



**SERIAL NUMBER:**\_\_\_\_\_

## **Maintenance and Inspection Procedures Manual**

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# Maintenance and Inspection Procedures Manual

Type: **CT**

Series: **CTSW LSA**

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## REVISION STATUS

Revision No.	Date Released	Affected Paragraphs	Affected Pages	Approved By
Original Issue	28-Feb-05	N/A	N/A	
1	25-Apr-05	2.14; 10; Added Appendix I with Owner's Operational Difficulty Report Form	24; 131	
2	22-Sept-06	<p>Title of document changed.</p> <p>Equipment list carried over to the Appendix II and changed.</p> <p>Appendix III, IV and V added.</p> <p>2 - Changed the levels of certification for performing this Maintenance' tasks.</p> <p>2 - Was: 'CT2k and CTSW', Is: 'CTSW and CTSW-2006'.</p> <p>2.3 - Care and cleaning of your CTSW.</p> <p>'Warning' label added.</p> <p>2.5 - Paragraph title changed.</p> <p>2.8 - Changed Fuel Filter on 5/16".</p> <p>2.9 - Deleted operating speeds and limits of 912 UL/A/F engine, 912ULS/S - changed.</p> <p>2.10 - Changed aircraft weight and balance information.</p> <p>2.12 - Max/usable fuel values changed.</p> <p>2.13 - 'Attention' note added.</p> <p>Illustration changed: General Safety Information (Fig.1);</p> <p>2.15 - Changed Flightstar postal address.</p> <p>3-4 - Deleted 50 hour maintenance check.</p> <p>Was: 'Level of Certification', Is: 'Minimum level of Certification'.</p> <p>Paragraph changed.</p> <p>Corrected wrong references.</p> <p>4 - 'Required certification level for maintenance procedures' table added.</p> <p>4 - Changed p. 4.1.1.</p> <p>4.1.2 - Minimum certification level changed.</p> <p>Illustration changed: Wing Installation (Fig.12, 13; 14, 15; 16);</p> <p>Illustration changed: Stabilator Installation (Fig.1; 2; 3);</p> <p>Corrected wrong references.</p> <p>4.1.2.5 - Reference added</p> <p>4.2.1.7 - Stabilator rigging angles changed.</p> <p>4.2.1.7 - Figure 6 deleted.</p> <p>4.2.1.9 - Added reference to Appendix III.</p> <p>4.3.1.3 - Type of maintenance changed.</p> <p>Illustration changed: Main Landing Gear Struts (Fig.3). Corrected wrong reference.</p> <p>Illustration changed: Main Wheel Removal (Fig.5);</p> <p>Corrected wrong references. Illustration changed: Main Gear Removal (Fig.9, 10);</p>	<p>6;</p> <p>6;</p> <p>7;</p> <p>7;</p> <p>11;</p> <p>17;</p> <p>19-20;</p> <p>21;</p> <p>22;</p> <p>22;</p> <p>23;</p> <p>24;</p> <p>25-36;</p> <p>25;</p> <p>30;32;33;</p> <p>34;</p> <p>37-38;</p> <p>38;</p> <p>38;</p> <p>43;44;45;</p> <p>47;49;50;</p> <p>48;51;54;</p> <p>58;65;</p> <p>45;</p> <p>51-52;</p> <p>53;</p> <p>54;</p> <p>56;</p> <p>66;</p> <p>68;</p> <p>70;71;72;</p>	
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		<p>Corrected wrong references.  Illustration changed: Brake System (Fig.1; 2; 3, 4);  Corrected wrong references.</p> <p>4.3.3.5.2 – List points added.  4.4.1.8 – Paragraph heading changed.  4.4.2.8 – Paragraph heading changed.  4.4.2.10 - Changed 'Inspection of Flap Control Microswitches'. Illustration changed: Flap Deflection Adjustment (Fig.12);  4.4.3.7 – Paragraph heading changed.  Illustration changed: Fuel System (Fig.1);  6 – Corrected wrong references.  Added p.6.7.  Illustration changed: Intake Filter / Side Access Panel (Fig.3, 4);  Illustration changed: Fuel Filter (Fig.6).  Illustration changed: Heating Control Inspection (Fig.3, 4);  Illustration changed: Electrical System (Fig.2; 3, 4);  11.1 - Type of maintenance changed.  Paragraph 14 added.</p>	<p>73;74;  75;76;77;  82;84;87  88.  76;  86;  94;  97;  102;  108;  109;  110;  111;  113;  116;  133-134;  136;  140.</p>	
3	08-Nov-06	<p>Added new type of tires to "List of disposable parts" table;  P.3.1 - Was: Pilot's Operating Handbook (POH), Is: Aircraft Operating Instructions(AOI);  Changed figures numbering:  was: 4, is: 4,a; was: 5, is: 4,b; was: 6, is: 5;  was: 7, is: 6.</p>	<p>17  25  127-128</p>	
4	18-Dec-06	<p>Changed p. 2.12.  Changed p. 3.6.  Changed Fig.1.  Changed paragraph 4.2.1.6.  Changed Fig.3.  Changed Fig.5.  Changed fig.1 in p. 6.1.  Changed checklist, paragraph 6.6.  Changed p. 6.11.  Changed fig.2a and 2b.  Changed fig.3a and 3b.  Changed fig.4a and 4b.</p>	<p>22  30  47  49-50  50  102  108  109  114  115  116  127</p>	
5	01-Apr-08	<p>Document title changed.  Changed p. 2.  Changed p. 2.4.  P. 2.6 Equipment List deleted  Changed p. 2.12  Changed p. 3.6.  Changed p. 4.3.1.7.5.  P. 13 Revisions changed to List of amendments  App. I. changed to Service difficulty report  App. II. Equipment List deleted.</p>	<p>i  2-1  2-3, 2-4  2-9  2-16, 2-17  3-6  4-25  13-1  1  2</p>	



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6	20-Nov-08	all. Paragraph sequence changed, task classification and level of certification matched with CTLS requirements Inserted new procedures: 5.4 Engine Mount Inspection; 4.2.2.9.4 Main Wheel Tube - Tire Change .	all	

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# 1 General

This maintenance and inspection procedures manual provides all standard maintenance and inspection procedures needed to keep the aircraft airworthy. This manual also states the certification requirements for the persons performing each task. Maintenance tasks exceeding the scope of this manual are possible but require prior coordination with and approval by the manufacturer.

The Flight Design CTSW is a three-axis control, high-wing, and two seats light sport aircraft of normal scheme with a cruciform tail. The primary structures are made of carbon fiber reinforced plastic. The aircraft is equipped with an all-moving stabilizer with a trim tab and tricycle landing gear with a steerable nose-wheel.

Federal rules require minimum certification levels of the mechanics performing individual maintenance tasks on an S-LSA aircraft to be defined by the airframe manufacturer. Refer to Paragraph 2 for the definition of the levels of certification applied throughout this manual. On each individual task you will find the allocation of level of certification.

**WARNING:** Use only alkali-free products when cleaning your composite aircraft. For more information, refer to Paragraph 1.3 Care and Cleaning of your CTSW.

## 1.1 Manufacturer

Flight Design GmbH  
Sielminger Str. 51  
D – 70771 L.-Echterdingen  
Germany

## 1.2 Contact in USA

Flight Design USA  
P.O. Box 325  
South Woodstock, CT. 06267  
860-963-7272  
[airworthiness@flightdesignUSA.com](mailto:airworthiness@flightdesignUSA.com)



### 1.3 Care and cleaning of your CTSW

Care must be taken when cleaning modern aircraft built with composite materials. Many products have been developed to clean a specific type of material and may be unsuitable or even damaging to others. Using the wrong product may damage your aircraft or its structures. Affected parts may be plainly visible or may be hidden from view. The type of damage can vary from the simply unsightly to the outright dangerous. You must always read the instructions for your cleaning products before using them. If you should have any questions about a product's suitability please contact your local dealer.

Each structure has its own cleaning requirements.

#### The basic airframe and wing structure

Composite aircraft are typically constructed of a sandwich of a structural material (Fiberglass-Carbon Fiber or Kevlar) over a foam core.

The Flight Design CTSW is made up of a Carbon fiber-foam-Carbon fiber and Kevlar laminate sandwich which is filled with polyester filler, sanded and painted with two-part urethane paint. The foam core of the wings is partially Rohacell foam which was chosen for its stiffness and resistance to fuel. The fuselage core is Airex foam which allows the contours for the CTSW fuselage. The stabilizer core again is widely Rohacell.

The Rohacell foam, while highly resistant to fuel and with excellent mechanical properties, is not resistant to strong Alkali cleaners or even water with very high alkali content. Therefore Flight Design requires that the cleaners used on the CTSW be PH neutral. Cleaners, such as Fantastik®, Formula 409®, Carbonex® and Castrol Super Clean®, which are otherwise good Alkali cleaning products, should not be used on the CTSW.

The use of this category cleaner can dissolve the foam core of the sandwich leaving a dented looking area that must be repaired and re-painted. Please note that the wing spars of the CTSW are sealed in epoxy and fiberglass and cannot be damaged in this manner.

#### The windshield and side windows

The windows of the CTSW are tinted, heat molded acrylic (also known as Plexiglas®). While durable, they must be carefully cleaned to avoid scratching the surface. Never use an abrasive pad, abrasive pastes or even dirty rags when cleaning the window surfaces. Always flush the window surface with water to remove as much dust and dirt before using an aircraft window specific cleaner or a plastic cleaner approved for cleaning acrylic windshields.

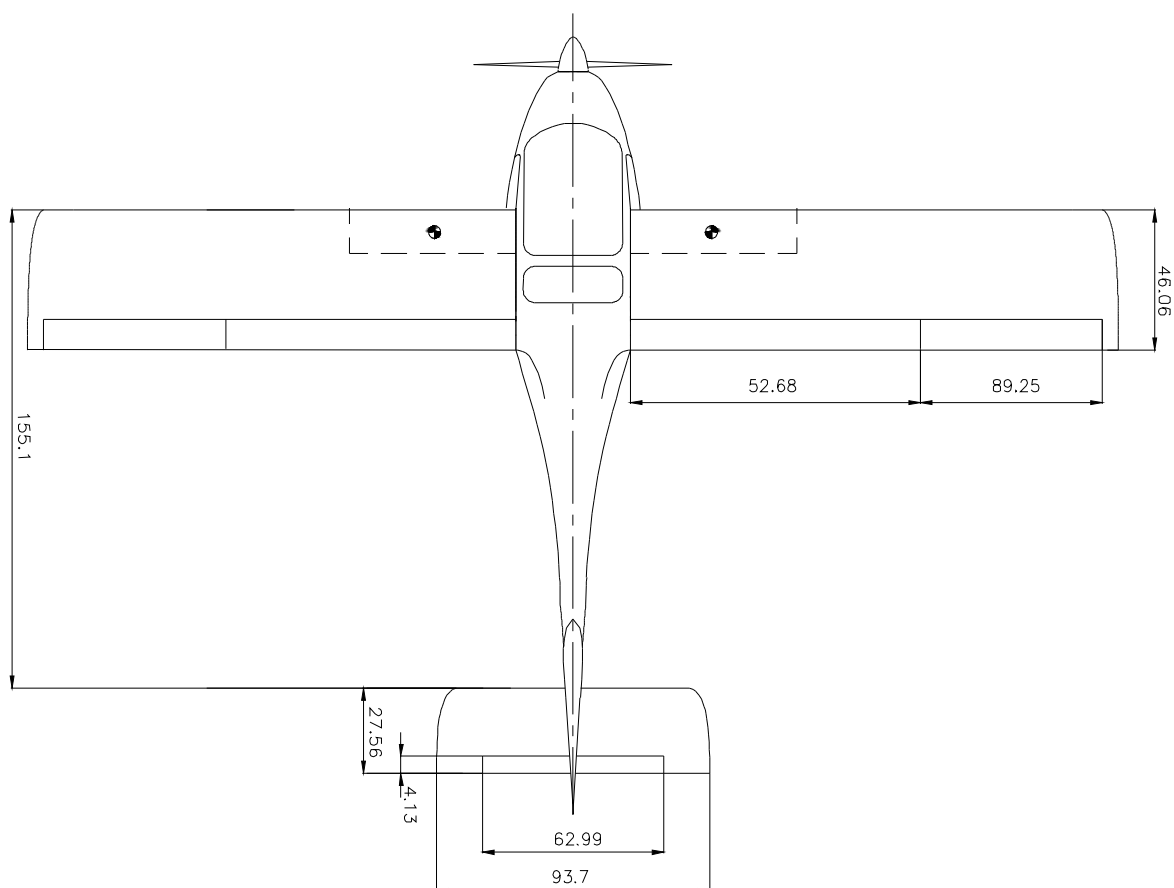
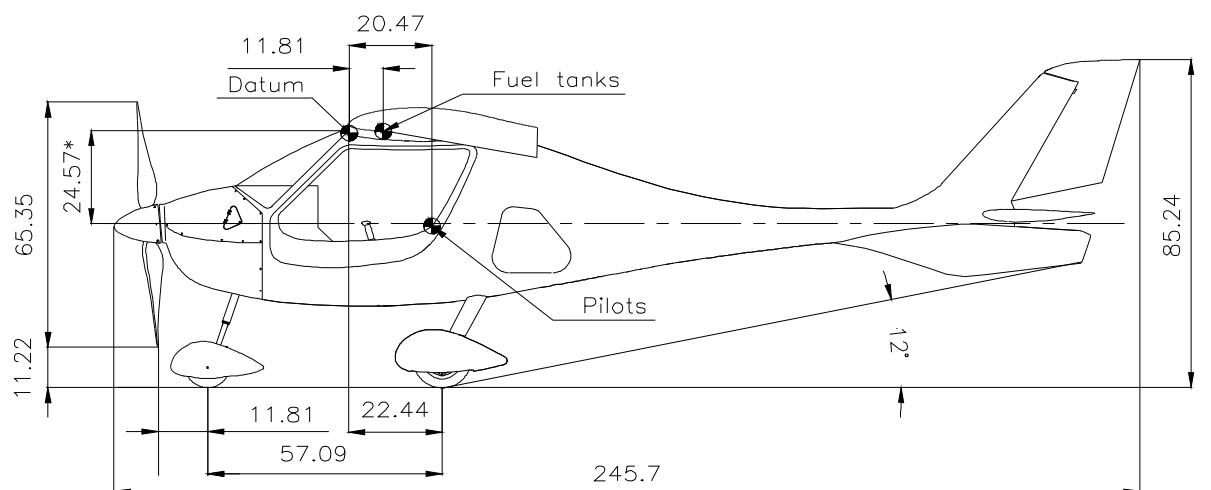
When polishing the windshield or side windows never polish in a circular motion, this creates a halo affect when looking into the sun. Always use horizontal or vertical pattern.

#### The engine and engine compartment

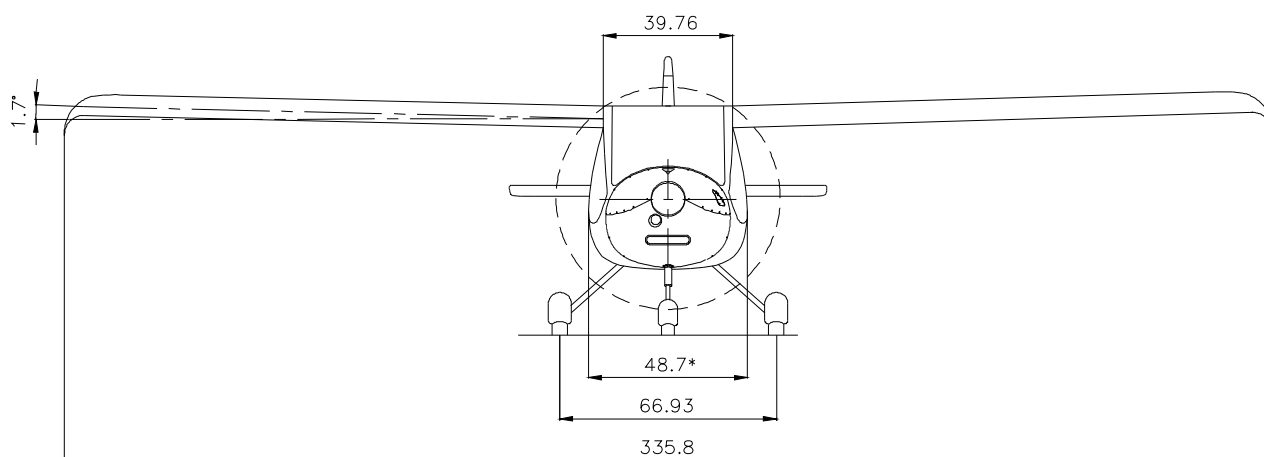
The Rotax 912 maintenance manual recommends the use of a commercially available cold cleaning agent. Some citrus based products have been found to be suitable. However, always read the instructions for any product to be used, keeping in mind that it must be compatible with both the engine components and the airframe structures.

## 1.4 Views, dimensions

**CTSW,**  
**inches**



## CTSW, inches

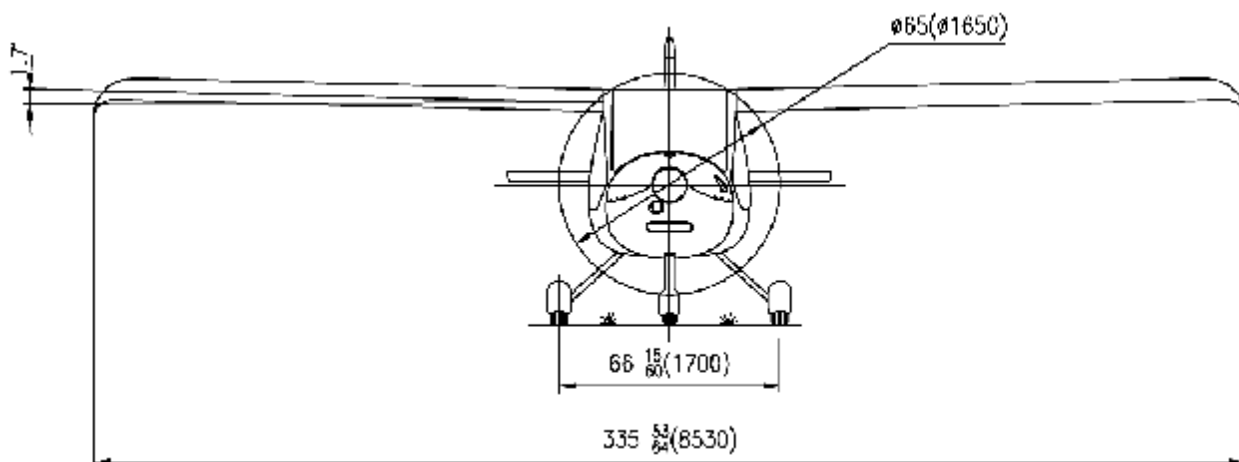


Geometry		
Max. length	6212 mm	20 ft 5 in
Max. height	2165 mm	7 ft 1 in
Cabin width	1230 mm	4 ft 4 in
Wing span	8530 mm	28 ft 0 in
Areas		
Wing	9.98 m <sup>2</sup>	107.43 sq ft
Stabilizer	1.60 m <sup>2</sup>	17.20 sq ft
Vertical tail	1.21 m <sup>2</sup>	12.98 sq ft
Aspect ratios		
Wing	7,29	
Stabilizer	3,38	





## CTSW-2006 / CTSW Classic / CTSW Advanced, inches (mm)



Geometry		
Max. length	6212 mm	20 ft 5 in
Max. height	2165 mm	7 ft 8 in
Cabin width	1230 mm	4 ft 4 in
Wing span	8530 mm	28 ft 0 in
Areas		
Wing	9.98 m <sup>2</sup>	107.43 sq ft
Stabilizer	1.60 m <sup>2</sup>	17.20 sq ft
Vertical tail	1.32 m <sup>2</sup>	14.21 sq ft
Aspect ratios		
Wing	7,29	
Stabilizer	3,38	



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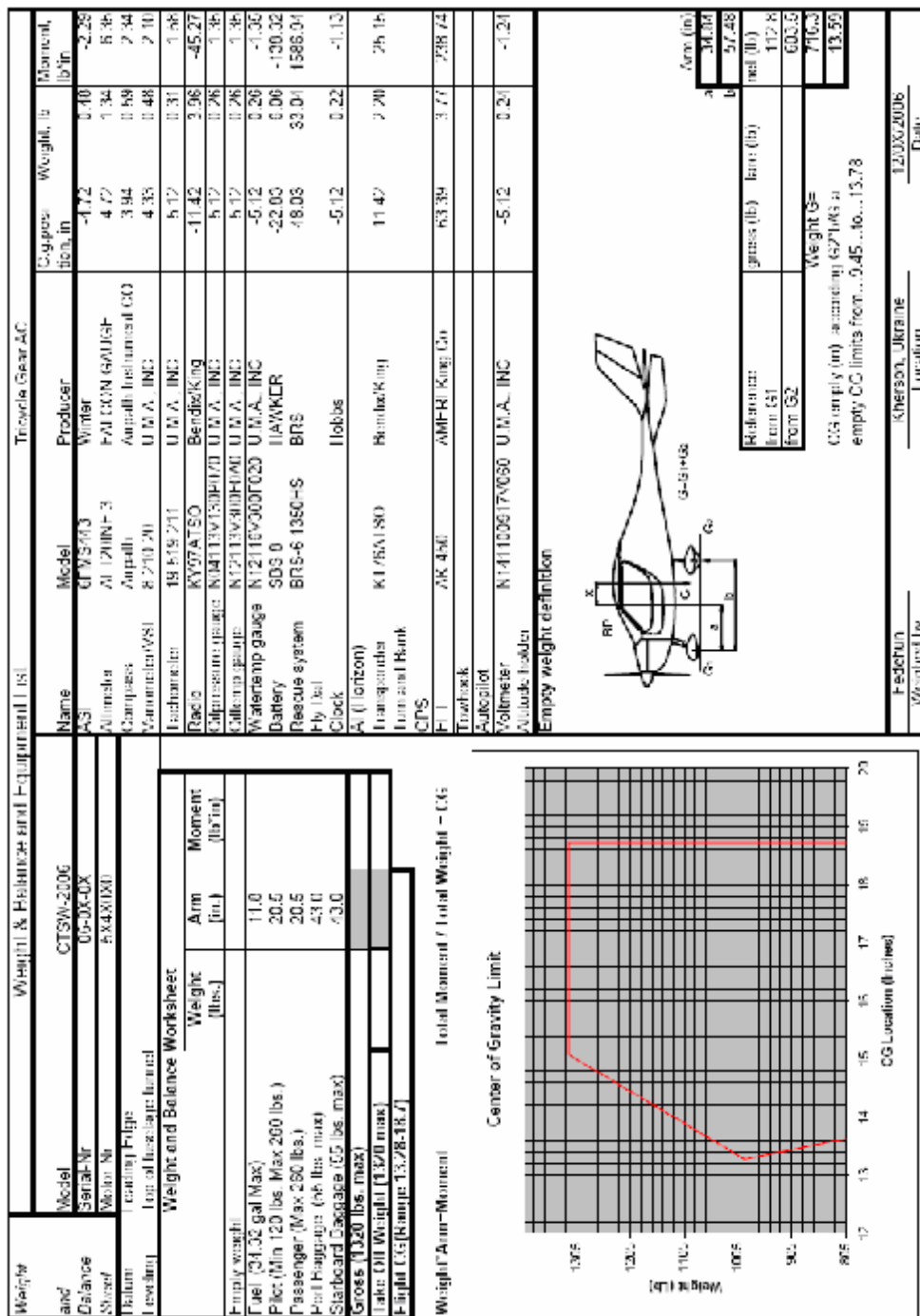
### 1.5 Construction Materials

The airframe is made of high-quality composite materials which permit excellent aerodynamic characteristics to be achieved at an efficient structural mass. Due to the strict mass regulations for ultra-light aircraft, re-inforced carbon and aramide fiber materials predominate.

Due to the complex nature of composite materials and the necessary knowledge in the lay-up of a specific structure, repair work on the composite airframe may only be undertaken by a qualified facility. For this reason, only general information about the materials used is given in this handbook. Should the aircraft structure be damaged, detailed information should be requested from the manufacturer.

Carbon, aramide, glass fiber:	various qualities Lange & Ritter, Gerlingen
Resin and hardener:	Larit L 285 Lange & Ritter, Gerlingen
Core material:	Rohacell, Airex various qualities Lange & Ritter, Gerlingen
Screws and bolts:	unless otherwise stated, class 8.8 zinc-plated or stainless steel, according to DIN standard

## 1.6 Equipment List





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### 1.7 Source to Purchase Parts

Spare parts can be ordered from Flight Design USA ([www.flightdesignusa.com](http://www.flightdesignusa.com)) using the Parts and Assemblies Manual delivered with each aircraft.

### 1.8 List of Disposable Replacement Parts

Air filter	Air filter C2039, Art. C9997770
Fuel filter	Fuel Filter 5/16", Art C9997813G
Oil filter	Oil filter – according to Rotax maintenance manual
Front wheel	Tire 4.00-4" UNION Tire 4.00-4" 6PR Kenda  Tube 3.00-4" with straight valve Tube 4.00-4" with straight valve
Main wheel	Tire 4.00-6 BfGoodrich 4PR PowerHoby Tire 4-ply 4.00 - 6" /4 PR V-5501 TT (B11) Tire 6PR Sava 4.00-6 6PR B11  Tube 3.50-6" not certified Tube 4.00-6 Pn TR13 Tube Sava, 3.5.00-6 38G11.5, 6 ply
Tundra front wheel	Tube 4.00-6 Pn TR13 or Tire 4.00-6 BfGoodrich 4PR PowerHoby
Tundra main wheel	Tire 4-ply 6,00-6" Air TRAC (420x140) or Tire 4-ply 6,00-6" Air TRAC
Batteries	Battery Powersafe SBS 8 or Battery Cyclon
Brake Assemblies	Master brake cylinder, Art C9997205L
	O-Ring set for master brake cylinder
	Brake pads for magnesium caliper, Art C9997214D
	Aeroshell fluid 41 MIL-H-5606 Brake Fluid
	Brake disk, Art C9997206M
	Caliper, Art C9997205K
Sparkplugs	Ignition plug - according to Rotax maintenance manual



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### 1.9 Weight and Balance Information

Maximum take off weight: 1320 lbs 600 kg

Typical empty weight: 683 lbs 310 kg

Typical useful load: 622 lbs 290 kg

Maximum weight per seat: 260 lbs 118 kg

Maximum baggage weight per side: 55 lbs 25 kg

Maximum fuel load (34 gal): 205 lbs 93 kg

Minimum single pilot weight: 120 lbs 54 kg

The acceptable empty center of gravity range is 11.1 to 18.82 inches / 282-478 mm behind the leading edge of wing.

Weighing:

The airplane is to be put on a level space on three scales or one scale with leveling blocks.

Make certain the plane is leveled using a bubble level put onto the tunnel between the seats.

The location of wheels is marked on the ground by a plumb.

The loaded center of gravity is located behind the leading edge of wing. Spanwise location of the datum is not important, as the wings are rectangular and un-tapered.

Important:

While determining the loaded center of gravity the aircraft must be leveled.

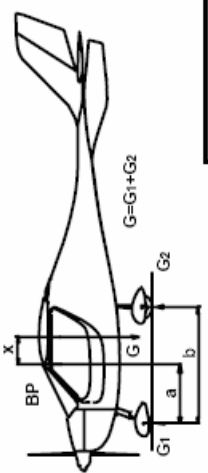
A Weight and Balance Sheet supplied with each plane. The example of it is shown below.

Weight & Balance and Equipment List				Tricycle Gear AC			
Weight and Balance Sheet	Model	Name	Model	Producer	C.g. position, in	Weight, lb	Moment, lb*in
Serial-Nr	CTSW-2006	ASI	6FMS443	Winter	-4.72	0.48	-2.29
Motor-Nr	08-0X-0X	Altimeter	ALT20INF-3	FALCON GAUGE	-4.72	1.34	-6.35
Leading Edge	5X4X0X0	Compass	Airpath	Airpath Instrument CO	-3.94	0.59	-2.34
Leveling:	Top of fuselage tunnel	Variometer/VSI	8-210-20	U.M.A., INC	-4.33	0.48	-2.10
		Tachometer	19-519-211	U.M.A., INC	-5.12	0.31	-1.58
		Radio	KY97ATSO	Bendix/King	-11.42	3.96	-45.27
		Oilpressure gauge	N04113V130P070	U.M.A., INC	-5.12	0.26	-1.35
		Oiltemp gauge	N12113V300F0A0	U.M.A., INC	-5.12	0.26	-1.35
		Watertemp gauge	N12116V300F020	U.M.A., INC	-5.12	0.26	-1.35
		Battery	SBS 8	HAWKER	-22.83	6.06	-138.32
		Rescue system	BRS-6 1350HS	BRS	48.03	33.04	1586.94
		Fly.Dat					
		Clock		Hobbs	-5.12	0.22	-1.13
		AI (Horizon)					
		Transponder	KT76ATSO	Bendix/King	-11.42	2.20	-25.15
		Turn and Bank					
		GPS					
		ELT	AK-450	AMERI-King Co	63.39	3.77	238.74
		Towhook					
		Autopilot					
		Voltmeter	N141100917V060	U.M.A., INC	-5.12	0.24	-1.24
		Altitude holder					
Empty weight definition							

Weight and Balance Worksheet			
	Weight (lbs.)	Arm (in.)	Moment (lb*in)
Empty weight			
Fuel (34.32 gal Max)		11.8	
Pilot (Min 120 lbs. Max 260 lbs.)		20.5	
Passenger (Max 260 lbs.)		20.5	
Port Baggage (55 lbs. max)		43.0	
Starboard Baggage (55 lbs. max)		43.0	
Gross (1320 lbs. max)			
Take Off Weight (1320 max)			
Flight CG (Range 13.28-18.7)			

**Weight\*Arm=Moment**

**Total Moment / Total Weight = CG**

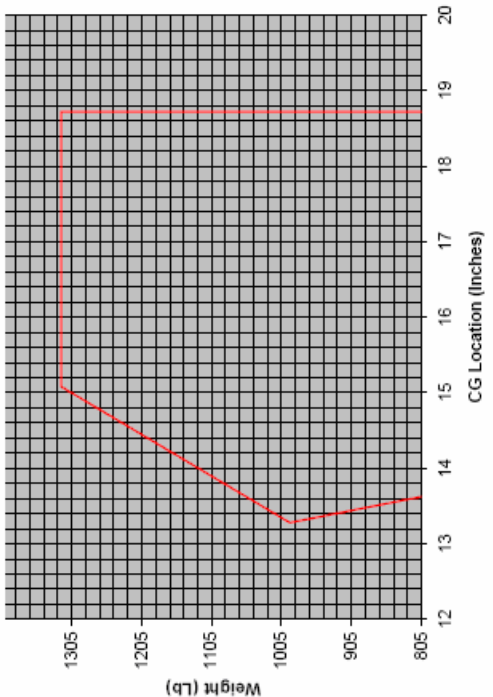


BP  
x  
G  
G1  
G2  
a  
b  
G=G1+G2

Reference	gross (lb)	tare (lb)	Arm (in)
from G1			a
from G2			b
			net (lb)
			112.8
			603.5
			716.3
			13.59

Weight G=  
CG empty (in) according G2\*b/G-a=  
empty CG limits from...9.45...to...13.78

**Center of Gravity Limit**



Weight (lb)  
CG Location (inches)

**Weighted by** Fedchun **Location** Kherson, Ukraine **Date** 12/0X/2006

**Note:** Sample weight and balance sheet only; not valid for the actual aircraft.



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### 1.10 Tire Inflation Pressure

Main wheels: 29 PSI / 2 bar

Nose wheel: 29 PSI / 2 bar

### 1.11 Approved Fluids and Capacities

Quality automotive motor oil as specified by the engine manufacturer has to be used. The engine is not approved for aircraft motor oil.

Allowed viscosities are listed in Paragraph 10 of the Engine Operator's Manual for all versions of ROTAX 912.

Do not use oil additives.

Oil capacity: 6,4 liq pt – min. 4,2 liq pt / 3 l – min. 2 l

Oil consumption: max. 0.13 liq pt/h / 0,06 l/h

The fuel valve is purely on / off and has to be in the appropriate maximum position. This engine does not have a mixture valve or require leaning.

Fuel content: (2 wing fuel tanks for 65 l) 34 U.S. gal / 130 l

Maximum fuel available: 33 U.S. gal / 124 l

Fuel consumption: max 7 U.S. gal/h / 27 l/h

Fuel specification: Premium Automotive Unleaded that conform to ASTM D 4814

Minimum AKI 91 for Rotax 912 ULS or AVGAS 100 LL.

Cooling fluid: Cooling fluid in accordance with the Rotax Engine Operation Manual has to be selected.

Attention: different coolants cannot be mixed! If in doubt, drain the complete coolant content and replace completely with new coolant of one type.

**Warning:** Due to its high lead content AVGAS has a detrimental effect on valve seating and causes greater deposition in the combustion chamber. It should thus only be used if fuel vapor or octane problems arise or if MOGAS is not available.

**Warning:** When using AVGAS particular attention must be paid to type of oil used. For details refer to the valid version of the ROTAX engine manual.

**Warning:** When using Auto fuel particular attention must be paid to Ethanol content. For details refer to Flight Design Service Notification SN-ASTM CT\_06 en.

**Warning:** Engine relevant data given here is not complete. For complete information refer to the current version of the relevant engine manual from the Rotax company.

Braking fluid: Aeroshell Fluid 41 MIL-H-5606 Brake Fluid

## 1.12 Recommended Fastener Torque Values and Bolts Installation

### ATTENTION!

All bolts has to be mounted up to down, inside to outside or front to aft, unless explicitly stated otherwise.

Bolt	Bolt M5 DIN 912-8.8	Bolt M6 DIN 912-8.8	Bolt M8 DIN 912-8.8	Bolt M5 DIN 7991-8.8 (countersunk)	Bolt M6 DIN 7991-8.8 (countersunk)
	Bolt M5 DIN 931 -8.8	Bolt M6 DIN 931 -8.8	Bolt M8 DIN 931 -8.8		
	Bolt M5 DIN 933 – 8.8	Bolt M6 DIN 933 – 8.8	Bolt M8 DIN 933 – 8.8		
Nut	Nut M5 DIN 985-8,8	Nut M6 DIN 985-8,8	Nut M8 DIN 985-8,8	Nut M5 DIN 985-8,8	Nut M6 DIN 985-8,8
Recommended Torques for class 8.8 (ISO 898) fasteners	52 lb-in 5.9 N*m	89 lb-in 10 N*m	222 lb-in 25 N*m	52 lb-in 5.9 N*m	89 lb-in 10 N*m
For areas with thick bonding seams (cotton + cab-o-sil + resin + hardener)	49 lb-in 5.5 N*m	80 lb-in 9 N*m	200 lb-in 22.5 N*m	40 lb-in 4.5 N*m	71 lb-in 8 N*m
Parts of PVC	49 lb-in 5.5 N*m	80 lb-in 9 N*m	200 lb-in 22.5 N*m	49 lb-in 5.5 N*m	80 lb-in 9 N*m
Carbon fabric composite packages assemblies	49 lb-in 5.5 N*m	80 lb-in 9 N*m	200 lb-in 22.5 N*m	49 lb-in 5.5 N*m	80 lb-in 9 N*m
Plywood bonded into composite	40 lb-in 4.5 N*m	71 lb-in 8 N*m	160 lb-in 18 N*m	31 lb-in 3.5 N*m	62 lb-in 7 N*m
Glass fiber composite packages	49 lb-in 5.5 N*m	80 lb-in 9 N*m	200 lb-in 22.5 N*m	49 lb-in 5.5 N*m	80 lb-in 9 N*m
Metal parts assemblies (steel, stainless steel, aluminum alloys)	53 lb-in 6 N*m	89 lb-in 10 N*m	222 lb-in 25 N*m	53 lb-in 6 N*m	89 lb-in 10 N*m

As long as not stated otherwise within this manual, for bolts using standard nuts, or bolts otherwise unsecured, Loctite must be applied. Middle strength loctite is to be used when bolts are mounted to plastic components.

In all cases, used self locking nuts (with plastic locking ring) must be exchanged after new ones at any time.



## 1.13 General Safety Information

### ATTENTION!

During all service and repair work beware of activating the Ballistic Parachute system rocket!

While running the engine on the ground, keep away from the propeller.

An accidental engine start is very dangerous! Ensure that the Ignition Switch C9997199 and main switches [Pushbutton Thermal, 30A C9997190B, Pushbutton Thermal 109S, 25A C9997190 (Fig. 1)] are turned off!



Fig. 1



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### ***1.14 Instructions for Reporting Possible Safety of Flight Concerns Found During Inspection / Maintenance***

To report possible safety of flight concerns forward to [airworthiness@flightdesignusa.com](mailto:airworthiness@flightdesignusa.com) information as follows:

Owner (or contact person)  
Inspector  
Aircraft Make/Model and S/N  
Engine Make/Model and S/N  
Date of inspection  
TT Airframe  
TT Engine  
Description of the un-airworthy items found

or by writing:

#### **Flight Design USA**

Woodstock Airport  
91 Route 169,  
P.O. Box 325,  
South Woodstock, CT. 06267  
USA

[e-mail:flightdesignusa@rcn.com](mailto:e-mail:flightdesignusa@rcn.com)  
[www.flightdesignusa.com](http://www.flightdesignusa.com)

using Service Difficulty Report Form (Appendix I).

Preferably send an appropriate check list to the same address.



## 2 Minimum Levels of Certification:

### 2.1 General

For each task listed in the maintenance manual, a minimum level of certification is specified. For example: Owner/Pilot, RLSA-M and A&P.

Where a minimum level of certification is specified, the implication is that an individual who holds a Light Sport Repairman certificate with a maintenance rating (listed here as a RLSA-M) may perform any task with the minimum level of competency listed as "Owner/Pilot", and an A&P may perform any task where the minimum level of competency is listed as Owner/Pilot, or RLSA-M.

Minimum levels of certification do not preclude the need for additional or task specific training. As a general rule, additional or task specific training is required for heavy maintenance tasks and is required on a case by case basis for line maintenance tasks. The requirement for additional or task specific training will be listed where applicable throughout the manual.

**Note:** Some tasks may require additional or task specific training for an RLSA-M but not for the holder of an A&P certificate.

### 2.2 Levels of certification

Levels of certification used in this manual are:

**Owner/Pilot:** The owner of an aircraft who holds a pilot certificate but who has not received any specific authorized training. Note: FAA regulations authorize SLSA aircraft owners who hold at least a sport pilot certificate to perform maintenance as outlined in 14CFRPart43.

**RLSA-M:** The holder of a LSA Repairman certificate with a maintenance rating. This is generally considered the minimum level of certification to perform line maintenance of LSA.

**A&P:** An Airframe and Powerplant mechanic as defined by 14 CFR Part 65 in the U.S. or equivalent certification in other countries.

For and questions or comments regarding maintenance procedures or minimum levels of certification, email Flight Design USA at [airworthiness@flightdesignusa.com](mailto:airworthiness@flightdesignusa.com).



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## 2.3 Required certification level for maintenance procedures

In accordance with applicable standards, the requirements for minimum levels of certification and task specific training are listed through out this manual. The following table provides an overview on the allocation of certification levels through out this manual.

Para.	Procedure		Minimum Level of Certification		
			Owner/Pilot	RLSA-M	FD Training
<b>4</b>	<b>Structures</b>				
<b>4.1</b>	<b>Wing</b>				
	4.1.2	Wing installation and removal		Ä	+
<b>4.2</b>	<b>Nose Landing Gear</b>				
	4.2.1.4	Nose Landing Gear Inspections	I		
	4.2.1.5	Nose Gear Removal		Ä	
	4.2.1.6	Nose Wheel	I		
<b>4.2.2</b>	<b>Main Landing Gear</b>				
	4.2.2.4	Inspection	I		
	4.2.2.5	Main Wheel Fairing Removal	I		
	4.2.2.6	Main Wheel Removal	I		
	4.2.2.7	Main Strut Fairing Removal		Ä	
	4.2.2.8	Main Gear Struts Removal		Ä	+
	4.2.2.9	Wheel Inspection and Maintenance	I		
<b>4.2.3</b>	<b>Brake System</b>				
	4.2.3.3	Inspection	I		
	4.2.3.4	Filling Brake System with Fluid		Ä	
	4.2.3.5	Brake Pads Replacement		Ä	
<b>4.3</b>	<b>Flight Controls</b>				
<b>4.3.1</b>	<b>Aileron</b>				
	4.3.1.5	Inspection		Ä	
	4.3.1.6	Aileron Installation		Ä	+
	4.3.1.7	Aileron Adjustment		Ä	+
<b>4.3.2</b>	<b>Flaps</b>				
	4.3.2.4	Inspection	I		
	4.3.2.5	Flap Installation		Ä	+
	4.3.2.6	Flap Adjustment		Ä	+
	4.3.2.7	Inspection of Flap Controller Microswitches		Ä	
<b>4.3.3</b>	<b>Rudder</b>				
	4.3.3.3	Rudder Installation		Ä	
	4.3.3.4	Rudder Deflection Adjustment		Ä	+
<b>4.3.4</b>	<b>Stabilizer</b>				
	4.3.4.4	Stabilizer Installation		Ä	
	4.3.4.5	Stabilizer Adjustment		Ä	+
	4.3.4.6	Balancing of Stabilizer Balancer		Ä	+
<b>4.4</b>	<b>Structural Repair</b>			Ä	+
<b>4.5</b>	<b>Painting and Coating</b>			Ä	+
<b>5</b>	<b>Engine</b>				
	5.1	Engine Systems and Accessories	case dependent		
	5.2	Rotax 912 Engine	case dependent		
	5.3	Carb Heat Control		Ä	
	5.4	Engine Mount Inspection.		Ä	



# Maintenance and Inspection Procedures Manual

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Para.	Procedure		Minimum Level of Certification		
			Owner/Pilot	RLSA-M	FD Training
<b>6</b>	<b>Fuel System</b>				
	6.4	Fuel System Inspection	<b>I</b>		
	6.5	Fuel Flow Check		<b>A</b>	<b>+</b>
	6.6	Intake Filter Inspection		<b>A</b>	
	6.7	Vent Manifold / Fuel Tank Cap		<b>A</b>	
	6.8	Fuel Filter Inspection		<b>A</b>	
	6.9	Gascolator Inspection		<b>A</b>	
<b>7</b>	<b>Propeller</b>			<b>A</b>	
<b>8</b>	<b>Utility Systems</b>				
	8.3	Inspection of Cabin Heat System	<b>I</b>		
<b>9</b>	<b>Instruments and Avionics</b>				
	9.3	Instrument maintenance		<b>A</b>	
	9.4	Inspection of Pitot and Static System	<b>I</b>		
<b>10</b>	<b>Electrical System</b>				
	10.3.1	Inspection	<b>I</b>		
	10.4	Battery Replacement	<b>I</b>		

Where listed, "FD Training" indicates the requirement for Flight Design task specific training. Flight Design task specific training may consist of one, or a combination of the following:

1. An approved Flight Design maintenance training course,
2. Individual training provided by a Flight Design representative
3. Training via multi-media or electronic means.

**Note:** For certificated persons such as an A&P, RLSA-M or persons working under the auspices of a Repair Station, prior experience will be considered when determining the training required.

Important: Participation in training described in this manual shall not be construed as an implicit authorization by Flight Design to perform inspections or repairs beyond the limitations set forth in the applicable regulations of the governing aviation authority.



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### 3 Aircraft Inspections

The following pages contain checklists suitable for performing periodic aircraft inspections of the Flight Design CTSW.

**Note:** The ROTAX 912 Maintenance Manual contains a periodic maintenance schedule for the 912 ULS engine.

Engine checks at 100hour according to Rotax maintenance manual are highly recommended to be conducted on time out of safety reasons.

Condition inspection checklist

Owner's Name: \_\_\_\_\_

Inspector's Name: \_\_\_\_\_

Aircraft Make/Model: Flight Design CT / \_\_\_\_\_. S/N: \_\_\_\_\_.

Engine Make/Model: \_\_\_\_\_. S/N: \_\_\_\_\_.

Date of Inspection: \_\_\_\_\_

TT Airframe: \_\_\_\_\_

TT Engine: \_\_\_\_\_



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### 3.1 Aircraft Records

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Aircraft logbooks.</b> Determine total times, times since overhaul and times since last required or recommended maintenance checks and record on Inspection Coversheet.			RLSA-M
<b>Check Continued Airworthiness Information.</b> Check Safety Directives (SD), Airworthiness Directives (AD), Service Bulletins (SB) and Safety Alerts (SA) which may need to be complied with at the time of the inspection.			RLSA-M
<b>Aircraft records.</b> Check for presence and condition of aircraft federal registration form and airworthiness certificate.			RLSA-M
<b>Aircraft Operating Instructions (AOI).</b> Check AOI revision number to be actual, Equipment List and latest Weight and Balance information.			RLSA-M

### 3.2 Run-up

Run-up shall be done prior to any inspection.

Run-up shall at least take long enough to bring all temperatures to levels acceptable for takeoff.

[illegible]





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## 3.3 Post-Run-up

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Engine cowling.</b> Remove engine cowling.			RLSA-M
<b>Engine oil.</b> Check the level of oil and follow the Operator's Manual for all versions of ROTAX 912.			RLSA-M
<b>Exterior lights.</b> Check operation of landing lights (if applicable), position lights, and strobe lights.			RLSA-M
<b>Interior lights.</b> Check operation of interior lights (if applicable).			RLSA-M
<b>Flight controls.</b> Check for smooth operation of all flight controls with flaps in retracted and extended positions. Leave flaps in the full up position when checks are completed.			RLSA-M
<b>Door apertures protection.</b> Check protection for wearing and flanges for cracks.			Owner/Pilot
<b>Rudder neutral position system.</b> Check operation.			RLSA-M
<b>Environmental Control System (ECS).</b> Check operation of the door window vents.			Owner/Pilot
<b>Trim tab.</b> Check trim tab position and indicator reading.			RLSA-M
<b>Brake System.</b> Check wheel chocks and disks for wearing. Check the level of fluid in the hydraulic system. Inspect the protection PVC hoses in the places where brake lines go through the fuselage skin			Owner/Pilot
<b>Battery.</b> Fully charge and clean up the battery surface and cables. Check the battery for reliable contact with the cables.			Owner/Pilot
<b>Fairings, access panels, seats, carpets, covers, and spinner.</b> Remove for inspection to ensure access. Check for missing or unscrewed bolts and nuts.			RLSA-M



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### 3.4 Propulsion System

CTSW Inspection and/or Required Maintenance Checklist	100 hour	Annual	Minimum Level of Certification
<b>Cleaning.</b> Clean the engine as required in the Maintenance Manual for ROTAX Engine Type 912 Series.	*		Owner/Pilot
<b>Engine.</b> Inspect all systems as required in the Maintenance Manual for ROTAX Engine Type 912 Series.	*		Owner/Pilot
<b>Induction system.</b> Check connection of manifolds between Air filter box and carburetors. Check the carburetor heater choke in the Air filter box for operating. Check for fuel leakage nearby carburetors.			Owner/Pilot
<b>Induction air filter.</b> Inspect for cleanliness and condition of sealing surfaces. Replace filter, if damaged.			Owner/Pilot
<b>Cabin Heater.</b> Check clamps and heater attachments. Check the manifold for holes and attachments.			RLSA-M
<b>Exhaust system.</b> Inspect entire system for cracks, and security.			RLSA-M
<b>Throttle Operation.</b> Check operation of throttle and choke controls. Ensure levers hit stops before cables reach end of travel.			RLSA-M
<b>Fuel sight gages.</b> Inspect for security and presence of fuel leakage. When hoses get coloured due to fuel additives and fuel level becomes difficult to read, they must be exchanged.			RLSA-M
<b>Fuel valve and distribution lines.</b> Inspect for evidence of fuel leakage. Inspect distribution lines for cracks, and signs of leakage.			Owner/Pilot
<b>Fuel Filter.</b> Change fuel filter behind lower instrument panel at least every 200 hrs.			RLSA-M
<b>Gascolator.</b> Open gascolator, remove filter and check for cleanliness. Clean filter and re-install.			Owner/Pilot
<b>Fuel lines.</b> Inspect all flexible fuel hoses for routing, chafing, security, and signs of leakage.			RLSA-M
<b>Fire Protection Hoses.</b> Check for condition and integrity on all fuel and oil lines inside the engine compartment.			RLSA-M
<b>Fuel Flow Rate.</b> Check fuel flow rate to be correct every 100 hrs. Compare value with previous value. In case of significant variations or too little flow refer to Paragraph 6 of the Maintenance Manual.			RLSA-M
<b>Spinner.</b> Inspect for cracks, security to propeller. Clean inside of spinner.			Owner/Pilot
<b>Propeller hub.</b> Inspect for cracks, corrosion. Re-torque all mounting nuts, if loss of torque is suspected on any nut.			RLSA-M
<b>Propeller blades.</b> Inspect for play, dents, nicks, cracks, corrosion, pitting, and leading edge erosion.			Owner/Pilot
<b>Engine cowlings.</b> Inspect for cracks, chafing, heat damage, and delamination, evidence of exhaust leakage, condition of fastening system, and condition of paint.			Owner/Pilot
<b>Firewall.</b> Inspect for cracks, buckling, and other signs of damage. Inspect all items attached to firewall for security.			Owner/Pilot

\* - Engine checks at 100hour according to Rotax maintenance manual are highly recommended to be conducted on time out of safety reasons.



