Phoenix S-LSA Glider 02/U15

Aircraft Operating Instructions
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## 1.0 Pilot operating handbook

In accordance with the specification F 2564 each U15 Phoenix includes Aircraft Operating Instructions (AOI). The content and format here-with is defined by F 2564. Additions to F 2564 are considered where necessary. All flight speeds are given in terms of calibrated airscreeds (CAS). All specifications and limitations are determined from the specification F 2564.

## 2.0 General information
## AIRCRAFT OPERATING INSTRUCTIONS

### 02/U15 Phoenix S-LSA Glider

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2.1 Read this before your first flight!

Every pilot has to understand the limitations and specifications of this light sport glider. The AOI must be read thoroughly. Please pay attention to the pre-flight and daily checks. Maintenance instructions for the aircraft are given in a separate Maintenance Manual. For maintenance of the Rotax® engine, emergency parachute system and other installed equipment refer to the original manufacturer’s manuals.

Flying the U15 Phoenix must be always done with the possibility of a safe landing due to loss of the engine power.

U15 Phoenix is a VFR aircraft only. Because of cruising speed and range of U15 Phoenix flight into vastly different weather patterns and meteorological conditions can occur. The entry into bad weather with IFR conditions with VFR aircraft is extremely dangerous. As the owner or operator of an aircraft you are responsible for the safety of your passenger and yourself. Do not attempt to operate U15 Phoenix in any manner that would endanger the aircraft, the occupants or persons on ground.
2.2 Manufacturer

phoenix

Lochmanova 64
562 01 Ústí nad Orlicí
Czech Republic
2.3 Warnings, cautions and notes

The following definitions apply to warnings, cautions and notes in the flight manual.

**Warning**

Means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

**Caution**

Means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

**Note**

Draws the attention of any special item not directly related to safety but which is important or unusual.
2.4 Descriptive data

2.4.1 Airplane description

U15 Phoenix is intended for recreational, sport, cross-country and training. It is not approved for aerobatic operation.

The Phoenix is a single engine, carbon airplane with two side-by-side seats. The airplane is equipped with a fixed main wheel undercarriage with a steerable tail wheel. The fuselage is a carbon shell with carbon/kevlar seats integrated. Safety belts are attached to the seats and to a shelf intended for lightweight objects (headphones, maps, etc.).

The wing is a monospar construction with a sandwich skin composed of two layers of fiberglass with a foam core. Control surfaces are of the same construction.

The airplane is controlled by a dual push-pull control system, only the rudder drive is controlled by cable. The ailerons and elevator are controlled by the control stick located between the pilot’s legs (co-pilot's). The rudder is controlled by the rudder pedals, flaps and spoilers are operated by control levers located between the pilots.
### 2.4.2 Basic Technical data

#### Wing
- Span/span with wing extension: 36/49.00 ft
- Area/area with wing extension: 100.9/138.5 ft²
- MAC: 3.238 ft

#### Aileron
- Area: 8.62 ft²

#### Fuselage
- Length: 21.65 ft
- Width: 3.54 ft
- Height: 4.75 ft

#### Horizontal tail unit
- Span: 8.20 ft
- Area: 14.00 ft²
- Elevator area: 4.84 ft²
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**Vertical tail unit**
- height: 3.93 ft
- area: 11.84 ft\(^2\)
- rudder area: 4.73 ft\(^2\)

**Landing gear**
- wheel track: 5.05 ft
- wheel base: 13.60 ft
- main wheel diameter: 1.31 ft
- tail wheel diameter: 0.65 ft

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2.5 Three-view drawing
3.0 Aircraft and systems descriptions

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3.1 Operating weights and loading

NOTE
Actual empty weight is stated in SECTION 10.5

Minimum load solo ........................................ 144 lb
Maximum weight per seat ................................ 242 lb
Empty weight (standard) .................................. 708 lb

Max. take-off weight .................................... 1320 lb
Max. landing weight ...................................... 1320 lb
Max. baggage weight ..................................... 110 lb
Weighing

