PILOT OPERATING HANDBOOK

for the aircraft **IKARUS C 42 Series**

Modell Nr.	C42 / C42B / C42C / C42E
LTZ-Nr.	61141 / 61141.1 / 61141.5 / 61141.6
Type	**IKARUS C42 Series**

Airplane Registration No. _____

Airplane Serial-No. _____

Reference: POH C42 Series Issue-3 / Rev. 1
28.01.2014

This handbook is to be kept in the aircraft at all times.

The described options of the C42 Series use are certified for Germany and have been tested in Germany.

Please note that for using the C42 Series as a towplane for towing gliders, towing aerial signs or decanting sky divers, different regulations may apply in different countries. Please contact your local authorities for further clarification.

COMCO IKARUS GmbH
Leichtflugzeuge

RECORD OF MANUAL REVISIONS

No.	Issue No.	Description of Changes	Date	Signature
1	3	Model C42E added	13.01.2014	A.Kurz
2	3	S. 47 Pre-flight inspection point 14.3 supplemented	28.01.2014	A.Kurz

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Owner _____

_____

_____

This Pilot Operating Handbook belongs to the aircraft:_____
and is to be kept in the aircraft at all times.

Introduction

C42 series aircraft are built in compliance with the airworthiness requirements of various countries and are certified as Microlight, Ultralight, Advanced Ultralight and Light Sport Aircraft.

To operate the aircraft the pilot must hold a license or certificate appropriate to this category of aircraft. The aircraft is not to be flown unless it is registered, carries registration markings in accordance with the requirements of the country in which the aircraft is to be flown, and has a Permit to Fly or certificate of Airworthiness valid in the country of operation.

The aircraft is to be flown under daytime VFR conditions. Flight in conditions other than daytime VFR without the correct aircraft equipment and pilot ratings is extremely dangerous and can result in serious injury or death.

Pilots holding licences for other categories, even higher ones, are required to be checked out by an appropriately qualified instructor prior to flying this aircraft as it possesses characteristics that are unique to light sport type aircraft. These characteristics include low inertia, susceptibility to turbulence and wind gradient and special engine considerations.

The safety of all occupants, the aircraft and persons on the ground are the sole responsibility of the the Pilot in command. Do not operate this aircraft in a manner that would endanger the occupants, the aircraft or persons on the ground.

Bear in mind that the engines used in C42 aircraft are not certified aviation engines and thus may not offer the same safety standards found in other classes of aircraft. Prepare your flight so that you can always reach an emergency landing area should you experience engine failure. On cross country flights, ALWAYS keep an emergency landing field in sight.

Changes to the control system, structure, wings and engine are prohibited.

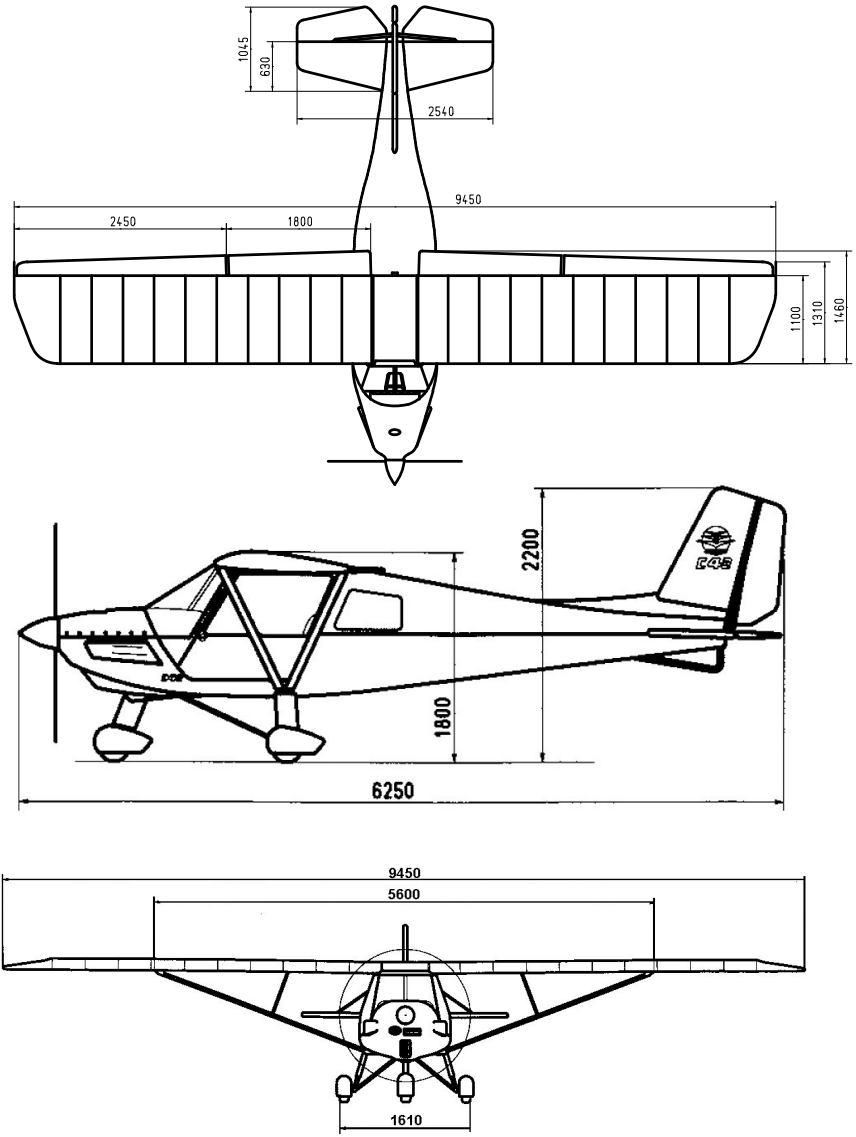
These changes would invalidate any certificate of airworthiness or permit to fly and as such would result in an insurance becoming null and void.

All operating difficulties and equipment failures should be reported to your dealer or the manufacturer.

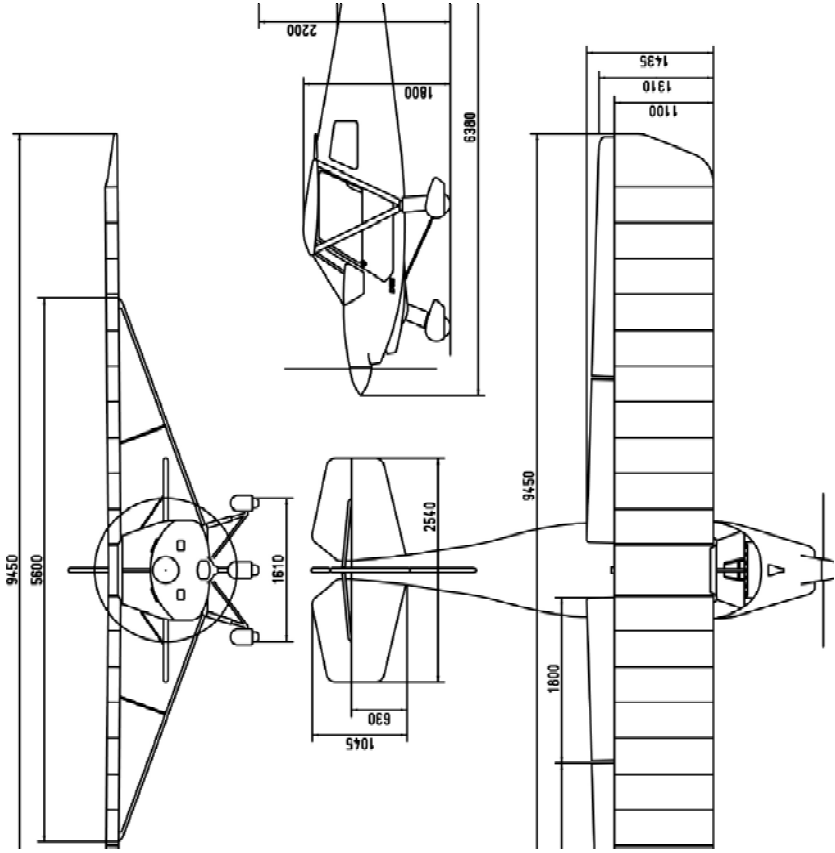
For fire safety reasons, smoking is prohibited on board of the aircraft.

Three side view: IKARUS C42 Series

IKARUS C42



IKARUS C42B / C42E (C42B LSA)



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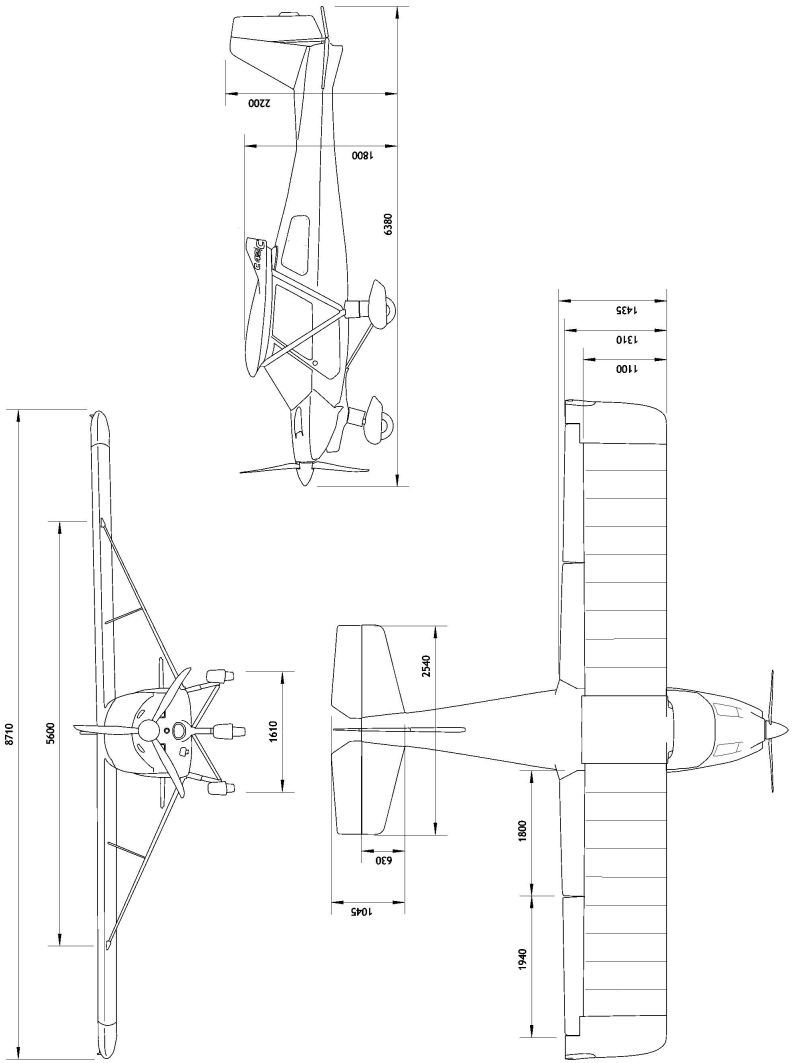
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1 Operating limitations

1.1 Airspeeds:

Never-exceed speed:

C42		V_{NE} =	97 kts	(180 km/h)
C42B / C42C / C42E		V_{NE} =	116 kts	(216 km/h)
Speed in turbulent air	:	V_B =	97 kts	(180 km/h)
Maximum manoeuver speed:		V_A =	80 kts	(148 km/h)

Speed with landing flap set. Vfe

until 2009	??? kts	Vfe =105 km/h
since 2009	??? kts	Vfe =117 km/h

Stall speed:	flap position 0:	V_{S1} =	40 kts	(75 km/h)
	flap position 1:	V_{S2} =	38 kts	(70 km/h)
	flap position 2:	V_{S3} =	35 kts	(65 km/h)

If V_A speed is exceeded, only little rudder movement are allowed.