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CTSW Inspection and/or Required Maintenance Checklist	100 hour	Annual	Minimum Level of Certification
<b>Landing and taxi lights.</b> Inspect for cracks, security of mounting, and cleanliness and condition of lens cover. Operate landing lights in a dark area and ensure that lights are properly aimed. If lights are not properly aimed, adjust as required.			Owner/Pilot
<b>Engine mount.</b> Lift up the nose landing gear off of the ground and inspect for cracks, corrosion, loose hardware, chafing by cables, wires, hoses, etc., and make sure that any flexing item is secured to the engine mount. Check torque of engine attachment bolts to be 25.8 lb.ft (35 Nm) or integrity of safety wire, whichever is applicable (refer to Paragraph 5.4)			RLSA-M
<b>Engine isolators.</b> Inspect for general condition and signs of loose bolts.			Owner/Pilot
<b>Battery attachment.</b> Inspect for security of mounting and condition. Ensure vent holes are clear.			Owner/Pilot
<b>Foreign objects.</b> Check engine compartment for foreign objects.			Owner/Pilot

### 3.5 Fuselage

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Skin surface.</b> Inspect for obvious latent signs of damage, including cracks, holes, buckling. Check drain holes for obstructions. Check condition of paint and cleanliness.			Owner/Pilot
<b>Placards.</b> Inspect for presence and condition.			Owner/Pilot
<b>Windows.</b> Inspect for cleanliness, condition, and bonding. Check door windows for scratches, cracks. Check door vents operating.			Owner/Pilot
<b>Cabin doors.</b> Inspect for operating and fit. Inspect skin, hinges, gas struts, latching mechanisms, and door seals. Lubricate hinges and all moving parts.			RLSA-M
<b>Baggage door.</b> Inspect for operating and fit. Inspect door skin, seal, hinge, and latching mechanism. Lubricate all moving parts.			RLSA-M
<b>Static Port.</b> Check static port for evidence of obstructions. Caution: Do not apply compressed air to the system, since this will result in damage to the static air flight instruments			RLSA-M
<b>Antennas.</b> Inspect for security and condition.			RLSA-M
<b>Aircraft identification tag.</b> Inspect for security and legibility.			RLSA-M
<b>Fin.</b> Inspect fin for visible damage and evidence of latent damage. Inspect hinge attach points for security and condition.			Owner/Pilot
<b>Underfin.</b> Inspect underfin for visible damage and evidence of latent damage. Inspect attach points for security and condition.			Owner/Pilot



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### 3.6 Wings

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Wing Attachment Area.</b> Inspect wing spar and main bolt bushings for cracks and debonding. Check visible attaching hardware for loss of torque. Inspect aileron bellcranks for cracks and corrosion. Check root rib pins for debonding and cracks, and the forward one for fuel leak. <b>Check each 600 hrs or at the next 100 hrs inspection after 2 years, whichever occurs first.</b>			RLSA-M
<b>Fuel Tanks.</b> Check wing leading edge for cracks and for fuel leak. Inspect outer skin in tank area for signs of fuel leakage. Inspect within visible area of the fuel tank for foreign objects. Inspect the fuel cap vents for obstruction, connections for leaks. Check fuel flow through the gascolator. For more detailed instruction see Paragraph 6, Fuel System.			Owner/Pilot
<b>Fuel filler and caps.</b> Inspect for proper locking, condition of o-ring and filler, and presence and legibility of placards.			Owner/Pilot
<b>Fuel Intake Filter.</b> Check intake filter every 1000 hrs or after negative fuel flow test.			Owner/Pilot
<b>Fuel contamination test.</b> Take fuel samples from both wings and fuel strainer. Inspect for contamination and proper grade of fuel.			RLSA-M
<b>Wing skins.</b> Inspect for obvious signs of damage, including cracks, holes, and buckling. Check condition of paint and placards. Check drain holes for obstructions.			Owner/Pilot
<b>Aileron and flap brackets.</b> Inspect for security of attachment to wing. Inspect bearing for condition and play as required in Paragraph 4.3.1.4 Aileron; 4.3.2.4 Flaps.			RLSA-M
<b>Ailerons.</b> Inspect for damage, looseness, or play in attach bearings, and condition of rod end attachment. Check security of static balance weights. Check for obstruction of drain holes. Lubricate the rod tip bearing as required in Paragraph 4.3.1.4 Aileron; 4.3.2.4 Flaps.			RLSA-M
<b>Flaps.</b> Inspect skins for condition and signs of debonding. Check hinges for play and attachment to wing and flap. Check flap rod and rod tips for condition, and lubricate.			RLSA-M
<b>Flap actuator.</b> Clean and run flaps up and down to check for smooth operation.			Owner/Pilot
<b>Flap deflection.</b> Ensure that flaps extend equally on each side of the airplane in the takeoff, cruise and landing configurations. Measure the down deflection on each side using neutral ailerons as a reference point. The difference in static deflection should not be greater than $\frac{1}{8}$ " / 3 mm. Inspect stop switches for operating. See detailed instructions in Paragraph 4.3.2.4 Flaps.			RLSA-M
<b>Wing interior.</b> Inspect wing spar through outer access panel and access holes along the trailing edge for signs of cracks or debonding. Inspect visible bonded areas of ribs and other structures.			RLSA-M
<b>Flight controls.</b> Inspect all push-pull rods, rod end bearings and bellcranks for condition, play, security of attachment and lubricate. Ensure locking is proper where applicable.			RLSA-M



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CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Pitot port.</b> Inspect for obstruction of Pitot, signs of damage, which may affect proper airflow. Remove the Pitot port before attempting to clear any obstructions, making sure the port is not damaged in any way. Test for proper operation after reinstallation.			RLSA-M

### 3.7 Empennage

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Rudder.</b> Inspect for signs of damage, looseness, or play in bearings, and condition of hinge attachments and rudder cable attachments. Check security of static balance weight. Check for obstruction of drain holes. Lubricate hinges and cable-attach points. Ensure rudder stops on the nose gear steering rods make full contact with left and right rudder stops on the engine mount. Verify rudder angles of deflection as described in Paragraph 4.3.3.4.			RLSA-M
<b>Stabilizer with trim tab.</b> Inspect for visible damage and evidence of latent damage. Inspect looseness or play in bearings. Check security of static balance weights. Check for obstruction of drain holes. Lubricate hinges. Ensure stabilizer forward and aft stops make full contact with stop plate. Verify stabilizer angles of deflection as described in Paragraph 4.3.4.5.			RLSA-M
<b>Stabilizer Pivot.</b> Inspect stabilizer pivot for cracks or signs of corrosion. Use mirror and torch to inspect all areas of the bracket. If necessary for better visibility, remove stabilizer following Paragraph 4.3.4.4. If damages are found pivot must be exchanged.			RLSA-M
<b>Flight controls.</b> Inspect all push-pull rods, push-pull cable, rudder and trim-tab control cables, rod end bearings and bellcranks for condition, play, security of attachment and lubricate. Ensure locking is proper where applicable.			RLSA-M



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### 3.8 Landing Gear

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Visual inspection.</b> Inspect from top to bottom for scratches, cracks, corrosion, signs of overstress and side-loading. Visually inspect the struts for straightness. See Paragraph 4.2.2.4.			Owner/Pilot
<b>Wheels.</b> Inspect for cracks and corrosion. Check all hardware for signs of loss of torque. Inspect tires for splitting, flat spots, wear, and dry-rotting. Check tire pressure (2 bar /29 PSI), and service as necessary. See Paragraphs 4.2.1.6 and 4.2.2.9.			Owner/Pilot
<b>Fairings.</b> Inspect for condition, scratches, cracks, and signs of overstress. Clean interior. See Paragraph 4.2.1.4; Paragraph 4.2.2.4, Paragraph 4.2.2.5 and Paragraph 4.2.2.7.			Owner/Pilot
<b>Wheel bearings.</b> Inspect for damage, wear, and corrosion. Check bearing for play, binding and bearing protection plate for condition. Replace bearings if necessary. See Paragraph 4.2.1.6 and 4.2.2.9.			RLSA-M
<b>Nose landing gear.</b> Lift up the nose gear and check rotation of the nose gear within operating limits for binding. Check the steering lever and the strut for play. See Paragraph 4.2.1.4.			RLSA-M
<b>Shock absorber.</b> Inspect for binding and unusual noises while operating. See Paragraph 4.2.1.4.			RLSA-M
<b>Hydraulic brake lines.</b> Inspect brake lines that are tie wrapped to the main gear strut. Check for security and evidence of chafing. Check for leaks (hydraulic fluid stains).			RLSA-M
<b>Brake calipers, brake pads and brake discs.</b> Clean and inspect for condition, fluid leakage, for cracks and corrosion, security of components. Inspect brake discs for pitting and signs of overheating. Inspect all hardware for signs of loss of torque. Do not lubricate. Ensure the brake discs have a little amount of free motion along the wheel axle. See Paragraph 4.2.3.3.			RLSA-M
<b>Brake fluid reservoir.</b> Inspect for condition, security, and fluid level. Service, if necessary.			Owner/Pilot



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### 3.9 Cabin and Baggage Compartment

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Fire extinguisher.</b> Remove fire extinguisher (if applicable) and check that expiry date is not exceeded. Replace if necessary.			RLSA-M
<b>Upholstery.</b> Inspect for general condition, attachment, and cleanliness.			Owner/Pilot
<b>Safety belts.</b> Inspect belts for wear, cuts, and broken stitching. Check all buckles for proper locking and release. Check belt attachments to structure.			RLSA-M
<b>Flight controls.</b> Inspect for dents, nicks and scratches in push-pull rods, play in rod end, security of rudder cable guide tubes to fuselage. Lubricate rod end bearings.			RLSA-M
<b>Seats.</b> Inspect seat structure for general condition, cracks, and corrosion. Check seat controls for locking. Inspect cushions and upholstery for condition.			RLSA-M
<b>Seat guides and stops.</b> Inspect for cracks, wear of latching holes and guides, and security of guides and stops.			RLSA-M
<b>Avionics.</b> Check control knobs for operating. Check security of indicators, radios, GPS display (if applicable), controls on side and central panels, and markings legibility. Magnetic tools must not be used during this procedure.			Owner/Pilot
<b>Instruments.</b> Check security of instruments and markings legibility. Magnetic tools must not be used during this procedure.			Owner/Pilot
<b>Placards.</b> Inspect for presence and condition of all required interior placards.			Owner/Pilot
<b>Instrument panels.</b> Inspect for general condition, security of attachment, and cleanliness. Magnetic tools must not be used during this procedure.			Owner/Pilot
<b>Magnetic compass.</b> Inspect for security and oil leakage. Inspect compass correction card for presence and legibility of all headings. Magnetic tools must not be used during this procedure.			RLSA-M
<b>ECS controls.</b> Check cabin and carburetor heating, heating ducts and side window vents for proper operation.			Owner/Pilot
<b>Instrument board inside and panels backside.</b> Remove all instrument panels and inspect all lines, wires, control cables, hoses, instruments, and so on, for chafing, any interference, and loose or stressed connections. Inspect firewall structure for cracks, debonding, and general condition.			RLSA-M
<b>Reinstall instrument panels.</b> Check security of attachment and condition.			Owner/Pilot
<b>Rudder pedals.</b> Inspect for security, cracks, and play. Lubricate pedals PVC supports.			RLSA-M
<b>Parking brake valve.</b> Inspect for security of mounting and signs of leakage.			RLSA-M
<b>Main Bulkhead.</b> Inspect for cracks, dents, and debonding from the fuselage.			RLSA-M
<b>Main landing gear attachment.</b> Inspect for cracks, debonding and security of hardware.			RLSA-M





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CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Floor (pyramid), tunnel, fuselage root ribs, spar box, A-struts.</b> Inspect for cracks, holes, debonding and general condition.			RLSA-M
<b>Flight controls (forward fuselage through baggage compartment).</b> Inspect for nicks, scratches, and dents in push-pull rods, play in rod end and attachment of rudder cable guide tubes to fuselage. Lubricate rod end bearings.			RLSA-M
<b>Baggage compartment doors.</b> Inspect for cracks, holes, and security.			Owner/Pilot
<b>ELT.</b> Remove from bracket and remove battery cover. Inspect for battery corrosion and any obvious internal or external damage to housing. Verify replacement date on battery matches date on housing placard. Reinstall battery cover. Inspect as required in the ELT Maintenance. Record battery replacement due date:			RLSA-M
<b>ELT installation.</b> Inspect ELT wiring and antenna cable for security, routing, and chafing. Check connectors for security of pins and proper connection. Inspect ELT bracket for cracks and security. Replace bracket if any cracks are found.			RLSA-M
<b>Tail beam (from the baggage compartment towards tail) and empennage interior structure.</b> Inspect for cracks, debonding, or other signs of damage. Make sure that all drain holes are clear of obstructions. Check rudder control cable guides and push-pull cable guides for debonding.			RLSA-M
<b>Access panels.</b> Inspect for condition. Check fasteners for condition.			Owner/Pilot





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### 3.10 Inspection Completion

CTSW Inspection and/or Required Maintenance Checklist	100hour	Annual	Minimum Level of Certification
<b>Fuselage and wings.</b> Make sure aircraft is free of any tools, parts, and debris, and reinstall all access panels, fairings, seats, and so on, removed for the inspection.			Owner/Pilot
<b>Engine.</b> Verify that there is oil in the oil tank, cooling liquid in the expansion tank and coolant level in overflow bottle take place between min. and max. marks as required by the Operator's Manual for all versions of ROTAX 912, and engine compartment is free of tools, rags, and debris.			Owner/Pilot
<b>Engine.</b> Run engine for no more than two minutes at 1400 to 1800. After shutdown, check for leaks at oil filter, and any other components removed during this inspection. Install cowlings, if no leaks are noted.			Owner/Pilot
<b>Aircraft.</b> Operate engine at 2000 to 2500 RPM to warm it up. Operate all aircraft systems to verify proper operation. As engine warms, operate engine systems at appropriate engine speeds and complete all checks listed on Inspection Coversheet.			Owner/Pilot
<b>Aircraft records.</b> Complete entries in logbooks, AD and SD compliance lists, and any other required records.			Owner/Pilot

## 4 Structures

### 4.1 Wing

#### 4.1.1 Wing Structure

The wing of CTSW consists of right and left wings made of carbon and fiberglass composite parts bonded together with structural epoxy resin. The wing is attached to the fuselage by means of a carry through structure developed by extensions of both right and left wing spars fixed together by two main bolts in the cabin.



Fig. 1

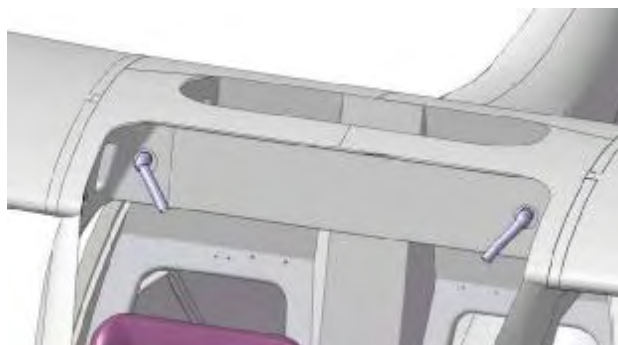


Fig. 2

The wing structure includes the skins (upper and lower), spar, and ribs. The brackets for aileron and flaps hinges are attached to the ribs along the trailing edge. The aileron control rod runs behind the spar. Two fuel filler caps are on the upper wing surface. An access panel is located on the lower skin of the wing, and inspection and maintenance holes are along the trailing edge of the wing.

The upper and lower skins are made of epoxy/carbon fiber and foam core. The spar caps are of epoxy/carbon fiber and the spar web is of epoxy/glass fiber and foam core. The ribs are made of epoxy/carbon.

Move the wing tips slightly forward and backward, there should be no play and noise. If there is play or noise, pull the wings about 20 cm out (see Paragraph. 4.1.2) and check if the root rib, especially at the pin area has no cracks or damages.

If there is not damage but some play between fuselage and wing root rib, washers can be used to compensate.



### 4.1.2 Wing Installation and Removal

The wings are easily removable due to quick connections used in the flap and aileron control systems.

#### 4.1.2.1 Tools Required

Wrench 8x102 pcs  
Hex-nut wrench 6 1 pcs  
Screwdriver 1 pcs  
Torque wrench 1 pcs  
Cradles for the wings

#### 4.1.2.2 Parts and Materials Required

Self-locking nuts M6 – 2pcs  
Multipurpose plastic grease LITOL-24M TY 0254-015-00148820-99 (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso))

#### 4.1.2.3 Type of Maintenance

Line

#### 4.1.2.4 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

#### 4.1.2.5 Wing Installation

**Note:** If installing a replacement wing or repaired wing that requires wing root contouring, explicit Flight Design task specific training required.

To install the wings requires three persons.

Prior to installation set the aircraft on the parking brake and remove any obstacle within 16 ft area from the fuselage.

Lubricate all metal details with LITOL-24M before connecting: the flap pin KA2040013 (2) (Fig. 5); pins on the wing root rib KA2010301 (1), Fig. 7, Fig. 8; the main bolts KA2000010 (1) Fig. 12.

- 1) Set each wing with the tongue into the spar box KA1001400 with clearance 0.75-1ft between the fuselage and the wing root rib (Fig. 3); insert the intake fuel line with the connecting pipe (1) to the fuselage.
- 2) Connect the pitot lines between the wing and the fuselage (for the right wing only). Pay attention not to mix the two pitot lines. One line is clearly marked with a black piece of shrink hose on both ends. Match this line together.



Fig. 3

- 3) Connect all fuselage-to-wing wiring, e.g. connect the position and strobe lights socket and plug (1 and 2) (Fig. 4).

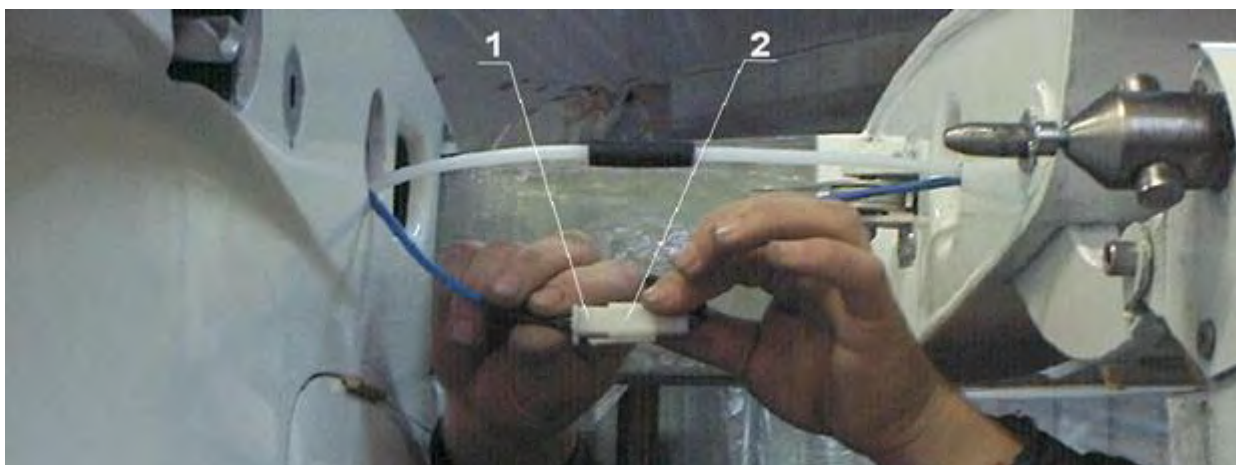


Fig. 4

- 4) Match the groove on the tip (1) with the flap pin (2) (Fig. 5, Fig. 6).

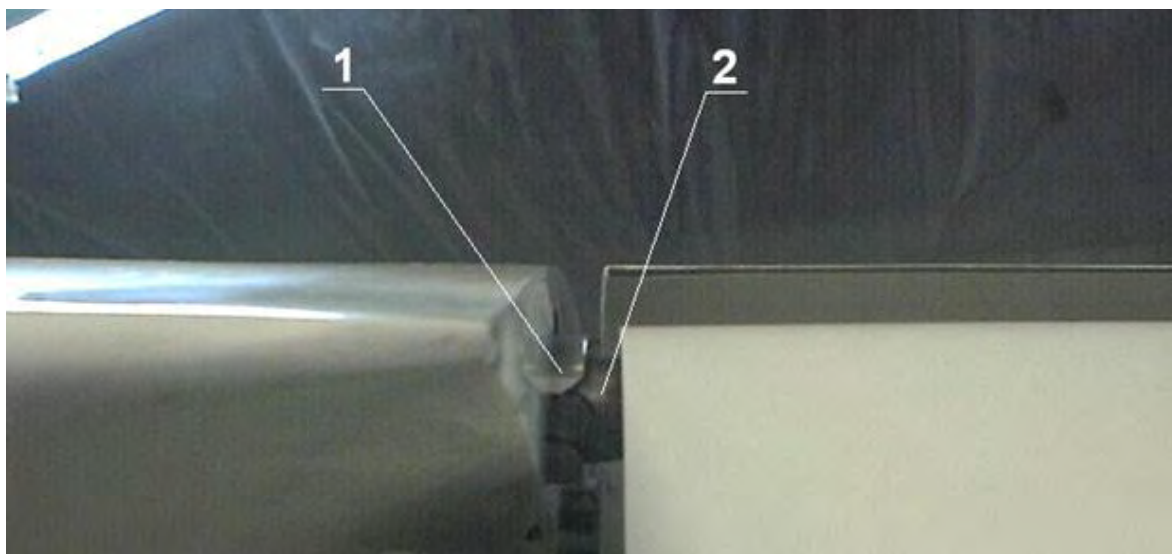


Fig. 5

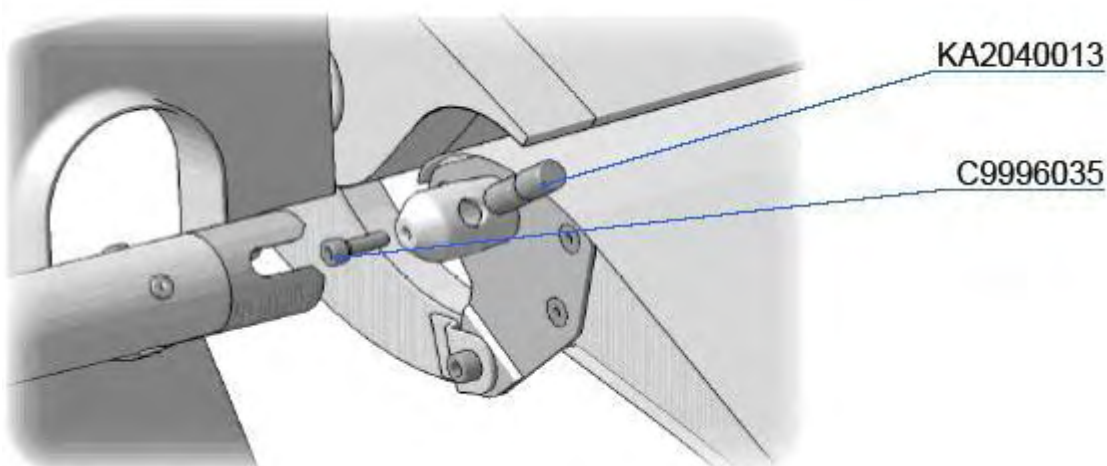


Fig. 6

- 5) Match the hole of the aft bushing KA1000101 on the fuselage with the pin on the wing root rib KA2010301 (1), Fig. 7.

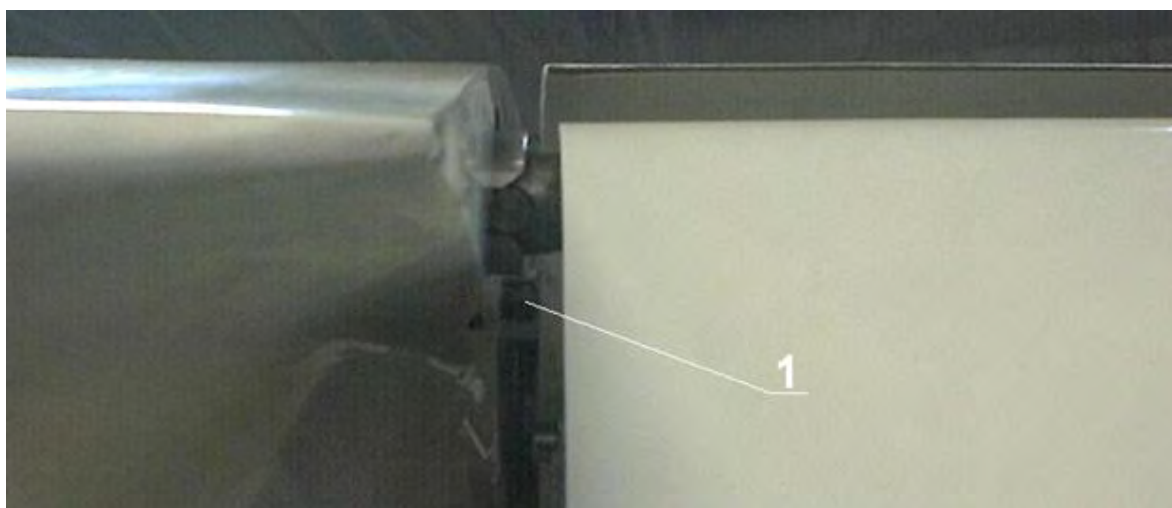


Fig. 7

- 6) Match the hole in the forward bushing KA1000110 of the fuselage with the pin of the wing root rib KA2010301 (1), Fig. 8.





Fig. 8

- 7) Set the pins of the wing root rib KA2010301 up to the stop into the forward KA1000110 and aft KA1000101 bushings on the fuselage. Take care that the flap pin KA2040013 gets into the groove of the tip KA6030201 (Fig. 5). Note that the pins can be set properly into the bushings by moving of the wing back and forth (Fig. 9) and up and down (Fig. 10).

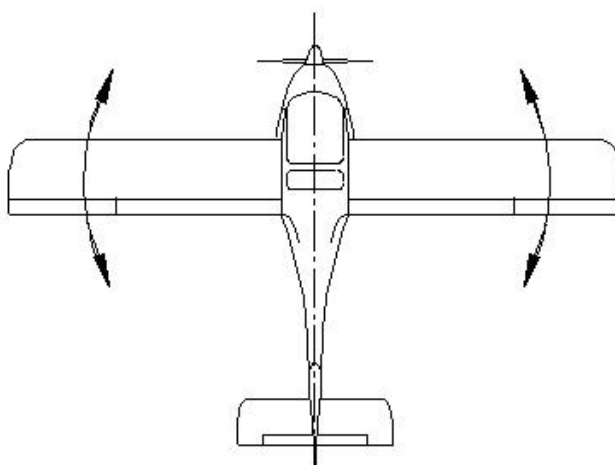


Fig. 9

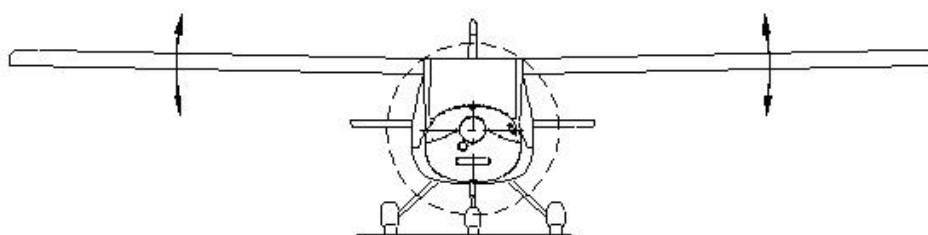


Fig. 10

- 8) Support the pre-set wing until both wings are installed and fixed by the main bolts KA2000010.  
9) Repeat the procedure (except item 2, for the left wing) for the other wing.

- 10) Match the hole of the spar bushing of the right wing KA2010102 with the hole of the bushing of the left wing KA2010103 from the right side moving the wing up and down (Fig. 9).



Fig. 11

- 11) Push the main bolts fully in, e.g. set the main bolt KA2000010 (1) into the matched holes of the bushings KA2010102 and KA2010103 by moving the wing up and down (Fig. 11 and 12).



Fig. 12

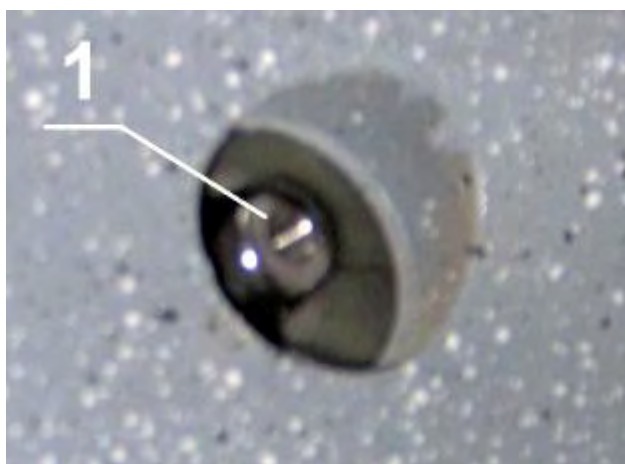


Fig. 13

- 12) Repeat item 11 for the second main bolt KA2000010.
- 13) Secure the main bolts with the cap and bolt, e.g. set the caps KA2000013 (1) onto the main bolts KA2000010 and fix them by bolts M8x35 C9996078A (Fig. 14). Torque value for the main bolts is 200 lb-in / 22,5 Nm.

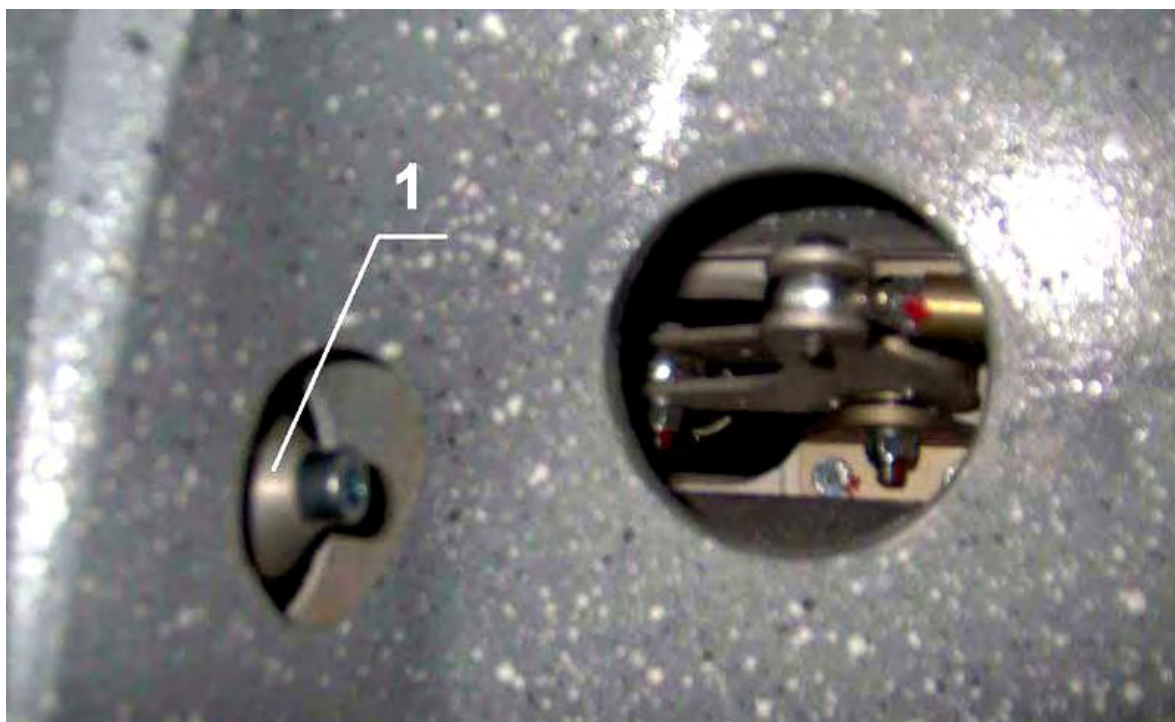


Fig. 14

- 14) Match the holes in the tip SMC6 of the rod KA6020050R with holes of the right wing lever KA6020040R (Fig. 14).
- 15) Fix the rod KA6020050R (1) in the lever KA6020040R (2) with the bolt M6x30 C9996259A (3). Use only new self-locking nuts M6 (Fig. 15).



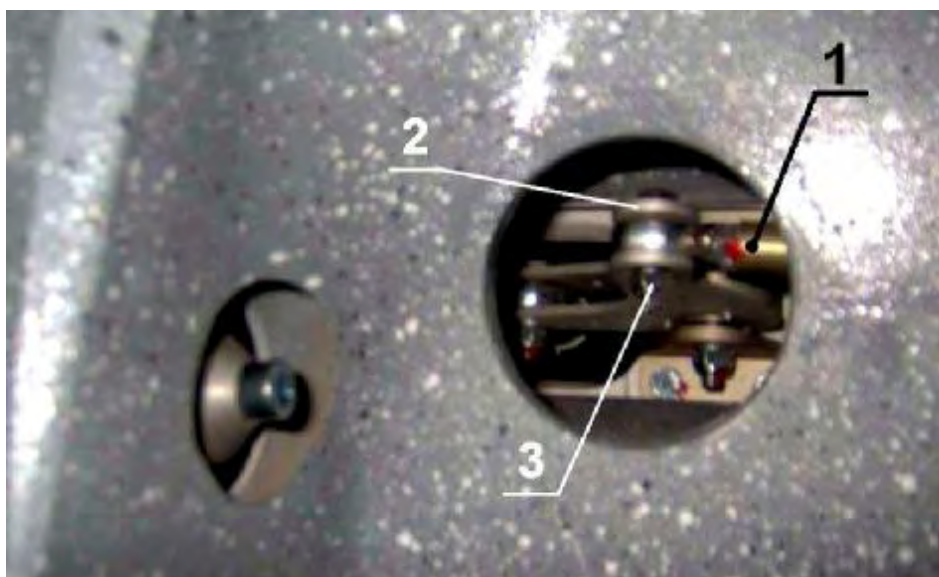


Fig. 15

- 16) Repeat the same for the left rod.
- 17) Connect the fuel feed line from the fuselage to the wing, e.g. set the fuel hose C9993184A (1) onto the connector (2) up to the stop, having the 13 mm clamp C9997715G on it (Fig. 16).

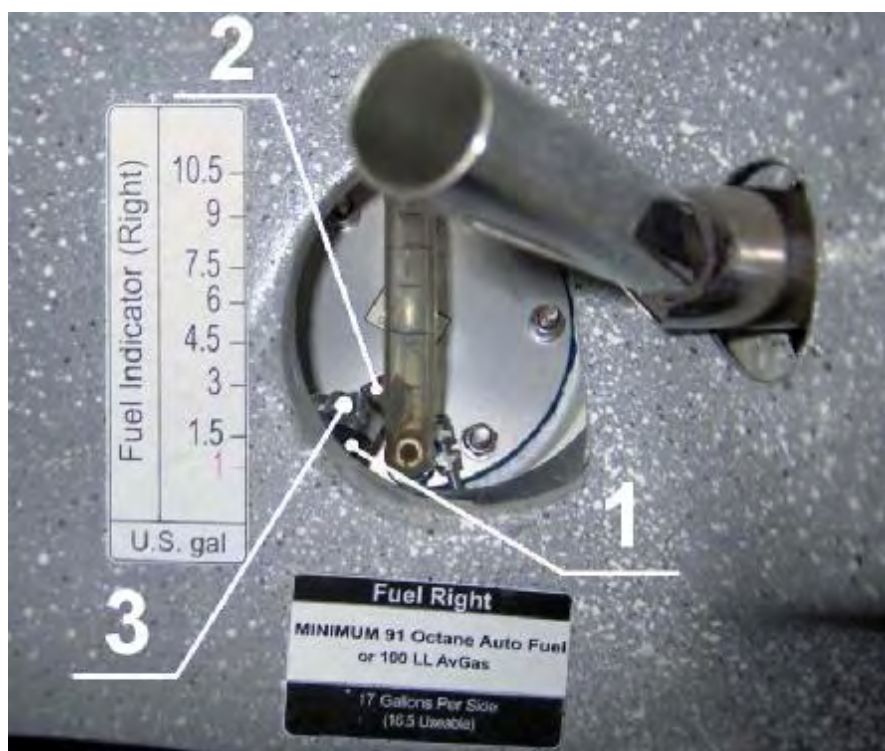


Fig. 16

- 18) Attach the fuel hose C9993184A (1) by the 13 mm clamp C9997715G (3) (Fig. 16).
- 19) Repeat the same for the fuel hose on the second wing.

**Warning:** After wing installation the fuel system must be checked as described in Paragraph 6 of this manual!



## Maintenance and Inspection Procedures Manual

Type: **CT**

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### 4.1.2.6 Wing Removal

Drain all the fuel from the wings, fuel lines, and gascolator. The process of draining the aircraft should be performed in a ventilated area with fire precautions taken.

The rest of the wing removal process goes in reverse to the wing installation process.

### 4.1.2.7 Verification Required

- Make sure the main bolts are properly tight, check torque of the screws.
- Make sure the control rod bolts are secured and marked with anti-sabotage lacquer
- Make sure the fuel lines are properly secured with hose clamps



## 4.2 Landing Gear

CTSW is equipped with conventional tricycle landing gear. The main gear legs made of aluminium alloy are attached to the main bulkhead located behind the pilot seats. The nose gear is equipped with a shock absorber and attached to the engine mount.

### 4.2.1 Nose Landing Gear

#### 4.2.1.1 Tools Required

Screw driver with header 132 pcs  
Wrench 8x10 1 pcs  
Wrench 10x13 2 pcs  
Wrench 17x192 pcs  
Hex-nut wrench 4 1 pcs  
Hex-nut wrench 5 1 pcs  
Drill (to drill metal) Ø 0,237 inch / 6,0 mm 1 pcs  
Brace 1 pcs  
34" support with padded top 1 pcs  
Chock 4 pcs

#### 4.2.1.2 Materials Required

Lock liquid of middle strength Loctite 243  
C9996064 Bolt DIN 912 M6x60-8.8 1 pcs  
C9996334 Self-locking nut DIN 985-M61 pcs  
C9996336 Self-locking nut DIN 985-M82 pcs  
C9996338 Self-locking nut DIN 985-M121 pcs  
C9997730F O-ring Simrit 72, NBR 872, 28,0x5,2 pcs  
C9997730P O-Ring 8x18x42 pcs  
Talcum AR  
CIATIM-201 GOST 6267-74 (or Aeroshell Grease 6 (SHELL), Unirex S 2 (Esso), Eneryrease LCI, LT 2 (British Petroleum))

#### 4.2.1.3 General

Due to lifting loads being hazardous, two persons are required to remove/install the nose landing gear.

- A. Before starting, set the parking brake. Remove cowlings; make sure the tail area is clear.
- B. Lift the forward fuselage by pushing down the tail at the narrowest part so that the nose wheel is at least 10" off the ground.
- C. Insert the padded support securely just behind the firewall.

**Note:** The top of the support has to be soft to prevent damage of the skin and paint.

- D. Set the chocks under the wheels to prevent plane's rolling.
- E. The nose gear fairing can not be removed without prior removing the nose gear strut.

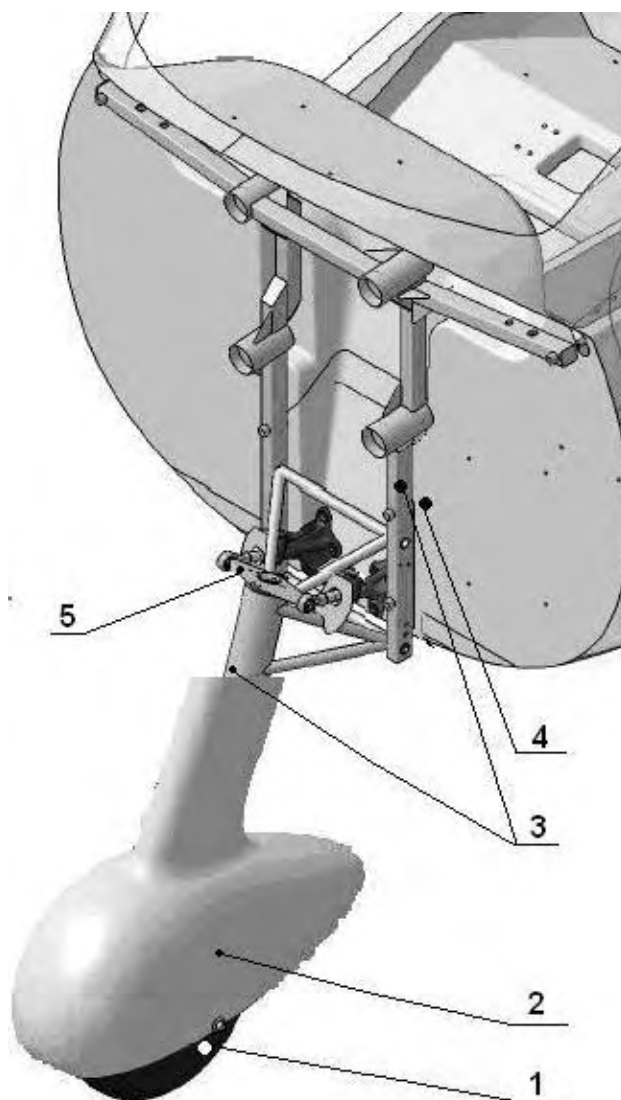


Fig. 1

## 4.2.1.4 Inspections

### 4.2.1.4.1 Type of Maintenance

Line

### 4.2.1.4.2 Minimum Level of Certification

Owner/Pilot

### 4.2.1.4.3 Visual Inspection

- 1) The strut and fork for damages, dents, cracks, paint detachment (Fig. 1). Pay specific attention to welding seam areas. Check for obvious damage to all visible parts each time the fairing is removed (Fig. 1, item 2).
- 2) The engine mounts for damage, dents, cracks (Fig. 1, item 3). Pay specific attention to welding seam areas. Check all visible surfaces before each flight (inspect engine compartment visually each time the cowlings are removed).
- 3) The firewall for damage, dents, cracks, delaminating (Fig. 1, item 4). Pay specific attention to the areas where the engine mount is attached to the firewall. Check all visible surfaces each time the cowlings are removed.

- 4) For all items above, thoroughly inspect with all removable items off at least (cowlings, fairing (Fig. 1, item 2) and so on). In case of a hard landing, inspect right after the landing.

**Note:** If damages are found per items 1 through 4, inform directly Flight Design for inspection and further instructions.

## 4.2.1.4.4 Shock Absorber Inspection

Shock absorber (Fig. 1) for binding and unusual noises while operating (all three wheels must be on the ground):

- Turn the propeller and set it horizontally.
- Push down the propeller by both hands as much as possible.
- Release sharply. Make sure the plane returned to original position by the shock absorber.
- Repeat for 2-3 times.
- If operation is suspected wrong, see Paragraph 4.2.1.5.

## 4.2.1.4.5 Fork Inspection

Inspect the fork for play, binding and unusual sounds while rotating (Fig. 1, items 3) with the rudder pedals:

- Lift up the nose gear as described in 4.2.1.5. General point B and turn the nose gear right by pedals and then release.
- Turn it to the left and release.
- Repeat 2-3 times to each side.
- If operation is suspected wrong, see Paragraph 4.2.1.5.

Make sure there is no play between the pin (KA4010101 Pin) and the slot in KA4010110 Rotating body. Replace the pin (KA4010101 Pin) if necessary – see Paragraph 4.2.1.5.

Make sure there is no play between the KA4010001 Rocker (Fig. 2) and the KA4010110 Rotating body. Replace if necessary – see Paragraph 4.2.1.5.

Make sure there is no play between the KA4010001 Rocker (Fig. 2) and the engine mount in vertical direction. Replace if necessary – see Paragraph 4.2.1.5.

## 4.2.1.4.6 Nose Wheel Inspection

**Inspect:**

1. The nose wheel for runout, play, binding unusual sounds while rotating (Fig. 1, item 1) - at least 100h. Lift up the nose gear as described before (4.2.1.3, General point B) and pull the wheel so that it makes 6-8 turns and watch rotation up to stop. If suspected something see Paragraph 4.2.1.6.
2. Tires for inflation visually, measure tire pressure (2 bar / 29 PSI) as necessary. If suspected something see Paragraph 4.2.1.6.
3. The tire for integrity and height of tread (at least 0,04 inch / 1 mm) – before each flight. If suspected something see Paragraph 4.2.1.6.
4. The wheel fairing for integrity (Fig. 1, item 2), secure attachment and foreign objects in the aft part of the fairing.

## 4.2.1.5 Nose Gear Removal (Replacement)

### 4.2.1.5.1 Type of Maintenance

Heavy

### 4.2.1.5.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 4.2.1.5.3 Fork Removal

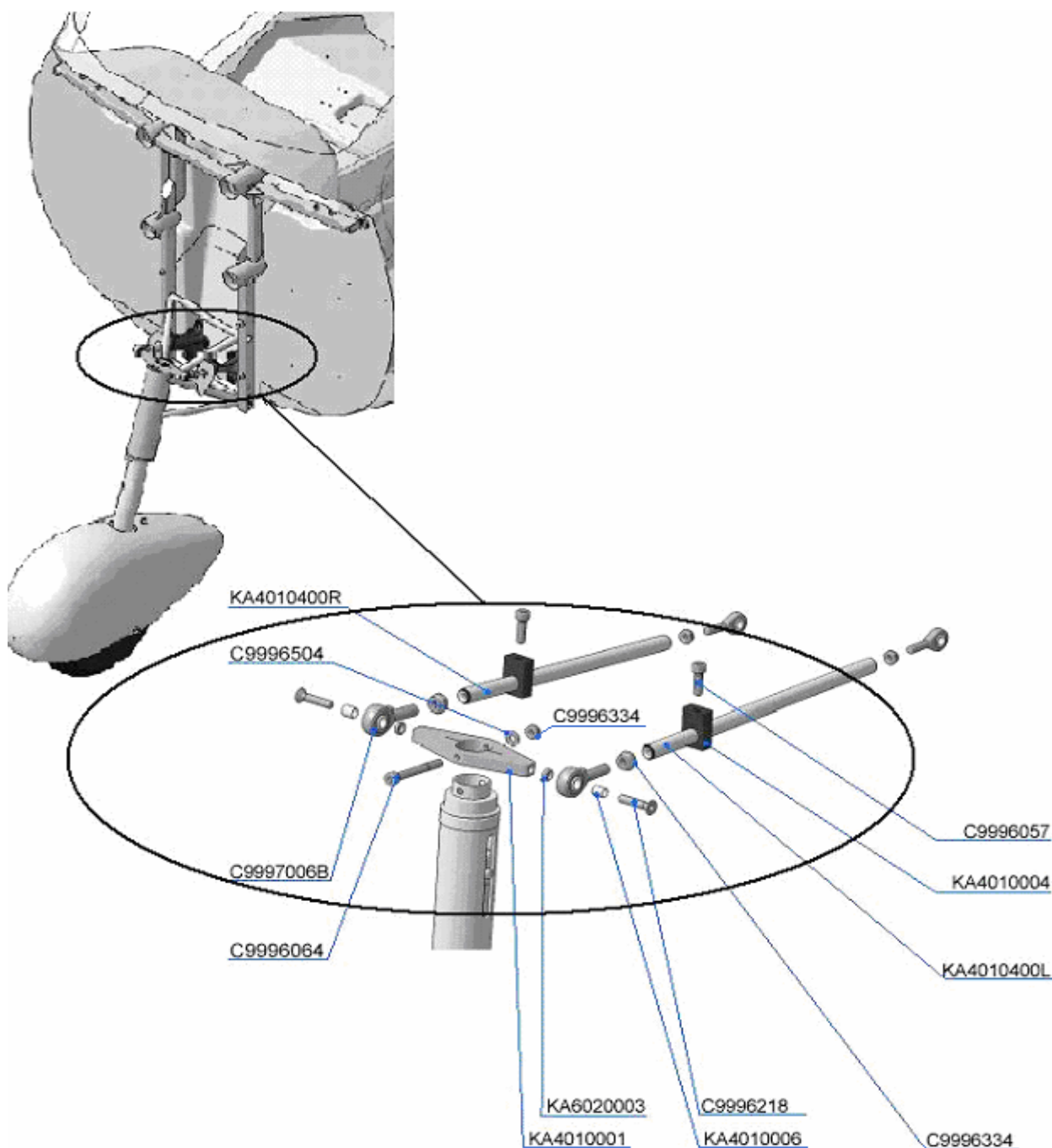


Fig. 2



Unscrew the nut C9996334 (Self-locking nut DIN 985-M6, regular) that fixes the bolt C9996064 (Bolt DIN 912 M6x60-8.8) by a 10x13 wrench and hex-nut wrench 5.

Slightly rocking and pressing the lever KA4010001 Rocker (Fig. 2), remove the bolt C9996064 and release the lever by holding the nose wheel axle.

Remove the fork out of the engine mount, rocking and pushing it down.

#### 4.2.1.5.4 Before Installation

Clean the mating surfaces of grease and debris, especially concerns the friction surfaces of the bronze bushings (Fig. 3, item A).

Make sure the fork tubes are not bent (the rotating tube in the engine mount, in particular) and check them for dents and cracks.

Check bronze bushings on the strut for security, play, integrity (they are to be of correct circular shape and of constant thickness), cracks, dents, nicks and wearing.

Check shape of the hole for the bolt C9996064.

Check diameter of the hole for the bolt C9996064 that has to be not more than 0.237 inch / 6.0 mm (0.197 inch / 5 mm for replacement strut).

Check the bolt C9996064 Bolt DIN 912 M6x60-8.8 for integrity and thread condition. Replace, if necessary.

Apply a thin layer of grease (Grease CIATIM-201 GOST 6267-74 (or Aeroshell Grease 6 (SHELL), Unirex S 2 (Esso), Enegrease LCI, LT 2 (British Petroleum)) to prevent corrosion onto the whole attaching (to the engine mount) surface of the strut;

Make sure that there is sufficient grease on the friction surfaces – (Fig. 3, item A).

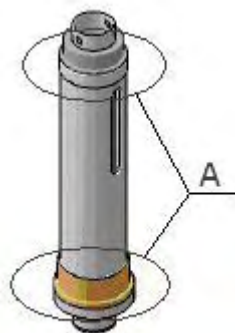


Fig. 3

#### 4.2.1.5.5 Fork Installation

Make sure that all operations from the "Before Installation" Paragraph are done!

Installation process is a reverse to removal process.

Make sure that only new nuts C9996334 (Self-locking nut DIN 985-M6, regular) are used for fixing the bolt C9996064 (Bolt DIN 912 M6x60-8.8) and tightened 80 lb-in / 9 Nm by a 10x3 wrench and hex-nut wrench 5.

## 4.2.1.5.6 Fork Replacement

Make sure that all operations from the "Before Installation" Paragraph are done!

Before lever KA4010001 Rocker (Fig. 2) installation:

- Insert the fork into the engine mount, remove the support from under the fuselage and set the plane onto the three wheels.
- Match the holes in the lever KA4010001 and in the tube of the fork vertically.
- Let down the lever into the lowest position on the tube.
- Bore out the hole in the fork tube by a 0.237 inch / 6.0 mm drill.
- Set the bolt C9996064 Bolt DIN 912 M6x60-8.8 and secure it by a new nut C9996334 Self-locking nut DIN 985-M6, regular, having put a washer C9996565 Washer DIN 9021-6.4 mm VZ under the nut. Use a 10x13 wrench and hex-nut wrench 5.
- Make sure that only new nuts C9996334 (Self-locking nut DIN 985-M6, regular) are used and tightened 80 lb-in / 9 Nm.