Put the airplane on three scales on a level surface. Make certain the plane is levelled using a bubble level put onto the canopy frame. Mark the wheel axle positions on the ground using a plumb.
3.2 Propeller

On-ground adjustable, 2 blade, composite propeller VARIA 1,6 is attached to the propeller flange with 6 bolts, and covered with a conic spinner.
3.3 Fuel and fuel capacity

Fuel specification:
Automotive Premium Unleaded per ASTM D 4814, minimum Octane 89 for Rotax 912 UL and minimum Octane 91 for Rotax 912 ULS.

For suitable fuel types refer to the original Rotax Operator’s Manual.

Warning
Do not use fuel containing more than 10% ethanol.

Fuel capacity:
2 x wing fuel tank 13.2 gal each, 26.4 gal total.
3.4 Oil

For suitable oil types refer to the original Rotax Operator’s Manual.

Oil type:
Automotive engine oil of registered brand with gear additives, but not aircraft oil (refer to engine Operator’s Manual). API classification „SF“ or „SG“.

Honda GN-4 10-40 motorcycle oil highly recommended.
### 3.5 Engine

**Engine Manufacturer:** Bombardier-Rotax GMBH

**Engine Model:** Rotax 912 ULS

**Power:**
- Max. Take-off: 73.5 kW (100hp) at 5800rpm
- Max. Continuous: 69 kW (95 hp) at 5500rpm
- Cruising: 59 kW / 79 hp at 4800 rpm

**Engine RPM:**
- Max. Take-off: 5800 rpm, max. 5 min.
- Max. Continuous: 5500 rpm
- Cruising: 4800 rpm
- Idling: 1400 rpm

**Cylinder head temperature:**
- Minimum: 60 °C (140 °F)
- Maximum: 150 °C (300 °F)

**Oil temperature:**
- Minimum: 50 °C (120 °F)
- Maximum: 130 °C (280 °F)
- Opt. operating: 90 °C – 110 °C (190-210 °F)

**Oil pressure:**
- Normal: 2 – 5 bar (29 – 73 psi)
- Maximum: 7 bar (102 psi) – for short time,
- After starting of a cold engine
- Minimum: 0,8 bar (12 psi) – under 3.500 rpm
Fuel pressure (if the fuel gauge and sensor are installed):

- Maximum: 0.40 bar (5.8 psi)
- Minimum: 0.15 bar (2.2 psi)

Warning
The Rotax 912 ULS has not been certified as an aircraft engine and its failure may occur at any time. The pilot is fully responsible for consequences of such a failure.

RPM, oil temperature, oil pressure and CHT table

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Note
Original Rotax analog engine instruments are installed in U15 Phoenix. Do not cross recommended limits.

Description of design
4-stroke, 4 cylinder horizontally opposed, spark ignition engine, one central camshaft – pushrods – OHV
Liquid cooled cylinder heads, ram air cooled cylinders, dry sump forced lubrication, dual breakerless capacitor discharge ignition, 2 x constant depression carburetors, mechanical fuel pump, prop drive via reduction gear with integrated shock absorber and overload clutch, electric starter (12V, 0.6 kW), integrated AC generator with external rectifier-regulator (12V, 20A, DC).

Note
For actual and complete information read the Rotax operation manual supplied with the aircraft.
4.0 Operating limitations

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4.1 Stalling speeds at maximum takeoff weight ($v_{S1}$ and $v_{S0}$)

$V_{s1} = 42$ kts
$V_{so} = 40$ kts

4.2 Flap extended speed range ($v_{S0}$ and $v_{FE}$)

$V_{fe} = 80$ kts
4.3  Maximum maneuvering speed ($v_A$)

$V_A = 97$ kts

Up to speed $V_A$ all control surfaces can be fully deflected

4.4  Never exceed speed ($v_{NE}$)

$V_{NE} = 120$ kts

From $V_A$ to $V_{NE}$ only 1/3 of the maximum deflection of control surfaces is allowed.

