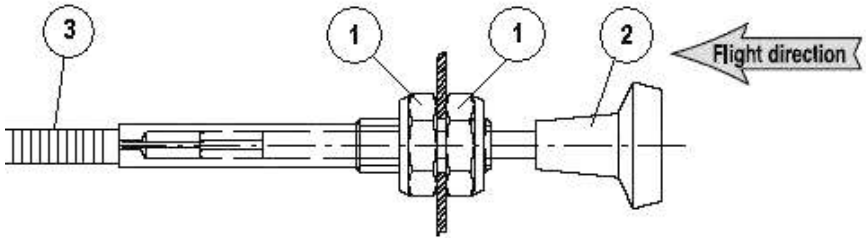
- wrench size No.8, No.14
- Screwdriver
- Cutting pliers

See the Fig. 10-17.

(a) Remove the upper engine cowling.

(b) Disconnect the control cable on the changeover lever of the air intake (4) (see the Fig. 10-13).

(c) Remove the inner nut (1) and pull out the knob (2) with the flexible housing (3) from the firewall and instrument panel.




1 ... Nut 2 ... Knob 3 ... Flexible housing

**Fig. 10-17**: Carburetors heating knob

### 10.3.16 Installing the carburetors heating knob

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No.8, No.14
- Screwdriver
- Cutting pliers

See the Fig. 10-17.

(a) 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).

(b) Fasten the knob from both sides of the instrument panel by the nuts (1).

(c) Connect the control cable with the changeover lever of the air intake (4) (see the Fig. 10-13).

(d) Adjust carburetors heating control (see section 10.4.4).

## 10.4 Check / Adjustment

### 10.4.1 Engine test

**Caution:** The person performing the engine test must be mechanic with a valid certificate and with registered engine type ROTAX 912 ULS. In the course of the whole test an aircraft mechanic who is familiarized with the aircraft type SPORTCRUISER must be present.

(a) Perform the test out of the buildings at the place assigned for performing engine tests in broad daylight.

(b) Test place must be equipped with extinguisher which is suitable for extinguishing burning liquids and electrical installation.

(c) Brake the airplane and put the chocks under the landing gear wheels.

(d) Before performing engine test cary out preflight check of the engine and the propeller in the range shown in the POH section 7.1 and the Rotax Operator's manual section 10.3.

(e) Start the engine according to the POH section 7.2 and the Rotax Operator's manual section 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 do 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 have be in range from 0.15 to 0.4 bar (*2.2 to 5.8 psi*).

(f) Engine warm up according to the POH section 7.2 and the Rotax Operator's manual section 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*).

(g) 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.

(h) 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 120 RPM. Write down results into the engine test report, see the tab. 10-1.

(i) Test of max. RPM on the ground:

Throttle ..... FULL

**Note:** Record max. RPM into the engine test report, see the tab. 10-1.

| ENGINE TEST REPORT | | | | | |
|---|---|---|---|---|---|
| **Aircraft** | *SportCruiser* | **Registration** | | **Serial No.** | |
| **Engine** | *ROTAX* | **Typ** | *912 ULS* | **Serial No.** | |

| | **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 – 14.4 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 *** | 135°C (*275°F*) | |
| 10. | RPM drop between ignition position **BOTH** and **L**/**R** at 4000 RPM | max. 300 (120 RPM **) | |
| 11. | Acceleration | 2 – 3 sec. | |
| 12. | Max. RPM on the ground | 5000 RPM | |
| 13. | Idle | min. 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 120 RPM. |
| *** | see the Rotax Operator's manual section 10.1.2 Operating speeds and limits and section 10.2.1 Coolant, the Rotax Installation manual section 12 Cooling system, the Rotax Service Instruction SI-912-016, the POH section 2.2 Coolant and section 10.2 Supplement No.2 Actual type of coolant used in engine or in this manual section 10.2.1 Engin and section 17.5 Operating liquids. |

| **Conclusion** | **Complying – Noncomplying**<br>Complying if the measured values are not out of the range of the prescribed values. |
|---|---|

| | | |
|---|---|---|
| Elaborated by: | Signature: | Date: |
| Checked by: | Signature: | Date: |

**Tab. 10-1**: Engine test report

### 10.4.2 Adjusting throttle control

(a) Pull the throttle control to the stop. The throttle lever on the carburetor (5) must be on the stop (see Fig. 10-9). The bowden must be supported in the terminals.

(b) Release the nut on the control lever (5) and take up any slack on the cable and tighten up the nut.

**Caution:** Control cable should not be too tight for the reason of a possible deformation of the control lever on the carburetor.

(c) 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 bowdens.

(d) In order to prevent the bowdens at the carburetor from shifting out from the terminals, secure the bowdens with locking wire. Mark all bolted joints with red paint.

### 10.4.3 Adjusting choke control

(a) Set the choke lever to the stops position and put it back about 3 mm (*1/8in*). The lever of choke control on the carburetor (6) must be on the stop (see Fig.10-9). The bowden must rest on the terminals.

(b) Release the bolt on the lever of choke control (6), slightly loosen the cable and tighten up the bolt.

(c) 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.

(d) To prevent the bowdens at the carburetor from shifting out of the terminal, secure the bowden with locking wire. Mark al bolted joints with red paint.

### 10.4.4 Adjusting carburetors heating control

(a) Push in the carburetor heating knob to the stop and pull it out by about 3 mm (*1/8in*). The changeover lever (4) on the air intake must be on the stop (see the Fig. 10-13). The bowden must rest on the terminal.

(b) Release the bolt on the changeover lever (4), slightly stretch the cable and tighten up the bolt.

(c) 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.

(d) To prevent the bowdens from shifting out of the terminal, secure the bowden with locking wire. Mark bolted joints with red paint.

### 10.4.5 Checking exhaust system

**Warning:** Check of exhaust system very carefully. The burst or leaky exhaust can expose the crew to danger presented by carbon monoxide or can result in engine power loss, possibly fire.

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 al 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.

## 10.5 Exchanges / Service information

### 10.5.1 Exchange / Refilling oil

- refer to the Rotax Maintenance manual Chapter 12-00-00 section 5 Lubrication system

**Note:** Recommended kinds of oil are mentioned in the Rotax Operator's manual section 10.2.3 Lubricants, in the Rotax Service Instructions SI-912-016.

Type of oil used by aircrafts manufacturer is shown in section 17.5 Operating liquids.

**Oil volume**

Total oil volume in the lubrication system of Rotax 912 ULS engine is approximately 3.8 litres (*1 US gallon*).

Check oil volume 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.

**Warning:** 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 10.2.1.2). 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 filing it with new oil - see the Rotax Maintenance manual.

**Refilling oil**

Refill oil in the oil tank that is located on the fire wall.

**Venting of the lubrication system**

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

## 10.5.2 Exchange / Refilling cooling liquid

- refer to the Rotax Maintenance manual Chapter 12-00-00 section 3 Cooling system

**Note:** Recommended types of coolant are shown in the Rotax Operator's manual section 10.2.1 Coolant, in the Rotax Service Instructions SI-912-016, in the Rotax Installation manual section 12 Cooling system.

Type of coolant used by aircrafts manufacturer is shown in section 17.5 Operating liquids.

**Cooling liquid volume**

Total volume of coolant in the engine is approximately 2.5 litres (*0.7 US gallons*).

**Drainage of cooling liquid**

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 cooling liquid**

Refill cooling liquid into the expansion tank in the engine compartment. In addition to this there is a overflow bottle which collects cooling liquid in case of engine overheating and is attached to the fire wall.

## 10.5.3 Exchange / Check of oil filter

- refer to the Rotax engine Maintenance manual Chapter 12-00-00 section 5 Oil system

**Note:** Carry out at every oil exchange.

(a) Remove the oil filter.

(b) 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.

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

(c) Install the new oil filter. Slightly lubricate the sealing ring of the new filter with engine oil and tighten it up manually by a normal force.

### 10.5.4 Exchange / Check of air filter

(a) Remove the hose fastener and the bracket attaching the air filter to the left side lower engine cowling and remov the air filter.

(b) Inspect the air filter and if contaminated, clean it according to instructions in the Rotax Maintenance manual Chapter 12-00-00 section 2.4.

(c) Attach the cleaned or the new filter to the hole on the left side of lower engine cowling by means of the bracket and hose fastener.

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# CHAPTER 11 – ELECTRICAL SYSTEM

## 11.1 General

Electrical system of SPORTCRUISER airplane serves for supplying electrical current to the instruments.

## 11.2 Description and operation

The airplane is equipped with 14V DC electrical installations with grounded negative pole. Primary source of electrical energy is formed by the generator. The secondary source of electrical energy is the battery 12V, which is located on the firewall. It is used for starting the engine and in the case of generator failure as an back-up source of electric energy.

DC voltage is distributed to the individual systems by means of the main busbar. Systems are protected by circuit breakers which are permanently ON and switches-circuit breakers which are turning ON as needed. If some 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 busbar is indicated by voltmeter on the instrument panel.

### 11.2.1 Switches

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

Every switch is marked with a placard with designation of the circuit (see Tab.11-1). The switches are located on the instrument panel and on the middle chanel. The buttons for ailerons and elevator trim are on the grip of control stick. Wiring diagrams are shown in section 16.

| Switches | | |
|---|---|---|
| **Designation** | **Description** | |
| **AVIONICS** | Switch of radio, intercom, transponder, GPS and other optional avionics. | |
| **FLAPS** | Switch of flaps control. | |
| **TRIM** | Switch of trim control. | |
| **Switches-circuit breakers** | | |
| **Designation** | **Description** | **Current rating** |
| **MASTER** | Main switch. | 25A |
| **INSTR** | Switch of engine instruments. | 5A |
| **FUEL PUMP** | Switch of electric fuel pump. | 5A |
| **STROBE** | Switch of optional strobe lights. | 10A |
| **NAV LIGHTS** | Switch of optional position lights. | 10A |
| **INSTR LIGHTS** | Switch of optional lighting of instruments on the instrument panel. | 5A |
| **LDG LIGHT** | Switch of optional landing light. | 15A |
| **TAXI** | Switch of optional taxilight. | 15A |

**Tab.11-1**: Switches

### 11.2.2 Circuit breakers

Circuit breakers serve for protecting individual electrical circuits from overloading. Every circuit breaker is marked by the placard with a circuit designation (see Tab.11-2). Circuit breakers are located on the instrument panel. Wiring diagrams are shown in the section 16.

**Note:** There are not used classical fuses in the aircraft.

| Circuit breakers | | |
|---|---|---|
| **Designation** | **Description** | **Current rating** |
| **COMM** | Circuit breaker of radio and intercom. | 10A |
| **XPDR** | Circuit breaker of optional transponder. | 5A |
| **GPS** | Circuit breaker of optional GPS. | 3A |
| **FLAPS** | Circuit breaker of flaps. | 5A |
| **12V** | Circuit breaker of 12V socket. | 7A |
| **TRIM** | Circuit breaker of trims. | 2A |

**Tab.11-2** : Circuit breakers

### 11.2.3 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*) |

### 11.2.4 Onboard battery

The maintenance-free battery **Sonnenschein A512/16 G5** or equivalent is installed on firewall. Battery can be charged directly in the airplane after its disconnecting from the onboard electrical system.

**Technical parameters:**

| | |
|---|---|
| Voltage | 12 V |
| Nominal capacity | 16 Ah |
| Discharging current | 800 mA |
| Maximum loading | 200 A |
| Short circuit current | 512 A |
| Range of operation temperatures | -30 to +50°C (*-22 to +122°F*) |
| Design life | 7 years |
| (at 20°C (68°F) ambient temperature, 80% remaining capacity) | |
| Service life is about | 4 years |
| Weight: | 6 kg (*13 lbs*) |

If the airplane is not operated for more than one month, then remove the battery from the airplane and store it.

Always store the battery fully charged at temperature of 20°C (*68 °F*). Daily discharging is less than 0.1 % of battery nominal capacity.

Regularly recharge it up to the full capacity of charging once a month.

### 11.2.5 Lighting

Airplane lighting consists of optional instrument lighting and external lighting.

#### 11.2.5.1 Optional instrument lighting

Instruments on the instrument panel can be equipped with light rings which in the case of need can be switched on by the switch **INSTR LIGHT** on the instrument panel.

#### 11.2.5.2 Optional external lighting

External lighting consists of optional position and strobe lights which are located in the wing tips and of the optional landing light which is located in the leading edge of the wing. Navigation lights are switched by the switch **NAV LIGHT** (together with instrument lighting) and strobe lights are switched by the switch **STROBE**. The landing light is switched by the switch **LDG LIGHT**. Wiring diagram of external lighting is shown in section 16.

## 11.3 Removal / Installation

### 11.3.1 Removal of the onboard battery

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- screwdriver
- wrench size No.8

(a) Remove engine cowlings

(b) Disconnect the contacts from the battery.

(c) Disconnect the draw band of the battery and remove the battery from the airplane.

### 11.3.2 Installation of the onboard battery

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- screwdriver
- wrench size No.8

(a) Install the battery into the bracket on the firewall.

(b) Fasten it with draw band so that the battery cannot move in the bracket.

(c) Grease the battery contacts with lubricating grease and install the clamps on them from the onboard electrical network.

(d) Install the engine cowlings.

### 11.3.3 Removal of the optional strobe/position lights

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- screwdriver

(a) Remove bolts attaching the cover glass of strobe/position lights.

(b) Remove bolts attaching the strobe/position lights to the wing tip, thus releasing the lights.

(c) Remove strobe/position light and disconnect the wire.

### 11.3.4 Installation of the optional strobe/position lights

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- screwdriver

(a) Connect the strobe/position lights wire.

(b) 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.

(c) Install the covering glass of the strobe/position lights.

(d) Seal the position light edges by polyurethane sealer to prevent water from in leaking under the position light.

### 11.3.5 Removal of the optional landing light

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- screwdriver

(a) Remove the plexiglass cover between ribs No.8 and 9 on the wing.

(b) Remove the cover rim from the light bulb.

(c) Remove the bulb and disconnect the wires on the rear side of it.

### 11.3.6 Installation of the optional landing light

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- screwdriver

(a) Set the wires into the light connector from the rear side of the bulb.

(b) Set the headlight into the back plate and screw on the bulb the cover rim.

(c) Adjust the landing light (see 11.4.1).

(d) Install the plexiglass cover on the leading edge of the wing.

## 11.4 Check / Adjustment

### 11.4.1 Adjusting the optional landing light

(a) Remove the plexiglass cover from the wing leading edge between ribs No.8 and 9.

(b) Do adjustment per securing bolts in the vertical direction in such a way that the light axis is directed 5° below the reference plane of the wing.

(c) Do adjustment in the horizontal direction according to the Fig.11-2 in such a way that the light axis is directed towards the airplane axis about 45m (*150 ft*) before the fuselage nose.