1.2 Weights

Maximum take-off weight:	***1041 lbs*** ??? (450,0 kg)
Maximum take-off weight with installed rescue system	1041 lbs (472.5 kg)

Empty weight (see last Weight and Balance plan) kg

Minimum payload: (see last Weight and Balance plan) 144 lbs (65 kg)

1.3 Structural limitations:

Positive limit load factor:	+4 g
Negative limit load factor:	-2 g

1.4 Center of gravity limits:

Reference datum:	Wing leading edge at a rib station
Forward center of gravity:	11.8 inches aft of datum (300 mm)
Rearward center of gravity:	22.0 inches aft of datum (560 mm)

1.5 Airspeed markings:

until 2009 / white	38 - 57 kts	(71 – 105 km/h)
since 2009 / white	38 - **???** kts	(71 – 117 km/h)
~~White arc:~~	~~38 - 57 kts~~	~~(71 - 105 km/h)~~
Green arc:	43 - 97 kts	(79 - 180 km/h)
Yellow arc C42B / C42C:	97 – 116 kts	(180 - 216 km/h)
Yellow triangle:	V_X = 51 kts	(95 km/h)
Yellow line:	V_A = 75 kts	(148 km/h)
Red line:		
C42A	V_{NE} = 97 kts	(180 km/h)
C42B / C42C / C42E	V_{NE} = 116 kts	(216 km/h)

The deviation curve for the airspeed indicator can be interpolated from the following table

IAS km/h	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
EAS km/h	65	74	83	91	100	109	117	125	134	142	151	160	168	177	185

1.6 Engine rpm limitations

Maximum engine rpm:	n = 5800 rpm, 5 min. max
Maximum continuous rpm:	n = 5500 rpm

1.7 Rpm indicator markings

Yellow arc:	n = 5500 - 5800 rpm
Red line:	n = 5800 rpm

1.8 Flap settings

Position 0:	cruising
Position 1:	take-off / landing
Position 2:	landing

1.9 Propellers for Rotax 912 UL:

With propeller WARP DRIVE 2-blade 68” (1.72 m Ø) constant speed,
pitch 23.5° at 15.75 inches (0.40 m) from hub,

full throttle rpm on the ground	max. 5200	1/min
Propeller rpm	approx. n = 2300	1/min

With propeller WARP DRIVE 3-blade 68” (1.72 m Ø)
pitch 21.0° at 15.75 inches (0.40 m) from hub,

full throttle rpm on the ground	max. 5200	1/min
Propeller rpm	approx. n = 2300	1/min

With propeller Sport-Prop 3-blade 68” (1.72 m Ø)
pitch 19.5° at 15.75 inches (0.40 m) from hub,

full throttle rpm on the ground	max. 4900	1/min
Propeller rpm	approx. n = 2150	1/min

With propeller GSC 3-blade 68” (1,72 m Ø)
pitch 21.0° at 15.75 inches (0.40 m) from hub,

full throttle rpm on the ground	max. 4900	1/min
Propeller rpm	approx. n = 2150	1/min

With propeller Neuform CR2-75 2-blade 69” (1,75 m Ø)
pitch 27.0° at r = 14.37 inches (0.365 m?????),

full throttle rpm on the ground	max. 5100	1/min
Propeller rpm	approx. n = 2250	1/min

With propeller Neuform CR3-75 3-blade 69” (1,75 m Ø)
pitch 24.0° at r = 14.37 inches (0.365 m?????),

full throttle rpm on the ground	max. 4800	1/min
Propeller rpm	approx. n = 2100	1/min

With propeller Kiev Prop BB 263/1700 3-blade (1,71 m Ø)
Pitch 22,0° at r = 0,4 m from hub,

full throttle rpm on the ground	max. 4800	1/min
propeller rpm	approx. n = 2100	1/min

With propeller Helix H50F-1,75m-R-SI-12-3 3-blade (1,75 m Ø),
Pitch. 16.0° at r = 656 mm

full throttle rpm on the ground	max. 4880	1/min
propeller rpm	approx. n = 2150	1/min

1.10 Propellers for Rotax 912 UL S

With propeller WARP DRIVE 3-blade 68” (1,72 m Ø)
pitch 25.0° at 15.75 inches (0.40 m) from hub,

full throttle rpm on the ground	max. 5200	1/min
Propeller rpm	approx. n =2150	1/min

With propeller GSC 3-blade 68” (1,72 m Ø)
pitch 25.0° at 15.75 inches (0.40 m) from hub,

full throttle rpm on the ground	max. 4900	1/min
Propeller rpm	approx. n = 2000	1/min

With propeller Neuform CR3-75 3-blade 69” (1,75 m Ø)
pitch 27.0° at r = 14.37 inches (0.365 m),

full throttle rpm on the ground	max. 4900	1/min
Propeller rpm	approx. n = 2000	1/min

With propeller Neuform CR3-V-R2H 3-blade 69” (1,75 m Ø), adjustable
pitch 16° - 30° at r = 29.53 inches (0.75 m),

full throttle rpm on the ground	max. 4200 - 5600	1/min
Propeller rpm	approx. n = 1700 - 2300	1/min

With propeller Kiev Prop BB 283/1800 3-blade (1,80 m Ø)
Pitch 24,0° at r = 0,4 m from hub,

full throttle rpm on the ground	max. 4900	1/min
Propeller rpm	approx. n = 2000	1/min

With propeller Helix H50F-1,75m-R-S-14-3 3-blade (1,75 m Ø),
Pitch 17.0° bei r = 656 mm

full throttle rpm on the ground	approx ca. 4800	1/min
Propeller rpm	approx ca. n = 1975	1/min

1.11 Engine limitations according to the Rotax operating manual

	ROTAX 912	ROTAX 912S
Take-off (5 min)	81 hp / 5800 rpm	100 hp / 5800 rpm
Continuous	79 hp / 5500 rpm	95 hp / 5500 rpm
75%	59 hp / 5000 rpm	69 hp / 5000 rpm
65%	51 hp / 4800 rpm	61 hp / 4800 rpm
55%	43 hp / 4300 rpm	51 hp / 4300 rpm

Type of oil: automotive oils (API SF or SG)

Amount of oil: min 0.57 imp. gallons (2.6 l)
max 0.67 imp. gallons (3.05 l)

Oil temperature	min 122°F (50°C)	min 122°F (50°C)
	max 284°F (140°C)	max 266°F (130°C)
	optimum 194°-230°F (90°-110°C)	

Oil pressure: normal operating pressure 29 - 72 psi (2 - 5 bar)
(cold start 101.45 psi/7 bar)

Fuel: Euro-Super ROZ 95 unleaded
(DIN EN 228 with max. 5% ethanol)

Super Plus ROZ 98 unleaded
(DIN EN 228 with max. 5% ethanol)

AVGAS 100 LL

AVGAS UL91

Fuel pressure: 2.17 - 5.80 psi (0.15 - 0.4 bar)

Cylinder head temp.	max. 302°F (150°C)	max. 275°F (135°C)
	optimum 230°F (110°C)	optimum 230°F (110°C)

Magneto check	at 4000 rpm
rpm drop	max. 300 rpm

2 Kinds of operation limitations

- Aerobatics and manoeuvres with more than 60° bank are prohibited
- Daylight, VFR conditions only.
- No flight in icing conditions
- Do not attempt flight in turbulent conditions or in winds exceeding 22 kts (40 km/h), and less when it is gusty.
- Always follow the appropriate regulations for this category of aircraft.

3 Operation of the Engine

The Rotax 912 is a 4-cylinder, four stroke, horizontally opposed, water-cooled engine.

Never move the prop with the ignition (MAG) switches on!

Fuel type for four-stroke 912 UL and 912 ULS engine:
Super leaded or unleaded (according to DIN EN 228 with max. 5% ethanol), AVGAS 100 LL or AVGAS UL91

To start the engine:

Main fuel valve	OPEN
Electrical fuel pump	ON
Throttle	IDLE
Choke	OPEN
Carburettor heat	OFF
Ignition (both magnetos)	ON
Propeller blade area	CLEAR
Brakes	ON
After engine starts, choke	CLOSED

If the engine does not start, repeat the starting procedure.

If the engine has been flooded, close main fuel valve, open the throttle to a half and start the engine. When the engine starts, quickly reduce the throttle to idle.

A four-stroke engine requires a fairly long warm up period. Run the engine at 2000 rpm for at least 2 minutes then increase to 2500 rpm until the oil temperature is at least 122°F (50° C).

Perform the MAG check at 4000 rpm. Rpm drop should not exceed 300 rpm with a maximum difference between MAGs of 115 rpm.

In case your aircraft is equipped with a cowl flap, please refer to the instructions in the paragraph 4.9 : when equipped with a cowl flap

4 Flight Operations

4.1 Taxiing:

The nose wheel steering is conventional and is directly connected to the rudder pedals. Push the right pedal to turn right. Push the left pedal to turn left.

Taxiing is simple. The turning radius of the C-42 is small, and the plane handles cross wind during taxing very well.

When taxiing with a strong tail wind, hold the control stick firmly in the neutral or nose-down position.

When taking off or landing on bumpy grass strips, exercise caution to avoid striking the propeller.

4.2 Take-off and climb:

After completing the "before take-off" checklist,

make certain the runway and approach are free before you taxi to the take-off position

Set trim to neutral. (with an electrical trim the third lamp from above)
Wing flaps in take-off position (flap position 1).
Gently bring the throttle to full forward position, check tachometer.
At full throttle, the tips of the propeller blades produce hard knocking sounds.

Pull the stick slightly back during the initial roll.
The nose wheel will lift off at approx. 27 kts (50 km/h).
Further accelerate with the nose wheel up 2-4 inches (5-10cm) off the ground.
.

Aircraft with the Rotax 912 UL S (100 hp) have a greater engine torque which must be countered by a slight right rudder input.
The aircraft will take-off at 38 kts (70km/h). Push the stick slightly forward and increase airspeed to 59 kts (110 km/h) in shallow climb.

Continue to climb at 59 kts (110 km/h).
Retract flaps at a height of approx. 150 ft. This will cause a slight nose-heavy moment. After reaching a safe altitude the electrical fuel pump can be switched off.
Trim the aircraft to 59 kts (110 km/h) and continue climbing. Slight right rudder is necessary to compensate both engine and propeller torque during climbing.

Whenever possible, take-off into the wind.

The maximum demonstrated crosswind component for take-off and landing is 16 kts (30 km/h). No special procedures are required. The classical “low-wing” procedure: keep windward wing low and carry out course corrections using the rudder.

During the initial take-off phase, it is essential that the aircraft accelerate sufficiently in order to prevent stalling, should a sudden loss of power be experienced.

By a loss of engine power at altitudes below 260 ft (80 m) do not attempt course corrections of more than 90°. Quickly trim the aircraft to a gliding speed of 54 kts (100 km/h) (push stick forward). Avoid obstructions. Using the flaps touch down at a low speed. The approach phase can be shortened by slipping. Before undertaking an emergency landing in rough terrain, turn off the fuel valve and the ignition.

4.3 Cruising flight

In cruising flight the most economical cruise speeds are between 75 and 91 kts (140 - 170 km/h). The required engine performance depends upon aircraft load. Max. continuous engine speed is 5500 rpm.
In order to fly the aircraft comfortably, it should be trimmed to the desired airspeed with the throttle set for the appropriate rpm for horizontal flight.

Typical cruising flight:

	Rotax 912 UL	**Rotax 912 UL S**
Engine speed	4500 rpm	4500 rpm
Airspeed:	81 kts (150 km/h)	86 kts (160 km/h)
Fuel flow:	2.20 - 2.64 gph (10 -12 l/h)	2.42 - 2.86 gph (11 - 13 l/h)

The maximum speed of must never be exceeded.

C42:	97 kts (180 km/h)
C42B / C42E / C42C:	116 kts (216 km/h

In a turbulent weather the maximum airspeed is.
At the first indication of carburettor icing (rpm drop, stuttering engine running, increase in fuel consumption as indicated by the flow meter, if installed) apply carburettor heat and, if possible, fly the aircraft into non-icing conditions.

4.4 Turning flight

Turns are coordinated using the aileron and rudders.
With the increase of airspeed, significantly less amount of rudder deflection is needed.
Banks of 45° degrees or more are not recommended, a banking angle of more than 60 degrees is prohibited. In steep banks keep the nose and airspeed under control by means of the rudders and elevator.

