COMCO IKARUS
Put the fun back into flying

Maintenance Manual

IKARUS C42 Series

C42 / C42B / C42C / C42CS

C42E (C42B LSA) / C42 UK / C42B UK

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Log of revisions

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1	Brake	21 - 22	Issue II	Dec. 2010	A.Kurz
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8	Installation manual Cowl flap	12	Issue VI	15 July 2012	A.Kurz
-	Pics C42C	8	Issue VI	15 July 2012	A.Kurz
-	Three-view C42C	10	Issue VI	15 July 2012	A.Kurz
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12	- Picture taken from POH - Current construction standard elevator redirection	Chapter 2.2.1 Chapter 4.3.6.3	Issue VIII Rev. 1	23 August 2019	H. Lieb

Table of Contents

Foreword

It is with much pleasure that we welcome you into the group of IKARUS C42 owners. The C42 is a solid micro-light aircraft which has proven itself in daily use. It is the result of many years of development and contains the experience gained in the production of more than 3000 micro-light aircraft.

The sophisticated and robust construction of the aircraft combines easy maintenance and repair work with solid flight performance and above-average flight characteristics.

It`s versatility allows universal utilisation in various fields of activity. The C42 is a recognised training and towing aircraft, it allows stress-free and comfortable travel and can be used for special missions such as parachute jumping, as a seaplane or a crop duster or, with skis attached, land on snow without difficulty.

The reliable global spare parts supply and 24 hour delivery within Germany is exemplary. This means that you or an Ikarus Service Centre (ISC) / Ikarus Technical Base (ITB) can carry out maintenance or repair work on the C42 quickly and easily.

This maintenance manual serves as a guideline for the implementation of maintenance measures. In addition, it is hoped that technically interested owners will be given an insight into the design and maintenance of the C42 and thus be able to make a contribution to flight safety and maintaining the value of their aircraft.

1 Introduction

1.1 Overview on maintenance

The operational safety of an aircraft depends not only on its design parameters and operating conditions but also on proper care and maintenance.

Maintenance includes all inspections, servicing and repairs and must be carried out at regular intervals. The following inspections are scheduled for the C42:

- every 50 hours
- every 100 hours

Before every flight, a pre-flight check must be carried out by the pilot.

In the case of damage caused by a hard landing or a collision with obstacles, special inspections and repair work must be carried out.

These measures have been developed to ensure that the aircraft remains airworthy over a longer period of time, that wear and tear is minimised and that the C42 has a long service life.

Experience shows that regular care and maintenance exceeding the levels required by the inspections results in a good, clean and well-performing aircraft. Defects and damage are more readily detected if the aircraft is regularly cared for and cleaned.

1.2 Carrying out maintenance work

Maintenance work must always be carried out by a properly qualified person. COMCO IKARUS has an extensive sales and maintenance network. We recommend that you commission an ISC (Ikarus Service Centre) or an ITB (Ikarus Technical Base) close to you with the maintenance of your aircraft.

Contact details can be found on our web site www.comco-ikarus.de/service/. These centres have competent staff who are qualified in the maintenance and repair of the Ikarus C42.

In addition, technically adept owners may carry out maintenance work on the C42. Should repair work be necessary, the owner is restricted to work involving the exchanging of defect parts. If the owner carries out maintenance and repair work himself, such work must be done carefully and in accordance with the instructions given in this manual.

Original spare parts must be used. They are available in the ISC / ITB or directly from COMCO IKARUS.

The alteration of individual components or the use of spare parts which are not originals is not permitted. Under no circumstances may parts be worked off, straightened or repaired in any way. This can lead to aircraft impairment which, in turn, may lead to life-threatening accidents.

Major technical faults or defects must be reported to COMCO IKARUS GmbH or the appropriate national authority. In Germany, the competent authority is: Luftsportgerätebüro of DAeC

In Germany, airworthiness inspections are carried out by DAeC approved Class V inspectors. Please check the rules and regulations in the country in which your C42 is registered.

2 Technical description

The IKARUS C42 Series are single-engine, two-seater, highwing micro-light aircrafts. They are not designed for aerobatics. The aircrafts have a 3-axis control system and high-lift wing flaps. They have a tricycle landing gear (C42CS with GRP main gear) with a steerable nose wheel. The wings are easy to rig and de-rig.

Figure 1: Ikarus C42 / C42 UK

Figure 2: Ikarus C42B / C42B UK / C42E

Figure 3: Ikarus C42C

Figure 4: Ikarus C42CS

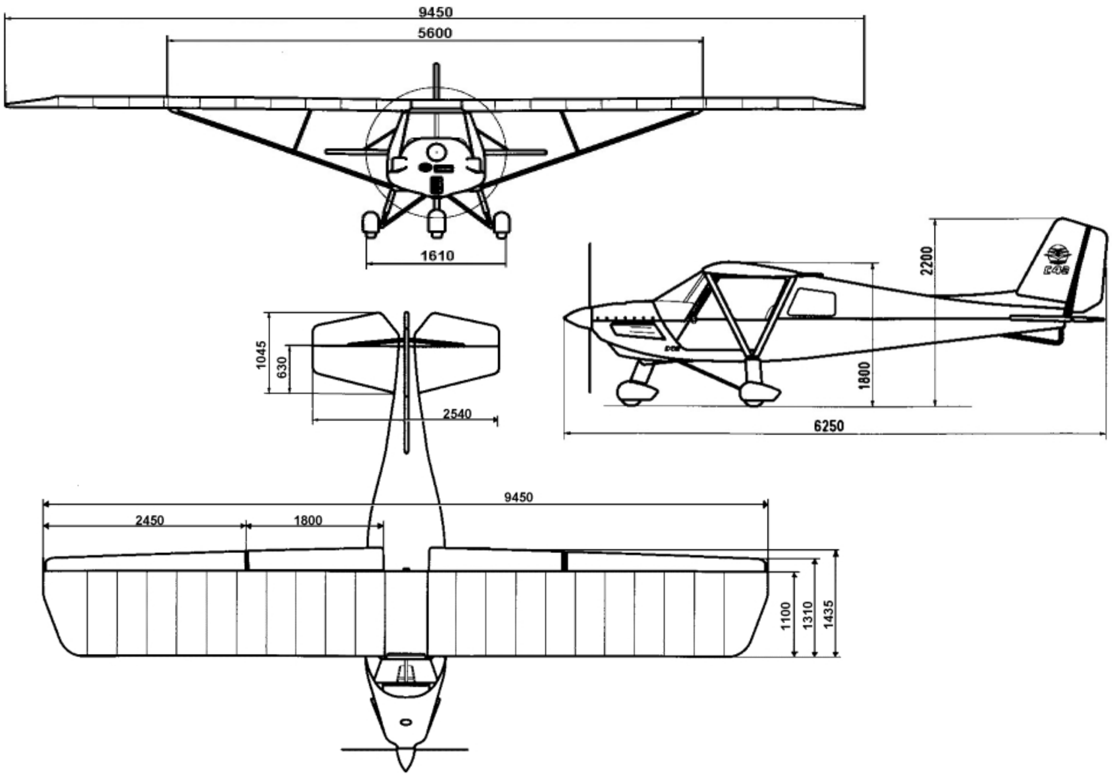


Figure 5: Three-view C42 / C42 UK

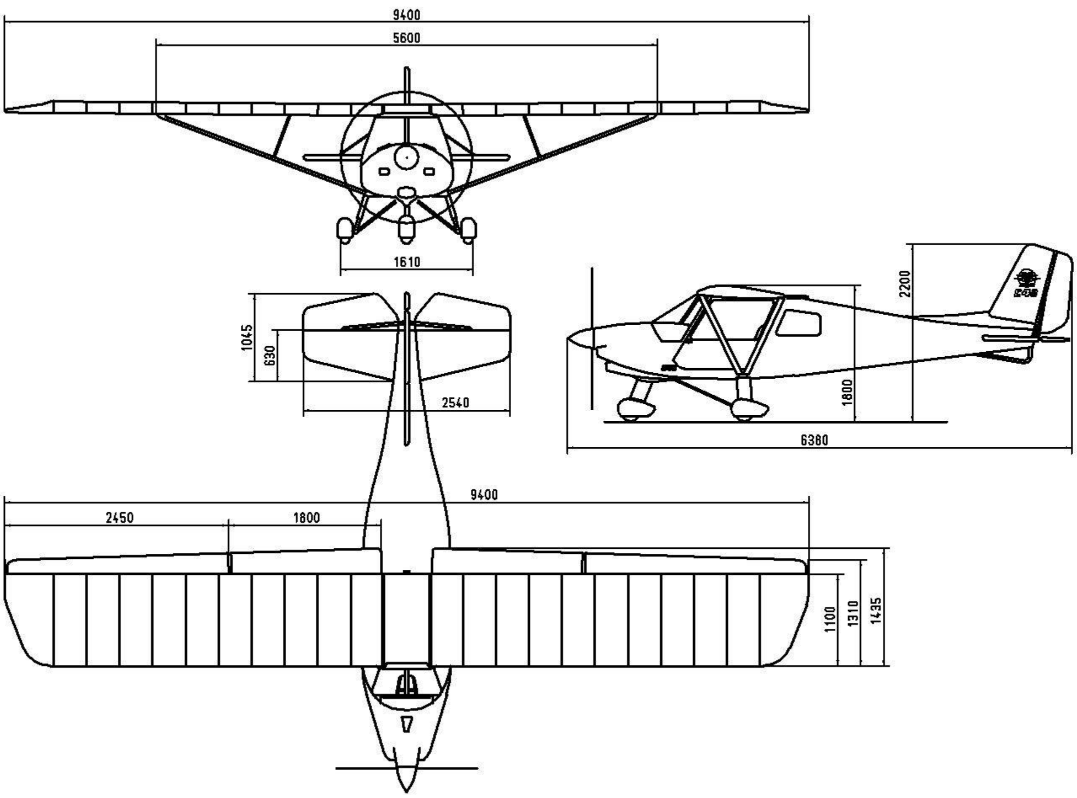


Figure 6: Three-view C42B / C42 B UK/ C42E

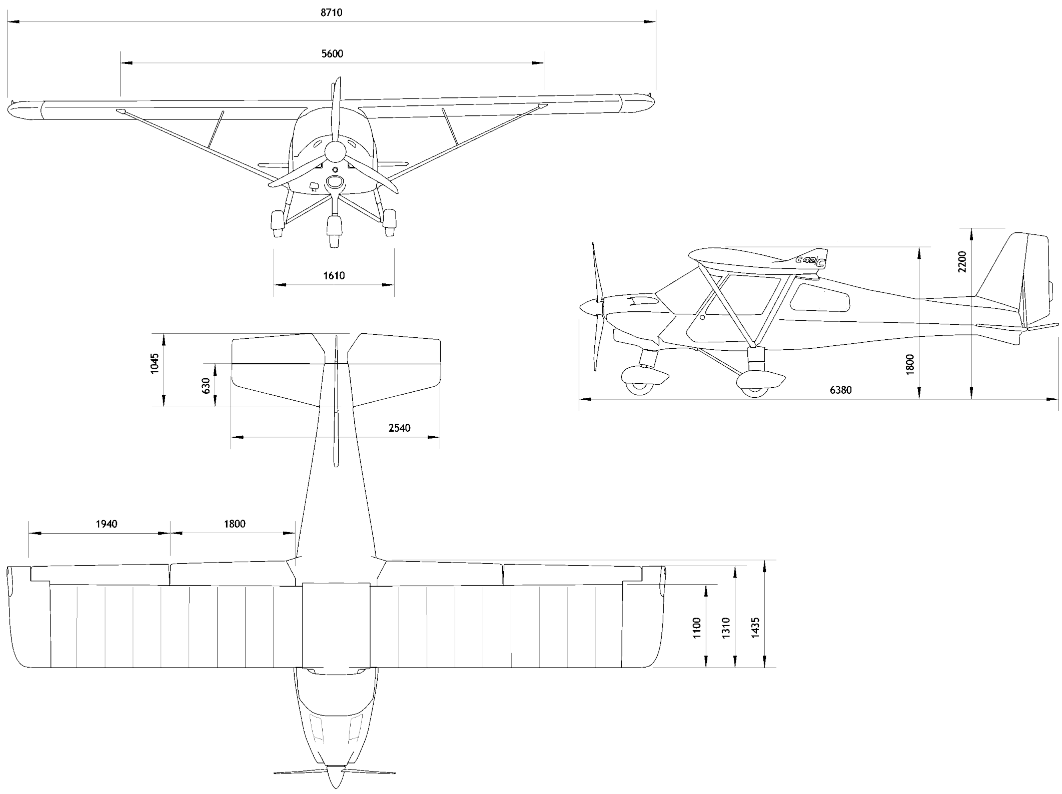
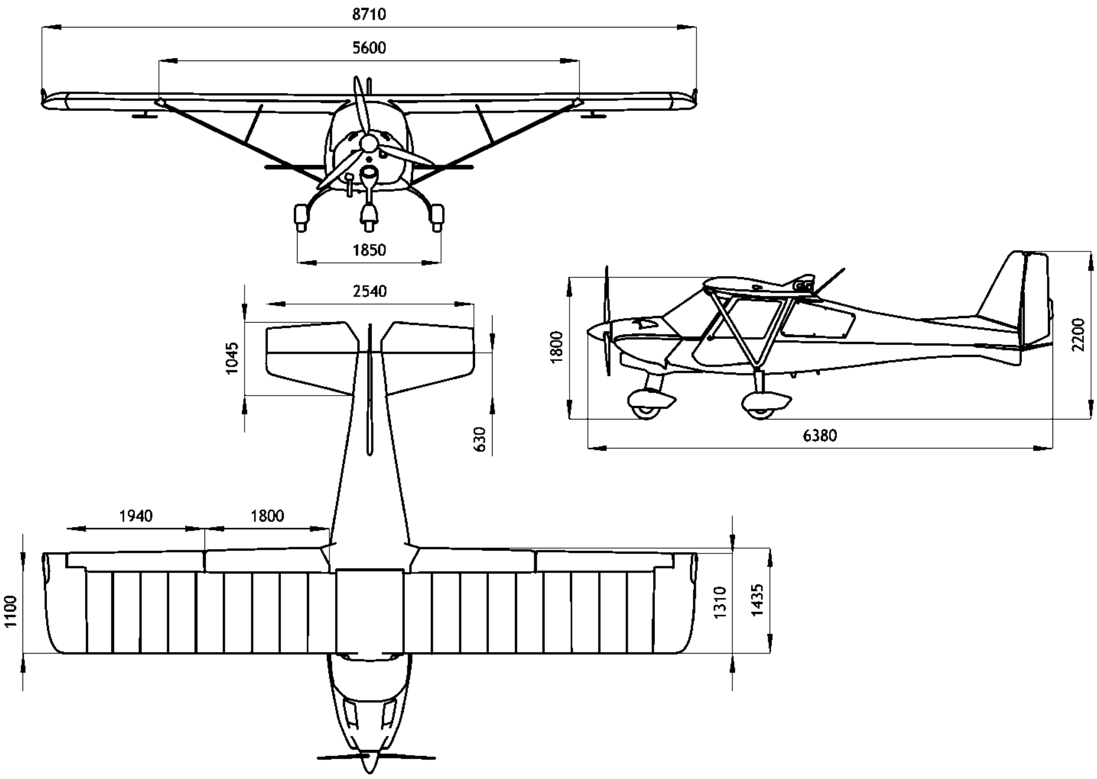


Figure 7: Three-view above: C42C   below: C42CS



2.1 Equipment List

This equipment list gives an approximate description of the C42 aircraft.

Design: Landing gear, fuselage, wings, struts and empennage are of certified, high-strength aluminium tubing. Fittings and screws are of stainless steel or of high-strength standard elements.
Wings and empennage are covered with lattice cloth foil (GT-foil) with high tensile strength and UV treated.
All fairings in glass-fibre/epoxy resin and Kevlar Aramid Honeycomb.
Cabin windshields made of Makrolon®.
Removable wings.

Power Plant: 4 cylinder, 4-stroke liquid-cooled / air-cooled Rotax 912 UL boxer motor 58 kW/80 hp or 73.5 kW/100 hp, with electrical starter, dual electronic ignition, integrated reduction gear box, ground adjustable 2 / 3-blade propeller or 3-blade variable pitch propeller.

Standard: Glass-fibre fairings (as above), (partly as sandwich construction).

Equipment:

- Highly effective hydraulic disc brakes with parking brake.
- UV-stable GT-foil coverings for wings and empennage available (white).
- High-lift flaps with separate aileron.
- Mechanical elevator trim at roof frame
- Gas-pressure spring assembly for cabin doors.
- Cabin heating, adjustable fresh-air inlets for both seats.
- 65 litre Fuel Tank.
- High power/ low weight sealed lead acid battery, 12 Volt power socket.
- Seat Cushions, map pockets, door locks, floor mats.
- Nose and main wheel fairings. Red or Blue stripe.
- design in many variations
- Radio Antenna.

Flight instruments:

- Altimeter, airspeed indicator, compass, bank indicator.

Engine instruments:

- RPM indicator, oil pressure indicator, oil temperature gauge, water temperature gauge, fuel gauge.

2.1.1 Optional Items

Propellers: Refer to POH for types cleared for use

Airframe:

- Carbon Fibre Shells (saves 4 kg)
- Wingtips Lightweight Version (White only)
- Cabin Ceiling Window
- Cabin Ceiling Window - Bronzed
- Folding Wing Kit (supplied separately)
- Main Wheel Strut Fairings
- Suspension Points (Hanging Storage)
- Cowl flap
- Stick mounted electric elevator trim
- Electric flaps

Instruments:

- Vertical Speed Indicator – approx. 80 mm
- Vertical Speed Indicator – approx. 55 mm
- Operating Hours Meter
- Artificial Horizon (Vacuum or electric)
- Vertical Card Compass 57 mm)
- Fuel Computer (Fuel CAT/NT)
- Master Caution Warning System (Comco Design)
- Different glass cockpit systems

VHF Coms:

- Filser ATR500 radio (incl. Intercom)
- Filser ATR600 radio (incl. Intercom)
- Filser TRT 600 Mode S/C Transponder
- Microair radio 760
- Microair Transponder T2000 mode C

Exterior Lighting:

- Landing Light (lower cowling)
- Strobe Light and position light mounted on Fin

Exterior fitment:

- Lotus Floats System
- Glider towing Kit
- Ski-Equipment

2.1.2 *Installation manual for Optional Items*

2.1.2.1 Cowl Flap C42 Series

I. General

Cowl flap for C42 series allows to considerably shorten warm-up period of the engine and to keep oil cylinder head temperature during flight operations in optimal range of 90°-110°C.
Annoying covering of the cowl flap in cold weather is a thing of the past. As a result, optimally regulated engine temperatures as well as shortened warm-up period of the engine minimizes fuel consumption and prolongs the life span of the engine.
Installed temperature warning sensor (orange warning light with buzzer) will notify that the flap is not opened.

II. Mechanical Installation

- Dismantle lower cowling.
- Put on the housing of the cowl flap and fix it with 2 bolts M4 at the upper and lower inlet lips.

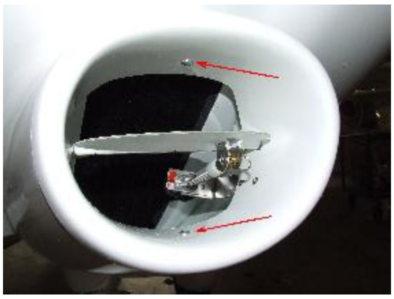


Figure 8: Bolts M4

- In flight direction left, about 10 cm from below cut a slot for the Bowden cable in the GRP sealed radiator surface of the cowling (e.g. with a small drill or round file)

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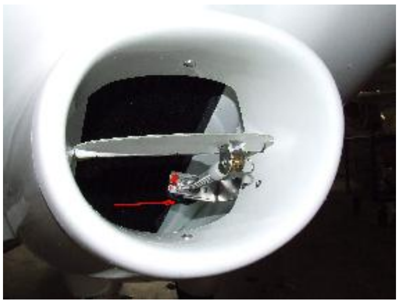


Figure 9: slot

- Assemble lower cowling, push the Bowden cable through the cut slot, lay it upward and push through the central firewall aperture.

Figure 10: Bowden cable

- Secure the Bowden cable with cable ties against contact with hot exhaust parts.

Figure 11: Exhaust pipe

- Fasten the actuating lever to the hinge bar with 2 x M5 countersunk head screws and locking nuts (left at pilot's side).

Figure 12: actuating lever

- Lead the Bowden cable under the instruments panel to the actuating lever, adjust the length with a clamping screw and clamp it

.

Figure 13: Bowden cable

- After functionality test secure the Bowden cable with cable and sleeve and shrink tubing and cut off the supernatant Bowden cable.

III. Electrical Installation

- Dismantel free temperature sensor at the front left cylinder.
- Mount the temperature switch, move up the sensor cable with abrasion protection between both left cylinders and push it through the central firewall aperture.

Figure 14: temperature switch

- In the appropriate place at the pilot's side drill a hole for the warning light and mount it.

Figure 15: warning light / actuating lever

- Connect the sensor cable with a cable shoe to the warning light.
- Connect the second port of the warning light with instruments " + ".
- Make functionality test with turned on main switch by removing the sensor cable from the temperature switch and hold it against mass.

Important: The light must be flash and produce a warning sound.

IV. Operating Instructions

Before starting the cold engine the cowl flap can now be closed with the actuating lever.
When reaching the cylinder head temperature of about 90° C the cowl flap can be again fully or partially opened depending on the outside temperature.

In case the flap was forgotten to be opened, the orange warning light will light up when the cylinder head temperature reaches 120°C. The cowl flap should be then forthwith fully opened as well as the engine output should be reduced if possible so that to allow for an immediate cooling down of the engine.
For dismantling the lower cowling (100 h control, oil change) the Bowden cable can be disconnected directly on the cowl flap. For that, after removal of the circlip it is necessary to pull the cotter bolt and by unscrewing the lentil-flange head screw (long Allen key or Torx) to remove the Bowden cable holder. The cowling can be now dismanteled without problems.
Assembling can be carried out in reversed order.

2.1.3 Sources for spare parts

Spare parts for the C42 Series can be obtained from the following sources:
All ISC / ITB (Comco Ikarus dealers).
Look at our website: http://www.comco-ikarus.de/service/

2.1.4 Wearing parts

Tyres, oil, coolant, battery, ignition plugs, oil filter, fuel filter, fuses

Part	Description
Tyres	4.00 x 6” 4 ply-rating
Inner tubes	4.00 x 6” angled valves
Coolant	glycol based @ 50% concentration
Engine oil	Shell AeroShell Sport PLUS 4
Battery	12 Volt 12 AH Banner GTZ14B-4
Ignition plugs	NGK DCPR7E (80hp) NGK DCPR8E (100hp)
Oil Filter	Rotax 912 825 016
Fuel Filter	Nylon mesh filter with 8mm connections
Fuses	Automotive 12 volt blade fuses (30, 15 & 5 amp rating)

2.1.5 Recommended Stocking List

QTY	Description
1	Set brake discs
2	Complete set brake pads
3	Tyres
3	Inner tubes
1	Suspension air pump
1	Metric socket set
1	Metric Allen key set
1	Litre LHM fluid
1	Nose wheel axle
1	Front forks
1	Square tube
2	Fuel filters
8	Coolant radiator mounting rubbers
10	Long exhaust springs
5	Short exhaust springs
1	3 metres 8mm Trelleborg fuel hose
1	3 metres 6mm Trelleborg fuel hose
1	3 metres 8mm clear urethane hose
1	3 metres 6mm clear urethane hose
20	Size 11.5 fuel line clips
20	Size 12 fuel line clips
20	Size 14 fuel line clips
20	8mm rubber buffers
20	4mm hex head screws
20	Complete engine cowl Camlocs
10	Complete long wing nut Camlocs
10	Complete short wing nut Camlocs
10	Complete lower engine cowl fixing

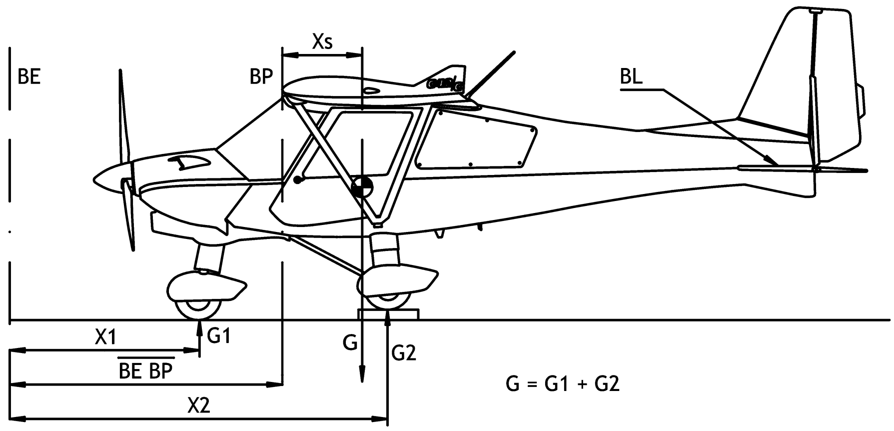
2.2 Weight & Balance

The aircraft should be maintained in a configuration which meets the weight and balance criteria set out below and in the POH.
If you are unsure of which certification you are flying under please refer to the POH.

Note:
For exact weight and balance restrictions, refer to the Flight and Operations Manual (POH).

2.2.1 Weight and Balance Calculations

The centre of gravity is measured in mm behind the zero datum. Zero datum is the leading edge root.
The aircraft's empty weight and CG are derived first:
Place the aircraft in a level position on three scales, such that the stabilizer is horizontal, as shown below. Push down on the rear fuselage, just in front of the tail, and chock the nose wheel to level the aircraft. Record the reading of each scale.



BP leading edge
Mean Aerodynamic Chord MAC = 1360 mm
BE BP = 39.37 inches (1000 mm)
X1 = 9 inches (230 mm)
X2 for C42 / B / C = 69.68 inches (1770 mm)
X2 for C42CS = 69.88 inches (1775 mm)

$$(I)\ Xs\ [mm] = \frac{G1 \cdot X1 + G2 \cdot X2}{G1 + G2} \cdot \overline{BE\ BP} = \_\_\_\_\_\_\_\_\_\_\ mm$$

$$(II)\ Xs\ [\%] = \frac{Xs\ [mm] \cdot 100}{1360\ mm} = \_\_\_\_\_\_\_\_\ \%$$

Insert the values for total empty weight, (G1 + G2) and CG distance aft of datum, (X), into the table below. Multiply Empty Weight (kg) by CG distance aft of datum (mm) to derive empty weight moment (kgmm) in the last column.

Complete the remaining weights for seat loads, fuel and baggage and multiply these by the lever arm lengths (given below).

Add up the weights and moments, then divide the total weight by the total moment to give laden CG location aft of datum.