(d) Install the plexiglass cover on the leading edge of the wing

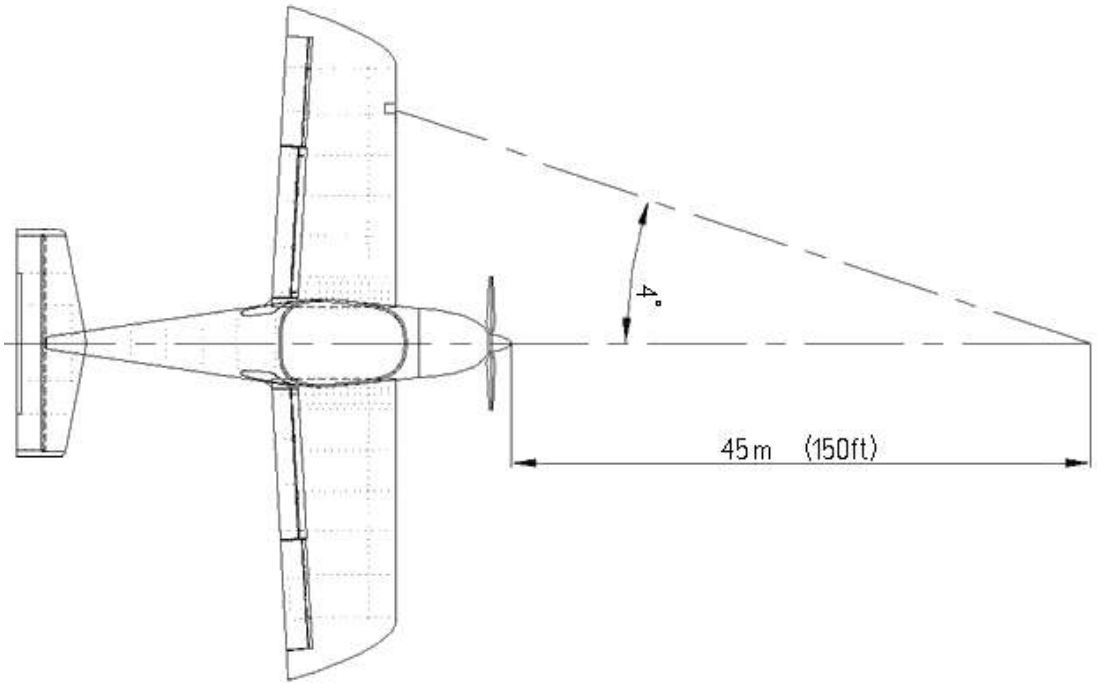



**Fig. 11-2**: Setting the optional landing light

## 11.5 Exchanges / Service information

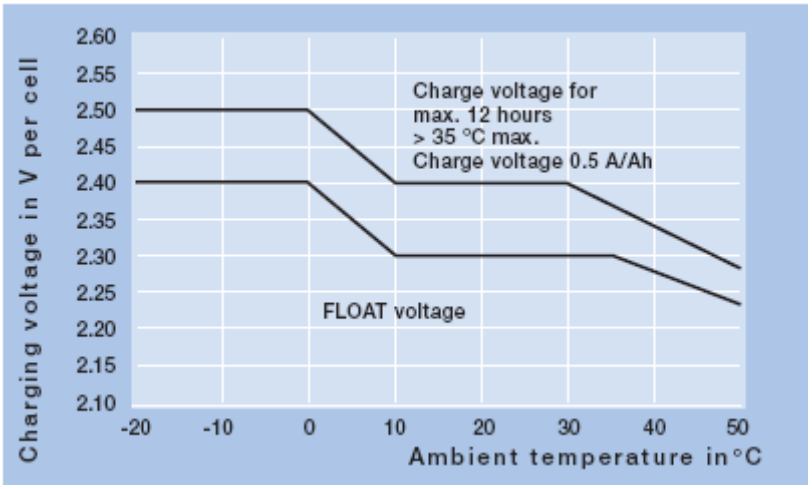
### 11.5.1 Charging the battery

(a) Disconnect the battery from the onboard electrical network.

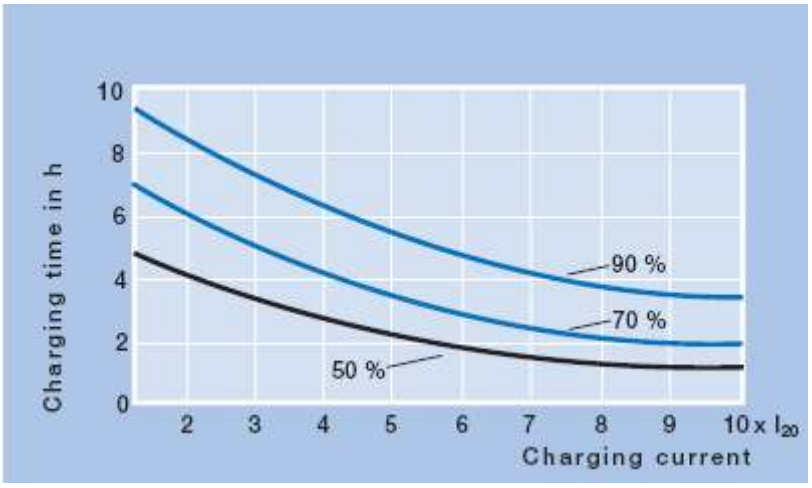
(b) Clean the battery contacts and connect the charging device on them. Mind the polarity!

(c) Charging voltage at temperature of 20℃ (68℉) is 13.8 to 14.4V (2.3 to 2.4V/cel). Maximum charging current is 8A. Battery temperature at charging must not exceed 50℃ (*122℉*).

(d) After charging grease the battery contacts with lubricating grease and reconnect the battery to the onboard electrical network.




**Graph 1:** Constant charge voltages for various ambient temperatures.




**Graph 2:** Recharging time in relation to initial current up to 50%, 70% and 90% charging state, charging voltage 2.4 V/cell.

### 11.5.2 Exchange of the optional position light lamp

(a) Remove the cover of the position lights including the cover glass.

(b) Slightly push in the front lamp and turn it counter-clockwise (bayonet closure) and exchange it for the same type.

(c) Remove the rear lamp and exchange it for the same type.

**Caution:** Don't touch the new lamps with bare hands. Use the cloth gloves or a cloth.

### 11.5.3 Exchange of the optional strobe light discharge tube

(a) Remove the strobe/position light (see 11.3.3).

(b) Exchange the discharge tube for the same type.

**Caution:** Do not touch the new discharging tube with bare hands. Use the cloth gloves or a cloth.

(c) Install the strobe/position light (see 11.3.4)

### 11.5.4 Exchange of the optional landing light lamp

(a) Dismantle the plexiglass cover between ribs No.8 and 9 on the left wing.

(b) Dismantle the cover rim in front of the light

(c) Remove the bulb from the back plate.

(d) Pull out the bulb. Disconnect wires on the rear side of the bulb.

(e) Install the new bulb of the same type.

**Caution:** Do not touch the new bulb with bare hands. Use a cloth gloves or a cloth.

(f) Connect wires of electrical system according to the scheme (see section 16).

(g) Put the bulb into the back plate.

(h) Install the cover rim on the bulb.

(i) Install the plexiglass cover on the leading edge of the wing.

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# CHAPTER 12 – PITOT-STATIC SYSTEM/INSTRUMENTS

## 12.1 General

This chapter provides information about pitot-static system and instruments

## 12.2 Description and operation

### 12.2.1 Pitot-static system

The pitot-static tube for sensing static and total pressure is located under the left half of the wing close to the rib No.4. Total pressure is sensed through the hole in the pitot-tube face and static pressure is sensed through the holes on the tube circumference. Pressure distribution to individual instruments is performed by means of flexible plastic hoses.

Static pressure is lead to the ALT, ASI, VSI and altitude encoder. Total pressure is connected to the ASI only.

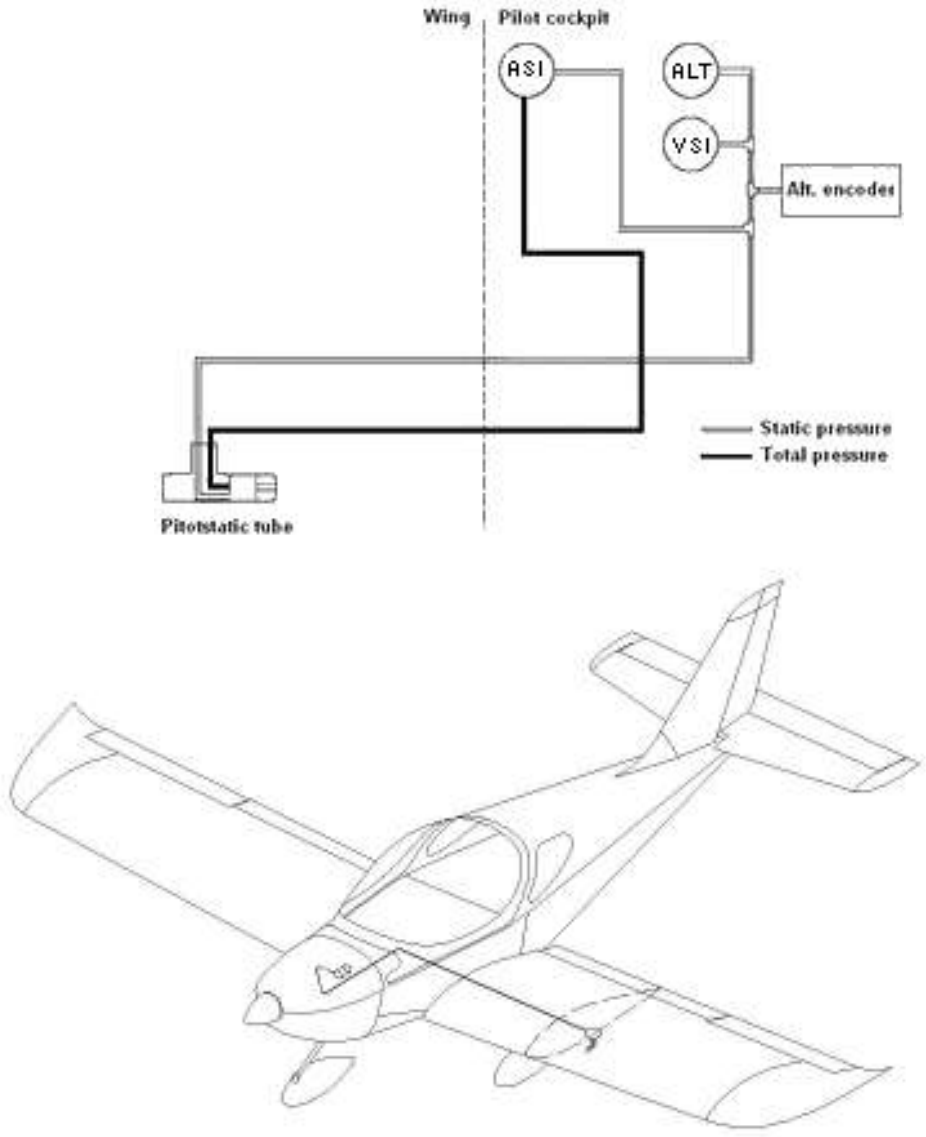


**Fig. 12-1**: Pitot-static system scheme

## 12.2.2 Flight instruments

**Airspeed indicator - ASI**

The airspeed indicator located on the left side of instrument panel is classical analogue round pressure gauge.

The airspeed indicator color range marking is shown in Tab.12-1.

| Marking | IAS value or range | | | Significance |
|---|---|---|---|---|
| | *knot* | *km/h* | *mph* | |
| **White arc** | ***32-75*** | ***59-139*** | ***37-86*** | Flap Operating Range. |
| **Green arc** | ***39-108*** | ***72-200*** | ***45-124*** | Normal Operating Range. |
| **Yellow arc** | ***108-138*** | ***200-255*** | ***124-158*** | Maneuvers must be conducted with caution and only in smooth air. |
| **Red line** | ***138*** | ***255*** | ***158*** | Maximum speed for all operations. |

**Tab.12-1:** ASI color range marking

**Altimeter - ALT**

The altimeter located on the left side of instrument panel is classical analogue round pressure gauge. Range of measure is up to 20,000 ft.

**Optional vertical speed indicator - VSI**

The vertical speed indicator located on the left side of instrument panel is classical analogue round pressure gauge. Range of measure is up to 2,000 fpm.

**Balance indicator**

The balance indicator located on the left side of instrument panel is classical construction – a ball in liquid filled tube.

**Magnetic compass**

**NOTE:** Magnetic compas is not required by ASTM F 2245

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 nonfreezing liquid with the little window in the front wall. The compass rose is positioned on the rotary and swinging pivot inside the compass.

## 12.2.3 Engine instruments

The engine instruments located on the right side of instrument panel serve for engine run checking. The engine instruments colour marking is shown in Tab.12-2.

**Tachometer**

The RPM indicator is electrical 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.

**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*).

**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*).

**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*).

**Optional fuel pressure gauge**

Fuel pressure on the outlet from the fuel pump can be checked by the classical analogue round pressure gauge. Range of measure is 0 to 2 bar (*0 to 29 psi*).

**Fuel quantity gauge**

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 fuel quantity gauge.

| **Rotax 912ULS 73.5 [kW] (*98.6 [hp]*)** | **Minimum Limit (red line)** | **Normal Operating Range (green arc)** | **Caution Range (yellow arc)** | **Maximum Range (red line)** |
|---|---|---|---|---|
| **Engine speed [RPM]** | 1400 | 1400-5500 | 5500-5800 | 5800 |
| **Oil Temperature** | 50 °C *(122 °F)* | 90-110 °C *(194-230 °F)* | 110-130 °C *(230-266 °F)* | 130 °C *(266 °F)* |
| **Exhaust Gas Temp. (EGT)** | - | 800-850 °C *(1472-1562 °F)* | 850-880 °C *(1562-1616 °F)* | 880 °C *(1616 °F)* |
| **Cylinder head Temperature (CHT)** | 50 °C *(122 °F)* | 75-110 °C *(167-230 °F)* | 110-135 °C *(230-275 °F)* | 135 °C *(275 °F)* |
| **Oil Pressure** | 0.8 bar *(12 psi)* | 2-5 bar *(29-73 psi)* | 5-7 bar *(73-102 psi)* | 7 bar *(102 psi)* *cold engine starting* |
| **Fuel Pressure** | 0.15 bar *(2.2 psi)* | 0.15-0.4 bar *(2.2-5.8 psi)* | - | 0.4 bar *(5.8 psi)* |

**Tab.12-2:** The engine instruments colour marking

## 12.3 Removal / Installation

### 12.3.1 Removal of the pitot-static tube

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- screwdriver phillips #1l
- pliers, cutting pliers

(a) Loose securing bolt in the pitot-static tube bracket and pull out a bit the pitot-static tube with hoses from the bracket.