4.5 Stalls

In cruising flight configuration (flap position 1), the stalling speed is 39 kts (75 km/h). The engine cowling will be well above the horizon.
At approximately 43 kts (80 km/h) there will be a slight buffeting of the airframe. When flown in this condition the aircraft is fully controllable. However, lateral altitude corrections must be done mainly with the rudder.
Example: right wing low => rudder deflection to the left.

If the aircraft is stalled slowly with the elevator in detent, it will enter into a stable stalled descent. Altitude loss can be up to 100 ft.

During a whip stall, the aircraft clearly pitches down (up to 40°). By slightly releasing the elevator, airspeed will increase and the aircraft will return to horizontal flight. Maximum altitude loss is 250 ft.

The aircraft reacts similarly in all flap positions.

Stall speeds for the various flap position,
take-off weight: 1042 lbs (472.5 kg):

v_{s1} flap position 0 (cruising flight)	ca. 40 kts (75 km/h)
v_{s2} flap position 1 (take-off/landing)	ca. 38 kts (70km/h)
v_{s0} flap position 2 (landing)	ca. 35 kts (65 km/h)

The stall speeds above will be affected by variations in take-off weights. .

4.6 Descent and landing

Begin with your approach early enough in order to set the correct landing configuration without hurrying. Activate carburettor heat.
The electrical fuel pump **must be switched on**.

In order to be able to steeply approach short landing strips, use flap position 2 (landing). Moreover, the glide path can be effectively shortened by a sideslip.

Before proceeding to flap position 2 reduce the speed below velocity Vfe - until 2009: 57 kts (105 km/h) - since 2009: 64 kts, favourably are about 48 – 54 kts (90 - 100 km/h).
On final approach with flap position 2 keep the speed at about 48 kts (90 km/h) with the engine at idle.

The glide angle in flap position 1 (take-off/landing) is significantly more shallow and thus the flare distance is much longer. The initial velocity should be about 57 – 59 kt (105-110 km / h).

At the height of approximately 10 ft (3m) begin rounding out to the landing flair. Begin final flair at the height of about 2 ft.(0.5 m). Landing speed is approx. 38 kts (70 km/h).

4.7 Shutting down the engine:

Under normal conditions, the engine will have cooled down sufficiently during descent and taxiing so that it can be shut down by turning off the ignition. Shut off all electrical accessories and radios **before** shutting down the engine.

4.8 Sudden loss of engine power:

I Loss of engine power during take off

Depending upon speed and altitude, lower nose and trim to gliding speed (ca.54 kts / 100 km/h). Do not attempt to return to airfield if altitude is below 1000 ft after gliding speed has been reached. At lower altitudes it is best to land straight ahead without attempting any course corrections.

Before attempting an emergency landing in rough terrain, turn off the fuel valve and switch off the ignition. When landing in a high vegetation (grain or similar) reduce speed directly above the vegetation by extending the flaps to position 2, pull stick fully aft and allow the aircraft to sink into the vegetation.

II Loss of engine power during cruising flight

Cross-country flights should be planned to ensure that a suitable landing field could be reached in the case of a loss of the engine power.

Once gliding speed has been established (flap position 0 = cruising flight, V_{IAS} = 48 - 54 kts / 90 - 100 km/h), look for a suitable landing field taking into consideration wind conditions. The best glide ratio is approx. 11:1 at 490 ft/min (2.5 m/s).

A lower rate of descent can be achieved with flap position 1 (take-off/landing), at approx. 48 kts (90 km/h), it does not however result in a better glide path.

With sufficient altitude you may attempt to restart the engine, check:

1. Fuel valve	OPEN
2 Magneto switches	ON
3. Fuel	SUFFICIENT
4. Fuel pump	ON

III Starting the engine in flight

- both magneto switches	ON
- electrical fuel pump	ON
- throttle	¼ OPEN
- carburettor heat	OFF
- fire up engine using starter	

Maintaining airspeed to windmill the prop can help.

4.9 Using the optional cowl flap on the aircraft C42

If your aircraft is equipped with the cowl flap, you have a possibility to control the temperatures of your engine via manual adjustment of the cooling air.

Thereby, you are in the position to keep the engine temperatures in the optimal range (90°-110°) independent of outside temperatures. It works in C42/C52 both for the oil and cylinder head temperature due to the installed oil and water heat exchanger.

Moreover, you can considerably shorten warm-up period by starting up the engine with a fully closed cowl flap.
It does not only protect the engine but also saves fuel. Though, for a reasonable and secure handling of the cowl flap it is necessary to closely watch the oil and cylinder head temperature.

Attention: If the cowl flap is closed the cooling air supply to the radiator will not be sufficient over a longer period, i.e. the oil and cylinder head temperature will rise to an inadmissible range (the red warning light range). In order not to forget to close the cowl flap, there will be installed an additional factory-provided warning light which flashes up when reaching the cylinder head temperature of 130° C. In this case, the cowl flap should be immediately fully opened.

The cooling down oft the cylinder head temperature to admissive and optimal temperatures can be supported by reducing the engine output and increasing the airspeed in descending.

The functionality test of the cowl flap is made during pre-flight inspection.

Principally, you should not wait for flashing of the caution lamp, but you have to observe the temperature and to open the cowl flap manually at the temperature of 90°-110°.

4.10 Emergency procedures

I Tipping due to lower speeds
Reduce back pressure on the stick and lower the nose.
Recover

II Sideslip
Set rudder in the opposite direction to a sideslip
Reduce back pressure on stick

III Spin
Throttle to idle.
Apply rudder opposite to the direction of rotation until the rotation will stop
Reduce back pressure on stick
Slowly pull aircraft up

IV Spiral dive
Set aileron and rudder opposite to the direction of rotation and pull back the stick slightly until a horizontal position will be taken.

V Loss of elevator control
With the elevator trim flap, the aircraft can be trimmed to speeds between 43 and 92 kts (80 und 170 km/h).

In calm weather conditions it can also be used to try to land the aircraft. If in doubt, deploy the parachute rescue system.

VI Loss of aileron control

Use the rudder to control the aircraft via skidding rollingmoments. If in doubt, deploy parachute rescue system.

VII Loss of rudder control

Controlling flatter curves is possible with the ailerons only.
If possible, perform a field landing in a straight flight.
If in doubt, deploy parachute rescue system.

VIII Carburettor fire

Main fuel valve	OFF
Electrical fuel pump	OFF

Full throttle
Sideslip
Follow emergency landing procedures.

5 Ground Handling

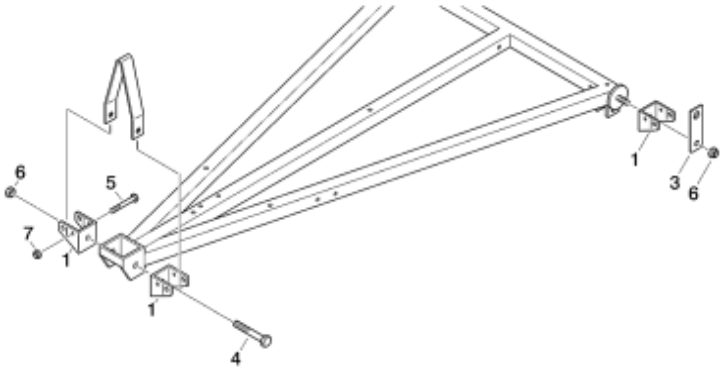
5.1 Towing

Manual moving of the aircraft is accomplished by using the tail struts upper connections as push points. Since there is no tow bar applicable at the nose gear, you have to press down the tail to raise the nose wheel off the ground. With the nose wheel clear of ground, the aircraft can be simply steered by pivoting it on the main wheels.

5.2 Hoisting

The aircraft may be lifted with a hoist of at least 1000 lb (0.5 tons) capacity by using T-support ceiling hangers.

Use suitable spring snap hooks for the three designated mounting points on the cabin roof.



5.3 Parking

When parking consider a number of factors:

- as a general precaution, set parking brake
- block the wheels with wheel blocks or brake blocks
- flap to zero = position 0

In severe weather and strong wind conditions, tie down the aircraft as outlined in paragraph 5.4 if a hangar is not available.

Caution:
Do not set parking brakes during cold weather (when accumulated moisture may freeze the brakes) or when brakes are overheated.

5.4 Tie-Down

When parking the aircraft outdoors, nose into the wind if possible. Set parking brakes or block wheels with brake pads.

Use ropes or belts (no chains, wire or steel cables) and fasten them to the tie down points (upper end of the front wing struts). Then secure them to the ground anchors.

Additionally, mount a rope or strap between the engine cowling and propeller spinner and secure to another ground anchor.

The control stick must be secured with the help of the safety belt in a fully retracted position.

Tie-Down Point at the Upper Front Strut Area

Tie-Down Point between the Engine Cowling and Propeller Spinner

6 Minimum equipment

- Four point harness for each seat
- Airspeed indicator 0 - 116 kts (0 - 216 km/h).
- Altimeter with Kolsmann window
- Compass
- Tachometer
- Cooling liquid temperature gauge
- Oil temperature gauge
- Oil pressure gauge
- Fuel gauge
- Generator charge control
- Data placard
- - Pilot's operating handbook
- - Parachute rescue system
- Checklist

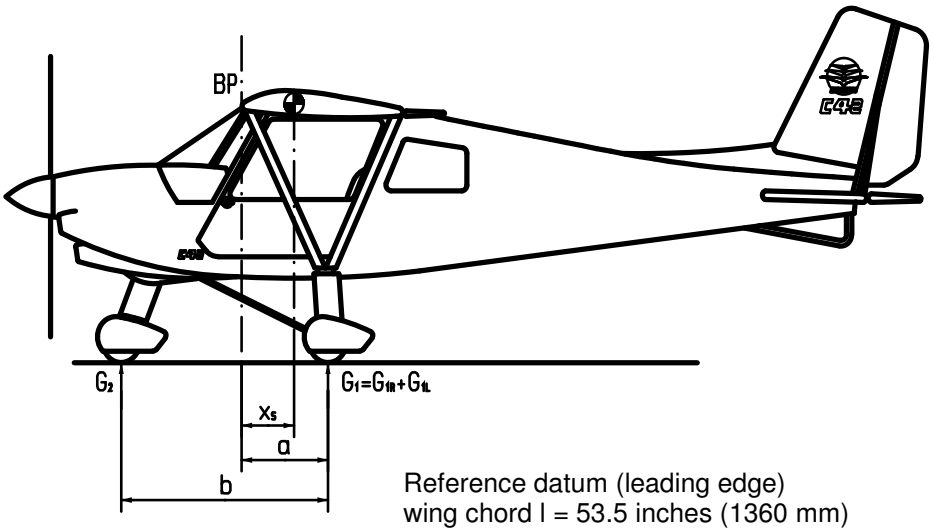
7 Dimensions

Cf. the following page 5 - 7.

8 Weight and balance

Place the aircraft in a level position on three scales with the stabilizer and elevator leveled.

The center of gravity is measured in mm or inches behind the reference datum and then calculated as a percentage of the wing chord.