Loading plan

Position	weight x	lever arm =	moment
	lb (kg)	in. (mm)	lb in (kgmm)
Empty weight			
1. Seats		15.7 (400)	
2. Fuel		37.4 (950)	
3. Baggage		51.2 (1300)	
Total Weight	lb (kg)	Total Moment	lb in (kgmm)
centre of gravity CG =	Total Moment lb in (kgmm) -- = Total Weight lb (kg)		in (mm)

Centre of gravity range is dependent on aircraft model. (Refer to POH)

2.2.2 Conditions of weighing

The dry empty weight of the aircraft is defined under the following conditions:

- All normal installed equipment fitted
- Oil and coolant levels normal
- No usable fuel

Note: Remaining within the Maximum Take-off Weight (MTOW) as specified in the POH is the pilot's responsibility.

2.3 Design

The fuselage, wings, struts and empennage are made of high-strength aluminium tubing/sections. The parts are screwed, riveted or welded to each other. All fittings and screws are either made from stainless steel or are high-strength standard elements.

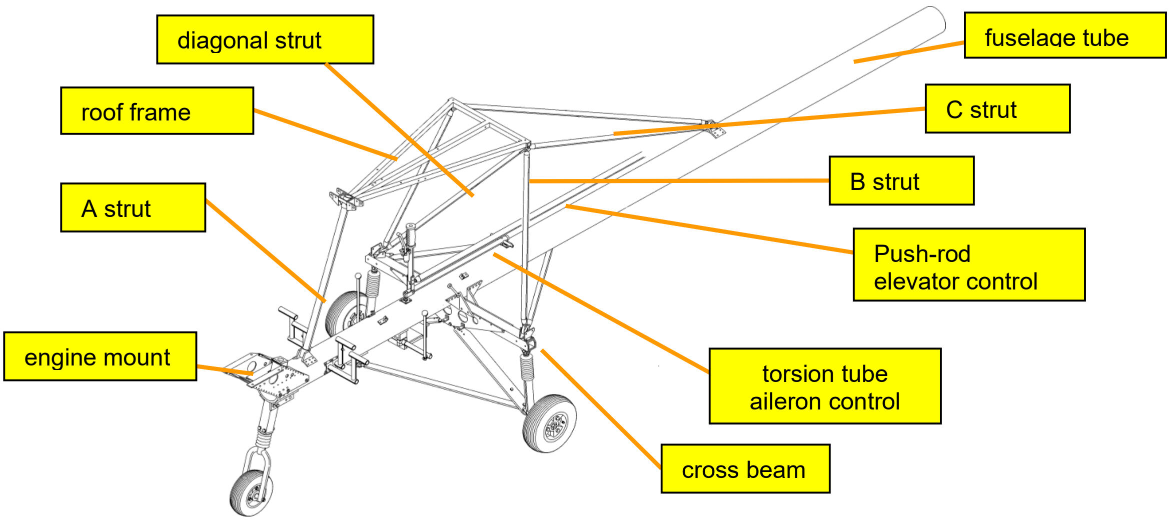
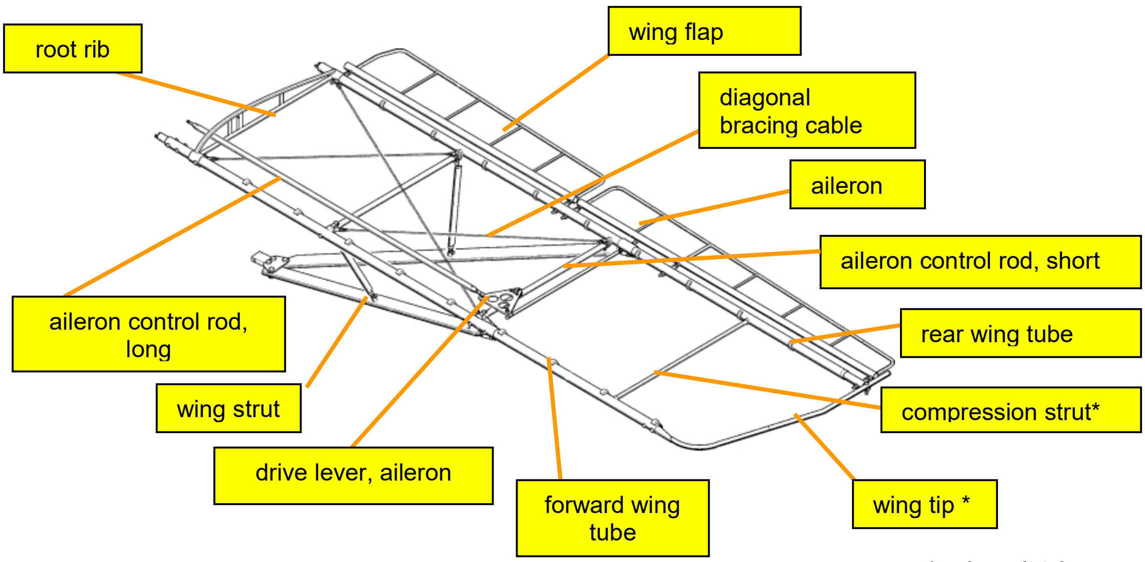


Figure 16: Fuselage design



*only valid for standard wing without winglet

Figure 17: Standard wing design without winglet

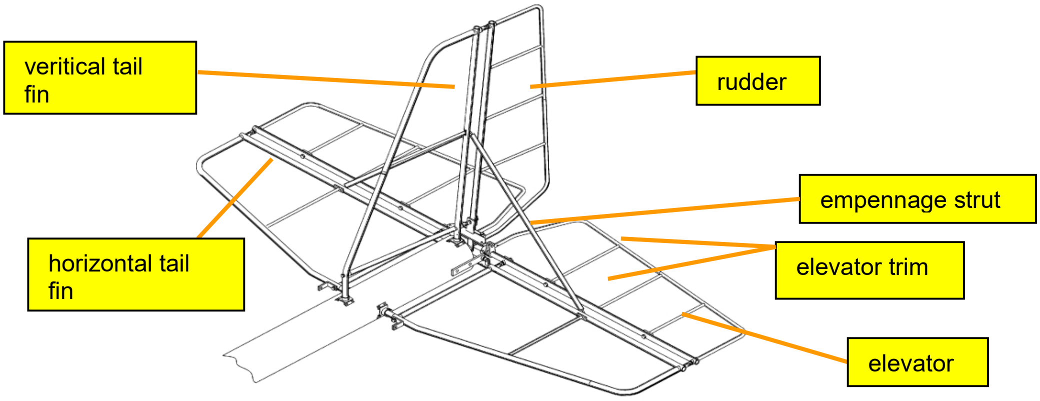


Figure 18: Empennage design

Non-supporting glass fibre/carbon fibre elements, partially in sandwich design, are used for the fuselage shell and the skin.
The covering is made of a UV-stabilised webbed fabric (brand name: Tedlar®).

The polycarbonate Makrolon® is used for the glazing. Makrolon® is a high-tech polycarbonate (not plexiglass) which is characterised by its resistance to weather, heat and cold, its impact strength and its light weight. However, the material is particularly susceptible to solvents and petrol.

Beginning with the production date 04/2008, a special, impact resistant plexiglass has been available as an option. This special plexiglass is characterised by a better buffability and its resistance to petrol and oil.

2.4 Landing gear

Nose wheel landing gear:
The nose wheel landing gear comprises the sprung nose wheel fork, the axle bolt, the nose wheel, the nose wheel spar and the steering bar. Up until 2003, a steel compression spring was used. However, since 2003 spring elements made of polyurethane have replaced the pressure spring. The nose wheel fork is stored in the nose wheel spar which passes through the fuselage tube and the engine mount and is attached to the engine mount by means of a mounting bracket.

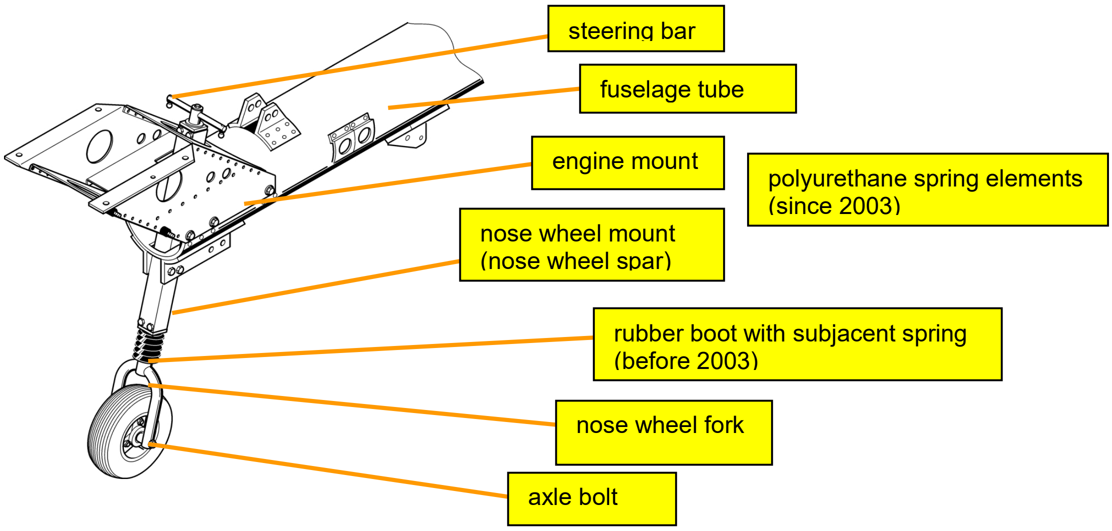


Figure 19: Nose wheel landing gear

Main landing gear:
The main landing gear comprises the cross beam, joists, axle tubes, shock absorbers, trailing arms and spar struts as well as wheel axles and main wheels. The individual elements of the landing gear are connected to each other by screws.

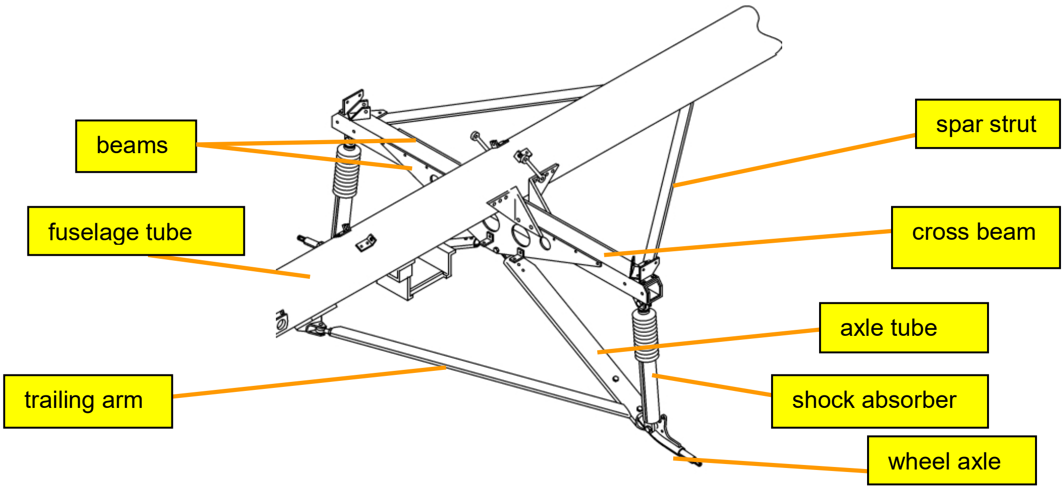


Figure 20: Main landing gear

Note: The C42CS with plastic undercarriage (GRP) is equipped with a double cross beam for better load distribution. Trailing arms, axle tubes and shock absorbers are not required with this version.

2.5 Power plants

2.5.1 Differences C42 / C42 UK and C42B / C42B UK / C42E / C42C

Since production year 2002, COMCO IKARUS has also been offering the C42B / C42B UK / C42E / C42C, a further developed model.
The differences between the C42 / C42 UK and the C42B / C42B UK / C42E / C42C are to be found in the engine compartment. The further developed models have a new cowling which is 13 cm longer, the engine has been set 6 cm forward and the windscreen is shallower. In addition, the air induction system and the coolant and oil cooling systems have been altered.
These alterations in particular have led to considerable improvements in performance and to a reduction in the warm-up phase. They also have carburettor preheating.

2.5.2 Engine

The aircraft is powered by an 80 hp or 100 hp rated, mixed liquid-cooled/air-cooled, opposed 4 cylinder, 4 stroke Rotax 912UL or 912ULS engine. Both engines have an electrical starter, electronic dual ignition and an integrated reduction gear.

A detailed description of the engines and the necessary maintenance measures are given in the Rotax documents.

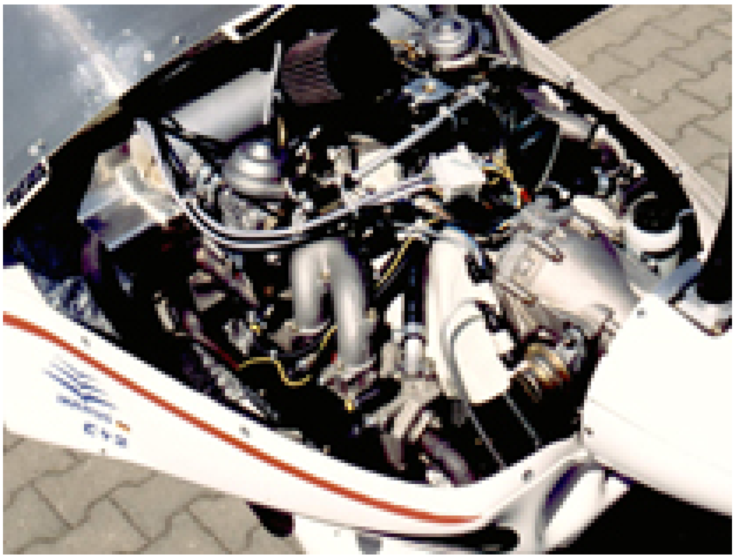


Figure 21: Rotax 912UL engine (C42 / C42 UK)

Figure 22: Rotax 912ULS engine (C42B / C42B UK / C42C / C42E)

2.5.3 Air induction system

The case of the C42 / C42 UK air is drawn in through the air filters mounted inside the engine compartment.
In the case of the C42B / C / UK / E, ambient air is drawn in through an inlet in the cowling and fed to the carburettors. This results in a 2-3 % improvement in performance. In the event of carburettor icing, an adjustable flap in the induction tube reduces the amount of outside air being fed into the system. Instead, additional warm air flows in from the exhaust shroud.

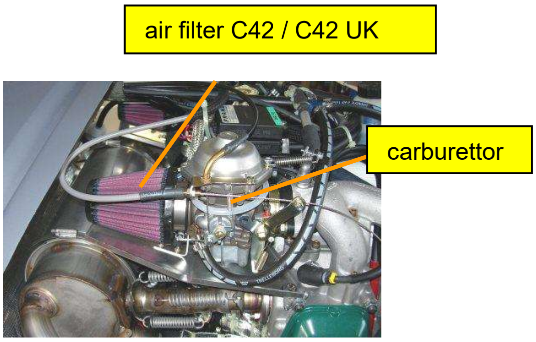


Figure 23: Air induction system C42 / C42 UK

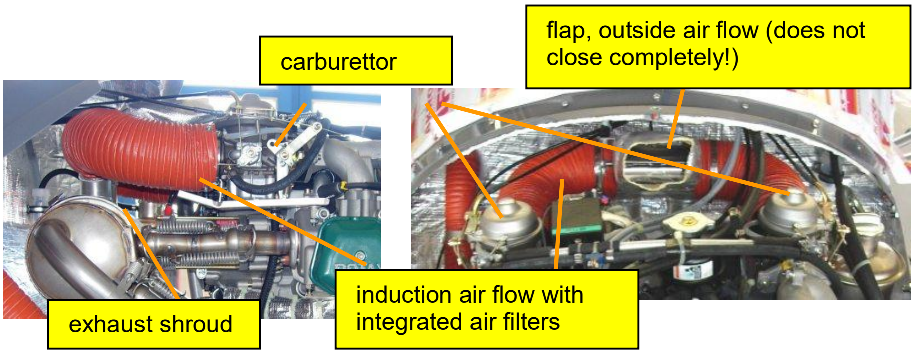


Figure 24: Air induction system C42B / C42B UK / C42C / C42E

2.5.4 Cooling system

The cylinder heads of the Rotax 912UL engine are liquid-cooled whereas the cylinder barrels are air-cooled.
In the case of the C42 / C42 UK, there are separate cooling systems for the coolant and the oil. In the case of the C42B / C42B UK/ C42C / C42E, only the coolant is cooled by a cooler. The coolant and oil systems are connected to one heat exchanger, thus the temperatures of both fluids adapt to each other. The temperatures of the coolant, oil and cylinder head of the C42B / C42B UK / C42C / C42E are, therefore, almost identical. Due to heat exchange the oil also warms up faster during the run-up phase. It is, however, still necessary to mask the water cooler if optimum engine temperature (>90°C) is to be achieved during cold weather operation (max. one third of the surface may be covered with tape or self-adhesive neoprene).

More detailed information on engine cooling and the relevant maintenance measures are to be found in the appropriate Rotax documents.

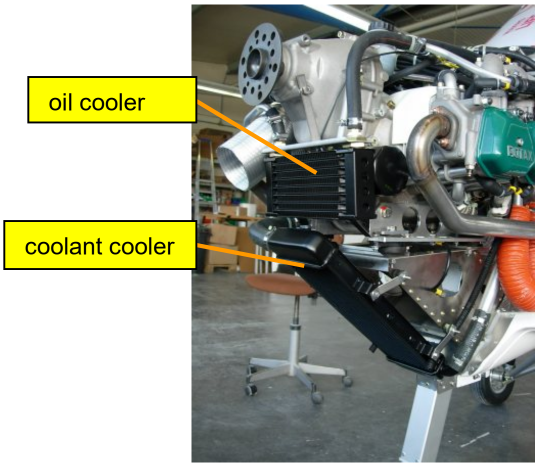


Figure 25: Cooler C42 / C42 UK

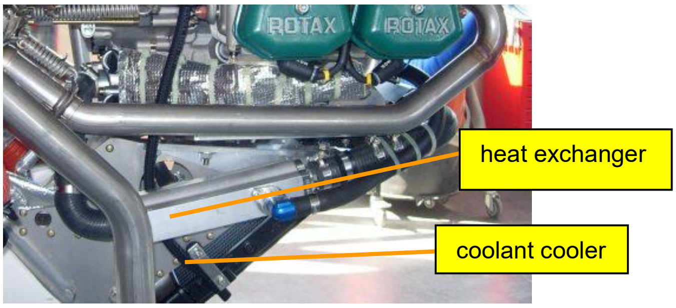


Figure 26: Cooler C42B / C42B UK / C42C / C42E

2.5.5 Propeller

The aircraft may be equipped with a 2 bladed or 3 bladed, ground-adjustable, carbon-fibre, glass-fibre or wooden propeller and a glass-fibre spinner. If a Rotax 912ULS engine (100 hp) is installed in the C42, it may also be equipped with a hydraulically or electrically adjustable propeller.

Information on certified propellers is to be found in the current technical data sheet or in the pilot's operating handbook. More details about the propellers and the appropriate maintenance measures are to be found in the relevant propeller documents or are available directly from COMCO IKARUS GmbH.

2.5.6 Exhaust system

The exhaust system is made of stainless steel components and is attached elastically to the engine by means of tension springs and ball cup connections.