(b) Remove the tightening strips from hoses. The hose and tube for static pressure line mark by **S** letter and for total pressure mark by **T** letter.

(c) Disconnect the transparent hoses of static and total pressure from the pitot-static tube.

### 12.3.2 Installation of the pitot-static tube

Type of maintenance: line

Authorization to perform:

- Repairman (LS-M) or Mechanic (A&P)

Tools needed:

- screwdriver phillips #1
- pliers, cutting pliers

(a) Connect the hoses to the outlets of the pitot-static tube and secure them with tightening strips.

**Warning:** When connecting the pitot-static system hoses pay increased attention. There must not be any incorrect connection! Connect the hose marked **S** letter to the outlet marked by **S** letter and the hose marked **T** letter to the outlet marked by **T** letter.

(b) Insert the pitot-static tube in the bracket.

(c) Secure pitot-static tube by means of securing bolt.

(d) Carry out check of pitot-static system tightness (see 12.4.1).

(e) Check, that pitot-tube is parallel to bottom wing skin.

## 12.4 Check / Adjustment

### 12.4.1 Check of pitot-static system tightness

(a) In the static pressure system create the under pressure by means of an appropriate instrument corresponding to altitude of 1000 ft. Drop in the indicated altitude per one minute must not exceed 100 ft.

(b) In the system of total pressure create the overpressure corresponding to speed of 140 knots (260 km/h,161 mph) by means of a suitable instrument. Drop in speed during 3 minutes must not exceed 2.3 knots (4.4 km/h, 2.7 mph).

### 12.4.2 Magnetic compass compensation

Rules for doing compensation of the magnetic compass:

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

(b) 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:**

(a) Turn the airplane to "N" heading, eliminate the deviation by "C" screw.

(b) Turn the airplane to "S" heading, reduce the found out deviation to the half-value by "C" screw and write down the rest of the deviation.

(c) Turn the airplane to "E" heading, eliminate the deviation by "B" screw.

(d) Turn the airplane to "W" heading, reduce the found out deviation to the half-value by "B" screw and write down the rest of the deviation.

(e) Turn the airplane by grades indicated in the compensation report (see tab. 12-1) and write down individual deviations in the table.

(f) After finishing compensation of the magnetic compass fill out the deviation card (see Fig. 12-2) and position it in the airplane near the magnetic compass.

| REPORT OF MAGNETIC COMPASS COMPENSATION | | | | | |
|---|---|---|---|---|---|
| **Aircraft** | | **Registration mark** | | **Serial No.** | |
| **Compass Type:** | | | | | |
| **Compass Serial No.:** | | | | | |
| **List of Switched-On Radionavigation** | | | | | |

| **Course** | **Engine running** | | **Engine stopped** | |
|---|---|---|---|---|
| | **Measured** | **Deviation** | **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:** | |

**Tab. 12-3**: Report of magnetic compass compensation

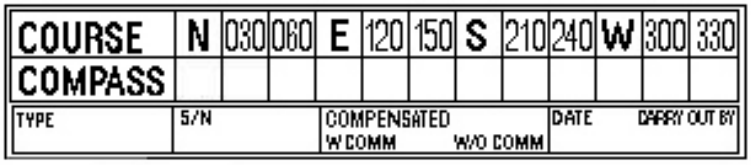


**Fig. 12-2**: Example of the deviation card

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# CHAPTER 13 – VENTING/HEATING

## 13.1 General

This chapter contains information on crew compartment heating and ventilation system.

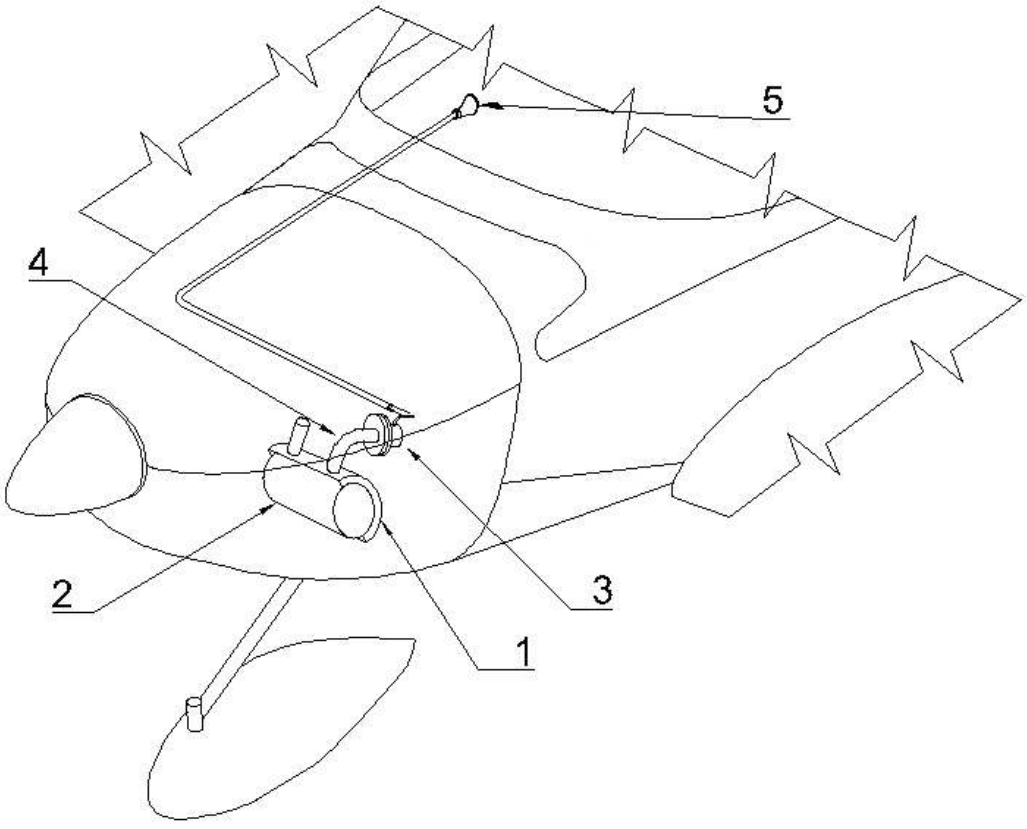
## 13.2 Description and operation

### 13.2.1 Venting system

Cockpit ventilation is ensured by two regulated air vents located on the cockpit sides under the instrument panel (see Fig.13-3). Air inlets of NACA type are located on the fuselage sides in front of the canopy frame. Quantity of inlet air is controlled by flaps which are movable in all directions which allows to adjust the air volume and air flow direction together.

### 13.2.2 Heating System

Cockpit heating is ensured by hot air from the heat exchanger (see Fig.13-1). The heat exchanger (1) is located on the muffler (2). Ambient inlet air taken by the muffler (2) is heated in the heat exchanger (1) and supplied through control flap (3) into the cockpit by air hoses (4). Quantity of hot air is regulated by **HEATING** knob (5) on the instrument panel.




1 ... Heat exchanger
2 … Muffler
3 ... Control flap
4 … Air hose
5 ... Heating knob

**Fig. 13-1**: Heating system

## 13.3 Removal / Installation

### 13.3.1 Removal of the heating control knob

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

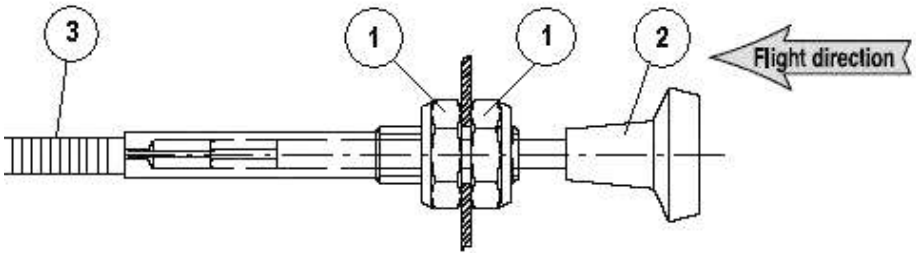
- wrench size No. 14, 9/16”
- pliers, cutting pliers

See Fig. 13-2.

(a) Disconnect the control cable on the control flap lever (3) (see Fig. 13-1).

(b) Remove the nuts (1) thus releasing the flexible housing (3) with the heating control knob (2).

(c) Remove the heating control knob with cable from the flexible housing (3).




1 ... Nut 2 ... Heating control knob 3 ... Flexible housing

**Fig. 13-2**: Heating control knob

### 13.3.2 Installation of the heating control knob

Type of maintenance: line

Authorization to perform:

- Sports pilot or higher

Tools needed:

- wrench size No. 14, 9/16”
- pliers, cutting pliers

See Fig. 13-2.

(a) Insert the heating control knob (2) into the flexible housing and fasten it from both sides of the instrument panel by means of nuts (1).

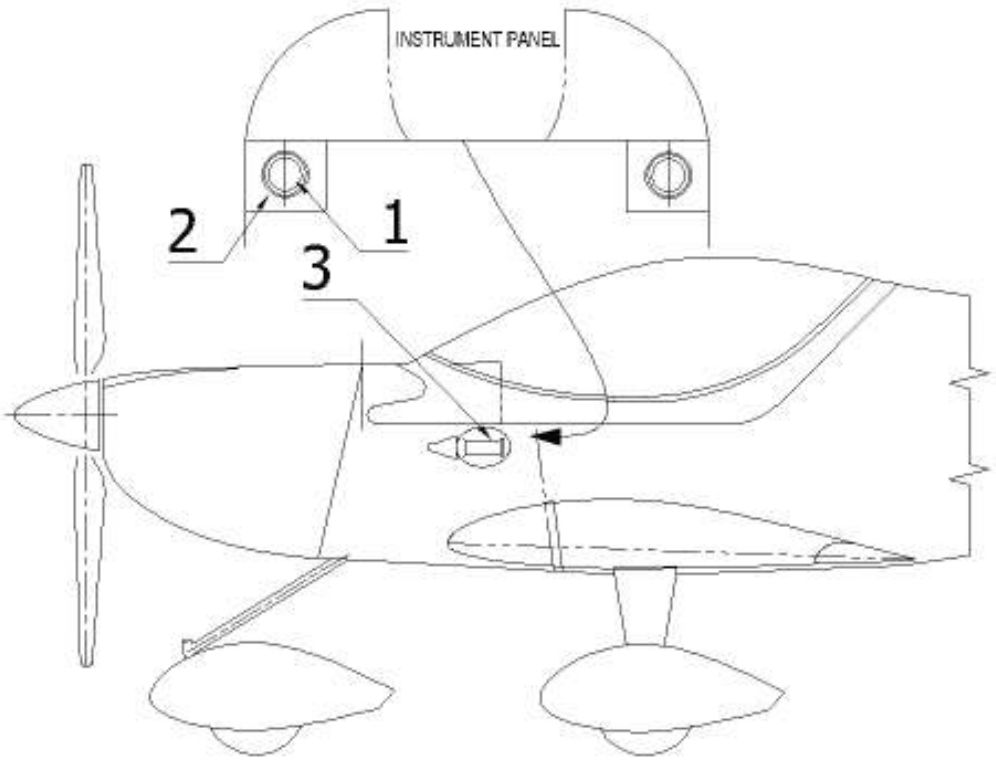
(b) Connect the control cable with control flap lever (3) (see Fig. 13-1).

(c) Adjust heating control (see 13.4.1).

### 13.3.3 Removal of the air vents

See the Fig. 13-3.

(a) Open the control flap (1) 90 degree and pull the vent (2) out from the housing (3).




1 ... Control flap 2 ... Vent 3 ... Housing

**Fig. 13-3**: Removal / Installation of the vents

### 13.3.4 Installation of the vents

See the Fig.13-3.

(a) Plug the vent (2) into the housing (3) under the instrument panel.

(b) Check the control flap (1) movement.

## 13.4 Check / Adjustment

### 13.4.1 Adjusting the heating control

(a) Adjust the control by screwing or unscrewing the control cable terminal from the control flap.

(b) After adjustment of the control, mark the mutual position of the control cable terminal and the flap controller with red color.

# CHAPTER 14 – AIRPLANE HANDLING

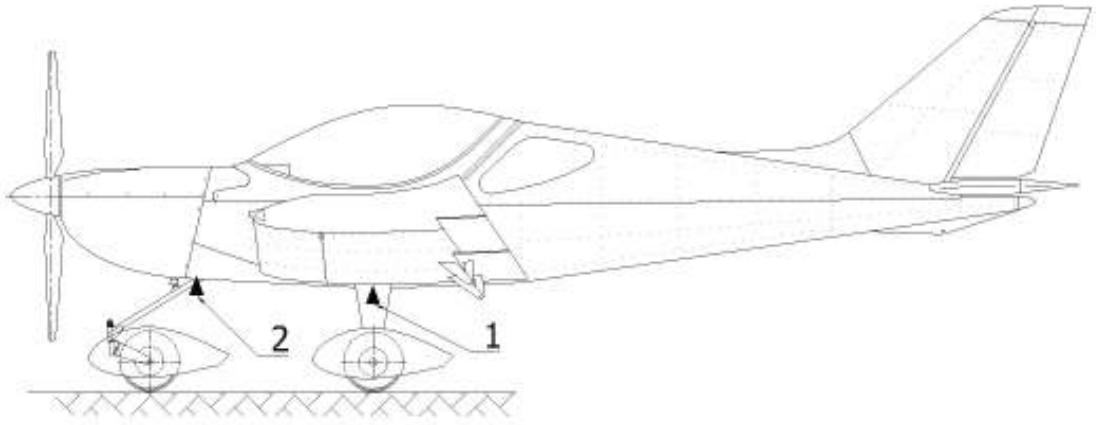
## 14.1 General

This chapter contains information on airplane handling - jacking, parking and anchoring.

## 14.2 Jacking and supporting the airplane

Due to the relatively low empty weight, the airplane jacking can be carried out by two persons.

There are three supporting points (see Fig.14-1), two of them are under upper ends of main landing gear legs (1), third one is on bottom skin of fuselage behind nose gear leg (2).




1 ... Main landing gear leg jack/support point
2 ... Front fuselage jack/support point

**Fig. 14-1**: The airplane jack/support points

## 14.3 Airplane towing

The airplane can be handled by propeller, tow bar inserted into the bracket mounted on nose wheel fork, by main gear legs, or by wingroot.

**Warning:** Switch OFF the ignition before handling the airplane on the ground!

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

## 14.4 Airplane 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.

**Caution:** 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.

## 14.5 Airplane 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.

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# CHAPTER 15 – AIRPLANE REPAIRS

## 15.1 General

This chapter contains information about standard procedures for performing common repairs of the airplane. These repairs can be made by an authorized organization. Other procedures for repairing individual airplane systems you can find in the appropriate chapter describing the system.