Reference datum (leading edge)
wing chord l = 53.5 inches (1360 mm)
determine measurements a and b
(center of wheel axle).

$$\text{(I)} \quad x_s\,mm = a - \frac{G_2 \cdot b}{G_1 + G_2} = ...mm$$

$$\text{(II)} \quad x_s\,\% = \frac{x_s\,\text{mm} \cdot 100}{1360\,mm} = ...\%\,1$$

8.1 Empty weight center of gravity:

Serial No._____

Aircraft data sheet No: Typ:_____

Basic empty weight (standard equipment): _____kg

Operating empty weight (incl. optional equipment): _____kg

a = mm, b = mm

G_1 G_{1R} :	+ G_{1L}:	=		_____kg
G_2		=		_____kg
G total		=		_____kg

x_s mm: mm

$x_{s\,\%}$: % L

It is the pilot's responsibility to ensure that the MTOW of 1041 lbs (472.5 kg) is not exceeded.

max. useful load: kg
MTOW: 472,5 kg

Loading plan

position	weight x lever arm = torque		
	kp	cm	cm kp
empty weight			
1. seats		40	
2. fuel		95	
3. baggage		130	
total weight kp		total torque	kp
center of gravity CG =	total torque [cm kp] / total weight [kp] =		cm

allowed range for CG: 300 - 560 mm behind zero datum (leading edge)
empty weight CG: 280 - 460 mm behind zero datum (leading edge)

Date:_____ Signature:_____

Loading plan

position	weight x lever arm = torque		
	kp	cm	cm kp
empty weight			
1. seats		40	
2. fuel		95	
3. baggage		130	
total weight kp		total torque	kp
center of gravity CG =	total torque [cm kp] / total weight [kp] =		cm

allowed range for CG: 300 - 560 mm behind zero datum (leading edge)
empty weight CG: 280 - 460 mm behind zero datum (leading edge)

Loading plan

position	weight x lever arm = torque		
	kp	cm	cm kp
empty weight			
1. seats		40	
2. fuel		95	
3. baggage		130	
total weight kp		total torque	kp
center of gravity CG =	total torque [cm kp] / total weight [kp] =		cm

allowed range for CG: 300 - 560 mm behind zero datum (leading edge)
empty weight CG: 280 - 460 mm behind zero datum (leading edge)

9 Data placard and checklist:

Airspeeds

Never-exceed speed		
C42		97 kts (180 km/h)
C42B / C42C / C42E		116 kts (216 km/h)
Stall speed		35 kts (65 km/h)

Load factor

Positive limit load factor	+4 g.
Negative limit load factor	-2 g.

Maximum recommended wind speeds for operation

Steady winds	22 kts (40 km/h)
Demonstrated cross-wind component	16 kts (30 km/h)

Capacity	max	
	min	65 kg

The pilot operates this aircraft at his own risk.

Manufacturer _____

Serial no. _____

Registration
LTZ-Nr _____

Year of
manufacture _____

Month _____

Aircraft basic
empty weight _____

10 “Before take-off” checklist

1.	The seat belts are fastened?	
2.	Control system free and correct?	
3.	Parachute system unlocked?	
4.	Check fuel level	
5.	Electric fuel pump	ON
6.	Choke	OPEN
7.	Carburettor preheating (in C42B / C42C)	OFF
8.	Electric instruments	ON
9.	Altimeter set?	
10.	Flaps (take-off/landing)	flap position **1**
11.	Check magnetos	
12.	Wind direction?	
13.	Runway and approach	CLEAR

11 Approved equipment

Engine: Rotax 912 UL
C-gearbox, 2.27 to 1 reduction ratio

Approved propellers

- WARP DRIVE 2-blade, 68” diameter
- WARP DRIVE 3-blade, 68” diameter
- Sport-Prop 170R 3-blade
- GSC 3-blade propeller, 68” diameter
- Neuform 2-blade CR2-75 ground adjustable propeller
- Neuform 3 blade CR3-75 ground adjustable propeller
- Kiev Prop 3-blade BB 263/1700 ground adjustable propeller
- Helix 3-blade H50F-1,75m-R-SI-12-3 ground adjustable propeller

Motor: Rotax 912 UL S
C-gearbox, 2.43 to 1 reduction ratio

Approved propellers

- WARP DRIVE 3-blade, 68” diameter
- GSC 3-blade propeller, 68” diameter
- Neuform 3-blade CR3-75 ground-adjustable prop.
- Neuform 3-blade CR3-V-R2H in-flight-adjustable prop.
- Kiev Prop 3-blade BB 283/1800 ground-adjustable prop.
- Helix 3-blade H50F-1,75m-R-S-14-3 ground-adjustable prop

Approved parachute rescue systems:

- BRS 5-UL4
- BRS-6-1050-SP-DAeC
- Magnum 450 Speed (MTOW 450 kg only)
- Magnum High speed Soft pack
- Magnum Lightspeed Soft pack

Be certain to follow the instructions of manufacturer for installation, required maintenance and particularly the avoidance of moisture in the parachute pack. Should the chute get wet, it must be aired and repacked.

There is a time limit on the use of the rocket cartridge in rocket deployed systems.
Before taking off, remove the system safety pin.
After landing secure the system with the safety pin.

Fuel tank capacity - approved versions:

~~1x / 2x / 3x / 4x 25l*~~
1x / 2x 11 imp gallons (50 l)*
1x / 2x 14.3 imp gallons (65 l)

* no longer available

Electrical flap drive

12 Flight performance:

12.1 Take-off distance

	Rotax 912 UL	Rotax 912 UL S
Sea-level, +15°C, no wind		
Take-off roll distance (gross) (1041 lbs/472.5 kg)	345 ft (105 m)	310 ft (95 m)
Take-off distance over 50 ft (15 m) obstacle		
solo	700 ft (210 m)	605 ft (185 m)
gross	800 ft (245 m)	705 ft (215 m)
Take-off speed	38 kts (70 km/h)	38 kts (70 km/h)
Speed at 50 ft (15 m) obstacle	49 kts (90 km/h)	49 kts (90 km/h)

Higher elevations and higher temperatures lengthen the take-off distances.

The figures given are valid for a MTOW of 793 lbs (360 kg) flown solo and 1041 lbs (472.5 kgs) with two persons on board. No wind, on dry, flat terrain with short grass.

12.2 Rate of climb

		Rotax 912 UL	Rotax 912 UL S
Sea-level, +15°C, no wind			
Engine speed		5500 rpm	5200 rpm
Rate of climb	solo	1180 ft/min (6.0 m/s)	1377 ft/min (7,0 m/s)
	gross	944 ft/min (4.8 m/s)	1082 ft/min (5.5 m/s)
Speed for best rate of climb		49 kts (90 km/h)	49 kts (90 km/h)

12.3 Cruising speed (solo)

C42 / at engine speed 4700 rpm (65%)	84 kts (155 km/h)	89 kts (165 km/h)
C42B / at engine speed 4700 rpm (65%)	86 kts (160 km/h)	92 kts (170 km/h)
C42LSA / at engine speed 4700 rpm (65%)	86 kts (160 km/h)	92 kts (170 km/h)
C42C / at engine speed 4700 rpm (65%)	89 kts (165 km/h)	94 kts (175 km/h)
Speed for a maximum range	76 kts (140 km/h)	78 kts (145 km/h)

Maximum range with 11 imp. fuel gallons (50 l) tank capacity when windless approx. 270 nm (500 km)

Maximum range with 14.3 imp. fuel gallons (65 l) tank capacity when windless approx. 350 nm (650 km)

12.4 Engine off performance (solo)

MTOW 1041 lbs (472.5 kg)

Minimum sink rate at 46 kts (85 km/h), flap position 1	393 ft/min (2 m/s) (take-off/landing)
Best glide angle at 51 kts (95 km/h) flap position 2	1 to 11 (cruise)

ATTENTION:
Follow the instructions in the Rotax 912 operator's manual.

13 Attaching the wings

13.1 Attaching the wings to the fuselage

The wings are attached to the fuselage as follows:

Step 1 Bring the wing main strut into a correct position to the wing by means of attaching the auxiliary struts in the receptacles on the front and rear wing spar.

Step 2 Grip the main strut and raise the wing tip. Keeping the wing in a vertical position, carry the wing forward at 90° to the fuselage.

Step 3 Turn the wing into a horizontal position, keeping the wing tip slightly higher than the wing root.

Step 4 Slowly push the wing against fuselage and wing spar brackets.

Step 5 Before pushing against the spar brackets, look for the slideway at the rear spar intake so that to lead the rear wing spar in the locking position. When the retaining bolt is touched, rotate the right wing slightly clockwise (the left wing must be rotated counter-clockwise).

By moving slightly upwards, the rear wing spar will lock into the retaining bolt and the front wing spar will take position under the retaining bolt of the front wing tube holder.

Push the front wing spar against the bracket while slightly lowering the wing tip. The front wing spar will lock into the retaining bolt. At the same time, launch the lower end of the wing support in the square cross-frame. Carefully check that both wing spars have properly locked into place.

Step 6 **Attention and now immediately**

1 insert mounting bolts into the front wing spar bracket

2 insert mounting bolts into the rear wing spar bracket

3 insert toggle bolt into the square cross-frame spar to secure the wing support

4 all three bolts must be secured with **the ring pins!**

5 **lift the wing and check that the wing support is fixed by the toggle bolt really reliable!**

Repeat Step 1 to 6 for the other wing.

Remove any aileron locks used.

Step 7 attach right and left aileron push rods to the see-saw connection. Carefully assure that the slide mechanism of the special ball-joint connectors is in completely closed position.

Step 8 left and right flaps connection must be locked

Step 9 fasten wing center section fairing

13.2 Folding the wings for hangaring

(optional on Model C42 / C42B)

1. Remove wing center section fairing

2. Unlock aileron push rods from see-saw cross connection

3. Unlock left and right flaps connection

4. first: remove toggle bolts at the base of the wing support
   second: remove fastening bolts at the rear wing spar
   third: remove fastening bolts at the front wing spar

The following 5 steps must be undertaken to fold back the wings.

Step 1 Lift right wing at the wing tip, rotate slightly to unlock first the forward wing spar and then the rear one.

Step 2 Draw the wing back off the fuselage until the stop ring on the slide tube is reached.

Step 3 Turn the wing into a vertical position – bottom surface of the wing to the forward.

Step 4 Swing the wing tip back.

Step 5 Place the wing tip on to the retainer bracket on the empennage.

Repeat steps 1 to 5 for the left wing.

14 Pre-flight inspection

Before each flight the pilot must carry out a visual inspection of the aircraft.

14.1 Engine

- Check propeller and spinner for damage and security
- Check cowling near the propeller for abrasion (sign of defective engine suspension or improper cowling attachment)
- Check for leakage under the engine cowling
- Check cooling liquids and lubricants
- Check secure attachment of the engine cowling
- Check that coolers are clean (oil cooler, water cooler)
- Check air vents for blockage
- Check NACA-intake for blockages

14.2 Landing gear

- Check secure attachment of all components (hub caps, brake cylinders, brake discs)
- Check for a visible deformation
- Check air pressure in the gas-filled shock absorber (aircraft t level, pull aircraft down and release, gas-filled shock absorber must fully rebound)
- Check pressure and condition of tires

14.3 Left wing

- Wing spar connections secured?
- Wing struts properly attached and secured?
- Auxiliary struts secured with quick-release fasteners?
- Pitot tube secured and free from dirt and water?
- Check aileron shift levers and push rods by opening the zippers on the wing bottom
- Check condition of fabric covering (rips, etc.)
- Check profiled struts for secure attachment
- Check wing tips and wing tube for deformation
- Check attachment of ailerons and flaps.
- Check the spring-loaded locks at the sliding sleeves for proper power transmission (they have to be locked properly at the front and rear end of the tubes)
- Check QR-Spades of the C42C model for secure attachment and deformation.

14.4 Left side of fuselage

- Check condition of glass-fiber fairing (cracks, holes, etc.)
- Check secure attachment of glass-fiber fairing (check for missing screws at the upper/lower connection)
- Check elevator shift lever through the baggage hatch in the fuselage wall
- Tank filler cap secured?

14.5 Empennage

- Check attachment of the horizontal stabilizer
- Check control surface hinges?
- Check elevator inter-connection
- Trim flap secured?
- Check attachment and connection of the Flettner rudder of the C42C model
- Check connections of the elevator push rod
- Check the elevator struts for a secured attachment and possible deformation
- Check rudder cables for being connected and secured
- Check fabric covering (rips, chafing)

14.6 Right side of fuselage

- Check condition of glass-fiber fairing (cracks, holes, etc.)
- Check secure attachment of glass-fiber fairing (missing screws, etc.)

14.7 Right wing

- cf. left wing

14.8 Cabin, inside and outside

- Check condition of windscreen, doors including locking mechanism (cracks)
- Check free movement of the steering (control stick, pedals, flap lever with a lock)
- Check the brake lever and stand lock
- Check aileron lever for being connected and secured
- Visually check aileron cables and pulleys
- Check fuel valve

14.9 Instruments

- Power supply (ignition switch in the position 1)
- Altimeter setting
- Amount of fuel
- Functioning of the radio and intercom system

14.10 Drainage

- Drainage of the fuel tanks (the drainage tap is located under the copilots seat)

15 Care and maintenance

1. Care and cleaning

All metal parts are corrosion-resistant and require no special care. Dirt on the aircraft and the fabric can be removed by using clear water.