4.5  Maximum aerotow speed ($v_T$)

N/A

4.6  Maximum winch tow speed ($v_W$)

N/A

4.7  Maximum landing gear extended operating speed ($v_{LO}$)

N/A
### 4.8 Never exceed speed ($v_{NE}$)

$$V_{NE} = 120 \text{ kts}$$

From $V_A$ to $V_{NE}$ only 1/3 of the maximum deflections of control surfaces is allowed.

### 4.9 Crosswind and wind limitations for takeoff and landing

Maximum demonstrated crosswind components for takeoff and landing is 23 kts. Cross wind takeoffs and landings demand a lot of training and skill, the higher the crosswind component, the greater your skill must be.

In gusty wind or wind speed more than 25 kts flight operations should be stopped.

### 4.10 Load factors

From $V_{SO}$ up to $V_{NE}$, $+4 \text{ g} / -2 \text{ g}$

### 4.11 Prohibited maneuvers

The U15 Phoenix is not certified for aerobatics or spins.
5.0 Weight and Balance Information

5.1 Installed equipment list

Phoenix has the following cockpit installation:

1. Pilot control stick  
2. Wheel brake  
3. Pedals  
4. Spoiler control lever  
5. Flap lever  
6. Trim lever  
7. Throttle  
8. Rescue system handle  
9. Co-pilot stick  
10. Fuel valve  
11. Tow release
1. Master switch
2. Ignition key
3. Slip/skid
4. Compass
5. Altimeter
6. Airspeed
7. VSI
8. Parachute handle
9. Cylinder head temp
10. Oil temp
11. Oil pressure
12. Fuel gauge
13. RPM
14. Switches
15. 12V power socket
16. Fuel switch
17. Throttle
18. Choke
19. Cowl flap
20. Air vent
21. Heat control
Center of gravity (CG) range and determination

**Weighting protocol**

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<th>Weight of support Pi (kg)</th>
<th>Total weight m (kg)</th>
<th>m (lb)</th>
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C.G. position

- \[ x_T = \frac{\text{Gsl} \times (a+b)}{m} \]
- \[ x_T (\text{mm}) = 286,3 \]
- \[ x_T = \frac{\text{Gsl} \times (a+b) \times 100}{930} = 286,3 \times \frac{73}{100} = 201,9 \]
- \[ x_T = 201,9 \% \]

Permitted C.G. position of empty airplane 30% +/- 2% MAC

**Ústí nad Orlicí** 24.6.2010

Lubos Slav

Place / Date

Weighting done by ... (Name / Signature)

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6.0 Performance

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6.1 Gliders

N/A

6.2 Powered gliders

6.2.1 Takeoff distances

Take-off distances stated in the following table are valid at sea level and for MTOW.

<table>
<thead>
<tr>
<th></th>
<th>Take-off run distance [feet]</th>
<th>Take-off distance over 15 m obstacle [feet]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass</td>
<td>450</td>
<td>700</td>
</tr>
<tr>
<td>Paved</td>
<td>400</td>
<td>600</td>
</tr>
</tbody>
</table>

Landing distances stated in the following table are valid at sea level and for MTOW.

<table>
<thead>
<tr>
<th></th>
<th>Landing distance over 15 m obstacle [feet]</th>
<th>Landing run distance (full braking) [feet]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass</td>
<td>800</td>
<td>300</td>
</tr>
<tr>
<td>Paved</td>
<td>800</td>
<td>300</td>
</tr>
</tbody>
</table>
6.2.2 Rate of climb

For Rotax 912ULS and VARIA 1.6 propeller the best rate-of-climb at MTOW is 1000 feet/min.

6.2.3 Climbing speeds

The best rate of climb speed is 55 kts CAS
The best angle of climb speed is 50kts CAS

6.2.4 Maximum RPM

All information is for Rotax 912ULS.