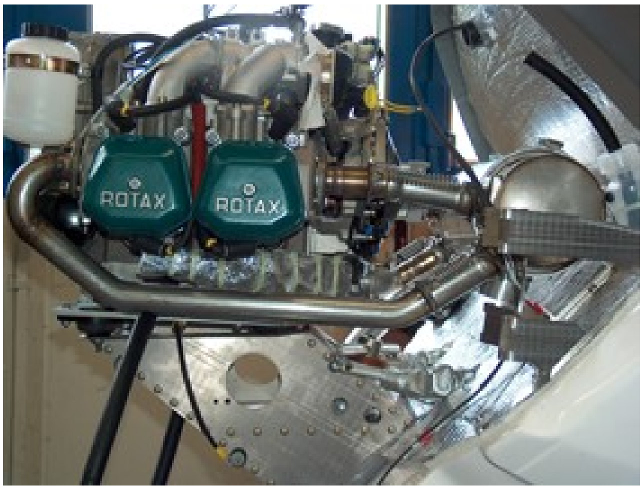


Figure 27: Exhaust system

2.6 Fuel system

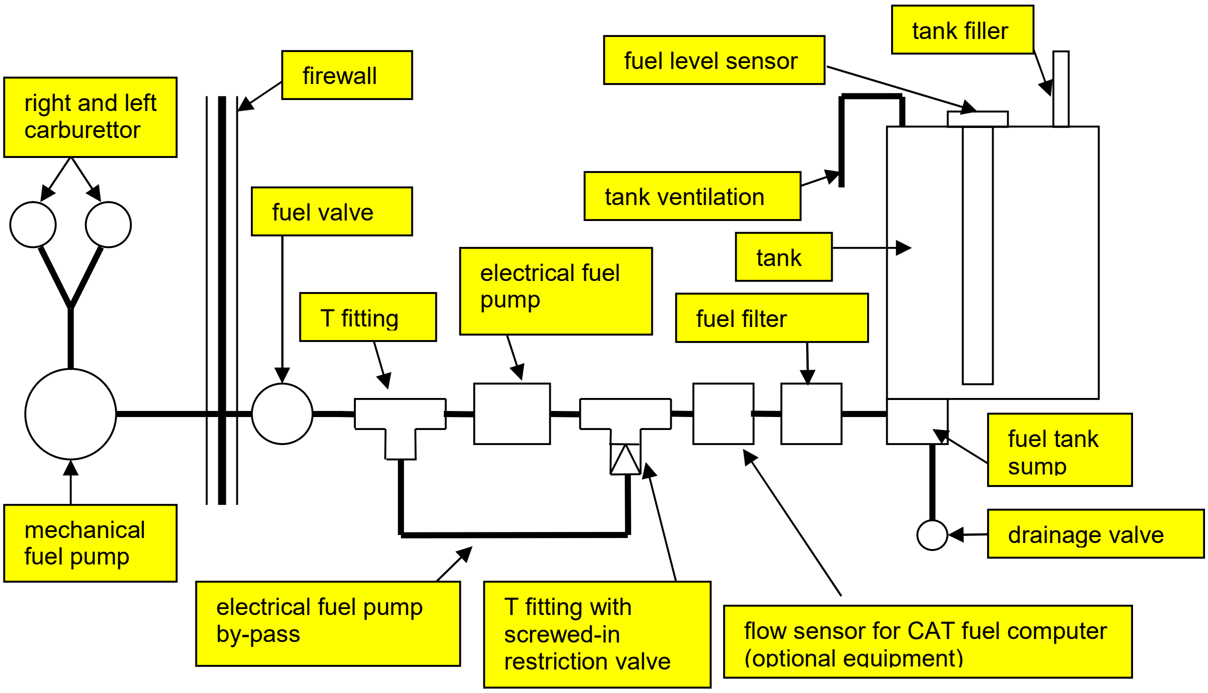


Figure 28: Schematic diagram of the fuel system C42 / C42B

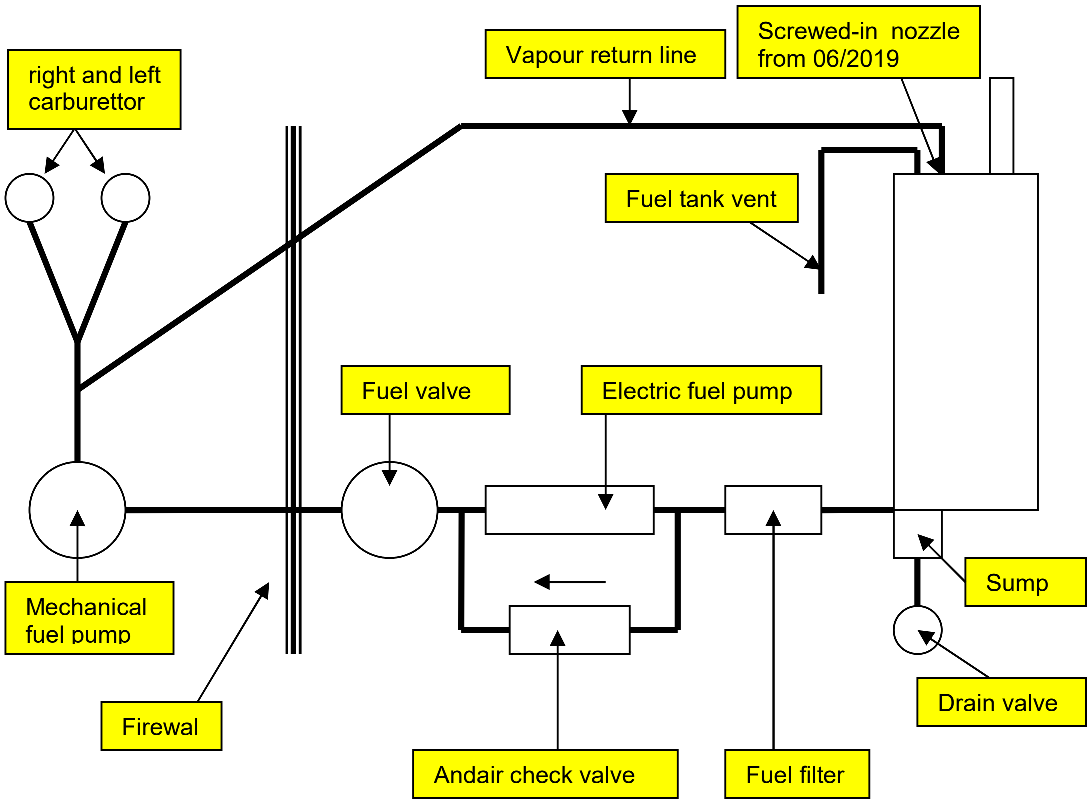


Figure 29: Schematic diagram of the fuel system C42 UK / B UK / C / E

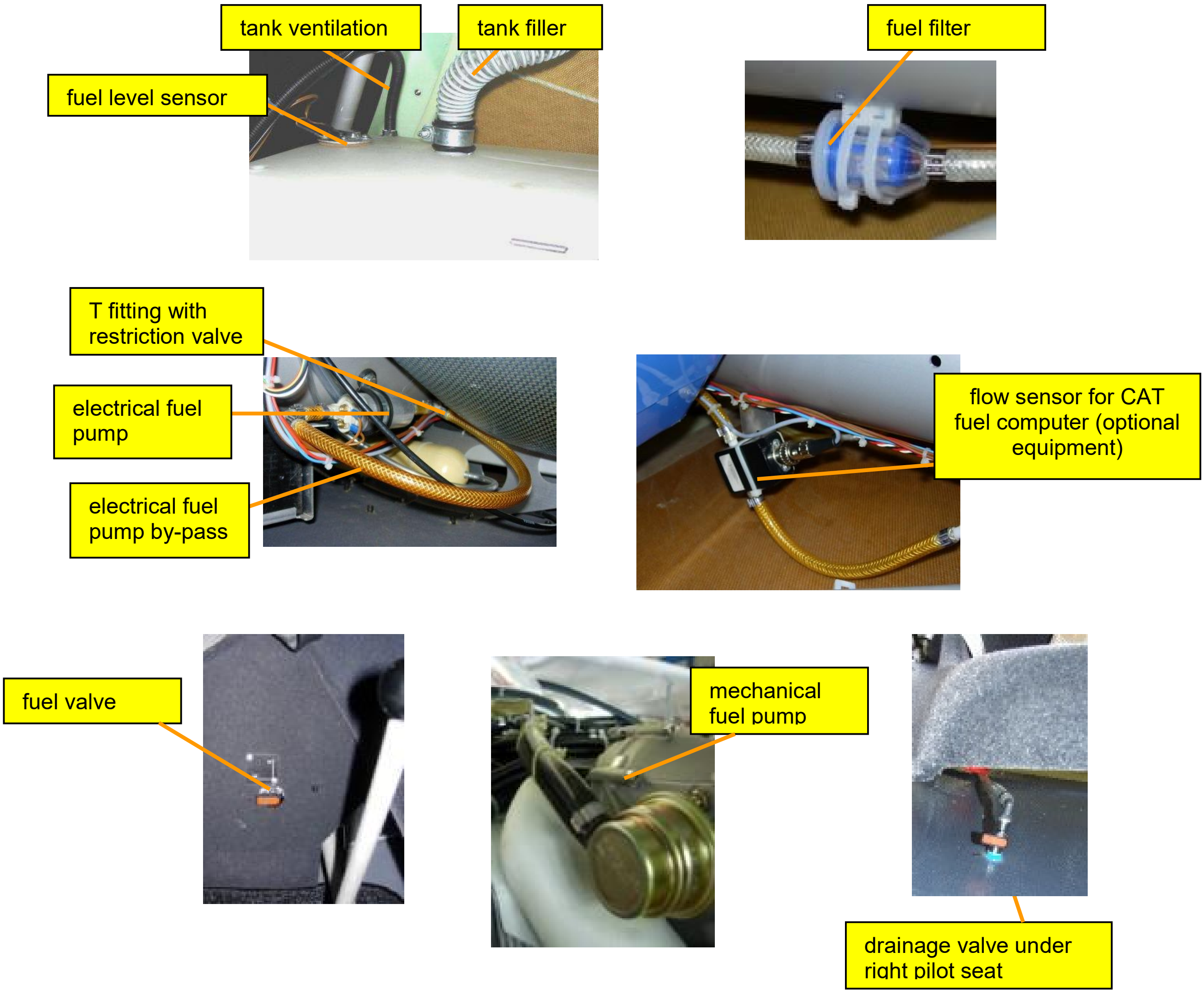
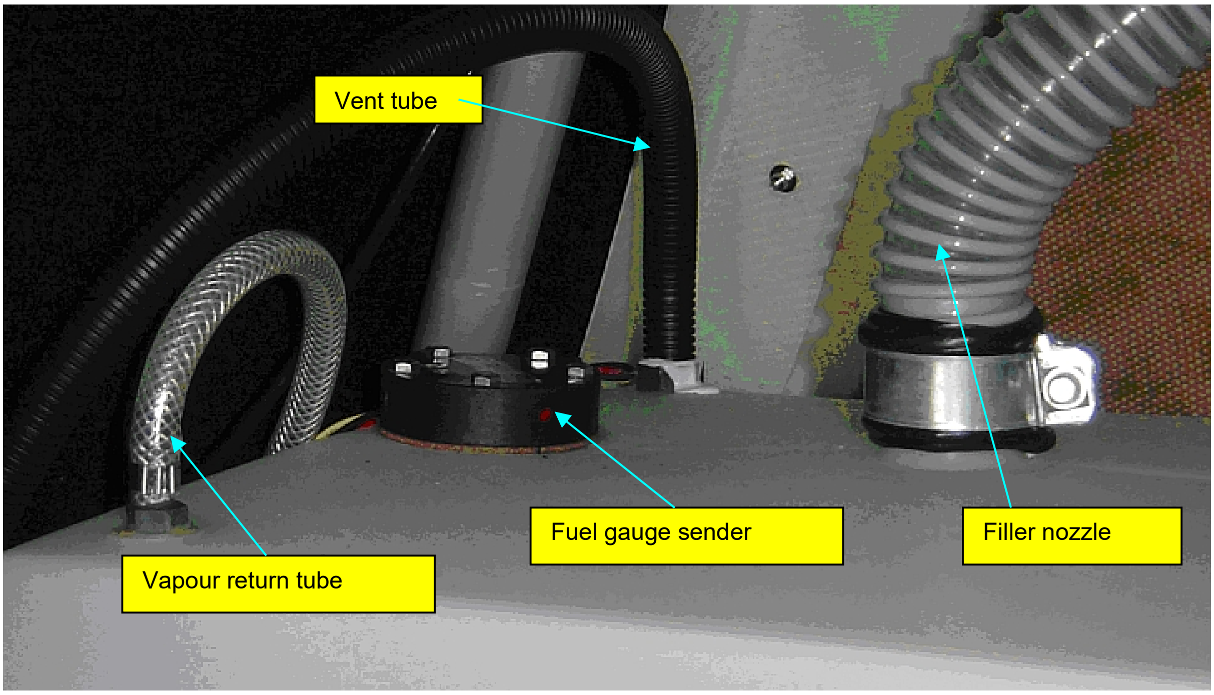
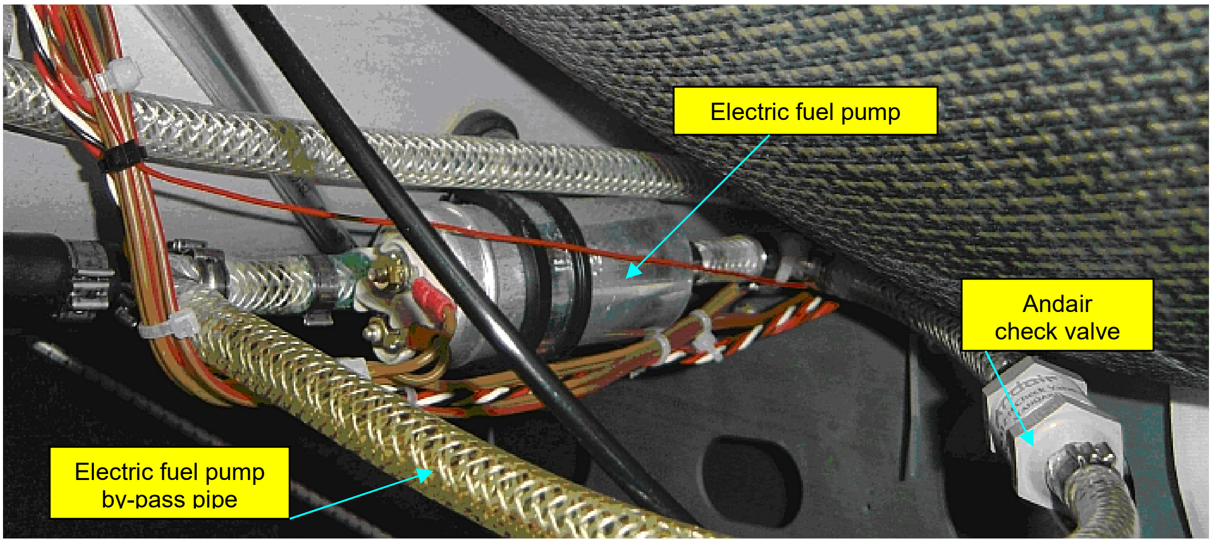


Figure 30: Fuel system components C42 / C42 UK



Fuel tank components



Electric fuel pump & Andair check valve

Figure 31: Fuel system components C42 UK / C42B UK / C42E

According to the current construction standard, the components in Figure 31 are no longer located under the left pilot seat, but under the fuselage tube in the area of the fuel tank.

2.7 Electrical system

The C42 is supplied with electricity via a generator attached to the engine (cf. Rotax documentation). Together with a regulator-rectifier, it provides 12.5 - 14.2 V DC voltage to the aircraft electrical system and simultaneously charges the battery. In aircraft with a ballistic recovery system, the battery is located on the underside of the fuselage tube near the seats.

For balance reasons, the battery is placed further back in aircraft without a ballistic recovery system.

Circuit diagrams are to be found in the appendix of this manual.

Figure 32: On-board battery C42 / C42B / C42C / C42E

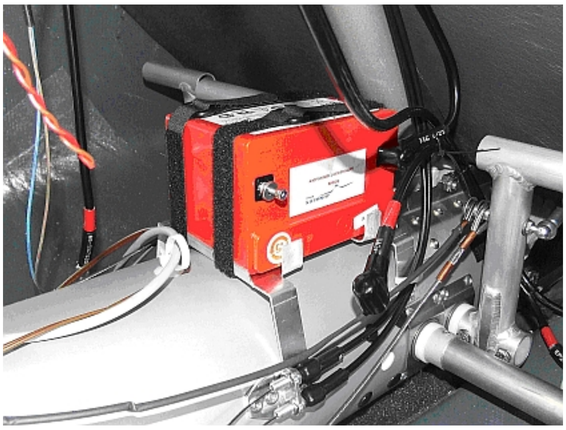


Figure 33: On-board battery C42 UK / C42B UK (optional)

Electrical parts

Please refer to the schematics below:

Maintenance of the electrical system is in accordance with the inspection schedule in Section 1 - Inspections.

All defective electrical components must be replaced with new parts obtained only from ISC / ITB (COMCO IKARUS dealers)

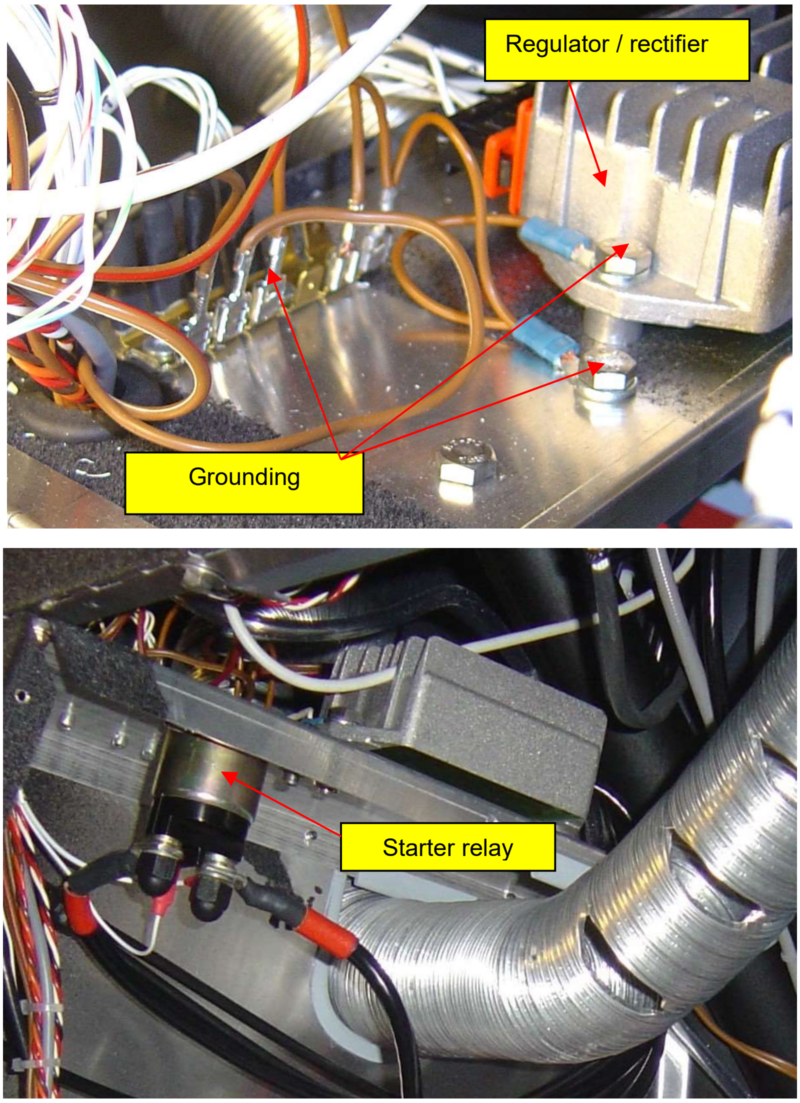


Figure 34: Electrical parts (old regulator to 2008)

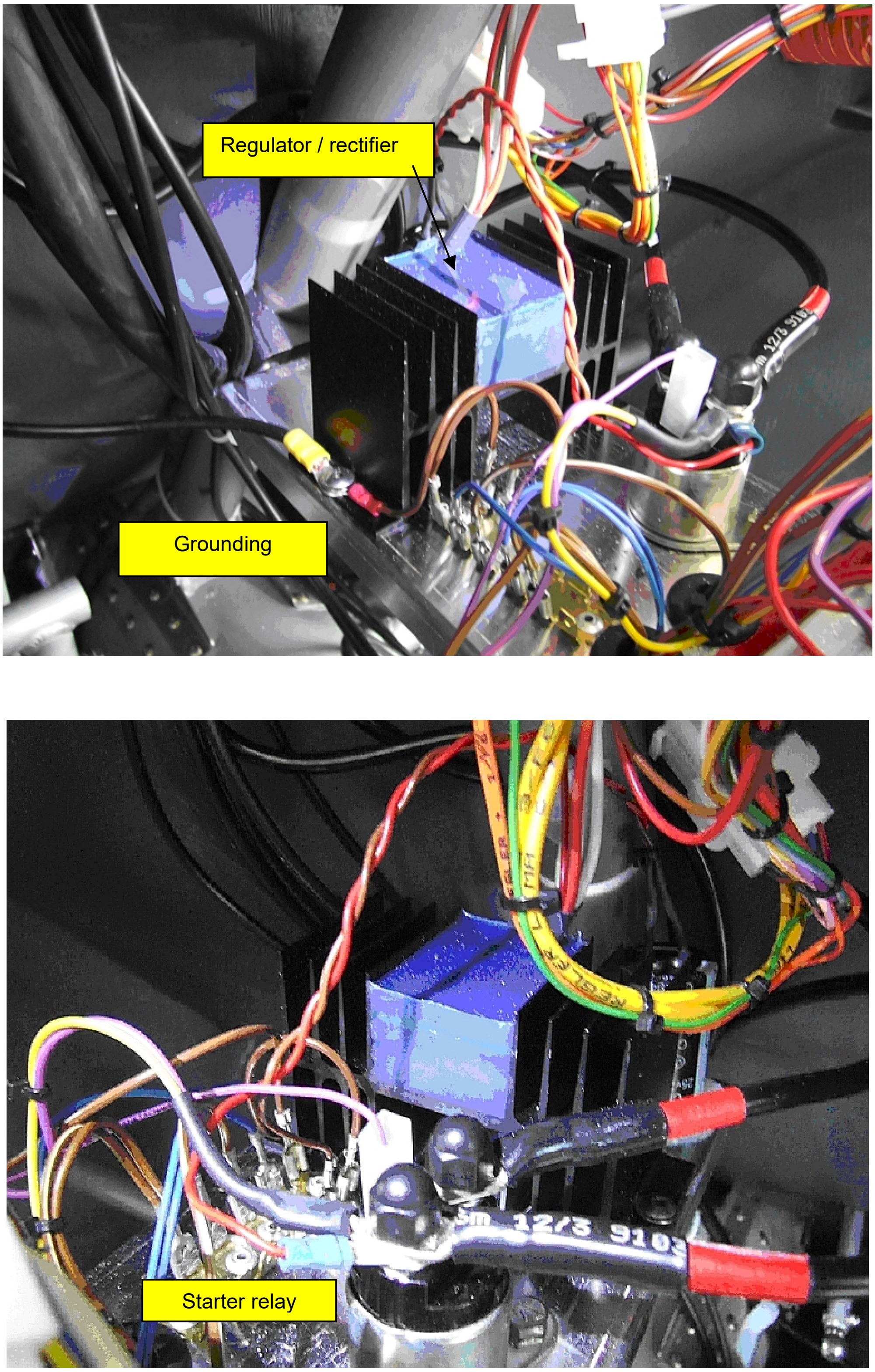


Figure 35: New regulator (since 2008)

2.8 Flight controls

The flight controls and the wing flaps of the C42 are actuated by push-rods, torsion tubes and cables.

2.8.1 Elevator

The elevator is actuated via the control stick and two push-rods. Actuation direction is reversed by means of a lever on top of the fuselage tube. Elevator direction change is limited by two polyamide spacers.
From factory no. *1805-7526* a vertical elevator direction changer is installed in all machines. The polyamide stops have been replaced by aluminium stops. An illustration of the currently installed elevator direction changer can be found in chapter 4.3.6.3.

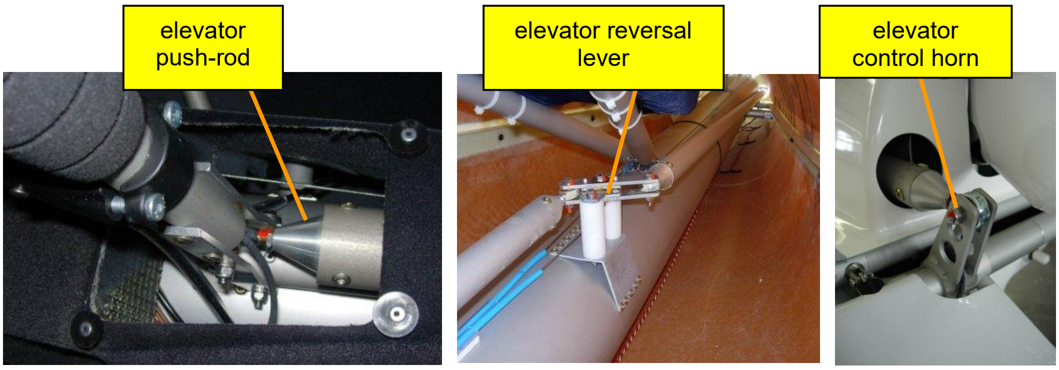


Figure 36: Elevator control

2.8.2 Trim

The aircraft is available with a mechanical or (as an option) an electrical trim system. In the case of the mechanical trim system, the trim tab is adjusted by a lever in the roof frame and a Bowden cable.

The trim tab of the electrical trim system is adjusted via buttons on the control stick which activate a trim servo and a rod. The circuit diagram for the electrical trim system is to be found in the appendix.

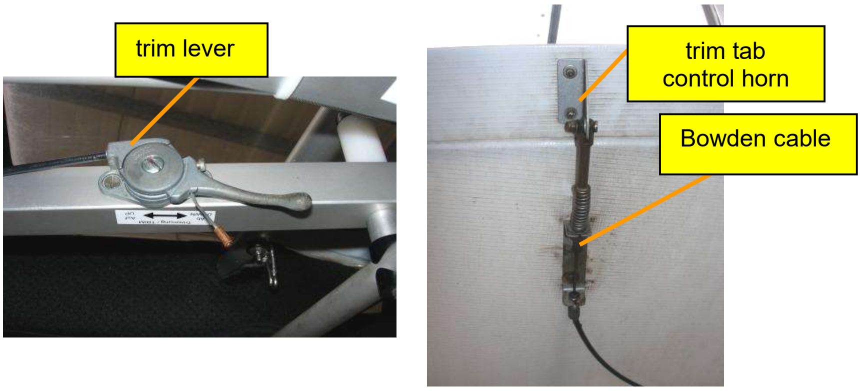


Figure 37: Mechanical trim

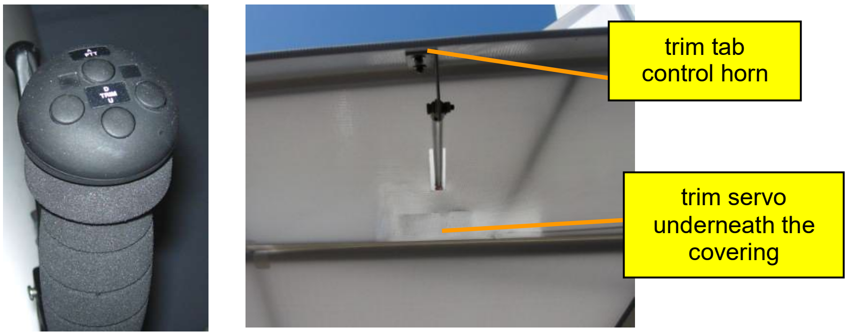


Figure 38: Activation of the electrical trim tab

2.8.3 Aileron

The control stick is attached to a torsion tube. This torsion tube drives two cables via a lever. The cables are re-directed by two pulleys mounted on the cross-rod of the roof frame and routed to the aileron quadrant. From the quadrant, the ailerons are actuated via two aileron rods and a lever per wing.

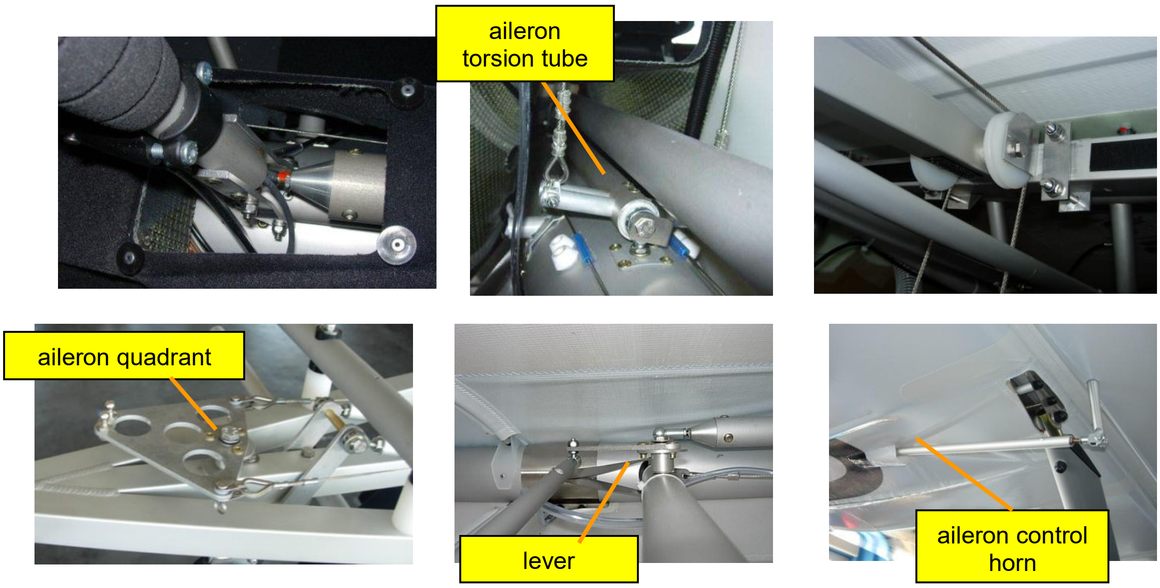


Figure 39: Aileron activation

2.8.4 Rudder

The rudder is actuated via floor pedals which are attached to torsion tubes which run in journal bearings directly mounted to the fuselage tube. The torsion tubes are connected to the rudder control horn via cables / Bowden cables routed along the fuselage tube. The Bowden cables are crossed near the elevator reversal lever.

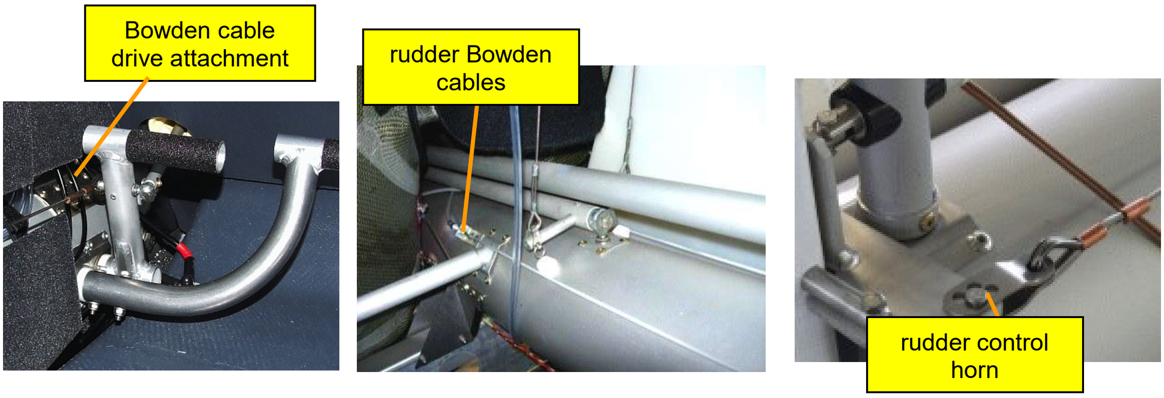


Figure 40: Rudder control system C42 / C42B

2.8.5 Nose gear steering

The nose wheel landing gear is steered via the floor pedals. Push-rods actuate the steering bar connected to the nose wheel fork.

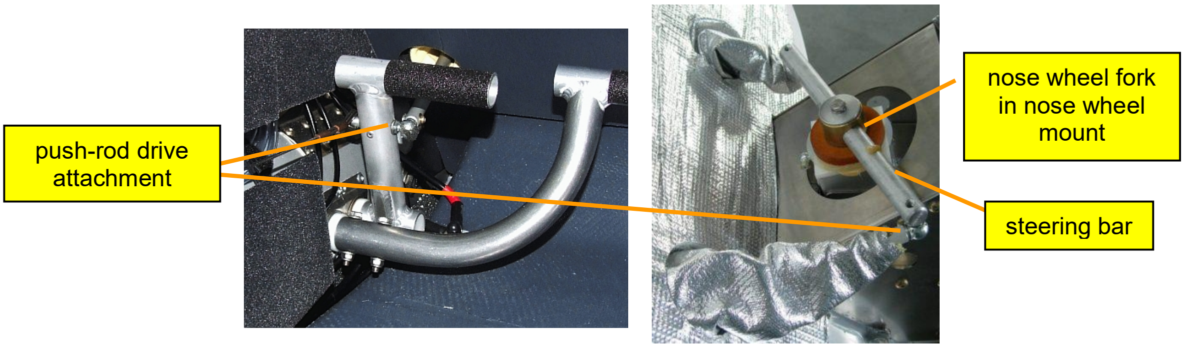


Figure 41: Nose wheel steering system C42 / C42B

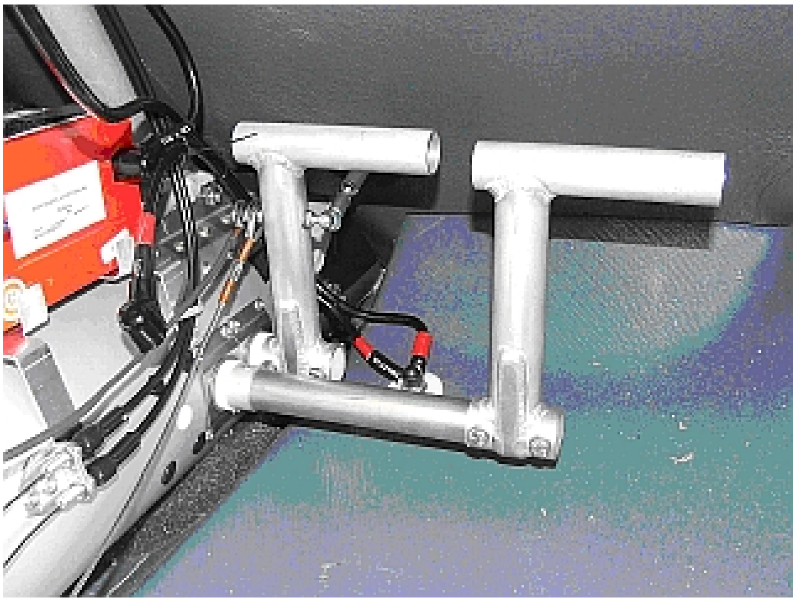


Figure 42: Nose wheel steering system C42 UK / C42B UK / C42E

Figure 43: Rudder return cable & spring for C42B UK / C42 E

Attention! As from December 2009, all C42 aircraft are equipped with the new pedals. Cf. AD no.: LSG 08-014 / SB_42_14_08

2.8.6 *Wing flaps*

The wing flaps are actuated by a lever located in the middle of the longitudinal tube of the canopy roof frame. The lever is linked to the flap horns via push-rods.
As an option, the wing flaps can also be actuated electrically via a servo motor which is controlled by means of a rocker switch in the control stick or a separate rocker switch in the instrument panel.