## 4.2.1.5.7 Shock Absorber

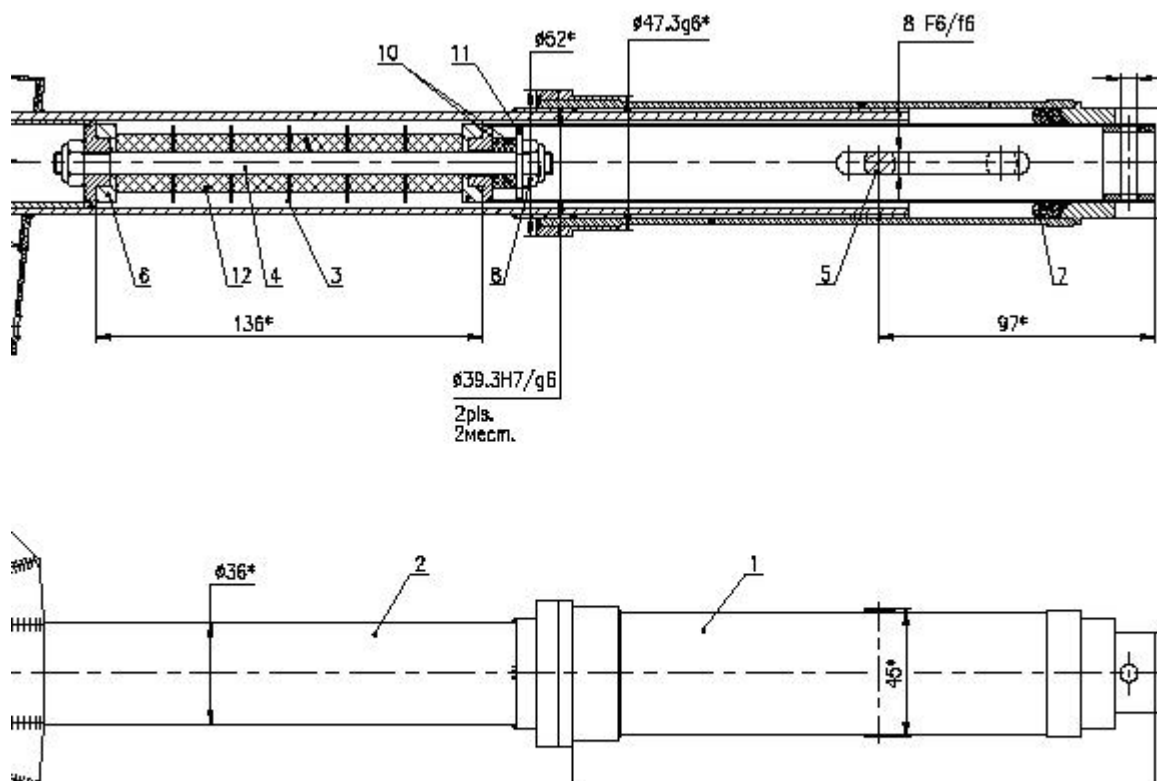


Fig. 4

- Take out the pin (KA4010101) (pos. 5, Fig. 4). Make sure there is no play between the pin (KA4010101) and the slot in KA4010110 Rotating body (pos. 2). Replace the pin (KA4010101) if necessary.
- Unscrew the upper nut (C9996336 Self-locking nut DIN 985-M8, regular) (pos. 8) by 2 screwdrivers with header 13 mm.
- Disassemble the strut.



4. Make sure of integrity of the Polyurethane Damper Elements (Urelastfeder 90 Shores (red 25/10,5 mm. X 20 mm)) (pos. 12). Replace if necessary

**Note:** Older production models of the CTSW use a steel spring instead of the polyurethane dampers. In this case inspect integrity of the steel spring. A replacement kit to change from steel spring to polyurethane dampere elements is available through your Flight Design dealer or service station.

5. Clean mating surfaces from remaining grease and debris, specifically care about friction surfaces of the bronze bushings.
6. Inspect the tubes of the fork for bending, dents and cracks.
7. Inspect the bronze bushings for security and play.
8. Inspect the bronze bushings for integrity; they must be of right circular shape and of constant thickness.
9. Check surfaces of the bronze bushings for cracks, dents, nicks and wearing.
10. Make sure of sufficient lubricant on friction surfaces of the bronze bushings.
11. Make sure of integrity of o-rings C9997730F (O-ring Simrit72, NBR 872, 28.0x5.0) and C9997730P (O-Ring 8x18x4) and replace, if necessary.
12. Replace the nut C9996336 (Self-locking nut DIN 985-M8, regular) to a new one.
13. Stack the polyurethane damper elements to the pin axle (pos. 4) as follows: support (pos. 6) flat surface facing the first polyurethane element, 6 polyurethane elements separated each by a washer (pos. 3), support (pos. 6) (flat surface facing the last polyurethane element). See Fig 4.
14. When installing the pack, carefully grease up all sides of each polyurethane element using all-purpose grease. Greasing the elements is very important for the functioning and durability of the device.
15. Assemble the shock absorber by running items 1 through 3 in reverse order. Tighten the nut C9996336 (Self-locking nut DIN 985-M8, regular) 200 lb-in / 22.5 Nm.

## 4.2.1.6 Nose Wheel

### 4.2.1.6.1 Type of Maintenance

Line

### 4.2.1.6.2 Minimum Level of Certification

Owner/Pilot

### 4.2.1.6.3 Nose Wheel Removal and Installation

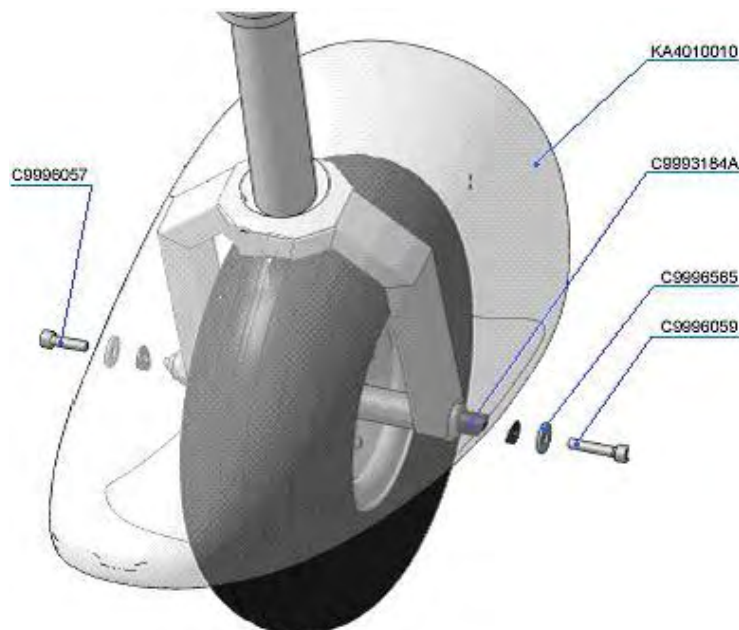


Fig. 5

Make sure that only new nuts are used!

Wheel removal is possible without nose gear fork disassembling.

- 1) Unscrew the two bolts C9996059 (Bolt DIN 912 M6x30-8.8) by a hex-nut wrench 5 and release the nose wheel fairing.
- 2) Lift up the fairing along the strut up to the stop.
- 3) Inspect according to the Paragraph 4.2.1.2.6. Make sure of sufficient length of bushings KA4010003 (Bush) to prevent play, otherwise replace them.

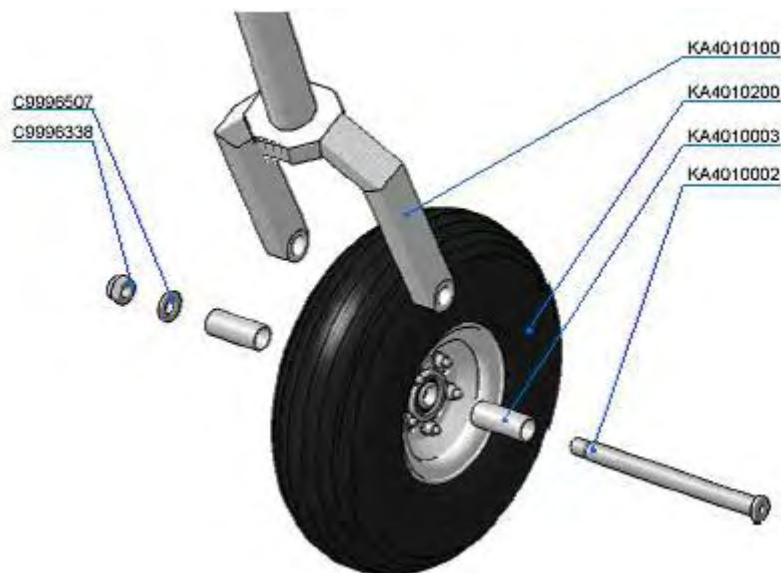


Fig. 6

- 4) Unscrew the nut C9996338 (Self-locking nut DIN 985-M12, regular), Fig. 6, by two wrenches 17x19 and remove the axle KA4010002 (Wheel axle).
- 5) Inspect the axle KA4010002 (Wheel axle) for integrity, nicks, dents and cracks, pay specific attention to the threaded part of it. Replace, if necessary.
- 6) Inspect the wheel rims for dents and cracks. Replace, if necessary (or suspected necessary).
- 7) Inspect mounting holes in the wheel rims for bearing, cracks and shape. Replace, if necessary (or suspected necessary).
- 8) Check bearings for condition.
- 9) Inspect the tube for integrity. Inspect the tire for foreign objects. Inspect metal parts of the wheel contacting the tube for sharp edges and nicks. Apply talcum onto the inner surface of the tire and onto the tube. Replace C9997207D 4.00-4" Unit with tire and tube, for Ultralight 4.00-4 in case of broken integrity, track depth less 0.04 in. / 1 mm or inability to keep necessary pressure within 24h.
- 10) Wheel installation is reverse to removal. Replace C9996338 (Self-locking nut DIN 985-M12), Fig. 6, to a new one. Secure the screws C9996059 (Bolt DIN 912 M6x30-8.8), Fig. 5, by lock liquid of middle strength Loctite 243.

## 4.2.2 Main Landing Gear

Due to lifting loads being hazardous, two persons are required to remove / install the main gear struts.

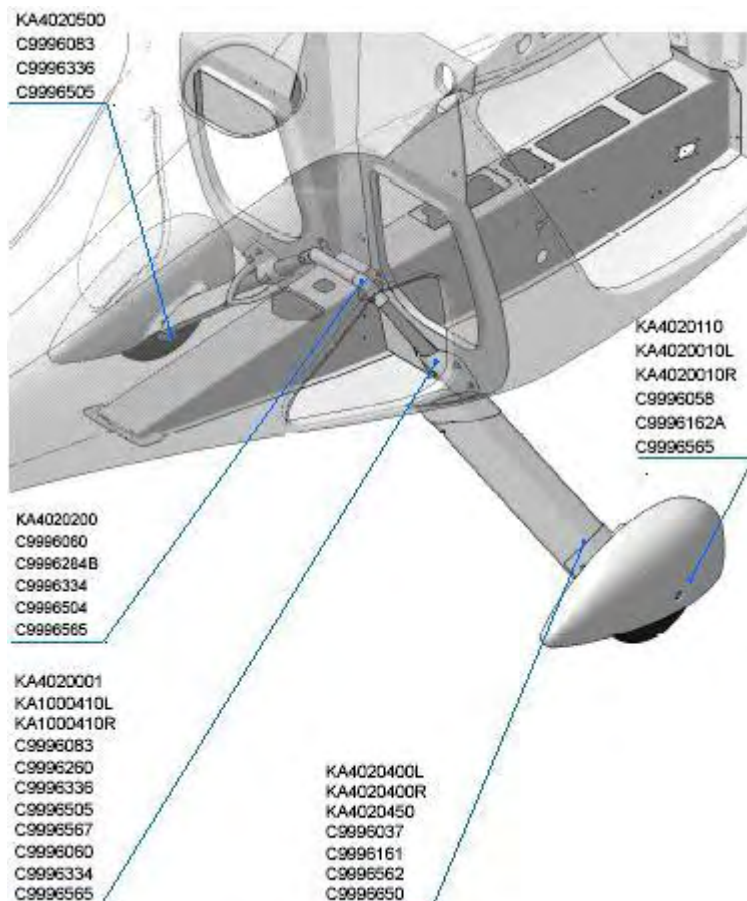


Fig. 1

### 4.2.2.1 Tools Required

Wrench 10x13 2 pcs  
Wrench 19x241 pcs  
Hex-nut wrench 3 1 pcs  
Hex-nut wrench 5 1 pcs  
Hex-nut wrench 6 1 pcs  
Rubber hammer 1 pcs  
Support with soft top 34 inch / 850 mm high 1 pcs  
Support 8 inch / 200 mm high under the main wheel  
attachments KA4020100L (R) 2 pcs  
Wheel Chock 4 pcs  
8" wheel support 2 pcs  
Wing support 2 pcs

### 4.2.2.2 Materials Required

Lock liquid of middle strength Loctite 243  
Lock liquid of high strength Loctite 270  
Anti-seize Loctite 8008  
Talcum

## 4.2.2.3 General

Before starting, set the parking brake, install and secure the wings. Remove cowlings; make sure the tail area is clear.

Lift the forward fuselage by pushing down the tail at the narrowest part so that the nose wheel is at least 10" off the ground.

Insert the padded support securely just behind the firewall.

### Note:

The top of the support has to be soft to prevent damage of the skin and paint.

Set the chocks under the wheels to prevent plane's rolling.

Lift up the wing tip of a wing and put the 8" (200 mm) support under each main wheel attachments KA4020100L (R), Fig. 2.

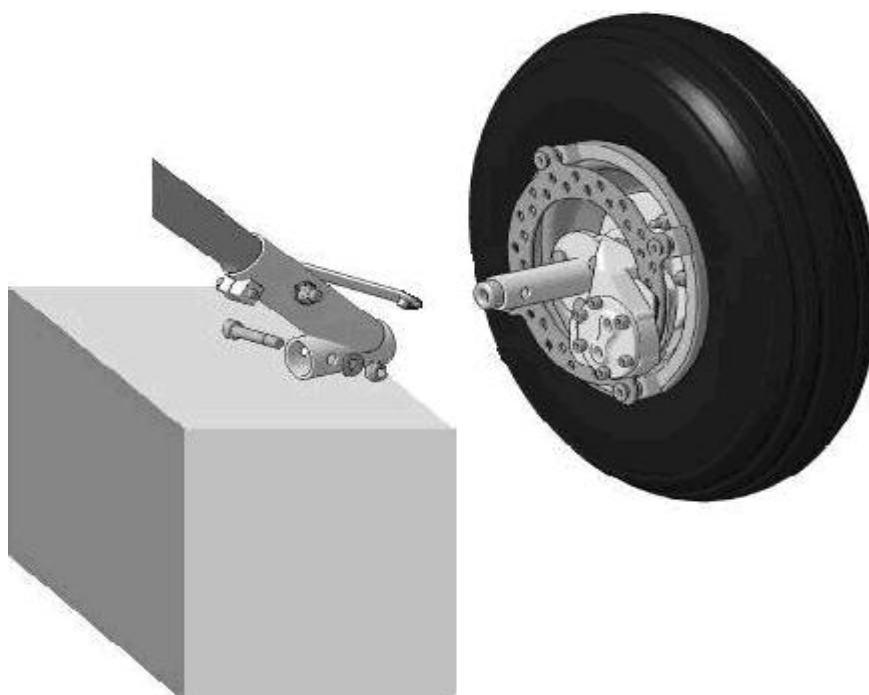


Fig. 2

Except for main wheel fairing replacement and wheel inspection (see Paragraphs 4.2.2.5 and 4.2.2.9), all the operations on disassembling parts of the main struts will require dismounting of the brake calipers C9997205U Caliper (Fig. 11, Fig. 5), and therefore bleeding and inspection of the brake system upon completion.

## 4.2.2.4 Inspection

### 4.2.2.4.1 Type of Maintenance

Line

### 4.2.2.4.2 Minimum Level of Certification

Owner/Pilot.

### 4.2.2.4.3 Visual inspection

- 1) Inspect the main gear bracket KA4020200 (Upper mounting unit), Fig. 3, item 4, for damages, dents, cracks, and paint delamination. Pay specific attention to welding seams areas.
- 2) Inspect KA1000410L(R), Rear reinforcement (left/right), for damages, dents, cracks, and delamination.

- 3) Check the bulkhead (Fig. 3, item 6) and tunnel (Fig. 3, item 7) made of composites for damages, dents, cracks, delamination at the areas of landing gear attachments.
- 4) Inspect the main struts KA4020001 (Fig. 3, item 3) for bending, damages, dents, cracks on the surface and especially at the mounting holes areas, integrity and circularity of the mounting holes.
- 5) Inspect annually for all stated above with removal of all the parts obscuring (strut fairing (Fig. 3, item 5) and so on) the ones being inspected. Inspect the main wheel attachment KA4020100R(L) for bending, damages, dents, cracks on the surface and especially at the mounting holes areas, integrity and circularity of the mounting holes. In case of hard landing inspect immediately after landing.

**Note:** If damage is found, contact directly Flight Design for inspection and making decision on further actions.

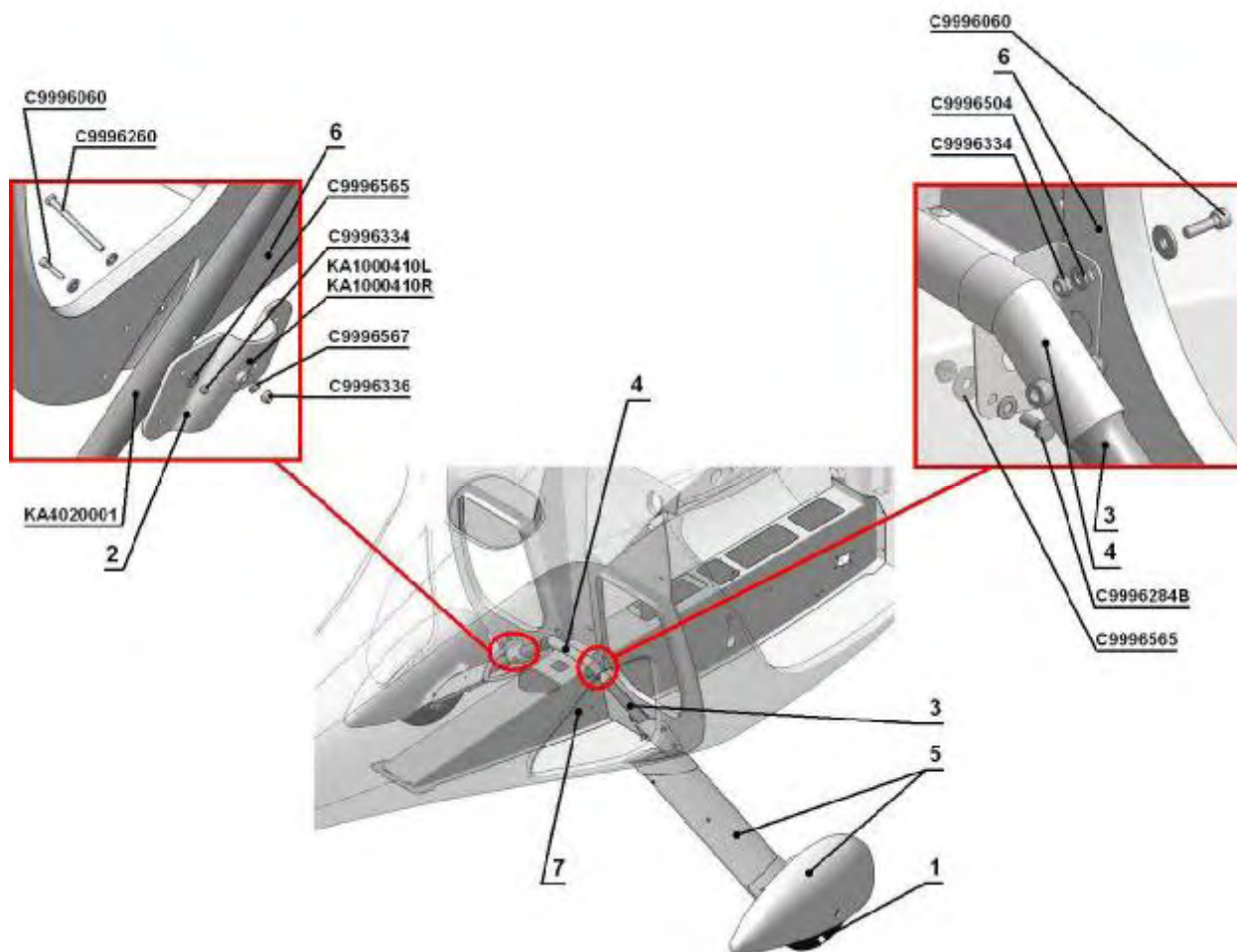


Fig. 3

#### 4.2.2.4.4 Wheel Inspection

1. Inspect the main wheels for runout, play, binding, strange noises for 100 h. Push the wheel so that it makes 6-8 turns and watch rotation up to stop.
2. Check tire pressure (29 PSI / 2bar).
3. Check tires for integrity and tread depth (at least 0.04 inch / 1 mm).
4. Inspect wheel and strut fairings for integrity and security (Fig 3 item 5). If replacement is necessary, refer to Paragraphs 4.2.2.5 and 4.2.2.7.



## 4.2.2.5 Main Wheel Fairing Removal (Replacement)

### 4.2.2.5.1 Type of Maintenance

Line

### 4.2.2.5.2 Minimum Level of Certification

Owner/Pilot

### 4.2.2.5.3 Procedure

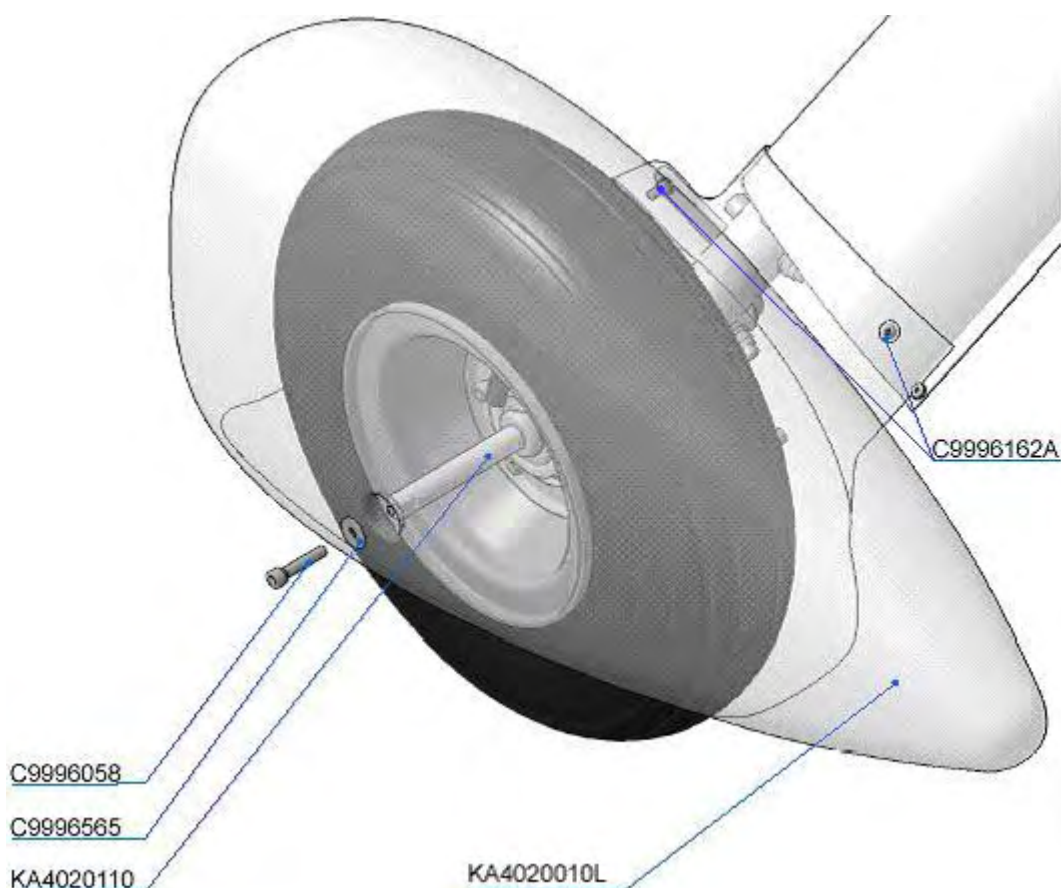


Fig. 4

Unscrew the bolt C9996054B (Bolt DIN 912 M6x16-8.8), Fig. 4, by a hex-nut wrench 5.

Unscrew three screws C9996162 (Screw ISO 7380 M5x16) by a hex-nut wrench 3, holding the wheel fairing. Remove the fairing.

Before installation make sure of integrity and security of the spacer KF32100036 (Spacer). The spacer must be installed with the middle strength Loctite 243 and tightened 49 lb-in (5.5 Nm).

Installation is the reverse to removal.

**Note:**

The bolt C9996054B must be set with lock liquid of middle strength Loctite 243 and tighten 80 lb-in (9 Nm); the screws C9996162 (Screw ISO 7380 M5x16) are to be set with lock liquid of middle strength Loctite 243 and tightened 49 lb-in (5.5 Nm).

## 4.2.2.6 Main Wheel Removal and Installation

### 4.2.2.6.1 Type of Maintenance

Line

### 4.2.2.6.2 Minimum Level of Certification

Owner/Pilot

### 4.2.2.6.3 Wheel Brake Line Disconnecting

Unscrew the nut (Fig. 3, pos. 1) from C9997417E (Fuel L-adapter A-Wek-6/4-1/8-MSv) and disconnect the line C9997205R (6x4 nylon tube) (Fig. 3, pos. 2). Prevent draining of brake liquid out of the hose by plugging it up.

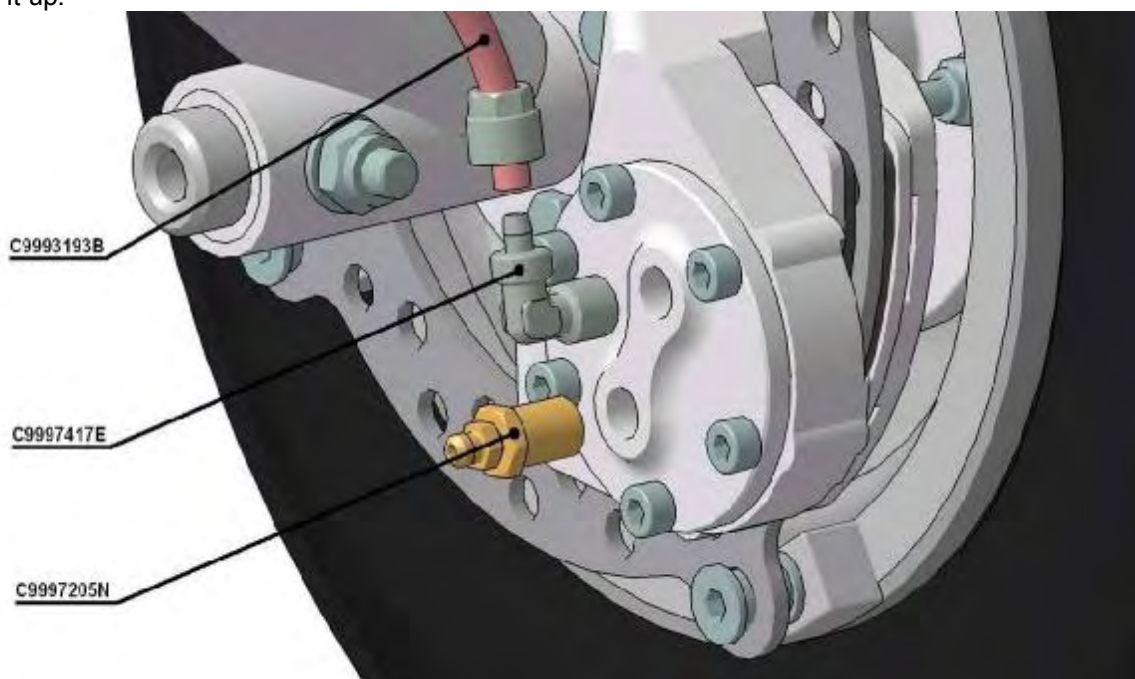


Fig. 5

### 4.2.2.6.4 Main Wheel Removal

Refer to Fig. 6.

Unscrew the nut C9996336 (Self-locking nut DIN 985-M8, regular), Fig. 6, by a 10x13 wrench and wrench 6.

Remove the bolt C9996083 (Bolt DIN 912 M8x60-8.8).

Remove the wheel KA4020500 (Main wheel), pulling it away from the fuselage. Use a rubber hammer, if necessary.

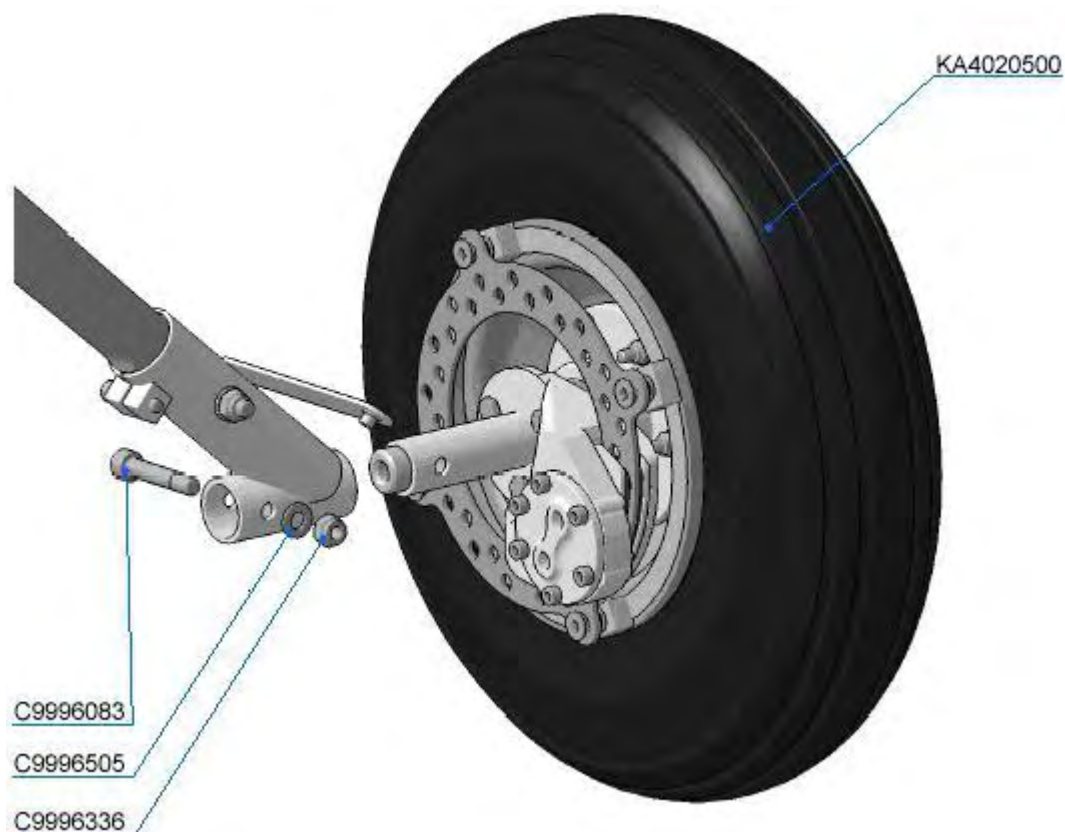


Fig. 6

#### 4.2.2.6.5 Before Installation

Inspect the bolt C9996083 for burrs, dents and tread integrity. Replace, if concerns appears.  
Inspect welding seams for integrity; the wheel attachment KA4020100R(L) (Main wheel attachment (right/left)), Fig. 7, for dents and cracks, mounting holes for integrity and circularity. Replace, if necessary.

#### 4.2.2.6.6 Replacement of Main Wheel Attachment

Refer to Fig. 7.

Unscrew the bolt C9996058 (Bolt DIN 912 M6x25-8.8) by a hex-nut wrench 5.

Unscrew the nut C9996336 (Self-locking nut DIN 985-M8, regular), Fig. 7, by a 10x13 wrench and hex-nut wrench 6.

Remove the bolt C9996083 (Bolt DIN 912 M8x60-8.8), Fig. 7.

Remove the wheel attachment KA4020100R(L).

Clean the mating surface on the main gear strut.

Inspect per item 4 of the Paragraph 4.2.2.4.3.

Apply lubricant Loctite 8008 onto the mating surface of the main gear strut.

Replace the nut C9996336 (Self-locking nut DIN 985-M8, regular), Fig.7, to a new one.

Check the bolt C9996083 for nicks and dents. Replace, if necessary.

Mounting of the main wheel attachment is a reverse of items 1 through 4. Tighten the nut (C9996336 Self-locking nut DIN 985-M8, regular), Fig. 7, with a 10x13 wrench and hex-nut wrench 6 to torque 200 lb-in (22.5 Nm), and the bolt C9996058 (Bolt DIN 912 M6x25-8.8) to 80 lb-in (9 Nm).



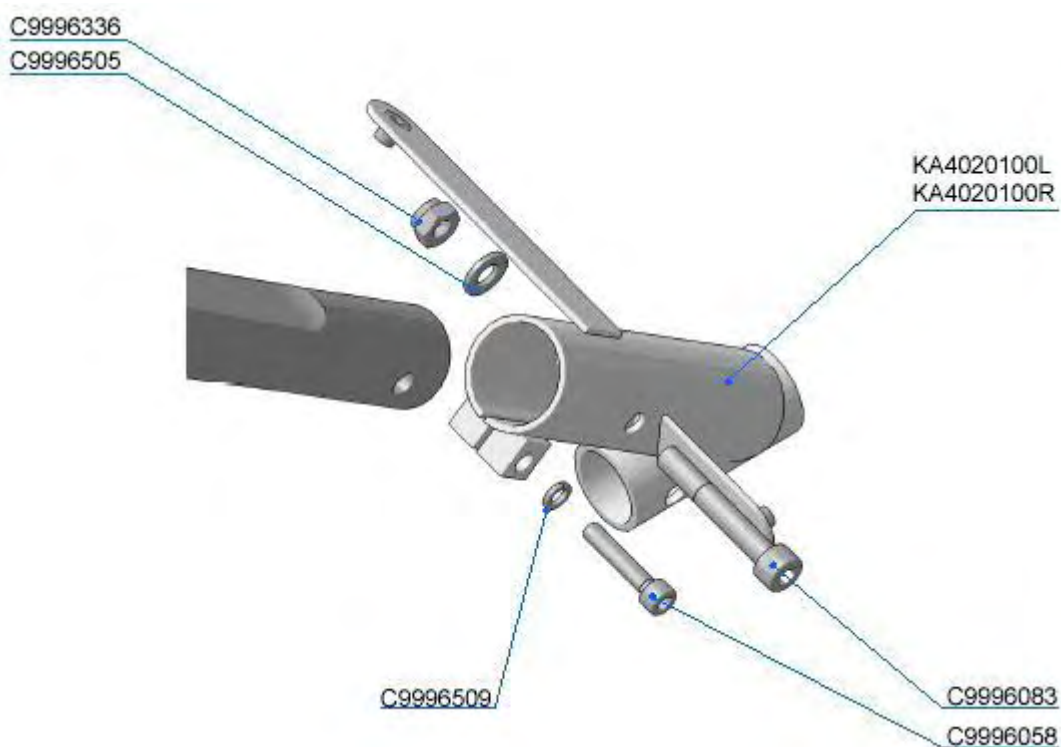


Fig. 7

## 4.2.2.6.7 Main Wheel Installation

Apply lubricant Loctite 8008 onto the surface of the axle to be inserted into the main wheel attachment KA4020100R(L).

Set the axle into the main wheel attachment KA4020100R(L) (Main wheel attachment (right/left)), Fig. 7, and match the holes for the bolt C9996083 (Bolt DIN 912 M8x60-8.8), Fig. 6.

Set the bolt C9996083 (Bolt DIN 912 M8x60-8.8), Fig. 6.

Replace the nut C9996336 (Self-locking nut DIN 985-M8, regular), Fig. 6, to a new one. Put a C9996505 (Washer DIN 125 A-8.4 mm VZ) washer under the nut. Tighten the nut to torque 200 lb-in (22.5 Nm) by a 10x13 wrench and hex-nut wrench 6.

## 4.2.2.7 Removal (Replacement) of Main Strut Fairing

### 4.2.2.7.1 Type of Maintenance

Line

### 4.2.2.7.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

To perform maintenance on the landing gear, brakes or wheel, first support the wing only at the chock wire location of the flap and aileron support (bracket No.3). Lift up the struts 10"-12" (250-300 mm).

Run operations from the Paragraph 4.2.2.5. Main Wheel Fairing Removal (Replacement) to demount the main wheel fairing.

Run operations from the Paragraph 4.2.2.6 Main Wheel Removal (Replacement): 1. Brake Chock Removal and 4. Main Wheel Attachment Replacement to demount the main wheel attachment KA4020100R(L).

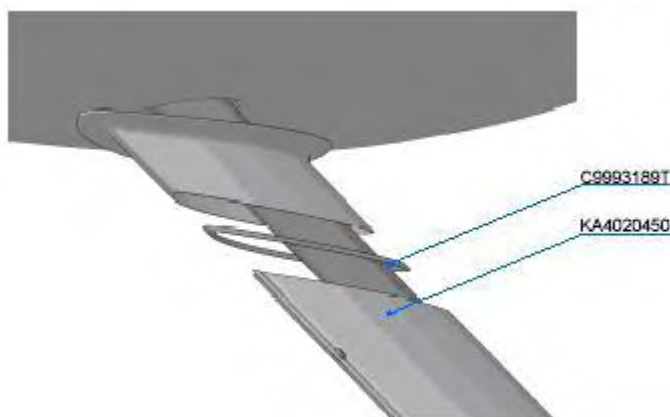


Fig. 8

Remove the fairing KA4020450 (Fairing, L/R), Fig. 8.

Inspect per item 4) of the Paragraph 4.2.2.4.3.

Inspect the seal C9993189T for integrity and install the fairing KA4020450 (Fairing, L/R), Fig. 8.

Run operations on main wheel attachment KA4020100R(L) installation (Paragraph 4.2.2.6.6, Main Wheel Attachment Replacement).

Connect the caliper C9997205U Caliper (Fig. 11, Fig. 5), bleed and check for operating the brake system.

Install the main wheel fairing (Paragraph 4.2.2.5 Main Wheel Fairing Removal (Replacement)).

## 4.2.2.8 Main Gear Struts Removal and Installation

### 4.2.2.8.1 Type of Maintenance

Line

### 4.2.2.8.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

### 4.2.2.8.3 Struts Removal (Replacement)

1. To remove the main gear struts dismount the strut fairings first (see Paragraph 4.2.2.7 Removal (Replacement) of the Main Strut Fairing).
2. Unscrew the nuts C9996336 (Self-locking nut DIN 985-M8, regular), Fig. 9, by a 10x13 wrench and 6 hex-nut wrench.
3. Unscrew the nuts C9996334 (Self-locking nut DIN 985-M6, regular), Fig. 9, by a 10x13 wrench and 5 hex-nut wrench.
4. Remove the bolts C9996060 (Bolt DIN 912 M6x35-8.8).
5. Remove the reinforcement KA1000410 L (R) (Rear reinforcement), left (right).
6. Remove the bolts C9996260 (Bolt DIN 931 M8x130-8.8), continuing to unscrew by a 6 hex-nut wrench, C9996083 (Bolt DIN 912 M8x60-8.8), turning and rocking the strut. Use a rubber hammer, if necessary.
7. Remove the strut KA4020001 (Main spring bar).

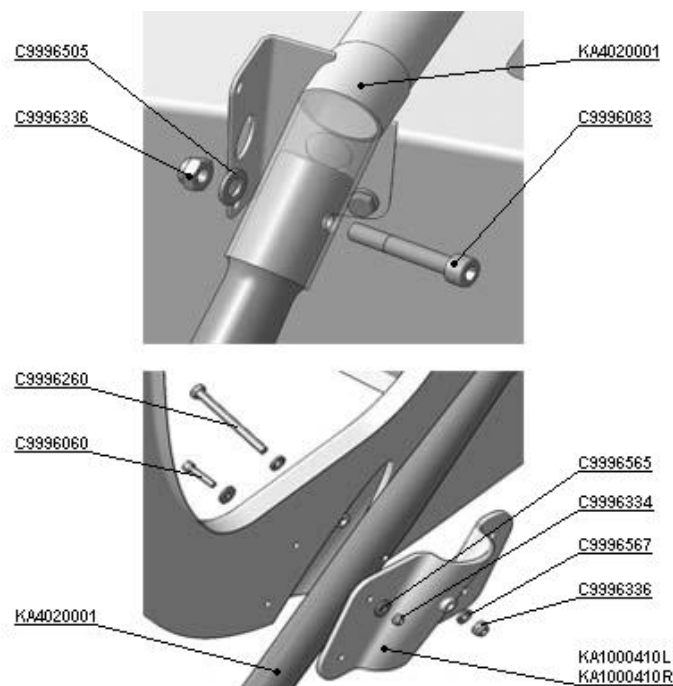


Fig. 9

8. Inspect per items 1)-4) of the Paragraph 4.2.2.4.3.
9. In case of concerns over integrity of the main landing gear parts, replace them to new ones.
10. If damages of the composite structure are found, contact directly Flight Design for inspection and making decision for further action.
11. Inspect the bolts C9996060, C9996083, C9996260 for nicks, dents and thread integrity. Replace, if necessary.
12. Apply lubricant Loctite 8008 onto the mating surfaces and attachments of the strut.

13. Install the strut KA4020001 (Main spring) and replace all the nuts to new ones. Installation is the reverse to removal (items 1 through 7). NOTE: Torque the nuts C9996336 (Self-locking nut DIN 985-M8, regular) to 200 lb-in (22.5 Nm), and nuts C9996334 (Self-locking nut DIN 985-M6, regular) to 80 lb-in (9 Nm).

## 4.2.2.8.4 Main Landing Gear Bracket Removal (Replacement)

1. To dismount the bracket KA4020200 (Upper mounting unit), Fig. 10 run items 1) through 7) of the Paragraph 4.2.2.8.3 for the right and left main gear struts.

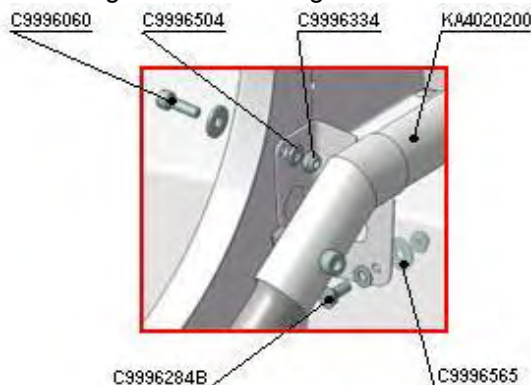


Fig. 10

2. Remove the bolts C9996284B (Bolt DIN 933 M6x20-8.8) by two 10x13 wrenches.
3. Unscrew the bolts C9996060 (Bolt DIN 912 M6x35-8.8) by a 10x13 wrench and 5 hex-nut wrench.
4. Inspect main gear bracket KA4020200, Rear reinforcement (left/right) KA1000410L(R), bulkhead and tunnel, main struts KA4020001 per items 1) through 4) of the Paragraph 4.3.2.6.1.
5. In case of concerns about integrity of the main gear components, replace them to new ones.
6. If damages of the composite structure are found, contact directly Flight Design for inspection and making decision for further action.
7. Inspect the bolts C9996060, C9996083, C9996284B and C9996260 for nicks, dents and thread integrity. Replace if necessary.
8. Replace the nuts C9996334 (Self-locking nut DIN 985-M6, regular) to new ones and install the bracket KA4020200 (Upper mounting unit) by running items 2 through 3 of this paragraph in reverse order. Torque the nuts to 80 lb-in (9 Nm).
9. Install the struts by running items 12 through 13 of the Paragraph 4.2.2.8.3.

## 4.2.2.9 Main Wheel

### 4.2.2.9.1 Type of Maintenance

Line

### 4.2.2.9.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

## 4.2.2.9.3 Wheel Inspection and Maintenance

### KA4020500 - MAIN WHEEL ASSEMBLY

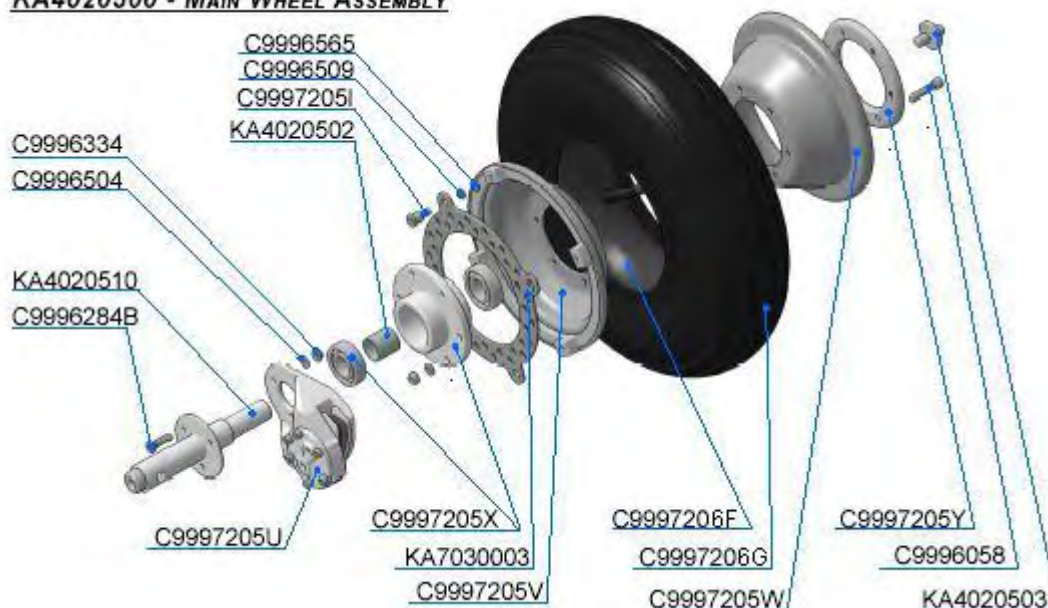


Fig. 11

For main wheel inspection (Fig. 11) do the following:

1. Unscrew the bolt KA4020503 (Bolt) by a 19x24 wrench.
2. Unscrew C9997205I (Pins for brake disk) by a 4 hex-nut wrench.
3. Remove the wheel from the axle.
4. Inspect the axle KA4020510 (Main wheel axle) for integrity, bending, nicks, dents, cracks. Inspect the threaded part for integrity. Replace, if necessary.
5. Unscrew the C9996058 Bolt DIN 912 M6x25-8.8 by a 10x13 wrench and 5 hex-nut wrench.
6. Inspect the rims for dents and cracks. Replace, if necessary.
7. Inspect mounting holes in the rims for bearing, cracks, circularity. Replace if necessary.
8. Inspect bearing for condition and replace if necessary.
9. Inspect the tube for integrity. Inspect the tire for foreign objects. Inspect metal parts of the wheel contacting the tube for sharp edges and nicks. Apply talcum onto the inner surface of the tire and onto the tube. Replace the tire C9997206G (Tire 4.00-6 BfGoodrich 4PR PowerHoby) and the tube C9997206F (Tube 4.00-6 Pn TR13) in case of cracks, height of tread less 0.04in (1 mm) or inability to keep necessary pressure within 24h.
10. Make sure that the spacer KA4020502 (Distance bushing) is of sufficient length to prevent bearing misalignment. Replace, if necessary.
11. Assembly is a reverse of removal. NOTE: The bolt KA4020503 (Bolt) must be set on lock liquid of high strength Loctite 270, and C9997205I (Pins) on lock liquid of middle strength Loctite 243.
12. Replace the nuts C9996334 (Self-locking nut DIN 985-M6, regular) to new ones and torque the C9996058 Bolt DIN 912 M6x25-8.8 by a 10x13 wrench and 5 hex-nut wrench to 80 lb-in (9 Nm).
13. Upon completion check brakes for operation.



## 4.2.2.9.4 Main Wheel Tube or Tire Change

**Note:** Before starting please verify that you have the correct tools available. To reach the screws inside the rim from the side of the gear leg you need a slim but long socket wrench.

1. Completely deflate the tire before starting to unscrew any of the bolts.
2. Unscrew the six bolts DIN 912 M6x25-8.8 (C9996058) (item 3, Fig 1,2,3) by a 10 socket wrench and 5 hex-nut wrench;
3. Remove the washer disk (item 1, Fig 2,3) from the wheel;
4. Remove the outer half rim (item 2, Fig 2) from the wheel hub. No needs to disassemble the hub with bearings from the axle during the replacing of tube and/or tire.
5. Remove tube and tire.
6. Inspect the rims for dents and cracks. Replace, if necessary.
7. Inspect mounting holes in the rims for bearing, cracks, circularity. Replace rims if necessary.
8. Apply talcum powder to the tube and proper position tube inside the tire.
9. Re-assemble wheel in reverse order. When closing the rims take special care that the inflation point is positioned straight and not sheared off by the rim, do not pinch the tube.
10. Replace the nuts C9996334 (Self-locking nut DIN 985-M6, regular) (item 4 , Fig 3) to new ones and torque the C9996058 Bolt DIN 912 M6x25-8.8 by a 10 socket wrench and 5 hex-nut wrench to 80 lb-in / 9 Nm.
11. Inflate tire to nominal pressure (2 bar / 29 psi)
12. Upon completion check the wheel condition and operation, brakes for operation.

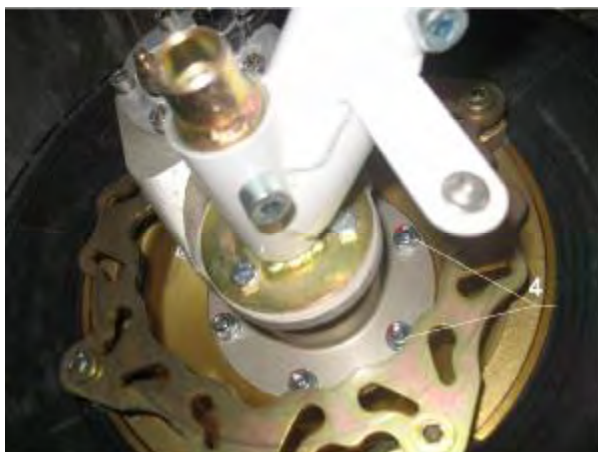


Fig. 1



Fig. 2

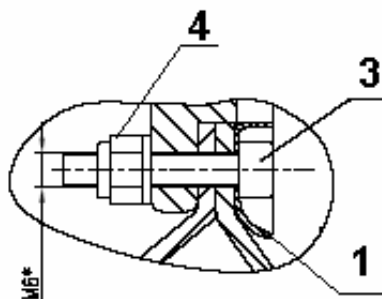


Fig. 3



### 4.2.3 Brake System

#### 4.2.3.1 Tools Required

Wrench 7x81 pcs  
Wrench 10x13 1 pcs  
Wrench 111 pcs  
Wrench 12x14 1 pcs  
Hex-nut wrench 3 1 pcs  
Hex-nut wrench 4 1 pcs  
Hex-nut wrench 5 1 pcs  
Wheel chocks 4 pcs

#### 4.2.3.2 Materials Required

Lock liquid of middle strength Loctite 243 as required  
Brake liquid 41 MIL-H-56060.88 pint / 0.5 l  
C9997205R 6x4 nylon tube 130" / 3.3 m (43.31" for each wheel and 43.31" for distribution)

#### 4.2.3.3 Inspection

##### 4.2.3.3.1 Type of Maintenance

Line

##### 4.2.3.3.2 Minimum Level of Certification

Owner/Pilot

##### 4.2.3.3.3 General

To inspect the brake system one person is required.