Repair of the wing fabric: repair even the smallest rips for your personal safety.

A wing fabric repair kit is available from the manufacturer. It is to be applied to a clean, grease-free area by means of contact adhesive. Larger rips in the fabric or along the seams in any case must be repaired by the covering specialists. When in doubt, contact the manufacturer.

Be especially careful in the maintenance and cleaning of the cabin glazing! It is highly recommended to abundantly use clear water with a little detergent for softening and rinsing of contamination. For drying, a fine microfiber cloth should be used which is solely used for this purpose. By no means solvent-based or acid-based detergents may be used.

2. All maintenance

All maintenance work must be carried out by appropriately qualified persons.

3. Especially Repair works and major changes must be reported and officially inspected.

4. Airworthiness inspections in Germany must be carried out by the manufacturer or by DAeC inspectors. In other countries different regulations may apply.

5. Repair works

Repairs by the owner are limited to the exchange of defective parts. Only original spare parts may be used.
In no case shall any part be reprocessed, straightened or otherwise processed for repair and re-installation.

6. Periodical inspections

Periodical inspections (50 / 100 hour inspection) should be carried out in accordance with the provisions of the C42 COMCO IKARUS GmbH Maintenance Manual and 912 ROTAX Maintenance Manual. If not conducted, the safety of the aircraft is not guaranteed and warranty claims may be omitted. The periodical inspections should be conducted in one of our IFC (Ikarus Flight Center), ITB (Ikarus Technical Base), ISC (Ikarus Service Center).If periodical inspections should be conducted by the owner himself, these technical documents (Maintenance Manual) have to be ordered at IFC/ITB/ISC or directly at COMCO IKARUS GmbH.

7. Technical problems

Technical problems or defects should be reported to
- the manufacturer
- the relevant national authority

16 Rigging data

Wingspan C42 / C42 B:	31,0 ft	(9450 mm)
Wing area	134,5 ft^2	(12,5 m^2)
Wingspan C42 C:	28,6 ft	(8710 mm)
Wing area	128,1 ft^2	(11,9 m2)
Wing chord at root:	4,7 ft	(1435 mm)
Wing dihedral 1°		

a.) Incidence angle of the wing relative to the fuselage main tube: 8,5°

Note The incidence angle is measured from the lower edge of the rear wing tube to the lower edge of the front wing tube at the root rib.

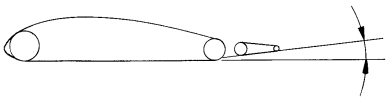
b.) Incidence angle of the horizontal stabilizer relative to the fuselage main tube: 7°

Note The stabiliser incidence angle is measured from the lower edge of the front tube to the lower edge of the rear tube of the horizontal stabiliser.

Incidence angle difference of the wing to the horizontal stabiliser
Measured at the root rib: **1,5°**

c.) Control surface deflections

Note: The angle of the aileron bottom relative to the wing chord is -5° (tangent front to rear spar). It is defined by the length of the aileron push rods.



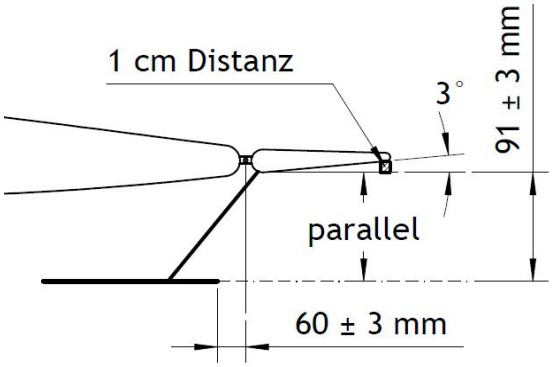
-5°
Distance from axis of rotation

Aileron

Neutral p.	-7°±-1°	-1.38” ± 0.39”	(-35 mm ± 10 mm)
Up	20°±-2°	3.54” ± 0.39”	(90 mm ± 10 mm)
Down	14°±-2°	2.76” ± 0.39”	(70 mm ± 10 mm)

Measuring point distance from the steering axis: 9.84” (250 mm)

Spade settings on the aileron in the C42C model
Spade angle in relation to the QR-bottom +3° ± 1°



Measurement with water level at base of 1 cm under Aileron end strip

Rudder

Left	32°±-2°	8.86” ± 0.39”	(210 mm ± 10 mm)
Right	32°±-2°	8.86 ” ± 0.39”	(210 mm ± 10 mm)

Measuring point distance from the steering axis: 16.24” (410 mm)

Elevator

Up	28°±-2°	8.27” ± 0.59”	(210 mm ± 15 mm)
down	20°±-2°	5.12” ± 0.59”	(130 mm ± 15 mm)

Measuring point distance from the steering axis: 16.24” (410 mm)

Flettner rudder

When the elevator neutral: Flettner rudder 0° ± 2° 78 mm ± 3 mm

Flaps

Note: Flap angle is measured from the flap bottom to the bottom of the wing at the root area (tangent front to rear spar)

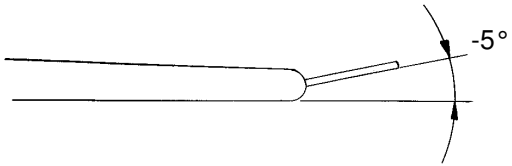
Position 1 (cruise)	-5°±-1°	1.06” ± 0.39”	(27 mm ± 10 mm)
Position 2 (take-off/landing)	+11°±-1°	2.36” ± 0.39”	(60 mm ± 10 mm)
Position 3 (landing)	+32°±-1°	6.69” ± 0.39”	(170 mm ±10 mm)

Measuring point distance from the steering axis: 12.20” (310 mm)

Trim flap

Lever nose-down: trim flap in relation to the rudder area -5°

Note:
with mechanically actuated trim flaps do not exceed -5° upwards



d) Landing gear

Main landing gear	2.0 - 2.5 bar	29 - 36 psi
Nose landing gear	1.6 - 2.0 bar	23 - 29 psi
Shock absorbers	28.0 - 34.0 bar	400 - 490 psi
Amount of oil	0.42 pts (200 ml)	
Hydraulic oil	HVP 10	

e) Brakes

In the Ikarus C42 series different brake systems are used.
e.g.-Sachs, Magura, Tost and Beringer brakes.

For service information, please see our maintenance manual or ask one of our IFC and ISC.

Always use low viscosity mineral oil	“CASTROL LHM 1756”
or	”PENTOSIN LHM” (Citroen)

Never use Glykol-based brake fluid!!

f) Engine

Tightening torque for propeller attachment screws	25 Nm
Tightening torque for propeller blade setting screws	12 - 15 Nm

For service information, please see our maintenance manual or ask one of our IFC and ISC.

Please be advised that towing glider planes or banner is subject to authorization of local authorities and is independent on the airplanes capabilities.

17 Information for ultralights with towing gear

I. Glider towing

17.1 Equipment of the towing aircraft

If the following additional equipment is installed the ultralight aircraft may be used for towing gliders:

1. Powerplant Rotax 912 UL S (74 kW / 100 hp)
   Warp Drive 3-blade 68" diameter
   Neuform 3-blade CR3-75 ground-adjustable
   Neuform 3-blade CR3-V-R2H in-flight-adjustable
   Kiev Prop 3-blade BB 283/1800 ground-adjustable

2. Tow hook mount

3. Tow nose hook E85

4. Comco release mechanism operated by the pilot

5. Rear mirror / camera system

6. Engine monitoring instruments with appropriate markings

7. Placards at the airspeed indicator and the tow hook

Installation must follow the relevant instructions from the manufacturer. Unauthorized alteration of the towing equipment is prohibited.

Tow rope and predetermined breaking point:

Only ropes, which correspond to the aviation standards, can be used, DIN or factory standards, if these standards (specifications) contain sufficient information and ensure the delivery of consistent quality. The rope connection must be protected against abrasion by a suitable coating.

When using the tow rope without a predetermined breaking point the true ultimate load of the tow rope must not exceed 300 daN. In the case of tow ropes with a higher ultimate load, a predetermined weak link must be installed for the protection of the aircraft and the glider.

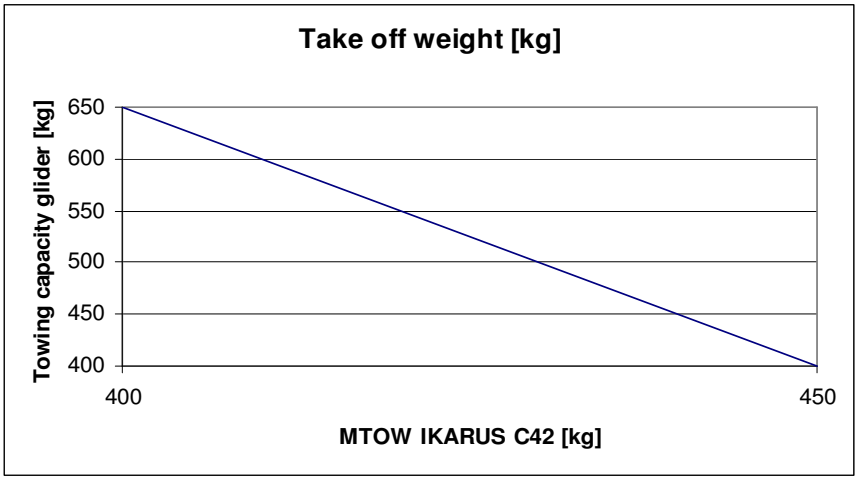
Length of the tow rope: 131 - 197 ft (40 - 60 m)

Max. nominal breaking strength of the weak link: 660 lbs (300 daN)

Joining ring pair on the tow rope according to LN 65091

17.2 Operating limitations

a) Permissible take-off weights
The aircrafts of the IKARUS C 42 series are approved for towing gliders with a maximum take-off weight of 1433 lbs (650 kg).
The maximum take-off weight of the towing aircraft in this case is 882 lbs (400 kg).
The maximum take-off weight of 1041 lbs (472.5 kg) of the towing aircraft may only then be used to the full if the weight of the glider does not exceed 882 lbs (400 kg).



b) Towing speeds
The minimum speed of the tug and tow depends upon the type of glider being towed. It, however, must not be lower than the minimum towing speed of the IKARUS C 42.

Vmin tow = 49 kts (90 km/h)

Depending upon the take-off weight of the IKARUS C 42 the following flap positions should be used at towing speeds below 59 kts (110 km/h):

Available flap positions 0 / 1 / 2
0 = no flap 1 = half flap 2 = full flap
Take-off weight below 882 lbs (400 kg)
Flap position 0
Take-off weight between 882 lbs (400 kg) and 1041 lbs (472.5 kg)
Flap position 1

The minimum speed of the majority of modern gliders generally lies above that of the ultralight towing aircraft. This means that the minimum speed depends generally on the operating limits of the glider. A glider pilot must pay particular attention to ensure the compliance with the required minimum speed during the entire towing procedure.

Maximum towing speed with the flaps in position 0 is 81 kts (150 km/h).
In order to achieve optimum performance during take-off and the towing of slow flying gliders, towing with flaps in flap position 1 is permitted.

IMPORTANT! Before towing, the pilot of the towing aircraft and the pilot of the glider must agree on the towing speed.