**Note:** Before carrying out any structural repairs to contact the relevant airworthiness authority for approval.

This chapter describes the following procedures:

- Removing rivets
- Riveting
- Repair of skins
- Repair of fiberglass parts
- Recommendation for repairing surface protection of the airplane
- Torque moments
- Securing bolt joints and screwed fittings
- Repairs of bonding
- Installing clamps by Nicopress pliers

## 15.2 Removing 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 by 0.6 mm (*0.025 in*) diameter smaller 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 diameter by 0.1 mm (*0.004 in*) smaller than rivet shank diameter. 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.

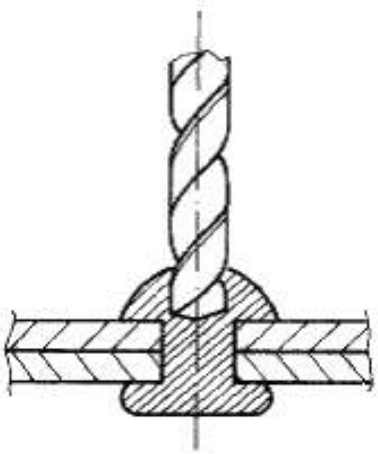


**Fig. 15-1**: Drilling of rivets (solid rivet displayed)

## 15.3 Riveting

### 15.3.1 General

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

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

| Type of rivets | Designation | Use |
|---|---|---|
| AVEX | Aluminium rivet on steel stem | Fuselage, wing, stabilizer, elevator , rudder, flaps, ailerons |
| MS20426AD | Aluminium rivet with countersunk head | |
| MS20470AD | Aluminium rivets with universal head | |

**Tab. 15-1**: Survey of rivets used in airplane structure

In case that different replacement rivets are used than shown in the Tab. 15-1 then rivet dimensions must be identical with originally used rivets and material of rivets must fulfill the same material characteristics.

### 15.3.2 Riveting procedure

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

**Note:** 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.

(b) Disassemble the parts and deburr the holes.

**Note:** For sunken 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 (*0.008in*), the rivet head must not be under the surface level (sunk).

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

**Note:** 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 cleaning continue on. Cleaning liquid always apply on the cloth only and wipe it of from the surface before its evaporating.

(d) 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 0.25 mm (*0.01 in*).

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

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

**Note:** 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 of with the plastic spatula and finally with cloth dipped in degreasing agent.

(f) After riveting, seal rivet heads, there, where are used pop rivets - see 15.6.2.2

## 15.4 Skin repairs

### 15.4.1 Removing damaged skins

In case that it is necessary to remove bigger part of the skin, ensure reliable support of the structure. Appropriately support the damaged part of the fuselage monocoque or the wing by supports located in the area of fuselage frames or wing ribs. The shape of supports must correspond with the shape of supported place and must be supplemented by cushion (or with other suitable material), so that airplane skin surface cannot be damaged. Remove rivets according to section 15.2.

### 15.4.2 Division of damaging into groups

To determine way of repair, find out by inspection the scope of structural damage, also in case of possible unriveting the skin.

Damage can be divided into the following groups:

(a) Little damage, which do not have to be repaired, such as local small impacts, scratches in the skin not exceeding thickness of the zinc chromated layer, appearance defects of paint coat etc.

(b) Damage, which can be eliminated by airplane operator. Methods of elimination are describer further in the text.

(c) Damage with disturbance of basic structural elements of the aircraft. (Deformation of wing and stabilizer spar, deformation of wing ribs, fuselage bulkheads etc.). These repairs can be made only by Czech Sport Aircraft a.s. as producer or by authorized repair shop - for more detailed information contact Czech Sport Aircraft a.s.

### 15.4.3 Principles for repair method determination

When repairing the damaged skin or airplane structure keep the following principles:

(a) Drill of the loose or damaged rivets and replace them with new rivets (see section 15.2).

(b) Strength in any section of the repaired place must be as a minimum equal to the strength of the original part.

(c) Use the same material for repairs as the material of a defective area (for survey of used materials see section 17.3).

(d) Carry out repair of skin damaging by means of patches having the same thickness as the original skin or higher.

(e) Repair the angle defects with inserted angles with the section by 10 to 20% higher than the section of the damaged angle (see 15.4.4).

(f) Loading from one side of the repaired area must carried through the repair element directly to the other side.

(g) Length of overlapping in the area of repair must be satisfactorily big so that loading can be equally distributed to nondefective part of the structure.

(h) Exist holes are, if possible, used for riveted joints. If these rivets are not able to transfer loading, drill other holes. Rivets around of the repaired area are a criterion for rivet size selection.

(i) Minimum distances of rivets from the edge of sheet metals or inserted bands are shown in the table 15-3:

| **Rivet diameter** | **Distance of rivet axis from the edge of the sheet metal (angle)** | |
|---|---|---|
| | **minimum** | **recommended** |
| 2.4 mm (*3/32 in*) | 5 mm (*0,2 in*) | 7 mm (*0,27 in*) |
| 3.2 mm (*1/8 in*) | 6 mm (*0,24 in*) | 7 mm (*0,27 in*) |
| 4.0 mm (*5/32 in*) | 7 mm (*0,27 in*) | 8 mm (*0,31 in*) |

**Tab. 15-3**: Minimum distance of rivets from the edge

### 15.4.4 Angle repair

Repair method consists in stiffening the damaged angle by means of the new one. When repairing observe the following instructions:

(a) Determine the section area of the damaged angle S1

(b) Choose S2 = 1.1 S1as section area of the stiffening angle.

(c) Thickness t2 = (1 to 1. 3) t1

(d) Drill of rivets in the area of repair

(e) Choose the same rivet diameter as in the damaged place.

(f) Use at least two rivets on each side from the crack

(g) At riveting follow section 15.3

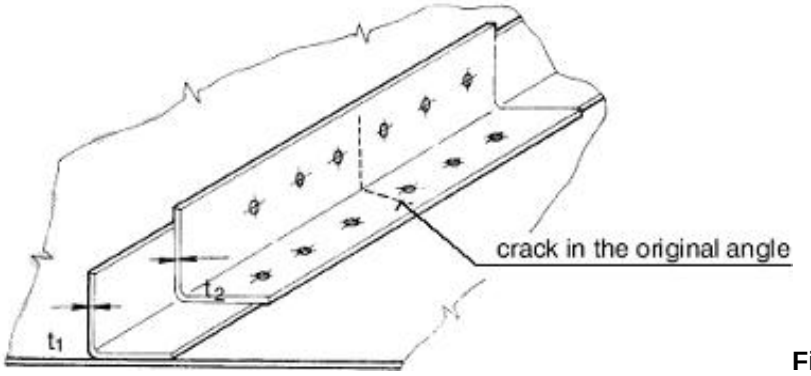



**Fig. 15-2**: Scheme of angle repair

## 15.4.5 Skin repair

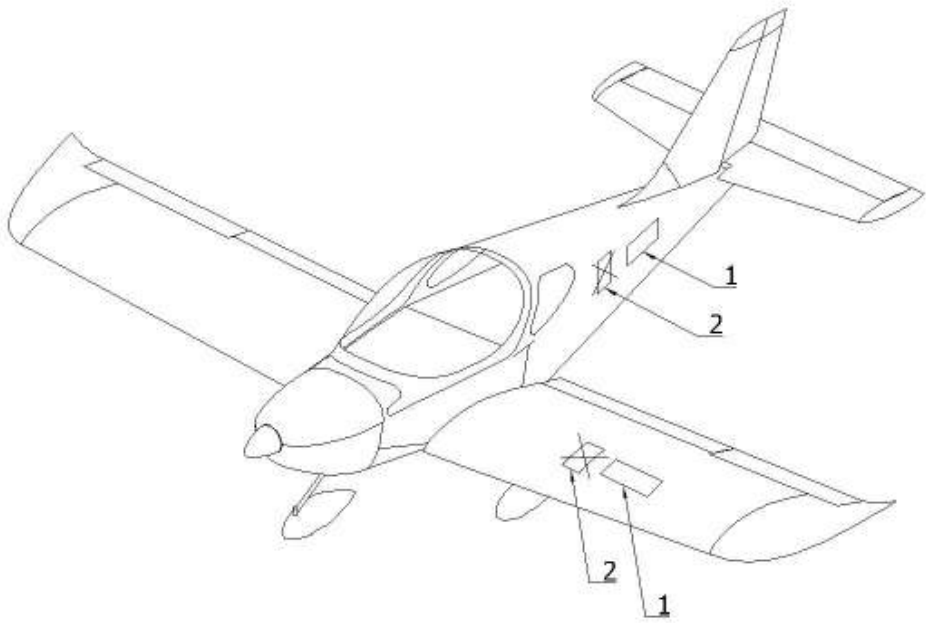
### 15.4.5.1 Stopping cracks and blinding small holes

Propagation of small cracks can be stopped by drilling a hole with the drill bit of dia 3.2 mm (*1/8 in*) at the utmost end of the crack. If propagation continues, repeat the drilling. Support the place of drilling with a wooden block at drilling thin skin and use the sharp drill bit so that it will not drift and will not cause another damage to the skin. Check in the operation whether the crack was successfully stopped.

At drilling the crack of the skin in the area of the flange, supporting stiffener etc., protect these parts before drilling by supporting the drilled place by means of the thin steel band. If the crack still propagates after repeated drilling, cut out the affected area and repair the skin by means of the patch - see next paragraph.

### 15.4.5.2 Repairing the skins with patches

**Caution:** The following procedure is intended for skin repairs only with max. area of the patch up to 200 $cm^2$ (*31 $in^2$*) (area of the cut out skin). Before riveting the patch check the adjacent part of the inner structure in the damaged area and find out whether its repair is needed. Place patches on the fuselage so, that the longer patch side lies in the longitudinal plane of the airplane (in flight direction), see Fig.15-3. Place patches on the wing so, that the longer patch side lies in direction of transversal axis of the airplane (parallel with the wing leading edge), see Fig. 15-3.




1 ... Correctly located patch 2 ... Incorrectly located patch

**Fig. 15-3**: Location of patches on the airplane skin

Mark the damaged surface area (preferably by spirit felt tip) and cut out the most suitable geometrical shape (circle, square, rectangle).

Be careful that all cracks as well as adjacent corroded areas are cutted out. Corners of cut out holes in the skin must have minimum radius of 12.7 mm (*0.5 in*) and their edges must be smoothly filed off.

Size of patch overlapping depends on the cut out of skin area :

(a) **patch up to the area of 51.6 cm$^2$ (*8 in$^2$*)** - rivet by one row of rivets, the patch edge must overlap the edge of the cut out hole by minimum 19 mm (*0.75 in*).

(b) **patch with the area over 51.6 cm$^2$ (*8 in$^2$*)** - rivet by two rows of rivets, the patch edge must overlap the cut out hole by minimum 32 mm (*1.25 in*).

Both ways of patching are shown on Fig. 15-5.

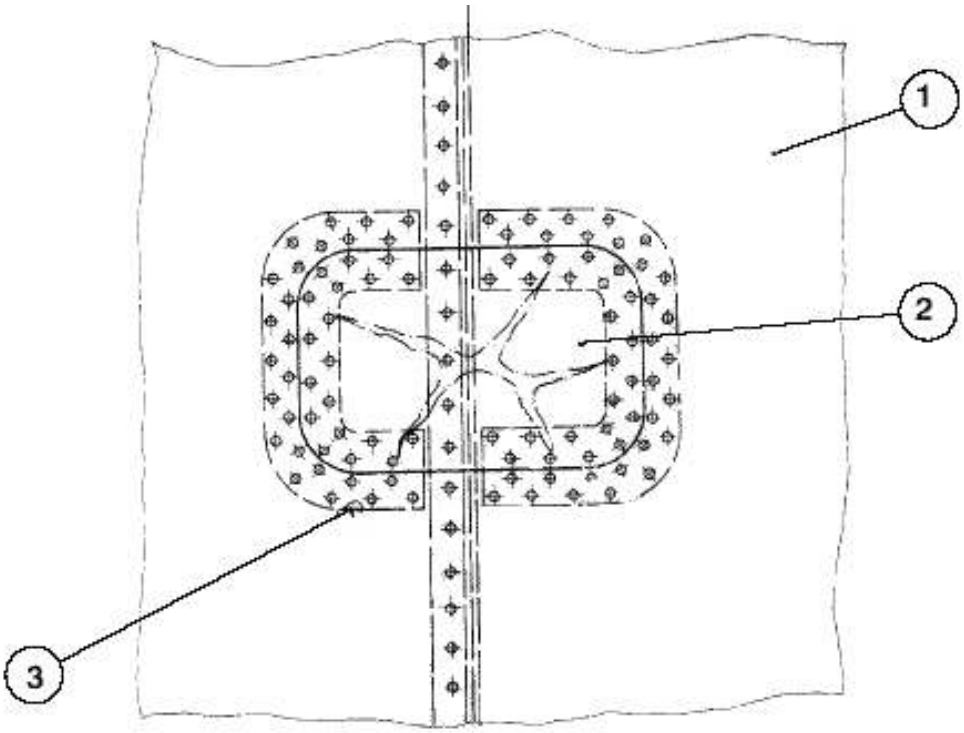
If the damaged area is located near the spars and frames, choose such patch dimension so that it covers all these elements of structure and it is possible to rivet it (Fig.15-4).

Types of patches according to their position on the airframe structure.