Takeoff performance 5800 rpm (max 5 minutes)
Max. continuous performance 5500 rpm
Maximum RPM (red line) 5800 rpm (max. 5 minutes)
Idle RPM 1400 – 1800 rpm
75% cruise RPM 5000 rpm
6.2.5 Time limit for the use of takeoff power

The limit for takeoff power if RPM is 5 800 rpm, and if all temperatures are in Engine Operating Manual limits is 5 minutes.

6.2.6 Fuel consumption and total usable fuel volume

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel consumption at takeoff power</td>
<td>6.88 gal/h</td>
</tr>
<tr>
<td>Fuel consumption at cruising power</td>
<td>3.44 gal/h</td>
</tr>
<tr>
<td>Fuel consumption at 5 500 rpm</td>
<td>5.5 gal/h</td>
</tr>
<tr>
<td>Usable fuel volume</td>
<td>26 gallons</td>
</tr>
</tbody>
</table>

6.2.7 Crosswind and wind limitations for takeoff and landing

Maximum demonstrated crosswind components for takeoff and landing is 23 kts. Cross wind takeoffs and landings demand a lot of training and skill, the higher the crosswind component, the greater your skill must be.

In gusty wind or wind speed more than 25 kts flight operations should be stopped.

6.2.8 Speeds for extracting and retracting power-plant

N/A
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7.0 Emergency procedures

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Section 7 provides checklist and amplified procedures for coping with emergencies that may occur.

Emergencies caused by airplane or engine malfunctions are extremely rare if proper pre-flight inspections and maintenance are practised.

However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

For best glide ratio, speeds and performance please see section 5.

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7.1 Engine failure

7.1.1 Engine failure during take-off run

1. Throttle - retard to idle
2. Ignition - off

7.1.2 Engine failure immediately after take-off

1. Speed - keep gliding speed at 55 kts
   - sink rate 180 feet/min
2. Altitude - below 100 feet: land in take-off direction
   - over 150 feet: choose landing area
3. Wind - evaluate direction and velocity
4. Landing area - choose free area without obstacles, into wind
5. Air brake - extend as needed
6. Fuel valve - off
7. Ignition - off
8. Safety harness - tighten
9. Master key - switch off position before landing
10. Land

Note
Skip 6-9 if necessary.
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7.1.3 Engine failure in flight (Forced landing)

1. Speed - keep gliding speed at 55 kts
   - sink rate 180 feet/min
2. Altitude - below 100 feet: land in take-off direction
   - over 150 feet: choose landing area
3. Wind - evaluate direction and velocity
4. Landing area - choose free area without obstacles
5. Air brake - extend as needed
6. Fuel valve - off
7. Ignition - off
8. Safety harness - tighten
9. Master switch - off before landing
10. Land

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7.2 In-Flight start

1. Speed - 60 kts
2. Altitude - check
3. Landing area - choose according to altitude (safest area)
4. Master switch - on
5. Fuel valve - open
6. Choke - closed initially, then as needed
7. Throttle - closed
8. Fuel pump - on
9. Ignition key - on – verify prop unfeathered
10. Ignition key - start, then on
11. Fuel pump - off

Note: If propeller fails to unfeather, use emergency servo disconnect lever, then start engine.

7.3 Smoke and fire

7.3.1 Fire on ground

1. Fuel valve - off
2. Throttle - full
3. Master switch - off
4. Ignition - off
5. Abandon the airplane
6. Extinguish fire if possible or call fire department.
7.3.2 Fire during take-off

1. Fuel valve - off
2. Throttle - full
3. Speed - 55 kts
4. Master switch - off
5. Ignition - off
6. Land and brake
7. Abandon the airplane
8. Extinguish fire if possible or call fire department.
## 7.3.3 Fire in flight

1. Fuel valve - off
2. Throttle - full
3. Master switch - off
4. Ignition - off after using up fuel in carburettors then engine stops
5. Choose area - head to the nearest airport or choose emergency landing area
6. Emerg. landing - perform according to par.3.6.1
7. Abandon the airplane
8. Extinguish fire if possible or call fire department.