17.3 Flight characteristics and performance

a. Flight performance

Glider take-off weight	860 lbs (390 kg)
Runway conditions	dry grass
Temperature	15°C
Elevation	0 ft ASL

Take-off weight of glider (lbs) Type of glider	Take-off distance, 50 ft obstacle [ft]	Towing speed [kts] IAS	Rate of climb [ft/min]
683 lbs Standardlibelle	1313	57	689
816 lbs LS4	1477	59	591
860 lbs Kestrel	1575	59	591
1300 lbs ASK 21	1706	57	453
1433 lbs Duo-Discus	1903	57	374

b. External factors

- Increase of take-off distance by about 5% for every 10°C increase of the air temperature
- Increase of take-off distance by about 10% for every 1000 ft increase of the pressure altitude
- Decrease of take-off distance by about 10% when taking off from a paved runway

- Considerable increase of the take-off distance on a wet grass runway
- Dirt on the glider surface, particularly on the wing leading edge, and raindrops can increase recommended towing speeds and take-off distances, depending upon the type of glider. Appropriate instructions from the glider manufacturer should be followed. Rain or dirt particles have no significant influence on the performance of the IKARUS C 42 Series when towing.
- Headwind will reduce the take-off distance as follows:

  10 kt (18 km/h) take-off distance with no wind x 0.7

  20 kt (37 km/h) take-off distance with no wind x 0.65

  30 kt (55 km/h) take-off distance with no wind x 0.6

c. Instructions for towing operations

- Electrical fuel pump must be switched on while towing
- Test the tow hook before each tow
- Check the tow rope and the weak link for mechanical damage before each tow

17.4 Placards

- Next to the airspeed indicator
  Observe towing speed

- On the release handle
  Tow hook - pull - open

- On the tow hook mount
  Weak link - max. 660 lbs (300 daN)

17.5 Emergency procedures during towing

a) During take-off
Should one of the following situations arise, the tow rope should be released by the towing pilot:

- if the glider breaks out and the glider pilot does not react.
- if the glider climbs above the towing aircraft and the attitude of the towing aircraft is no longer properly controllable
- if the towing aircraft climbs prematurely and the towed glider cannot follow due to a lack of speed (high wing loading, water ballast, etc.), the rate of climb of the towing aircraft should be reduced and the towing speed increased immediately. If this is not possible, the towing cable should be released.

NOTE: If possible, the pilot of the towing aircraft should inform the glider pilot before releasing the tow rope.

b) During towing

- Lateral displacement of less than 30°, vertical displacement of the glider - less than 30° (up) and 20° (down) - can be corrected using the rudder and elevator. In the case of greater displacement angles, particularly high vertical displacement angles, the tow rope should be released by the towing pilot.
- Avoid tight circling with a long tow rope. When circling, make sure that the turn radius is sufficiently large so that the glider can follow the towing aircraft.
-
- - If there is a danger of exceeding the maximum engine temperatures (oil and cylinder head temperature), reduce engine power and increase the towing speed.
-

c) Failure of the release mechanism

- If the release mechanism of the towing aircraft fails, execute final approach over an obstacle-free area and land with tow hook released.
- If both release mechanisms fail, execute descent but do not exceed the maximum rate of descent of 295.3 ft/min (1.5 m/s) and land with the tow hook released (by employing the brake flaps of the glider, make sure that tow rope is tense).

18 Inspection and maintenance intervals

NOTE:
The inspection and maintenance instructions in the operating handbook for the E 85 tow hook must be followed at all times.

The maximum operating time of the tow hook between two general overhauls is:

2,000 take-offs or 10,000 releases.

The weak link must be replaced every 200 tows.

In addition to the inspection and maintenance instructions in the operating handbook for the E 85 tow hook, the following should also be considered:

Check Bowden cable for the freedom of movement and damage near the release lever and near the tow hook	before each towing flight
Check release force at release lever with unloaded tow hook ≤ 13 daN	every 200 tows
Clean and grease the Bowden cable at the adjustment bushings near the release lever and the tow hook	every 200 tows

Please be advised that towing glider planes or banner is subject to authorization of local authorities and is independent on the airplanes capabilities.

II. Banner tow

1. Equipment in the towing aircraft

In order to perform a banner tow, the aircraft must be equipped with the same equipment as described above for towing gliders.
The following propellers are approved for banner towing when the aircraft is eqiped

with a ROTAX 912 UL (80 PS):

1. Warp Drive, 3 bladed, 68"
2. Neuform CR3-75, 3 bladed, ground adjustable propeller
3. Kiev Prop BB 263/1700, 3 bladed, ground adjustable propeller

with a Rotax 912 S/ULS (100 PS):

1. Warp Drive 3-blade (1)
2. Neuform 3-blade CR3-V-R2H variable pitch propeller (3)
3. Neuform 3-blade CR3-75 (4)
4. Kiev Prop BB 283/1800 3-blade (5)

Banners may only be picked up and towed according to approved procedures and by aircraft with the appropriate equipment.
Banners must be made of water-resistant material.
Only banners may be used which correspond to the products requirements defined by the organisations DAeC and DULV.

2. Limitations

a) Maximum permissible banner drag: 80 daN

b) Passengers: 1 pilot or 2 pilots during tow training

Warning: Do not exceed maximum take-off mass!

c) Weak link rating, tow rope breaking point
Banner tow 100 daN

d) Length of the tow rope

Laid-out banner	40 – 60 m
Rolled banner	25 – 40 m

e) Speeds

Minimum airspeed	85 km/h
Best rate of climb airspeed	95 km/h
Airspeed during tow	100 km/h
Maximum airspeed	120 km/h

Flaps must be retracted at airspeeds above 105 km/h!

f) Banner size

Rotax 912 UL (80 PS)	120 m^2
Rotax 912 ULS (100 PS)	150 m^2
Maximum banner height	5 m
Maximum banner mass	20 kg

3. Placards

a) In a view of the pilot on the instrument panel:

Aero-towing:
Operating conditions for banner tow are to be found in the supplement to the Pilot's Operating Handbook.

b) On the airspeed indicator:

Watch airspeed during tow

c) On the release lever:

tow hook - pull - open

4. Emergency procedures

Banner tow

- In the case of an emergency (e.g. engine loss, loss of power) the banner should be dropped over open country, if possible.

- If the banner cannot be dropped, the aircraft must be landed with the banner attached, paying close attention to the obstacle clearance.

5. Normal procedures

a) The banner must be assembled and used in accordance with the relevant instructions from the manufacturer.

Set flaps to position 1 (take-off/landing) for take-off. Fly curves at low angles only.

Avoid aero-towing in rain.

b) Check the following before commencing aero-tow:

- Tow hook, release mechanism (functionality), rear mirror/camera position

- Condition of the tow rope and attachment elements (knots, connecting rings)

- Check banner for damage and completeness

c) The laying out and picking up of the banner must comply with manufacturer recommendations.

d) Except in the case of an emergency, the banner must be dropped at safe airspeed and low altitude within the airfield over an open area with no risk to people or property.
After dropping the banner, the C42 will accelerate slightly.
A landing with the banner attached is only permitted in an emergency.

6. Performance

The take-off distance over 50 ft obstacle increases by about 50 %. The ground roll for a shirred banner set up in accordance with the relevant manufacturer recommendations is not affected. For a take-off with a rolled banner, refer to the values given in the following tables:

Rotax 912 S (100 PS) banner size	Ground roll aircraft	Ground roll banner	Take-off distance over 50 ft obstacle
70 m^2	110 m	180 m	330 m
120 m^2	150 m	210 m	380 m
150 m^2	180 m	240 m	410 m

Rotax 912 S (80 PS) banner size	Ground roll aircraft	Ground roll banner	Take-off distance over 50 ft obstacle
70 m^2	140 m	180 m	360 m
120 m^2	180 m	210 m	410 m

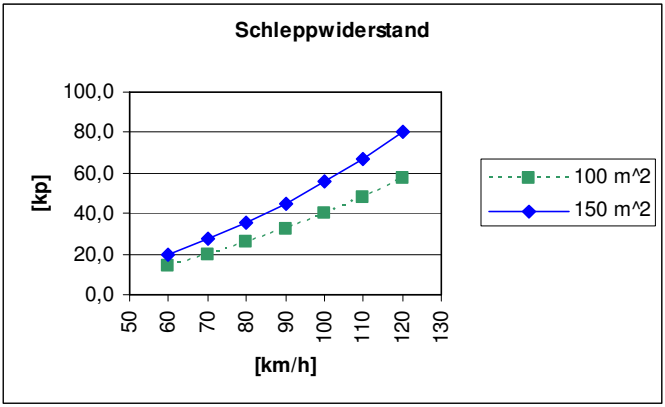
Rotax 912 S (100 PS) banner size	Rate of climb single-seat
70 m^2	3.5 m/s
120 m^2	3.0 m/s
150 m^2	2.5 m/s

Rotax 912 S (80 PS) banner size	Rate of climb single-seat
70 m^2	2.5 m/s
120 m^2	2.0 m/s

Sufficient power should be set for a climb, otherwise there will be a strong speed drop. The operating limits of the drive unit must not be exceeded. The relevant values should be constantly monitored.

Fuel consumption increases by approximately 30%.

Fuel consumption at 100 km/h:
Banner size: 100 m^2 approx. 15 l/h
Banner size: 150 m^2 approx. 17 l/h



19 Special features of the aircraft equipped for handicapped pilots

1. Equipment

If the following additional equipment is installed in the aircraft, it can be operated without using the feet to control the nose wheel and the rudder:

1. modified throttle shaft including throttle lever extension;
2. rudder control lever with push rod;
3. placard on the rudder control lever.

Installation must be undertaken in accordance with the instructions of the manufacturer. The unauthorised alteration of the equipment for handicapped pilots is not permitted.

2. Installation / Dismantling

The rudder control lever is installed by attaching to the mounted axle in the main tube and bolting with a hexagonal bolt M8xM40.
The push rod which is attached to the rudder control lever is connected to the right pedal of the left seat by a quick-release fastener. The sliding sleeve of the quick-release fastener is then checked for a proper fit in the locked position.
Throttle lever length is then set so that the knob of the throttle lever is approximately ten to thirty millimetres under the rudder control lever and can pass freely under it.

The additional control equipment is dismatled in reversed order.

3. Operation

The nose wheel and the rudder are controlled with the left hand on the rudder control lever. By pulling out the rudder control lever, the aircraft turns to the left, by pushing it in, the aircraft turns to the right.
The right hand remains constantly on the control stick and operates the elevator, aileron and brakes. The left hand operates the rudder control lever and the throttle lever, which is located directly below the rudder control lever.

Take-off:

1. Align the aircraft on the runway, left hand (LH) on the rudder control lever.
2. Apply throttle expeditiously with LH.
3. Put LH immediately back to the rudder control lever and steer aircraft during take-off run.
4. After take-off in approximately 5 to 10 m above the runway, use LH to check that the throttle lever is still in the full throttle position.
5. Excepting in case of power changes, LH remains constantly on the rudder control lever.

The various flight conditions, e.g. horizontal flight, turn, slow flight, side-slip, are not affected.

Landing:

The landing approach is by default. In the case of crosswind, the wing-down method should be used.

Attention should be paid to the following when flaring out:

1. Air speed is approx. 100 km/h until flare out is in approx. 4 to 5 m above the runway, LH - on the rudder control lever.
2. Throttle to idle using LH.
3. LH should be immediately back to the rudder control lever and steer aircraft during landing roll.

When carrying out touch-and-go, follow the procedures for take-off.

20 Flying with the IKARUS C42 Series with the removed doors

Under the following conditions, the IKARUS C42 SERIES may be flown with the dismantled doors:

- All loose items (maps, documents) should be properly secured.
- The dropping of objects during flight is prohibited.
- Maximum speed for flights with one or both doors removed is 150 km/h IAS.
- Side-slipping is not permitted with dismantled doors.
- Turbulence in the cockpit will increase when the flaps are set to position **2**.

Please be advised that towing glider planes or banner is subject to authorization of local authorities and is independent on the airplanes capabilities.

21 Additional instructions for dropping parachutists from the IKARUS C42 Series

1. Personnel requirements

In order to use the micro-light aircraft C42 SERIES to drop parachutists, the following requirements must be fulfilled:

- The pilot must have a valid licence and flight experience of at least 100 hours as well as the aeronautical radio telecom licence.
- The parachutist must have a valid licence and have carried out at least 100 jumps with manual release and at least 12 jumps in the last 12 months.