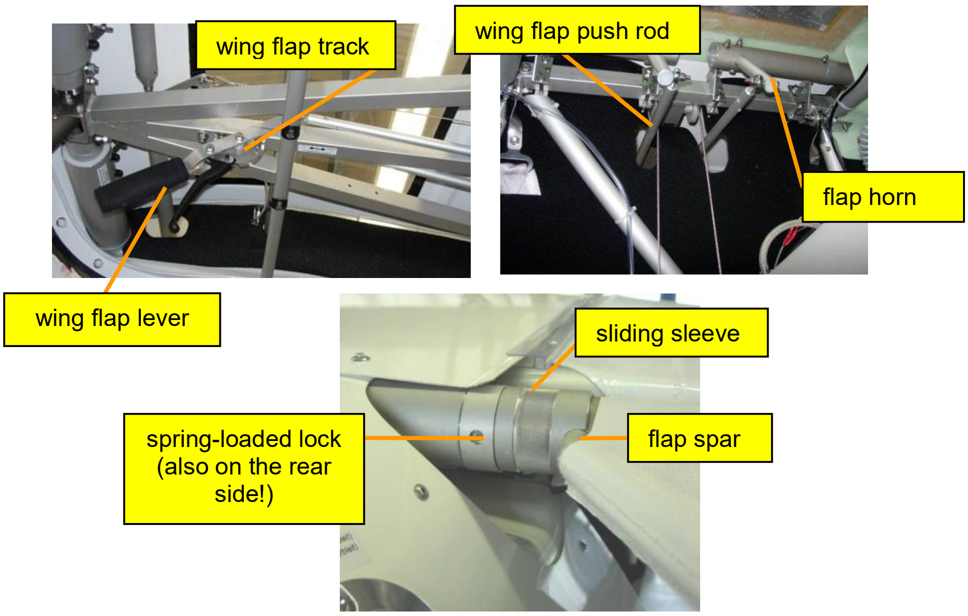


Figure 44: Flap controls

2.8.7 Carburettor control

The throttle is controlled by two throttle levers via Bowden cables. The choke is also actuated via a central pull-knob and Bowden cables.

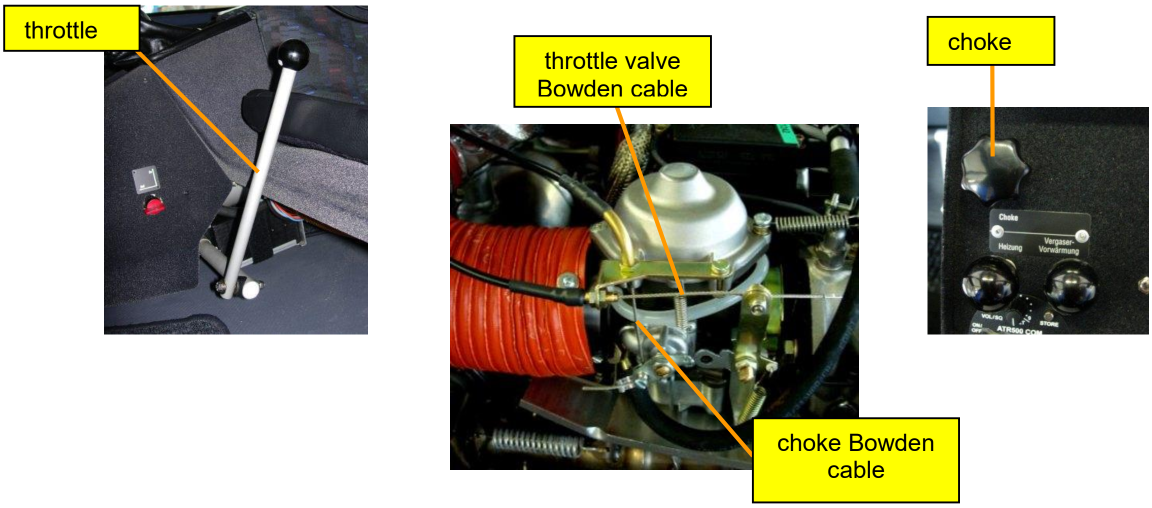


Figure 45: Carburettor controls C42 / C42B

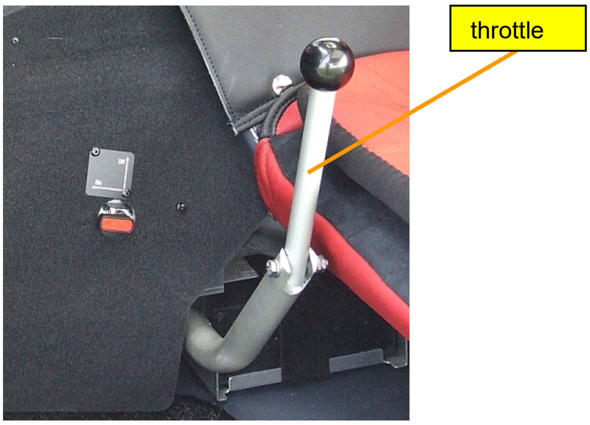


Figure 46: Carburettor controls C42 UK / C42B UK / C42 E

2.8.8 Brakes:

The wheels of the main landing gear are equipped with hydraulic disc brakes and parking brake function. The brake lever with integrated master brake cylinder is located in the control stick. Braking force is transmitted to the brakes via hydraulic tubes.

In June 2003, the brake system was modified due to the discontinuation of production of the previously used system. Since then, the C42 has been equipped with Magura® Big brakes. Due to this change, alterations have also been made to the wheel axles, the brake shoes and the brake discs as well as to the length of the trailing arms.

From February 2010 a new type of brake will be offered as optional equipment. This high-quality disc brake made by Beringer® is characterised by high wear-resistance and constant brake force. A better-quality wheel is part of this optional equipment which offers better impact damping and a much longer service life. Retro-fit kits will be available from February 2010 from COMCO IKARUS GmbH and can be ordered from the ISC / ITB.

From November 2010 another new type of brake will be offered as optional equipment. This premium disc brake system made by "Tost" excels in high stability and braking efficiency. Aero Classic tires are mounted with this brake system serially. The easy and low-price retrofitting on aircrafts with "Magura® Big" brakes (from June 2003) has to be pointed out. Retro-fit kits are available from November 2010 from COMCO IKARUS and distributed via the ISC's and ITB's.

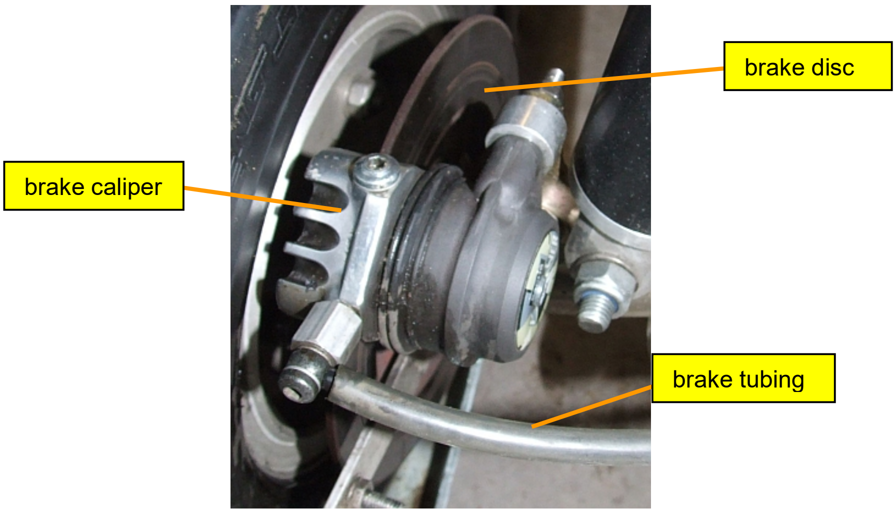


Figure 47: Brake system – "Magura-Sachs" brakes (up until 06/2003)

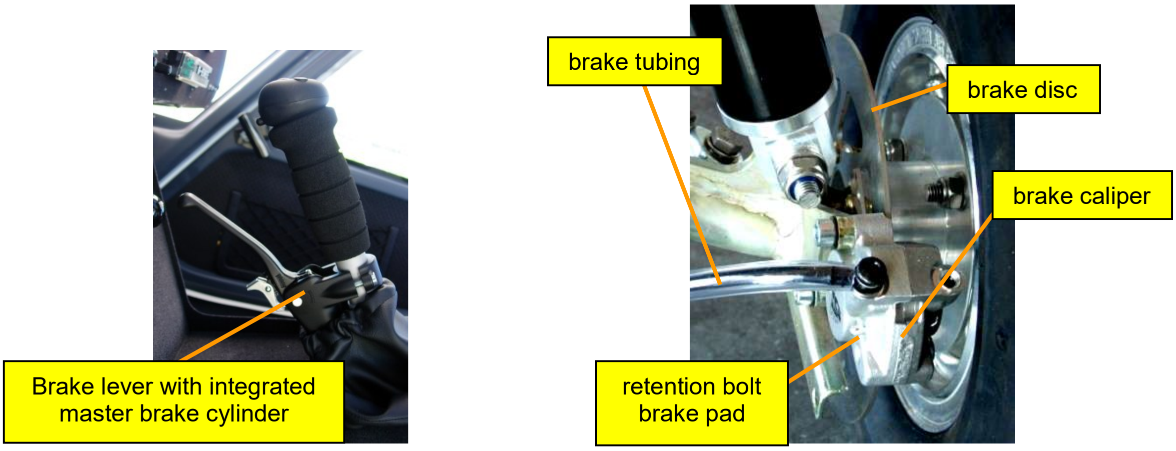


Figure 48: Brake system – "Magura-BIG" brakes (since 06/2003)

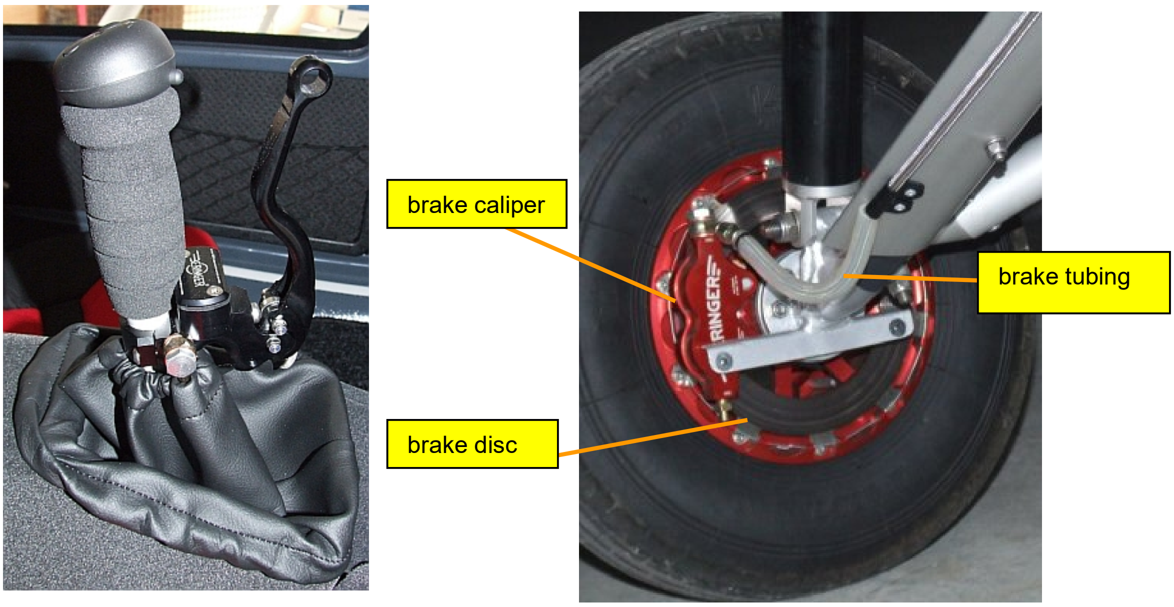


Figure 49: Brake system – "Beringer" brakes (optional, from 01/2010)

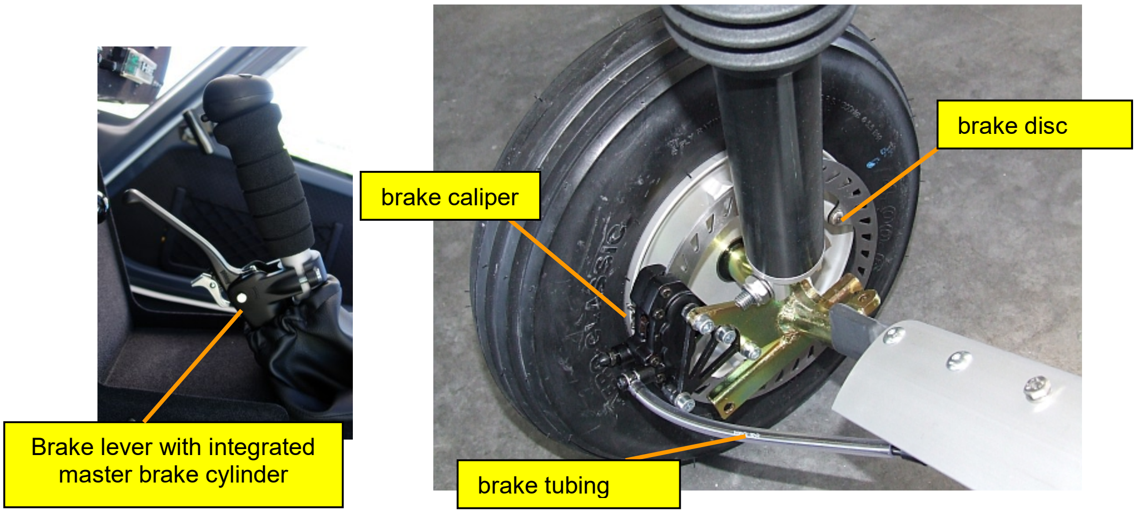


Figure 50: Brake system – "Tost" brakes (optional from 11/2010)

2.9 Instruments

Depending upon customer request various instruments can be installed in the cockpit of the C42.

Figure 51: Instrument panel - example

The following instruments are standard equipment:

<u>Flight instruments:</u>

- Altimeter
- Air-speed indicator
- Compass

Aneroid instruments are attached to a pitot-static pressure system.

Engine monitoring instruments:

- Rpm indicator
- Oil pressure indicator
- Oil temperature indicator
- Cylinder head temperature indicator
- Fuel tank indicator

Further instruments are available on request.

For further information on operation and maintenance, please consult the documents relevant to the appropriate instrument or contact an ISC / ITB or COMCO IKARUS GmbH.

2.10 Heating

Cabin heating is part of the standard equipment of the C42:

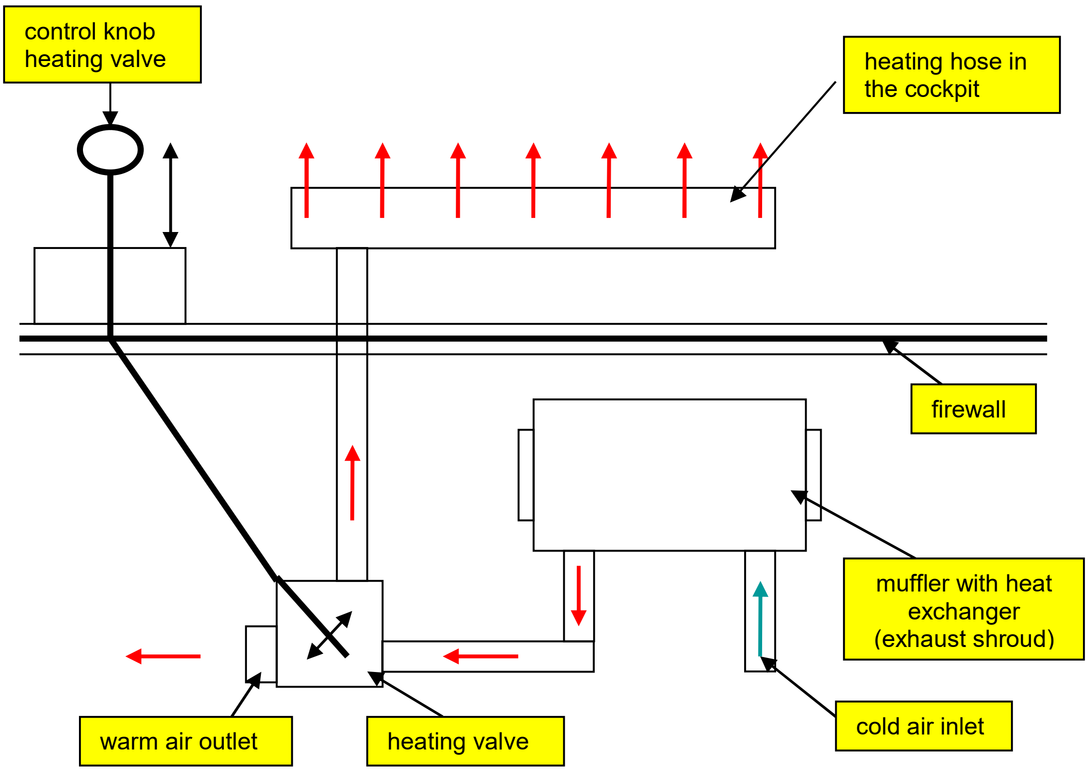


Figure 52: Schematic diagram of the heating system

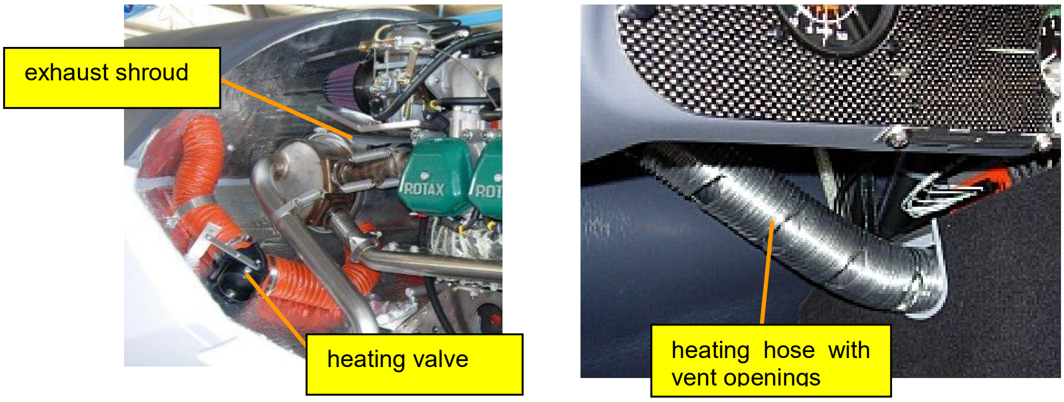


Figure 53: Heating system elements

3 Cleaning and care

3.1 Aircraft covering

Soiled aircraft covering can usually be easily removed with water. More persistent dirt may be removed at a suitable place (environmental protection) by car shampoo or detergent. While cleaning the covering, it can also be checked for damage to the skin and the integrity of the seams.
To improve the durability of the covering, it should be waxed annually with a normal car wax. This sealing protects the cloth and prevents it from drying out or becoming brittle.

3.2 Windscreens

Normal soiling during flight operations can usually be removed using lots of clear water. The windscreens should be soaked thoroughly, using a soft sponge or by covering the windscreen with wet newspaper (do not let the newspaper dry out, if necessary, repeatedly soak the newspaper). The dirt can then be removed with a fine micro-fibre cloth. The micro-fibre cloth must be kept clean and used only for cleaning the windscreens. This prevents scratching and further soiling.

Should dirt not be able to be removed in this manner, a cleaning agent should be applied to the windscreens. It is essential that the cleaning agent does not damage Makrolon® or Plexiglas®. The cleaning agent used must be suitable for cleaning synthetic and Plexiglas® windscreens (read label!) and may not contain any solvents or abrasive components. Suitable cleaning agents are available from the ISC / ITB or directly from COMCO IKARUS GmbH.

3.3 Glass-fibre components

Normal plastic cleaning agents which do not damage the gel coat surface may be used to clean all glass-fibre parts.
In addition, glass-fibre components should be polished once a year with a normal car polish to protect the varnish. Products from the sail-plane and caravan sectors are equally suitable.

3.4 Metal parts

All metal parts of the Ikarus C42 are protected against corrosion and thus do not require special care. Should parts become dirty, they can be cleaned using normal metal cleaning agents. A thin wax or grease film on the electro-galvanised steel parts increases corrosion protection, particularly in older aircraft.

3.5 Cockpit and instruments

The sealing of the cockpit doors should be regularly coated with a rubber care product or vaseline, particularly during winter operation.
The cockpit and the instruments may be cleaned with a cockpit spray from the automobile sector (adhere to cockpit spray instruction). Sensitive surfaces such as instrument glass and displays should be cleaned carefully with a micro-fibre cloth, applying little pressure and very little liquid (a damp cloth suffices).

3.6 Movable connections, particularly in the flight controls

The movable connections installed in the C42 are more or less subject to wear and tear, depending on use. For example, abrasion may be identified through a growing play in the flight controls, through a "rattle" in the landing gear or through increasing noise in the cockpit during flight.

Proper assessment of increasing play or wear is made difficult by the fact that such changes occur only very slowly under normal flight operations and may be regarded as "normal" for a long time. An operator can do a lot himself to reduce or indeed prevent wear and tear.

Individual joints, journal bearings and bolt connections should be regularly leached with benzine or another grease-solvent and then freshly greased. It is usually not necessary to dismantle the joints.

Various brake cleaning agents and grease sprays containing PTFE have proven to be suitable for such work. The latter have the advantage of combining good creeping abilities with dry lubrication characteristics and of preventing the attraction of dust and dirt.

The following connections should be treated regularly:

- rod ends on the torsion tube under the control stick
- rod ends on both elevator push-rods
- brass bushing in the torsion tube, directly under the control stick
- journal bearing in the elevator lever arm (Glykodur bushings)
- journal bearing of the aileron quadrant in the upper cockpit area (Glykodur bushings)
- quick-releases of the aileron push-rods in the upper cockpit area
- journal bearing in the aileron lever arm in the wing (Glykodur bushings)
- rod ends on the aileron push-rods (long, short)
- bolt connections of the short aileron push-rods at the ailerons
- journal bearing of the rudder pedals (Glykodur bushings)
- rod ends on the rudder push-rods to the nose wheel
- bearings of the pulleys for the aileron cables in the upper rear cockpit
- swivel bearings of the wing flap push-rods
- all cotter pin connections on all control surfaces as well as the trim tab bolts
- all swivel bearings and bolt connections at the main landing gear

4 Servicing the C42

4.1 General maintenance information

This chapter contains all the important information and regulations concerning the handling and maintenance of the Ikarus C42. It is essential that you read this chapter before undertaking any maintenance or repair work.

4.1.1 Safety elements

As customary in aircraft manufacturing, all connections in the C42 are safetied in one way or another. The following safetying elements are to be found in the C42:

- Self-locking nuts
    - with plastic insert
    - Cleveloc nuts (in hot areas)
- Safety rings
    - main bolts
    - drilled bolts
- Safety pins (e.g. rod ends)
- Safety wire (e.g. screws in engine compartment)
- Locking plates (torsion tubes, flight controls)
- Loctite (e.g. blind thread bore-holes)
- Cotter pins (e.g. connections with castle nuts)

4.1.2 Screw connections

Screw connections of various dimensions are to be found in the C42. This construction is typical for Ikarus aircraft and has the advantage of allowing damaged parts to be easily and economically replaced. The screws are usually made of stainless steel in accordance with the standard DIN A2-70. High-strength, electro-galvanised standard screws (e.g. 8.8) are used for highly-stressed connections.

Rules for handling the screw connections of the C42:

- When connecting aluminium elements, ensure that appropriate washers are fitted under the nuts.
- To allow the further use of DIN standard measurements, in some cases several washers are used. At highly-stressed points, this procedure ensures that only the bolt shank carries the load in the boreholes. For this

reason, the same type of screws must be installed in the same way during maintenance and repair work!

- For safety reasons, all self-locking nuts (plastic or Cleveloc) may only be used once.
- Since screws and nuts, and particularly those made of stainless steel tend to stick, machinery grease must be used during assembly.
- At least two turns of thread of the screw must be visible outside the nut to ensure a proper safety function.
- Generally, the screws are installed from top to bottom and from front to back. In some places, however, this is not possible due to design and/or assembly reasons. The installation method found in the aircraft must always be maintained.
- For compact screw connections, the usual torque values used in mechanical engineering must be used (e.g. M8 → 25 Nm; M6 → 12 – 15 Nm).
- Exceptions are the screw joints of aluminium tubes. Although plastic shoes are used, the tubes would buckle beyond limits. In these cases the screws may only be torqued up to an elastic strain of a maximum of 3% of the tube diameter.
- In the case of screw connections with plastic parts, large over-sized washers are used for better induction of the load. When repairs are done on such parts, these washer must be employed again.
- If blind thread boreholes are used instead of nuts in screw connections, safetying is either done by using lock washers (e.g. propeller bolts of WarpDrive propellers), locking plates (e.g. torsion tube) or in a lot of cases anaerobic screw safetying fluid (e.g. Loctite medium).
- Safety washers may only be used once. To ensure proper protection against corrosion, only stainless steel washers are used.
- In the C42 counter nuts are also used as a means of securing screw connections. Especially when used in the control system, counter nut safetying permits adjustments to control surfaces and flap lever arms. Red safety varnish secures the nuts further and also allows a quick visual inspection.
- Screws which have been secured with Loctite and then loosened must be cleaned thoroughly before being used again (Loctite cleaning spray) to ensure that the screw connection remains secure when Loctite is applied again.