### 7.4

**Note**

Estimated time to pump fuel out of carburettors is 30 sec.
7.5 Landing emergencies

7.5.1 Emergency landing

1. An emergency landing may be carried out due to engine failure and when the engine cannot be restarted.
2. Speed - 55 kts
3. Trim - trim the airplane
4. Safety harness - tighten
5. Flaps - extend as needed
6. Air brake - extend as needed
7. COMM - if installed - report your location if it is possible
8. Fuel valve - off
9. Ignition - off
10. Master switch - off
7.5.2 Precautionary landing

A precautionary landing may be carried out due to low fuel and/or bad weather conditions. It is best to land at an airport whenever possible. But if an airport is not available, a landing may be made in a field or on a road. A field is usually preferable due to street signs and other obstacles on the road.

1. Choose landing area, determine wind direction
2. If a radio is installed - report your plan to land and land area location to nearest ATC
3. Perform low-altitude passage into wind over the right-hand side of the chosen area with flaps extended to the take-off position at a speed of 55 kts to thoroughly inspect the area
4. Perform flight around the chosen area
5. Perform an approach at increased idling with fully extended flaps
6. Reduce power to idle when over the runway threshold and touch-down at the very beginning of the chosen area
7. Stop the plane as quickly as possible with generous use of brakes to avoid hitting a hole or other unseen obstacle under the grass surface
8. After stopping the airplane switch off all switches, shut off the fuel valve, lock the airplane and look for help

Note

Watch the chosen area continuously during precautionary landing.
7.5.3 Landing with a flat tire

1. Approach - Normal
2. Touch down - good tire first, keep the damaged wheel above ground as long as possible using ailerons
3. Maintain the direction at landing run, applying braking control
7.5.4 Landing with a defective landing gear

1. If the main landing gear is damaged, perform touch-down at the lowest speed possible and maintain direction during landing run, if possible.

2. If the tail wheel is damaged perform touch-down at the lowest possible speed and maintain direction during landing run, if possible.
7.6 Recovery from unintentional spin

Warning
Intentional spins are prohibited!

There is no tendency of spontaneous uncontrollable spin entry if normal pilot techniques are used.

Should an inadvertent spin occur, the following recovery procedure should be used:

1. Throttle - retard to idle
2. Control stick - hold ailerons neutralized
3. Rudder pedals - apply full opposite rudder
4. Control stick - forward elevator control as required to break the spin
5. Rudder pedals - immediately after the stopping of a rotation neutralise the rudder
6. Recover from dive
7.7 Other emergencies

7.7.1 Vibration

If vibrations appear:

1. Set engine speed to power setting where the vibrations are the lowest.
2. Land at the nearest airfield or perform a precautionary landing according to 3.6.2
3. Note that if unbalanced wheel spins in flight, vibration may result. Use brake lever to stop wheel from spinning, but do not set the parking brake!

7.7.2 Carburetor icing

Carburetor icing mostly occurs when getting into an area of ice formation. The carburettor icing shows itself through a decrease in engine power and an increase of engine temperatures.

To recover the engine power, the following procedure is recommended:

1. Speed - 55 kts
2. Throttle - set for 1/3 power
3. If possible, leave the icing area
4. Gradually increase the engine power to cruise conditions after 1-2 minutes.

If you fail to recover the engine power, land at the nearest airfield (if possible) or depending on circumstance, execute a precautionary landing according to 3.6.2
8.0 Normal Procedures

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8.1 Pre-flight check

The pre-flight inspection is very important because an incomplete or careless inspection could allow airplane failure. The following pre-flight inspection procedure is recommended by the airplane Manufacturer:
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⇒ Check if ignition is switched off in the cockpit

1. Wing
   • Wing surface condition
   • Leading edge condition
   • Pitot tube inspection
   • Wing flaps free movement

2. Wing tips
   • Surface condition
   • Check of tips attachment
   • Condition and attachment of position lights (if installed)