2. Technical requirements

The C42 Series micro-light aircraft may be used for dropping parachutists if the following technical requirements are fulfilled:

- The doors, or at least the right door, must be removed before take-off. (It is not permitted to open the door during flight.) The additional instructions for flying the C42 Series with the removed doors must be followed!
- During the flight the parachutist must be secured at least with the seat belt.
- The pilot and the parachutist must be able to communicate with each other at all times.

3. Measures prior to the take-off

The pilot and parachutist must agree on the following points before take-off:

- drop zone
- drop altitude
- drop airspeed
- agreed signals
- function and activation of the aircraft's recovery system

Prior to take-off, the course of action for jumping out of the aircraft must be demonstrated and practised on the ground:

- opening the seat belt;
- the parachutist turning outward about 90° and possibly holding on to the upper tube of the door frame;
- changing the grip to the lower cockpit frame and the wing strut;
- leaving the aircraft to the side and in front of the wing strut.
- ensuring that there is sufficient distance between the parachutist and the propeller!

4. Drop procedures

After completing the climb to the agreed drop altitude, level off the aircraft and continue horizontal flight at the airspeed of 90 to 110 km/h. For that set the flaps to position1 (take-off).

Then, the parachutist opens his seat belt, takes up his jump position and signals to the pilot that he is ready to jump.

During the drop, the pilot must pay attention to any balance changes (slight climb tendency). Once the drop has been completed, the pilot should check that no objects have been caught up in the aircraft (on the wing strut, empennage) which could adversely affect the control surfaces.

The seat belt on the co-pilot seat must be secured.

During descent, airspeed limitations must be observed. A subsequent analysis of the drop, after it has been completed, is practical and useful for the future.

22 Instructions for the use of the LiFe-Battery

The usage of LiFe-Batteries on C42/C52 is related to the battery modulation technology which allows for an effective reduction of the empty weight for more than 3,5 kg due to its high energy density. These batteries are characterised by the following qualities:

- low-maintenance
- small size
- high voltage
- fast charging
- high impulse current ability
- extremely low self-discharge

What is special is the ability to produce high battery power during the starting procedure, though the battery develops it only at a certain minimum temperature.

At cold outside temperatures it can lead to the false conclusion that the battery is empty.

Therefore, we recommend before the very starting procedure to preheat the battery by spinning of the starter (2-3 times for 2-3 sec.) **without** switched on magnetos.

Once the engine is rotating with a sufficient rpm, the starting procedure can be accomplished as usually. (switching on the fuel pump, magnetos and choke)

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23 COMCO IKARUS Manufacturer Warranty

Warranty Information

Comco Ikarus guarantees to you, the original purchaser, that the aircraft, which you have purchased from an authorised Ikarus Flight Center, to be in conformance with the applicable Comco Ikarus specifications current at the time of manufacture for a term of two (2) years from the date of purchase of the aircraft. (Warranty Term)

This is the complete and exclusive warranty for the aircraft with original accessories of the Comco Ikarus GmbH.

In no event shall Comco Ikarus be liable for damages or losses in excess of the purchase price nor for any incidental special or consequential damages, including without limitation loss of use, loss of time, inconvenience, commercial loss, lost profits or savings arising out of the use or inability to use the aircraft, to the full extent such may be disclaimed by law.

This warranty does not affect any statutory rights that you are entitled to from your purchase agreement, such as warranty of fitness for an ordinary use and service, which is common for things of the same kind, so the claims against the seller of the aircraft under the purchase agreement.

Warranty Service

Should the aircraft not comply with the warranted specifications, the warranty claim consists of a repair of the defect by Comco Ikarus at no charge.

Thus, you are bound to inform Comco Ikarus of the lack of conformity to the applicable specifications of the aircraft promptly if you detect a defect in material, workmanship or lack of conformity, in any case before the expiry of the warranty period, you must immediately bring your aircraft for service to the authorised Ikarus Flight Center, Ikarus Technical Basis or a Ikarus Service Center.

Comco Ikarus shall not be bound by product related statements not directly made by Comco Ikarus nor any warranty obligations applicable to the seller.

In most cases the authorized Ikarus Flight Center which sold and/or installed your aircraft and original accessories will honour a warranty claim and/or provide warranty service.

Claiming

In order to claim the warranty service you must return the aircraft and/or accessory in question to the authorised Ikarus Flight Center or Ikarus Service Center in the original configuration as supplied by Comco Ikarus.

The microlight aircraft should be accompanied with the following information

- Name of the owner
- Address of the owner
- Telephone numer of the owners
- Email address of the owner
- Comco Ikarus serial number
- Total flying hours
- Number of landings
- Description oft the problem
- Digital photos if requested

In order to be eligible to receive warranty service, you must present your receipt of purchase or a comparable substitute proof of purchase bearing the date of purchase.

You must ensure that all repair or customer service is handled at all times by the authorized Ikarus Flight Center or Ikarus Service Center in accordance with Comco Ikarus service requirements.

In some cases, you may be requested to provide additional information concerning the maintenance of the aircraft by the authorized Ikarus Flight Centers or Ikarus Service Centers only, therefore it is important to keep a record of any previous repairs, and make them available if questions arise concerning maintenance.

Requirements for a warranty

This warranty will not apply if the type or serial number on the aircraft has been altered, deleted, duplicated, removed or made illegible. Comco Ikarus reserves the right to refuse from free-of-charge warranty service if the requested documentation cannot be presented or if the information is incomplete, illegible or incompatible with the factory records.

Repair, at Comco Ikarus option, may include the replacement of parts or accessories with functionally equivalent, reconditioned or new parts. Replaced parts or accessories are warranted for the balance of the original warranty time period. The original warranty period will not be extended. All original parts that have been replaced shall become the property of Comco Ikarus. Comco Ikarus does not warrant the installation, maintenance and service of the products, parts and accessories.

Comco Ikarus will not be responsible in any way for problems or damages caused by not distributed by Comco Ikarus accessories which are connected to the aircraft or used together with it. Neither does Comco Ikarus guarantee trouble-free operation of the Comco Ikarus aircraft in conjunction with these accessories. Such accessories are specifically excluded from this guarantee.

As long as the aircraft is used in conjunction with the accessories not supplied by Comco Ikarus, Comco Ikarus does not warrant the operation of the product combination and Comco Ikarus will not honour any warranty claim where the aircraft is used in such a combination and it is determined by Comco Ikarus that there is no fault with the aircraft. Comco Ikarus specifically disclaims any responsibility for any damage to the aircraft and for other damages of the aircraft with the accessories, when such accessories are not manufactured or distributed by Comco Ikarus.

What is not covered by the warranty

This warranty is not valid if the defects are due to damage, misuse, tampering, neglect or lack of care and in case of alterations or repair carried out by unauthorized persons.

The following are examples of defects or damage not covered by this product warranty

1. Defects or damage resulting from use of the aircraft in other than is normal and customary manner.

2. Defects or damage resulting from misuse, use with incompatible devices or accessories, accident or neglect.

3. Defects or damage due to improper operation, testing, maintenance, installation, adjustment, unauthorized modifications.

4. The aircrafts which are disassembled or repaired other than by Comco Ikarus or the IFC / ISC in such a manner as to adversely affect performance or prevent adequate inspection and testing to verify any warranty claim.

5. All plastic and synthetic surfaces and all other externally exposed parts that are scratched or damaged due to a customer's normal use.

6. Periodic maintenance and repair or replacement of parts due to a normal wear and tear.

24 Appendix:

24.1 Placards

Subject	Location
Aerobatics warning	Instrument panel
Trim	Roof frame
Flaps, mechanical	Roof frame
Engine oil specifications	Oil control cap
Fuel specifications	Filler neck
Baggage loading	Baggage compartment opening
Deviation table	Instrument panel
Controls - Choke - Heating - Carburettor heat	Center console
Fuel valve	Center console
Data placard	Center console
Type placard, fire-resistant	Fuselage tube, behind the tank

24.2 Data placard

Type: _____

Manufacturer:
COMCO IKARUS GmbH
D-88367 Hohentengen
Germany

Serial No.: _____

Year of production: _____

Never-exceed speed	
C42	97 kts (180 km/h)
C42B / C42C / C42E	116 kts (216 km/h)
Stall speed	35 kts (65 km/h)
Structural limitations	
positive limit load factor:	4 g
negative limit load factor:	2 g

Load limits:

Maximum take-off weight:	1041 lbs (472.5 kg)
Minimum useful load	143 lbs (65 kg)