4.1.3 Welded joints

There are relatively few welded joints in the C42. For example, the canopy roof frame is a welded aluminium structure. Further welded connections are to be found on the elevator control horn and the wing root rib. Welded joints are also located on the double cross member installed in the C42CS.

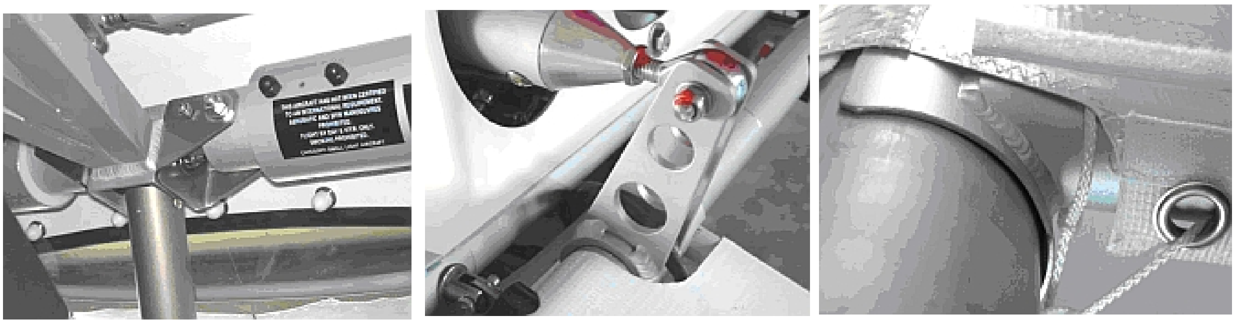


Figure 54: Welded joints

During normal flight operations, these joints usually do not pose any problems. However, the joints should be examined in detail after hard landings, collisions of the wings with obstacles or similar accidents.

A visual check of the connection points for deformation and cracks at the weld seam suffices (in case of doubt with the help of a magnifying glass). A typical sign of excessive strain of components is a visible alteration to the anodic coating. In such areas the anodic coating appears brighter and has numerous small cracks.

Experience has shown that the welded joints in the landing gear (axle stubs, nose gear) are so robust that during crash landings deformation of the steel parts is more likely to occur than damage to the weld seams.

Finally, it is emphasised that welding repairs, particularly to aluminium components is not allowed. Only original spare parts may be used.

4.1.4 Rivet connections

Many of the permanent connections in the C42 take the form of rivet connections. This is particularly the case in the fuselage tube, engine mount and cross beam. Here, mainly special blind rivets (e.g. Magna Bulb - brand name) are used.
These special blind rivets are characterised by large breakstems, great axial contact pressure and a very high shear strength.

Figure 55: Rivet connections on the engine mount

To ensure that all these conditions are fulfilled, it is paramount that the correct type of rivet with the correct grip length be used. We, therefore, urge everyone to use only original spare parts. Rivets that are pulled with ordinary hand tools, such as blind rivets offered in normal DIY shops, cannot replace these special rivets.

In secondary structures with low strength requirements, however, simple blind rivets made of aluminium alloy or steel are used. Simple hand tools available from good hardware shops can be used to pull this kind of rivet.
A special application for blind rivets is the windscreen attachment. Here very light and soft blind rivets with large heads are employed (3.2 mm diameter).
When mounting the windscreen care must be taken that the bore holes in the windscreen material have a diameter of 3.3 - 3.4 mm to prevent star-like cracking under the rivet head.

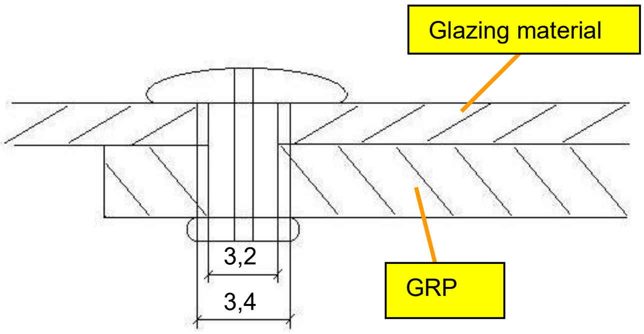


Figure 56: Glazing rivet joint

4.1.5 Propeller

Any defect propeller parts must be replaced by new parts. Only original spare parts may be used.
In the case of composite propellers, even slight damage to the surface can have grave effects on strength properties and thus safety. If cracks go deeper than the outer surface, propeller strength is reduced and humidity can seep into the structure which can result in propeller imbalance.

It is thus very important that the propeller be checked before each flight. If in doubt, contact an expert.
Propeller imbalance is usually the cause of vibration in flight. In this case, the propeller should be checked for proper tracking and setting by an ISC / ITB.

4.2 Pre-flight check

Before beginning flight operations, the pilot in command must carry out a visual inspection of the aircraft. The relevant check points are also listed in the aircraft flight manual.

<u>Power plant:</u>

1. Check propeller for damage and security of spinner.
2. Check the cowling in the vicinity of the propeller for scratches (this is a sign of improper engine suspension or cowling attachment).
3. Check for signs of leaking under the engine cowling.
4. Check coolant and lubricants.
5. Check security of engine cowling.
6. Check that the coolers are clean (water cooler and oil cooler, if appropriate)
7. Coolant vents clear of obstructions
8. NACA inlet clear of obstructions (C42 B / C / E)

<u>Landing gear:</u>

1. Check security of all parts (wheel pants, brake cylinder, brake discs)
2. Check for visible deformation
3. Check air pressure in the gas dampers (aircraft aligned straight; compress landing gear by pushing aircraft down and release again, gas dampers must return to their fully extended position)
4. Check pressure and condition of tyres
5. In the case of CS main gear, check the swingarm for visible damage (cracks, detachments).

Left wing:

1. Check that the wing spar connections are secure
2. Check that wing struts are properly connected and secure.
3. Check that auxiliary struts with quick-release fasteners are secure
4. Check that airspeed indicator pick-up is secure, free from dirt and water and pulled out
5. Check the aileron bell cranks and push-rods. To do this, open the zips on the underside of the wings
6. Check condition of covering (cracks, etc.)
7. Check that the profile struts are secure
8. Check wing tip and wing tubes for deformation
9. Check aileron and wing flap attachment and connections

Left fuselage:

1. Check condition of glass-fibre fuselage shell (cracks, holes, etc.)
2. Check that glass-fibre fuselage shell is secure (check for missing screws at the upper-/underside slice)
3. Check elevator direction changer through inspection hole on the side of the fuselage (baggage bin)

Empennage:

1. Check connections of the horizontal tail fins
2. Check control surface hinges (safety devices)
3. Check elevator inter-connection
4. Check trim tab attachment and connections
5. Check elevator push-rod connection
6. Check attachment of horizontal tail struts for deformation
7. Check rudder inter-connection
8. Check rudder cable connections and safety devices
9. Check covering for cracks and chafing

Right fuselage:

1. Check condition of glass-fibre fuselage shell (cracks, holes, etc.).
2. Check that glass-fibre fuselage shell is secure (check for missing screws at the upper-/underside splice)
3. Check that the tank filler cap is tightly closed

Upper fuselage:

1. Check that the antenna is secured

Right wing:

Cf. left wing

Cockpit:

1. Check condition of windscreens and doors, including the locks (cracking)
2. Check controls for freedom of movement (control stick, pedals, wing flap lever and detent)
3. Check brake lever and standard detent
4. Check aileron lever arm connections and safety device
5. Visual check of aileron cables and pulleys
6. Check fuel valve - position "ON"
7. Drainage (under the right seat)

Instruments:

1. Electricity supply (ignition switch in position 1)
2. Altimeter setting
3. Amount of fuel
4. Functionality of radio and intercom systems
5. Transponder

4.2.1 Periodic inspections

Aircraft type: ____________________ Date of inspection: __________________

Call-sign: ____________________ Serial no.: __________________

No. of flight hours ____________________

No.	**Description**	**Inspection**		**Ref. Chapter**	**Signature**
		every 50 hours	**every 100 hours**		
1	Clean the aircraft	**x**	**x**	3	
	Engine cowling				
2	Check condition of engine cowling and its attachments; repair damage as required	**x**	**x**		
	Engine				
3	Maintenance in accordance with Rotax manual	in accordance with Rotax manual			
	Engine compartment				
4	Visual inspection of integrity of fire protection mats: - at the fire wall - at the push-rods for the nose wheel steering	**x**	**x**		
	Engine mount				
5	Check condition of engine mount, particularly the rivet connections and attachment screws; check security of screws	**x**	**x**		
6	Visual inspection of integrity of heat-resistant silicon sealings at the transitions: - engine mount - fuselage tube - engine mount - nose wheel spar - nose wheel spar - fuselage tube - fuselage tube - A column	**x**	**x**		
7	Visual inspection of engine damper blocks for porosity, excessive deformation, cracks, etc.; if necessary, replace affected blocks (the engine must not be removed)		**x**		
	Carburettor				
8	Visual inspection of carburettors, especially: - air filter connections - fuel line connections - equalising line connections - attachment of throttle cables - attachment of choke cables	**x**	**x**		
9	- check carburettor supports for cracks		**x**		
10	Check Bowden cables at their exit at the adjustment screws for wear and grease them; adjust if necessary (synchronisation)	**x**	**x**	4.3.1.1	
11	Check condition and attachment of air tubes between carburettor and induction system (pressure sensors in the air filters)	**x**	**x**	4.3.1.2	

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
	Induction system				
12	Check condition and attachment of the induction system hoses (C42 B / C / CS / E only) and air filter attachment (C42 A), respectively	x	x		
13	Check condition of air filters and clean as required *Note:* The air filters in the C42 B / C / CS / E are located in the induction system hoses between the air plenum and the carburettor. The induction system hoses must be dismantled in order that the air filters may be inspected and serviced.		x		
14	Check carburettor heating air flap (C42 B / C / CS / E only) for freedom of movement	x	x		
	Fuel system				
15	Visual inspection of connections and hoses for integrity, condition (porosity), leaking and secure attachment	x	x		
16	Visual inspection of tank for leaking	x	x		
17	Check tank for inner cleanliness; clean as required		x	4.3.2.1	
18	Check tank ventilation is free of obstacles (blow through)	x	x		
19	Check fuel filter for dirt; replace, if necessary	x	x		
20	Check electrical fuel pump for - secure fitting of the cable connections - secure fitting/leaking of line connections - every 300 hours, check flow capacity	x	x	4.3.2.2	
21	Check fuel valve for freedom of movement	x	x		
	Cooling system				
22	Visual inspection of cooler condition and check for leaks	x	x		
23	Visual inspection of condition of heat exchanger and check for leaks (C42 B / C / CS / E only)	x	x		
24	Check cooling system for leaks	x	x		
25	Visual inspection of condition, porosity and secure attachment of hoses; if necessary, replace damaged hoses and attachments and loose clamps	x	x		
26	Check that the correct amount of coolant is in the reservoir; if necessary, fill up with coolant	x	x		
27	Check coolant for oil; if applicable, find out and eliminate the cause	x	x		
28	Coolant change in accordance with Rotax maintenance manual	in accordance with Rotax manual			
	Oil system				
29	Check condition of oil cooler and for leaks (C42 A only)	x	x		
30	Visual inspection of condition of heat exchanger and check for leaks (C42B / C / CS / E only)	x	x		
31	Check oil tank for amount of oil, condition, leaks and attachment	x	x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
32	From construction year 2005: visual inspection of condition and attachment of overflow tank (to firewall); empty if necessary	x	x		
33	Oil and oil filter change	in accordance with Rotax manual			
	Exhaust system				
34	Check condition of attachment springs and that none are missing	x	x		
35	Check mufflers and manifold for damage, in particular for cracks in the weld seams; if necessary, repair at a specialist workshop	x	x		
PLEASE NOTE: Every 500 hours the exhaust pipes connected to the silencer on the right side have to be dismantled and the condition of the pipe inside the silencer has to be checked concerning any deformations using a lamp.					
36	Check exhaust shroud for secure fitting; if necessary, tighten straps	x	x		
	Heating				
37	Visual inspection of heating tube in the engine compartment (red tube) and in the cockpit (silver aluminium tube under the instrument panel) for deformation, proper attachment and condition	x	x		
38	Check condition and functionality of heating valve	x	x		
	Propeller				
39	Service according to the relevant instructions from COMCO IKARUS GmbH	in accordance with COMCO IKARUS GmbH instructions			
40	Check torque moment of propeller screws in accordance with propeller manual		x		
	Propeller blades				
41	Check for abrasion and damage, check condition of propeller tips and leading edges; repair in accordance with COMCO IKARUS GmbH instructions	x	x		
	Spinner				
42	Visual inspection for damage	x	x		
43	Check secure fitting of all attachment screws and that none are missing	x	x		
	Hub				
44	Check hub for damage, in particular for cracks and check condition and secure fitting of attachment screws (spinner must be removed)		x		
45	Check spinner plate for cracks near the adapter	x	x		
46	Check propeller clearance (ground, cowling)	x	x		
47	Check propeller pitch control mechanism in accordance with COMCO IKARUS GmbH instructions (only if a variable pitch propeller is installed)	in accordance with COMCO IKARUS GmbH instructions			
	Nose wheel landing gear				
48	Check nose gear fairing for secure fitting and damage; repair or replace as required	x	x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
49	Check wheel pant and wheel pant bracket for secure fitting and damage; repair or replace as required	x	x		
50	Check attachment of nose wheel spar to fuselage tube; check screws in and under the engine mount for secure fitting		x		
51	Check nose wheel fork for deformation and other damage		x		
52	Check suspension rubber boots for damage, porosity, etc. (year of construction before 2003)	x	x		
53	Check functionality and condition of damping spring (year of construction before 2003)	x	x		
54	Check functionality and condition of rubber spring elements above and below nose wheel spar (year of construction 2003 and younger); check particularly for cracks, porosity, deformation; replace as required		x		
55	Check nose wheel fork for play and freedom of movement in direction of rotation and compression	x	x		
56	Check steering rods, joints, push-rods and links of the floor pedals of the nose wheel steering for secure fitting, damage and abrasion	x	x		
57	Clean, grease and secure rod ends of the pedal controls at the pedals and steering rods		x		
58	Check axial attachment screw of the nose wheel fork for secure fitting		x		
59	Grease both journal bearings in the nose wheel spar with a grease press via upper and lower grease nipples		x	4.3.3.1	
	Tyres				
60	Check tyre for damage, uneven wear, age and tread; replace as required	x	x		
61	Check tyre pressure; adjust appropriately	x	x		
	Wheel rim				
62	Check for damage, deformation, cracks; replace if necessary	x	x		
63	Check condition of valve	x	x		
64	Check wheel bearings for play and freedom of movement	x	x		
	Main landing gear				
65	Check main landing gear fairing for secure fitting and damage; repair or replace as required	x	x		
66	Check wheel pants and wheel pant brackets for secure fitting and damage; repair or replace as required	x	x		
67	Check cross beam for damage and deformation (visual inspection of beam); check screw connections between fuselage fittings and cross beam for secure fitting (visual inspection under the seats)		x		
68	Check rivet connections between cross beam and joists		x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
69	Check axle tubes (swing axles) for damage and secure fitting; check connections and bearings, in particular plastic spacers between the joists on the cross beam	x	x		
70	Check condition of trailing arm for damage, secure fitting and freedom of movement of the rod ends	x	x		
71	Check condition of spar struts for damage and secure fitting (inspection through baggage bin)	x	x		
72	Check shock absorber rubber boots for damage and porosity; replace as required	x	x		
73	Check functionality, condition and attachment of shock absorbers; pressure check		x	4.3.3.2	
	Tyres				
74	Check tyres for damage, uneven wear, age and tread; replace as required	x	x		
75	Check tyre pressure, adjust appropriately	x	x		
	Wheel rims				
76	Check for damage, deformation and cracks; replace if necessary	x	x		
77	Check condition of valves	x	x		
78	Check wheel bearings for play and freedom of movement	x	x		
	Brakes				
79	Check braking function	x	x		
80	Check attachments of lines to main landing gear	x	x		
81	Check brake system in its entirety for damage and leaks; repair leaks, fill up with brake fluid and ventilate system as required		x	4.3.4.1	
82	Check proper attachment of lines to the brake lever and the brakes	x	x		
83	Visual inspection of brake pads, check for uneven, asymmetrical wear or reaching wear limit; replace pads if necessary	x	x	4.3.4.2	
84	Check brake discs for wear and true running; replace as required		x		
	Wing				
85	Check wing tips/winglets for damage; repair or replace as required	x	x		
86	Visual inspection of covering for any kind of damage and integrity of seams; repair if necessary	x	x		
87	Check wing attachments for play. Move the wing tips up and down and back and forward; if necessary, tighten the M8 attachment screws on the U fittings of the wing attachment (25 Nm)	x	x		
88	Check wing struts and auxiliary struts for damage and secure attachment	x	x		
89	Check wing battens; repair or replace any damage battens	x	x	4.3.5.1	

No.	Description	Inspection every 50 hours	Inspection every 100 hours	Ref. Chapter	Signature
90	Check the diagonal cables for correct tension Note: This inspection can be done through the open zips of the wing covering and from the cockpit through the wing-fuselage junction	x	x		
	Ailerons				
91	Visual inspection of the condition of the ailerons	x	x		
92	Check ailerons for freedom of movement	x	x		
93	Check condition, secure fitting, play and security of the aileron hinges (fork joints), in particular wear of the eye-bolts and bolts	x	x		
94	Clean, grease and secure fork joints		x		
95	Check aileron control horn for damage, secure fitting and security	x	x		
96	Check attachment of aileron rod: - control stick - torsion tube - axial screws on the front and rear bearings of the stick-torsion tube for secure fitting of the screws and their safety pins - pulleys: condition, attachment and bearings - aileron quadrant at canopy roof frame: attachment and bearings - pulleys in the wings: attachment and bearings		x		
97	Check condition of aileron rod ends: - torsion tube front and rear - aileron quadrant - aileron control rod, long – direction changer - aileron control rod, short - control horn – direction changer	x	x		
98	Clean, grease and secure rod ends and check for play		x		
99	Check security of aileron push-rods short/long	x	x	4.3.5.2	
100	Check quick-release fittings of the aileron push-rods at the aileron quadrant for freedom of movement and secure closure	x	x		
101	Check aileron cables, thimbles and swaged grommets for damage and secure attachment		x		
102	Check cable tension of the aileron quadrant; if necessary, adjust using eccentric wheel	x	x	4.3.6.1	
103	Check aileron quadrant and lever arms in the wing for freedom of movement and security; if necessary, wash out the journal bearings and grease		x		
	Wing flaps				
104	Visual inspection of the condition of wing flaps	x	x		
105	Check condition, secure fitting, play and security of wing flap hinges (fork joints), in particular wear of the eye-bolts and bolts	x	x		
106	Clean, grease and secure fork joints		x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
107	Check functionality, freedom of movement and play in the controls	x	x		
108	Check fitting of sliding sleeves on the flap spar; sliding sleeves and spars must fit exactly into each other	x	x	4.3.6.2	
109	Loosen the sliding sleeves and check for wear; clean and grease as required		x		
110	Check the spring-loaded locks at the sliding sleeves for proper form fit (they must positively lock at the front and rear end of the tubes)	x	x		
111	Check spring-loaded locks freedom of movement		x		
112	Check the wing flap steering rod for damage and secure fitting	x	x		
113	Check condition of swivel heads of connections: steering lever - wing flap push-rods - actuator lever	x	x		
114	Clean, grease and secure swivel heads and check for play		x		
115	Check secure fitting and functionality of wing flap link and actuator lever Note: The detents in the flap track tend to enlarge with time; if the flap lever shows significant play in one of the detents the flap track must be replaced	x	x		
116	Grease the flap tracks		x		
	Fuselage				
	Frame				
117	Check metal frame (fuselage tube, A/B/C columns, canopy roof frame, struts, fittings, etc.): - screw connections - rivet connections - welded connections - joints - deformations	x	x		
ATTENTION: Reference to SB-42-022-2019: In case of damage history and/or more than 2000 operating hours (see SB-42-022-2019), the inner surface of the A-strut at the junction to the upper main tube mount shall be inspected with an endoscope every 300 hours.					
	Skin				
118	Check condition of all glass-fibre and carbon-fibre shells, fairings and cowlings for damage, cracks, deformation, etc.; repair or replace any damaged elements	x	x		
119	Check functionality of fuselage shell attachments and that none are missing	x	x		
120	Check proper attachment of mounted parts such as antennas, etc.	x	x		
121	Check rubber sealing around the opening of the ballistic recovery system	x	x		
122	Check proper functioning of the Camloc locks in the baggage bin cover	x	x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
	Towing mechanism (if installed)				
123	Maintenance in accordance with the appropriate documents (tow hook E85)	in accordance with COMCO IKARUS GmbH instructions		operating manual	
124	Check Bowden cable for freedom of movement and damage near the release lever and near tow hook; this check should be carried out before every flight	x	x		
125	Check release force at the release lever when the tow hook is unloaded (< 13 daN); this check should also be carried out every 200 tows		x		
126	Clean and grease Bowden cable at the adjustment screws near the release lever and the tow hook; this check should also be carried out every 200 tows		x		
	Doors and windscreen				
127	Check the front door attachment bolts for cracks near the attachment screws	x	x		
128	Check seals for damage and porosity	x	x		
129	Check glass for cracks, scratches; repair or replace damage elements as required	x	x		
130	Check condition and functionality of cabin locks	x	x		
131	Check condition and functionality of ventilation window	x	x		
	Empennage				
	Horizontal tail				
132	Check condition of horizontal tail struts and for secure fitting	x	x		
133	Visual inspection of the condition of the horizontal tail fin and of the elevator	x	x		
134	Check horizontal tail fin for secure fitting	x	x		
135	Visual inspection of safety screws in the horizontal tail fin attachment	x	x		
136	Check condition, secure fitting, play and security of elevator hinges (fork joints), in particular wear of the eye-bolts and bolts	x	x		
137	Clean, grease and secure fork joints		x		
138	Check elevator control horn for damage, in particular for cracks in the welded connection, and for secure fitting	x	x		
139	Check freedom of movement of the elevator	x	x		
140	Check condition and freedom of movement of the elevator push-rod rod ends; with the elevator in full deflection, check counter nuts for secure fitting	x	x		
141	Check counter nuts for proper torque and that they are properly installed	x	x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
142	Clean, grease and secure rod ends and check for play; tighten and secure the counter nuts with Loctite; secure rod end with counter nut		x		
143	Check condition, security and attachment of elevator direction changer (on top of fuselage tube); in particular, check screws in the bearing block, fittings and rivets; observe service bulletin	x	x	4.3.6.3	
144	Check elevator direction changer for security, wear and freedom of movement; wash out and grease journal bearings		x		
145	Check attachment of push-rod to control stick	x	x		
	Trim tab				
146	Check trim tab functionality and lever arm (cf. setting data)	x	x		
147	Visual inspection of condition and attachment of tab, control horn and control rods Note: The bearing "rod-control horn" used in the design prior to 2004 can wear out. Retro-fit new construction as required	x	x		
	Electrical trim tab				
148	Check functionality and the connections for secure fitting (insofar as they are accessible, cf. circuit diagram)	x	x		
	Mechanical trim tab				
149	Check function, condition and attachment of the Bowden cable; if stiff, oil using an injection syringe or replace	x	x		
150	Check counter nuts of the Bowden cable adjusting screws	x	x		
	Vertical tail				
151	Visual inspection of the condition of vertical tail fin and rudder	x	x		
152	Check vertical tail fin for secure fitting	x	x		
153	Check guide bushing of forward and aft vertical tail attachment in fuselage tube for play; replace, if necessary		x		
154	Check condition of rudder hinges (fork joints)	x	x		
155	Clean, grease and secure fork joints and check for play		x		
156	Check freedom of movement of rudders	x	x		
157	Check cables and Bowden cables for secure attachment, correct routing, damage, wear and tension; adjust and grease as required	x	x		
158	Check counter nuts of the Bowden cable adjusting screws	x	x		

No.	Description	Inspection		Ref. Chapter	Signature
		every 50 hours	every 100 hours		
	Interior/Cockpit				
	Battery				
159	Visual inspection of wires, connections and wire routing for integrity and security insofar as accessible	x	x		
160	Visual inspection of attachment	x	x		
161	Check that battery is charged, recharge if necessary	x	x		
	Instrument panel				
162	Check condition and attachment of instrument panel (attachment clips)	x	x		
163	Check attachment of each individual instrument	x	x		
164	Check functionality of control elements: - choke - cabin heating - carburettor heating	x	x		
	Pitot-static pressure system				
165	Visual inspection of condition and attachment of pitot tube on the left wing	x	x		
166	Check system for leaks	x	x	4.3.8	
	Flight controls				
167	Check control stick attachment	x	x		
168	Check control stick for freedom of movement	x	x		
169	Check throttle for freedom of movement and sufficient friction	x	x	4.3.6.4	
170	Check Bowden cables for freedom of movement; grease if necessary	x	x		
	Pedal assembly				
171	Check condition and attachment of pedals (in particular, check for deformation and the condition of the welded connections)	x	x		
172	Check attachment and security of push-rods and control cables				
173	Check pedals for freedom of movement				
	Seats				
174	Check seats for damage	x	x		
175	Check condition and attachment of safety belts, check functionality of belt locks	x	x		
	Other				
176	Check attachment of the side panelling of the centre console (thread-forming self-tapping screws, M3 screws and attachment clips)	x	x		
177	Check that placards are legible and none are missing	x	x		
	Engine test run in accordance with Rotax operating handbook				
	Test flight				

4.3 Maintenance instructions

4.3.1 Engine compartment

4.3.1.1 Synchronising the carburettors

Synchronising the carburettors may either be done by pneumatic synchronising or by mechanical synchronising. For pneumatic synchronising two manometers are required. No special tools are required for mechanical synchronising.

The procedures are described in the Rotax maintenance manual.

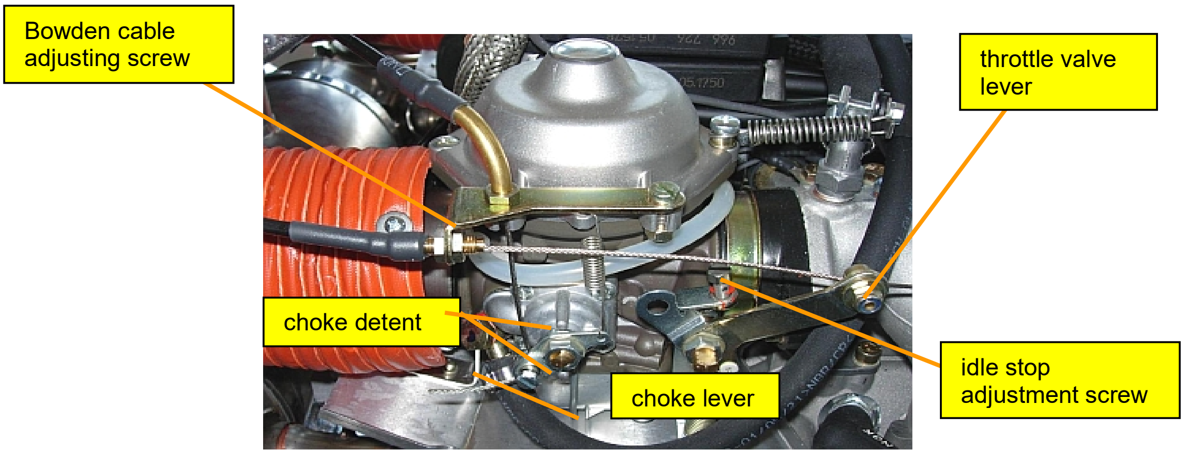


Figure 57: Carburettor

A simple mechanical method is described here:
Pre-requisite: The throttle valve stop screws must be synchronised.