3. Flaperons
   • Surface condition
   • Attachment
   • Play

4. Fuselage rear
   • Surface condition

5. Vertical tail unit
   • Surface condition
   • Play
   • Free movement
6. Horizontal tail
   • Surface condition
   • Attachment
   • Play
   • Free movement
   • Tail wheel tire and steering
7. see. 5
8. see. 4
9. see. 3
10. see. 2
11. see. 1
12. Landing gear
   • Check of main landing gear
   • Condition and inflation of tires
   • Condition and attachment of wheel fairings (if installed)
13. Engine
   - Engine cowlings condition
   - Engine mount condition
   - Engine attachment check
   - Oil quantity check (after burping the engine)
   - Cooling liquid quantity check
   - Fuel and Electrical system visual check
   - Fuel system drain

Caution
It is advisable to turn the propeller by hand with ignition off if the engine has been out of operation for a long time. Avoid excessive pressure on a blade tip and trailing edge.

14. Propeller
   - Propeller attachment
   - Blades, Hub, Spinner condition
## 15. Cockpit

- Ignition key - off
- Master switch - on
- Instruments - check of condition
- Fuel gauge - fuel quantity check
- Master switch - off
- Controls - visual check
  - check for proper function
  - check for play
  - check for flap operation
  - check for free movement up to the stops
- Check for loose items - secure papers
- Canopy - Condition of attachment, cleanliness
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**8.2 Powered glider normal procedures**

**8.2.1 Ground engine starting**

**Before entering cockpit**

1. Airplane surface - check for damage
2. Cockpit - items inside the cockpit
3. Ignition - off
4. Master switch - off

**After entering cockpit**

1. Rudder control - free movement check - Correct?
2. Brakes - check function
3. Hand control - free movement check - Correct?
4. Trim - check control movement
5. Engine controls - throttle and choke lever movement
6. Fuel valve - off
7. Fuel gauge - fuel quantity check
8. Circuit breakers - off
9. Ignition - off
10. Instruments, COMM- condition check
11. Safety harness - check of integrity and attachment
12. Cockpit - condition and canopy lock function

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Engine starting

1. Fuel valve - on
2. Ignition key - off
3. Circuit breakers - in
4. Throttle - set for idling
5. Choke - according to engine temperature
6. Control stick - fully pulled
7. Check of free area - clear
8. Master switch - on
9. Ignition key - on, verify prop unfeathered, start
10. After starting - set throttle to idling
11. Oil pressure - within 10 sec. min. pressure
12. Cowl flap - fully open
13. Choke - off
14. Engine warm - according to 4.4.4
15. Flaps -0°
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Caution

The starter should be activated for max. 10 sec., then 2 min. pause for engine cooling.

After engine starting adjust the throttle for smooth running at 2500 rpm. Check oil pressure which should increase within 10 sec. Increase engine speed after oil pressure reaches 2 bars and is steady.

To avoid shock loading start the engine with throttle lever set for idling or max. 10% opened, then wait 3 sec to reach constant engine speed before accelerating.

Use ignition key for magneto check.

Engine warm up, Engine check

Lock the main wheels by means of wheel chocks before engine check. Refer to the Engine Manual for warming.

Set max. power.

Check acceleration from idling to max. power. If necessary cool the engine prior to its shutdown.

Caution

Engine check should be performed with the airplane pointing upwind and not on loose terrain (the propeller will pick up debris which can damage the propeller).
8.2.2 Taxiing

The maximum recommended taxiing speed is 8 kts. The direction of taxiing can be controlled by the steerable rear wheel – rudder. Use the lever on the control stick to operate the brakes intermittently. Do not ride the brakes which can cause overheating of the brake pads and possible locking of the brakes. Use appropriate controls in windy conditions: position the stick to climb into a headwind, and dive away from a tailwind while taxiing.