(a) **Surface patches** - These can be used in the areas where surface smoothness is not important

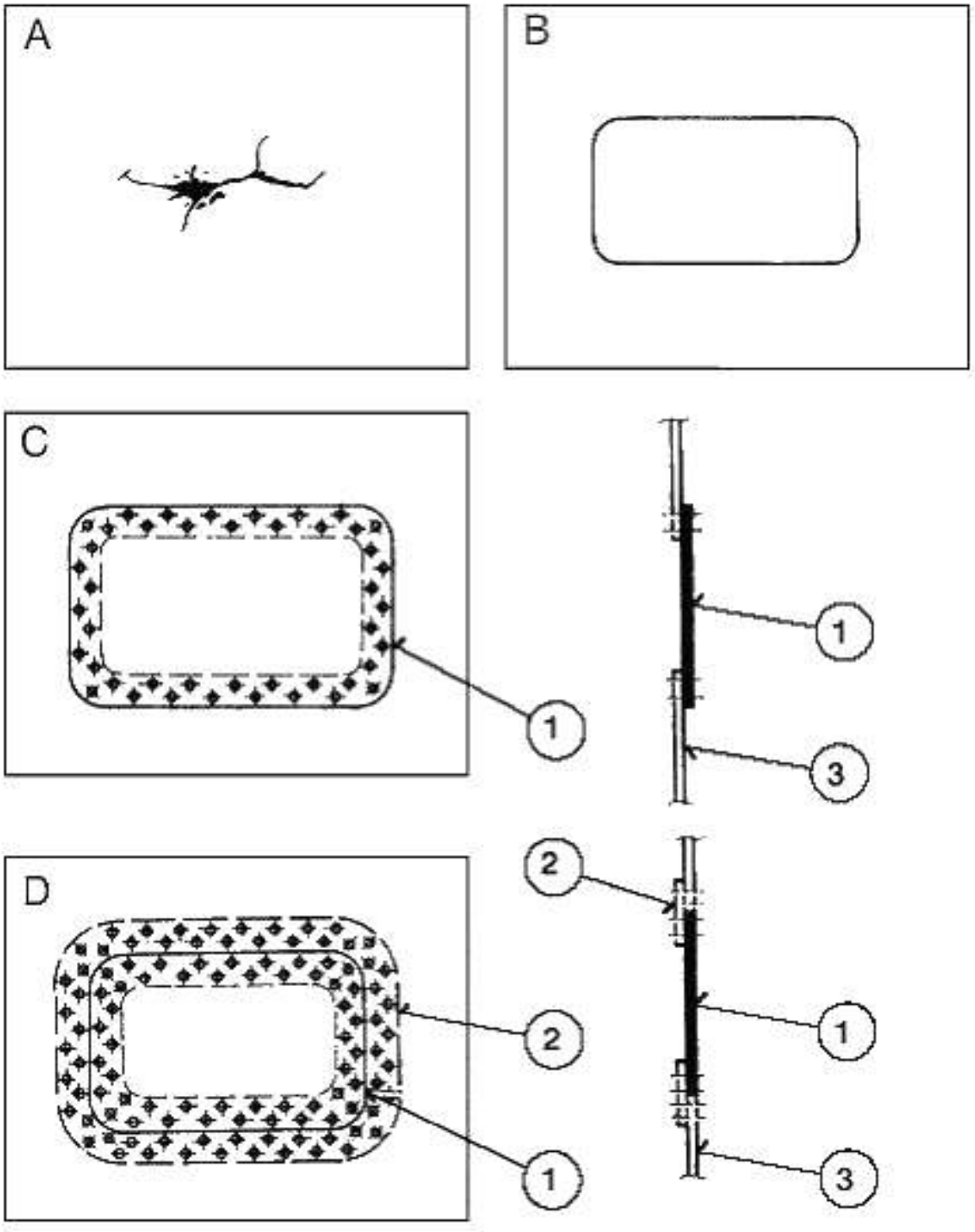
(b) **Sunk patches** - Use for patches on the wing, tail unit and control surfaces.

(c) **Surface patches across obstacles and stiffeners in the skin** - pay special attention to drilling the patch together with the surrounding structure. Attach the patch in several points and then drill holes for rivets from inner side (if possible). Use original holes in frames and stiffeners.




1 ... Skin 2 ... Patch 3 ... Stiffening frame

**Fig. 15-4**: Repair of the punctured skin in the frame area




A ... Punctured skin
B ... Cutting out and cleaning the damaged skin
C ... Repair with the unsunk patch
D ... Repair with the sunk patch
1 ... Patch
2 ... Frame
3 ... Skin

**Fig. 15-5**: Repair of the punctured skin

## 15.5 Repair of fiberglass parts

### 15.5.1 Damage classification

Any damage of parts from reinforced plastics with epoxy matrix leads to increased saturation of the matrix with humidity and subsequently to loss of properties. Therefore we recommend carry out their repair as soon as possible after the damage has occurred.

Two kinds of parts are made from these materials in the airplane:

- structural, load-bearing parts (canopy frame)
- design appearance, non load-bearing parts (fairings)

According to the damage size we can divide repairs into:

- small damage (surface defects, not affecting the stiffeners)
- medium damage (not more than 2/3 of stiffener thickness damaged)
- big damage

We recommend carry out repairs by means of epoxy resin and glass or carbon stiffeners.

### 15.5.2 General

Epoxy resin mixtures are prepared in a given mass ratio by means of weighing (accuracy of scales 1 gram (*0,002 lbs*) ).

### 15.5.3 Parts of external appearance

#### 15.5.3.1 Small damage

Repair of damage just by application of mastic and by varnish repair.

**Preparatory grinding**

For a good adhesion of repair layers it is necessary to carry out surface sanding at the utmost up to the depth of contact with the stiffener (do not damage). It is necessary to do surface sanding with overrun of 51 mm (*2 in*) from the damage location smoothly to the top layer. It is suitable to do sanding with grain size of 160. Dry sanding equipment with suction from the sanding area is used. Al2O3 or equivalent (fused corundum) can be used as sanding material.

**Dust removing**

It is made by wiping with clean and dry brush or by a vacuum cleaner.

**Application of smoothing layer**

After preparation of mixture (for material recommendation see the tab. 15-4) and its eventual thickening to enhance the noncurtaining capability (for vertical or lower areas) is performed its application onto the repair area by means of a plastic spatula. For better distribution of deposited material on irregular surface it is possible to form it through the

laid PE or PP transparent polyethylene. After proper application the layer is without bubbles. Deposit thickness is given by necessary thickness of surrounding layers (leveling) and ranges from 0.2 to 12.7 mm (*0.008 to 0.5 in*) in one deposit.

| manufacturer, name | type | mixing ratio | delay | rate of setting | time of setting | temperature | fillers |
|---|---|---|---|---|---|---|---|
| MGS,<br>A: L285<br>B: Hardener 285 | epoxy | A:B 100:40 | to be processed within 50 min (for 0.2kgs (*0.44lbs*) mixture) | 40% | 16hours (32hours) | 20-35℃ (17-20℃) *68-95℉ (62-68℉)* | thickening: Aerosil, microballs |
| | | | | 100% | 26hours (72hours) (2hours) | 20-35℃ (17-20℃) (80℃) *68-95℉ (62-68℉) (176℉)* | |

**Tab. 15-4:** Recommended materials for mixture preparation for application of leveling layer

**Sanding**

sanding or eventually sealing the surface is made after setting the mixture and possible tearing of the used polyethylene. It is suitable to start sanding with grain size up to 160 and finish with grain size of at least 400. It is carried out by dry sanding equipment with suction from the sanding area. Al203 or equivalent (fused corundum) can be used as sanding material. Basic material of the part must not be diminished at sanding.

**Note:** Especially in case of C/K (carbon/Kevlar) stiffener in the basic part, sanding through up to the stiffener must not occur (complication - see note about preparatory sanding at medium damage).

**Finishing**

See section 15.6 - Paint repairs

### 15.5.3.2 Medium damage

Repair of damage by replacing the stiffener part, by mastic and varnish repair. At such repair it is necessary to distinguish type of used stiffener (especially for sanding):

- C/K (carbon/Kevlar), rovings of fabric of black color (C) take turns with yellowish (K)
- G (glass), rovings from milky white to transparent

**Preparatory sanding**

For good adhesion of repair layers it is necessary to do sanding up to the depth of damage. It is necessary to do surface sanding from the damage area with overrun at the least 25 mm (*1 in*) for every damaged stiffener layer smoothly up to the top layer and then about 51 mm (*2 in*) for finishing and mastic application. It is convenient to do sanding with sanding material having grain size of 160. It is carried out by dry sanding equipment with suction from sanding area. Al203 or equivalent (fused corundum) can be used as sanding material.

**Note:** In case of C/K stiffener K rovings tend to rise up from the surface at sanding - it is difficult to sand them, we recommend to use diamond sanding tool and one-way sanding.

**Dust removing**

Dust is removed by wiping with a clean and dry brush or by a vacuum cleaner.

**Stiffener preparation**

For this kind of repairs we recommend the stiffener G (glass) with plain weave, 150 g/m$^2$ (*0.037 lb/ft$^2$*), with surface protection for epoxy resins. Number of needed stiffener layers depends on depth of damage. It is possible to say that each layer of the mentioned fabric represents at proper saturation by matrix resin thickness of 0.5 mm (*0.020 in*).

Stiffener layers must be prepared (cut out) gradually from the smallest (the lowest) up to the bigger (upper), each with overrun of 19 mm (*0.75 in*).

**Putting layers**

After preparing lamination mixture (for recommendation of material see the tab. 15-4), it is applied to the place of repair by means of rigid brush. The first stiffener is laid into the deposit and it is again saturated by brush. Another layer of stiffener is laid and saturated. When putting the last layer it is necessary to pay attention to a proper saturation and compression of stiffeners so that they cannot „come up" to the surface and subsequent useless damage at final grinding. For better saturation of the surface by resin and securing against curtaining it is possible to put PE or PP transparent foil across the surface. When applied properly, the layer is without bubbles. Repair thickness should exceed surrounding surface in this phase by about 0.5 to 1 mm (*0,02 in to 0,04 in*) for finishing.

**Sanding**

Carry out sanding and eventually apply mastic on the surface after setting, eventually tearing of the foil (see small damage). It is suitable to begin sanding by abrasive with grain size of 160 and finish by grain size of at least 400. Dry sanding equipment is used with suction from the sanding area. Al2O3 or equivalent can be used as sanding material. It is important not to diminish basic material of the part at sanding.

**Note:** Especially in case of C/K stiffener in the basic part there must not be any sanding through up to the stiffener (complication - see the note about preparatory sanding).

**Finishing**

See section 15.6 - Paint repairs

#### 15.5.3.3 Major damage

At such damage we recommend to change the part or to do this repair in a professional facility. Use instructions in chapter about medium damage as recommendation for used materials.

### 15.5.4 Structural parts

On these parts we do not recommend to do other as small damages repair. In case of the other damage we recommend to contact Czech Sport Aircraft a.s. as manufacturer.

**Caution:** When repairing, it is necessary to pay attention to timely repair (see the text about low of properties at humidity effect at the beginning of 15.5.1) !

**Small damage**

Repairs are made according to instructions with appearance parts.

**Caution:** When repairing, it is necessary to carefully pay attention not to damage the stiffeners!

## 15.6 Paint repairs

### 15.6.1 Safety rules

When working with paints, thinners and solvents follow the following safety rules:

- it is necessary to follow safety rules for working with flammable and volatile substances
- working area must be properly aerated
- it is prohibited to smoke and anyway handle with free fire in a working area
- use protective working means such as goggles, gloves, respirator, etc.

### 15.6.2 Recommendation for additional surface treatment of the airplane surface

**Caution:** By applying permanent protective coats weight of airplane is increased and gravity center position is changed. Increase in weight depends on type of coat and its thickness.

#### 15.6.2.1 Washing and degreasing

It is possible to use both organic solvents and solvents based on water.

(a) **Organic solvents** - acetone, metyetylketone (MEK), benzine, toluene,

BASF Glasurit 360-4

- Applied by spraying on washed surfaces (e.g. mechanical sprayer, jet ejector) or by wiping with wet (by pouring, not by dipping because it would contaminate the whole volume of solvent) textile wad. After applying it, the agent is wiped of by clean absorbing material before solvent evaporation.

- **Advantages**: fast and reliable evaporation even from the corners and borders without additional warming
- **Disadvantages**: it must be used without other dilution (expensive); not ecological (danger of water contamination); detrimental to health (must be carried out in an aerated area with personal protective means); waste (including dripping from the area) must be eliminated in the incinerating plants.
- **Use**: for Al-alloys surfaces, epoxy fiberglass

**Caution:** these agents must not be used for degreasing parts from plastics (PC -Lexan, PMMA Plexiglass)

(b) **Water-based agents** - emulgation substances, wetting agents

- Applied also by spraying onto washed surfaces or by wiping with wet (by pouring and dipping) textile wad. After applying it, let it act for some time (see manufacturers recommendation) and then it is rinsed with clear water (by means of sponge dipped in ample amount of water or water jet).
- **Advantages**: (different according to the type of product: it is possible to highly dilute with water (cheap); ecological - waste (including dripping from the surface due to ample amount of water it is necessary to contain it) can be generally eliminated after its additional dilution with water in public sewerage; the least detrimental to health.
- **Disadvantages**: slow and unreliable evaporating from corners and borders, additional warming (drying) mostly required imperfect elimination of water results in wrong adhesion of paint coats; imperfect degreasing of fiberglass parts (not possible to use)
- **Use**: for Al-alloys surfaces and plastics

### 15.6.2.2 Bonding rivet heads, big irregularities and material transitions

**Caution:** In case that airplane surface remains without top coat, carry out just rivet head bonding.

After perfect degreasing carry out bonding of rivet heads, big irregularities and transitions of fiberglass parts with Al-sheet.

Epoxy and polyester bonding agents for car bodies are suitable; moreover for transitions between two types of material with increased elasticity. Recommended bonding agents are shown in the tab. 15-5.

Polyester bonding agents are applied with plastic spatula after being mixed with initiator. Sanding with sanding paper with grain size of 240 is made to smooth surface after drying. Remove dust after sanding and clean with degreasing agent.

Epoxy bonding agent is applied from the special jet with static mixer by means of extruding pistol. Excessive material is wiped off with spatula to final appearance before setting (slight recess is not a defect) - **do not sand!**

| surface | manufacturer, name | type | other components | drying (grindable) [min] / 18℃ ( *65℉* ) |
|---|---|---|---|---|
| Al–alloys | BASF Glasurit 801-703 (base) | polyester | BASF Glasurit 965-53 (initiator) | 20 |
| transitions epoxide – fiberglass + Al-alloys | BASF Glasurit 801-703 (base) | polyester | BASF Glasurit 965-53 (initiator) | 20 |
| Rivet heads | BASF Glasurit | polyester + styren | | 20 |

**Tab. 15-5**: Recommended bonding agents

### 15.6.2.3 Application of primer (paint)

In order to reach a uniform resistance to corrosion and smooth surface, we recommend carry out application by means of spraying (air standard gun with the upper vessel, air HVLP gun, airless electric gun). The adjusting of the used gun (given by manufacturer) differs according to the type - air pressure, jet diameter. Primer should be applied in several sprayings (total thickness is not reached at a blow) with defined maximum dwell and total drying time till further treatment or handling. Primer serves especially for anchoring (adhesion to the substrate) the topcoats and can serve also for eliminating irregularities of the surface (function of filer, for sanding). For surfaces from Al-alloys we recommend to use the etch-primers for light metals based on alkyd or materials based on epoxy or polyurethane (2-component paints); specific recommendations according to the table 15-6.

| Surface | Manufacturer, name | Type | Further components | Surface mass | Recom. thickness | Drying (between spraying / total) 18℃ ( *65℉* ) |
|---|---|---|---|---|---|---|
| Al-alloys | BASF Glasurit 801-1880 (base) | epoxy | BASF Glasurit 965-35/2 (hardener) | 1.6 [kg/mm/m$^2$] | 0.025 mm (*0.00098"*) | 15 min / 12 hours |
| epoxy – fiberglass | | | | | (at 0.05 mm (*0.00197"*) it can be also used as filler) | |
| PC (Lexan), PMMA (Plexiglass) | | | Glasurit 965-50 (thinner) | 8.49 [*lb/in/sqft*] | | |

**Tab. 15-6**: Recommended primers

### 15.6.2.4 Bonding

After total drying of basic coat we recommend to carry out total bonding of irregularities including repairs of bonding. Recommended binders are shown in the table 15-5. After drying perform sanding with emery paper with grain size of 240 until the surface is smooth. After sanding clean dust and wipe of with grease remover and perform repairing paint coat by primer (1/3 of coat thickness).