Prior to beginning put wheel chocks each side of the wheels to prevent unintended motion of the aircraft.

All the connectors but the connectors A (Fig. 5) are to be tightened up to torque 80 lb-in / 9 Nm and secured by lock liquid of middle strength Loctite 243.

The connector A (Fig. 5) is to be tightened up to torque 35 lb-in / 4 Nm, no lock liquid is to be used in this case.

Load on the brake control handle and its play can be adjusted by the rod tip C9997006C (Rod end bearing, ext. thread GA5), Fig. 1, b. Prior to adjusting the lock nut C9996333 (Self-locking nut DIN 985-M5, regular) has to be unscrewed by a 8x10 wrench, and a new one tightened to 49 lb-in / 5.5 Nm after adjustment is finished.

If brake system lines are broken, drain off brake fluid completely (put a can under the wheels to collect drained fluid, and unscrew the connectors A (Fig. 5) on both wheels 1 to 2 turns by a 7x8 wrench. After the repair is completed, carry out all the items of the Paragraph 4.2.3.4.

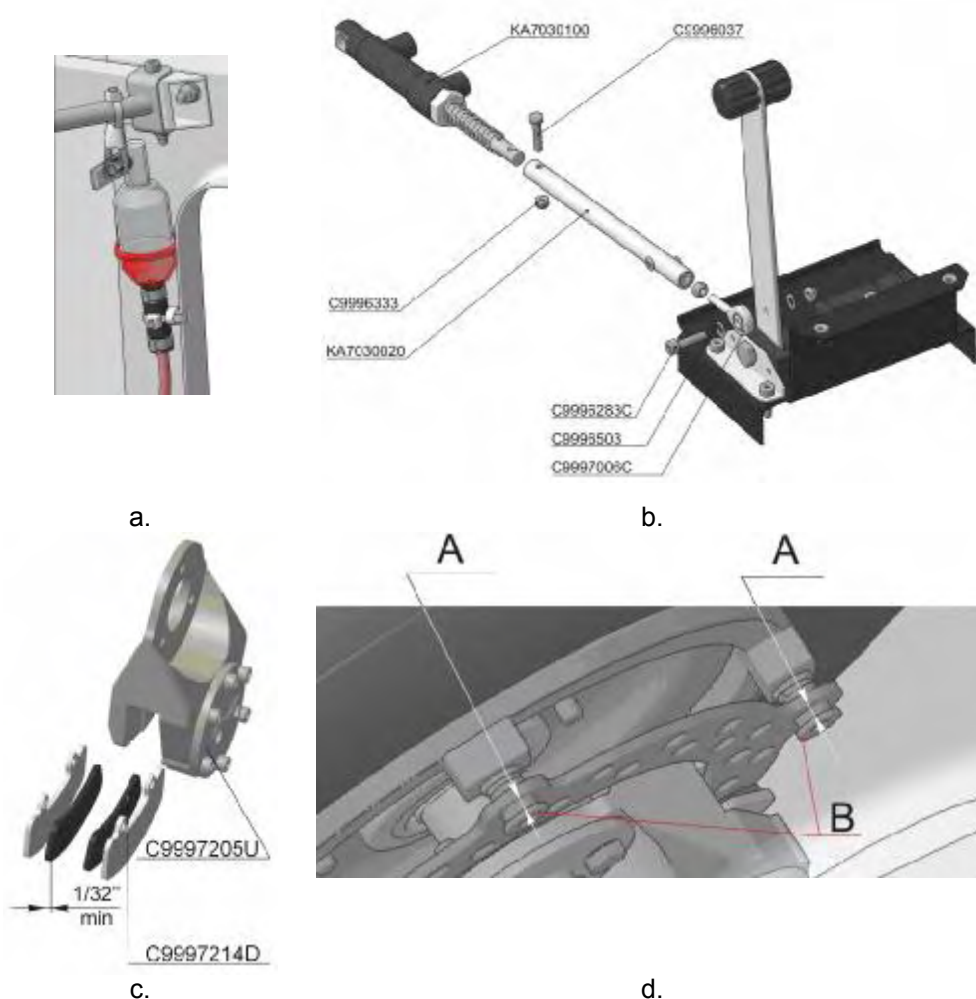


Fig. 1

## 4.2.3.3.4 Inspection of Wheel Brakes

Check for the necessary level of brake fluid (0.5 of the tank C9997813G Fuel Filter 5/16"), Fig. 1, a, visually before flight.

Check the brake control handle (item 1, Fig. 2) for play (up to  $1 \frac{3}{16}$ " / 3cm) prior to using brake, before flight.

Check for signs of leakage nearby the brake calipers C9997205U (Caliper), Fig. 1, c, visually before flight. Check the system for operating before flight.

Check brake disks for correctness of their shape, dents, bends, nicks, signs of oil and other liquids.

Ensure the brake discs have a little amount of free motion along the guide pins (See Fig. 1, d: B - C9997205I Pin for brake disk, A – distance for free motion).

Check thickness of brake pads C9997214D (Brake pads for magnesium caliper) (at least  $\frac{1}{32}$ " / 1 mm for each (Fig. 1, c).

Check tightness of all joints and connections with access panels removed and fairings that block visual inspection – 100 hours.



## 4.2.3.3.5 Inspection of Brake Controls

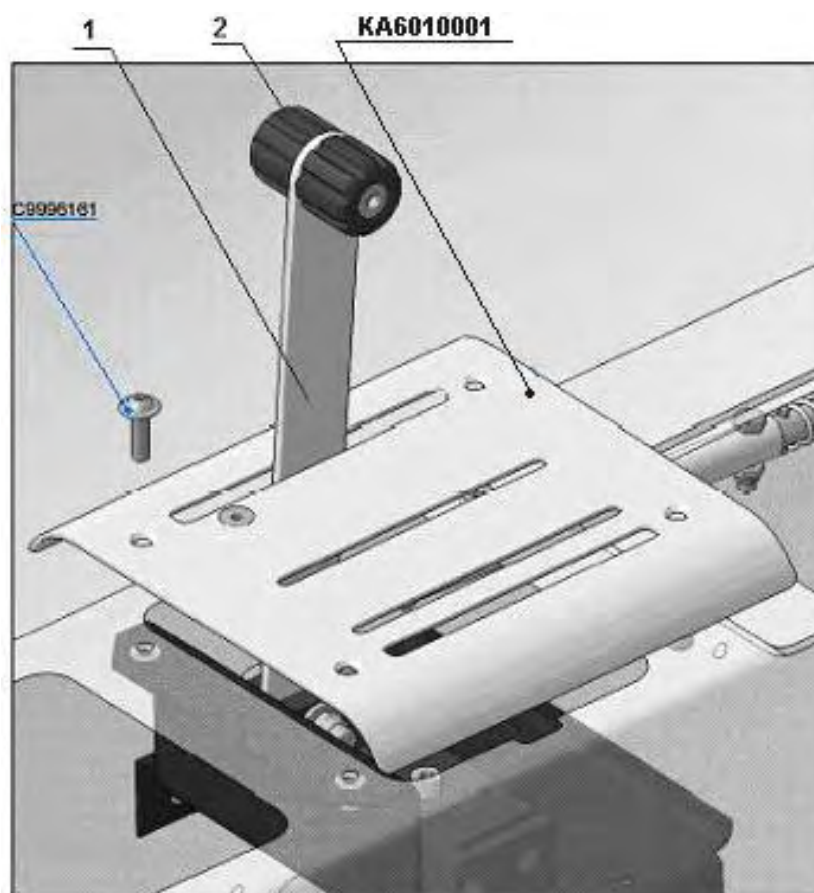


Fig. 2

Remove the access panel KA6010001 (Access Panel) for inspection. For that remove the knobs (item 2, Fig. 2) using a hex-nut wrench 4 from the levers (items 1, Fig. 2) and unscrew the four screws C9996161 (Screw ISO 7380 M5x12).



Fig. 3

Check the control lever (items 1, Fig. 2, Fig. 3), brake cylinder KA7030100 (Brake cylinder), and parking brake C9997419A (Fuel valve K-MI-561-1/8-22-II-MSV) (Fig. 2, Fig. 3) for operating.

**NOTE:** to get full access to brake system controls remove the access panel (item 3, Fig. 3) that hides the brake cylinder KA7030100 (Brake cylinder).

**Warning:** Do not overpressure the parking brake valve by applying too much force to the brake handle. The parking brake must work after gentle operation already.

View A

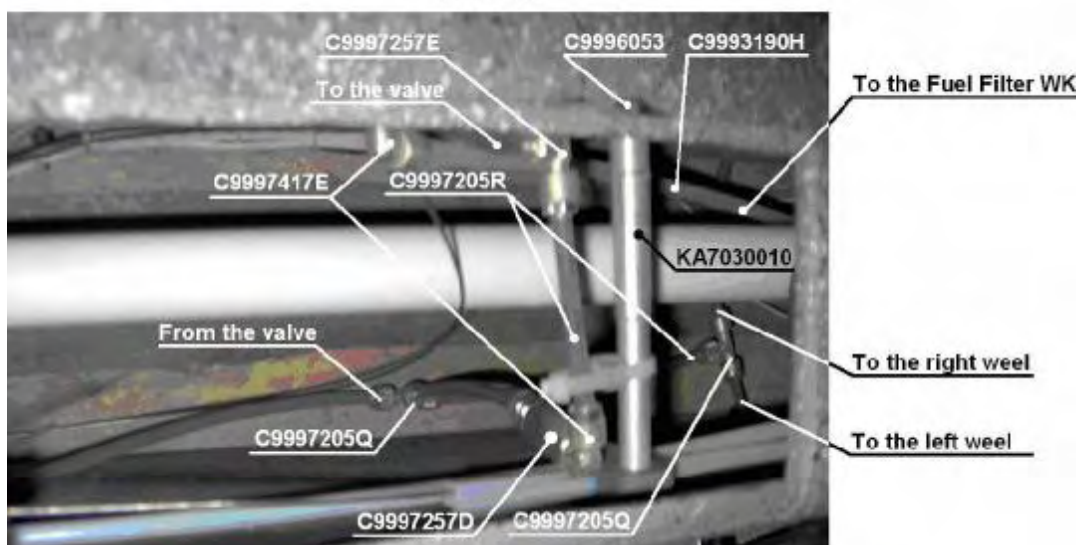


Fig. 4

Brake system controls connections are shown at Fig. 4.

Note that while installing the brake system lines the tee fitting C9997205Q - that distributes fluid between the left and right wheels must be shifted towards the left wall of the tunnel in order to ensure free access to the check valve C9997257D (Check valve L-RV6-11-1/8-MSv), Fig. 4.

Operation of the brake system is based on functioning of KA7030100 (Brake cylinder) (item 3, Fig. 3, Fig. 4), C9997419A (Fuel valve K-MI-561-1/8-22-II-MSV) (Fig. 2, Fig. 3) and C9997257D (Check valve L-RV6-11-1/8-MSv) (Fig. 4). If concerns raised, do the following.

- Inspect the level of brake fluid (a half of tank).
- Visually inspect the lines for air bubbles.
- Inspect line connections for leaks and damage where they contact the structure.
- Inspect the protection PVC hoses (Art No. 3193B) in the places where brake lines go through the fuselage skin. If necessary replace them with new ones. See figure below.



- Check thickness of the brake pads.
- Inspect the brake disks surface for signs of oil and other liquids.
- Replace brake system control parts as follows.
  1. drain off brake fluid completely (put a can under the wheels to collect drained fluid, and unscrew the connectors A (Fig. 5) on both wheels 1 to 2 turns by a 7x8 wrench.
  2. For the check valve C9997257D (Check valve L-RV6-11-1/8-MSv), Fig. 4, unscrew hose connectors and install the new valve, carefully tightening the hose connectors.
  3. For the parking brake valve C9997419A (Fuel valve K-MI-561-1/8-22-II-MSV), Fig. 2 and Fig. 3) open the hose connectors, exchange the parking brake valve, re-connect hose connectors and tighten them carefully.
  4. For the brake cylinder KA7030100 (Brake cylinder) (item 3, Fig. 3 and Fig. 4) open the hose connectors, disconnect from brake handle, exchange the brake cylinder, re-connect the brake handle, re-connect hose connectors and tighten them carefully.
  5. After the repair is completed, carry out all the items of the Paragraph 4.2.3.4. Carefully check all re-attached hose connections to be leak free after multiple operations.

**Note:** In case of unsatisfactory operation of the brake system after followed by carrying out all said above operations, immediately contact Flight Design for inspection and making decision on further action.

## 4.2.3.4 Filling Brake System with Fluid

### 4.2.3.4.1 Type of Maintenance

Line

### 4.2.3.4.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 4.2.3.4.3 Procedure

One person is required.

Visually check the system for integrity and tightness.

Make sure the brake control handle (item 1, Fig. 2 and Fig. 3) is in most forward position.

Make sure the aircraft is not set on parking brake, i.e. the valve C9997419A (Fuel valve K-MI-561-1/8-22-II-MSV) (Fig. 2 and Fig. 3) is open and the handle of the valve is aligned to aircraft longitudinal axle.

Place a can under the tank (item 1, Fig. 1) C9997813G (Fuel Filter 5/16") to collect brake fluid in case of overfilling.

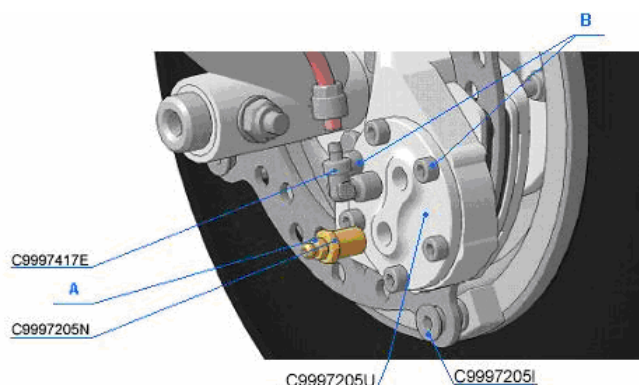


Fig. 5

To fill the brake system do the following.

1. Using a piece of tube C9997205R (6x4 nylon tube) connect a 0.35 pint / 200 ml syringe filled with brake fluid without air bubbles.
2. Unscrew the connector A 1 to 2 turns on the right wheel using a 7x8 wrench (Fig. 5).
3. Fill the lines with brake fluid so that it goes further 4" / 10cm from the tee fitting C9997205Q (Fig.4), that connects the lines from the right and left wheels, towards the brake cylinder KA7030100 Brake cylinder (item 3, Fig. 3 and Fig. 4).
4. Tighten the connector A (Fig. 5) using a 7x8 wrench up to torque 80 lb-in / 9 Nm). Disconnect the syringe.
5. Totally refill the syringe with the brake fluid with no bubbles and carry out operations 1 through 3 for the left wheel so that C9997813G (Fuel Filter 5/16" (item 1, Fig. 1) is ¾ full.
6. Screw in the connector A (Fig. 5) by a 7x8 wrench.
7. Move the brake control handle back and forth 5 to 8 times (items 1, Fig. 2 and Fig. 3). Note if there are air bubbles in the line nearby the caliper C9997205U (Caliper)
8. Unscrew the connector A 1 to 2 turns by a 7x8 wrench (Fig. 5).
9. Add as more brake fluid as enough to eliminate air bubbles nearby the caliper C9997205U Caliper.
10. Repeat operations 6 through 9 until full elimination of air in the caliper C9997205U (Caliper) with pads activated.
11. Screw in the connector A by a 7x8 wrench (Fig. 5).
12. Close the valve C9997419A (Fuel valve K-MI-561-1/8-22-II-MSV), Fig. 2 and Fig. 3, and move the handle 2 to 3 times back and forth (item1, Fig. 2 and Fig. 3). Note if there are air bubbles in the line nearby the check valve C9997257D (Check valve L-RV6-11-1/8-MSv), Fig. 4.
13. Inspect joints and connections for leaks.
14. Open the valve C9997419A (Fuel valve K-MI-561-1/8-22-II-MSV), Fig. 2 and Fig. 3, sharply.
15. Unscrew the connector A (Fig. 5) 1 to 2 turns by a 7x8 wrench.
16. Add as more brake fluid to eliminate air bubbles nearby the check valve C9997257D (Check valve L-RV6-11-1/8-MSv) (Fig. 4).
17. Repeat operations 11 through 16 until full elimination of air in the brake system controls.
18. Tighten the connector A (Fig. 5) up to torque 80 lb-in / 9 Nm by a 7x8 wrench. Disconnect the syringe.
19. Make sure the line is completely filled by fluid, no air bubbles are seen and the capacity C9997813G (Fuel Filter 5/16"), item1, Fig. 1, is ¾ full.
20. Make sure the brake disks and pads are dry and clean.
21. Check brakes for operating 2 to 3 times before flight while warming up the engine and taxiing.



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### 4.2.3.5 Brake Pads Replacement

#### 4.2.3.5.1 Type of Maintenance

Line

#### 4.2.3.5.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

#### 4.2.3.5.3 Procedure

1. Using 5 hex-nut wrench, unscrew the bolts C9997205I (Pin for brake disk), Fig. 5, and release the brake disk that it does not get between the pads.
2. Unscrew two bolts (item B, Fig. 5) attaching the brake pads by a 4 hex-nut wrench. Check that the springs C9997702C (Compression spring 1x8x28.5x8.5) opening the pads all present.
3. Replace the pads and set the spring C9997702C (Compression spring 1x8x28.5x8.5) between them.
4. Tighten two mounting bolts (item B, Fig. 5) of the pads by a 4 hex-but wrench up to torque 49 lb-in / 5.5 Nm. Use lock fluid of middle strength Loctite 243.
5. Install the brake disk.
6. Secure the brake disk tightening the bolts C9997205I (Pin for brake disk), Fig. 5, up to torque 80 lb-in / 9 Nm by a 5 hex-nut wrench. Use lock fluid of middle strength Loctite 243.
7. Make sure the brake disks are dry and clean.
8. Make sure all the lines are filled with fluid, no bubbles are seen, and the capacity C9997813G (Fuel Filter 5/16"), item 1, Fig. 1, is  $\frac{3}{4}$  filled.
9. Check brakes for operating 2 to 3 times before flight while warming up the engine and taxiing.





### 4.3 Flight Controls

#### 4.3.1 Aileron

Both ailerons are made of aramid top and bottom skins, carbon web and three glass fiber composite ribs. The aileron is hinged to the wing brackets by means of two aileron brackets.

To install ailerons one person is required.

To install wings after rigging ailerons three persons are required.

To adjust aileron angles of deflection two persons are required.

##### 4.3.1.1 Tools Required

Wrench 10 2 pcs

Wrench 81 pcs

Hex-nut wrench 3 1 pcs

Hex-nut wrench 4 1 pcs

Hex-nut wrench 5 1 pcs

Electronic level 1 pcs

Flexible 5 hex-head screwdriver 1 pcs

Screw driver with header 101 pcs

##### 4.3.1.2 Materials Required

Bonding fluid, middle strength Loctite 243 as required

C9993247B Glue Loctite 480 as required

Multipurpose plastic grease LITOL-24M TY 0254-015-00148820-99 (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso)) as required

C9996334 Self-locking nut DIN 985-M6, regular 12 pcs

C9997022 Spherical Bearing EGLM10 pcs

##### 4.3.1.3 General

- A. Unless otherwise specified the instructions below concern both right and left ailerons.
- B. To increase (reduce) length of a rod:
  - 1) Release the rod tips, having loosened the locking nut by an 8x10 wrench.
  - 2) **Take care that the tips are screwed into the threaded adjuster bushing body at least 5/16" / 8 mm.**
  - 3) Unscrew (screw in) the rod tip a half-turn (180°) on each of the rods.
  - 4) Check rod length.
  - 5) Repeat items 2 through 4, if necessary.
  - 6) Tighten the locking nut by an 8x10 wrench, unscrewing it from the tip towards the rod.
  - 7) Note that the nuts C9996334 (Self-locking nut DIN 985-M6, regular) are to be tightened to 80 lb-in / 9 Nm and C9996333 (Self-locking nut DIN 985-M5, regular) to 49 lb-in / 5.5 Nm.
- C. Set the fuselage so, that fuselage roof is horizontal. Check it by a level that must be perpendicular to the wing saddle area (root rib).

##### 4.3.1.4 Inspection

###### 4.3.1.4.1 Type of Maintenance

Heavy

###### 4.3.1.4.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

## 4.3.1.4.3 Bracket Inspection

Inspect the wing brackets for security and play (KW2010030, KW2010040 for the right wing, and KW2020030, KW2020040 for the left wing). Torque the bolts (C9996286P Bolt DIN 912 M6x35, A2) by a 5 hex-head screwdriver and screwdriver with header 10 in case of play. Use hole A for access to the aft of the wing lower skin.



Inspect the aileron brackets (KW2030010R and KW2030020R for the right wing, or KW2030010L and KW2030020L for the left wing) for play. In case of play torque the bolts C9996221 (Bolt DIN 7991 M5x16 A2) to 49 lb-in. / 5.5 Nm by a hex-nut wrench 3, and bolts C9996286K (Bolt DIN 912 M6x16, A2) to 80 lb-in. / 9 Nm by a hex-nut wrench 5.

## 4.3.1.4.4 Wing bracket bearings inspection

Inspect the bearings (C9997022 Spherical Bearing EGLM) for play. Do not lubricate them with anything. If play exceeds  $\frac{5}{256}$ " / 0.5 mm, replace the bearing (C9997022 Spherical Bearing EGLM). For bearing installation use lock liquid Glue Loctite 480.

Check if there is KA2010008 bushing (1) in the wing brackets (2) (KW2010030, KW2010040 for the right wing or KW2020030, KW2020040 for the left wing), Fig. 1.

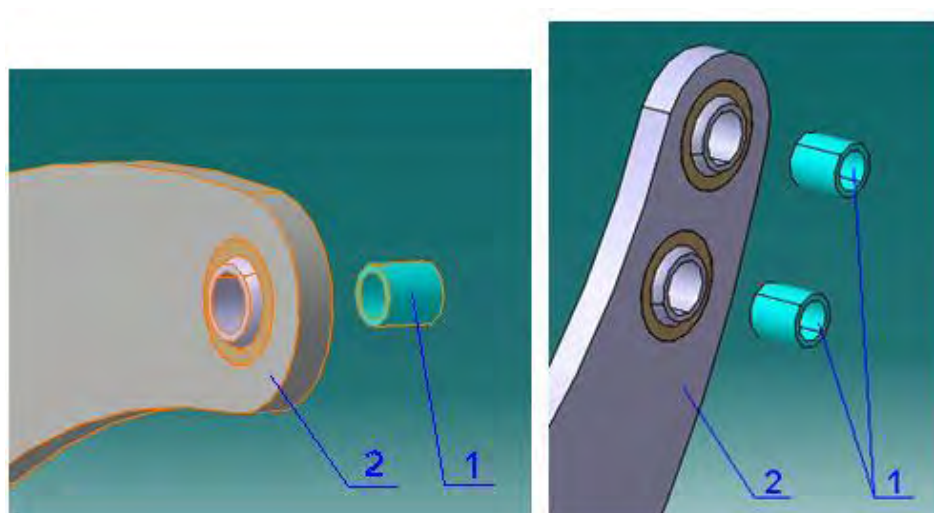


Fig. 1



## 4.3.1.4.5 Rods / Bellcranks inspection

Check that the rod tips (Rod end bearing, ext. thread GA) are screwed into the rods on a length of more than  $\frac{15}{64}$  inch / 6 mm. If this is not the case, try to balance the screwed in length between the rod end bearings on both sides. If this does not give the desired result, the rod must be exchanged against a longer one.

Inspect all rod tips for play.

Inspect all bellcranks and other parts of the aileron control with bearings for play. If play exceeds  $\frac{5}{256}$ " / 0.5 mm, replace the bearing. Play of the control stick tip should not exceed  $\frac{5}{128}$ " / 1 mm. Otherwise **inform directly Flight Design for inspection and further instructions.**

Lubricate the bearings with LITOL-24M (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso)) as necessary.

## 4.3.1.5 Aileron Installation

### 4.3.1.5.1 Type of Maintenance

Heavy

### 4.3.1.5.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

Flight Design task specific training required.

Put the wing top skin down onto a horizontal surface. Inspect per Paragraph 4.3.1.4.3.

Match hole on the root aileron bracket (1) (KW2030010R for the right wing) with hole in the bushing of the bearing of the wing bracket No.3 (2) (KW2010030) and connect them by the bolt (3) KW2020005 (do not fix the bolt by the nut (4) (C9996334, Self-locking nut DIN 985-M6, regular)). Fig. 2.

**NOTE:**the bolt connecting the aileron and the rod tip must not be installed.



Fig. 2

Match hole in the aileron bracket (1) (KW2030020R) with hole in the bushing of the bearing of the wing bracket No.4 (2) (KW2010040), put 4 washers (4) (C9996504, Washer DIN 9021-6.4 mm VZ) between the wing bracket and the aileron bracket and connect them by the bolt (3) KW2020007 (do not fix the bolt by the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular)) Fig. 3.

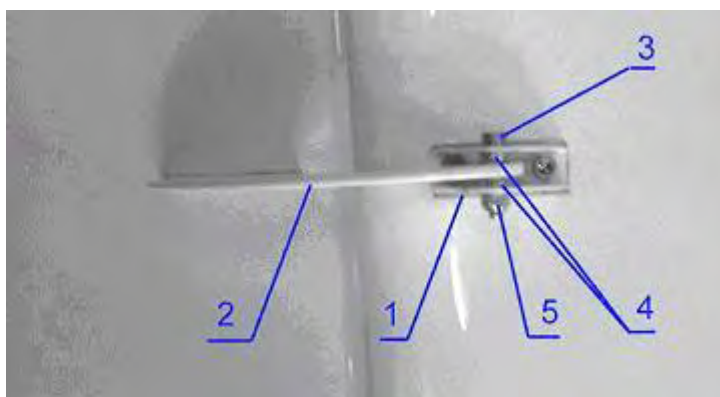


Fig. 3

Using a washer C99965604 (Washer DIN 125 A2B-6.4 mm) and the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular) fix the bolts KA2020005 and KW2020007 (3). Use new nuts only. Torque the nut with two 8x10 wrenches to 80 lb-in / 9 Nm, Fig. 2 and with one 8x10 wrench and one 5 hex-nut wrench to 80 lb-in / 9 Nm Fig. 3.

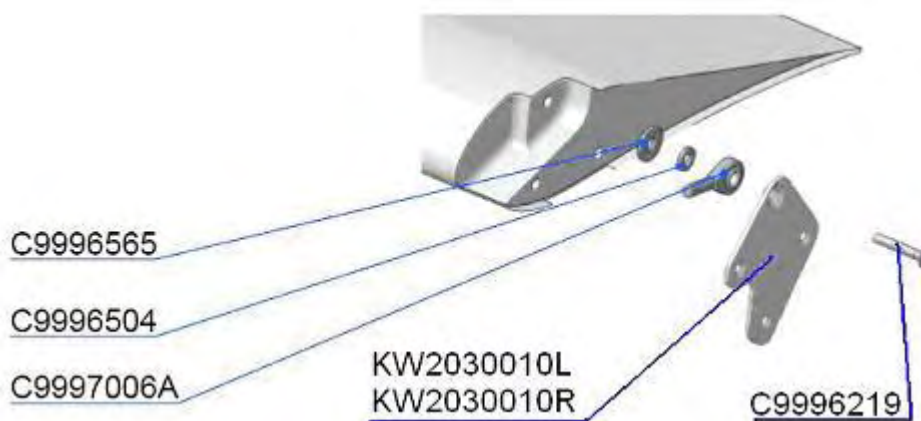


Fig. 4

Apply 1 or 2 drops of Bonding liquid, middle strength Loctite 243 onto the threaded part of the bolt C9996219 (Bolt DIN 7991 M6x35). Set the bearing C9997006A (Rod end bearing, ext. thread GA6) by the bolt C9996219 (Bolt DIN 7991 M6x35 A2) onto the aileron root rib. Use washers C9996565 (Washer DIN 9021-6.4 mm VZ) and C9996504 (Washer DIN 125 A2B-6.4 mm) as shown (Fig. 4). Torque the bolt by a 4 hex-nut wrench to 80 lb-in / 9 Nm.

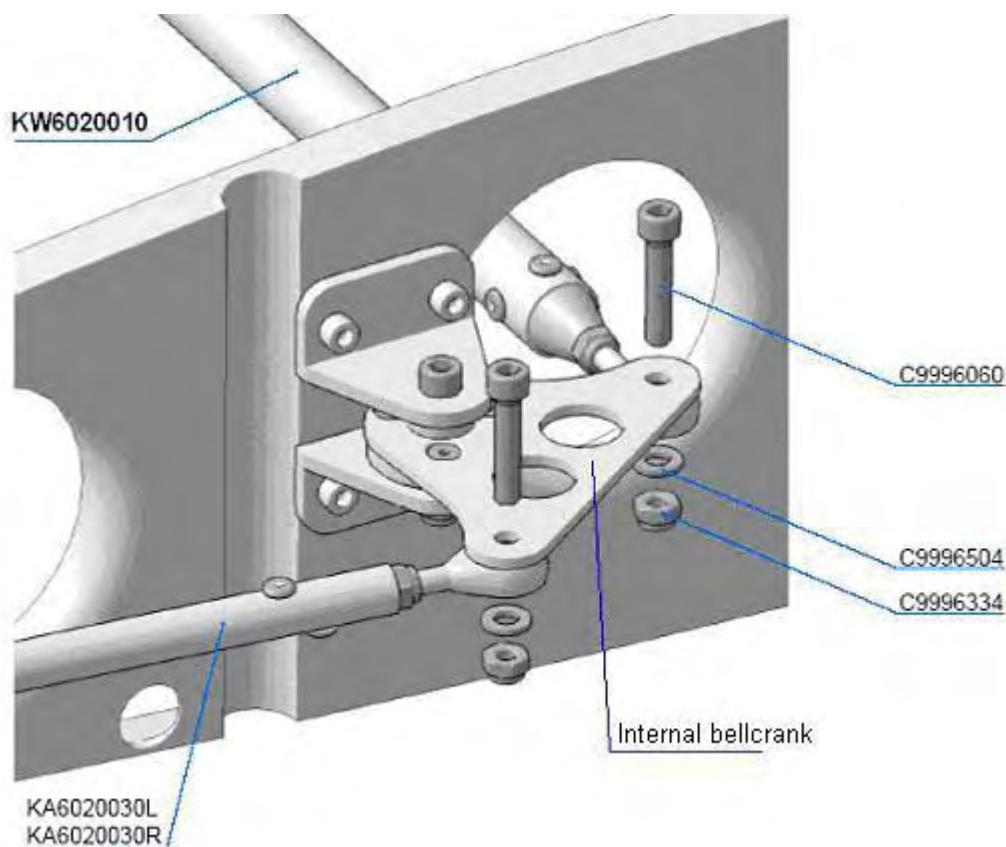


Fig. 5

Unscrew the nut C9996334 (Self-locking nut DIN 985-M6, regular) by a 10 wrench and 5 hex-hut wrench. Disconnect the rod (KA6020030R) from the internal bellcrank. Fig. 5.

Connect the rod (3) (KA6020030R) with the bearing (1) (C9997006A, Rod end bearing, ext. thread GA6), that is fixed to the aileron root rib as shown (Fig. 6).

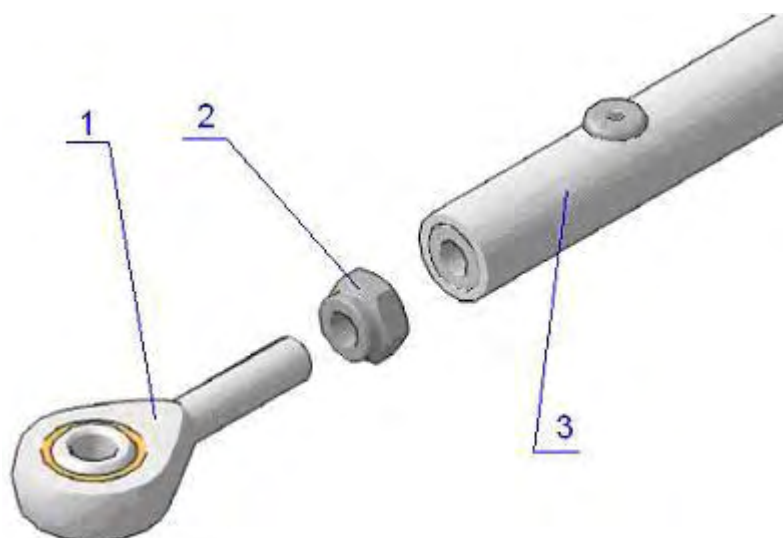


Fig. 6

Connect the aileron rod (1) (KA6020030R) with internal bellcrank (Fig. 5). Engage, but do not tighten the nut on the bolt.

Set the external bellcrank (2) KA6020040 so that the line between the rod (1) attachment hole and bellcrank axle of rotation is perpendicular to the root rib (Fig. 7). At the same time the internal bellcrank must be set so that the line between the rod KW6020010 mounting hole and bellcrank axle of rotation is parallel to the rib of the wing.

Otherwise correct internal bellcrank positions by adjusting length of the KW6020030R rod; disconnect the rod KW6020030R from internal bellcrank and aileron and adjust length of the rod per Paragraph 4.3.1.3 B. Take care that the tips are inserted into the KW6020030R rod at least 0.25 inch / 6 mm.

Check "zero" position and angles of deflection.

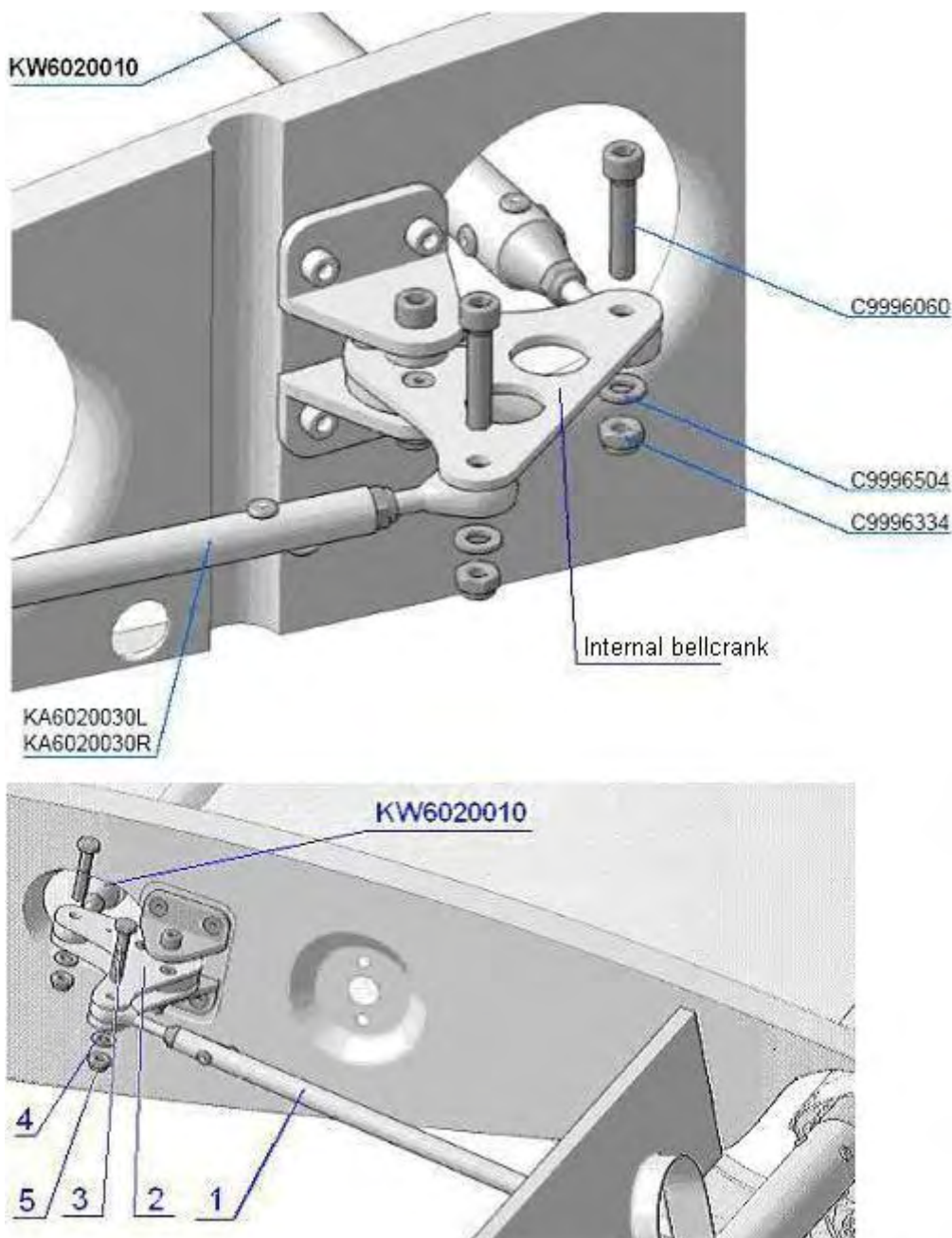


Fig. 7

Install the wings (1 and 2) onto the fuselage. Fix them by the main bolts (3) KA2000010. Fig. 8.  
While installing the wings make sure that the pin in the flap root bracket (1) (KA2040010L for the left wing, KA2040010R for the right wing) gets into slot in the tip of the flap rod (2) KA6030200 (Transverse rod). Fig. 9.

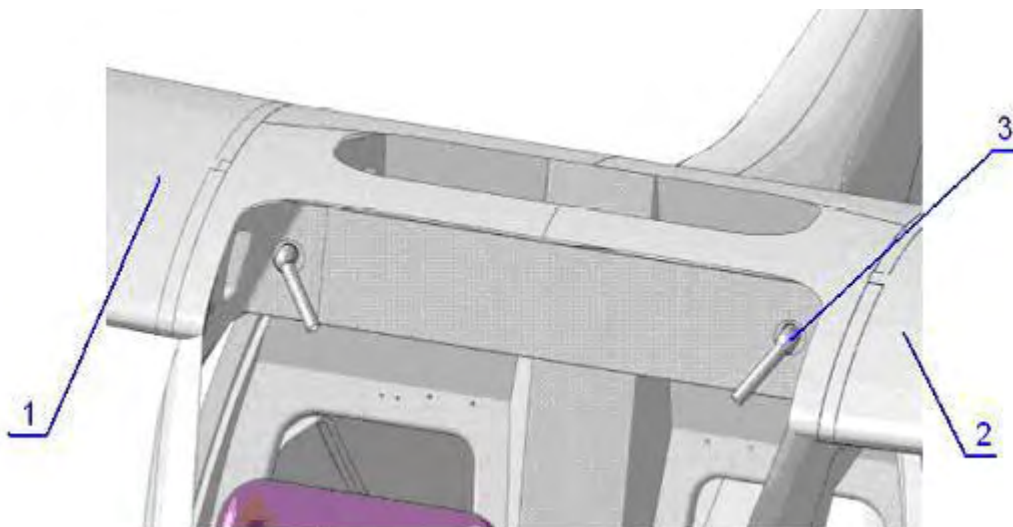


Fig. 8



Fig. 9



## 4.3.1.6 Aileron Adjustment

### 4.3.1.6.1 Type of Maintenance

Line

### 4.3.1.6.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

### 4.3.1.6.3 Rigging Aileron "Zero" Position

"Zero" position of the ailerons is the position when the ailerons are aligned to the flaps in  $-6^{\circ}$  ( $-12^{\circ}$ ) cruise configuration.

1. Set the flaps in  $-6^{\circ}$  ( $-12^{\circ}$ ) cruise position.
2. Fix the control sticks (Fig. 10) in neutral position (sticks must be vertical when seen from behind perpendicular to tube under the pyramid. The fork-rod (Fig. 11) must be in neutral position with respect to the fuselage roof in the spar box area. (the top is set horizontally by a level)



Fig. 10

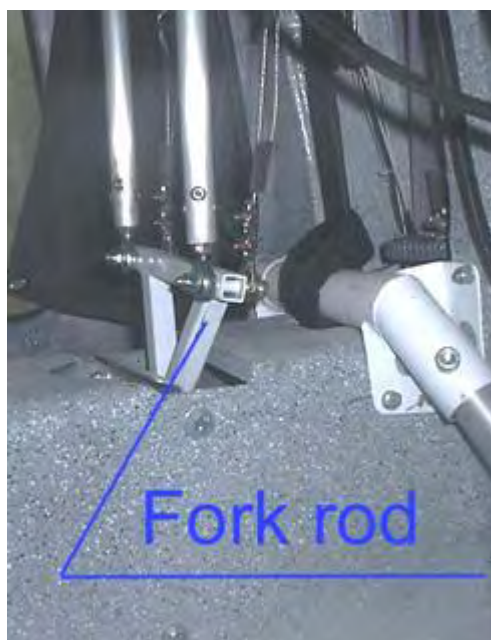


Fig. 11

3. Match the holes in the rod tip (C9997006A, Rod end bearing, ext. thread GA6) with the hole in the bellcrank (2) KA6020040 (Fig. 7). Note that when the external bellcrank (2) KA6020040 is set so that the line between the rod (1) attachment hole and bellcrank axle of rotation is perpendicular to the root rib (Fig. 7), the internal bellcrank must be set so that the line between the rod KW6020010 mounting hole and bellcrank axle of rotation is parallel to the rib of the wing. Otherwise disconnect KA6020050R(L) and change its length per Paragraph 4.3.1.3 B.
4. Connect the rod in the fuselage root rib box (1) (KA6020050L for the left wing, KA6020050R for the right wing) with bellcrank (2) (KA6020040L for the left wing, KA6020040R for the right wing) by the bolt (3) KA6020021. Engage the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular) onto the bolt (3), but do not tighten. Fig. 7.
5. Check "zero" position of the ailerons. If the ailerons are not aligned with the flaps, disconnect the rod (KA6020030R for the right wing, KA6020030L for the left wing) from the internal bellcrank KA2010130. (Fig. 7) and reduce length of the rod KA6020030R(L) in case the aileron trailing edge is lower than the flap trailing edge (refer to Paragraph 4.3.1.6 B). Otherwise increase length of the rod.
6. Connect the aileron rod KA6020030L (KA6020030R) with the internal bellcrank. Engage, but do not tighten the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular) on the bolt (3) (C9996061, Bolt DIN 912 M6x40-8.8). Fig. 7.
7. Check aileron "zero" position. If the ailerons are not aligned with the flaps repeat items 5 through 6.



## 4.3.1.6.4 Aileron Deflection Adjustment

Aileron deflections are defined in the deflection table.

Deflection can be adjusted by length of the rods in the aileron control system.

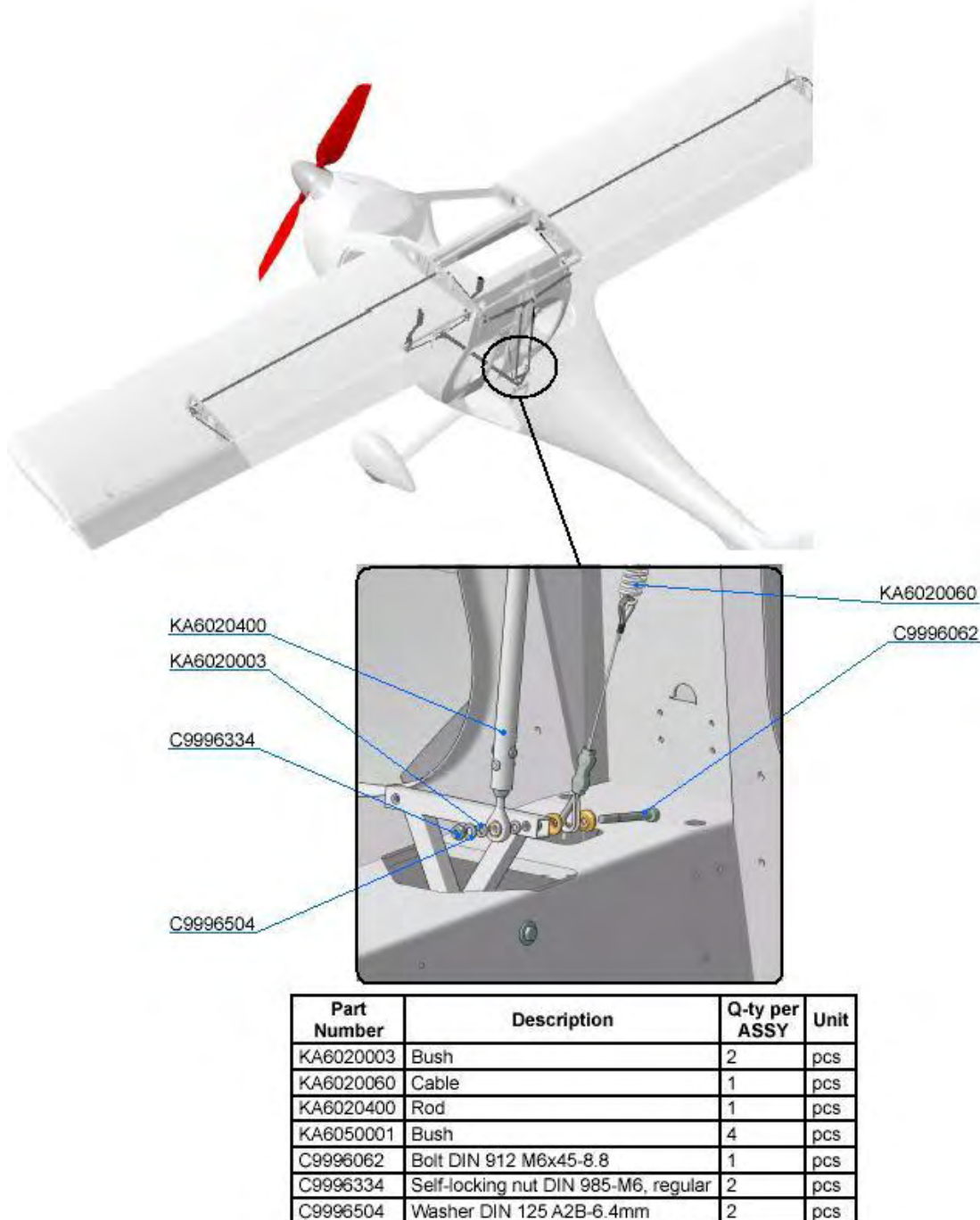


Fig. 12

To change it, length of the vertical rods KA60200400 (Fig. 12) (decrease length of the rod for make wider the range of deflection, and otherwise) and rods in the root rib box (KA6020050L for the left wing, and KA6020050R for the right wing) are to be changed. Length of the rod can only be changed according to Paragraph 4.3.1.3 B). After every change, check angles of deflection by an electronic level.

## 4.3.1.6.5 Measuring Aileron Deflection

Any adjustment of the aileron control system must be documented in an adjustment report. You can find the template starting the nominal values and allowable tolerances in the Appendix of this maintenance manual.

Step 1. Set flaps to upper position  $-6^\circ$  or  $-12^\circ$  ( $-6^\circ$  is required for CTSW registered within USA as LSA aircraft). In this position the trailing edges of aileron and flaps must coincide (see photo 1).



Photo 1

Step 2. Put the pattern on the flap (see photo 6). Deflect the aileron in upper position by control stick. Place between markers on the pattern must coincide with the aileron trailing edge (see photo 2). Markers on the pattern define boundary values of maximum deflection angle.



Photo 2

Using ruler instead of deflection template:

Measure distance between same corners (lowest or topmost) on the rear edge of the flap and on the aileron (see photo 2.1).



Photo 2.1

Step 3: Deflect the aileron in lower position by control stick. Place between markers on the pattern must coincide with the aileron trailing edge (see photo 3). Markers on the pattern define boundary values of maximum deflection angle.



Photo 3

Using ruler instead of deflection template:

Measure the distance between same corners (lowest or topmost) on the rear edge of the flap and on the aileron (see photo 3.1).



Photo 3.1

Step 4. Repeat operations 2 and 3 for the other aileron.

#### 4.3.1.7 Verification of Aileron Installation and Adjustment

1. Inspect per Paragraph 4.3.1.4.
2. Check aileron deflection (Paragraph 4.3.1.6.5).
3. Tighten the rod end locking nuts by an 8x10 wrench, tightening them onto the rod per Paragraph 4.3.1.3 B) for all rods that have been re-adjusted.
4. After adjustment, the elements of the ailerons control system must not touch the elements of fuselage construction and flaps control system elements.
5. Torque bolts with 8x10 wrenches to 80 lb-in / 9 Nm as shown (Fig. 7).



### 4.3.2 Flaps

The flaps are driven by an electrical spindle motor and are activated via the flap control in the lower section of the instrument panel. The desired flap setting is selected with a torque switch. The position indicator will flash as long as the flaps are moving to the desired setting. Once the desired setting has been reached, the position will be constantly illuminated. The flaps may be set at any of the following positions:  $-12^{\circ}$  ( $-6^{\circ}$  for USA registered aircraft),  $+0^{\circ}$ ,  $+15^{\circ}$ ,  $+30^{\circ}$ ,  $+40^{\circ}$ .

The spindle motor is integrated into the mixer behind the main frame in the aircraft baggage compartment. It influences the controls mixer, whence the flaps are activated via push rods. Both flaps are directly attached to a torque tube in the fuselage, thus ensuring that they are always deflected symmetrically.

The flap servo has an internal load-limiting device which prevents the extension of the flaps at too high airspeeds without causing sustainable damage to the structure. Should the indicator blink constantly when extending the flaps, airspeed should be reduced. If the flaps then extend, the internal load-limiting device was in operation. If extension speed is below the maximum speed for flap extension as given in the handbook, the next Flight Design service station should be contacted.

The flap control circuit breaker is to be found directly adjacent to the flap controls. It will pop if the flap servo is continuously over-loaded. As it is a thermal circuit breaker, it can take some time before it can be pushed back in.

**Note:** The CTSW can be safely landed in any flap configuration.  
Control forces during go-around in the landing configuration have been demonstrated to be acceptable.