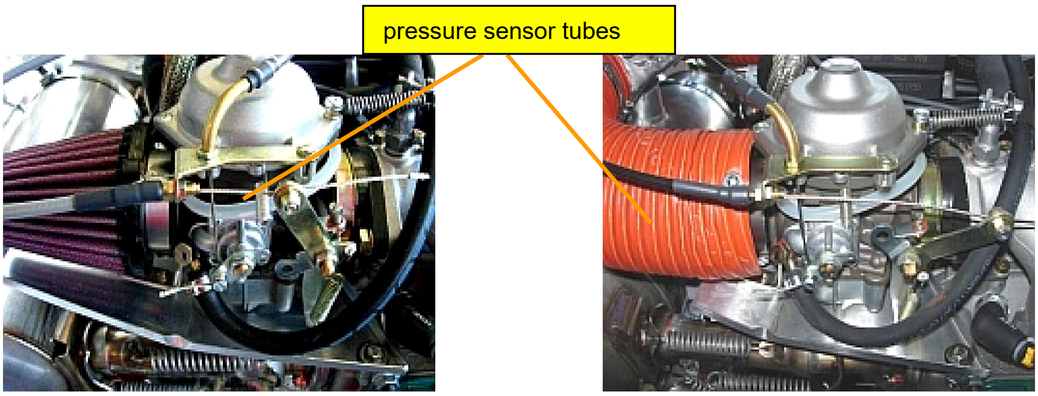
- Set the throttle to idle and then open the throttle until there is approx. ½ -1mm play on one of the two throttle valve levers (check play by moving the throttle valve lever by hand).
- Try to move the throttle valve lever of the 2nd carburettor by hand applying the same force.
- Both throttle valve levers should have the same amount of play.
- Adjust play as required with the Bowden cable adjustments nuts (SW9).

During the first 50 operating hours in particular, the Bowden cables and sleeves tend to "set" so that the correct settings carried out in the factory may change noticeably.

Note: The throttle valve levers should reach their stop simultaneously when the throttle levers in the cockpit are approx. 5 mm in front of the pilot seat. An inadmissible force on the carburettors is thus averted (stop).

4.3.1.2 *Inspection of air hoses between the carburettors and the air filters*

The pressure sensor hoses must be checked for damage, general condition and secure fitting.



C42 /C42 UK **C42B / B UK / C / E**

Figure 58: Hoses between air filters and the carburettors

Pressure pick-up occurs at different points in the C42 / C42 UK and C42B / B UK / C / E. In the former case, pressure pick-up is inside the air filter whereas in the case of the C42B / B UK / C / E it is outside the filter.

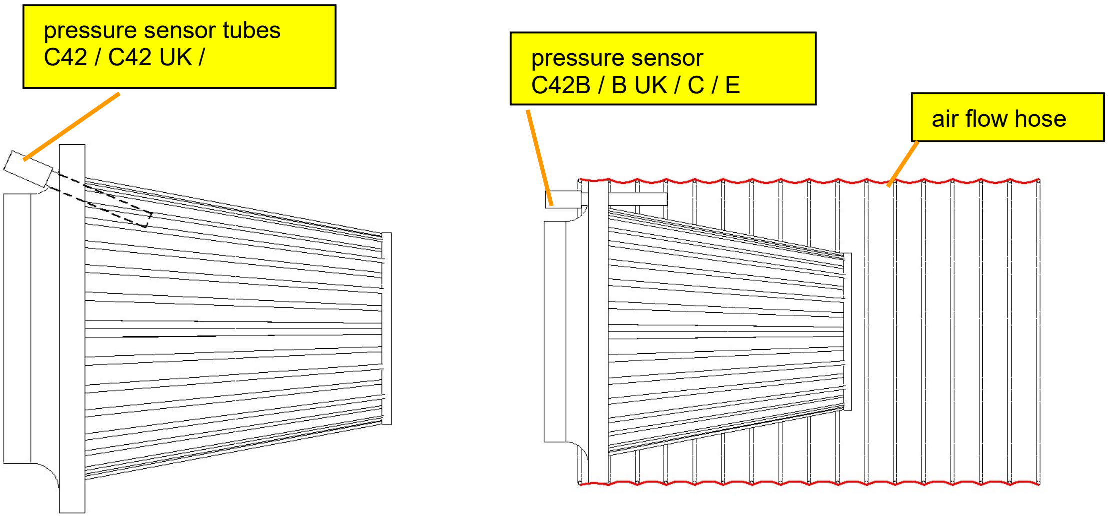


Figure 59: Schematic depiction of carburettor pressure sensors

4.3.2 Fuel system

4.3.2.1 Checking cleanliness in the fuel tank

First, the tank must be emptied. With the help of a torch, the tank is then screened from the outside. Dirt usually collects in the sump. If contamination is found, the tank can be washed out with methylated spirits. This work should be carried out by an ISC / ITB. In case of doubt, the tubular-type fuel level sensor should be removed and the tank interior screened with a torch.

Attention: The screw patterns of the tubular-type sensor attachment screws is not symmetrical - mark positions with a felt pen before removing.

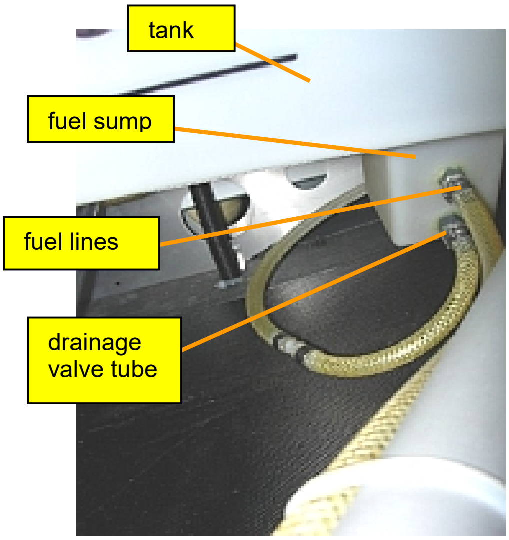


Figure 60: Fuel sump

4.3.2.2 Checking the electrical fuel pump

To check the output of the electrical fuel pump, the fuel hose must be removed from the mechanical fuel pump (with the engine shut down). The hose end is placed in a measuring beaker. The fuel valve is then opened and the electrical fuel pump switched on. At full throttle, fuel flow into the measuring beaker must reach at least 125% of declared engine consumption.

<u>80 hp engine:</u>
Consumption: 24 litres/hour which means a fuel flow of 30 litres/hour or more than 500 millilitre/minute

100 hp engine:
Consumption: 27 litres/hour which means a fuel flow of 33.75 litres/hour or more than 562 millilitre/minute

4.3.3 Landing gear

4.3.3.1 Greasing the nose wheel fork bearing

The nose wheel fork bearing in the nose wheel spar must be greased. Using a grease gun, grease is pressed in via the grease nipples above and below the nose wheel spar.

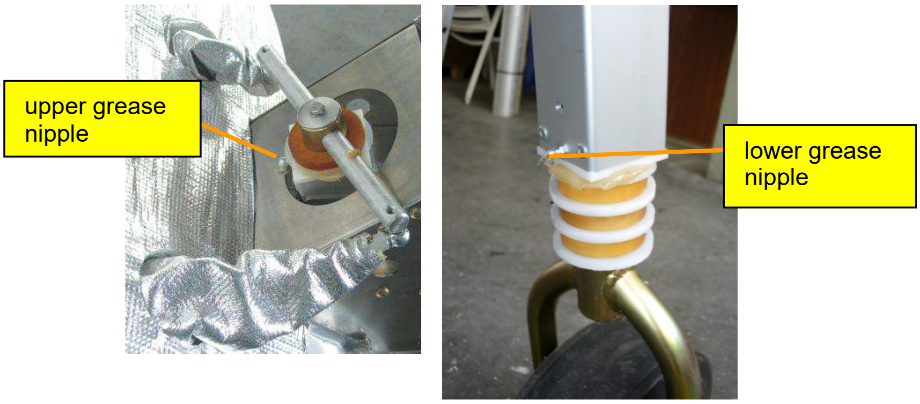
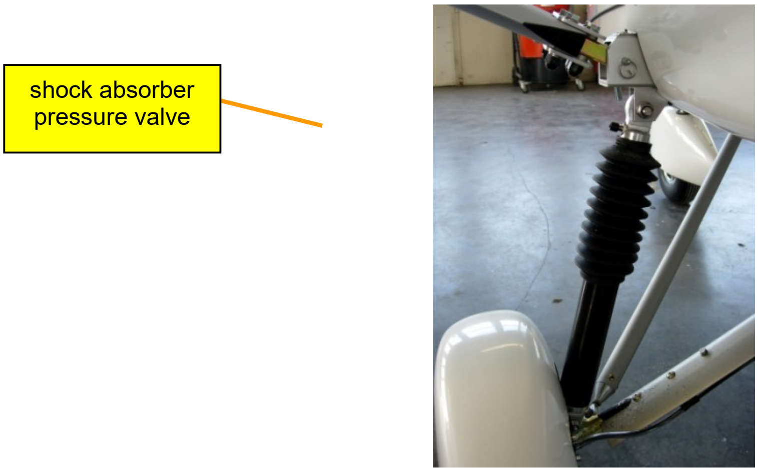


Figure 61: Grease nipples, nose wheel landing gear

4.3.3.2 Checking and setting the shock absorbers

The spring stiffness of the main landing gear can be adjusted via the shock absorbers. Air pressure can be adjusted by means of a special high pressure pump. ISC / ITB are equipped with such a pump. It can also be ordered from COMCO IKARUS GmbH, part number 01798.

air pressure, shock absorber: ....28,0 - 34,0 bar ....400 - 490 PSI
amount of oil:...200 ml
hydraulic oil:.. HVP 10



Attention: Do not use a standard automobile air pump.

Figure 62: Shock absorbers

4.3.4 Brakes

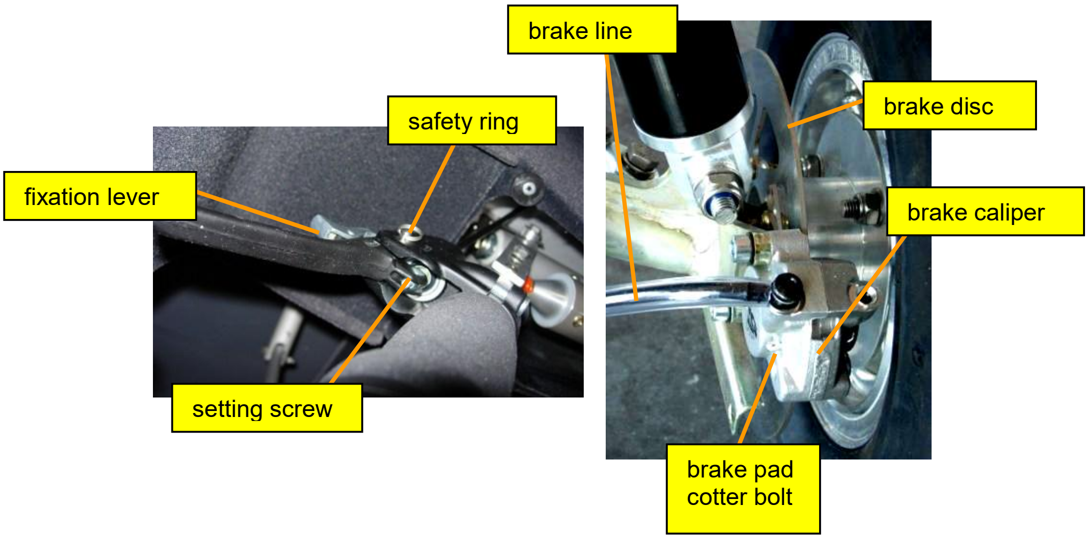


Figure 63: Brakes

4.3.4.1 Replenishing brake fluid

1) Remove safety ring from brake lever, pull out the cotter bolt and remove the brake lever.
2) Pull the aluminium cup out of the piston using long nose pliers or a small screwdriver.

Figure 64: Removing the aluminium cup

3) Carefully pull out the pressure piston using long nose pliers. Be careful not to damage the grey sealing ring.

Figure 65: Removing the pressure piston

4) Using a syringe (e.g. from the chemist) or a pipette, fill in Magura brake fluid (available from ISC / ITB), until the correct filling level is reached (approx. 1.5 cm below the upper edge of the brake cylinder). Do not use standard automobile brake fluid.
5) Reinstall the pressure piston and the aluminium cup
6) Screw out setting screw completely
7) Remount brake lever, cotter bolt and safety ring
8) Set the pressure point using the setting screw
9) Carry out a functional test of the brakes

4.3.4.2 Changing the brake pads

These instructions are only valid for brakes installed after 2003 (Magura Big).
Brake pads must always be replaced in sets.

1) Remove wheel pant
2) Make sure that the parking brake is released
3) Screw out setting screw
4) Loosen the brake shoe attachment screw, note position of shims
5) Lift up brake shoe. Be careful not to bend, twist or damage the brake line in any way.
6) Remove brake pad holding pin
7) Pull out the brake pads using long nose pliers
8) Insert new pads. If necessary, the brake pistons can be gently pushed apart using a piece of wood or pliers.
9) Insert new brake pad holding pin.
10) Slide brake shoe over brake disc and mount at anchor plate. The brake disc must lie between the brake pads. If necessary, adjust position with the help of shims.
11) Apply brakes
12) Set pressure point using setting screw
13) Check freedom of movement of brake discs in the shoe (lift wing)
14) Carry out functional test

4.3.4.3 Changing the brake discs

The brake discs of the C42 are riveted to the rims by means of an adapter. The rivets can only be removed or set anew using special tools. For this reason, damaged brake discs should always be replaced by an ISC or ITB.

4.3.5 Wing

4.3.5.1 Inspecting and replacing wing battens

Open the zip in the covering and carry out a visual inspection of the batten connections to the wing tubes. Pay particular attention to damage to the eccentric spanner of the upper battens on the rear wing tube.

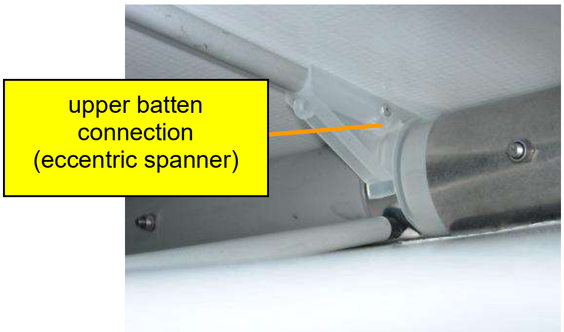


Figure 66: Batten connections (rear wing tube)

The affected battens must be repaired or replaced if a connection is damaged.

<u>Replacing the upper battens:</u>
This work requires some experience and technical skill. Particular attention must be paid to the covering which must not be damaged in any way.

1) Remove the tape or velcro fastening from the relevant batten

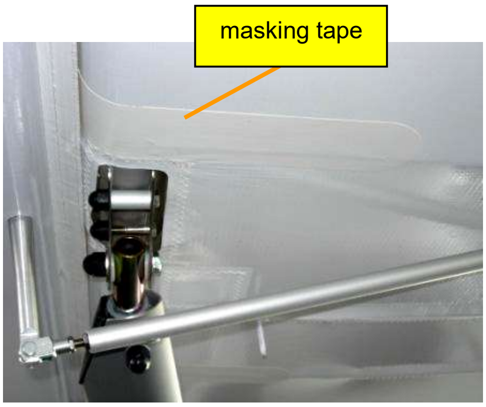


Figure 67: Batten covering on the wing underside

2) Remove batten safety plate by bending it up. A new plate is delivered with a new batten.

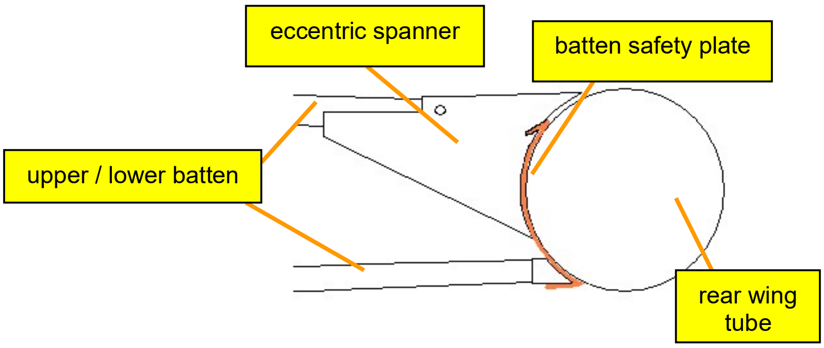


Figure 68: Batten safety plate

3) Pull out the lower batten. Pliers may be used to do this.

4) Pull out the upper batten by loosening the eccentric spanner.

5) Insert new upper batten into the guide of the wing covering until it snaps into the batten seat in the front wing tube.

6) Insert new batten safety plate in the slot provided in the eccentric spanner.

7) Insert the angled batten connection into the batten guide rail.

8) Push in the upper batten until the batten is in its seat at the front wing tube.

9) Tighten the eccentric spanner until the batten lies flat under the wing covering. Press the other side of the wing with your hand to prevent damage to the covering.

10) Push the lower batten into the guide of the wing covering until it touches the front wing tube.

11) Bend/flatten the safety plate around the end of the batten. Be careful not to break the plate.

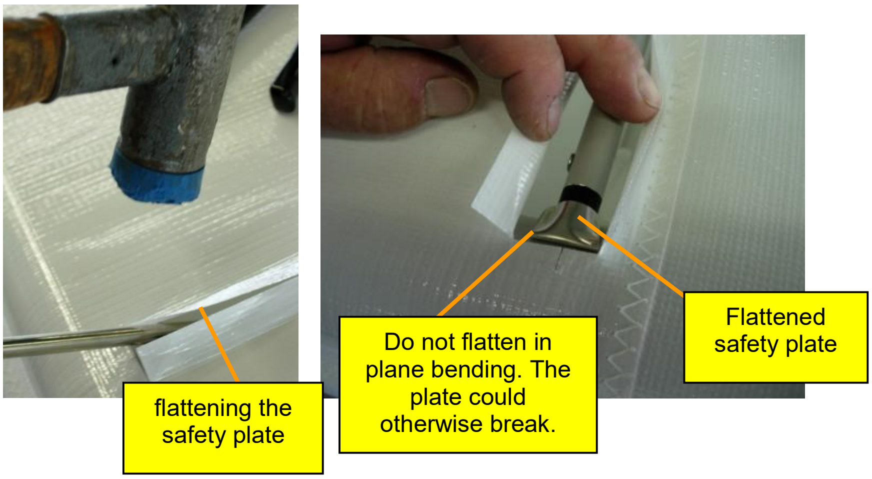


Figure 69: Flattening the safety plate

12) Clean and degrease the covering where the masking tape is attached.
13) Reattach tape.

4.3.5.2 Checking the security of the aileron push-rods

Safety pins are used to secure the rod ends. These can be visually inspected or felt through the zip openings.

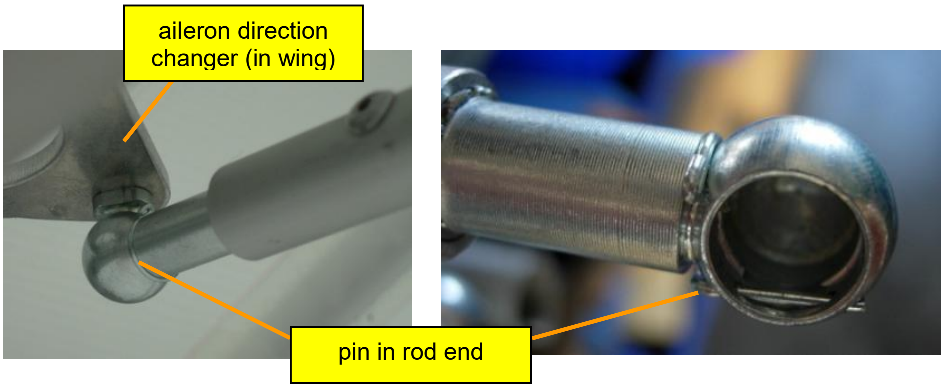


Figure 70: Safety pin at aileron push-rod drive lever

4.3.6 Flight controls

4.3.6.1 Adjusting the cable tension of the aileron control system

If the ropes are not sufficiently tensioned, they must be tightened. The attachment screw of the aileron quadrant must first be loosened slightly. The eccentric disc can then be turned by a sharp-edge screwdriver and a small hammer so that the aileron quadrant axle can be pushed forward in the oblong hole. The tension of the aileron cable is thus tightened. When the correct tension is reached, the hexagon bolt is tightened. Cable tension adjustment is done by "feel". The cable should neither sag not be too tight.

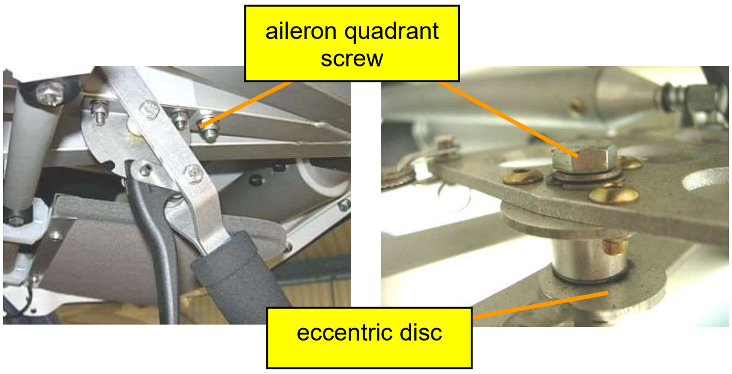


Figure 71: Eccentric disc at aileron quadrant

4.3.6.2 Checking the connection of the sliding sleeve with the flap spar

With this connection care must be taken that the flap spar tube positively fits into the detents of the sliding sleeve without significant play and that the pins of the spring-loaded locks are completely extended on both sides.

If this is not the case, an ISC / ITB or COMCO IKARUS GmbH must be contacted. Adjustments may be necessary if wings or wing flaps are replaced.

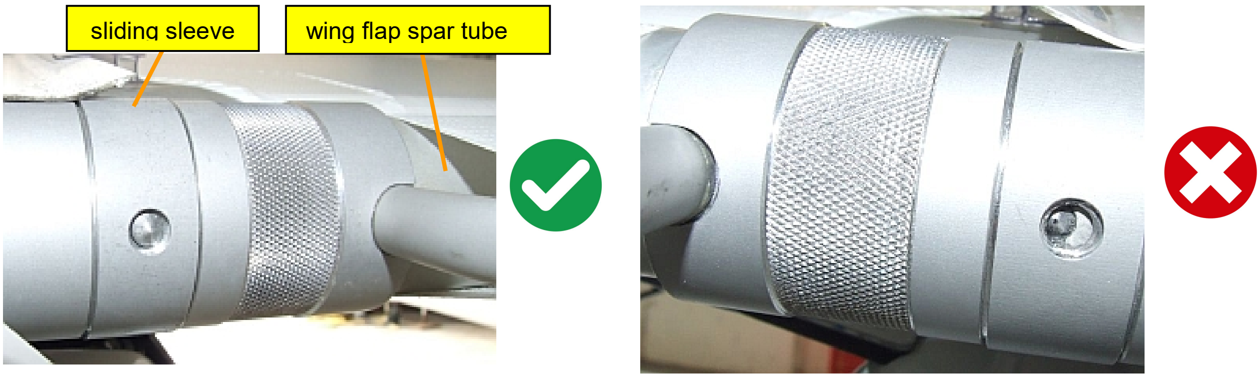


Figure 72: Connection sliding sleeve - wing flap

4.3.6.3 Servicing the elevator direction changer

The following areas in particular must be inspected carefully: the bracket of the elevator direction changer for cracks, the rivet connection for proper fit and missing rivets, the screws at the bracket for proper fit and condition.

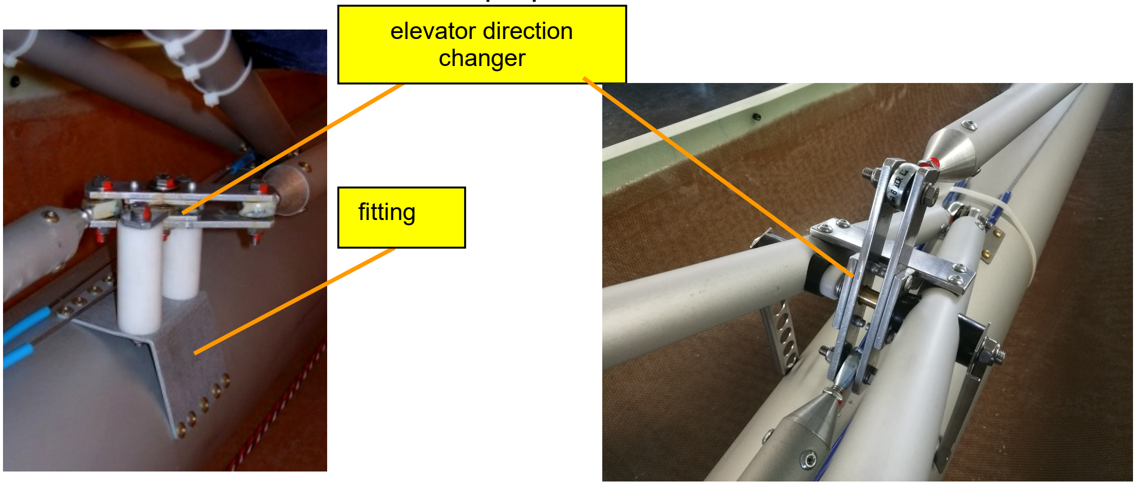


Figure 73: Elevator direction changer old (left) and new (right)

4.3.6.4 Setting the throttle friction

The carburettor throttle valves have tension springs that pull the valves into the full open position should the throttle cable snap. The moment of the springs on the throttle valve levers is compensated by the friction of the throttle lever shaft in the plastic clamps and a tension bungee. Journal bearing friction can be set by the front attachment screw.

First, the running surfaces of the plastic clamps are greased slightly (journal bearing). Then the bearing attachment screws are screwed so tight to compensate the retention moment of the springs. The throttle lever must not be drawn forward by the springs but it should also not be difficult to move. The correct tension must be checked in various throttle settings.