### 15.6.2.5 Application of top coat

In order to reach smooth surface we recommend again carry out the paint coat by spraying (see 15.6.2.3).

Topcoat serves especially for creating the coat resistant to weather and external effects for aesthetic rendering of the unit. Considering the higher loading by external effects we recommend to use top materials, exclusively two-component ones, on the acrylic-polyurethane or polyurethane basis, always with guaranteed adhesiveness to the used base coat (according to manufacturer). It is possible to use to advantage some of the coat system for car repairing. In our recommendation (see the tab. 15-7)

there are two types of colors: single coat (color shade and protection in one) double coat (one-component color shade is formed by the substrate and protection is ensured by two-component transparent top coat). By single coat paint it is possible to reach the wide spectrum of colors, but it is difficult to do metallic paint coats (we do not recommend them).

| Type of color | Manufacturer, name | Type | other items | Surface mass | Recom. thickness | Drying (between spraying / total) 18℃ (*65℉*) |
|---|---|---|---|---|---|---|
| single coat | BASF Glasurit R-68 / shade (base) | acrylic – polyurethane | BASF Glasurit 922-36 (standard hardener) Glasurit 352-91 (standard thinner) | 1-1.6 [kg/mm/m$^2$] 5.24-8.38 [*lb/inch/ft*$^2$] (by shade) | 0.02-0.04 mm (*0.00078-0.00157"*) | 15 min / 16 hrs |
| Double coat | base color coat: BASF Glasurit R-55 / shade (base) | acrylic – polyurethane | BASF Glasurit 352-216 (thinner, long) | 1.2-1.4 [kg/mm/m$^2$] 6.29-7.33 [*lb/inch/ft*$^2$] (by shade) | 0.015-0.02 mm (*0.00059-0.00078"*) | 10 min / 20 min |
| | Top coat, bright: BASF Glasurit 923-155 (base) | acrylic – polyurethane | BASF Glasurit 929-93 (standard hardener) Glasurit 352-91 (standard thinner) | 0.9 [kg/mm/m$^2$] 4.82 [*lb/inch/ft*$^2$] | 0.03-0.04 mm (*0.00118-0.00157"*) | 5 min / 5 hrs |

**Tab. 15-7**: Recommended paints

## 15.6.3 Small damage

### 15.6.3.1 General

Small damage is a deterioration of corrosion resistance. At repair the situation is made more difficult by the fact that the substrate for repair coats is not a compact surface of basic material but mostly al coats of surface protection (after sanding), of which not al are suitable for (in ageing stage) for good adhesion of paint coats. Therefore we recommend to carry out such repairs by a verified system.

Before repairing it is necessary to differentiate the type of the existing topcoat, single coat and two-coat (with the top coat). For repair it is necessary to follow the used type of color.

It is suitable to choose the delimited area (e.g. connection of sheets, wing edge) for the scope of the place, which is being repaired transition, is then better blended. In the case that it is not possible to choose the area in this way, it is necessary to take into consideration the higher difficulty of the procedure as for the uniformity of shade and elaboration of coat transition.

### 15.6.3.2 Sanding

For good adhesion of the repair coats it is necessary to carry out sanding of the old paint coat at least up to such depth as the depth of damage. Ground area must be larger from 51 to 102 mm (*2 to 4 in*) than damaged area. With two-coat type of the topcoat it is necessary to add at least 51 mm (*2 in*) for the run-out of the top coat. Sanding can be started with abrasive having grain size of max. 160 and finish with grain size of 400. It is made by the sander equipped with the suction from the area of sanding or by manual sanding under water.

**Caution:** Anodized coat can not be destroyed by sanding on the Al-alloy sheet.

### 15.6.3.3 Degreasing

It is carried out in the same way as in the case of the total spray coat - see 15.6.2.1

### 15.6.3.4 Application of primer

For reaching the satisfactory equal adhesion we recommend to carry out a spray coat of the place to be repaired by adhesive interlayer (see the tab. 15-8).

| surface | Manufacturer, name | type | Surface weight | Recomm. thickness | Drying (total) 18℃ (*65℉*) |
|---|---|---|---|---|---|
| Al-alloys | BASF Glasurit 934-0 | single-component | 0.8 [kg/mm/m$^2$] 4.19 [*lb/inch/ft$^2$*] | 0.005-0.01 mm (0.00019-0.00039") | max 15 min |
| Epoxy fiberglass | | | | | |
| Old paint coats | | | | | |

**Tab. 15-8**: Adhesive interlayer

Subsequently the primer is applied according to the table 15-6. Paint coat thickness is given by necessary thickness of surrounding coats (leveling).

**Caution:** In case that the primer was not removed by the previous step, it is not necessary to apply the primer again. The original ground primer with adhesive intercoat is enough.

Actual application of primer will be carried out in the same way as for the total spray-coat (see 15.6.2.3).

### 15.6.3.5 Application of top coat

**Caution:** For repairing it is necessary to choose the identical type (single coat, double coat) of the repair color as on the original surface.

Application of the top coat will be carried out by spraying as for the total spray coat (see 15.6.2.3) with the exception of used thinners and hardeners. Due to the need of smooth transition to the basic surface it is necessary to use so called „spraying into the surface" using longer time of drying initiations for a good result of work. The recommended material is shown in the table 15-9.

| Type of color | Manufacturer, name | Type | other components | Surface mass | Recomm. thickness | Drying (between spray coats / total) 18℃ (*65℉*) |
|---|---|---|---|---|---|---|
| single coat | BASF Glasurit R-68 / shade (base) | acrylic – polyurethane | BASF Glasurit 922-36 (standard hardener) Glasurit 352-319 (extra long thinner) | 1-1.6 [kg/mm/m$^2$] 5.24-8.38 [*lb/inch/ft$^2$*] (according to shade) | 0.02-0.04 mm (*0.00078-0.00157"*) | 15 min / 19 hrs |
| double coat | basic color code: BASF Glasurit R- 55 / hade (base) | acrylic – polyurethane | BASF Glasurit 352-216 (long thinner) | 1.2-1.4 [kg/mm/m$^2$] 6.29-7.33 [*lb/inch/ft$^2$*] (according to shade) | 0.015-0.02 mm (*0.00059-0.00078"*) | 10 min / 20 min |
| | Glossy top coat: BASF Glasurit 923-155 (base) | acrylic – polyurethane | BASF Glasurit 929-93 (standard hardener) Glasurit 352-400 (extra long thinner) | 0.9 [kg/mm/m$^2$] 4.82 [*lb/inch/ft$^2$*] | 0.03-0.04 mm (*0.00118-0.00157"*) | 5 min / 6 hrs |

**Tab. 15-9**: Recommended colors

## 15.7 Torque moments

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

(a) Unless specifically stated do not grease neither nut nor bolt.

(b) 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.

(c) 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 recomended | | 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. 15-10**: Recomended torque values for oil-free, cadmium-plated threads

## 15.8 Securing the bolt joints

### 15.8.1 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.

### 15.8.2 Bolt joint securing by locking wire

Procedure of bolt joint securing is shown on the Fig.15-6 and Fig.15-7. The zinc-coated or stainless steel wire having diameter of 0.8 mm (*0.032in*) is used for securing.

**Fig. 15-6**: Ways of bolt joint securing

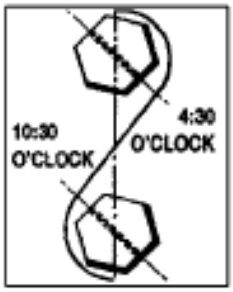
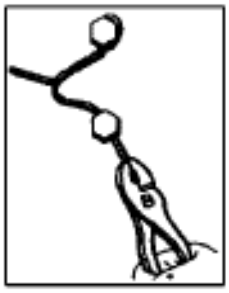
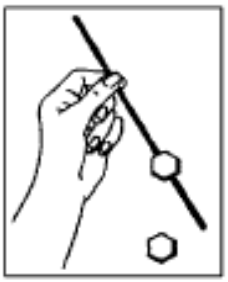
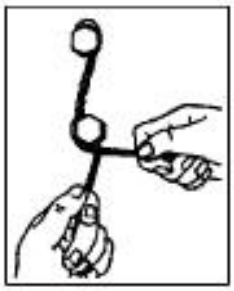
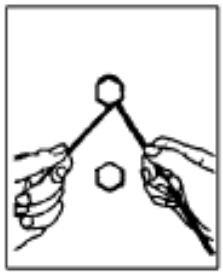
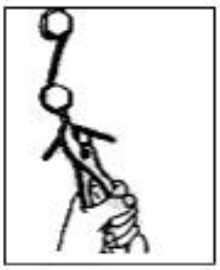
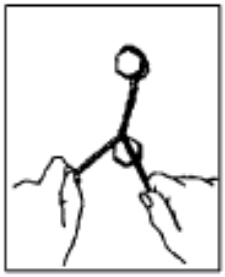
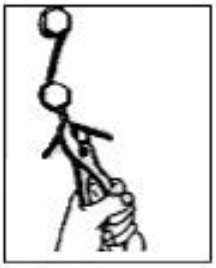
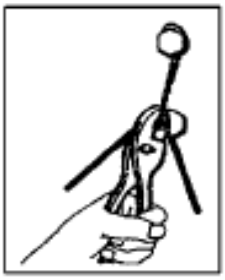
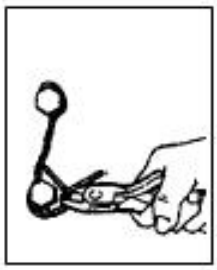
| | | | |
|---|---|---|---|
|  | 1. Adjust the correct position of holes for locking wire. |  | 6. Pull the upper wire through the hole in the other bolt. Hold the wire end by pliers tighten it firm. |
|  | 2. Pull the locking wire through the hole in one bolt to be secured. |  | 7. Hold the free end 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 so tight as possible. |  | 9. Bend the end of the wire under the bolt head. |
|  | 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*). |  | 10. Cut off the surplus wire. |

**Fig. 15-7**: Procedure for securing the bolt joint with locking wire

### 15.8.3 Bolt joint securing 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.

**Caution:** 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 the Fig.15-8.

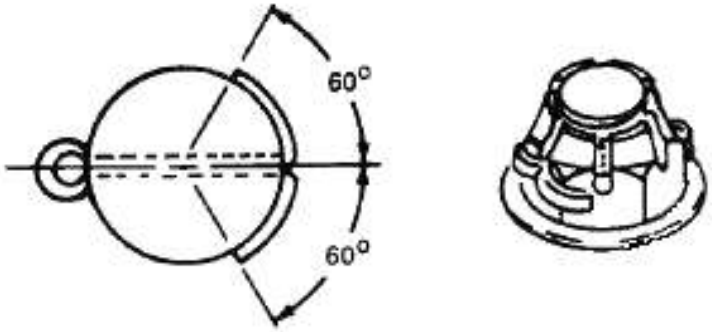



**Fig. 15-8**: Securing the castle nut by using the cotter pin.

## 15.9 Bonding repairs

### 15.9.1 General

In order to keep the set down values of the transition resistances between some stuctural parts of the SPORTCRUISER airplane structure, the bonding (conductive interconnection) is installed between all important parts of the fuselage structure.

### 15.9.2 Removal and installation

Before installing the bonding remove the paint coat which protects the joint. Principles for repeated installation of the bonding:

(a) Carefully clean the whole bonding including the washers, bolts and nuts from all impurities, if necessary degrease the contacting surfaces on the connecting material.

(b) Carefully check whether wires of bonding band are not torn off. Change the damaged band.

(c) Carefully clean and degrease contacting surfaces on the airplane structure. Clean corroded surfaces with emery paper to the metallic luster.

**Caution:** If a new part was installed into the airplane, its surface is provided by non-conductive surface protection (for example anodizing), this surface protection must be removed from the area of bonding installation.

(d) The threaded joints, which fulfill a function of bonding can not be lubricated.

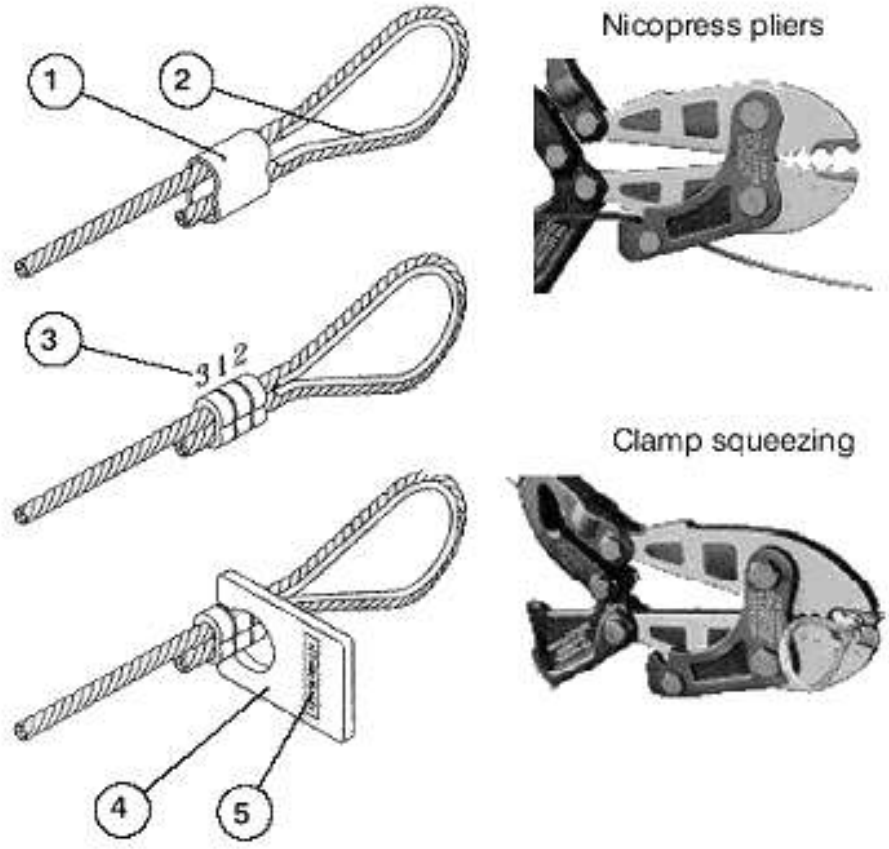
(e) On the same areas of the airplane structure install the same type of bonding which you removed.