#### 4.3.2.1 Tools Required

Wrench 101 pcs  
Wrench 71 pcs  
Wrench 81 pcs  
Hex-nut wrench 3 1 pcs  
Hex-nut wrench 4 1 pcs  
Hex-nut wrench 5 1 pcs  
Electronic level 1 pcs  
Screwdriver 5 mm 1 pcs  
Flexible hex-head screwdriver 51 pcs  
Screw driver with header 101 pcs

#### 4.3.2.2 Materials Required

C9993247C Bonding liquid, middle strength Loctite 243  
C9993247B Loctite Glue 480  
C9993513 Multipurpose plastic grease LITOL-24M TY 0254-015-00148820-99 (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso))  
C9996334, Self-locking nut DIN 985-M6, regular 6 pcs  
C9996333, Self-locking nut DIN 985-M5, regular 3 pcs  
C9997022 Spherical Bearing EGLM10 pcs  
KA2010008 Bush 10 pcs  
KB6030305 Bush 2 pcs  
KA2040013 Pin 2 pcs  
C9997198B Miniature switch 2 pcs



## 4.3.2.3 General

1. Unless otherwise specified the instructions below concern both right and left flaps.
2. To increase (reduce) length of a rod:
  - a) Release the rod tips, having loosened the locking nut by an 8x10 wrench.
  - b) Take care that the tips are screwed into the threaded adjuster bushing body at least 15/16" / 6 mm.**
  - c) Unscrew (screw in) the rod tip a half-turn (180°) on each of the rods.
  - d) Check rod length.
  - e) Repeat items 2 through 4, if necessary.
  - f) Tighten the locking nut by an 8x10 wrench, unscrewing it from the tip towards the rod.
  - g) Note that the nuts C9996334 (Self-locking nut DIN 985-M6, regular) are to be tightened to 80lb-in / 9 Nm and C9996333 (Self-locking nut DIN 985-M5, regular) to 49 lb-in / 5.5 Nm.
3. Set the fuselage so, that fuselage roof is horizontal. Check it by a level that must be perpendicular to the wing saddle area (root rib).

Installation or removal of the flaps requires one person.  
Setting of flap deflections requires two persons.

## 4.3.2.4 Inspection

### 4.3.2.4.1 Type of Maintenance

Line

### 4.3.2.4.2 Minimum Level of Certification

Owner/Pilot

### 4.3.2.4.3 Bracket Inspection

Inspect the wing brackets for security and play (KW2010010, KW2010020 and KW2010030 for the right wing, and KW2020010, KW2020020 and KW2020030 for the left wing). Torque the bolts (C9996286P Bolt DIN 912 M6x35, A2) by a 5 hex-head screwdriver and screwdriver with header 10 in case of play. Use hole A for access to the aft of the wing lower skin if necessary.



Inspect the flap brackets (KW2040010R, KW2040020R, and KW2040030R for the right wing, or KW2040010L, KW2040020L and KW2040030L for the left wing) for play. In case of play torque the bolts C9996221 (Bolt DIN 7991 M5x16 A2) to 49 lb-in / 5.5 Nm by a hex-nut wrench 3, and bolts C9996286K (Bolt DIN 912 M6x16, A2) to 80 lb-in / 9 Nm by a hex-nut wrench 5.

#### 4.3.2.4.4 Wing bracket bearings inspection

Inspect the bearings (C9997022 Spherical Bearing EGLM) for play. Do not lubricate them with anything. If play exceeds  $\frac{5}{256}$ " / 0.5 mm, replace the bearing (C9997022 Spherical Bearing EGLM). For bearing installation use Loctite 480.

Check if there is KA2010008 bushing (1) in the wing brackets (2) (KW2010010, KW2010020 and KW2010030 for the right wing, and KW2020010, KW2020020 and KW2020030 for the left wing), Fig. 1.

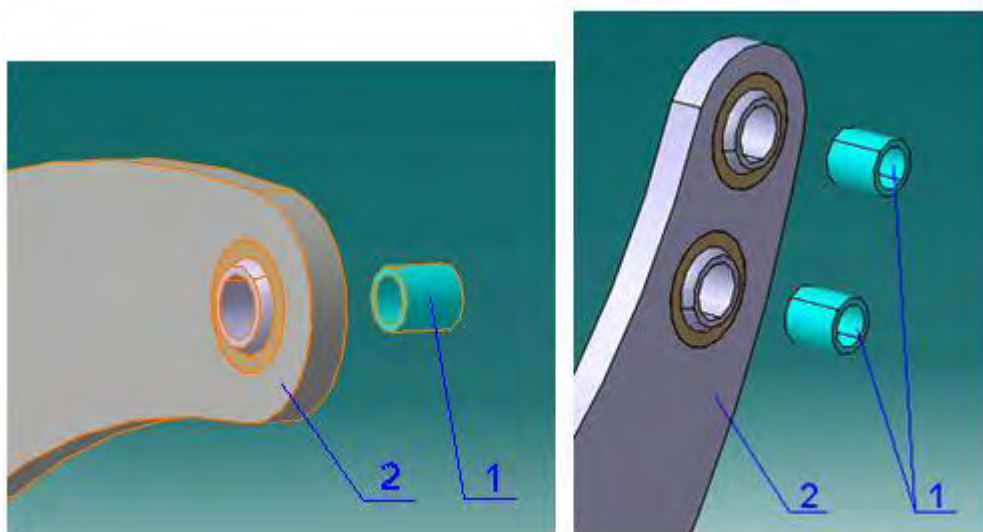


Fig. 1

#### 4.3.2.4.5 Rods / Bellcranks inspection

Check that the rod tips (Rod end bearing, ext. thread GA) could be inserted into the rods more than  $\frac{15}{64}$  inch / 6 mm. Change the rod, if negative.

Inspect all rod tips for play.

Inspect all bellcranks and other parts of the flap control with bearings for play. If play exceeds  $\frac{5}{256}$ " / 0.5 mm, replace the bearing.

Lubricate the bearings with LITOL-24M (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso)) as necessary.



## 4.3.2.5 Flap Installation

### 4.3.2.5.1 Type of Maintenance

Heavy

### 4.3.2.5.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

### 4.3.2.5.3 Procedure

Match the hole in the root flap bracket (1) (KW2040010R for the right wing, or KW2040010L for the left wing) with the hole in the bushings of the bearing of the wing bracket No.1 (2) (KW2010010 for the right wing, or KW2020010 for the left wing) and connect them by the bolt (3) KA2020006 (but do not fix the bolt by the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular), Fig. 2.

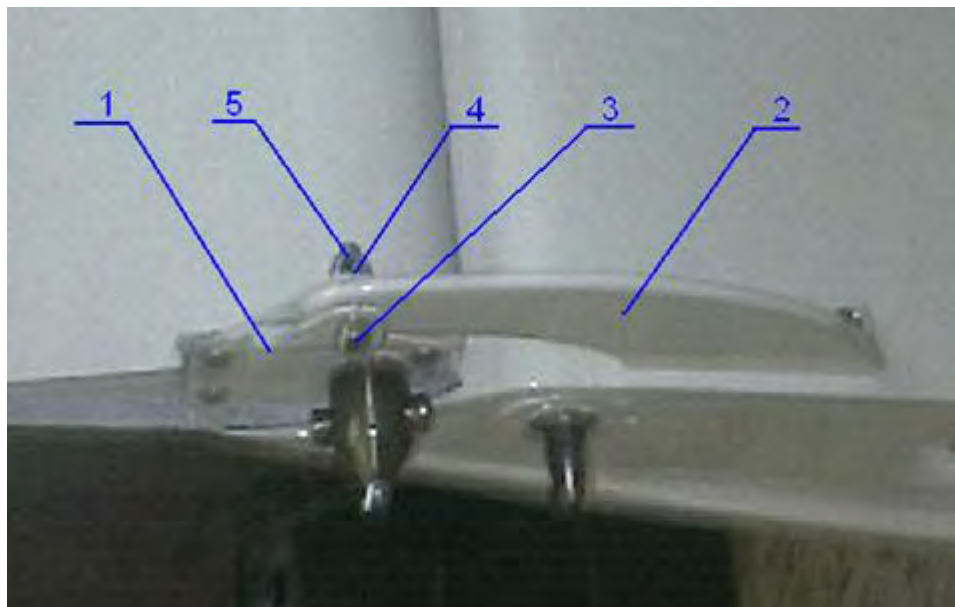


Fig. 2

Match the holes in the flap mid bracket (1) (KW2040020R for the right wing or KW2040020L for the left one) with the hole in the bushing of the bearing of the bracket No.2 (2) (KW2010020 for the right wing or KW2020020 for the left wing), put four washers (4) (C9996565, Washer DIN 9021-6.4 mm VZ) between the flap bracket and wing bracket (2 from one side of the wing bracket and 2 from other one) and connect them (brackets) by the bolt (3) KA2020007 (but do not fix the bolt by the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular). Fig. 3.

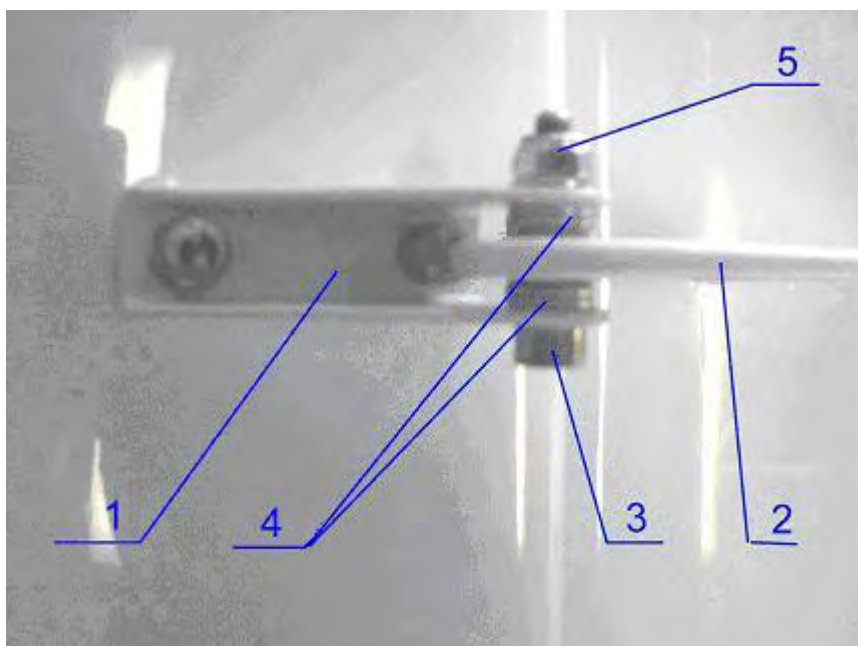


Fig. 3

Match the holes in the outer flap bracket (1) (KW2040030R for the right wing or KW2040030L for the left wing) with the hole in the bushing of the bearing of the wing bracket No.3 (2) (KW2010030 for the right wing or KW2020030 for the left wing) and connect them by the bolt (3) KA2020006 Fig. 4.

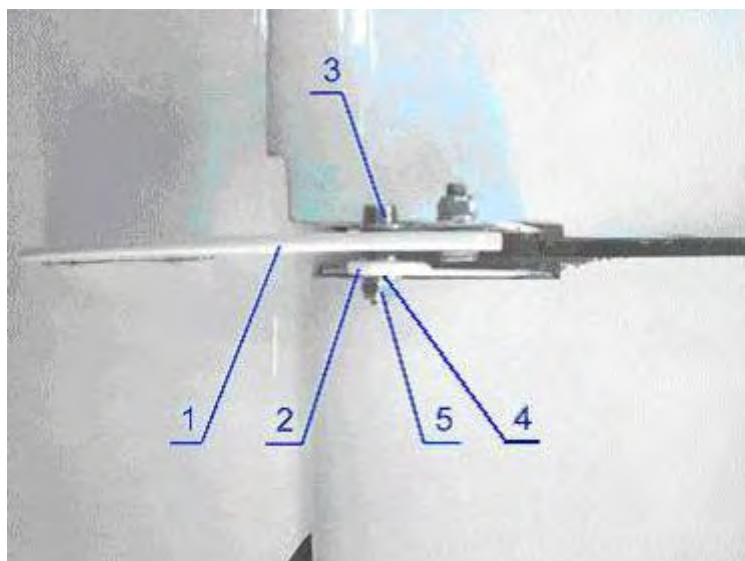


Fig. 4

Using a washer C99965604 (Washer DIN 125 A2B-6.4 mm) and the nut (5) (C9996334, Self-locking nut DIN 985-M6, regular) fix the bolts (3) KA2020007 Fig. 3, (3) KA2020006 Fig. 2, Fig. 4. Use new nuts only. Torque the nut with one 8x10 wrench and one 5 hex-nut wrench to 80 lb-in / 9 Nm, Fig. 2, Fig. 3 and Fig. 4.

While installing the wings, make sure that the pin at the root flap bracket (1) (KA2040010L(R)) got into connection with the tip of the flap rod (2) KA6030200 (Transverse rod). Fig. 5.

Check connection between the flap bracket and the tip of the flap rod for play. Play is defined by free movement of the flap trailing edges with respect to each other while the actuator is fixed. The flaps are to be pre-set into "zero" position (aligned with the top of the fuselage). If play exceeds 5/128" / 1 mm, replace the pin KA2040013 (Fig. 6) on the flap bracket (KA2040010L(R)) to one of bigger diameter.



Fig. 5

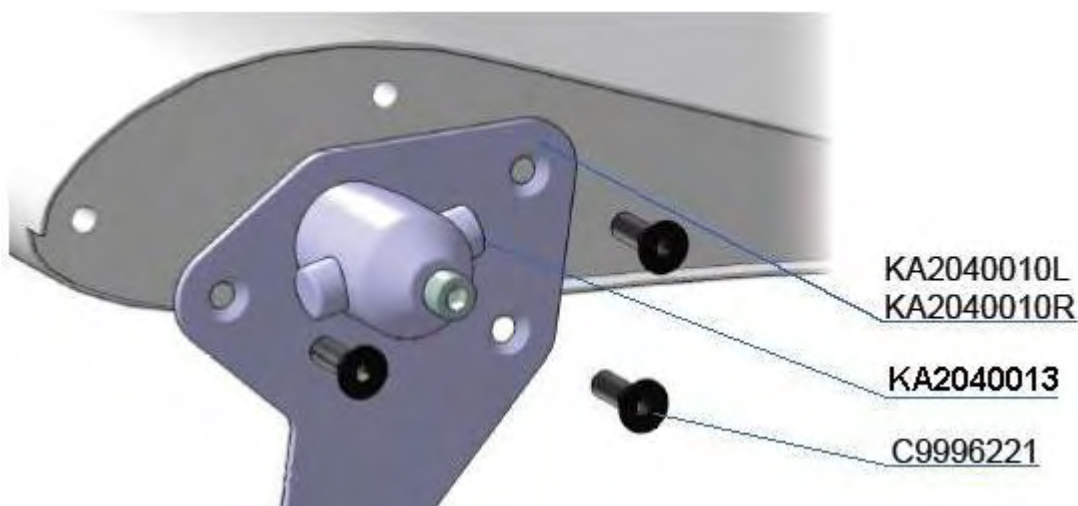


Fig. 6

## 4.3.2.6 Flap Adjustment

### 4.3.2.6.1 Type of Maintenance

Line

### 4.3.2.6.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

### 4.3.2.6.3 Rigging “Zero” Position of the Flaps

“Zero” position is the position of the flaps when the top skin of the flaps is aligned with the top of the fuselage.

If the flaps are not synchronous (at the “zero” position one is higher than another), adjust the flap rod KA6030200 (Transverse rod) as follows.

- 1) Unscrew the lock-nut C9996332 (Self-locking nut DIN 985-M4, regular) by a 7 wrench towards the head of the bolt and release the bolts C9996026 (Bolt DIN 912 M4x20-8.8), Fig. 7.
- 2) Unscrew the bolts C9996026 (Bolt DIN 912 M4x20-8.8) 5 turns from the flange of the flap rod KA6030220 (Transverse rod tube, left) by a 3 hex-nut wrench. Fig. 7.
- 3) Unscrew the nuts C9996333 (Self-locking nut DIN 985-M5, regular) from the bolts C9996042 (Bolt DIN 912 M5x45-8.8) by an 8 wrench and 4 hex-nut wrench. Fig. 7.
- 4) Turn KA6030210 (Transverse rod tube, right) and KA6030220 (Transverse rod tube, left) with respect to each other so that both flaps are aligned to the top of the fuselage.
- 5) Fix position of the bolts C9996042 Bolt DIN 912 M5x45-8.8 with respect to the KA6030220 (Transverse rod tube, left) by the bolts C9996026 (Bolt DIN 912 M4x20-8.8). The bolts C9996026 (Bolt DIN 912 M4x20-8.8) are to be screwed into the flange of KA6030220

(Transverse rod tube, left) by 3 hex-nut wrench up to bolts C9996042 (Bolt DIN 912 M5x45-8.8). Fig. 7.

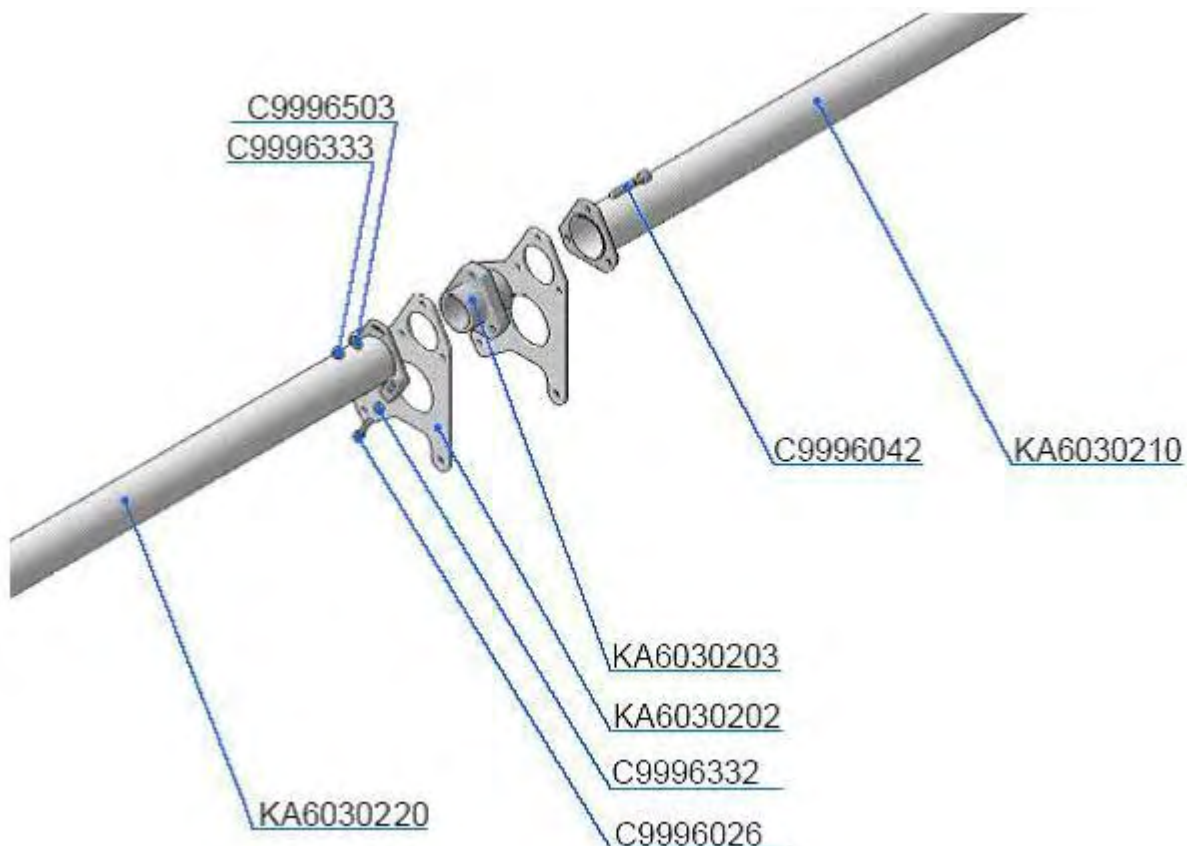


Fig. 7

- 6) Tighten the nut C9996333 (Self-locking nut DIN 985-M5, regular) on the bolt C9996042 (Bolt DIN 912 M5x45-8.8) by an 8 wrench and 4 hex-nut wrench. Use only new nuts. Put the washer C9996503 under the nut C9996333 (Self-locking nut DIN 985-M5). Repeat for all bolts. Fig. 5.
- 7) Set the flap position indicator to zero.
- 8) Inspect connection of the tip KA6030201 and the flap rod (KA6030210 and KA6030220, Transverse rod tube) for play. In case of play replace the rivets (3) (C9996653 Stainl. steel rivet A2 4x11.5) to next bigger ones (Fig. 8). Eventually diameter of the rivets should not exceed  $\frac{5}{256}$  " / 0.5 mm. If it would, replace the tubes (KA6030210 and KA6030220, Transverse rod tube) and the tip KA6030201.



Fig. 8

- 9) Inspect the tip of the actuator (2) KA6030404 for play. If play exceeds  $\frac{5}{256}$  " (0.5 mm), replace the bronze bushing (1) KA6030005 in the tip of the actuator KA6030404 (Fig. 9).



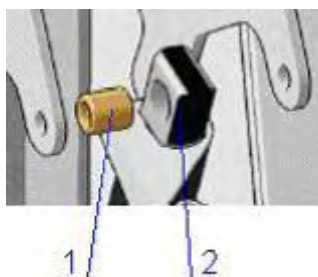


Fig. 9

- 10) Inspect attachment pins of the actuator (1) for play. If play exceeds  $\frac{15}{256}$  " (0.15 mm ), replace the bushings (2) KB6030305 on the T-bracket KB6030300 (Fig. 10).

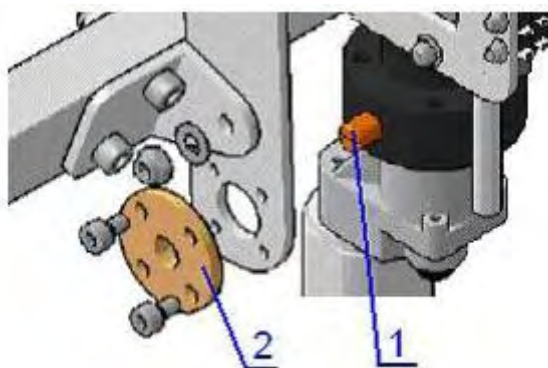


Fig. 10

#### 4.3.2.6.4 Flap Deflection Adjustment

Flap deflection can be adjusted by the flap control panel. Check flap angle of deflection after each adjustment by means of electronic level.

1. Connect printed circuit board (PCB) connectors with corresponding headers of the flap actuator control (Control Card MT-10) wiring harness (Fig. 11).
2. Connect auxiliary control switches SW1 and SW2 to corresponding connectors at the PCB for programming.
3. Set the flap into required position by SW2 using a level. Set the digital screen indication corresponding to the value at the level by SW3.
4. Press SW1 to input data into the PCB memory. If the operation has been performed correctly the display shows the value set by SW3.
5. Move the flap by SW2 to the next required position using a level. Change the value at the screen by SW3 according to the value at the level. Press SW1 to save settings into the memory.
6. Repeat the process for each of the flap positions.
7. If you cannot adjust (set) max angles of deflection (the rod of the flap actuator takes the end position), this problem could be solved by adjusting the length of the rod of flap control. The length of the rod can be adjusted only following the item 4.4.1.5.
8. After rigging all flap positions turn off the circuit breaker 25A.
9. Remove the switches SW1 and SW2.
10. Turn the circuit breaker 25A on.
11. If the instruction has been performed correctly the flaps will take their predefined positions.



1. Set the flaps in the flap max up position ( $-6^{\circ}$  or  $-12^{\circ}$ ).
2. Set the flap control switch in  $40^{\circ}$  position.



3. While the actuator is moving press the down limit switch by a screwdriver. The actuator must stop then.
4. Release the up limit switch. The actuator must move down to 40° position.
5. Replace the Microswitch C9997198B (Miniature switch), if it does not work per items 3 and 4.

## 4.3.2.7.4 Measuring Flap Deflection

Any adjustment of the flap control system must be documented in an adjustment report. You can find the template starting the nominal values and allowable tolerances in the Appendix of this maintenance manual.

Step 1. Set flaps in zero position.



Step 2. Put the level on upper surface of the flap (see photos 1 and 2) and note the measured value. Repeat this operation for the second flap.



Photo 1 Photo 2

Step 3. Set flaps to negative (-12° or -6° for USA registered LSA aircraft)

Put the level on upper surface of the flap in the same place than before (see photo 3). Note down the detected angle. Repeat this operation for the second flap.



Photo 3

Step 5. The difference between the noted zero deflection value and the negative deflection value provided the angle of deflection for each individual flap.

Using ruler instead of deflection template:

Measure distance between same corners (lowest or topmost) on the rear edge of the flap and on the rear edge on the flap tip on the fuselage (see photo 3.1).



Photo 3

Step 6. Set flaps to maximum positive deflection (+40°).

Step 7. Put the level on the upper surface of the flap in the same place that point 2 (see photo 4). Note down the detected angle. Repeat this operation for the second flap.



Photo 4

Step 8. The difference between the noted zero deflection value and the negative deflection value provided the angle of deflection for each individual flap.

Using ruler instead of deflection template:

Measure distance between same corners (lowest or topmost) on the rear edge of the flap and on the rear edge on the flap tip on the fuselage (see photo 5 and 6).

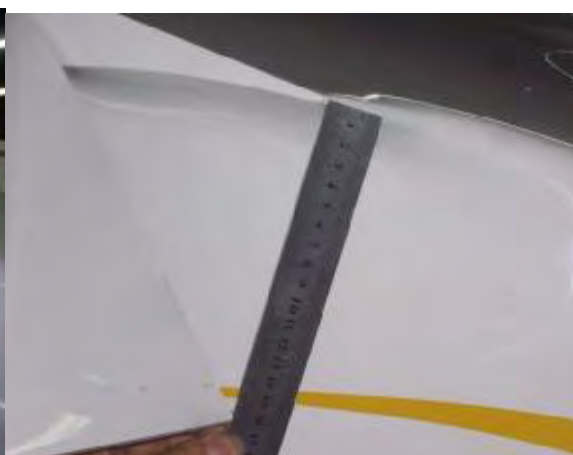


Photo 5Photo 6



### 4.3.3 Rudder

Rudder installation requires one person.

To adjust rudder deflection two persons are necessary.

#### 4.3.3.1 Tools Required

Wrench 8x10 1 pcs

Wrench 10x13 2 pcs

Hex-nut wrench 4 1 pcs

Hex-nut wrench 5 1 pcs

Ruler 20 inch / 500 mm 1 pcs

#### 4.3.3.2 Materials Required

Lock liquid of middle strength Loctite 243

Safety wire

#### 4.3.3.3 Rudder Installation and Removal

##### 4.3.3.3.1 Type of Maintenance

Heavy

##### 4.3.3.3.2 Minimum Level of Certification Required

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

##### 4.3.3.3.3 Procedure

Set the plane on parking brake. Ensure good access to the rear part of the fuselage.

Match the hole in the bearing of the bracket KA3020030 (1) with the pin KA3020022 (2) of the rudder lower support KA3020020 (3). Match the hole of the slider bearing MFM-0610-06 (4) of the upper bracket KA3020010 (5) with the pin KA3020512 (6), Fig. 1.

Let down the rudder along the matched holes and pins.

Turn the rudder by hand right up to the stop and set the nut DIN 985 M6 (7) onto the pin KA3020020 (2). Tighten the nut by a wrench 8x10.

**NOTE:** the rudder must be installed to the aircraft prior to stabilizer installation, due to accessibility reasons.

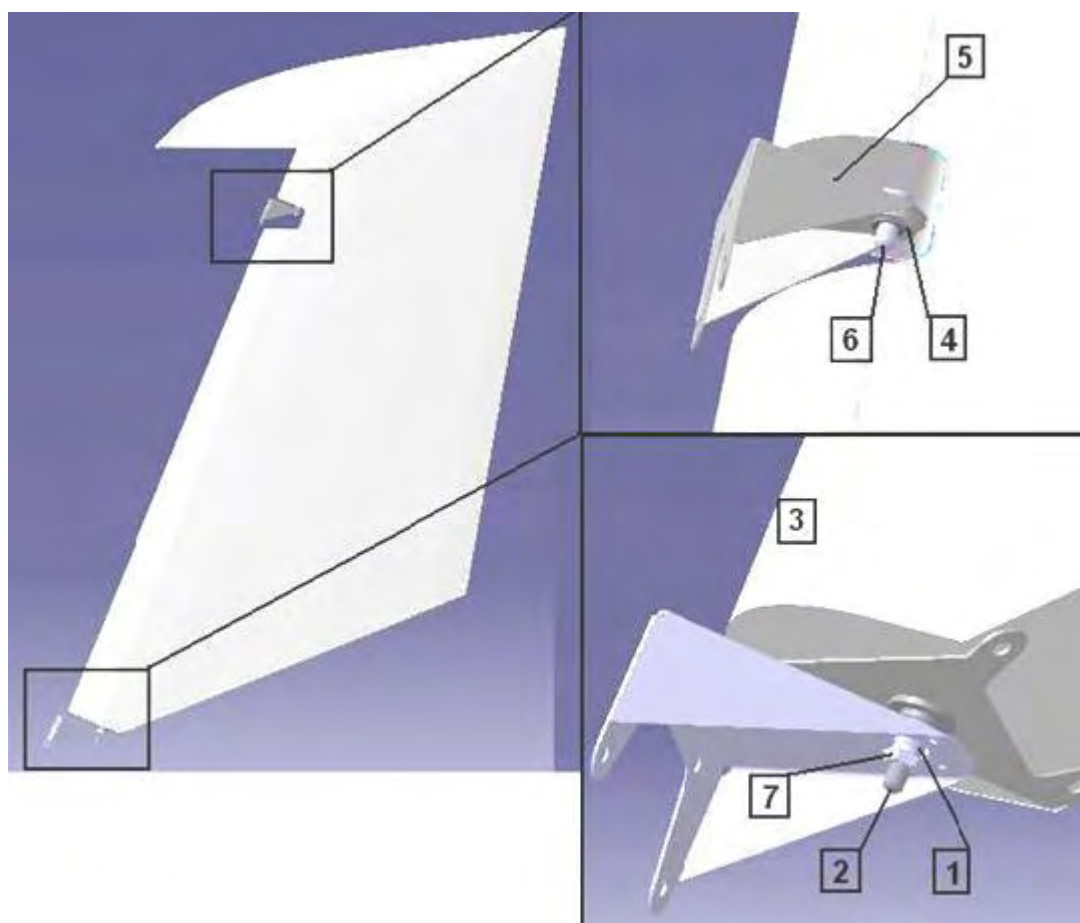


Fig. 1

Turn the rudder left up to the stop and set the rudder left cable (1). Prior to that the bushings KA6050001 (2) are to be installed from both sides of the thimble and tightened by the screw DIN 7991 M6x30-8.8 (3) to the rudder lower support KA3020020 (4) using a hex-nut wrench 4. Use lock liquid of middle strength Loctite 243 for the screw.

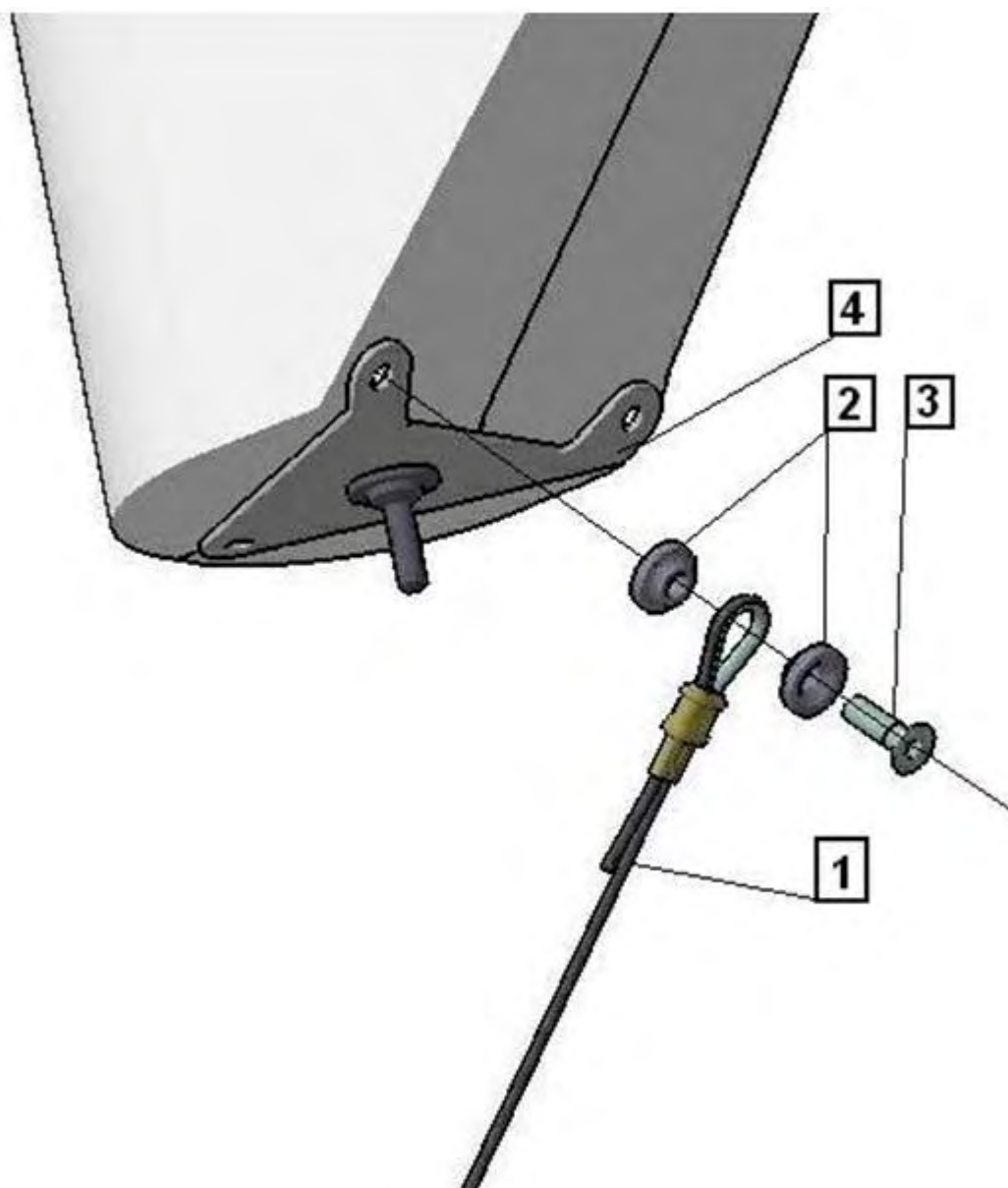


Fig. 2

Turn the rudder right up to the stop and repeat the process for attaching the right cable to the rudder.



## 4.3.3.4 Rudder Deflection Adjustment

### 4.3.3.4.1 Type of Maintenance

Line

### 4.3.3.4.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

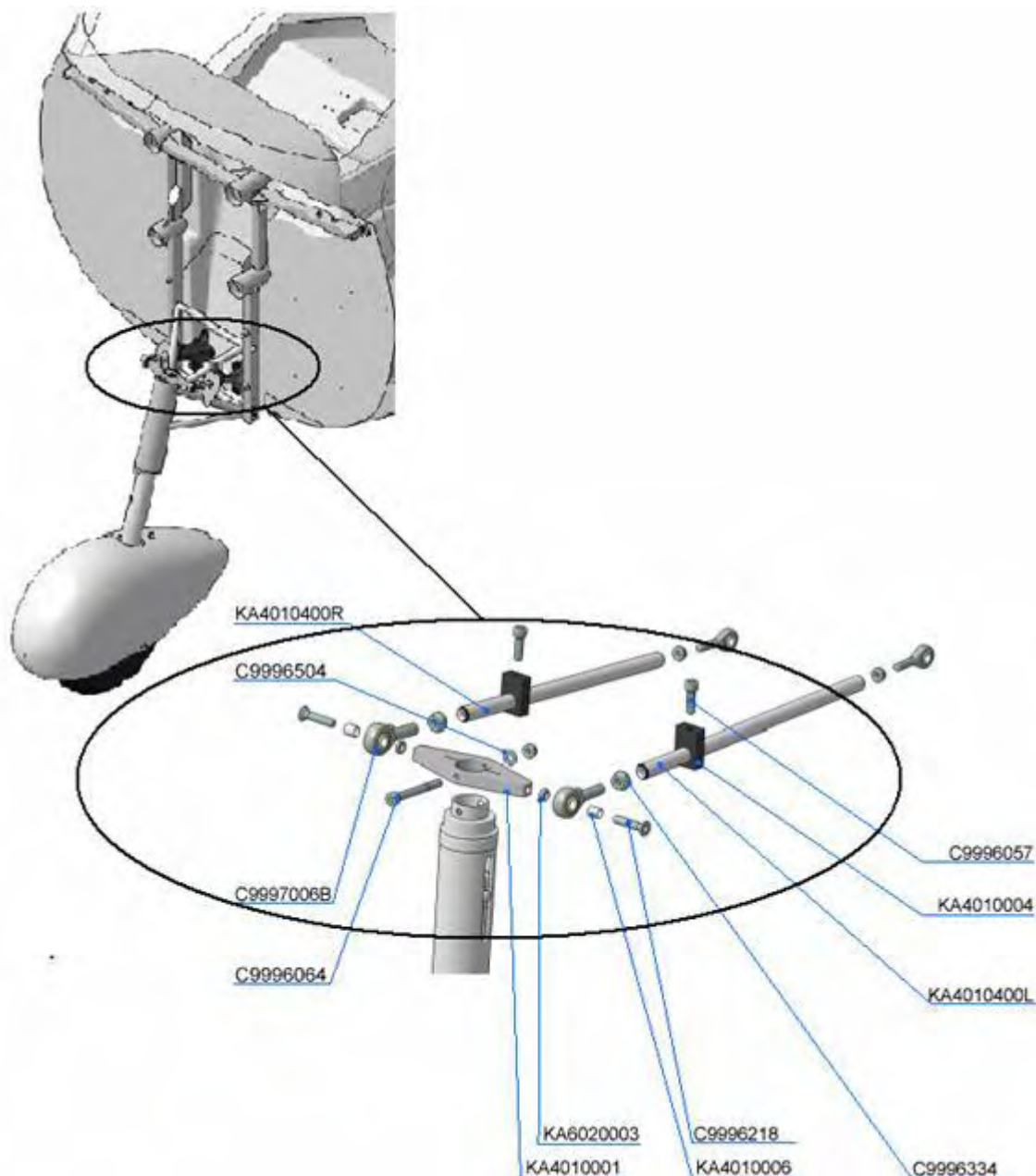


Fig. 3

Rudder deflection angles are defined by the stops KA4010004 (Fig. 3). Distance between the plate with a hole for the steering rod on the engine mount and the front edge of the stop has to be about 3/4inch / 20 mm. The nose wheel has to be aligned along the aircraft and the pedals are to be leveled.

To adjust rudder deflection to the right:

- 1) Use hex-nut wrench 5 to unscrew 2-3 turns the bolt C9996057 DIN 912 M6x20-8.8 fixing the stop KA4010004 on the right rod.
- 2) Move the stop KA4010004 towards the cabin 0.08-0.16 inch / 2-4 mm.
- 3) Fix the stop KA4010004 by the screw C9996057 DIN 912 M6x20-8.8.
- 4) Check angles of deflection as described in Paragraph 4.3.3.4.3.
- 5) Repeat items 1 through 4 if necessary.
- 6) Set the bolt C9996057 DIN 912 M6x20-8.8 using lock liquid of middle strength Loctite 243
- 7) To reduce angle of deflection to the right move the stop KA4010004 on the right rod KA4010400R. The rest of the process repeats items 1 and 3 through 6.

To change angle of deflection to the left repeat items 1 through 7 for the stop on the left rod KA4010400L.

## 4.3.3.4.3 Measuring Rudder Deflection

Any adjustment of the flap control system must be documented in an adjustment report. You can find the template starting the nominal values and allowable tolerances in the Appendix of this maintenance manual.

Step 1. Put rudder to neutral deflection.

Step 2. Install the template to measure rudder deflection angle (see photos 1, 2, 3)



Photo 1



Photo 2



Photo 3

Step 3. Deflect the rudder to left (right) side by pushing the pedals up to the stop. Deflection angle can be read from the template.

Using ruler instead of measuring template:

Position a pointer marking the rear lower edge of the rudder in the neutral position. Then deflect rudder by pushing the pedals up to the stop and measure distance between pointer and deflected rear edge of the rudder (see photos 4)



Photos 4

## 4.3.3.4.4 Rigging Rudder Neutral Position

- 1) Remove the middle panel KB1081300 (2) from the instrument board (1) (Fig. 4).



Fig. 4

- 2) To move rudder neutral position to the left, loosen by two 10x13 wrenches the nuts DIN 985 M8 (1) which tighten the stop plate KA6050206 (2) on the returning mechanism KA6050200 (3) (Fig.5).

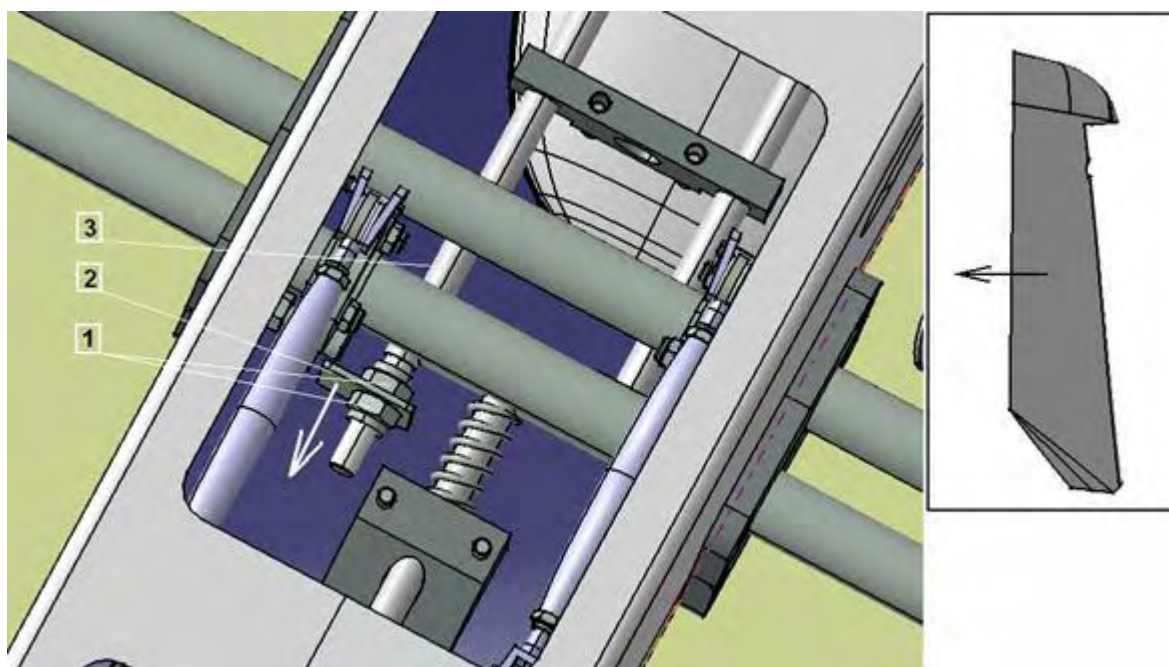


Fig. 5

- 3) Move the stop plate KA6050206 (2) towards the engine 0.4-0.8 inch / 1-2 mm and tighten it again by the nuts M8 (1) (Fig. 5), using a two 10x13 wrenches.



- 4) Check neutral position of the rudder (the rudder axle must coincide with the plane axle, Fig. 6). Repeat item 3 if necessary.

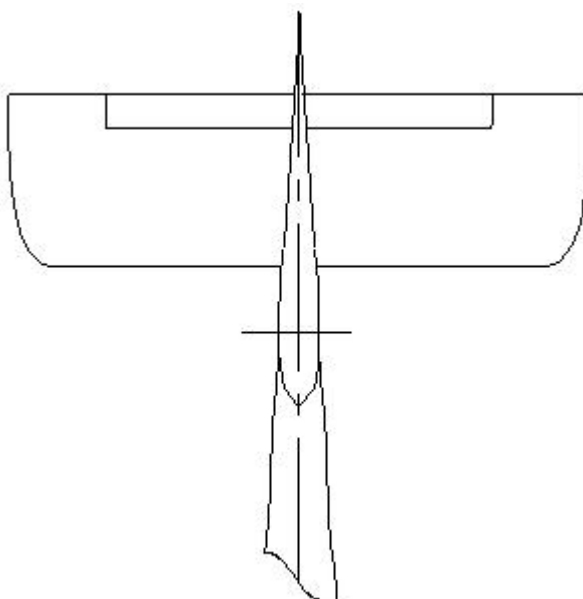


Fig. 6

- 5) Shifting rudder neutral position to the right can be done in the same way as shifting rudder neutral position to the left, but the stop plate KA6050206 (2) has to be moved away from the engine (Fig.7).

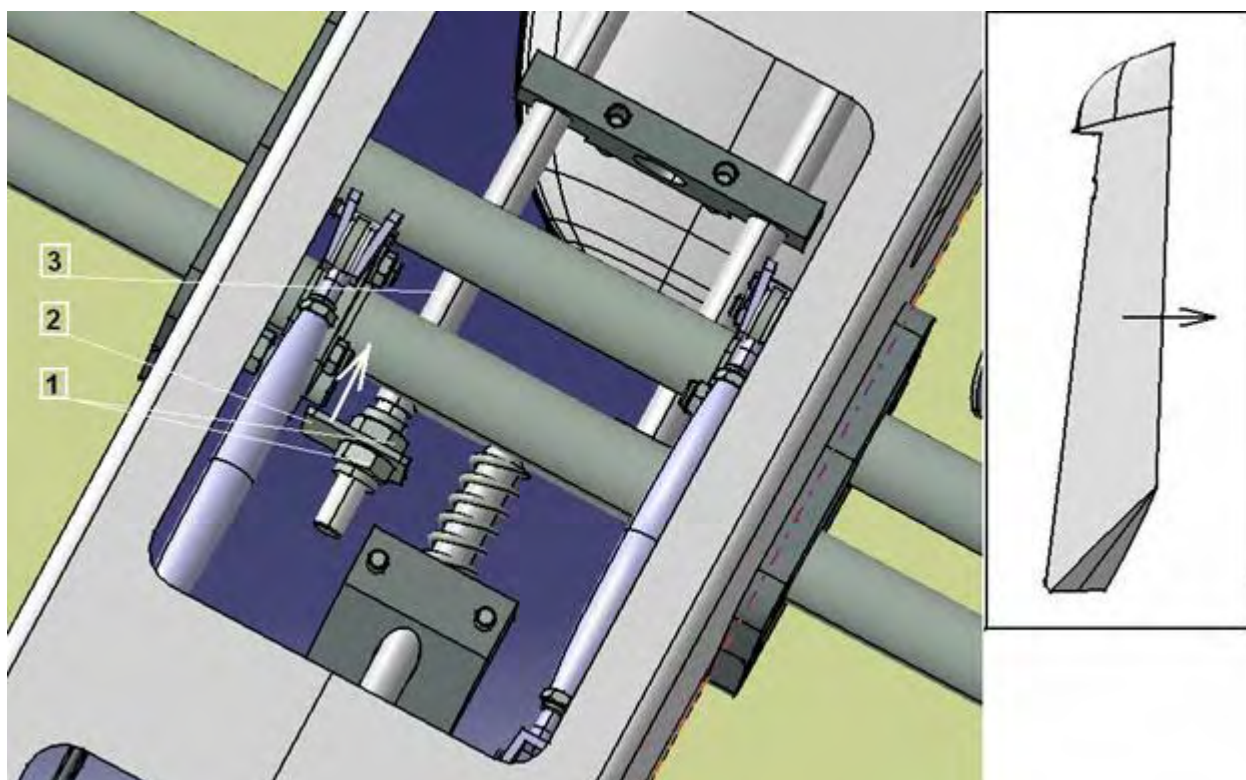


Fig. 7





## 4.3.3.4.7 Coarse Adjustment

If failed with fine adjustment, coarse adjustment by the threaded adjuster bushings C9997080 Turnbuckle Bluewave M6 (Fig. 9, item 1) has to be done.

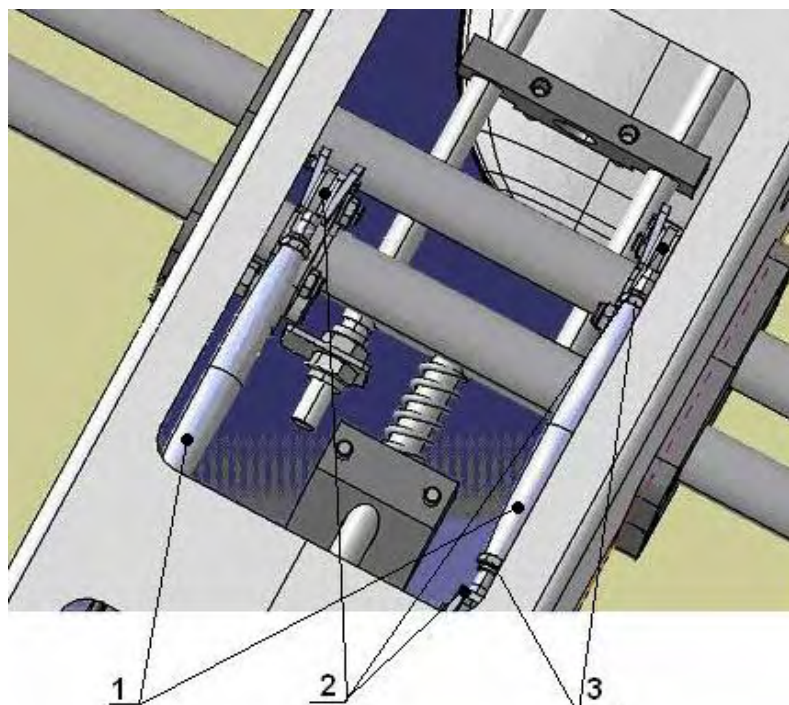


Fig. 9

To reduce tension:

1. Look the way the threaded adjuster bushing is secured by the safety wire. Remove the safety wire.
2. Release the tips (Fig. 9, item 2), having loosened the locking nut (Fig. 9, item 3) by a 10x13 wrench.
3. Take care that the tips are inserted into the threaded adjuster bushing body at least  $\frac{15}{64}$  inch / 6 mm.
4. Unscrew the tips half-turn on each threaded adjuster bushing.
5. Check rudder cables tension ( $11.75 \pm 0.25$  kgf).
6. Repeat items 4-5, if necessary.
7. Tighten the nuts (Fig. 9, item 3) by a 10x13 wrench unscrewing them from the tip towards the threaded adjuster bushing.
8. Lock the threaded adjuster bushing by safety wire.