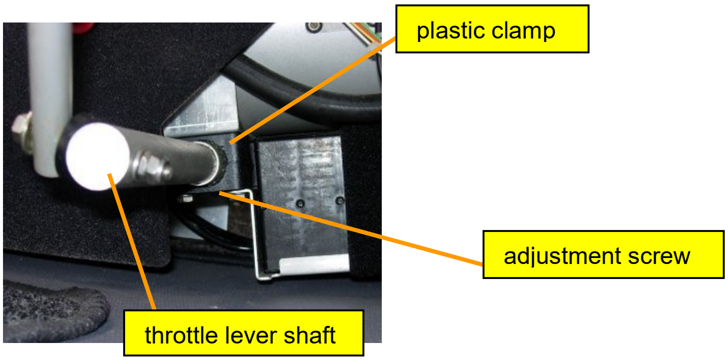


Figure 74: Plastic clamp at throttle lever shaft

4.3.7 Visual inspection of the empennage attachment safety screws

The inspection can be carried out through the baggage bin and using a torch and comprises checking that none of the horizontal tail fin attachment safety screws is missing.

Figure 75: Safety screws

4.3.8 Inspecting the pitot-static pressure system

This inspection can be carried out with special measuring equipment. If such equipment is not available, the inspection may be undertaken using simpler means. The inspection is carried out by two people. A clean and leak-proof injection syringe and a short piece of appropriate and elastic tubing (inner diameter 5 mm) are needed.

4.3.8.1 Pitot pressure system

1. The tubing is attached air-tight to the pitot tube on the left wing.

Figure 76: Checking the pitot pressure system

2. One person slowly presses the syringe so that overpressure results in the system. At the same time, the second person watches the airspeed indicator. The syringe is pressed until a speed between 60 and 180 km/h appears on the indicator. The syringe must be pressed very carefully to ensure that the airspeed indicator is not over-wound and irreparably damaged.
3. Once the desired speed has been reached, the second person continues to watch the airspeed indicator. The indicated airspeed must not fall by more than 3 km/h per minute. The first person makes sure that syringe does not yield to the overpressure in the system.

Should the airspeed fall faster, this does not necessarily mean that there is a leak in the pitot pressure system. A leak in the syringe and the connection to the pitot tube should first be ruled out and the cause identified and repaired in an ISC / ITB, respectively.

4.3.8.2 Static pressure system

Static pressure is picked up inside the fuselage beneath the wing tube close to the trailing arm.

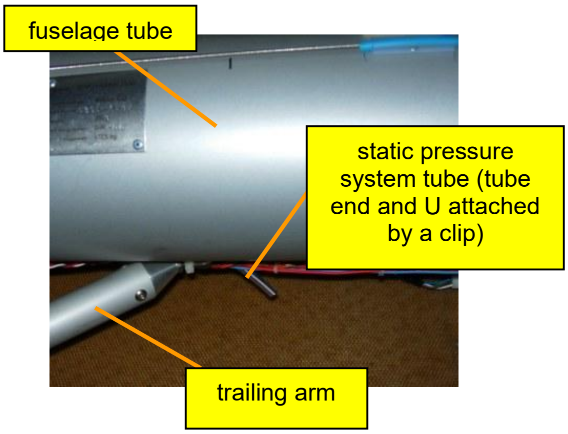


Figure 77: Static pressure system tube

1. The syringe is attached to the pressure system.
2. One person slowly draws the syringe until under-pressure results in the system. At the same time, the second person watches the airspeed indicator. The syringe is drawn until a speed of between 60 and 180 km/h appears on the indicator. The syringe must be drawn very carefully to ensure that the airspeed indicator is not over-wound and irreparably damaged.
3. For further action: cf. "Pitot pressure system".

5 Repairing the C42

5.1 Repairing the covering

The webbed structure of the Tedlar® cloth prevents further tearing by slight damage so that the overall structure and strength are not affected by small cracks (3-5 cm). However, in the interest of safety, even the smallest defects should be repaired immediately. Original covering repair material is available from the ISC / ITB and from COMCO IKARUS GmbH.

5.1.1 Damage to the fabric

Depending upon the size of the damage, the following measures must be undertaken: Before repairing the covering, it must be cleaned. Silicone-removing cleaning agents or grease solvents may be used.

Small cracks (< 10cm):
A patch of original covering repair material is cut to shape. Corners should be rounded. The patch is cleaned, Pattex® transparent contact adhesive applied and the patch attached to the covering.

Cracks (10-15 cm):
Larger cracks must be sown together with a saddler needle and a robust thread. A patch is then prepared and attached to the covering (see above).

Large cracks:
The covering must be removed and sent to an ISC / ITB or COMCO IKARUS GmbH if cracks are larger than 25 cm. Entire stretches can then be made by sail makers, as required. The damage must be examined by an appropriately qualified person, e.g. Class 5 inspector.

5.1.2 Damage to the seams

The seams of the C42 covering are made of synthetic fibres. If individual threads protrude, they can be melted with a soldering iron. Be careful not to damage the covering. The affected position can then be patched.
If the damage is greater (> 1 cm) an ISC / ITB or COMCO IKARUS GmbH must be contacted.

5.1.3 Thermal tensioning of the covering

If fabric tension is reduced and/or the fabric is wrinkled, buckled or showing similar signs of slackness, the covering can be tensioned to a certain degree by applying heat. In this way the original tension can be restored. The process can be repeated as often as required.
The necessary heat may be produced by an industrial heat gun or a radiator. A certain degree of experience and skill is, however, required and special care must be taken. If too much heat is applied, bubbles can form and the material can break and/or burn. We, therefore, recommend that you contact an ISC / ITB or COMCO IKARUS GmbH directly, if such repair work is required.

5.2 Repairing the aircraft structure

Repair work is limited to the exchanging of parts. Only original spare parts may be used. These are available from the ISC / ITB or from COMCO IKARUS GmbH.

No structural repairs can take place without the direct authorization of the ISC / ITB or from COMCO IKARUS GmbH.

All structural repairs must be completed using only with new parts obtained only from the manufacturer. Do not use pattern parts.

Never straighten bent tubes or bracket assemblies, replace with new parts only.

Never re-weld any parts.

Any defects must be reported to the ISC / ITB or from COMCO IKARUS GmbH.

5.2.1 Fuselage

A 165 mm diameter aluminium tube runs from nose to tail and carries all the major assemblies: engine, seats, undercarriage, fuel tank, and tail empennage. The cockpit structure, consisting of a thin walled aluminium tube frame, includes a welded aluminium box-section frame at its top to which the wing spars' roots attach, and which provides compression load carry-through for both spars.

The composite seats are supported around their edges by attachment to the cockpit frame. Around the outboard edges of the seats, some of these loads are passed via the composite lower fairing to a lateral beam consisting of a 56mm reinforced box section. The ends of this beam accommodate the wing struts and withstand tension loads from them.

All load carrying (structural) members of the airframe are aluminium alloy tubes; most of which terminate in spherical bearings.

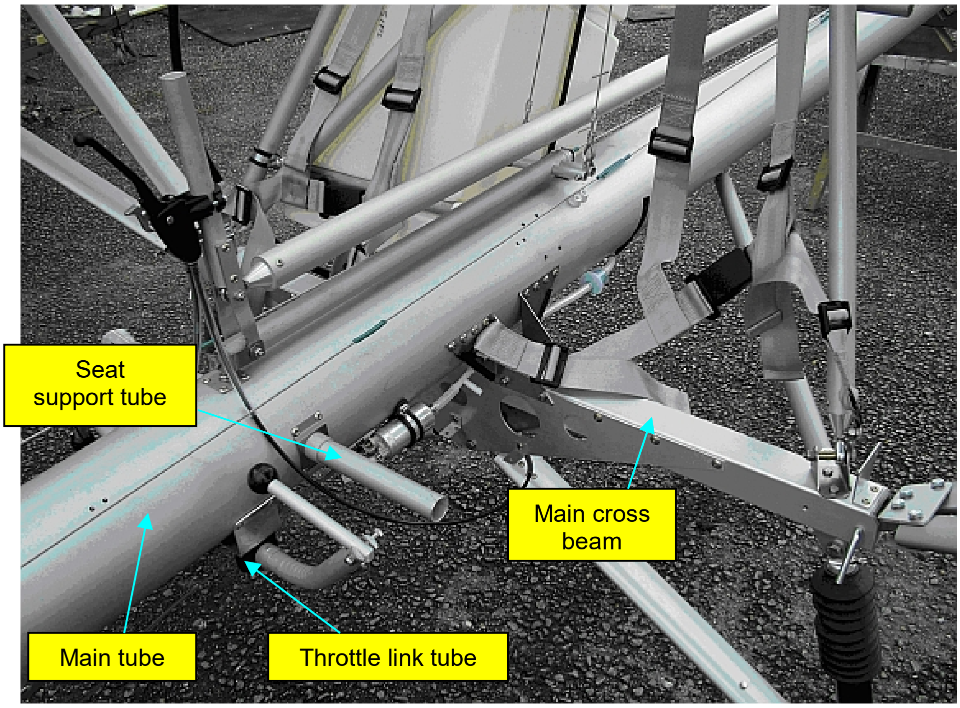


Figure 78: Main fuselage tube

5.2.2 Wing

The wing has a ladder construction comprising leading and trailing edge tubes, connected by compression struts at intervals along its span. The triangulated wing struts, terminating at a fixed point at the top of the undercarriage, brace the wing against fore and aft loads. In normal +g flight these struts are under tension.
In +g flight both leading and trailing edge tubes inboard of the wing struts junctions, experience compression loads from the wing struts, as well as direct bending from lift loads.

The wing, tail empennage and all control surfaces are constructed of thin walled aluminium tubing. They are covered by a reinforced polyester fabric, sewn into complete envelopes and fitting tightly over their frames.

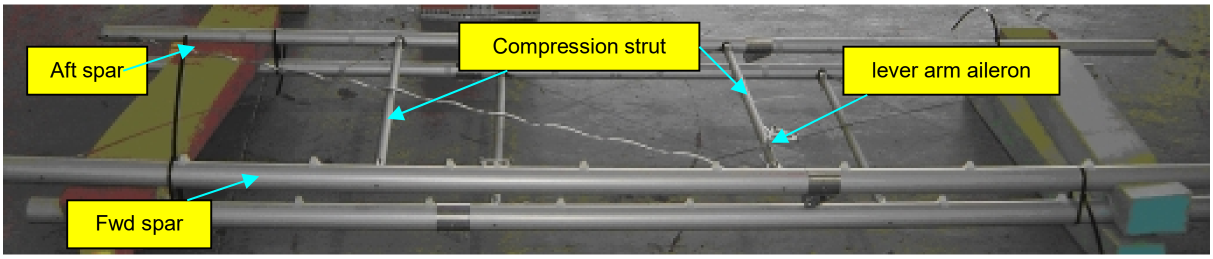


Figure 79: Wing frames

5.2.3 Rigging the Wings

Before attempting rigging, take a look at the wing roots and the way in which the rigging mechanism works. Note that the fulcrum (the roller bracket) is located near the wing root, and also in line with the rear spar attachment point. The front spar attachment point however is located some way inboard. This means that lifting the wing tip will result in the front spar clearing its fitting before the rear one. This can be used to advantage during rigging.

Step 1. Ensure that the spar channels in the cockpit roof are aligned with the top surface of the cockpit roof frame. Lock the controls, place the flap lever in the fully up position and ensure the brake is on.

Step 2. Bring the left wing strut into its correct position on the left wing and attach the auxiliary (jury) struts on the front and rear wing struts to the leading and trailing edge fittings.

Step 3. If this is the first side to be rigged and the second wing half is still resting on the tail, lift the wing at its tip with one hand. With the other hand, steadily lift the tail so that the aircraft rests on its nosewheel.

Step 4. Carry the wing into its 90° position relative to the fuselage, taking care not to damage the door and fuselage with the front spar.

Step 5. Turn the wing into a horizontal position and push it gently towards the fuselage

Step 6. Lifting the tip, slowly insert the wing roots into position in their channels, leading edge first. It may be necessary to gently rock and twist the wing to engage the spar hooks on to their pins.

Step 7. Ensure that front and rear wing spars are properly engaged in their channels. Then insert the lower end of the wing struts into the open box-section end at the top of the shock absorbers.

Step 8. Attach front wing bolt and safety pin, using the tool provided.

Step 9. Attach rear wing bolt and safety pin.

Step10. Attach the strut bolt through the box-section end and lower steel block of the wing struts ends. Install the safety pin.

Step11. Check that all three bolts have their safety pins installed.

Step12. As a final check, lift the wing at the wing tip to ensure proper attachment of the wing strut block to the box-section end.

Step 13. Connect the pitot tube to its fitting situated to the left of the pilot's headrest. Pull out the pitot tube forwards to its full extent.

Step 14. Repeat steps 1 through 12 for the other wing. Now you may remove the control lock.

Step15. Attach right and left aileron push rods to the central direction changer connection. Carefully ensure that the slide mechanisms of the special link connectors are properly engaged (closed and locked).

Step 16. On the flap drive tube, take the split sleeve fitted around the sprung taper pins (and through which they protrude), spread it a little, then rotate it over the pins. Using this sleeve as an aid, squeeze it, thus compressing the pins. Then move the sleeve so that the drive fitting moves freely on its tube.

Step 17. Align the flap root tube and its drive fitting on the fuselage. Slide the flap drive fitting over the junction so that its cutaways engage snugly in the roots of the flap frame tubes and the sprung pins are fully out. Rotate the split sleeve so that its holes align with the tips of the pins again, permitting the pins to spring out fully. Left and right landing flaps must be securely locked and it may be necessary to wiggle the fitting a little to ensure proper engagement, particularly when the aircraft is new.

Step 18. Position and fasten the wing centre section (cockpit roof).

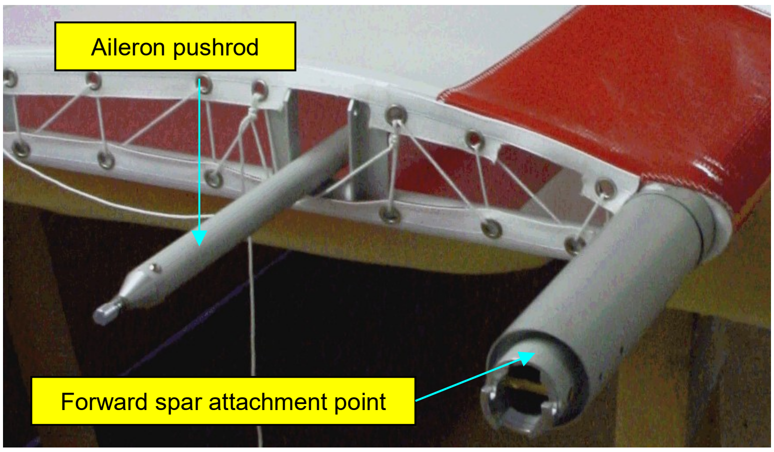


Figure 80: Wing root

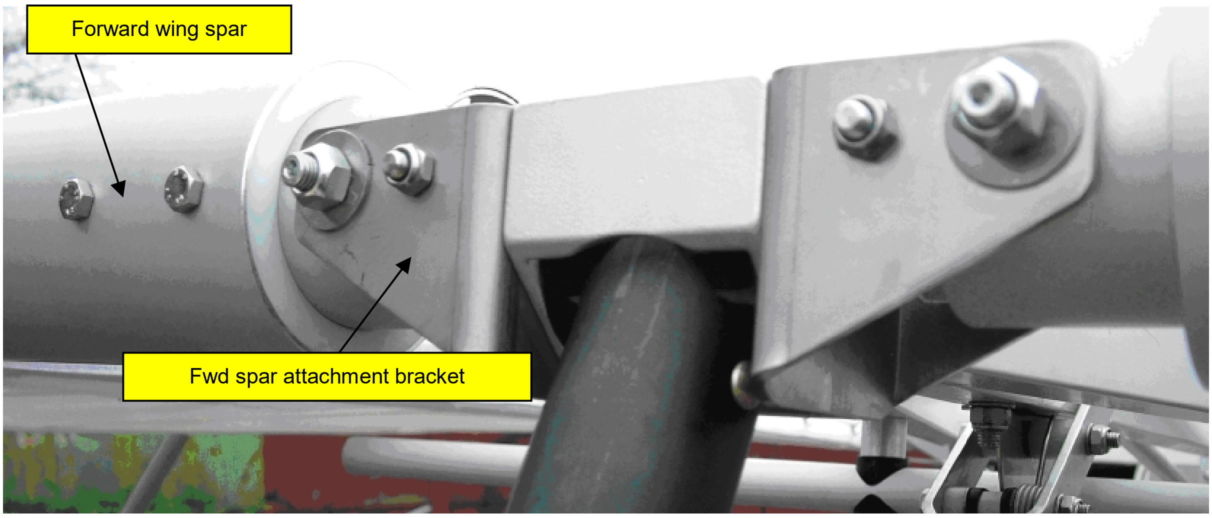


Figure 81: Forward spar attachment

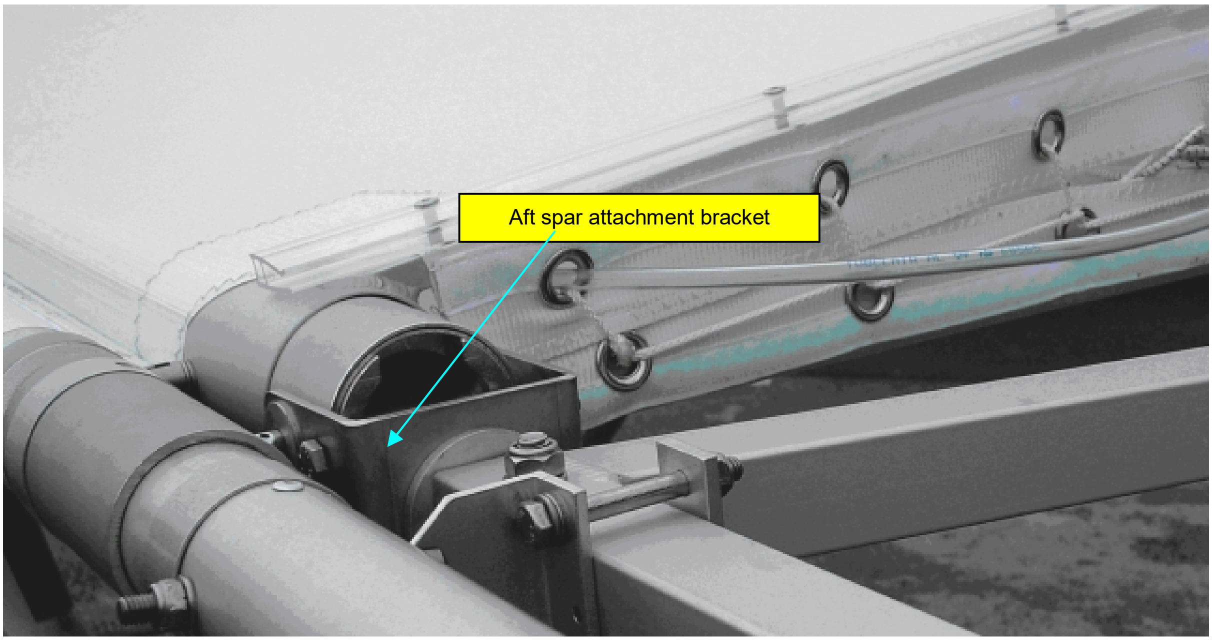


Figure 82: Aft spar attachment

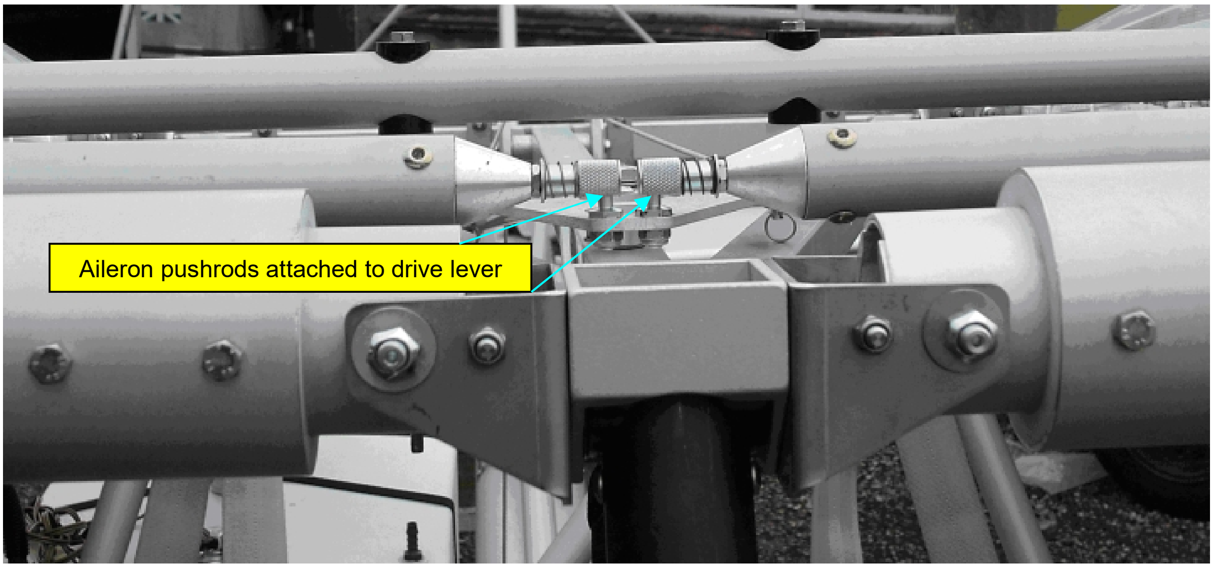


Figure 83: Aileron attachment

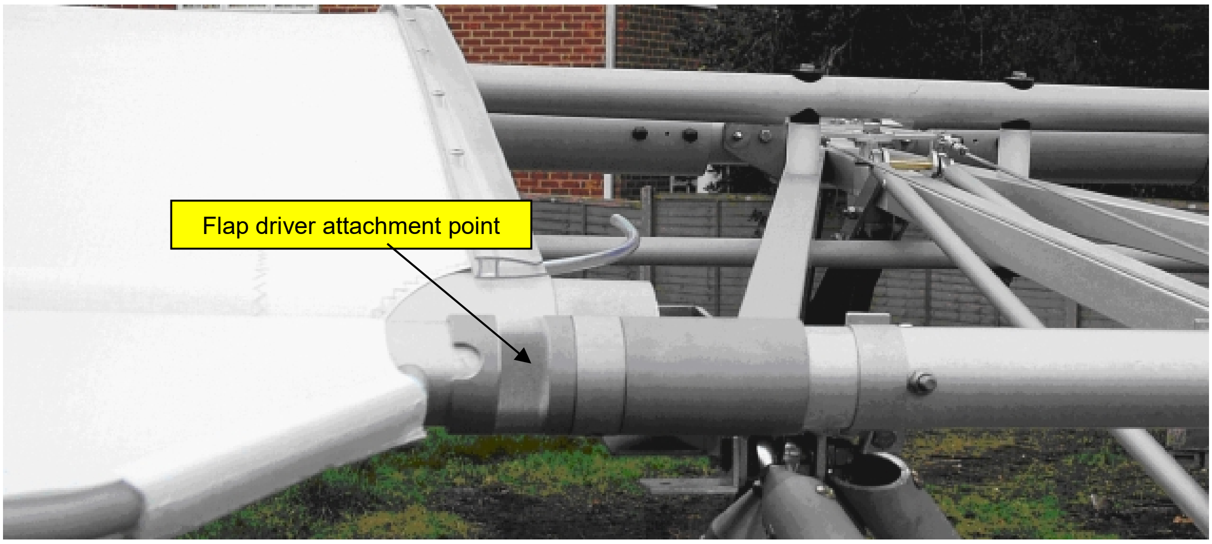
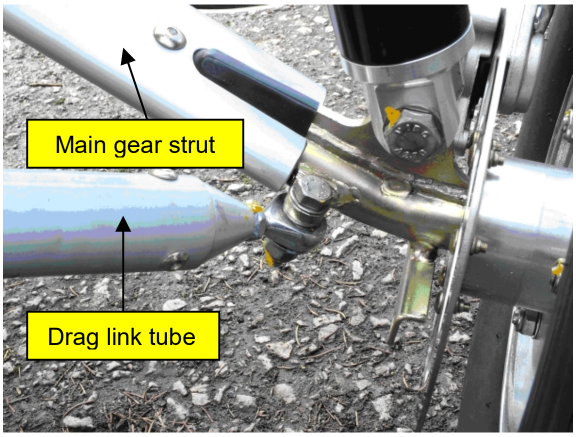


Figure 84: Flap attachment

5.2.4 Undercarriage

The tricycle undercarriage has suspension on all wheels and damping on the main wheels. The front fork is directly connected to the rudder pedals. Hydraulic disc brakes operate on the main wheels only.

Main wheel suspension stiffness can be adjusted by varying the air pressure in the damper units via the valves in their struts. A special high pressure pump is required for this purpose.



5.2.5 Main landing gear

5.2.5.1 Jacking up the aircraft

In order to carry out various maintenance measures on the landing gear, the aircraft must be jacked up. The following instructions should be followed to this end:

<u>Nose wheel landing gear:</u>
The nose wheel landing gear can be raised by weighing down the tail of the C42. Before applying any weight, foam or a similar material should be laid under the tail skid to protect the composite fuselage skin from scratching. Furthermore, something must be prepared to weigh down the tail. For example, two full water canisters attached to each other by a tension belt can be used. The tail can then be pushed down to the ground and the weight attached.

Main landing gear:
2 people are required to jack up the main landing gear. One person lifts the wing on the side of the wheel which is to be jacked up while the other person pushes a suitable wooden block under the wheel axle.

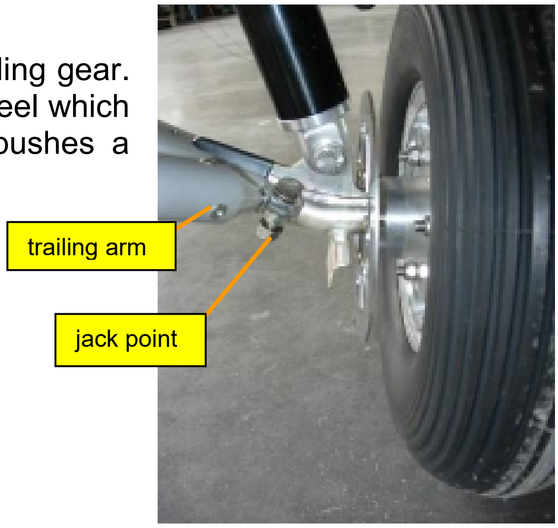


Figure 85: Jacking up the main landing gear

The aircraft may also be jacked up using a Y strut (Kny fork) which is pushed under the strut-wing connections. This method allows more comfortable access to the landing gear. The fork can be ordered from COMCO IKARUS GmbH.