(f) After repeated bonding installation coat the remaining metallically clean surface of the contact area, as well as protruding heads of bolts and nuts with protective paint.

## 15.10 Installing clamps by Nicopress pliers

Procedure of clamp installation by Nicopress pliers is shown on the Fig. 15-10.

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.




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

**Fig. 15-10**: Installation of clamps by Nicopress pliers

# CHAPTER 16 – WIRING DIAGRAMS

## 16.1 General

This chapter contains typical wiring diagrams of SPORTCRUISER airplane systems, navigation and communication means. Further wiring diagrams, relating to additional equipment of the airplane, are the part of additional equipment description which is mentioned in Chapter 17 - Appendices.

## 16.2 General wiring diagram of SportCruiser aircraft

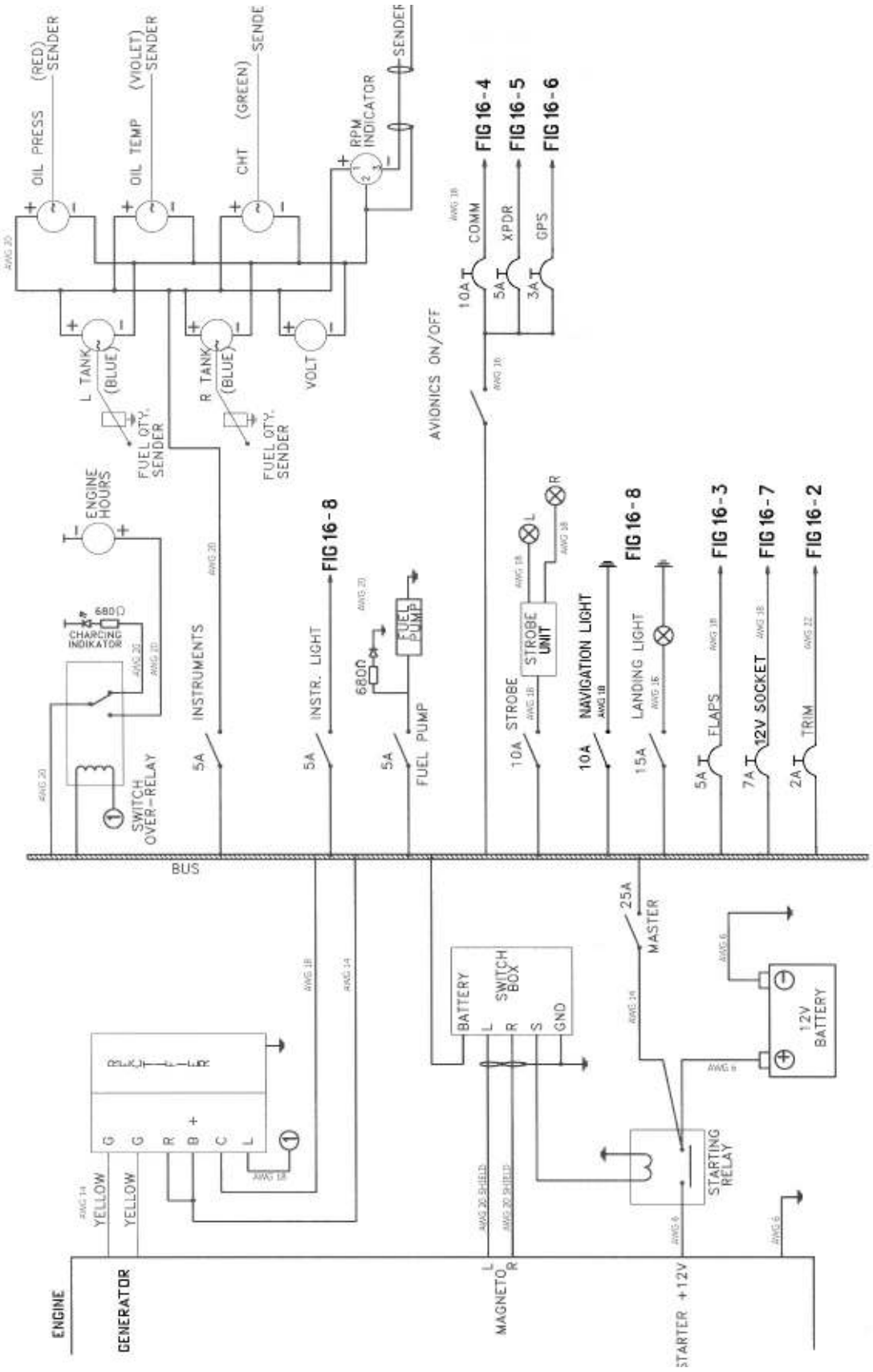



**Fig. 16-1**: Wiring diagram of SportCruiser aircraft

## 16.3 Wiring diagram of trims

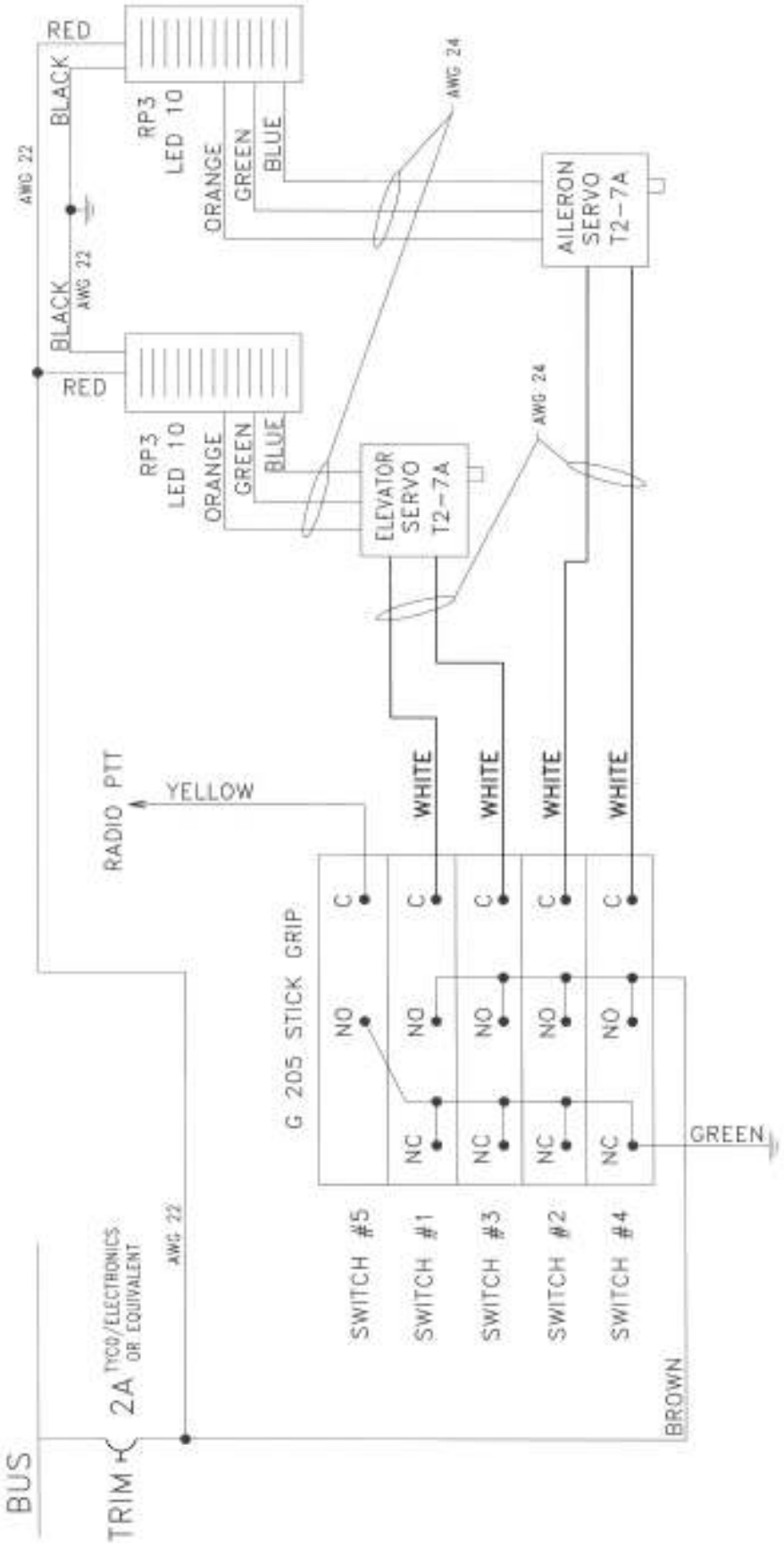



**Fig. 16-2**: Wiring diagram of the aileron and elevator trim

## 16.4 Wiring diagram of flaps

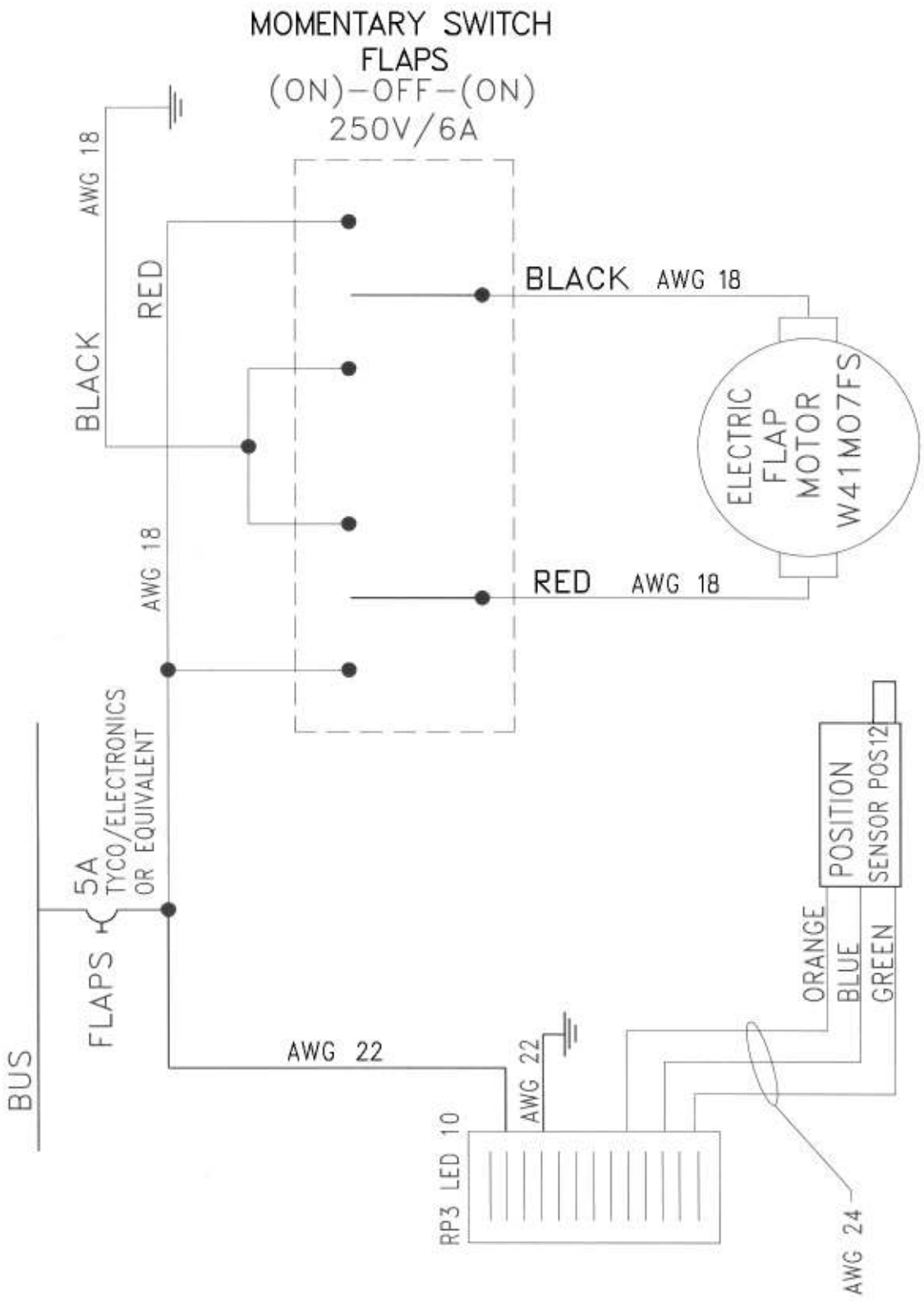



**Fig. 16-3**: Wiring diagram of flaps

## 16.5 Wiring diagrams of the communication system

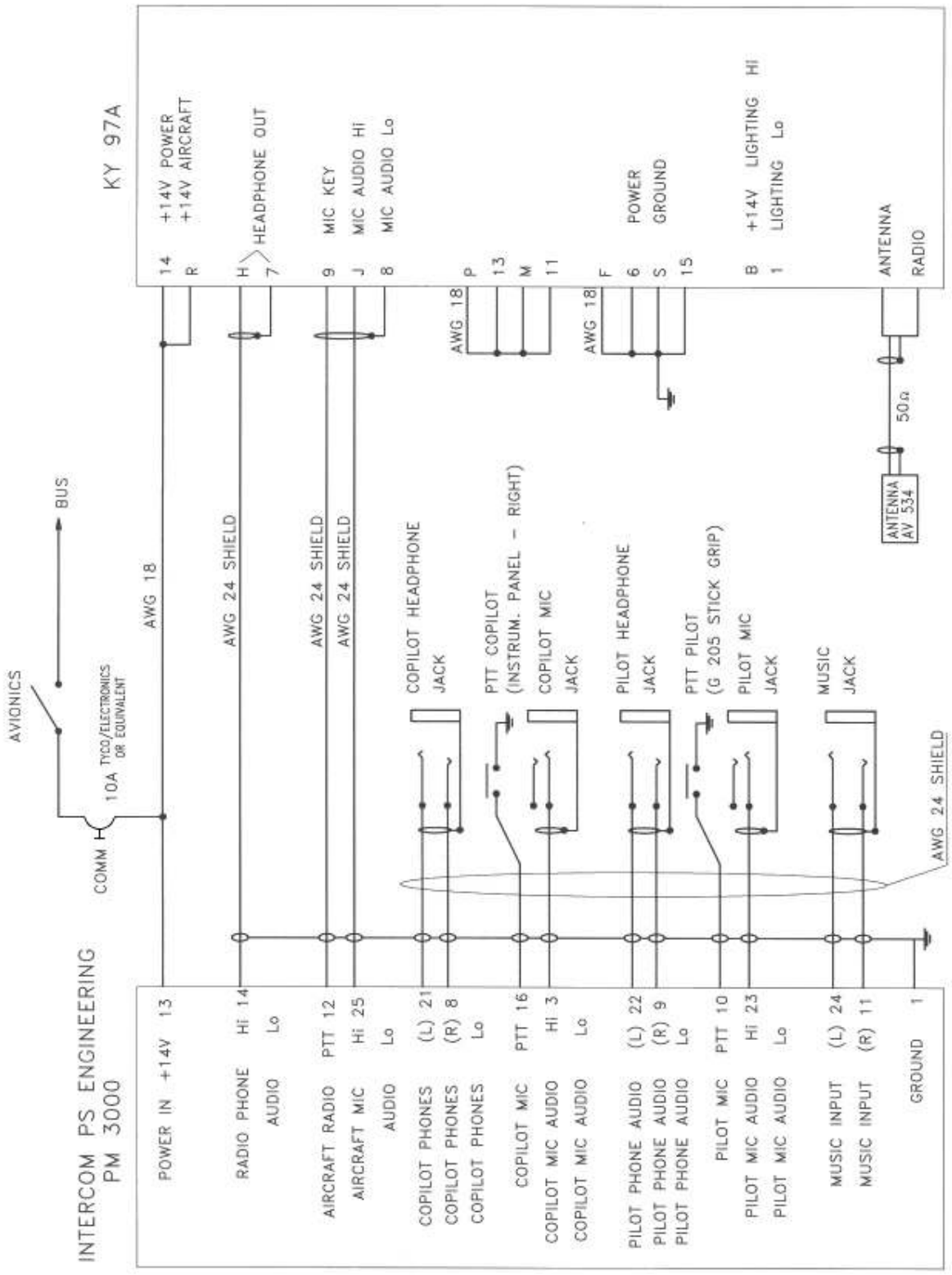



**Fig. 16-4** : Wiring diagram of the radio and intercom (stereo)

## 16.6 Wiring diagram of the transponder

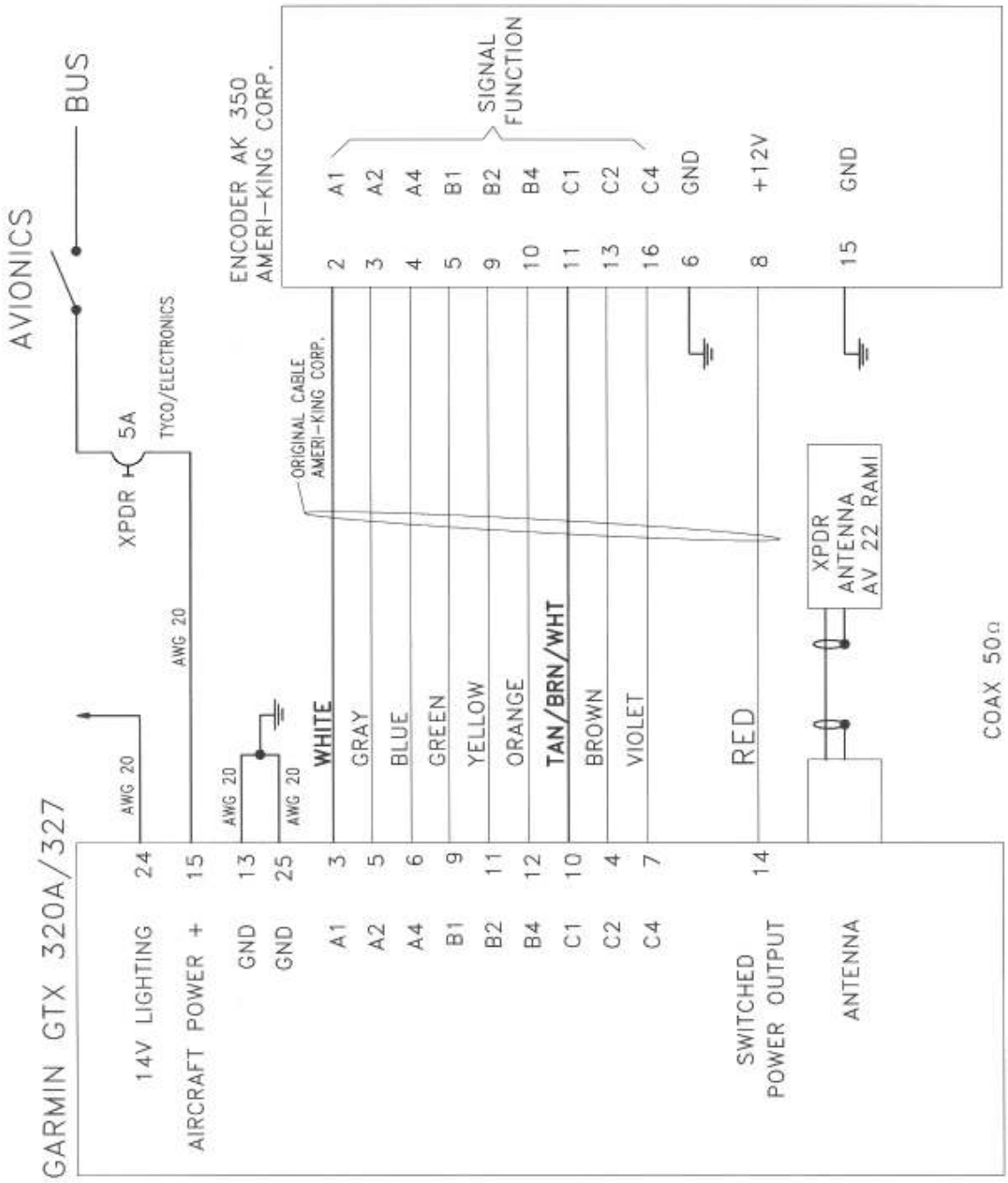



**Fig. 16-5**: Wiring diagram of the transponder and encoder

## 16.7 Wiring diagram of the GPS

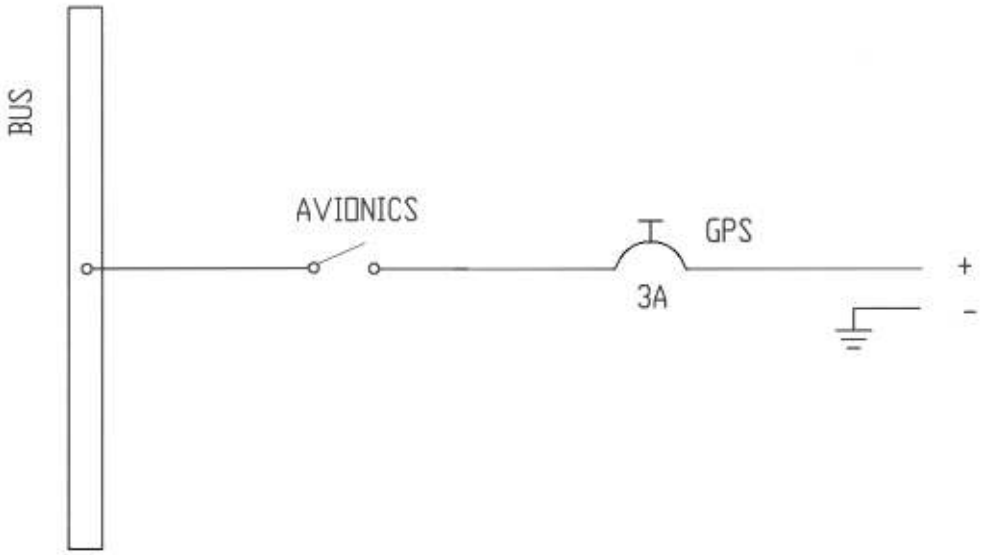



**Fig. 16-6**: Wiring diagram of the GPS

## 16.8 Wiring diagram of the socket

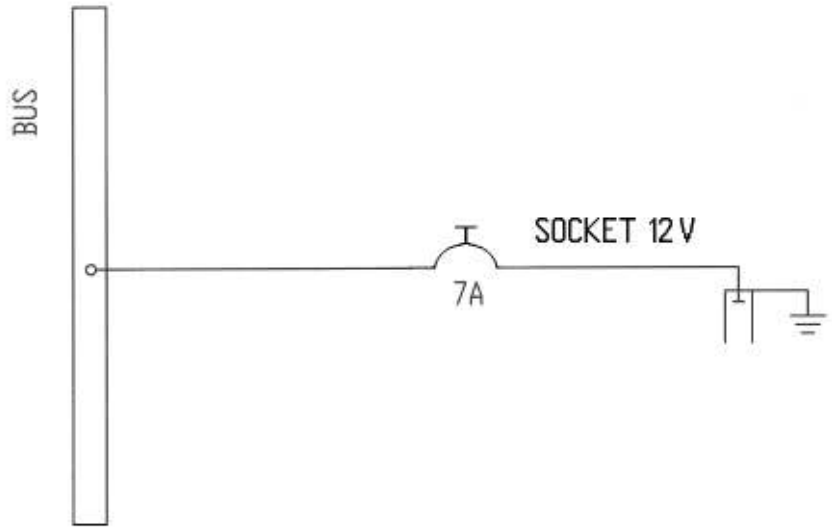



**Fig. 16-7**: Wiring diagram of the socket

## 16.9 Wiring diagram of the lighting system

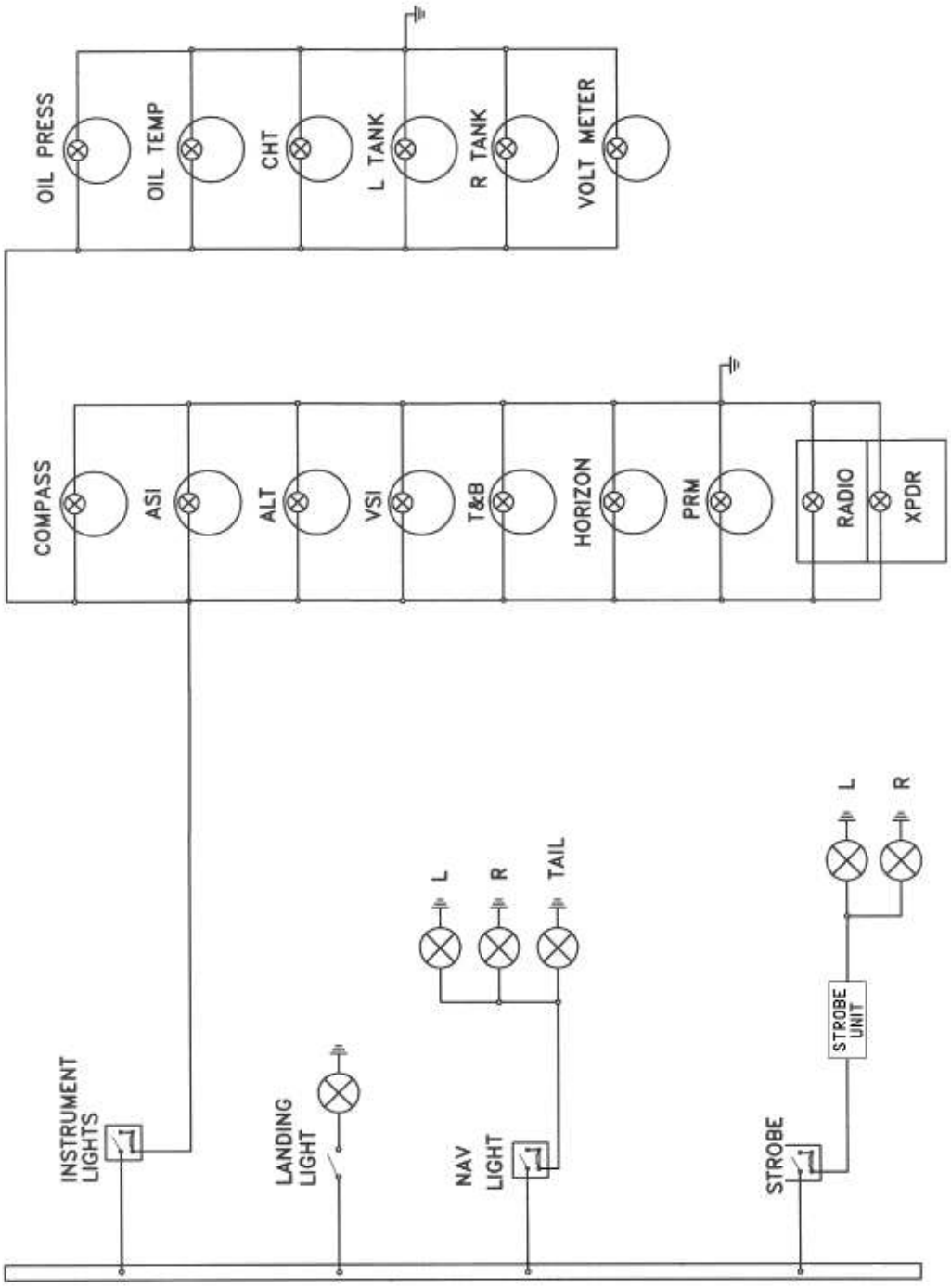