To increase cables tension, perform items 1 through 8, having reversed tip rotation for the operation 4.

## 4.3.3.5 Verification of Rudder Installation and Adjustment

1. Set the nose wheel along the longitudinal axle of the plane.
  - a. Make sure the right and left pedals are on the same line.
  - b. The rudder must be in neutral position, along the plane axle.
  - c. The aircraft must run straight on a plane surface
2. verify deflection angles following Paragraph 4.3.3.4.3
3. Lift up the front of the plane so that the nose wheel is off the ground. Deflect the rudder by the pedals to the left. Release the pedals and the rudder and nose wheel must return to the neutral position by the returning mechanism. Check the same for the right deflection. Note that unsatisfactory functioning of the returning mechanism may be the result of excessive tension of the rudder control cables.



### 4.3.4 Stabilizer

CTSW empennage is equipped with an all moving horizontal tail called stabilizer. The stabilizer is equipped with an anti-tab. The stabilizer is attached to a fuselage-mounted stabilizer pivot bearing. An individually matched counter-weight mass with which the stabilizer is completely mass-balanced is also attached to this bearing.

The anti-tab on the trailing edge of the horizontal tail covers 70% (CTSW) or 100% (CTSW2006 onwards) of the elevator span. It is attached to the fin by discrete metal hinges. It is activated through kinematical coupling when the elevator is deflected. In this way the anti-tab deflects in the same direction as the elevator, thus improving elevator effectiveness and generating a tangible force on the control stick.

The stabilizer is activated via a special push-pull cable that runs through the tunnel and along the fuselage floor. This push-pull cable aligns itself to the fuselage and does not require specific regular maintenance.

#### 4.3.4.1 Tools Required

Wrench 8x10 1 pcs

Wrench 10x13 2 pcs

Hex-nut wrench 3 1 pcs

Hex-nut wrench 4 1 pcs

Hex-nut wrench 5 1 pcs

Level 1 pcs

Ruler 20in. / 500 mm 1 pcs

Drill (to drill metal) Ø1/4in. / 6.0 mm 1 pcs

#### 4.3.4.2 Parts and Materials Required

Multipurpose plastic grease LITOL-24M TY 0254-015-00148820-99 (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso)), Aeroshell Grease 6

#### 4.3.4.3 General

Set the plane on parking brake and ensure good access to the tail of the aircraft.

Inspect metal parts and especially welding seams for cracks and dents.

Inspect fasteners and axles for nicks and their threads for condition.

Ensure only new self-locking nut DIN 985 are used.

Check if the sheave is greased enough.

Ensure the free motion of the sheave on the axle.

Inspect composite parts for cracks, paint delamination, and mounting holes for ovaling where bolts, pivots and bearings are attached. If found, contact Flight Design for making decision on further inspection and maintenance.

#### 4.3.4.4 Stabilizer Installation and Removal

##### 4.3.4.4.1 Type of Maintenance

Heavy

##### 4.3.4.4.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

##### 4.3.4.4.3 Procedure

The stabilator is attached to the fuselage by means of the bracket KA3010120 (Stabilizer mounting pivot) that rotates on axle KA3010001 (Stabilizer axle of rotation) installed into bearings C9997025 (Bearing SKF 608-2RZ) in the fuselage (Fig. 1).

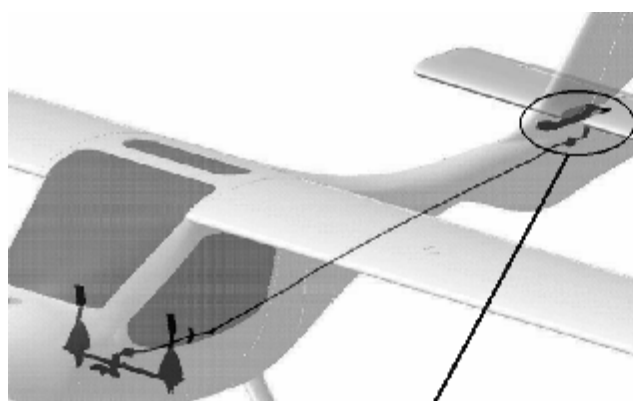


Fig. 1.1

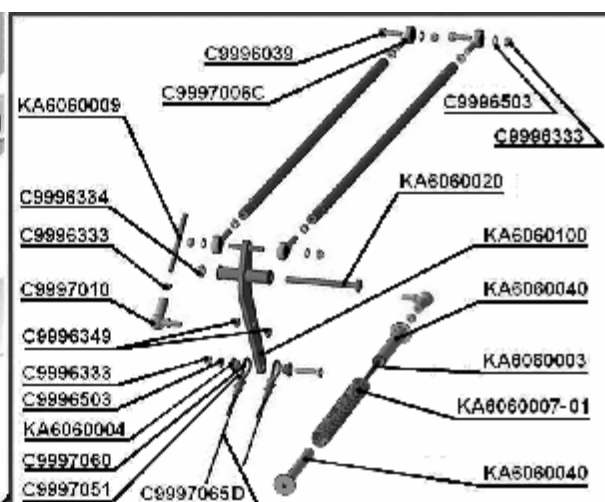


Fig. 1.4

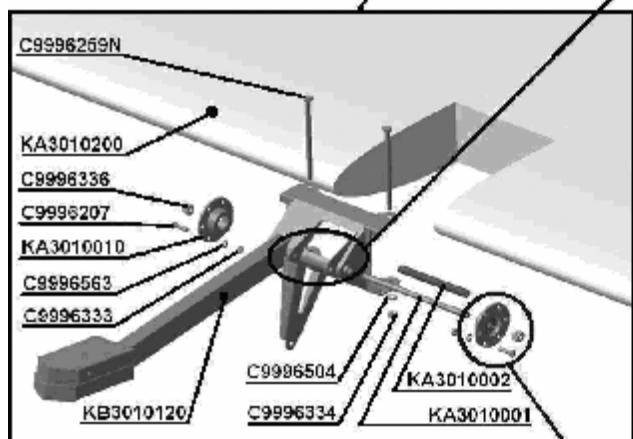


Fig. 1.2

KA606000-01 - Trim Tab Control			
Part Number	Description	Q-ty per ASSY	Unit
KA6060003	Rod	1	pcs
KA6060004	Bush	1	pcs
KA6060007-01	Spring	1	pcs
KA6060009	Rod	1	pcs
KA6060010	Rod	2	pcs
KA6060013	Bolt M5x17	2	pcs
KA6060020	Bolt	1	pcs
KA6060040	Telescopic Guide	1	pcs
KA6060100	Rocker	1	pcs
C9996208K	Bolt DIN 7991 M5x25-8.8	1	pcs
C9996333	Self-locking nut DIN 985-M5, regular	11	pcs
C9996334	Self-locking nut DIN 985-M6, regular	1	pcs
C9996349	Hexagon nut DIN 934-M5-8	2	pcs
C9996503	Washer DIN 125 A2-5.3mm	3	pcs
C9997006C	Rod end bearing, ext. thread GA5	4	pcs
C9997010	Angle joint M 5	2	pcs
C9997051	Niocoress oval sleeve 1.5-1.7 mm for 1.6mm cable	2	pcs
C9997060	Thimble 2 mm	2	pcs
C9997065D	Steel rope 7x7 1.6 mm	9.4	m

Part Number	Description	Q-ty per ASSY	Unit
KA3010001	Stabilizer axis of rotation	1	pcs
KA3010002	Stabilizer axis spacer	1	pcs
KA3010010	Stabilizer rotation bearing body	2	pcs
KA3010120	Stabilizer mounting pivot	1	pcs
KA3010200	Stabilizer with trim tab	1	pcs
C9996207	Bolt DIN 7991 M5x16-8.8	6	pcs
C9996259N	Bolt DIN 931 M6x110-8.8	2	pcs
C9996333	Self-locking nut DIN 985-M5, regular	6	pcs
C9996334	Self-locking nut DIN 985-M6, regular	2	pcs
C9996336	Self-locking nut DIN 985-M8, regular	2	pcs
C9996504	Washer DIN 125 A2B-6.4mm	2	pcs
C9996505	Washer DIN 125 A-8.4mm VZ	4	pcs
C9996563	Washer DIN 9021-5.3mm VZ	6	pcs

Fig. 1.3



Fig. 1

One person is needed to install the stabilator.  
Prior stabilator installation, check it for balancing as follows.

1. Install the stabilator bracket with balancer KA3010120 onto the stabilator KA3010200 (Fig. 1). Make sure the trim tab is installed on the stabilator, the control rods KA6060010 (Rod) are connected to the trim tab, the stabilator bracket is equipped with trim tab bellcrank KA6060100 and rod KA6060009.
2. Match holes in the bracket with holes in the top and bottom skins of the stabilator.



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3. Secure the bracket by bolts C9996259N (Bolt DIN 931 M6x110-8.8), Fig. 1.2.
4. Inspect stabilator balance as follows. Set the stabilator so that it can revolve on its axle under its own weight. If the top skin does not align horizontally when stopped, correct balancing (refer to 4.3.4.6).
5. Remove the bracket from the stabilator.

To verify correctness of the stabilator balance, mount the stabilator on the fuselage in order as follows:

1. Check lock rings C9997032 (Lock ring DIN 472-22x1) that secure the bearings C9997025 (Bearing SKF 608-2RZ) on both sides of the fuselage (Fig. 1.3) are present. Check inner cage of the bearings C9997025 for free rotation. Replace bearings, if necessary.
2. Lubricate the axle of rotation KA3010001 by CIATIM-201 (or Aeroshell Grease 6 (SHELL), Unirex S 2 (Esso), Eneryrease LCI, LT 2 (British Petroleum)). Make sure that the threaded parts of the axle are not lubricated.
3. Install the bracket KA3010120 with the trim tab bellcrank KA606100 (Rocker), Fig. 1.4, on the fuselage as follows. Match holes in the bracket with holes in the bearings C9997025. Insert the axle KA3010001 through the left hole in the bracket, hole in the left bearing C9997025, spacer KA3010002, right bearing C9997025, and right hole in the bracket KA3010120.
4. Ensure that threaded parts of the axle KA3010001 are not lubricated. Secure the axle by new nuts C9996336 (Self-locking nut DIN 985-M8) and torque to 200 lb-in (22.5 N\*m) using two 8x10 wrenches.
5. Install the stabilator KA3010200 (Fig. 1) into the bracket KA3010120 by matching holes in the bracket with holes in the top and bottom skins of the stabilator.
6. Set the bolts C9996259N (Bolt DIN 931 M6x110-8.8) through the matched holes in the bracket KA3010120 and stabilator skins, put washers C9996504 Washer DIN 125 A2B-6.4 mm, and tighten them by the nuts C9996334 (Self-locking nut DIN 985-M6, regular) using two 8x10 wrenches to torque 80 lb-in (9 N\*m), Fig. 1.2. Make sure that the heads of the bolts are on the top of the stabilator, Fig. 1.1.
7. Check balancing of the stabilator, i.e. after some rotation around the axle KA3010001 the stabilator KA3010200 returns to horizontal position. If the top skin does not stabilize at horizontal position, remove the bracket and correct the balancer (refer to 4.3.4.6).
8. Inspect stabilator "cross incidence" with respect to the fuselage roof (set the level across the fuselage first on the stabilator skin behind the bracket, then on the roof nearby the spars. The difference should not be more than 0.5°. Otherwise do the following.
  - Remove the stabilator from the bracket.
  - Using a hex-nut wrench 3 and 8x10 wrench loosen the body KA3010011 Bearing body, by taking the bolts C9996207 Bolt DIN 7991 M5x16-8.8 out either from one side of the fuselage, or from both, depending on stabilator angle of "cross incidence".
  - Correct stabilator "cross incidence" using eccentricity of the KA3010011 Bearing bodies.
  - Attach the bearing body KA3010011 (Bearing body) by bolts C9996207 Bolt DIN 7991 M5x16-8 nuts (during adjustment it is allowable to use non- self-locking nuts, which have to be replaced for final installation).
  - Install the stabilator into the bracket and check angle of "cross incidence" with respect to the fuselage roof.
  - Repeat described above operations, if necessary, to get the roof and stabilator parallel (The difference should not be more than 0.5°)
  - Secure KA3010011 Bearing bodies by tightening new nuts C9996333 (Self-locking nut DIN 985-M5) to torque 94 lb-in (5.5 N\*m) on bolts C9996207 (Bolt DIN 7991 M5x16-8.8).
9. Connect trim tab control rods KA6060010 (Rod) with an 8x10 wrench and 4 hex-nut wrench. Tighten the nuts C9996333 (Self-locking nut DIN 985-M5) to torque 49 lb-in (5.5 N\*m) (Fig. 1.4). Make sure that rod tips C9997006C (Rod end bearings, ext. thread GA5) are secured by C9996333 (Self-locking nut DIN 985-M5) to torque 49 lb-in (5.5 N\*m).
10. Using a bolt C9996060 Bolt DIN 912 M6x35-8.8 connect to rod tip C9997004 (Rod end bearing, int. thread SI6E) to the stabilator bracket B3010120. Tighten the nut C9996334 (Self-locking nut DIN 985-M6, regular) using two 10x13 wrenches to torque 80 lb-in (9 N\*m) (Fig. 2).





Part Number	Description	Q-ty per ASSY	Unit
KA6040060	Rear connection	1	pcs
C9996060	Bolt DIN 912 M6x35-8.8	1	pcs
C9996215	Bolt DIN 7991 M6x16-8.8	2	pcs
C9996334	Self-locking nut DIN 985-M6, regular	2	pcs
C9996504	Washer DIN 125 A2B-6.4mm	1	pcs
C9997004	Rod end bearing, int. thread S16E	1	pcs

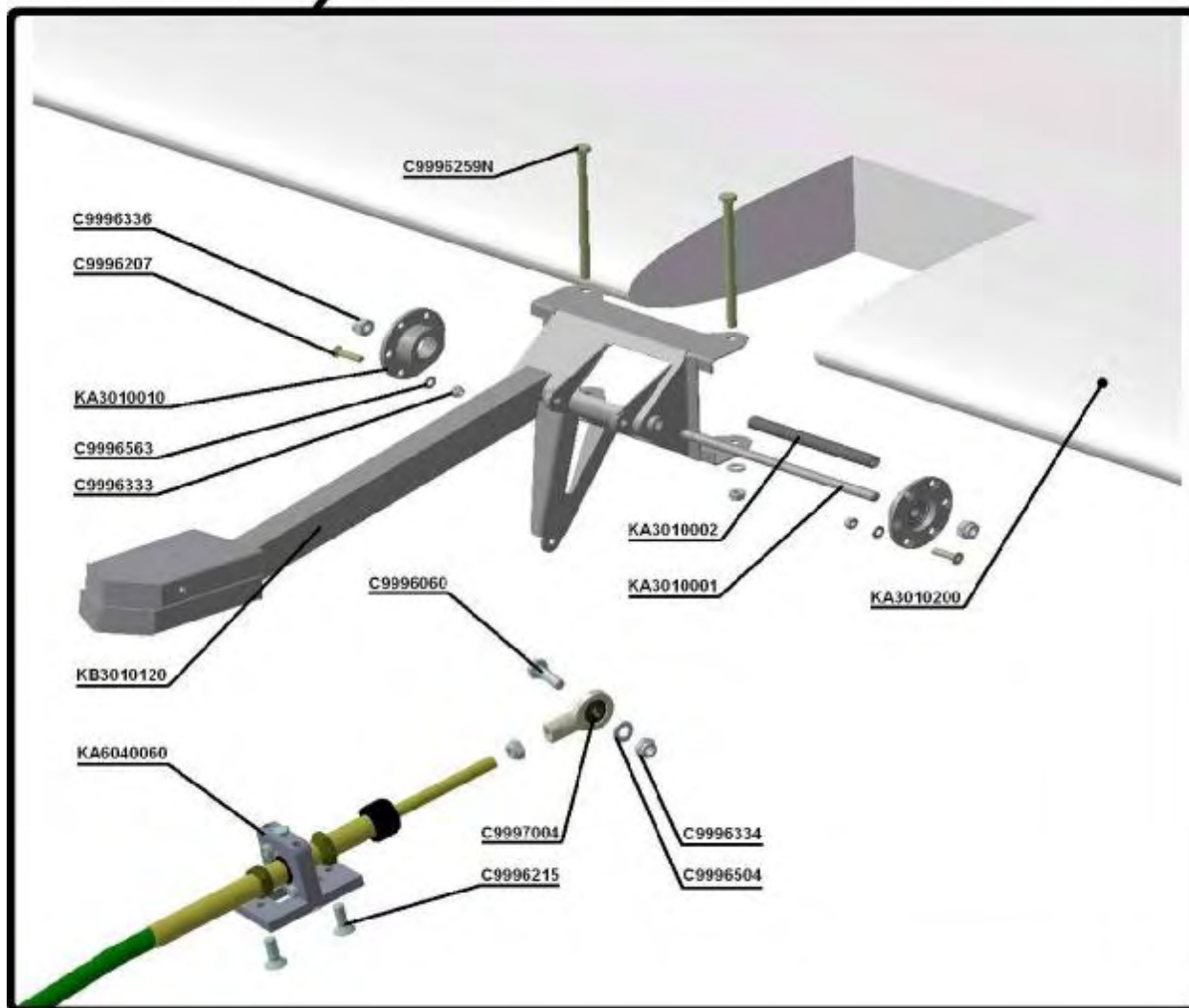


Fig. 2

11. Connect the rod KA6060003 (Rod) together with the trim tab returning spring KA6060007-01 (Spring), that is attached to the fin wall, and telescopic guide KA6060040 (refer to Fig. 1.4) to the third counting from the bottom hole in the trim tab control bellcrank.

The telescopic guide consists of two tubes with washer welded to one end of each, that slide one in the other. The telescope guides supports the spring from inside and are itself guided by the 5 mm diameter rod. The parts are shown on figure below. The spring has 37 windings and a length of approx. 260 mm.

To install the spring with telescopic guide, compress the spring and hold it in compressed state using safety wire. Carefully grease the outside of both telescopic tubes and the flanges, where



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the spring will have contact. This is to ensure smooth operation of the telescopic guide itself and of the spring guided by it, when installed. Insert the telescopic tubes to the pre-tensioned spring. Insert the 5 mm diameter rod to the telescopic guide.  
Insert the telescopic system with spring and rod to the lower hole in the shear wall of the fin.

**CAUTION!** Do not use the upper hole / attachment area!

Snap the Angle Ball Joint to the Ball Head attached to the Rocker Arm and secure the ball head with the safety pin.

Release the spring by removing the safety wires. Be careful to fully remove the complete safety wire.

Depending from the overall adjustment of the elevator the free length between the spring attachment points might vary for the individual plane. The telescope is designed as to deliver maximum possible guidance in the design operation point. If at your airplane the unlikely case happens and the telescope comes to a block when trimmed to max. fast speed, the inner tube of the telescope can be shortened carefully. In this case take care that the cutting edges are properly deburred as to allow smooth operation of the telescope.

12. Install the trim tab stop KA6060009 into the second from the bottom hole of the trim tab control bellcrank KA6060100 (Fig. 3). Make sure that within entire range of angles of deflection of the stabilator and trim tab the tab stop KA6060009 (Rod) runs out the stabilator bracket into the hole B (Fig. 4) at least 3/16 in. / 5 mm.



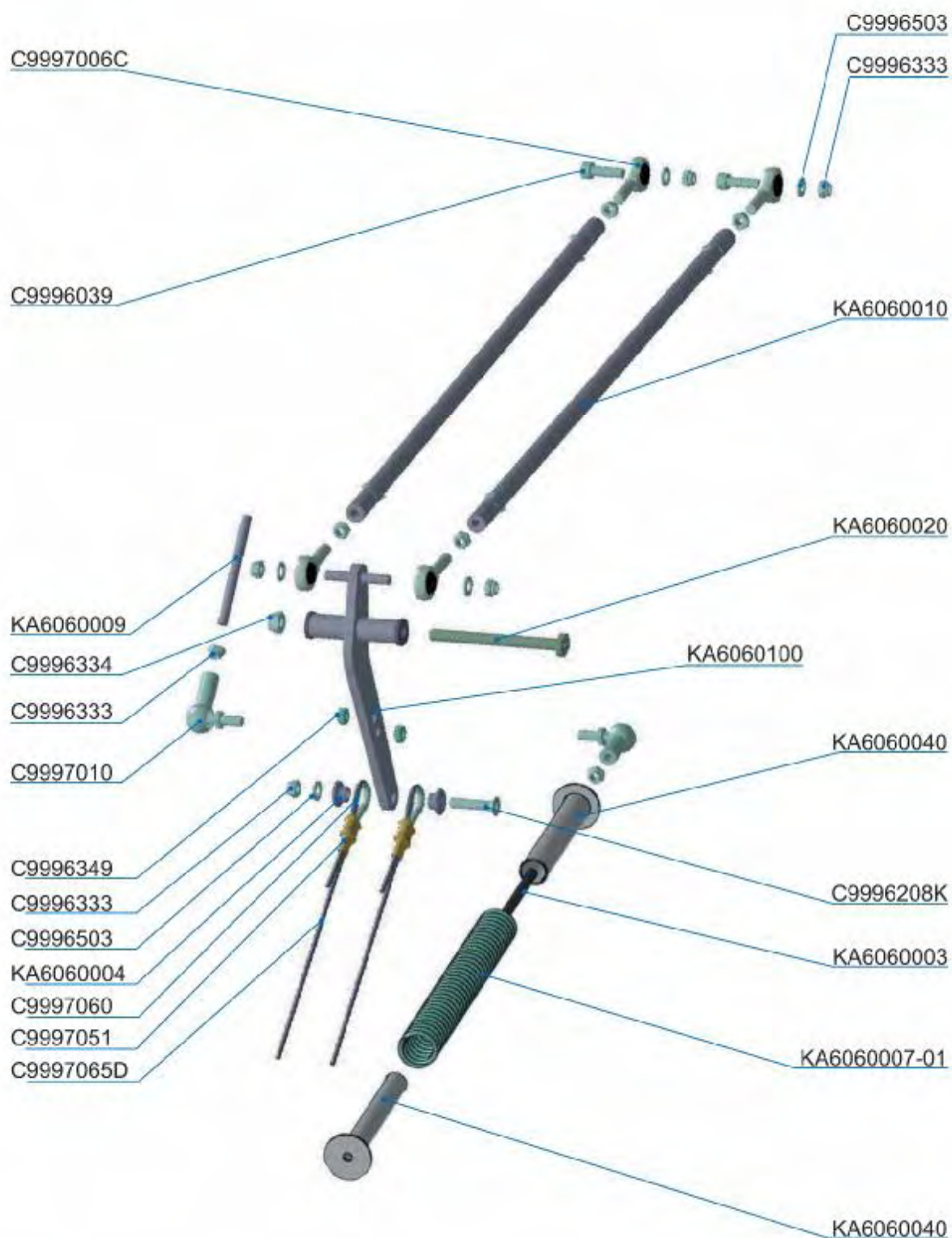


Fig. 3

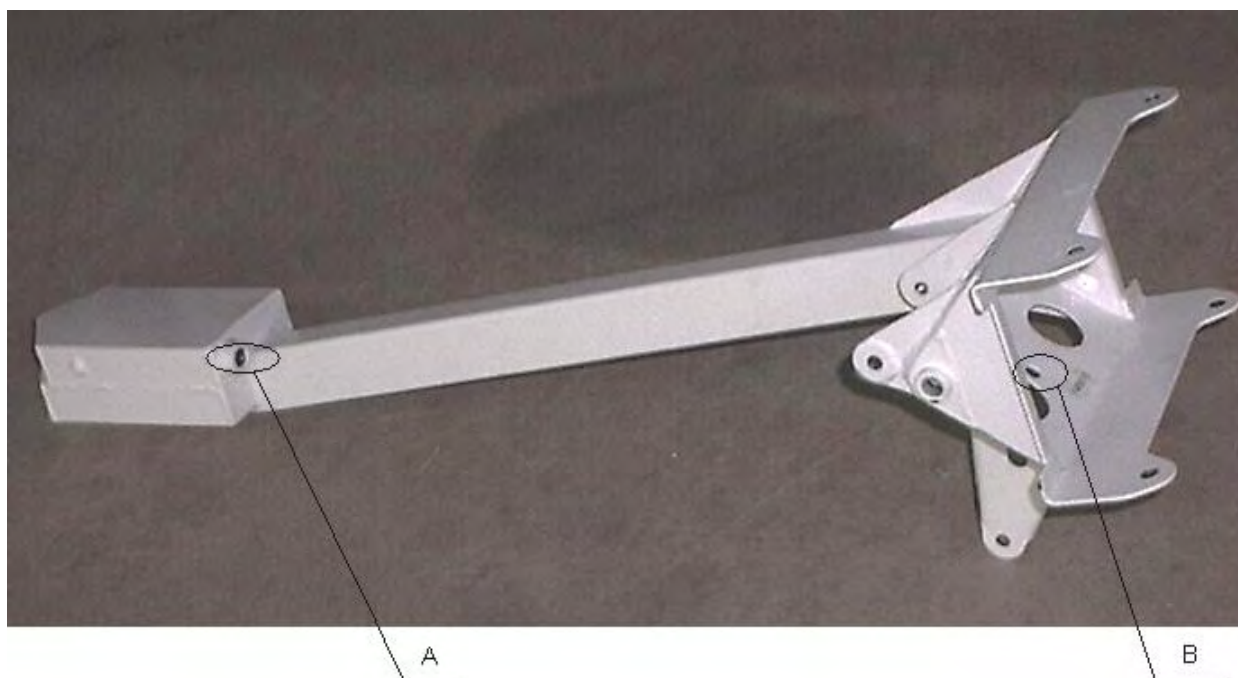


Fig. 4

13. Connect the trim tab control cables C9997065F (Fig. 3) by bolts C9996208K (Bolt DIN 7991 M5x25-8.8). Make sure of clearance 1/25" – 2/25" (1-2 mm) between thimble C9997060 (Thimble 2 mm) and sleeve C9997051 (Nicopress oval sleeve 1.5-1.7 mm for 1.6 mm cable). As the bolt is set and screwed into the bellcrank, the nuts C9996333 (Self-locking nut DIN 985-M5, regular) are tightened to 49lb-in (5.5 N\*m), check that the thimble C9997060 (Thimble 2 mm) should rotate freely KA6060004 Bush. Otherwise replace KA6060004 Bush.
14. For the procedure of adjustment of stabilator and trim tab deflection refer to Paragraph 4.3.4.5.
15. Make sure
  - that lock nuts on the rods and in front of C9997010 (Angle joint M 5) are tightened to 49lb-in (5.5 N\*m).
  - the lock nuts in front of C9997004 (Rod end bearing, int. thread SI6E) are tightened to 80 lb-in (9 N\*m).
  - the lock dowels are installed onto C9997010 (Angle joint M5) to prevent unintended disconnecting of C9997010 (Angle joint M5) and its axle of rotation.
  - The axle of rotation of C9997010 (Angle joint M5) is locked by the nut C9996333 (Self-locking nut DIN 985-M5) after screwing it into the bellcrank KA6060100 (Fig. 3).

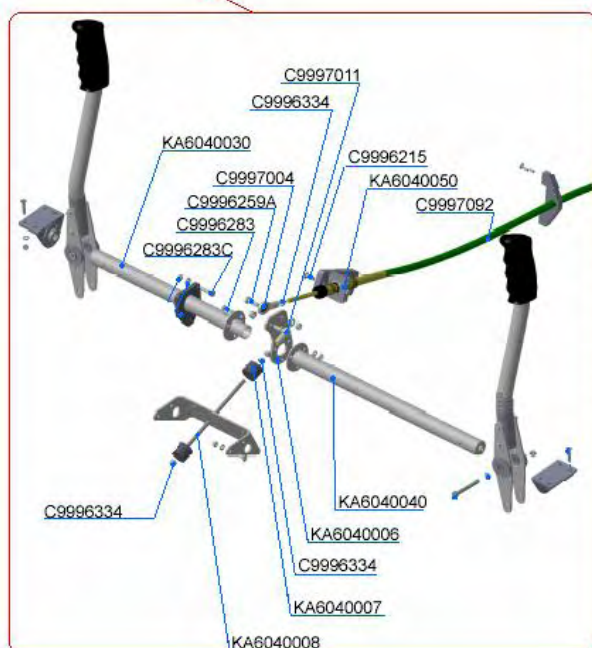
## 4.3.4.5 Stabilizer Adjustment

### 4.3.4.5.1 Type of Maintenance

Line

### 4.3.4.5.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.



KA6040000 (Forward Part)			
Part Number	Description	Q-ty per ASSY	Unit
KA6030007	Bush	1	pcs
KA6040001	Support	1	pcs
KA6040002	Support	1	pcs
KA6040006	Rocker	1	pcs
KA6040007	Bush	2	pcs
KA6040008	Rod	1	pcs
KA6040009	Clamp	1	pcs
KA6040020	Bracket	2	pcs
KA6040030	Torsion tube, right	1	pcs
KA6040040	Torsion tube, left	1	pcs
KA6040050	Front connection	1	pcs
KA6040071	Plate	1	pcs
KA6040100	Control stick	2	pcs
C9993172F	Shrinking hose 6.4-3.2	0.1	m
C9996064	Bolt DIN 912 M6x60-8.8	2	pcs
C9996207	Bolt DIN 7991 M5x16-8.8	4	pcs
C9996208K	Bolt DIN 7991 M5x25-8.8	10	pcs
C9996215	Bolt DIN 7991 M6x16-8.8	2	pcs
C9996259A	Bolt DIN 931 M6x30-8.8	1	pcs
C9996283	Bolt DIN 933 M5x16-8.8	3	pcs
C9996283C	Bolt DIN 933 M5x20-8.8	5	pcs
C9996333	Self-locking nut DIN 985-M5, regular	19	pcs
C9996334	Self-locking nut DIN 985-M6, regular	10	pcs
C9996503	Washer DIN 125 A2-5.3mm	19	pcs
C9996504	Washer DIN 125 A2B-6.4mm	6	pcs
C9996563	Washer DIN 9021-5.3mm VZ	5	pcs
C9997004	Rod end bearing, int. thread SI6E	1	pcs
C9997011	Angle joint M 6	1	pcs
C9997092	Push-pull cable TIPO 70	1	pcs

Fig. 5

Stabilizer deflection can be adjusted by bushings KA6040007 Bushes, Fig. 5. Unscrew 2-3 turns the lock nuts C9996334 by two 10x13 wrenches to unlock the bushing KA6040007 (Bushes) for adjusting.

#### Stabilizer deflection down:

- to increase angle of deflection down screw the aft bushing KA6040007 Bush (Fig. 5) from KA6040008.
- to reduce angle of deflection down screw the aft bushing KA6040007 Bush (Fig. 5) onto KA6040008.
- as needed deflection is set, lock the bushing KA6040007 Bush by the nut C9996334 (Self-locking nut DIN 985-M6) tightening it by 10x13 wrench to 80lb-in / 9 N\*m.

## Stabilizer deflection up:

- to increase stabilizer deflection up screw the forward bushing KA6040007 Bush (Fig. 5) from KA6040008;
- to reduce stabilizer deflection up screw the forward bushing KA6040007 Bush (Fig. 5) onto KA6040008.
- As needed deflection is set, lock the bushing KA6040007 Bush by the nut C9996334 (Self-locking nut DIN 985-M6) tightening it by 10x13 wrench to 80lb-in / 9 N\*m.

### 4.3.4.5.3 Measuring Stabilizer Deflection

Any adjustment of the flap control system must be documented in an adjustment report. You can find the template starting the nominal values and allowable tolerances in the Appendix of this maintenance manual.

Step 1: Set stabilizer to neutral. Neutral position is achieved when the stabilizer leading edge coincides in angle with the fuselage. (photo 1).



Photo 1

Step 2. Put the level on upper surface of the stabilizer (see photos 2 and 3). Set digital indication to zero or note down detected value. Hold the level in the same place (don't move) during all measurements.



Photo 2





Photo 3

Step 3. Deflect the stabilizer with the control stick control stick up to forward (rearward) stop the stick. Note detected values and determine deflection in reference to the value read at neutral deflection (see photos 4 and 5).



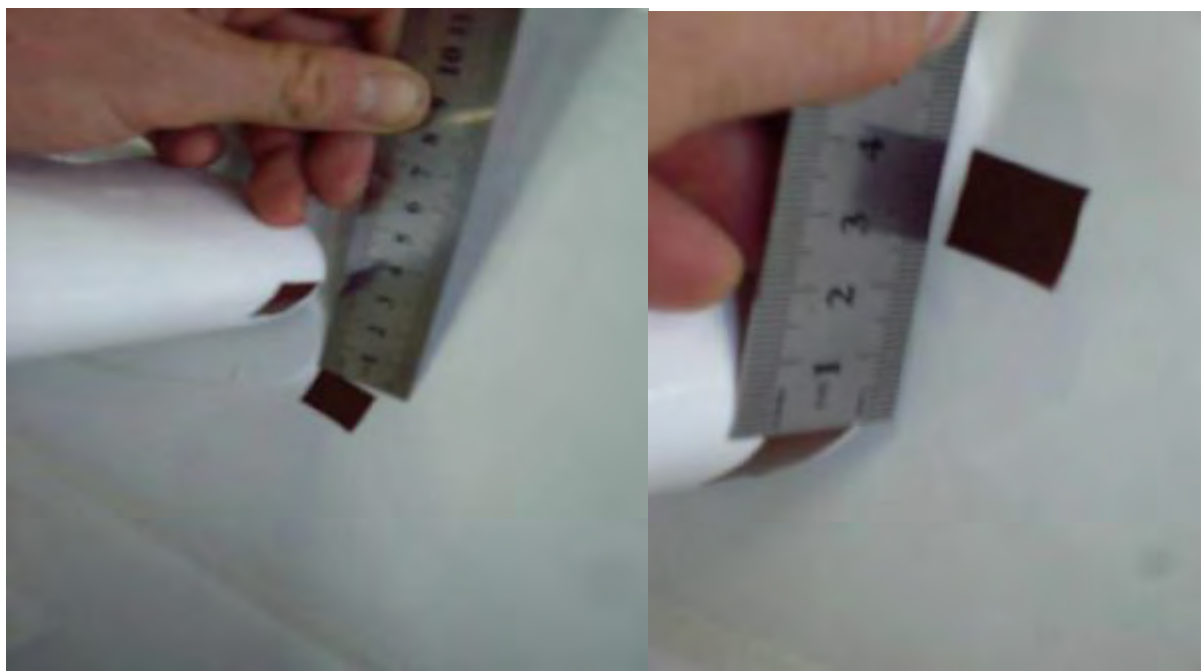
Photo 4



Photo 5

Using ruler instead of scale:

Set two coinciding markings on the stabilizer and on the fuselage. Deflect the stabilizer and measure the distance (see photos 6)



Photos 6



## 4.3.4.5.4 Measuring of Trim Tab Deflection and Adjustment

Attention: Trim tab deflection can be adjusted only after stabilizer deflection is set correctly.

Trim tab angles of deflection can be adjusted by changing of length of the trim tab control rods KA6060010 (Fig. 6). To change angle of trim tab deflection, unlock rod tip C9997006C (Rod end bearing, ext. thread GA5) by screwing the nut C9996333 (Self-locking nut DIN 985-M5, regular) towards the tip using an 8x10 wrench. Then by screwing C9997006C (Rod end bearing, ext. thread GA5) into or out of the rod KA6060010 adjust angles of deflection as required (Fig. 3). Upon completion of adjusting tighten the nut C9996333 (Self-locking nut DIN 985-M5) to 49lb-in / 5.5 N\*m by screwing it towards the tip.

Any adjustment of the flap control system must be documented in an adjustment report. You can find the template starting the nominal values and allowable tolerances in the Appendix of this maintenance manual.

Step 1: Set stabilizer to neutral (see Paragraph 4.3.4.5.3 Step 1)

Step 2: Set trim wheel to neutral.

Step 3: Apply deflection template and verify neutral deflection of trim tab (Photo 1)



Photo 1 (example only; trim tab is deflected down on this picture)

Using ruler instead of measuring template:

Apply a pointer from the upper surface of the stabilizer by setting a spacer to the upper stab surface right upfront of the elastic hinge. Measure distance between pointer and upper corner of the trim tab. Subtract the thickness of the spacer to obtain the deflection value (see photo 2).



Photo 2

Step 4: Select maximum tail heavy trim. Determine deflection of trim tab with stabilizer in neutral.

Step 5: Deflect stabilizer nose up. Determine deflection of trim tab.

Step 6: Select maximum nose heavy trim. Determine deflection of trim tab with stabilizer in neutral.

Step 7: Deflect stabilizer nose down. Determine deflection of trim tab.



### 4.3.4.6 Checking the Balance of the Stabilizer

#### 4.3.4.6.1 Type of Maintenance

Heavy

#### 4.3.4.6.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

#### 4.3.4.6.3 Procedure

In case if balancing of the stabilizer is necessary (replacement, repairing surface of the stabilizer \ trim tab or changing stabilizer bracket), it should be done by means of change of the balancer weight in small increments continuously checking balance. While checking balance, the bolt M8 in the hole A (Fig. 4) has to be screwed in, but not tightened. The stabilizer, bracket and axle are to be set on some supports so, that the stabilizer could freely wobble around the axle of rotation.

- To reduce balancer weight

Screw the bolt M8 out of the hole A Fig. 4 using 10x13 wrench.

Using a drill not more than 6 mm drill out needed material through the hole A (Fig. 4). Drill in small increments and check balance with the bracket installed onto the stabilator. Upon completion tighten the bolt to 200 lb-in (22.5 N\*m) having applied lock liquid of middle strength Loctite 243.

- To increase balancer weight

Screw the bolt M8 out of the hole A Fig. 4 using 10x13 wrench.

Put lead pellets of suitable size as required into the hole. If necessary, drill out material through the hole A (Fig. 4) as required to accommodate enough lead pellets. After balance is set, put epoxy resin into the hole A to fill empty spaces inside the balancer. Tighten the bolt in the hole A to 200 lb-in (22.5 N\*m) having applied lock liquid of middle strength Loctite 243.

## 4.3.4.7 Verification of Stabilizer Installation and Adjustment

Check stabilator deflection per Paragraph 4.3.4.5.3.

Check trim tab deflection per Paragraph 4.3.4.5.4.

Check push-pull cable attachments C9997092 (Push-pull cable TIPO 70), Fig. 6, for presence of grease  
Multipurpose plastic grease LITOL-24M TY 0254-015-00148820-99 (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso)).

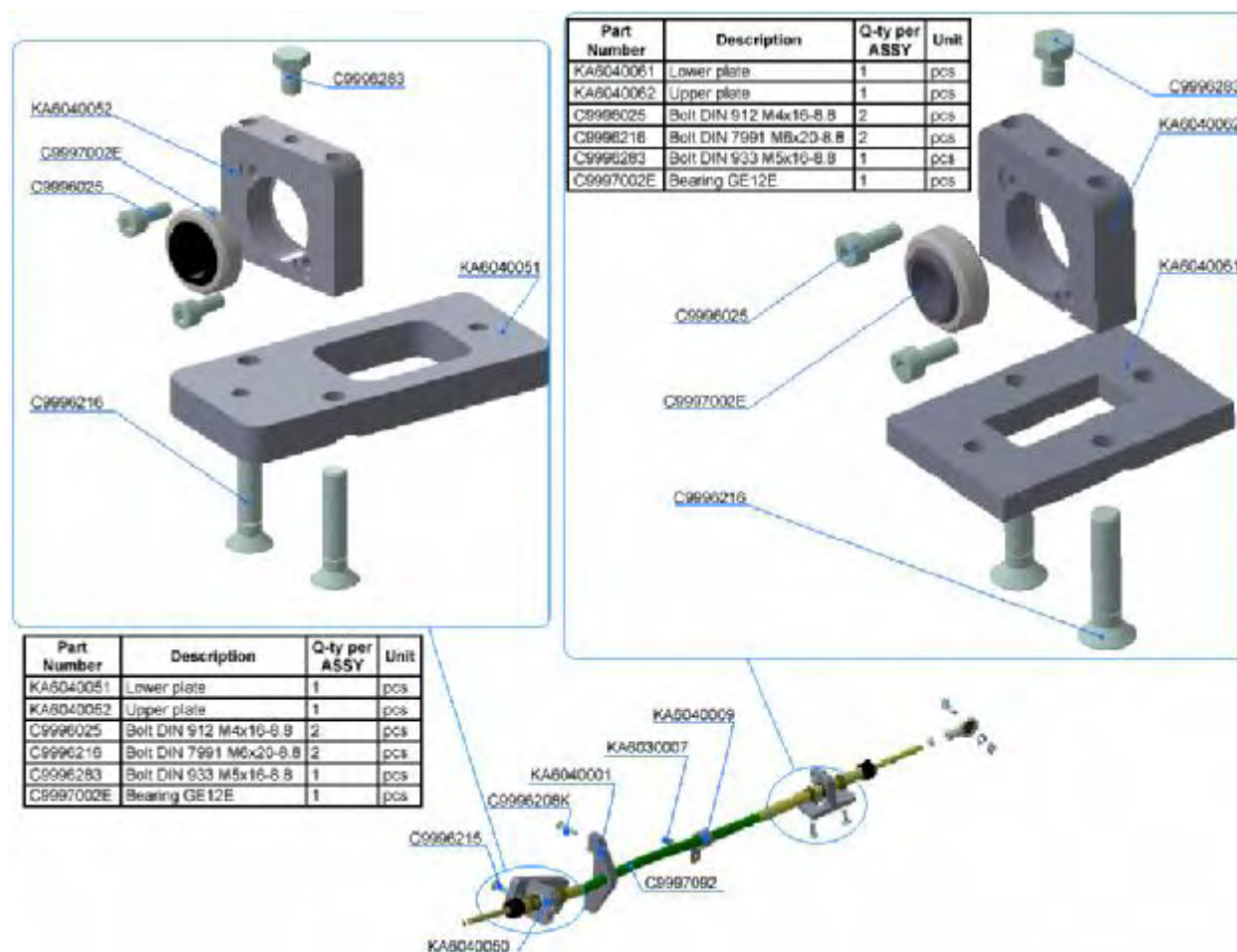


Fig. 6



### 4.4 Structural Repair

#### 4.4.1 Type of Maintenance

Heavy

#### 4.4.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design structural repairs and composite training required.

Authorized Flight Design Service centers are equipped to perform structural repairs.

#### 4.4.3 Repair Procedures

Structural repairs on composites can not be defined by standard procedures. Therefore, in any case, the individual repair procedure has to be agreed with the airframe manufacturer upfront. Approval of the manufacturer is also necessary to ensure compliance with applicable standards and regulations.

### 4.5 Painting and Coating

#### 4.5.1 Tools needed to accomplish the task

Sandpaper 1200 mm;  
Sandpaper 800 mm;  
Sandpaper 400 mm;  
Sandpaper 240 mm;  
Sandpaper 120 mm;  
Sandpaper 80 mm;  
Sandpaper 50 mm;  
Paint gun nozzle 1.6 mm;  
Polishing paste Poly Glanz;  
Polishing Creme Glanz.

#### 4.5.2 Parts needed to perform the task

None

#### 4.5.3 Type of Maintenance

Heavy

#### 4.5.4 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

#### 4.5.5 Puttying

Get ready the surface to repair (sand it with coarse grade sandpaper K 60 23x28 brown (Wuerth GmbH & Co.), degrease with solvent, e.g. acetone).

Get ready the putty mixture VAKU-FZ from Wuerth GmbH & Co (mass proportion 50:1 putty to hardener).

Apply putty mixture onto the surface to repair so that it fills cavities and interstices between the fibers of the fabric, smoothens the surface of the area being repaired and is of minimum thickness. Putty consumption should not exceed 0.041PSF (200g/m<sup>2</sup>).

After 30 minutes apply putty for the second time onto the places with insufficient smoothness. Putty consumption should not exceed 0.041PSF (200g/m<sup>2</sup>).

Remove excessive putty using a set of sand papers in ascending grain order (first middle-grained Sandpaper 120, and then fine-grained Sandpaper 240 (Wuerth GmbH &Co). Remove the dust with a piece of water wetted cotton fabric.

Inspect the surface being repaired thoroughly for cavities needed to putty. If no defects found, the surface can be primed. Repeat puttying if defects are found.

## 4.5.6 Priming

Place the part being repaired into a paint room.

Get the primer mixture ready (mass proportion 4:1:15 corresponds to primer: hardener (Lesonal (Lange & Ritter)): solvent (Acetone)).

Apply a thin layer of the primer mixture evenly so that it just covers the puttied surface. Primer mixture consumption should not exceed 0.031PSF (150g/m<sup>2</sup>) (just run the paint gun over the surface once).

Apply primer mixture for the second time so that it just covers the first layer of primer. Primer mixture consumption should not exceed 0.031PSF (150g/m<sup>2</sup>).

Place the part into a compartment with temperature at least 65°F (18°C) for 30 minutes.

Smooth down the surface with a set of sandpapers in ascending grain order (first middle-grained Sandpaper 240, and then fine-grained Sandpaper 400 (Wuerth GmbH &Co.)).

Remove the dust with a piece of water wetted cotton fabric.

## 4.5.7 Painting

Get the paint mixture ready (keep mass ratio 10:2:3 corresponding to Woeropor lacquer white 77547 W750 / Woeropor hardener 58213 / Woeropor solvent 28750(Karl Woerwag Lack- und Farbenfabrik GmbH & Co.).

Apply the paint mixture onto the surface being repaired so that it just covers the primer. Paint mixture consumption should not exceed 0.031PSF / 150g/m<sup>2</sup>.

Place the part into a compartment with temperature at least 65°F / 18°C for 30 minutes; for internal surfaces of the fuselage, doors, baggage doors and rescue system hatch – for 1.5-2 hours.

As soon as the first layer of paint gets dry, apply the second layer of paint mixture minimally needed to cover the first one. Paint mixture consumption should not exceed 0.031PSF / 150g/m<sup>2</sup>.

Place the part into a compartment with temperature at least 65°F / 18°C for 30 minutes; for internal surfaces of the fuselage, doors, baggage doors and rescue system hatch – for 1.5-2 hours.

As soon as the second layer of paint gets dry, apply the next layer of paint mixture minimally needed to cover the previous one. Paint mixture consumption should not exceed 0.031PSF / 150g/m<sup>2</sup>.

Place the part into a compartment with temperature at least 65°F / 18°C for 10-12 hours.

If primer or paint is found on the surfaces where they are not supposed to be, remove them with a piece of acetone wetted cotton fabric.

## 4.5.8 Polishing

Sand the surface that needs to be polished with fine grained Sandpaper 400, Sandpaper 800, Sandpaper 1200 (Wuerth GmbH &Co.).

Apply polishing paste Poly Glanz (Lange & Ritter) onto the surface and rub by smooth circular hand motions applying some pressure. Polishing paste consumption should not exceed 0.008PSF / 40g/m<sup>2</sup>

Polish the rubbed surface by a right-angle polishing machine with a 6" / 150 mm polishing disk (Lange & Ritter) for 2-3 times.

Clean the polished surface with a piece of cotton fabric to remove remains of the polishing paste.

Apply Polishing Creme Glanz (Wuerth GmbH & Co.) on the surface. Right after that polish the surface by a dry piece of cotton fabric up to gloss. A right-angle polishing machine can be used.

## 4.5.9 Method of Verification

For final inspection touch the painted (or coated) surfaces of parts. Finished surface must be smooth, no dents or bumps are allowed. Ensure original profile of the treated surfaces, if necessary.

Inspect painted surface visually from various viewpoints. No paint runs, unpainted areas are allowed. Quality of polishing must be the same of adjacent areas.





## 5 Engine

### 5.1 Engine Systems and Accessories

Engine systems and accessories described in this manual, such as the Carburetor Heat system, are inspected and repaired as line maintenance items. These items may require task specific training.

Some engine installation components, such as the Firewall and the Engine mount, if in need of repair, are Heavy maintenance items.

Besides task specific training, instructions and authorizations on a case by case basis may be required. Contact Flight Design for details.

### 5.2 Rotax 912ULS Engine

For engine inspection and maintenance refer to the valid original Rotax manuals. Initial manuals are supplied with the aircraft:

- Operator's Manual for all versions of ROTAX 912;
- Maintenance Manual (Line Maintenance ) for ROTAX Engine Type 912 Series;
- Maintenance Manual II (Heavy-Maintenance) for ROTAX Engine Type 912 Series.

Before performing any inspection or maintenance task on the aircraft check these manuals for available updates through ROTAX.

**Engine removal, installation & replacement can only be done of Flight Design USA authorized service center.**

Important: Rotax training may be required to perform maintenance on the engine

## 5.3 Carb Heat Control

To inspect and eliminate damages of the ventilation system one person is required.

### 5.3.1 Tools Required

Hex-nut wrench 3 (or screwdriver) 1 pcs  
Screwdriver 5 mm 1 pcs  
Hand pressing tool for rope 0.45 - 2.00 mm 1 pcs  
Cross-screwdriver or wrench with header 71 pcs  
Knife 1 pcs

### 5.3.2 Materials Required

C9997065B Steel rope 7x7 1 mm 39.4 in. / 1 m  
C9997056E Nicopress stop sleeve 1.5-1.7 mm for 1.6 mm cable 1 pcs  
C9993188A AERODUCT tube CEET-12 3 ID 29.5 in. / 0.75 m  
C9997770 Air filter C2039 1 pcs  
C9997727F TY-wraps CV-200 white 6 pcs

### 5.3.3 Type of Maintenance

Line

### 5.3.4 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 5.3.5 General

Remove upper and lower cowling to ensure good access to the firewall forward area. Set the plane's parking brake on. Put wheel chocks under the main wheels to prevent rolling.

### 5.3.6 Inspection of Carburetor Heater Control

1. Inspect Air filter for conditions. Replace if necessary.  
To replace the filter C9997770 (Air filter C2039) inside KB5030500 (Air filter box) and the hose C9993188A (AERODUCT tube CEET-12 3 ID) do the following:  
-Release the cable C9997065B (Steel rope 7x7 1 mm) from C9997816C Cable stop 1806-Z ni. (Fig. 1).