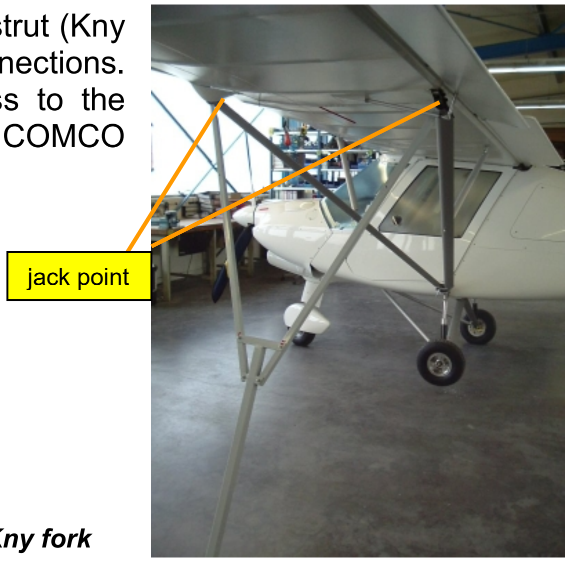


Figure 86: Jacking up the main landing gear with a Kny fork

When working with the nose wheel lifted or the main landing gear jacked up the parking brake can be applied for safety reasons.

5.3 Repairing rivet connections

It must be ensured that the correct type of rivet is used and mounted in the proper way (cf. Chapter 4.1.4).

If rivets come loose due to exceptional loading or if a riveted component has to be replaced the following procedure should be followed:

1. Punch out the mandrel using the appropriate puncher.
2. Drill out the rivet head without damaging the bore-hole.
3. Punch out the remaining shaft using a suitable puncher
4. Set the new rivet (pay attention to rivet type, grip length and diameter!)
5. Pull the rivet using the appropriate tool (electrical, pneumatic, hydraulic or manual riveting tool)

5.4 Glass repairs

The windscreen/windows made of Makrolon® are extremely difficult to repair. As spare parts are cheaper, it makes more sense to replace any damage glass. If the damage is large-scale, particularly if visibility is adversely affected, the glass pane has to be replaced. Spare parts are available from any ISC / ITB or from COMCO IKARUS GmbH directly.

Small-scale damage can be repaired without great effort.
It is indeed often possible to remove small scratches simply by polishing the surface.
Deeper scratches can be sanded down (1000 - 1400 grain).

Small cracks and fissures can be repaired by stop-drilling:
A stop hole is drilled at both ends of the crack/fissure using a 2mm borer thus preventing the crack/fissure from growing further.
The crack/fissure can then be repaired by grinding a V-shaped groove into the crack and filling it with a special polycarbonate adhesive. Cracks/fissures repaired with polycarbonate adhesive are liable to distortion. Once the adhesive has hardened, the area should be wet-sanded (1000 - 1400 grain). Finally, the spot should be polished with polishing wadding.
It is, however, often simpler and less time-consuming to replace the glazing.

5.5 Repairing the glass-fibre / carbon-fibre skins

In contrast to many sailplanes and other micro-light aircraft, the glass-fibre/carbon-fibre parts of the C42 rarely carry loads as they are mainly fairings. Damage to glass-fibre/carbon-fibre parts thus has no effect on the strength of the aircraft. This is also the reason repair work on the glass-fibre/carbon-fibre parts of the C42 is relatively simple. One must, however, be careful that repair work does not lead to an increase in mass or a change in the centre of gravity of the aircraft.
Normal glass-fibre/carbon-fibre repair kits may be used. The instructions accompanying the kit must be followed. If large-scale damage has been done, replacement of the damaged part should be considered as original glass-fibre/carbon-fibre spare parts for the C42 are relatively inexpensive. Large-scale repair work is thus not particularly practical. The ISC / ITB provide information about spare parts.

During repair work a minimum temperature of 20°C is necessary to ensure that the laminate hardens properly. Higher temperatures will accelerate the hardening process. Before beginning with repair work, clean the repair area thoroughly. Then grind the damaged area and remove the adjacent coating (polyester gel coat) using, for example, 60-80 grain sandpaper. The fibre layers should be visible 30-50 mm around the damaged area. If possible, enough of the damaged laminate should be left to act as a mould for the repair work. If this is not possible, a base for laminating can be formed using a wide adhesive tape and a thin sheet (glass-fibre, sheet metal, etc.). The sheet must be covered with a separating agent (e.g. packing tape) so that it can be removed after laminating.

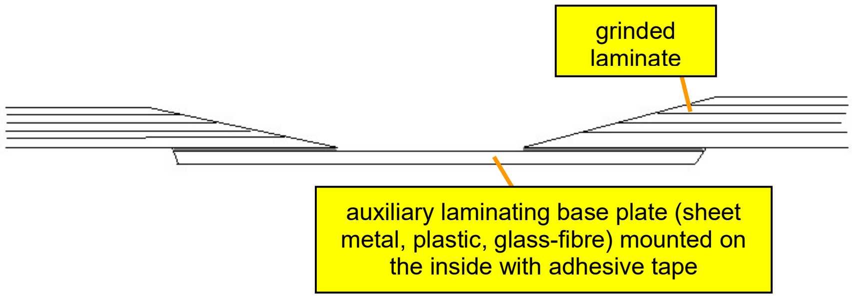


Figure 87: Grinding of laminate

The next step is the repair lay-up. Glass-fibre fabric sections are cut, the top layers being smaller than the lower layers. The fibre direction of all the layers is the same as that of the lowest layer. The fabric layers should overlap the repair area by approx. 30-50 mm. The number of layers required depends upon the kind of repair material used and the scale of the damage.

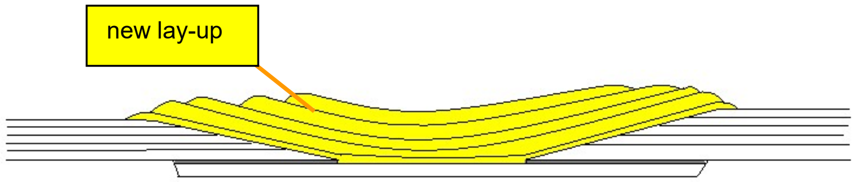


Figure 88: New laminate lay-up

The repaired area is then covered with resin and the largest fabric layer placed in fibre direction on the undermost fabric layer. Using a brush the layer is then completely soaked with resin. Further fabric layers are applied and completely soaked in the same manner.
Usually, no resin must be applied to the final fabric layer. Dabbing with a brush ensures that sufficient resin is absorbed from the lower layers. Finally, a PE foil is placed over the repaired area and the laminate is allowed to harden. The hardening process can be assisted through uniform heat application (approx. 60°C) using, for example, a heating foil. Once the hardening process has been completed (standing fibres can be broken off), the foil is removed and the repair area sandpapered (grain 180) to ensure a smooth transition at the edges. The repair area should be a few tenths of a millimetre deeper than the surrounding area. If the area is too deep, it can be filled. The repair area can now be varnished.
Original coating: polyester gel coat (white).

5.6 Electrical repairs

Faulty electrical components may only be replaced by new original spare parts which may be ordered from an ISC / ITB or directly from COMCO IKARUS., Circuit diagrams are to be found in the appendix to this manual.
Faults must be reported to COMCO IKARUS.

5.7 Ikarus Service Centres

A list of ISCs / ITBs is to be found on our website http://www.comco-ikarus.de

6 Appendix

6.1 Operating fluids

6.1.1 Engine oil

Exact details concerning oil type and amount are given in the Rotax documents.

6.1.2 Coolant

The coolant used must be suitable for aluminium engines and must not be mixed.
For exact composition details, please consult the appropriate Rotax documents.

6.1.3 Brake fluid

Magura / Sachs / Tost brake fluid type: .... ROYAL BLOOD
Beringer brake fluid type:... brake fluid (DOT-4)

No other brake fluids or hydraulic fluids may be used as they could damage the sealings.
Brake fluid can be ordered from an ISC / ITB.

6.2 Settings

6.2.1 Angle of incidence wing - fuselage tube

The angle of incidence of the wing to the fuselage tube: 8.5°

The angle is measured from the underside of the rear wing tube to the underside of the forward wing tube at the root rib.

6.2.2 Angle of incidence horizontal tail fin - fuselage tube

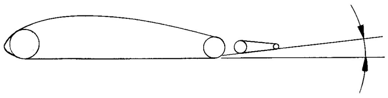
The angle is measured from the underside of the forward tube to the underside of the rear tube of the horizontal tail fin.

The difference in the angle of incidence between the wing and the horizontal tail fin measured at the root rib is 1.5°

6.2.3 Control surface deflections

Aileron

Note: The basic setting of the ailerons is -7° relative to airfoil chord (tangent front to rear spar). It is defined by the length of the aileron push-rods.



-7° distance from axis of rotation

up	20° ± 2°	85 mm, ± 10 mm
down	14° ± 2°	60 mm, ± 10 mm

Measuring point distance from rudder axis ....250 mm

Elevator

up	28° ± 2°	200 mm, ± 15 mm
down	20° ± 2°	140 mm, ± 15 mm

Measuring point distance from rudder axis ....410 mm

Rudder

to the right	32° ± 2°	225 mm, ± 10 mm
to the left	32° ± 2°	225 mm, ± 10 mm

Measuring point distance from rudder axis ....410 mm

Wing flaps

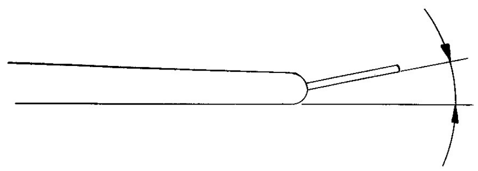
Note: The angle measured is the angle between wing flap underside and wing underside at the wing root (tangent front to rear spar).

Flap position I (cruise)	-5° ± 1°	27 mm, ±15 mm
Flap position II (take-off/landing)	11° ± 1°	60 mm, ± 15 mm
Flap position III (landing)	32° ± 1°	170 mm, ± 15 mm

Measuring point distance from rudder axis ....310 mm

Trim tab

Lever nose-heavy: trim tab to elevator surface .... -5°



-5° with mech. trim
Do not exceed!

6.2.4 Tyre pressure

Main landing gear	2,0 – 2,5 bar	29 – 36 PSI
Nose wheel landing gear	1,6 – 2,0 bar	23 – 29 PSI

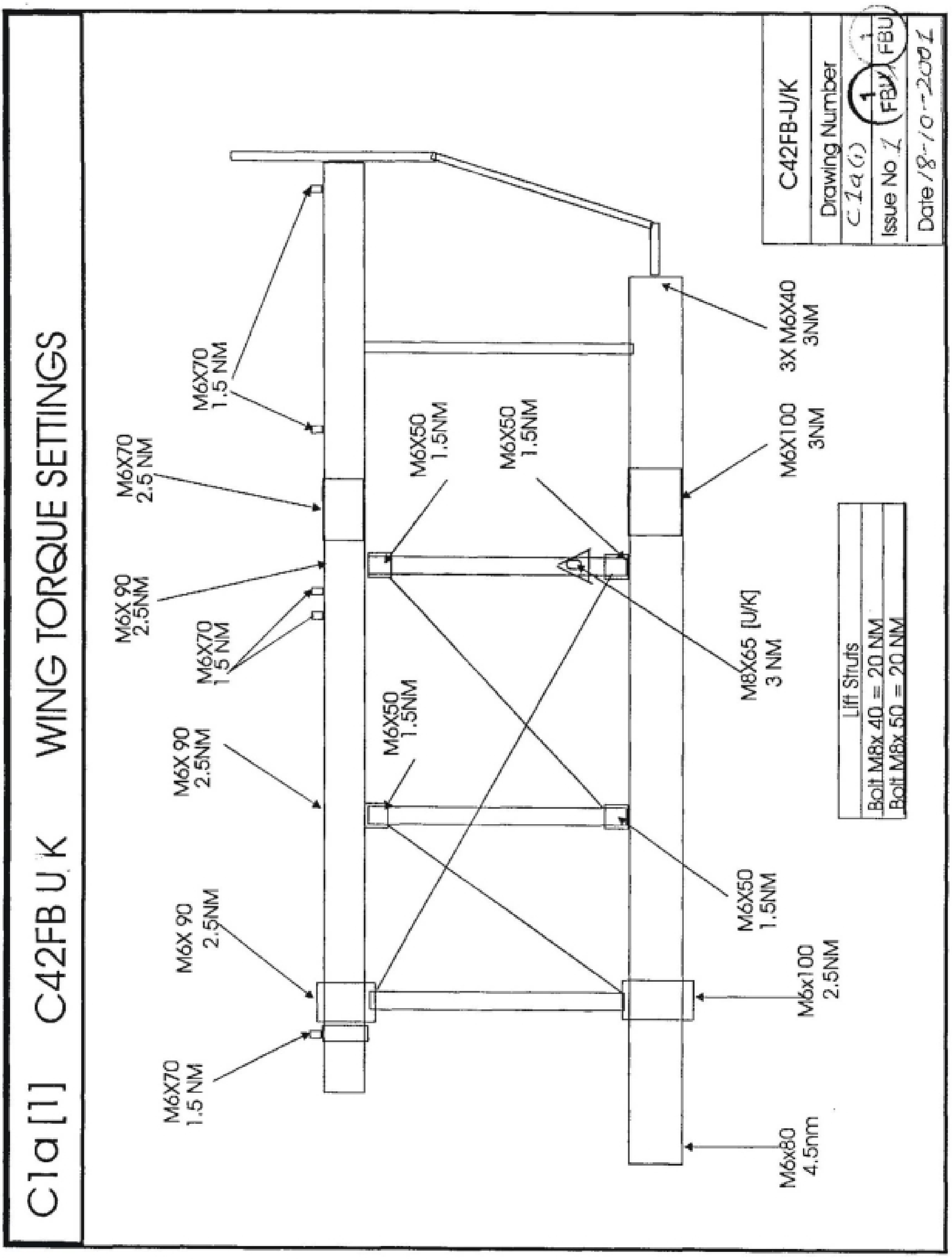
6.2.5 Tightening torques propeller

A large number of propeller types are approved for the UL aircraft C42. Here you will find the most important tightening torques for some selected propellers.

Type of propeller	torque moment, propeller attachment screws	torque moment, propeller blade clamping screws
WarpDrive 2 blade / 3 blade	25 Nm	12 – 15 Nm
Sportprop ø170 3 blade	25 Nm	12 Nm
Neuform CR3 – 75 CR2 - 75	27 Nm	12 Nm
Kiev BB 263 Kiev BB 283 GSC – 3 blade	27 Nm	27 Nm

The mandatory torque moments for other propellers are to be found in the relevant propeller manuals or may be requested from an ISC / ITB.

Wing torque settings



6.3 Placards

Subject	Location
Aerobatic warning	instrument panel / fwd wing spar
Trim	canopy roof frame
Wing flaps, mechanical	canopy roof frame
Engine oil specifications	oil inspection cover
Fuel specifications	tank filler
Baggage loading	baggage bin cover
Deviation chart	instrument panel
Control levers - choke - heating - carburettor heating	centre console
Fuel valve	centre console
Data plate	centre console
Type plate, fire-proof	fuselage tube, behind tank
Warning Rescue missile	Lid upper body shell

6.4 Notification of technical defect and/or damage to micro-light aircraft

Type of micro-light: ________________ Serial no.: ___________________

Year of construction: ________________ Engine: ___________________

COMCO IKARUS GmbH: ____

Owner: ____

Registration: ____

No. of flight hours when damage/defect occurred: ________________________

Engine hours: ________________

Airframe hours: ________________

No. of flight hours (pilot) on micro-light aircraft: ____________________

Description of damage/defect: _______________________________________

____

____

Description of how damage occurred:___________________________________

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____

____

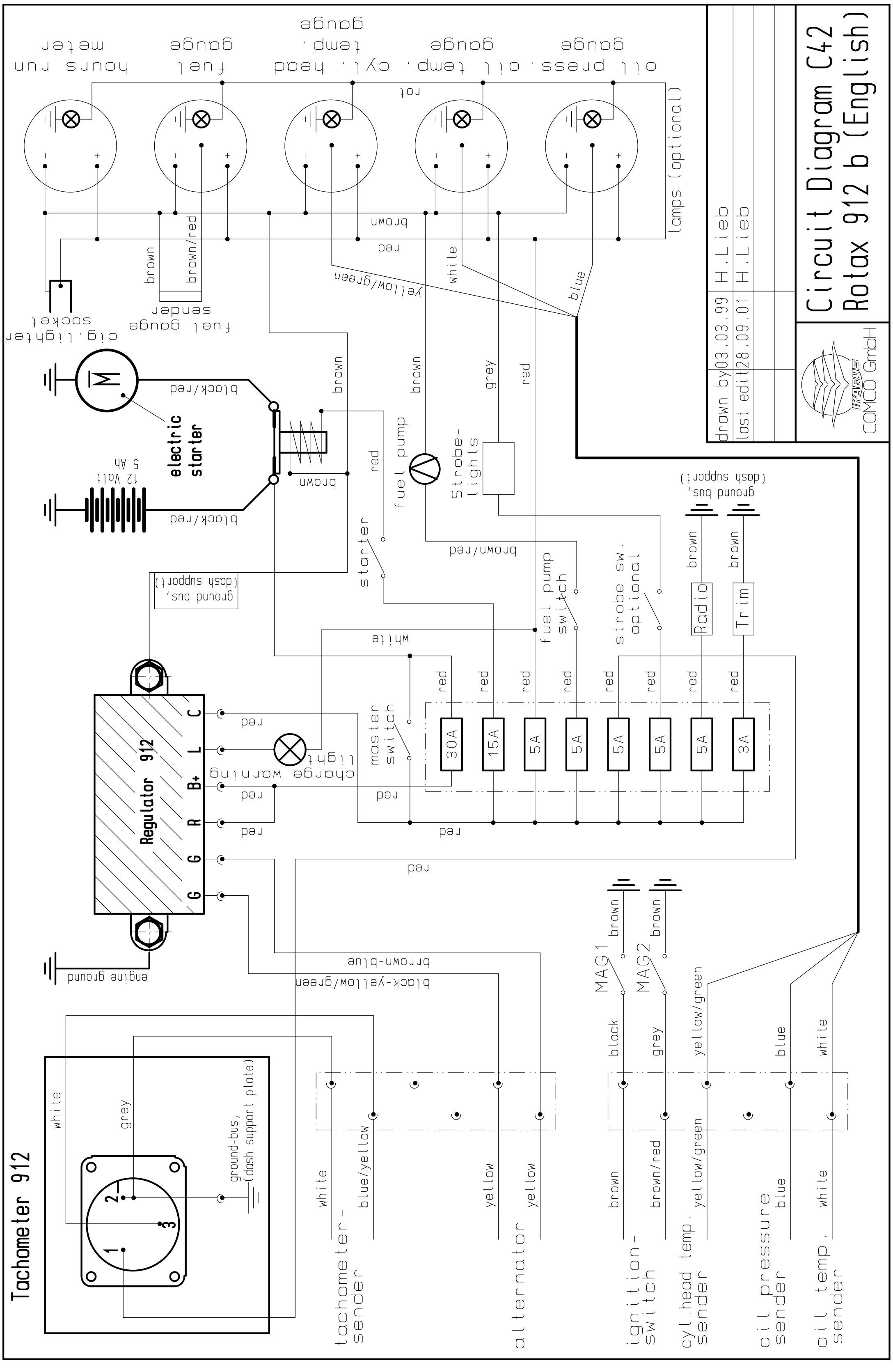
Determined by Name: _______________________________________

Date: _______________________________________

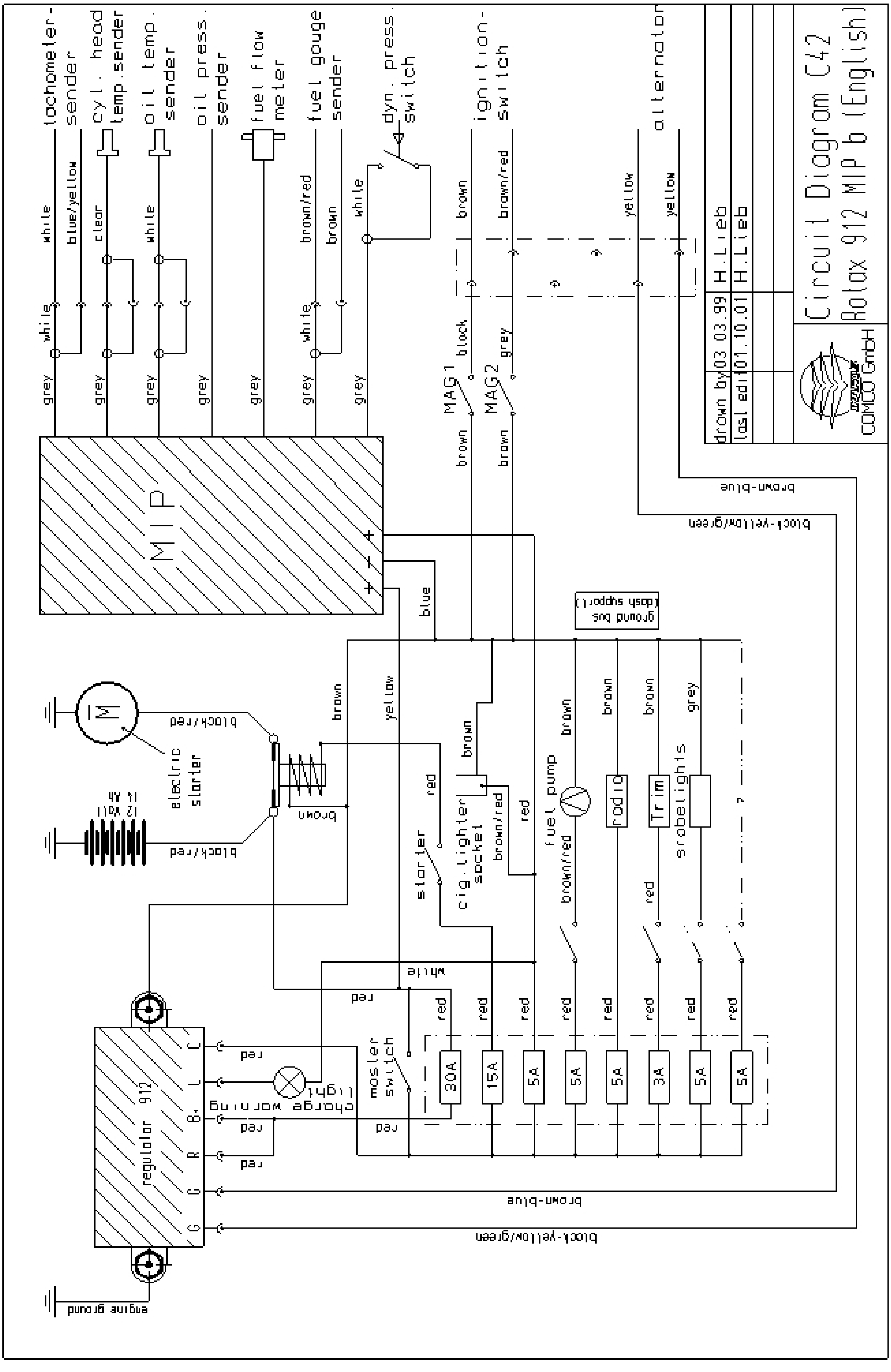
Signature: _______________________________________

Circuit diagrams

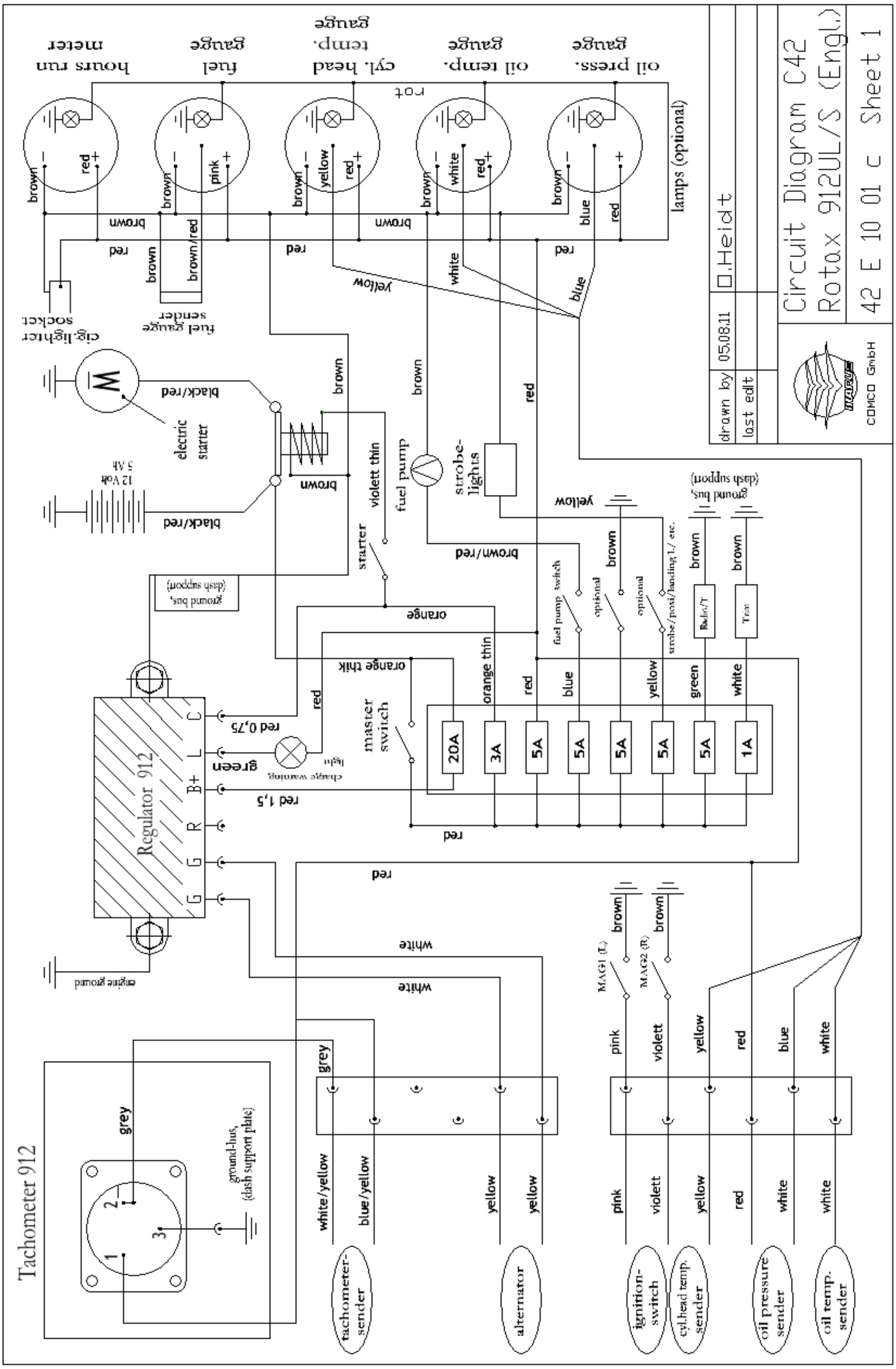
Circuit diagram until Nov. 2008



Circuit diagram until Nov. 2008



Circuit diagram since Nov. 2008



Circuit diagram electric trim