**Fig. 16-8**: Wiring diagram of the lighting system

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# CHAPTER 17 - APPENDICES

## 17.1 General

This chapter contains other information necessary to maintain the SPORTCRUISER airplane in the form of appendices.

## 17.2 List of appendices

| No. | Title |
|---|---|
| 17.3 | List of used materials |
| 17.4 | Airplane failure card |
| 17.5 | Operating liquids |

## 17.3 List of used materials for airframe production

| Prescribed material | |
|---|---|
| 2024 T351 | Duraluminium |
| 6061 T6 | Duraluminium |
| 4130 N | Steel |
| 11 353 | Steel |
| 17240.4 | Stainless steel |
| D 671 | Stainless steel |

## 17.4 Airplane failure card

| | | | | |
|---|---|---|---|---|
| **CZECH SPORT AIRCRAFT a.s.** | | | Na Záhonech č.e.212, 686 04 Kunovice, Czech Republic | |
| **Airplane Failures Card** | | | | |
| Dear customer,<br>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:<br>(encircle appropriate number) | 1. Flight<br>2. Taxiing<br>3. Take-off run<br>4. Take-off<br>5. Touch down | | 6. Landing run<br>7. Daily inspection<br>8. Periodical inspection<br>9. Other |
| 4. | Consequences for operation:<br>(encircle appropriate number) | 1. No consequences<br>2. Airplane put out of operation<br>3. Airplane returned from take-off<br>4. Flight with damaged aggregates | | 5. Emergency landing<br>6. Occurrence on the ground<br>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):<br>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: |

## 17.5 Operating liquids

Aircrafts manufacturer used this operating liquids :

**Engine oil**

AeroShell Oil Sport Plus 4

**Coolant**

VIP ANTIFREEZE C (VW TL 744C-G11) + WATER, mixture ratio coolant/water 50/50 [%]
-40℃ → +120℃

**Hydraulic (brake) fluid**

AeroShell Fluid 41 (Mil-H-5606, DOT5)

INTENTIONALLY LEFT BLANK