Useful load according to the Pilot Operating Handbook

24.3 Service Problem Report Form -Aircraft

Aircraft Type: _____ Serial No._____

Year of Manufacture: _____

Engine Type_____

Manufacture_____

Owner:_____

Airframe:_____

Total Flight Hours until Defect: _____

Engine:_____

Airframe:_____

Total Flight Hours (Pilot) on Aircraft: _____

Description of damage:_____

_____

_____

Damage Report: _____

Name:_____

Date:_____ Signature:_____

24.4 Inspections performed

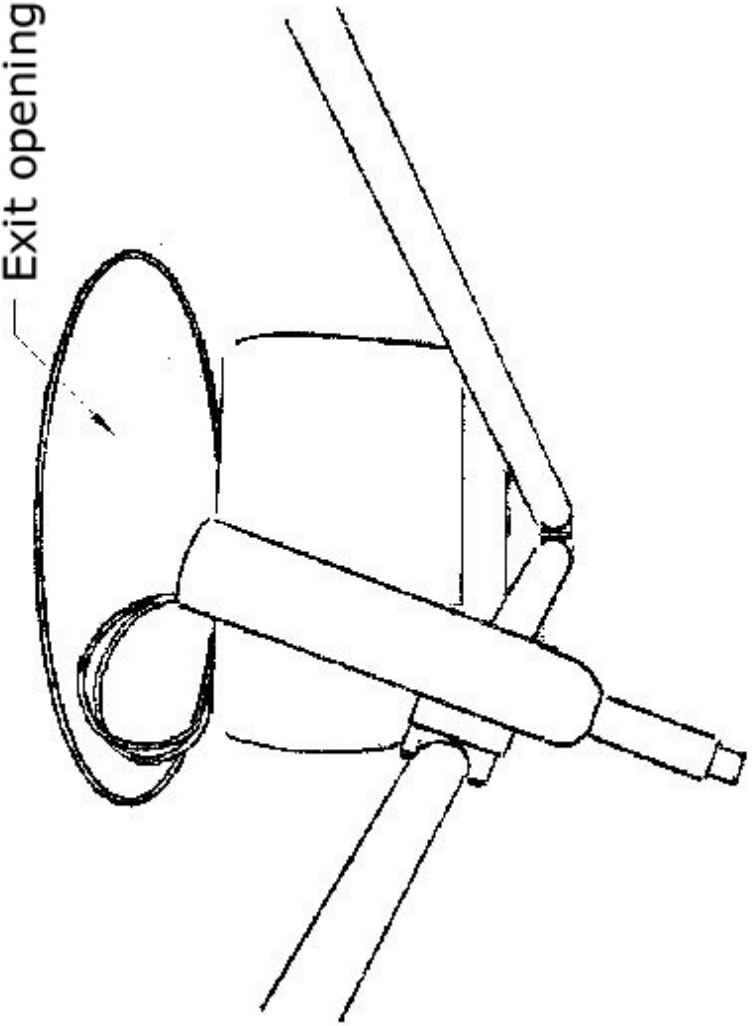
Type: _____ Serial No._____

Marking:_____

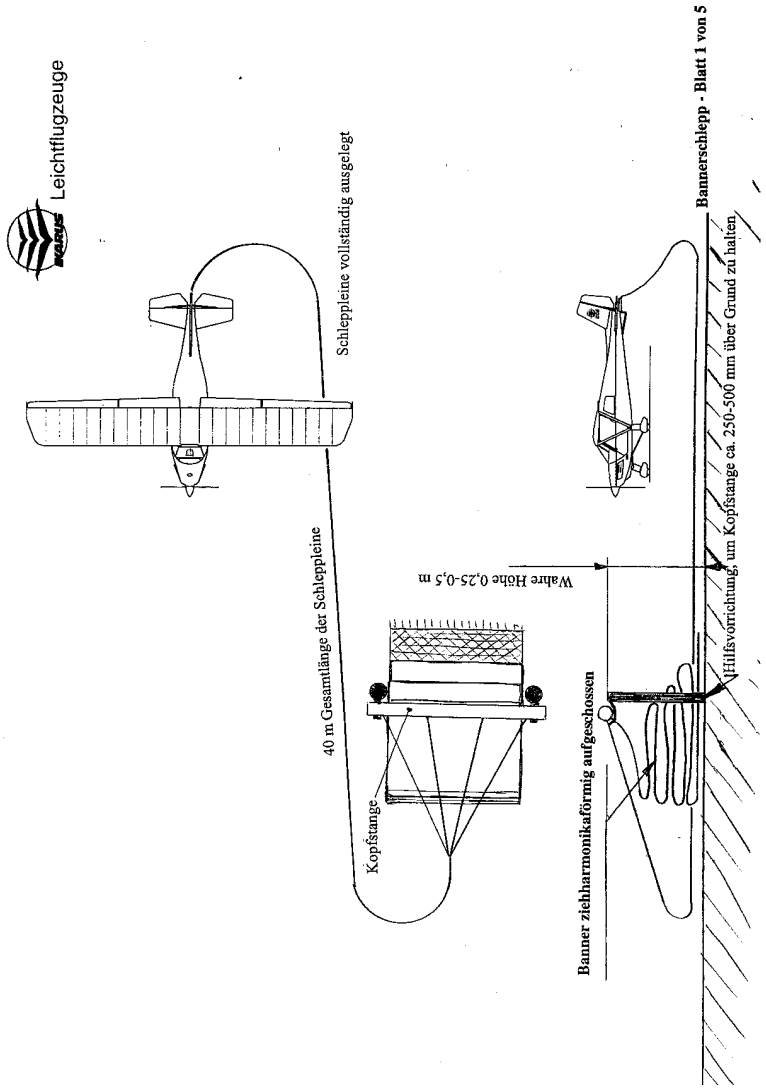
Date	Type of inspection	Recognised expert

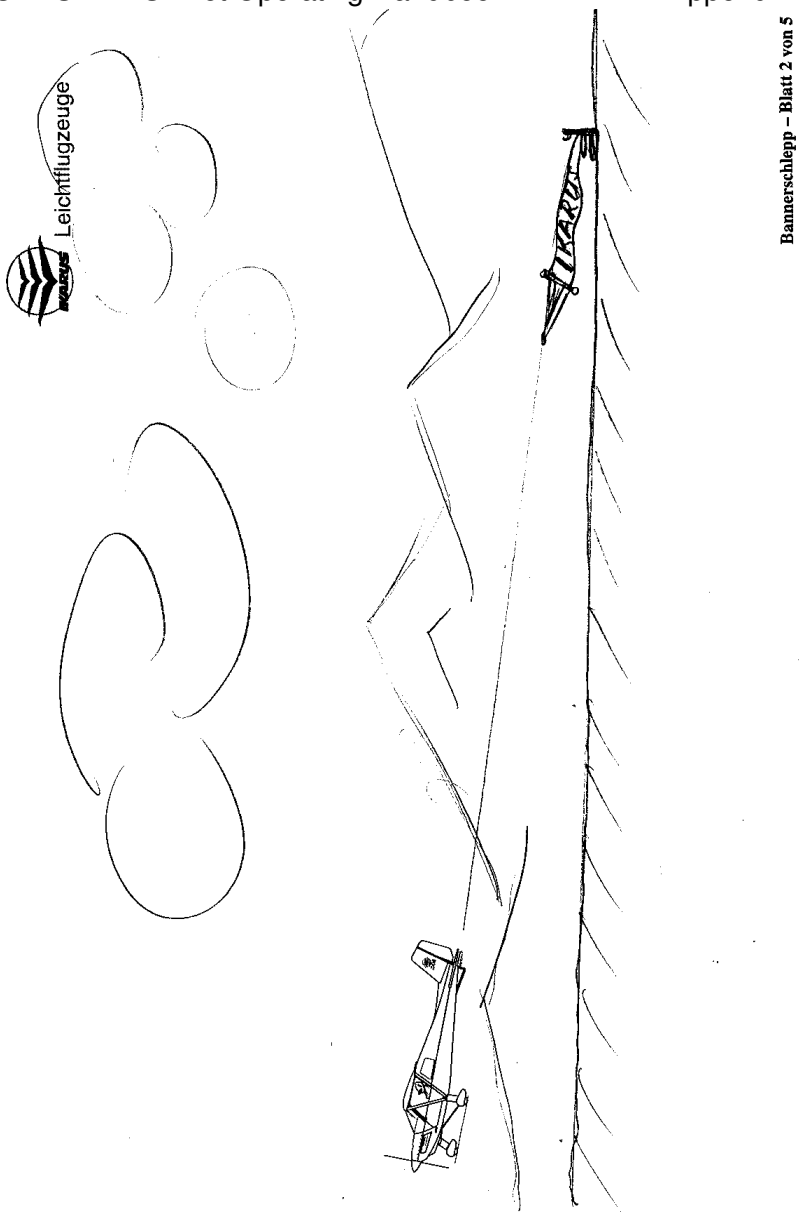
24.5 Location of the parachute rescue system

Caution:
Lay the cable tie (450 x 7,8 mm) around the clamp of the ballistic rocket and trough the first, front mounting flap of the rescue system and tighten it. Thereby backward slipping of the parachute package is prevented.

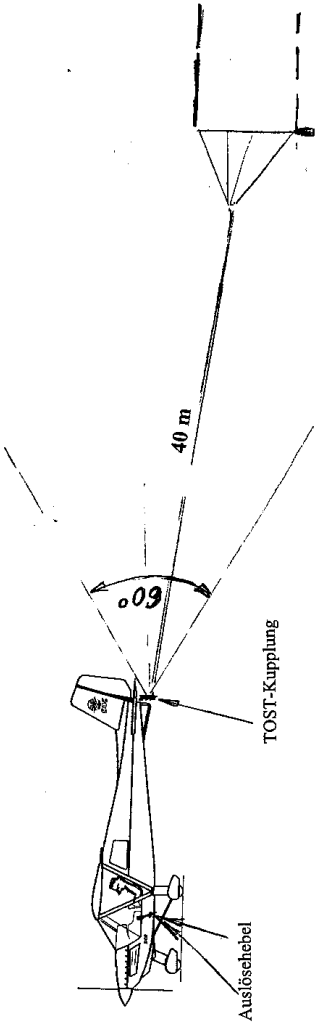

Exit opening

24.6 Banner towing




Leichtflugzeuge
IKARUS
Bannerschlepp – Blatt 2 von 5

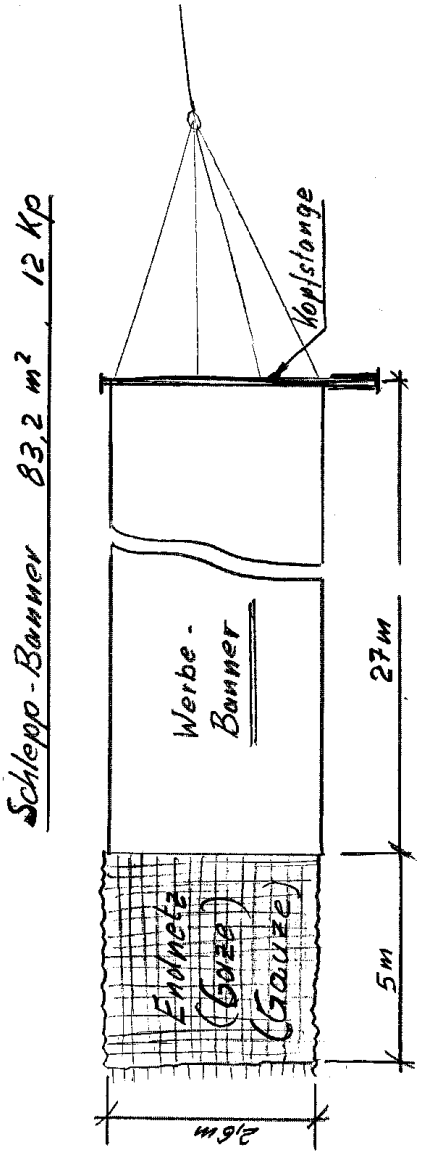
Leichtflugzeuge

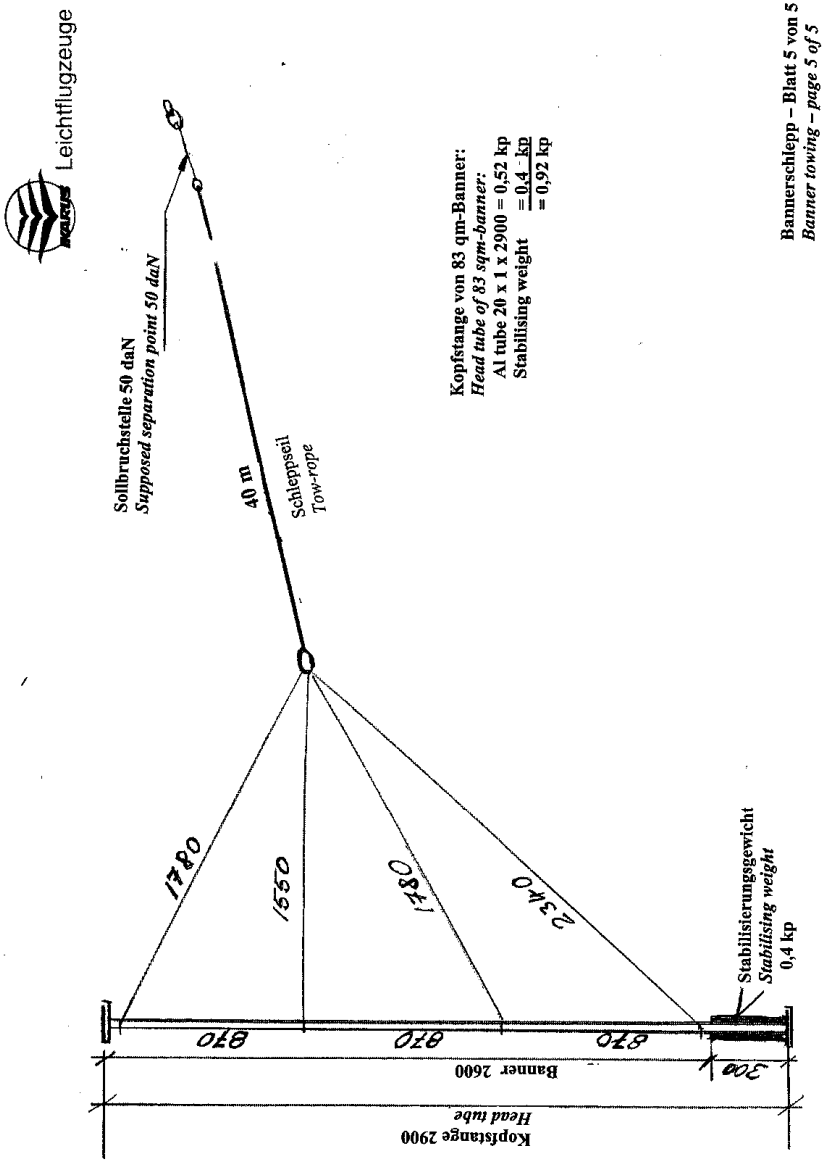


Bannerschlepp – Blatt 3 von 5

Leichtflugzeuge

Bannerschlepp – Blatt 4 von 5




Leichtflugzeuge
Sollbruchstelle 50 daN
Supposed separation point 50 daN
40 m
Schleppseil
Tow-rope
Kopfstange von 83 qm-Banner:
Head tube of 83 sqm-banner:
Al tube 20 x 1 x 2900 = 0,52 kp
Stabilising weight = 0,4 kp
= 0,92 kp
Bannerschlepp – Blatt 5 von 5
Banner towing – page 5 of 5
1780
1550
1480
2350
870
870
870
300
Banner 2600
Kopfstange 2900
Head tube
Stabilisierungsgewicht
Stabilising weight
0,4 kp

24.7 Wiring diagram