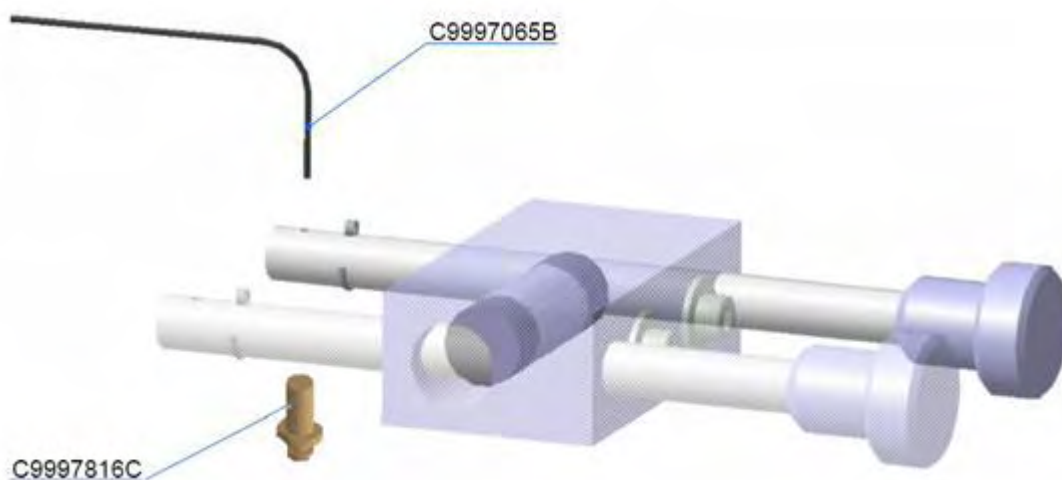


Fig. 1

- Unscrew the bolt by cross-screwdriver or wrench with header 7. Release the clamp C9997723B (Clamp 60-80) by a screwdriver and disconnect the hose C9993188A (AERODUCT tube CEET-12 3 ID) from KB5030003 (Transitional bush) located near the carburetor (Fig. 2). Repeat for the hose from the other side of KB5030500 (Air filter box). Fig. 3.

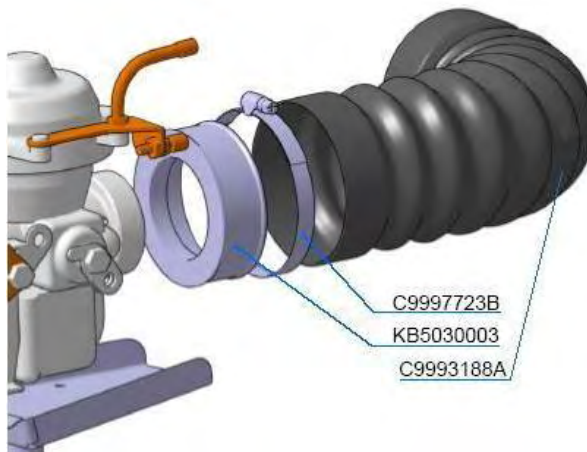


Fig. 2

- Cut TY-wraps holding the tubes C9993188A (PTFE tube 4.0x6.0 mm) connected to KB5030500 Air filter box.

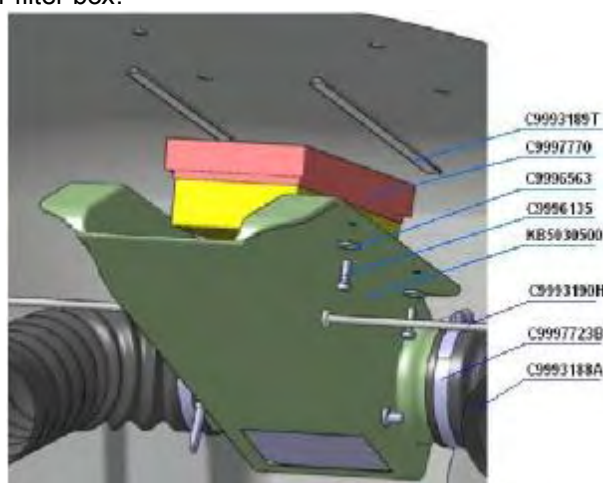


Fig. 3

- Unscrew the four bolts C9996135 (Bolt DIN 7984-M5x16-8.8) by a hex-nut wrench 4. Fig. 3.
- Take out KB5030500 Air filter box.
- Cut the TY-wraps holding the Air filter C2039.
- Replace the filter with a new one.
- Secure the new filter C9997770 (Air filter C2039) inside KB5030500 Air filter box by TY-wraps C9997727F (TY-wraps CV-200 white). Cut off the ends of TY-wraps C9997727F (TY-wraps CV-200 white) with a knife.
- Unscrew the bolt by cross-screwdriver or wrench with header 7. Release the clamp C9997723B (Clamp 60-80) with a screwdriver and disconnect the hose C9993188A (AERODUCT tube CEET-12 3 ID) from KB5030500 Air filter box. (Fig. 3).
- Replace the damaged hose C9993188A (AERODUCT tube CEET-12 3 ID) to a new one of the same length.
- Connect the hose C9993188A (AERODUCT tube CEET-12 3 ID) to KB5030500 (Air filter box). Tighten the clamps C9997723B (Clamp 60-80) by a cross-screwdriver or wrench with header 7.
- Install KB5030500 Air filter box.

- Screw the bolts C9996135 Bolt DIN 7984-M5x16-8.8 into the fuselage to secure KB5030500 Air filter box.
  - Connect the hose C9993188A (AERODUCT tube CEET-12 3 ID) to KB5030003 (Transitional bush). Tighten the clamps C9997723B (Clamp 60-80) by a cross-screwdriver or wrench with header 7.
  - Repeat item 1 for the second carburetor.
  - Secure C9993190H PTFE tube 6x1 by TY-wraps C9997727F TY-wraps CV-200 white. Cut off the ends of TY-wraps C9997727F (TY-wraps CV-200 white) by a knife.
  - Pass the cable C9997065B (Steel rope 7x7 1 mm) through the tube C9993190H (PTFE tube 4.0x6.0 mm) into the cabin.
  - Connect the cable C9997065B (Steel rope 7x7 1 mm) to the carburetor heater control handle. Fig. 1.
  - Secure the cable near the handle with a stop C9997816C (Cable stop 1806-Z ni) by a screwdriver. Fig. 1.
2. Check air filter choke inside KB5030500 (Air filter box) for operation.
- When the handle is pushed (Fig. 4, a) the choke of KB5030500 Air filter box (Fig. 3) in OFF position.
  - When the handle is on pulled (Fig. 4, b), the carburetor heater choke of KB5030500 Air filter box is in ON position.



Fig. 4, a



Fig. 4, b

3. If the choke inside KB5030500 Air filter box does not operate properly, check the cable connecting the choke and the handle and eliminate the problem as follows.
- Inspect the cable C9997065B (Steel rope 7x7 1 mm) for frays and if the sleeve C9997056E (Nicopress stop sleeve 1.5 -1.7 mm for 1.6 mm cable) is missing near the attachment of the cable to the choke inside KB5030500 Air filter box. Fig. 5.
  - If the C9997056E Nicopress stop carburetor heater sleeve 1.5-1.7 mm for 1.6 mm cable is missing, connect the cable C9997065B Steel rope 7x7 1 mm to the choke as shown (Fig. 15) and secure it with the stop C9997816C (Cable stop 1806-Z ni) using a Hand pressing tool for rope 0.45 - 2.00 mm.
  - Check the stop C9997816C Cable stop 1806-Z ni at cable connection to the handle. Fig.1.
  - If the stop is missing C9997816C (Cable stop 1806-Z ni), connect the cable C9997065B (Steel rope 7x7 1 mm) to the control handle and secure by the stop C9997816C (Cable stop 1806-Z ni) using a screwdriver. Fig. 1.
  - If frayed, replace the cable C9997065B (Steel rope 7x7 1 mm), 39.4 in. (1 m) long (while replacing the handle must be pushed (Fig. 4, a)):
  - Replace the damaged cable. Pass the new cable C9997065B Steel rope 7x7 1 mm through the tube C9993190H (PTFE tube 4.0x6.0 mm) into the engine compartment.
  - Pass the cable through the spring C9997701P (Compression spring 0.5x5x1000).
  - Connect the cable C9997065B (Steel rope 7x7 1 mm) to the choke KB5030500 (Air filter box) as shown (Fig. 15), secure the cable by the sleeve C9997056E (Nicopress stop sleeve 1.5 -1.7 mm for 1.6 mm cable) using a Hand nicopress tool for cable 0.45 - 2.00

mm.

Secure the cable near the handle by the stop C9997816C (Cable stop 1806-Z ni) using a screwdriver. Fig. 1.

- Check the choke control handle for operating according to item 2. If positive, continue with item 6

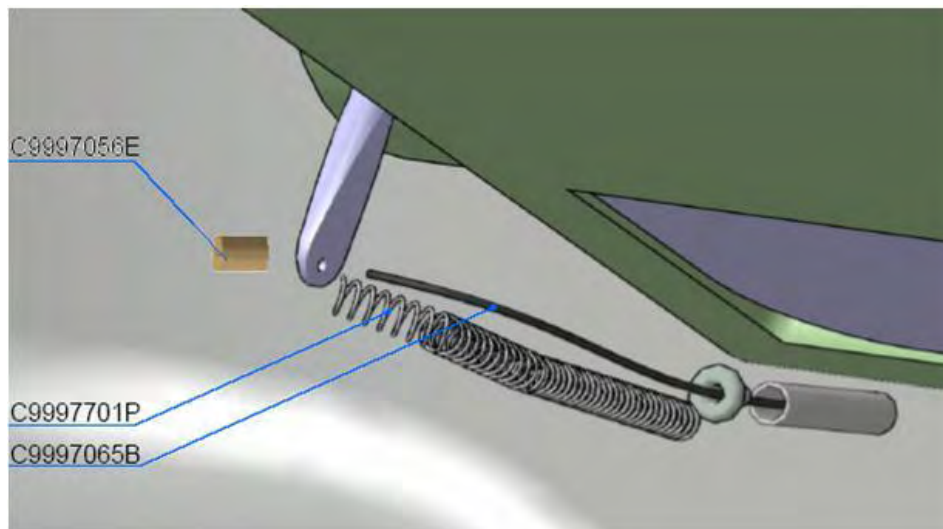


Fig. 5

4. If the choke is not in OFF position, when the handle is pulled out (Fig. 4, b) do the following;
  - Release the stop C9997816C (Cable stop 1806-Z ni) by a screwdriver and tighten the cable C9997065B (Steel rope 7x7 1 mm).
  - Secure the stop C9997816C Cable stop 1806-Z ni using a screwdriver.
  - Check the control handle for operation per item 2. If positive, continue with item 6.
5. If the carburetor heater choke is in OFF position, but the handle is not fully pulled out, do he following;
  - Mark length on the handle it can be pulled more (distance a from the bracket to the cotter-pin in the handle). Fig. 6.
  - Release the stop C9997816C (Cable stop 1806-Z ni) by a screwdriver.

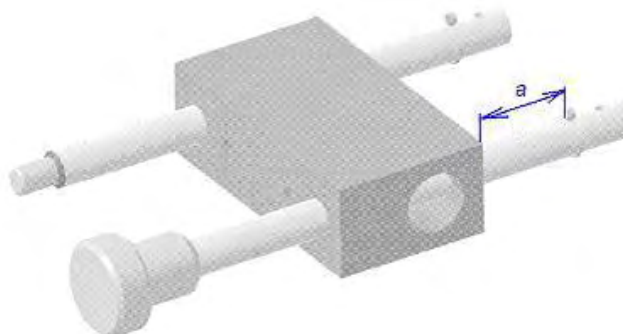


Fig. 6

- Move the stop C9997816C (Cable stop 1806-Z ni) on distance a towards the tip of the cable C9997065B (Steel rope 7x7 1 mm) and secure the stop C9997816C (Cable stop 1806-Z ni) using and screwdriver.
  - Check the handle for operating per item 2. If positive, continue with item 6.
6. Length of the running end of the cable (from the tip to the stop) must not exceed 2 in. (50 mm).
  7. Install and secure the left instrument panel. Tighten the bolts by a 3 hex-nut wrench.



## 5.4 Engine Mount Inspection.

### 5.4.1 Type of Maintenance

Line

### 5.4.2 Minimum Level of Certification

Repairman, Light sport Aircraft-Maintenance, or higher

### 5.4.3 Procedure

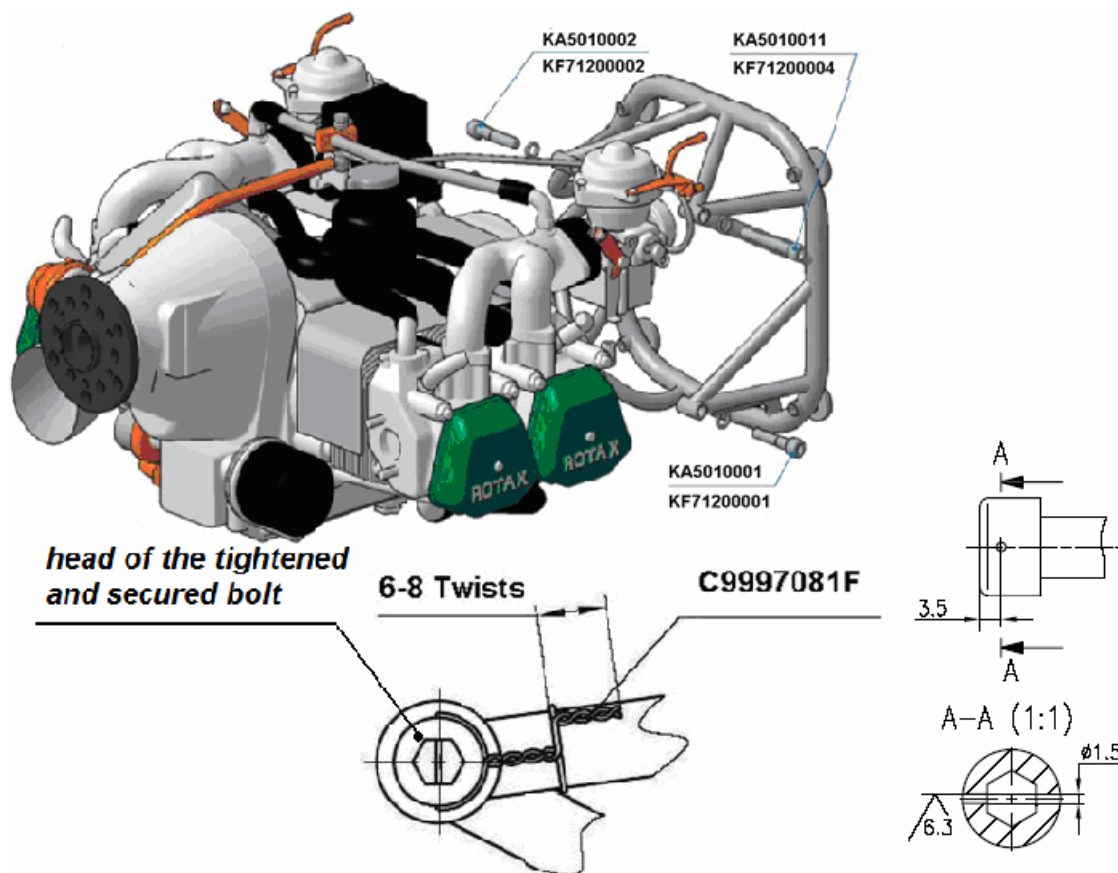


Fig. 1

On newer production aircraft three of the four engine attachment bolts that attach the engine to the small engine mount are locked by safety wire, in addition to tightening them with nominal torque. This makes the inspection for correct torque faster and easier. Due to geometrical constraints this method is not possible for the upper left bolt position.

When inspecting engine attachments without locking wire it is necessary to check the tightening torque to be 25.8 ft.lb (35 Nm) every time.

When inspecting engine attachments with locking wire it is sufficient to check the safety wire to be without damage.

Older production aircraft that do not have a safety wire installed can be easily upgraded. To do so remove the three possible engine mounts one by one, drill a hole for the safety wire to the bolt head (diameter 1.5mm), and attach the safety wire C9997081F (diameter 1 mm) like illustrated on the sketch Fig. 1.



## 6 Fuel System

### 6.1 General

Fuel system inspection and maintenance are to be performed in a well-ventilated compartment, away from heaters and flame.

A fuel tank with a capacity of 65 l is integrated into each wing. The fuel tanks are each divided into two sections by an anti-sloshing rib. Fuel is filled into the outer section via a fuel filler opening on the upper side of each wing. The fuel filler cap can be unscrewed counter clock wise. To do this the upper end of the fuel levelling gauge can be used.

The tanks are vented through individual studs extending from the fuel filler cap. It is important that, when fuel filler cap properly closed, the angled lower end of the vent studs is facing forward, so that the air flow in flight can slightly pressurize the fuel tanks.

Each tank outlet has a coarse screen which can be removed via a maintenance flap in the root rib for visual inspection and cleaning.

Fuel is fed by gravity via two down lines in the A columns. They have larger volume to maintain fuel flow also in sideslip conditions with low fuel for a certain time. The two lines are connected to each other via a T-piece. The fuel shutoff valve is located behind the fine fuel filter and directly before the lead-through through the fire wall. The fuel flow sensor and the associated pulsation damper (both only with Dynon EMS installed) are in this lead-through, the latter being in the engine compartment.

The fuel flows from here into the gascolator which has another fine filter. The gascolator is the lowest point in the fuel system and has a drain valve. The fuel system must be drained at this point before the first flight of the day and after filling up with fuel.

The fuel pump feeds fuel from the gascolator to the engine which then feeds the fuel to the carburetors. Excess fuel is pumped back to the gascolator.

The fuel system is presented schematically in Fig. 1.

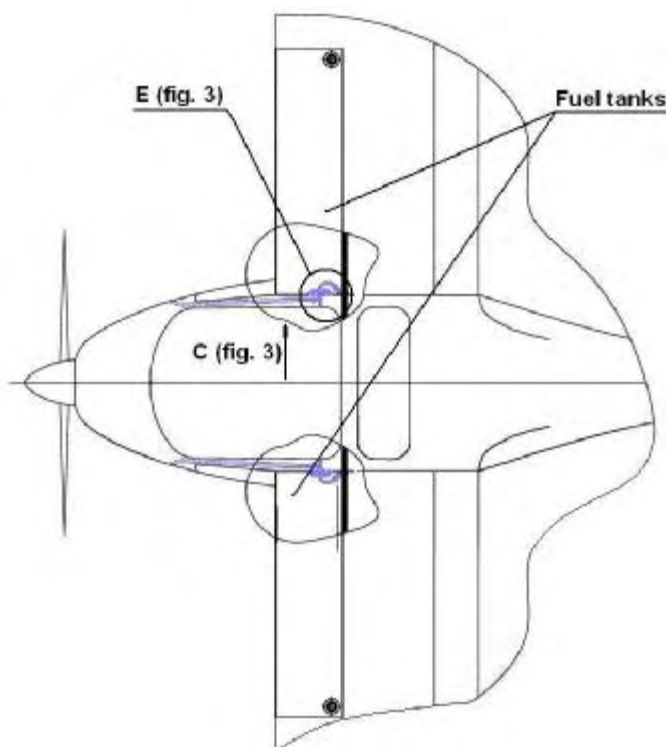




Fig. 1

One person is required for inspection and maintenance of the fuel system.

## 6.2 Tools Required

Fuel level gauge 1 pcs  
Claw 1 pcs  
Screw-driver 1 pcs  
Hex-nut wrench 41 pcs  
Hex-nut wrench 51 pcs  
Wrench 6x81 pcs  
Wrench 8x101 pcs  
Wrench 10x131 pcs  
Wrench 14x171 pcs

## 6.3 Materials Required

C9993189Z FE as required  
C9997715G Clamp 13 mm 6 pcs  
C9997715H Clamp 14 mm 14 pcs  
C9997720A Disposable clamp 13.8 mm 2 pcs  
C9997727C TY-wraps CV-100 white 10 pcs  
C9997813G Fuel Filter 5/16" 1 pcs  
C9996334 Self-locking nut DIN 985-M6 6 pcs x 2 wings  
KA7020009 Seal ring 1 pcs x 2 wings  
KA7020030R Fuel intake 1 pcs  
KA7020030L Fuel intake 1 pcs  
Universal jointing compound Hylomar as required  
Acetone as required

## 6.4 General System Inspection

### 6.4.1 Type of Maintenance

Line



### 6.4.2 Minimum Level of Certification

Owner/Pilot

### 6.4.3 Procedure

1. Drain the fuel through gascolator and check for water.
2. Check Fuel flow at each 100 hr inspection (see paragraph 6.5 for details). Min. rate is 35 l / hour (9.25 GPH).
3. Check Intake filters inside the fuel tanks every 1000 hrs or at negative result from 100 hr flow checking (see Paragraph 6.6 for details).
4. Inspect the fuel cap vents for obstructions (Fig. 5) not less than 1 time after 100h
5. Inspect connections for leaks.
6. Inspect the fuel tank and fuel line connection for leaks (KA7020030R(L) - C9993184A (Fig. 2)).
7. Inspect moving and rubbing elements for operating, play, binding. Inspect the fuel valve C9997419D (Fuel valve K-MI-6400-1/4-22-II-MSV, 2/2) (Fig. 1, item P) and fuel valve handle (Fig. 1, item O) for operating (stopping fuel).
8. Inspect the fine filter for cleanliness (Fig. 1, item R; Fig. 6, C9997813G Fuel Filter 5/16") each time the middle panel KB1081300 (Fig. 1) of the instrument board is removed (see Paragraph 6.8 for details).
9. Inspect the filter inside the Gascolator C9997421 (Fig. 1, item S; Fig. 7) for cleanliness for 100h (see paragraph 6.9).
10. Inspect the fire protection hoses C9993189G (Fire protection hose, red) for condition and integrity on all fuel lines of the firewall forward compartment at every 100h.

## 6.5 Fuel Flow Check

### 6.5.1 Type of Maintenance

Line

### 6.5.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.  
Flight Design task specific training required.

### 6.5.3 Checking of Fuel Flow Rate

Check the fuel flow per minute of each tank through the gascolator exactly and note and compare with the previous fuel flow rate. If there is a drop more than 5%, then check full system (bows in fuel lines) and if still a difference, check all fuel filters (see paragraphs 6.6, 6.8, 6.9).

1	Set the plane on the prepared platform. Attach the wings. Place a level on a roof. Set a fuselage on horizon level, using supports under the main wheels.
2	<p>Fill in a left wings' tank with not less than 5 liters of fuel. Open a gascolators' drain valve. Fuel should drain by gravity.</p> <p>If it is not, create superfluous pressure in a tank which generates the fuel drainage. After the fuel starts to flow down, remove the superfluous pressure in a tank.</p> <p><b>Inspection: checking the fuel pipe throughput. Fuel should drain from a gascolator by gravity with the charge not less 35 l / hour (9.25 GPH).</b></p> <p>Drain all fuel from the left wings' tank. Close the gascolators' drain valve.</p>
3	<p>Fill in a right wings' tank with not less than 5 liters of fuel. Open a gascolators' drain valve. Fuel should drain by gravity.</p> <p>If it is not, create superfluous pressure in a tank which would promote the fuel drainage. After the</p>

	fuel starts to flow down, remove the superfluous pressure in a tank.
	<b>Inspection: checking the fuel pipe throughput. Fuel should drain from a gascolator by gravity with the charge not less 35 l / hour (9.25 GPH).</b>
4	Close the gascolators' drain valve. Add the drained fuel in the right wings' tank.
5	<b>If the charge is less than 35 l / hour (9.25 GPH),</b> it is necessary to check up: fuel hoses for absence of inflections, cleanliness of the fuel filter and a gascolator. After checking the fuel hoses repeat items 1-3.

## 6.5.4 Simulation of In-Flight Engine Restart

6	Put the plane on a parking brake; fix it with tie-down belts (Fig.1).
7	Put a support 150 – 200 mm height under the left main wheel. The height of a support should provide such roll of the plane that the level of fuel in a tank was below the fuel filter of tanks' side frame (check up according to fuel level index).
8	Start the engine. Keep up engine working while it stops after the rests of fuel will come to end in the fuel pipes.
9	Pull out a support from under the left main wheel. When the plane takes horizontal position, start the time countdown.
10	Start the engine.  <b>Inspection: the engine should be started in 60 seconds.</b>
11	If the engine is not started in 60 seconds, make all fuel system check for absence of inflections of fuel hoses, absence of fuel system blockage. Start the engine. Keep the engine working during 5-10 minutes. Stop the engine. Repeat items 6-9.



Fig.1



Fig.2



## 6.6 Intake Filter / Side Access Panel

### 6.6.1 Type of Maintenance

Line

### 6.6.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 6.6.3 Procedure

The fuel tank is closed by the access panel from the cabin side KA7020002R (L) (Fig. 2). Inspect the access panel and fuel level indicator for leaks before every flight. If found - tighten the screws on the clamps or nuts and the access panel.

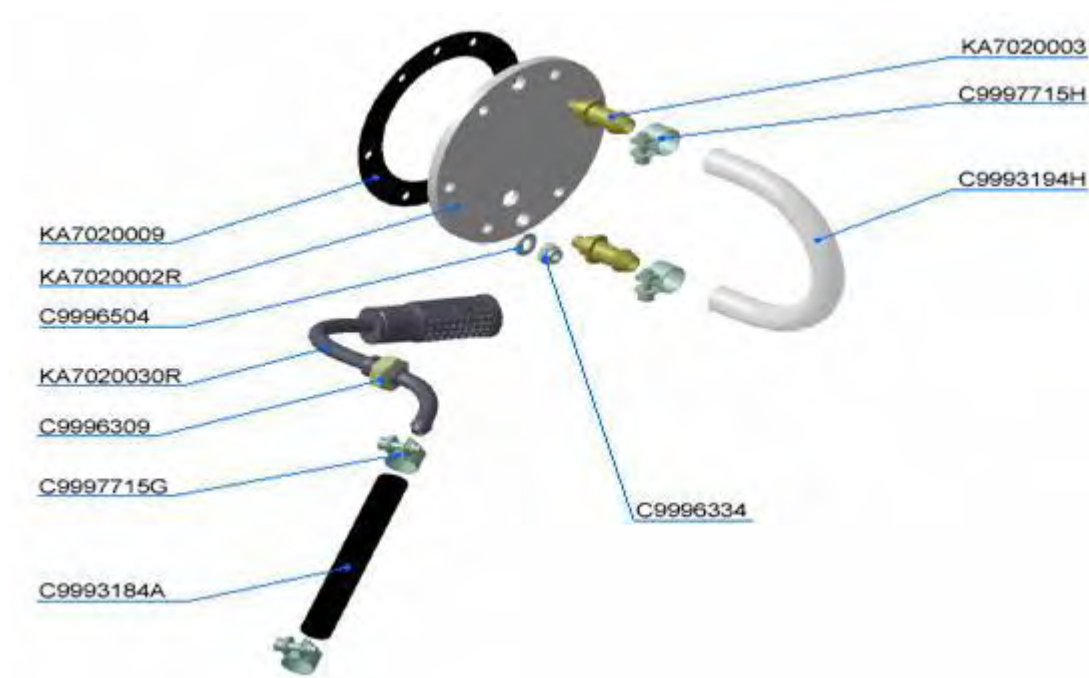


Fig. 2

Inspect the intake filter for cleanliness as follows:

- drain fuel from the tank;
- uninstall the wing from the fuselage and make sure there no fuel in the tank;
- leave the fuel tank cap KA7020051 (Refill cap) (Fig. 5) open for ventilation;
- Get the 6 nuts C9996334 (Self-locking nut) DIN 985-M6 on the access panel KA7020002R (L) (Cap plate) unscrewed 1-2 turn and then unscrew them fully;
- Remove the fuel tank access panel KA7020002R (L);
- Make sure there are no foreign objects within visible and convenient for touching areas of the fuel tank;
- Ensure integrity of the filter mesh KA7020030R(L) and no foreign objects inside and on the surface of the mesh. Replace if necessary;
- Make sure the thread on the bolts is of good condition before access panel mounting;
- Make sure the flange of the access panel is clean;
- Degrease the flanges of the access panel with acetone;
- Apply Universal jointing compound Hylomar 1-2 mm thick;



- Set the gasket KA7020009 (Seal ring). NOTE: Use only new gaskets KA7020009 (Seal ring) each time the access panel is to be mounted.
  - Install the access panel KA7020002R (L);
  - Make sure the fuel filter is turned towards the trailing edge of the wing (Fig. 3) and is in the lowest position (lays on the bottom skin) (Fig. 4.);
  - Set the washers C9996504 DIN 125 A2B-6.4 mm onto the bolts;
- NOTE: use only new nuts C9996334 each time the fuel tank access panel is to be installed.**
- Pre-tighten the nuts C9996334 cross-wise by a 10x13 wrench and then finally tighten the nuts going from one to another.

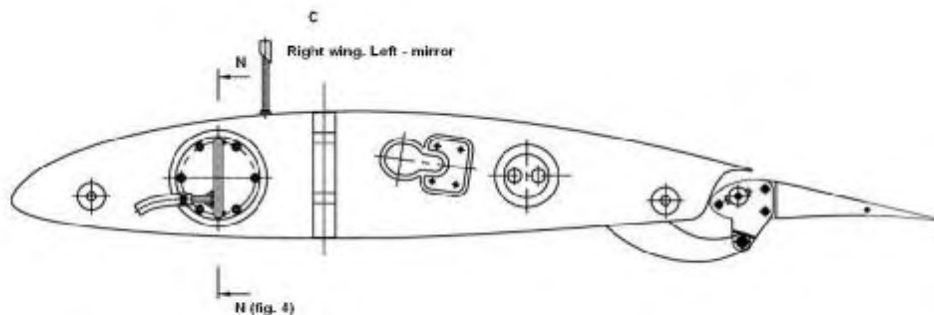
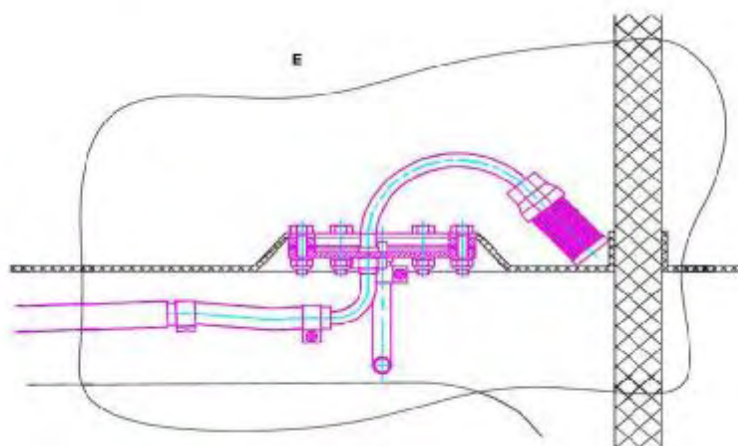


Fig. 3



N-N

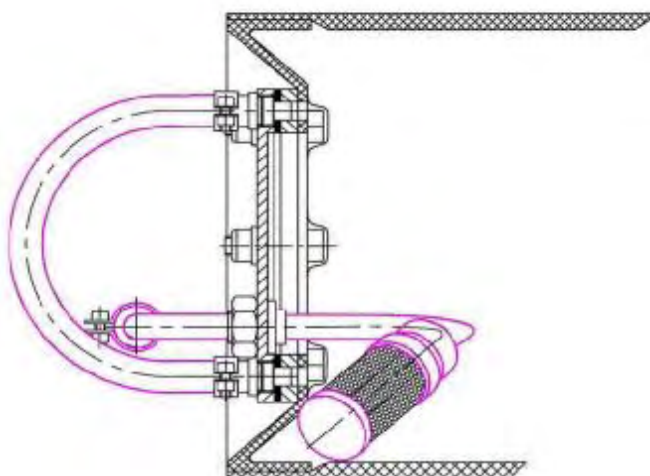


Fig. 4

## 6.7 Vent Manifold / Fuel Tank Cap

### 6.7.1 Type of Maintenance

Line

### 6.7.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 6.7.3 Procedure

Inspect the fuel tank vents for obstructions not less than 1 time after 100h as follows (Fig. 5):

Unscrew the cap KA7020051 (Refill cap) by the fuel level gauge (Side A)

Blow out the vent KA7020060 (Vent) by compressed air through the hole in the cap KA7020051.

If air does not come out of the vent cap, unscrew the vent KA7020060 as follows:

Unscrew the nut C9996334 DIN 985-M6 by a 10x13 wrench up to the stop;

Unscrew the vent KA7020060 (Vent);

Clean out the hole in the cap KA7020051;

Clean out the channel in the tube KA7020060;

Set the O-ring C9997730H (O-ring 38.0x3) under the cap KA7020051 (Fig. 5) and tighten it using the fuel level gauge (Fig. 5, side A) as a lever tool;

Screw in the vent tube KA7020060 (Vent), make sure the nut C9996334 DIN 985-M6 is screwed onto it up to the stop.

**NOTE:** The angled lower side of the vent cap must face forward (Fig. 3, view C);

Fix position of the vent by tightening the nut C9996334 against the filler cap using a 10x13 wrench.

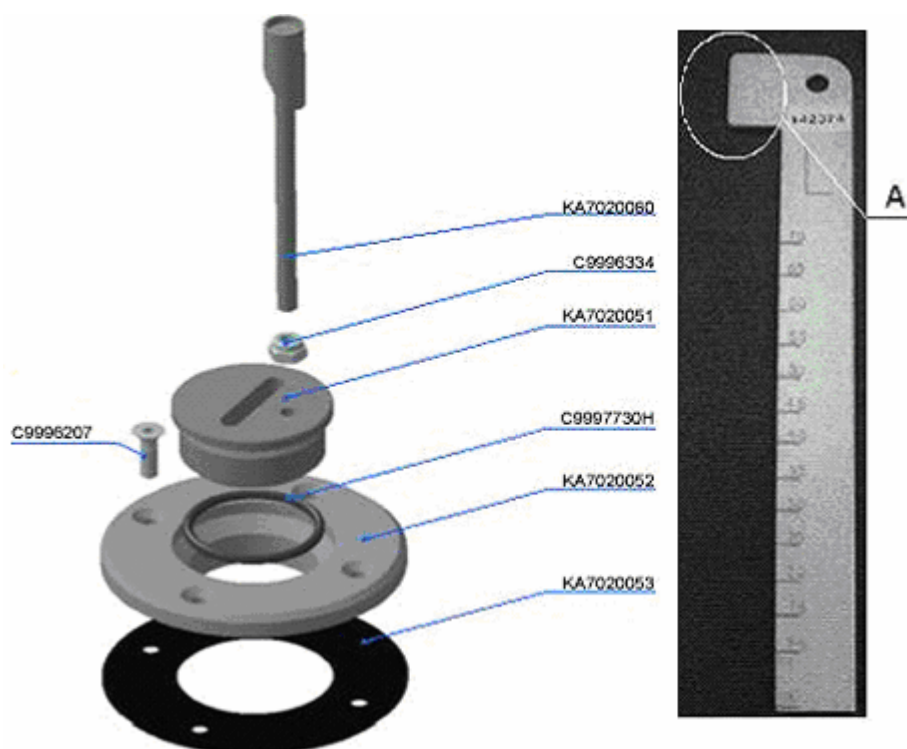


Fig. 5

Fuel line is connected to the tank by the hose C9993184A (Fuel tube) DIN 73379, 7.5x13.0 and clamps C9997715G (Clamp) 13 mm (Fig. 2) each time the wing is being installed. Make sure the clamps are secure and check hose connections for leaks.

## 6.8 Fuel Filter

### 6.8.1 Type of Maintenance

Line

### 6.8.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 6.8.3 Procedure

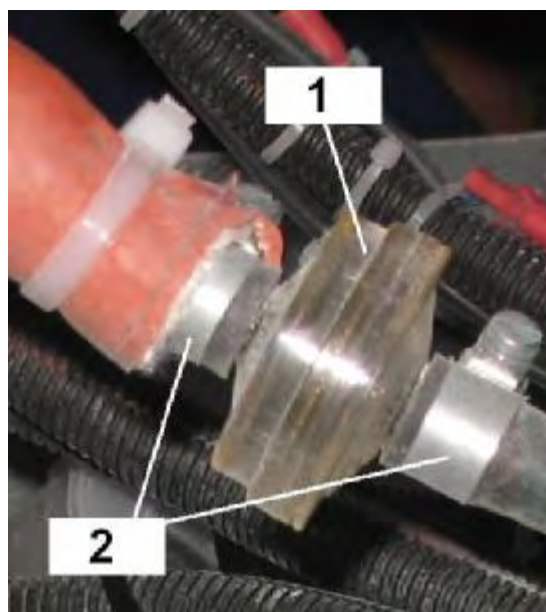


Fig. 6

Inspect for:

1. Leaks at joint of the connector (Fuel Filter 5/16", Fig. 6, unit 1) and hose (Fuel tube DIN 73379, 7.5x13.0). Tighten the clamp Fig. 6, unit 2), if necessary;
2. Filter body integrity.
3. Foreign objects inside the filter.

The filter must be replaced latest every 200h, or earlier on condition.

## 6.9 Gascolator

### 6.9.1 Type of Maintenance

Line

### 6.9.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 6.9.3 Procedure

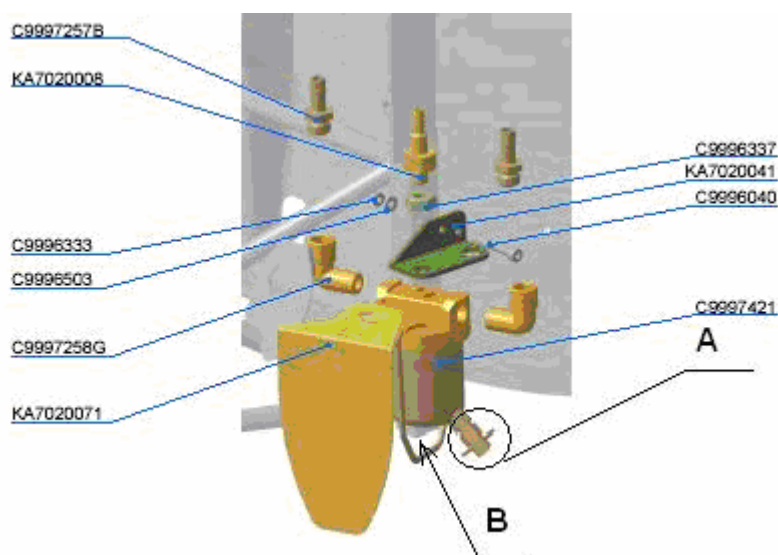


Fig. 7

Inspect:

1. For leaks on connections.
2. For passing fuel through the lines and water in fuel by draining some fuel through the drain valve (item A, Fig. 7).
3. For foreign objects in the gascolator (Unscrew the nut (item B, Fig. 7), remove the bail and remove the body (ensure integrity of the O-ring that recovers its sizes upon some time needed to get it dry). Assemble the gascolator in reverse of the disassemble process).
4. Fire Protection Hoses C9993189G (Fire protection hose, red) on all the fuel lines in the firewall forward compartment for condition and integrity.



## Maintenance and Inspection Procedures Manual

Type: **CT**

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## 7 Propeller

### 7.1 Type of Maintenance

Line

### 7.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

### 7.3 Propeller Maintenance Procedures

For propeller inspection and maintenance refer to the latest maintenance manual issued by the propeller manufacturer.

## 8 Utility Systems

### 8.1 Tools Required

Wrench 8 1 pcs  
 Hex-nut wrench 3 (or screwdriver) 1 pcs  
 Hex-nut wrench 4 (or screwdriver) 1 pcs  
 Hex-nut wrench 51 pcs  
 Screwdriver 5 mm1 pcs  
 Hand pressing tool for rope 0.45 - 2.00 mm1 pcs  
 Cross-screwdriver (or wrench with header 7)1 pcs  
 Screwdriver with header 121 pcs  
 Wheel chock2 pcs

### 8.2 Materials Required

C9997065B Steel rope 7x7 1 mm59 in. / 1.5 m  
 C9997056E Nicopress stop sleeve 1.5-1.7 mm for 1.6 mm cable1 pcs  
 C9997703B Spring 0,5x5,0x25,01 pcs  
 C9993188 AERODUCT tube CEET-7 1-3/4 ID59 in. / 1.5 m  
 C9997727F TY-wraps CV-200 white 2 pcs

### 8.3 Cabin Heat System

For inspection and maintenance of the heating system one person is required.

#### 8.3.1.1 Type of Maintenance

Line

#### 8.3.1.2 Minimum Level of Certification

Owner/Pilot

#### 8.3.1.3 Procedure

Set the plane's parking brake and additionally put wheel chocks under the main wheels to prevent rolling.

1. Remove the cowlings to get access to the lower part of the firewall forward. Fig. 1.



Fig. 1

2. Check the cabin heater choke for operation:
  - When the handle is pushed (Fig. 2, a), the Cabin heater choke KA7040200 (Fig. 2, b) is OFF.





Fig. 2, a

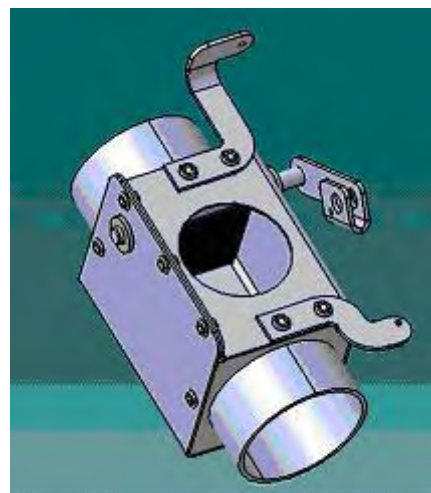


Fig. 2, b

- When the handle is pulled (Fig. 3, a), the Cabin heater choke KA7040200 (Fig. 3, b) is ON.



Fig. 3, a

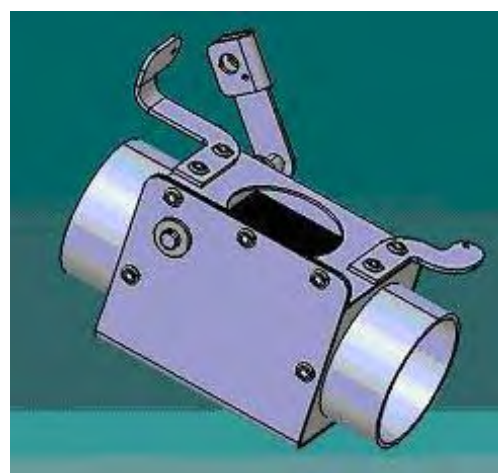


Fig. 3, b

3. If the cabin heater choke does not operate, inspect the connecting cable between the choke and the handle and eliminate damage as follows:
  - a. Check if there is the spring C9997703B Spring 0,5x5,0x25,0 at the Cabin heater choke KA7040200. If the spring is missing or damaged, set a new one. Fig. 4.

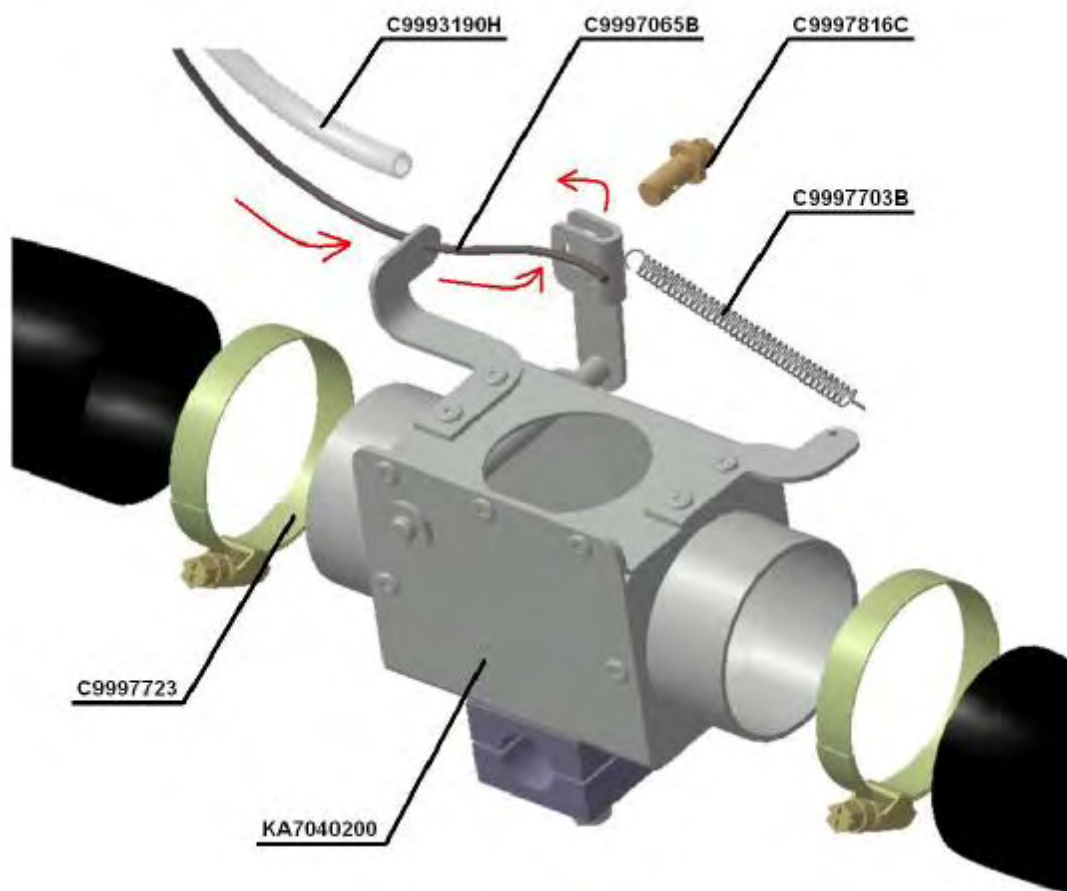


Fig. 4

- b. Check if the cable C9997065B Steel rope 7x7 1 mm is frayed and if there is the stop C9997816C Cable stop 1806-Z ni at the cable attachment to the Cabin heater choke KA7040200. Fig. 4.
- c. If the stop C9997816C (Cable stop 1806-Z ni) is missing, connect the cable C9997065B (Steel rope 7x7 1 mm) to the Cabin heater choke as shown at the Fig. 4 and fix it by the stop C9997816C (Cable stop 1806-Z ni) using a screwdriver.
- d. Remove the panel from the instrument board using 3 hex-nut wrench and check the cable C9997065B (Steel rope 7x7 1 mm) for fraying and if there is the sleeve C9997056E (Nicopress stop sleeve 1.5-1.7 mm for 1.6 mm cable) at the cable attachment to the handle. Fig. 5.
- e. If the sleeve C9997056E (Nicopress stop sleeve 1.5-1.7 mm for 1.6 mm cable) is missing, connect the cable C9997065B (Steel rope 7x7 1 mm) to the handle and secure it with the sleeve C9997056E (Nicopress stop sleeve 1.5-1.7 mm).
- f. If frayed, replace the cable to a new one C9997065B (Steel rope 7x7 1 mm), 59 in. / 1.5 m long. While replacing the handle must be pushed in (Fig. 2, a):
- g. Remove the damaged cable, secure a tip of the new cable by the sleeve C9997056E (Nicopress stop sleeve 1.5-1.7 mm for 1.6 mm cable) using a Nicopress tool for rope 0.45 - 2.00 mm. Fig. 5.
- h. Pass it through the tube C9993190H PTFE tube 4.0x6.0 mm into the engine compartment.
- i. Attach the cable C9997065B (Steel rope 7x7 1 mm) to the heating Cabin heater choke KA7040200 as shown by arrows at Fig. 4, secure the cable by C9997816C Cable stop 1806-Z ni.

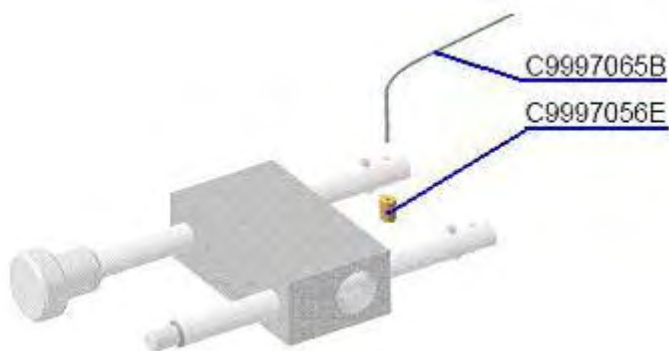


Fig. 5

4. Check the Cabin heater choke KA7040200 for operating according to the item 2. If positive, continue from item 7.
5. If, while the handle is pulled, the choke is OFF, do the following
  - a. Release the stop C9997816C (Cable stop 1806-Z ni) a little by a screwdriver and tighten the cable C9997065B (Steel rope 7x7 1 mm).  
**NOTE:** the stop can move along the cable, when the bolt is not tightened.
  - b. Secure stop 9997816C (Cable stop 1806-Z ni) position by a screwdriver.
  - c. Proceed to item 4.
6. If the choke KA7040200 is at OFF position and the handle is not fully pulled out, do the following.
  - a. Mark on the handle length it can be pulled out more (distance from the bracket to the cotter-pin in the handle). Fig. 6.

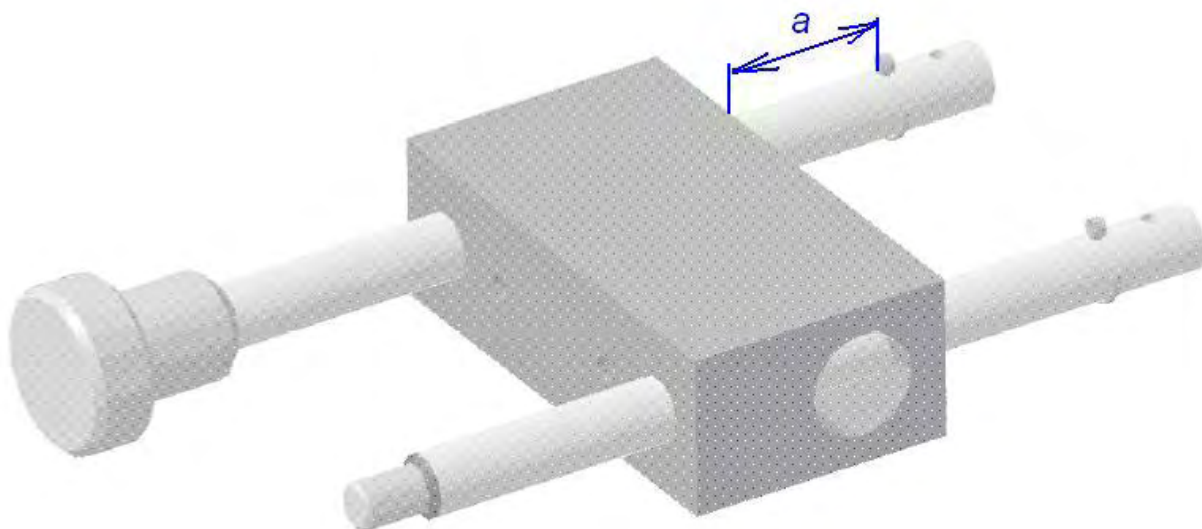


Fig. 6

- b. Release the stop C9997816C (Cable stop 1806-Z ni) unscrewing the bolt in the stop by a screwdriver.
  - c. Move the stop C9997816C (Cable stop 1806-Z ni) on a distance towards the tip of the cable C9997065B (Steel rope 7x7 1 mm) and secure the stop C9997816C (Cable stop 1806-Z ni) by a screwdriver.
  - d. Proceed to item 4.
7. Remove the central panel from the instrument board by a 3 hex-nut screwdriver and inspect all parts of the manifold C9993188 (AERODUCT tube CEET-7 1-3/4 ID) for integrity. The manifold consist of three pieces of hose C9993188 AERODUCT tube CEET-7 1-3/4 ID (1 long piece in the

engine compartment (1), long piece in the cabin (under the instrument board) (2), and the short piece (3) between the Cabin heater choke KA7040200 and KB7040400 Air branch canal (Fig. 7). If no damages are found, proceed to item 8, otherwise replace the damaged hose as follows.

- a. To replace the damaged hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) in the cabin do the following.
  - Unscrew the bolt by a cross-screwdriver or wrench with header 7 and release the clamp C9997723 Clamp 40-60 that secures the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) near KB7040400 Air branch canal. Fig. 7.

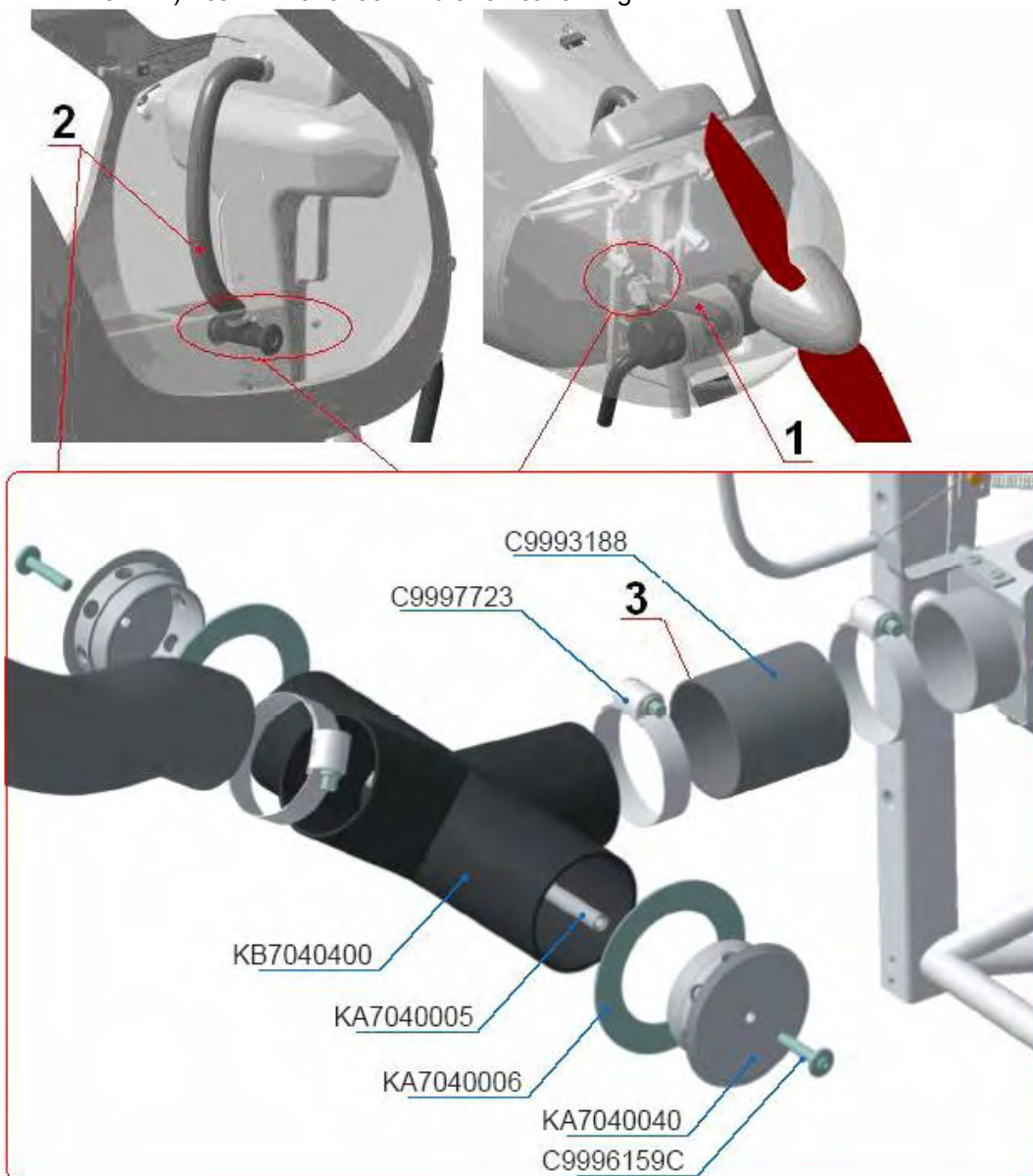


Fig. 7

- Unscrew the bolt by a cross-screwdriver or wrench with header 7 and release the clamp C9997723 Clamp 40-60 that secures the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) near KB7040300 (Air mixer) under the instrument board. Fig. 8.
- Replace the damaged piece of hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) to a new one of the same length. Put the clamps C9997723 (Clamp 40-60) on the new hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID).
- Tighten the clamps C9997723 (Clamp 40-60) by a cross-screwdriver or wrench with header 7.



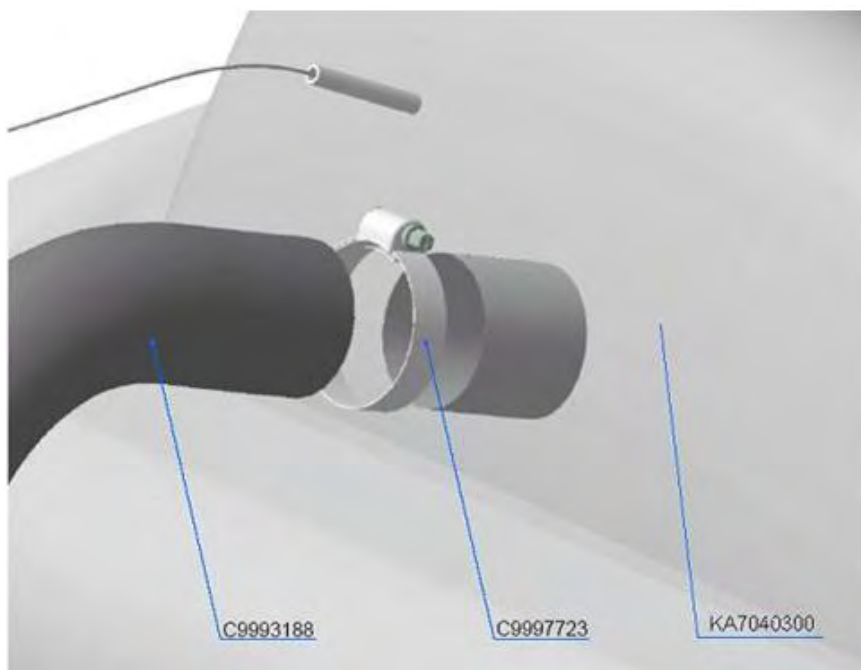


Fig. 8

- b. To replace a damaged hose in the engine compartment C9993188 (AERODUCT tube CEET-7 1-3/4 ID), Fig. 9, do the following:

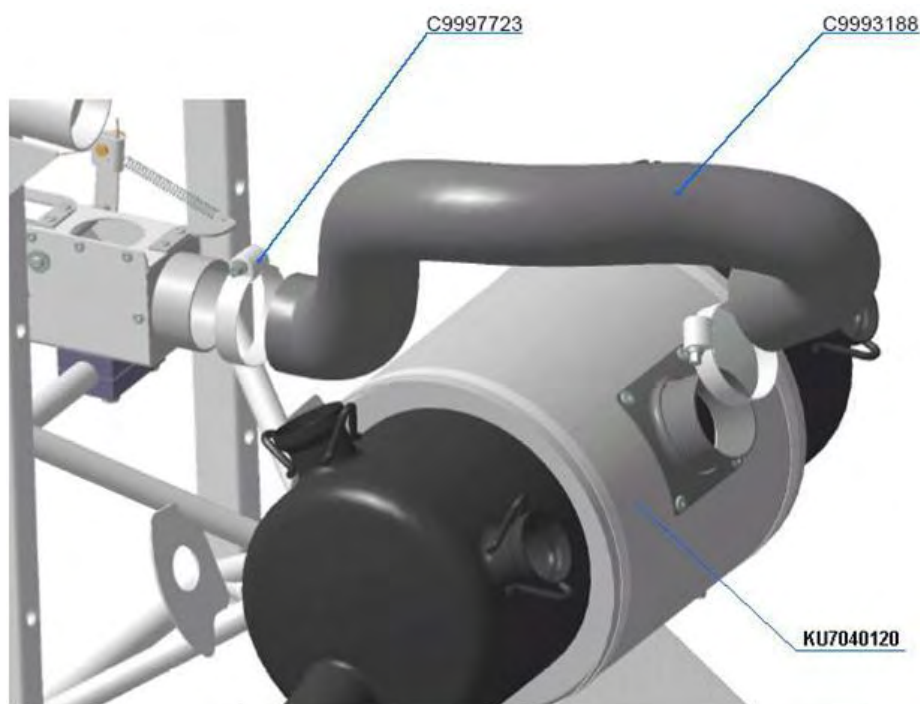


Fig. 9

- Unscrew the bolt by a cross-screwdriver or wrench with header 7 and release the clamp C9997723 Clamp 40-60 that secures the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) near the heating Cabin heater choke KA7040200. Fig. 9.
- Unscrew the bolt C9996053 (Bolt DIN 912 M6x10-8.8) by a hex-nut wrench 5 and remove the shield KA5030001 (Protection plate, left Fig 10 a).
- Unscrew the bolt C9996053 (Bolt DIN 912 M6x10-8.8) by a hex-nut wrench 5 and remove the shield KA5030002 (Protection plate, right Fig 10 b).

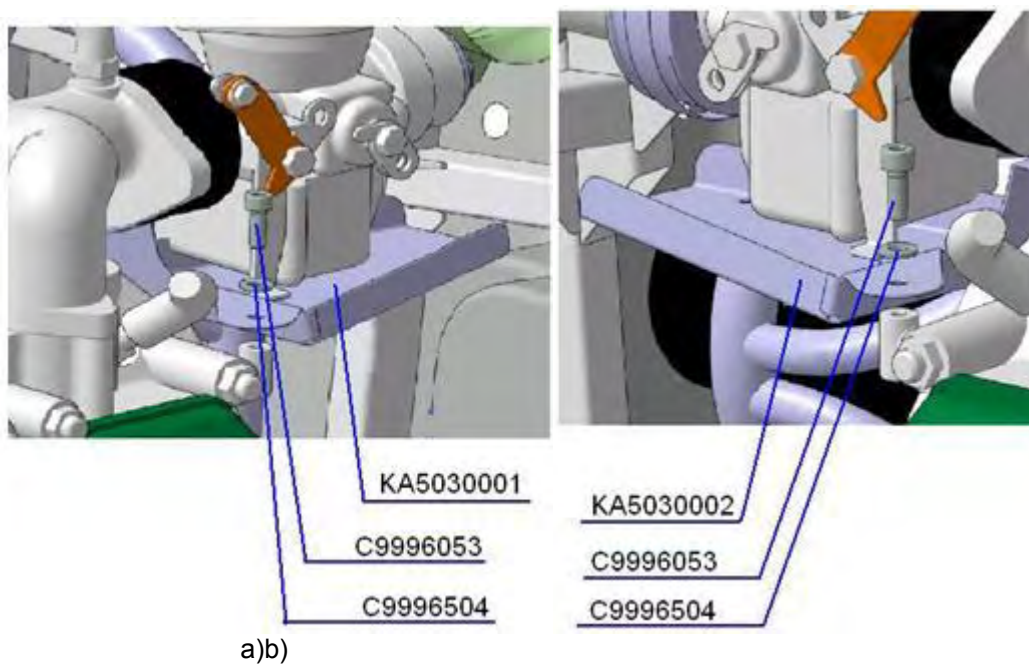


Fig. 10

- Disconnect the springs C9997703C from the muffler KA5020500 (Muffler with exhaust pipe). Fig. 11.
- Release the nuts C9997499B (Soldering nut M8x1) by a screwdriver with header 12 (unscrew 3-5 turns towards the engine, but do not remove them).
- Remove the muffler KA5020500 (Muffler with exhaust pipe). Fig. 11.



Fig. 11

- Unscrew the bolt by a cross-screwdriver or wrench with header 7 and release the clamp C9997723 Clamp 40-60 that secures the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) near the heater KU7040120 (Air heater) in the engine compartment. Fig. 9.



- Disconnect the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) from the heater KU7040120 (Air heater). Fig. 9.
- Replace the damaged piece hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) to a new one of the same length. Put the clamps C9997723 (Clamp 40-60) on the new hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID).
- Attach the hose C9993188 AERODUCT tube CEET-7 1-3/4 ID to the heater KU7040120 (Air heater).
- Tighten the clamp C9997723 (Clamp 40-60) by a screwdriver or wrench with header 7.
- Install the muffler KA5020500 (Muffler with exhaust pipe) and connect the springs C9997703C.
- Tighten the nuts C9997499B (Soldering nut M8x1) by a screwdriver with header 12.
- Set the shield KA5030001 (Protection plate, left). Put the washer C9996504 (Washer DIN 125 A2B-6.4 mm) under the bolt and tighten the bolt C9996053 (Bolt DIN 912 M6x10-8.8) by a 5 hex-nut wrench.
- Set the shield KA5030002 (Protection plate, right). Put the washer C9996504 (Washer DIN 125 A2B-6.4 mm) and tighten the bolt C9996053 (Bolt DIN 912 M6x10-8.8) by a 5 hex-nut wrench.
- Connect the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) to the Cabin heater choke KA7040200.
- Tighten the clamp C9997723 (Clamp 40-60) by a cross-screwdriver or wrench with header 7.
- c. To change a damaged hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) between the Cabin heater choke KA7040200 and KB7040400 (Air branch canal) do the following.
  - Set the control handle to OFF position. Fig. 2, a.
  - Unscrew the lower bolts of the instrument board KA1081000 by a 3 hex-nut screwdriver.
  - Disconnect KA7040002 (Tap) from KB7040400 (Air branch canal). Fig. 7
  - Unscrew the bolt by a cross-screwdriver or wrench with header 7 and release the clamp C9997723 Clamp 40-60 that secures the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) near KB7040400 Air branch canal. Fig. 7.
  - Unscrew the bolt with a cross-screwdriver or wrench with header 7 and release the clamp C9997723 Clamp 40-60 that secures the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) near the Cabin heater choke KA7040200 Fig. 7.
  - Unscrew the bolts C9996283C by 8 wrench. Remove the clamp KA704004 (Clamp) and the Cabin heater choke KA7040200 from the engine mount.
  - Remove KB7040400 (Air branch canal).
  - Replace the damaged piece of hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) to a new one of the same length. Pass the hose through the hole in the firewall from inside the cabin. Put the clamps C9997723 Clamp 40-60 on the new hose.
  - Set the heating Cabin heater choke KA7040200 on the engine mount. Connect the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) to the Cabin heater choke KA7040200. Secure the choke by a clamp KA704004 (Clamp) and tighten the bolts C9996283C by a wrench 8.
  - Connect the hose C9993188 (AERODUCT tube CEET-7 1-3/4 ID) to KB7040400 Air branch canal.
  - Tighten the clamps C9997723 (Clamp 40-60) by a cross-screwdriver or wrench with header 7.
  - Set KA7040002 Tap. Secure the bottom edge of the instrument board KA1081000 tightening bolts by a hex-nut screwdriver 3.
- 8. Install and secure the central and left panels of the instrument panel. Tighten bolts by a 3 hex-nut wrench or hex-nut screwdriver.



## 9 Instruments and Avionics

For inspect and maintenance of instruments and avionics one person is required.

### 9.1 Tools Required

Compressor 1 pcs

### 9.2 Parts Required

Tags 10 pcs

### 9.3 Instrument Maintenance

#### 9.3.1 Type of Maintenance

Line

#### 9.3.2 Minimum Level of Certification

Repairman, Light Sport Aircraft-Maintenance (RLSA-M) or higher.

#### 9.3.3 General

Information pertaining possible instrumentation errors depending on operating conditions are described in FAA-H-8083-15, Paragraph 3. The procedures listed below apply depending on the actual aircraft equipment. When your equipment is not listed here please contact Flight Design for maintenance details.

#### 9.3.4 Glass Cockpit Dynon EFIS 100

Except for regulatory periodic checks and an annual internal battery capacity test (if optional internal emergency battery is installed), maintenance of the EFIS-D100 is "on-condition" only.

#### 9.3.5 Glass Cockpit Dynon EMS D120

Dynon Avionics' products incorporate a variety of precise, calibrated electronics. Except for replacing the optional internal backup battery in EFIS-based products per the installation guide, our products do not contain any field/user-serviceable parts. Units that have been found to have been taken apart may not be eligible for repair under warranty. Additionally, once a Dynon Avionics unit is opened up, it will require calibration and verification at Dynon's Woodinville, WA offices before it can be considered airworthy.

#### 9.3.6 Analog Airspeed Indicator

A leak test should be performed on condition or as required by applicable regulations.

Normally, the instruments remain serviceable and accurate over a long period of time. If test or repair necessary, the instrument is to be sent to the manufacturer or a qualified repair station. The instrument should be packed in shock absorbing material, and the connection fittings should be sealed. The Manufacturer strongly advises against service by unqualified personnel. Manufacturer recommends checking airspeed indicators after 5 years.

#### 9.3.7 Analog Altimeter

Visually check altimeter for integrity and clean it.

#### 9.3.8 Vertical Speed Indicator (VSI)

Leak testing should be carried out at least once a year. Otherwise, the instrument does not require any maintenance.

The service condition and accuracy of measurement of instruments is normally retained over a long period. Should retesting or repair be necessary, the instrument should be sent to the manufacturer or a suitable aircraft engineering firm. It should be packed to protect it from impacts and connections should



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be sealed. Under no circumstances should you interfere with the measuring mechanism of the variometer.

### 9.3.9 Magnetic Compass with Deviation Table

Inspect the compass for secure mounting, damages, leaks, and filling by liquid. Air bubbles and clouding are not allowed. Liquid must be transparent. Check for presence of deviation card and seal.

### 9.3.10 Bank indicator

Visually check bank indicator for integrity and clean it.

### 9.3.11 Flap position indicator

Inspect annually for operation. If inop - contact Flight Design USA.

### 9.3.12 FLYdat (engine data instrument)

Refer to FLYdat Operator's Manual

### 9.3.13 Hobbs Hour Meter

Maintenance is "on-condition" only.

### 9.3.14 Radio Garmin SL40

The SL40 display lens is coated with a special anti-reflective coating which is very sensitive to skin oils, waxes, and abrasive cleaners. It is very important to clean the lens using an eyeglass cleaner that is specified as safe for anti-reflective coatings (one suitable product is Wal-Mart Lens Cleaner) and a clean, lint-free cloth.

### 9.3.15 Radio Garmin SL30 with VOR functionality

The SL30 unit is designed to not require any regular general maintenance except as included in this Paragraph.

#### VOR Checks

Even though the SL30 is designed to utilize the most state-of-the-art DSP technology and maintain a very high accuracy and repeatability record, it still must undergo the VOR accuracy checks as required by the applicable requirements.

The last VOR check information may be entered into the SL30 via the system mode VOR Check. See the Garmin SL30 operator's manual for details.

#### Reference Oscillator (Com Only)

The reference oscillator frequency should be checked approximately every 3 to 5 years to ensure the units transmit frequency is within allowable tolerance.

The oscillator frequency can be checked by connecting the transmitter output through an appropriate load to a calibrated frequency counter. The transmit frequency should be within 15ppm of the selected channel frequency. Contact the Garmin AT factory for instructions on adjusting the frequency if required.

#### Cleaning the Front Panel

The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water DO NOT use any chemical cleaning agents Care should be taken to avoid scratching the surface of the display.

### 9.3.16 Transponder Garmin GTX 330 or GTS 327

Other than for regulatory periodic functional checks, maintenance of the GTX 327 / 330 is "on condition" only. Refer to the GTX 327 / 330 Maintenance Manual. Periodic maintenance of the GTX 327 / 330 is not required.



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### 9.3.17 Altitude Encoder ACK A30 (Classic) or Dynon (Advanced)

The model A-30 Altitude Encoder requires no periodical maintenance. Maintenance should be performed on condition. With Dynon glass cockpit installed, Altitude Encoder functionality can be covered by the Dynon D100 EFIS.

### 9.3.18 GPS Garmin 496

The GPSMAP 496 is constructed of high quality materials and does not require user maintenance other than cleaning. Clean the unit using a cloth dampened with a mild detergent solution and then wipe dry. Avoid chemical cleaners and solvents that may damage plastic components.

### 9.3.19 ELT Ameriking AK450

To insure continued reliability of your ELT, it must be inspected for damage and wear which could be caused by age, exposed elements, vibrations, etc.

The inspections **must be performed a minimum of one time each 12 months.**

The Ameri-King Corp. Model AK-450 ELT is designed to use only Duracell MN1300 Alkaline Batteries which are dated by the Manufacturer.

Battery replacement is required upon reaching the date marked upon each cell. All cells must be replaced at the same time and all cells must have the same expiration date.

### 9.3.20 Intercom PM 3000 A with aux music input and connection to GPS Audio

The PM3000 is considered an on condition maintenance item. During normal operation it is checked on to each flight by the pilot. It is a good practice to periodically check the unit to make sure it is securely fastened in its location, and that the wiring harness is not chafed or pinched, and remains secure. All panel jacks should be checked at each periodic inspection to ensure that they are tight and not in contact with other items behind the instrument panel.

## 9.4 Inspection of Pitot & Static Port

### 9.4.1 Type of Maintenance

Line

### 9.4.2 Minimum Level of Certification

Owner/Pilot

### 9.4.3 Procedure

Figure 1 gives the overview on the pitot / static system of the CTSW aircraft. The static port is located at the lower fuselage, between the main gear legs. The pitot pressure is taken using a probe at the right wing leading edge. The pitot line is connected top the fuselage at the right wing root rib.

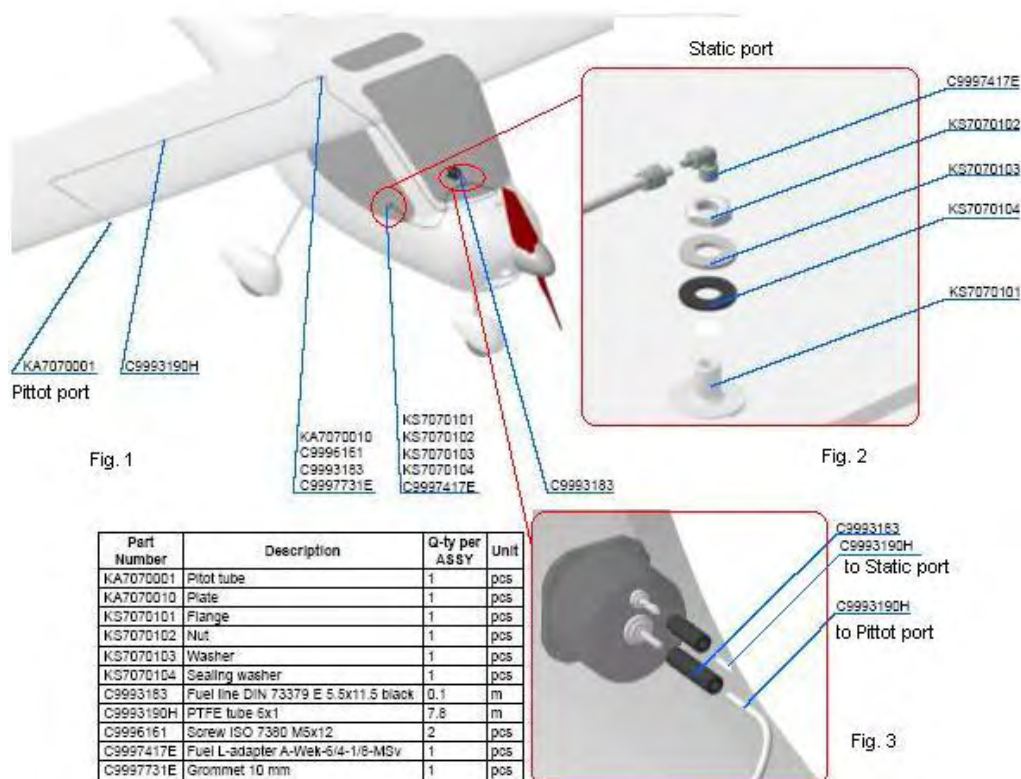


Fig 1

At every 100 hrs inspection inspect the system for obstruction as follows.

Take the Pitot tube C9997455Q (Pitot tube) out of the wing (Fig. 2; Dynon pitot / AoA probe shown), clean it (remove insect, debris and so on) using a stick.

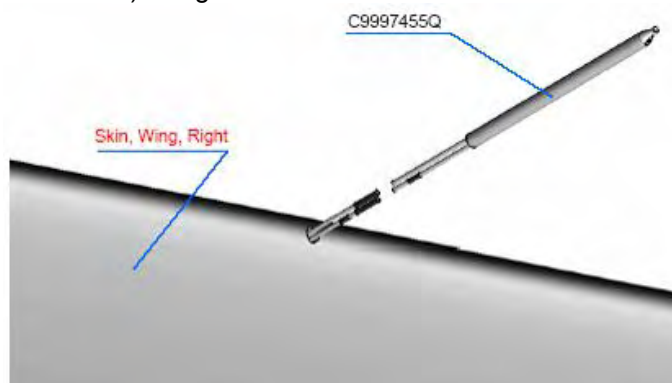


Fig. 2



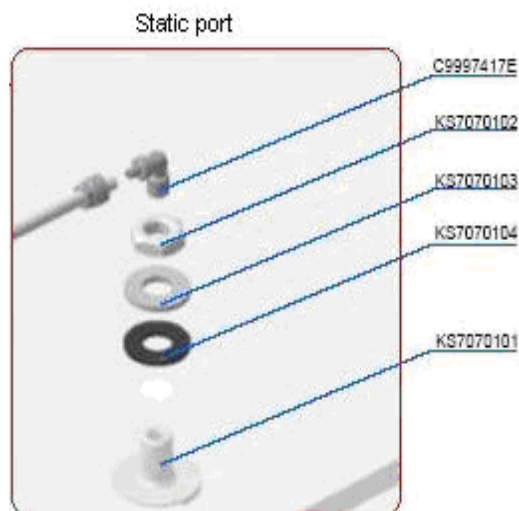


Fig. 3

Disconnect the tubes C9993190H (PTFE tube 6x1) from the instruments.

Attach a tag to each of the ends of tubes C9993190H PTFE (tube 6x1) to show with instrument the ends are to be connected to. Carefully blow out the systems by compressed air with little pressure.

Install the Pitot tube C9997455Q to the wing.

Connect the tubes C9993190H (PTFE tube 6x1) to the instruments according to the tags

## 9.5 Special Equipment

Maintenance of special equipment like comm. transceiver, transponder, GPS, autopilot, attitude gyro, directional gyro and etc. must be carried out according to the original manufacturer's manuals for this equipment.

## 10 Electrical System

For a wiring diagram of the electrical system please refer the drawings supplied with the aircraft, or available at Flight Design.

### 10.1 Tools Required

Wrench 8x10 1 pcs  
Wrench 10x13 1 pcs  
Hex-nut wrench 3 1 pcs  
Hex-nut wrench 4 1 pcs  
Hex-nut wrench 5 1 pcs  
Multimeter

### 10.2 Materials Required

Multipurpose plastic grease LITOL-24M TY 0254-015-00148820-99 (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso))

### 10.3 General

One person is required for inspection and maintenance.  
Prior to beginning set the aircraft on parking brake to prevent unintended motion.  
The location of the major items of the electric system are shown on Fig. 1.

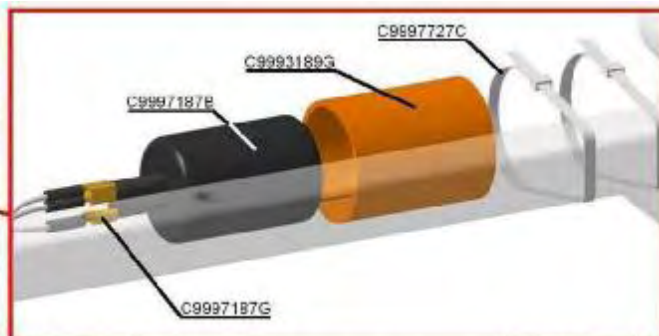


Fig. 1

The major components of the electric system within engine compartment are shown on Fig. 2.



Fig. 2.1



Part Number	Description	Q-ty per ASSY	Unit
C9993189G	Fire protection hose, red	0.06	m
C9997187B	Capacitor 22000-25V	1	pcs
C9997187G	Flat plug 6.3 mm 1-2.5 sqmm	2	pcs
C9997727C	TY-wraps CV-100 white	2	pcs

Fig. 2.3

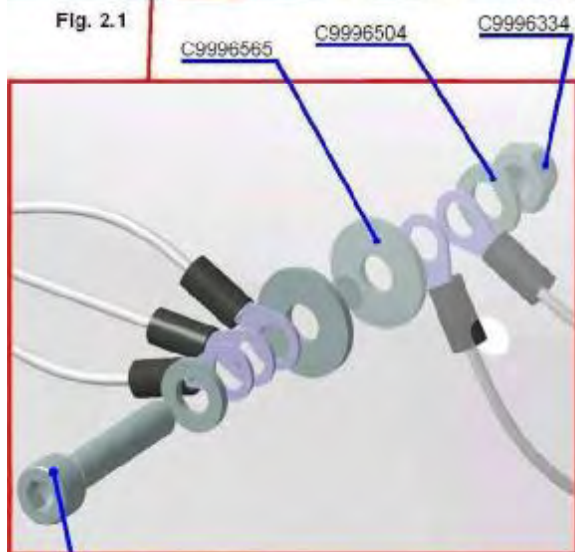


Fig. 2.2

Part Number	Description	Q-ty per ASSY	Unit
C9996059	Bolt DIN 912 M6x30-8.8	1	pcs
C9996334	Self-locking nut DIN 985-M6,regular	1	pcs
C9996504	Washer DIN 125 A2B-6.4mm	2	pcs
C9996565	Washer DIN 9021-6.4mm VZ	2	pcs

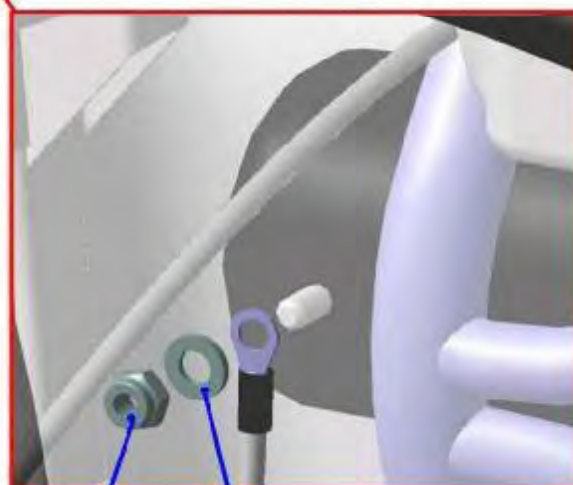


Fig. 2.4

Part Number	Description	Q-ty per ASSY	Unit
C9996334	Self-locking nut DIN 985-M6,regular	8	pcs
C9996504	Washer DIN 125 A2B-6.4mm	4	pcs

Fig. 2

Electric instruments control, switch panel, ignition\starter switch and circuit breakers are located on the central console and shown on Fig. 3.

Unscrew the bolts attaching the instruments panels by a screwdriver to ensure access to the studs and lines.



Fig. 3

To inspect the relay board of the flap controller, located at the firewall, remove one of the side instrument panels. (Fig. 4).

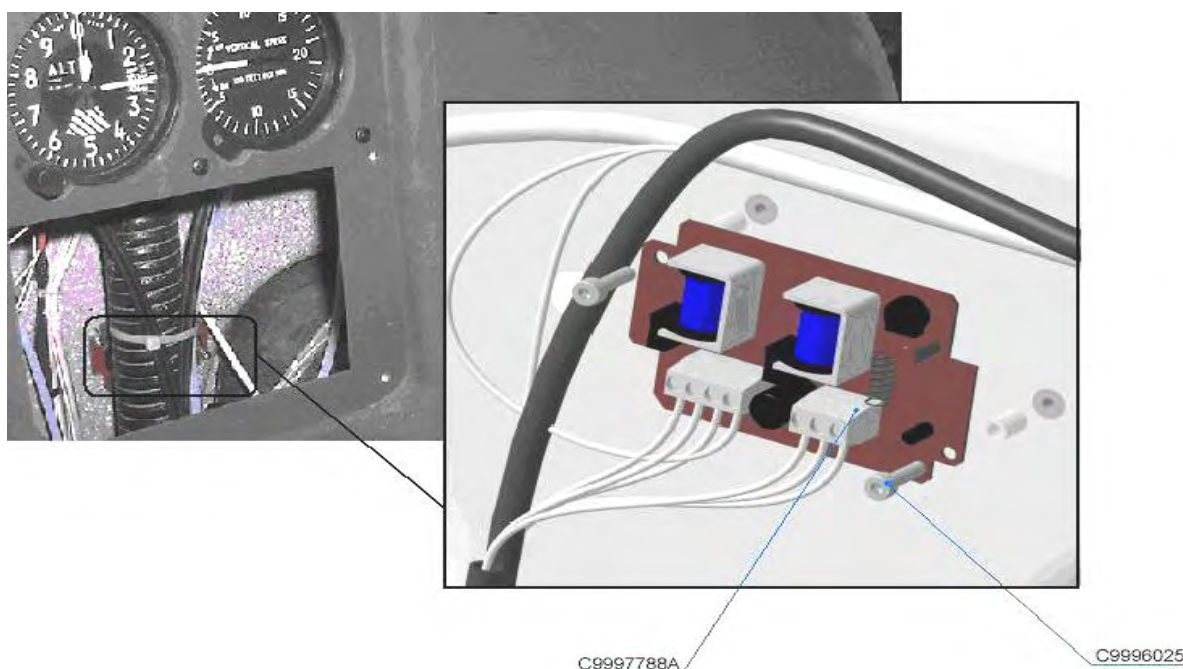


Fig. 4



The aircraft is equipped with a Hawker Battery SBS 8 (Fig. 5).

## Battery SBS 8



Model	Nominal Voltage (V)	C <sub>6</sub> to 1.75Vpc @ 25°C	C <sub>10</sub> to 1.80Vpc @ 20°C	Terminal Fastener	Dimensions mm (inches)			Weight kg (lbs)
					Length	Width	Height	
<b>SBS 8</b>	12	7	7	M4 F	138 (5.4)	86 (3.4)	101 (4.0)	2.7 (5.9)

Fig. 5

**NOTE:** For extended service life, disconnect the battery to prevent it from being continuously charged by external power when the aircraft is in maintenance.

When the aircraft is stored for an extended period of time, remove the battery and charge it fully. Then store it in a warm dry place. Never leave the battery discharged.

Provide adequate ventilation when charging or using batteries in an enclosed space, keep sparks, flames and cigarettes away.

Do not replace the sealed lead acid battery with a wet lead acid battery.

Never “jump-start” an aircraft that has a “dead” or discharged battery. It takes approximately three hours to recharge a fully discharged battery with the aircraft generating system or external power.

Unauthorized modifications, including the fitting of optional electrical equipment, must not be carried out under any circumstances without official modification authorizations issued by the factory.





### 10.3.1 Inspection

#### 10.3.1.1 Type of Maintenance

Line

#### 10.3.1.2 Minimum Level of Certification

Owner/Pilot

#### 10.3.1.3 Procedure

Inspect wiring insulation for integrity. Replace wire, if insulation is damaged.

Inspect studs connection annually. Tighten bolt connections and re-braze soldered connections.

Inspect each electric instrument for secure ground connection (Fig. 2.2) using multimeter.

Both sides of terminals and mating surfaces must be dressed, cleaned of rust and tightened to torque 80 lb-in / 9 Nm.

Inspect for leakage current using an multimeter after 100h.

Inspect switch board (lower middle instrument panel) annually for switch attachment, arcing and damage.

Inspect terminals and studs for oxidation after annually. Dress the oxidated studs, if necessary. Apply LITOL-24M (Retinax EP 2. Alvania EP-2 (SHELL); Alvania Grease R3 (Petroleum Co, Ltd); Mobilgrease MP, Mobilux 3 (Mobil Oil Corp.); Energrease LS 3 (British Petroleum Co.); Beacom 3 (Esso)) onto the ground (Fig2.4) and battery terminals.

### 10.4 Battery Replacement

#### 10.4.1 Type of Maintenance

Line

#### 10.4.2 Minimum Level of Certification

Owner/Pilot

#### 10.4.3 Procedure

Refer to battery manufacturer's instructions for batteries other than the one specified.

To remove battery refer to Fig. 2.1.

#### CAUTION!

To reduce the chance of personal injury and possible equipment damage, remove the negative wire before removing the positive wire.

1. Disconnect the two connectors.
2. Remove the 4 screws connecting the battery cover plate to the firewall.
3. Remove the battery.

Installing Battery

1. Place the battery in the battery housing.

#### WARNING!

Failure to reconnect the battery connectors properly could result in reversing the polarity of the battery. Battery terminals face forward when properly installed.

2. Install the battery cover plate over the battery, and install 4 screws, using Self-locking nut DIN 985-M5 only and tightened them to torque 49 lb-in / 5,5 Nm.
3. Reconnect the two connectors to the battery.

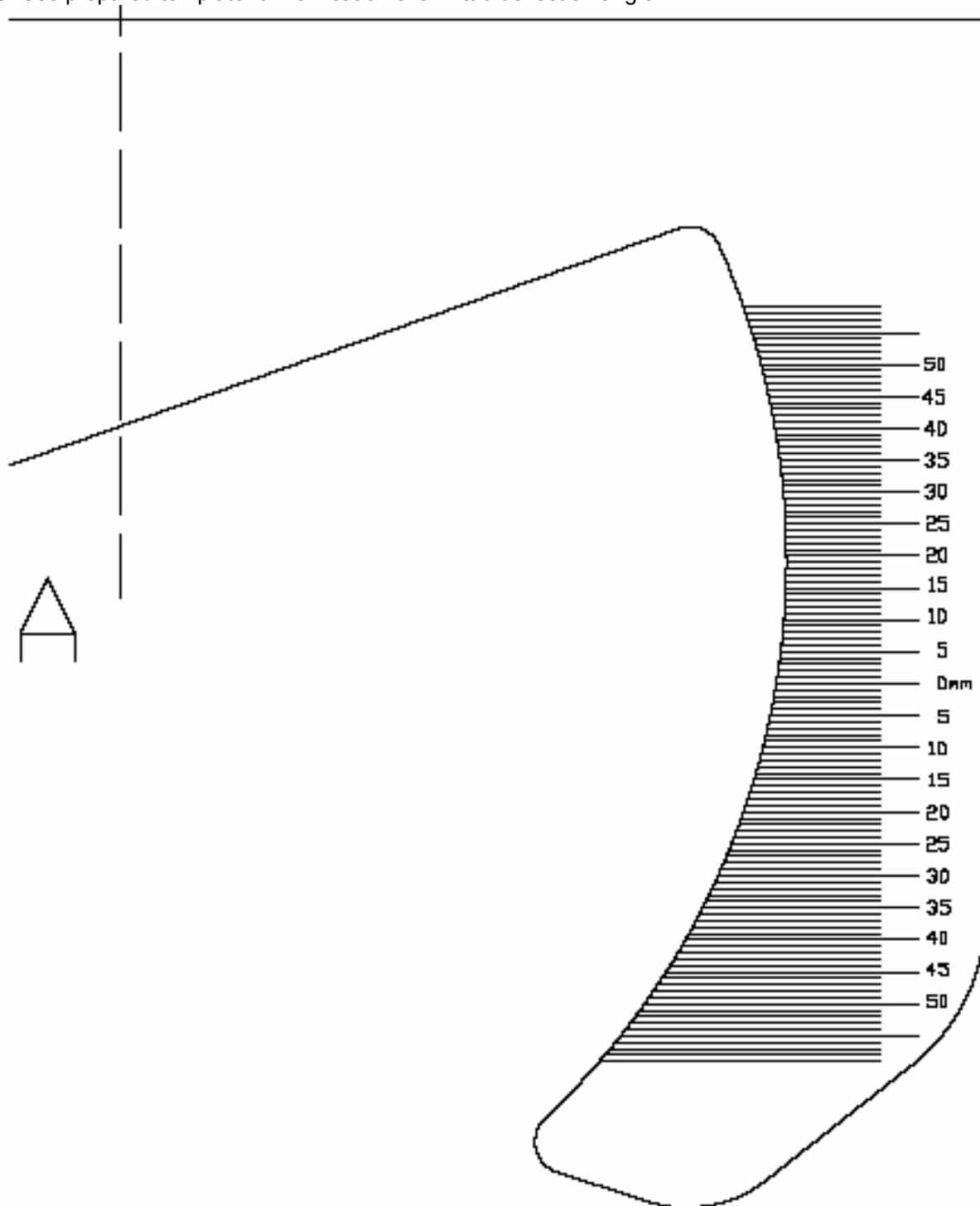
#### CAUTION!

**Do not replace the sealed lead acid battery with a wet lead acid battery.**

## Appendix I . Template for Trim Tab Deflection Angles Measurement

For checking trim tab deflection angles:

1. Cut out two parts of template and glue them together through A-A line.
2. Glue prepared template on the appropriate surface (for example 3-4 mm polycarbonate) and cut it out.
3. Use prepared template for verification of trim tab deflection angle



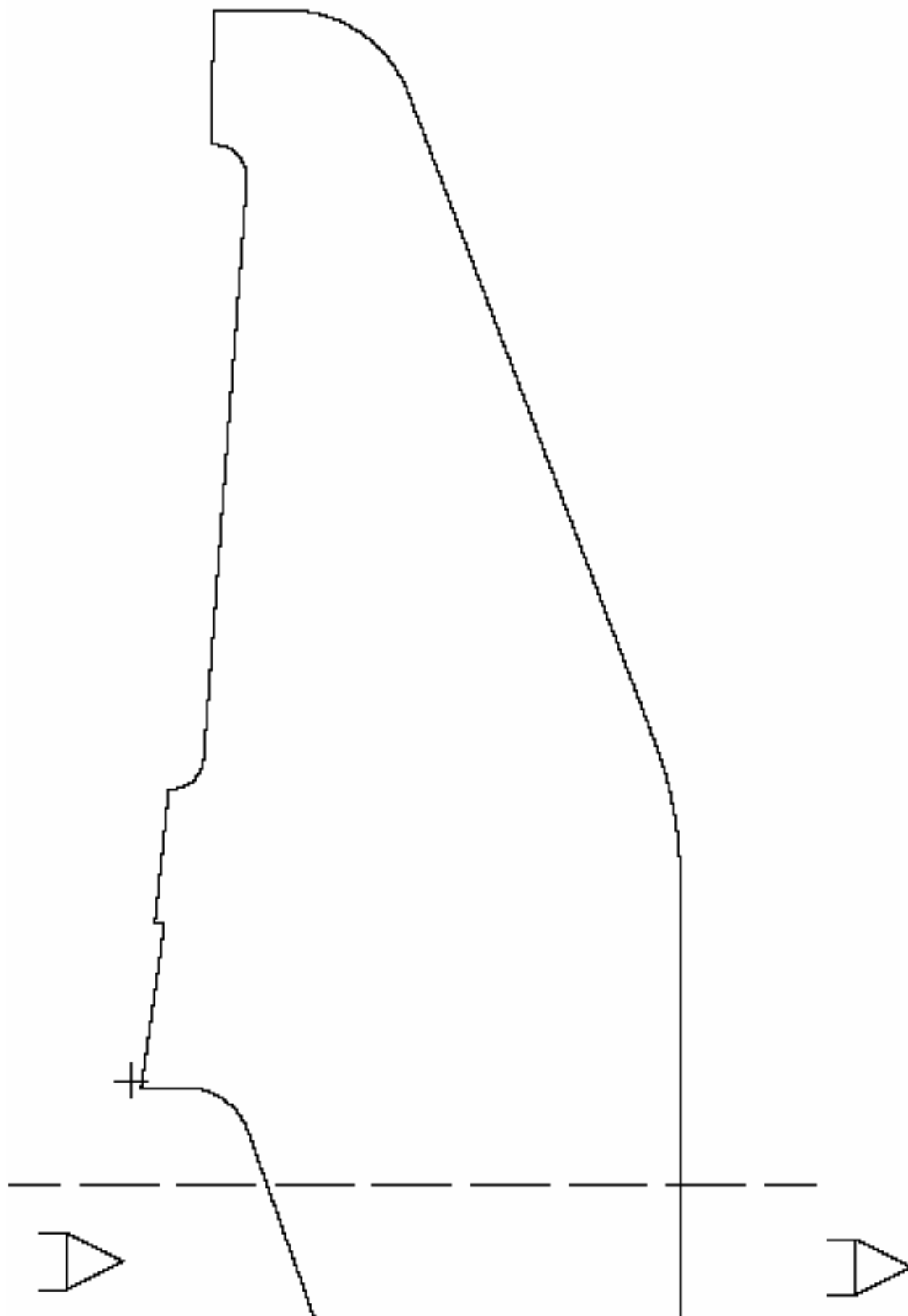


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## Appendix II. Adjustment report

### Adjustment report 1 (Flaps -12° maximum negative deflection)

Airplane serial number:

Inspector:

Control surface	Position	Limits, degrees/mm	Actual, degrees/mm	Note
Flap left	up (deg)	12 deg, Tol.+1 deg, -1 deg		
	up (mm)	54 mm, Tol.+4 mm, -4 mm		
Flap left	down (deg)	38 deg, Tol.+1 deg, -1 deg		
	down (mm)	170 mm, Tol.+4 mm, -4 mm		
Flap right	up (deg)	12 deg, Tol.+1 deg, -1 deg		
	up (mm)	54 mm, Tol.+4 mm, -4 mm		
Flap right	down (deg)	38 deg, Tol.+1 deg, -1 deg		
	down (mm)	170 mm, Tol.+4 mm, -4 mm		
Aileron left	up (deg)	26.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -12 degrees
	up (mm)	109 mm, Tol.+6 mm, -6 mm		
Aileron left	down (deg)	12.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -12 degrees
	down (mm)	52 mm, Tol.+6 mm, -6 mm		
Aileron right	up (deg)	26.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -12 degrees
	up (mm)	109 mm, Tol.+6 mm, -6 mm		
Aileron right	down (deg)	12.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -12 degrees
	down (mm)	52 mm, Tol.+6 mm, -6 mm		
Stabilizer	up (deg)	14 deg, Tol.+1 deg, -1 deg 30 mm, Tol. + 3mm, -3 mm		
Stabilizer	down (deg)	9 deg, Tol.+1 deg, -1 deg 25 mm, Tol. + 3mm, -3 mm		
Trim tab	down (mm)	7.5 mm, Tol.+2.5 mm, -2.5 mm		Handle (wheel) neutral Stabilizer in neutral position
Trim tab	up (mm)	31 mm, Tol. +5 mm, -5 mm		Handle (wheel) forward Stabilizer TE up
Trim tab	down (mm)	38 mm, Tol.+5 mm, -5 mm		Handle (wheel) rearward Stabilizer TE down
Rudder	left (deg)	28.5 deg, Tol.+1.5 deg, -1.5 deg		
	left (mm)	217 mm, Tol.+11 mm, -11 mm		
Rudder	right (deg)	28.5 deg, Tol.+1.5 deg, -1.5 deg		
	right (mm)	217 mm, Tol.+11 mm, -11 mm		

Date:

Inspector's  
signature:



# Maintenance and Inspection Procedures Manual

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## Adjustment report 2 (Flaps -6° maximum negative deflection)

Airplane serial number:

Inspector:

Control surface	Position	Limits, degrees/mm	Actual, degrees/mm	Note
Flap left	up (deg)	5.5 deg, Tol.+0.5 deg, -0.5 deg		
	up (mm)	25 mm, Tol.+2 mm, -2 mm		
Flap left	down (deg)	38 deg, Tol.+1 deg, -1 deg		
	down (mm)	170 mm, Tol.+4 mm, -4 mm		
Flap right	up (deg)	5.5 deg, Tol.+0.5 deg, -0.5 deg		
	up (mm)	25 mm, Tol.+2 mm, -2 mm		
Flap right	down (deg)	38 deg, Tol.+1 deg, -1 deg		
	down (mm)	170 mm, Tol.+4 mm, -4 mm		
Aileron left	up (deg)	26.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -6 degrees
	up (mm)	109 mm, Tol.+6 mm, -6 mm		
Aileron left	down (deg)	12.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -6 degrees
	down (mm)	52 mm, Tol.+6 mm, -6 mm		
Aileron right	up (deg)	26.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -6 degrees
	up (mm)	109 mm, Tol.+6 mm, -6 mm		
Aileron right	down (deg)	12.5 deg, Tol.+1.5 deg, -1.5 deg		Aileron and flap zero position is -6 degrees
	down (mm)	52 mm, Tol.+6 mm, -6 mm		
Stabilizer	up (deg)	14 deg, Tol.+1 deg, -1 deg 30 mm, Tol. + 3mm, -3 mm		
Stabilizer	down (deg)	9 deg, Tol.+1 deg, -1 deg 25 mm, Tol. + 3mm, -3 mm		
Trim tab	down (mm)	7.5 mm, Tol.+2.5 mm, -2.5 mm		Handle neutral Stabilizer in neutral position
Trim tab	up (mm)	31 mm, Tol. +5 mm, -5 mm		Handle forward Stabilizer TE up
Trim tab	down (mm)	38 mm, Tol.+5 mm, -5 mm		Handle rearward Stabilizer TE down
Rudder	left (deg)	28.5 deg, Tol.+1.5 deg, -1.5 deg		
	left (mm)	217 mm, Tol.+11 mm, -11 mm		
Rudder	right (deg)	28.5 deg, Tol.+1.5 deg, -1.5 deg		
	right (mm)	217 mm, Tol.+11 mm, -11 mm		

Date:

Inspector's  
signature:



## Appendix III . Service Difficulty Report Form

[illegible]

Please be as specific as possible. If needed, attach additional sheets, drawings, sketches, etc.

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