Taxi with spoilers open to reduce the possibility of a wing lifting in windy conditions.
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8.2.3 Normal takeoff

Before take-off (CCCCIGAAR – Lights, Camera, Action)

1. Controls       - check of free movement
2. Canopy         - closed and locked
3. Choke          - off
4. Cowl flap      - open
5. Instruments    - set and in the green
6. Gas            - fuel valve on left tank
7. Attitude       - trim set for take-off
8. Airbrakes      - closed and locked
9. Runup          - 3000rpm – check magnetos
10. Lights        - strobe/nav lights on if installed
11. Camera        - transponder on alt
12. Action        - fuel pump on
Take-off

Gradually increase the throttle (max. power) to set the airplane into motion.

The direction of take-off run can be controlled by steerable tail wheel and rudder. Place the stick 2 inches forward of the rear stop. The airplane takes-off at a speed above 38 kts, then slightly push forward the stick to reach climb speed of 55 kts. Refer to the par. 5.2.5 for optimum climb speed.

Warning

The Take-off is prohibited if:
- The engine run is unsteady
- The engine instruments values are beyond operational limits
- The engine choke is on
- The crosswind velocity exceeds permitted limits. 5.3.3
8.2.4  Engine extraction and retraction

N/A

8.2.5  Best rate of climb

For Rotax 912UL and VARIA 1.6 propeller the best rate-of-climb speed is 1000 feet/min.

1. Throttle - Max. continuous power (5 500 rpm)
2. Speed - 55 kts
3. Trim - adjust as needed to reduce stick pressure
4. Instruments - CHT, Oil temp. and pressure within limits.

Caution

If cylinder head or oil temperature exceed limits, reduce the angle of climb to increase airspeed and allow better cooling.

8.2.6  In-flight starting of engine

Follow same engine start procedures as in 8.2.1 Engine Starting

8.2.7  Ground shutdown of engine

1. Engine speed - idling
2. Instruments - engine instruments within limits
3. COMM + intercom - off
4. Ignition key - off
5. Circuit breakers - off
### 8.3 Cruise

The airplane flight characteristics are very forgiving within permitted limits of airspeeds, configurations and C/G range. The airplane can be controlled very easily. Refer to the Section 5 par. 5.3.1.

#### Warning

Never remove your feet from rudder pedals during flight!

Your feet are making tension in rudder control line!

### 8.4 Approach

#### Descent

1. Throttle - idling
2. Speed - 55 kts
3. Trim - as necessary to reduce stick pressure
4. Instruments - within limits

#### Caution

When on long final or descending from a very high altitude, it is not advisable to reduce the engine throttle control lever to idle. The engine becomes overcooled and a loss of power occurs. When descending, apply increased idle so that engine instrument readings stay within the limits for normal use.
Check before landing – GPS-FUSTALL

1. Gas - fuel on left tank
2. Pump - fuel pump on
3. Straps - tight
4. Flaps -0° or +10°
5. Undercarriage - down
6. Speed - 60kts
7. Trim - adjust as required
8. Airbrakes - unlocked and operational
9. Look - watch for other traffic
10. Land - stabilized approach to land

On base leg

1. Speed - 60 kts
2. Airbrakes - as necessary
3. Throttle - as necessary

On short final

1. Speed - 50 kts
2. Air brakes - as necessary
3. Throttle - as necessary
8.5 Normal landing

Landing

The airspeed during final is slowly reduced, so that the touchdown speed is about 38 kts.

Gradually pull the stick after touchdown. The landing run can be shortened by braking.

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the airplane rebounds 2 or 3 feet hold the control stick fully pulled. If higher, go around.</td>
</tr>
</tbody>
</table>

Balked landing

1. Throttle - full
2. Engine speed - Max. Cont. Power
3. Airbrakes - closed and locked
4. Climb - at a speed of 55 kts
5. Trim - as necessary
6. Instruments - within limits
7. Flaps - 0 setting
8. Fuel pump - off above 500 feet agl
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After landing

1. Engine speed - set as necessary for taxiing
2. Fuel pump - off

Engine shutdown

1. Instruments - engine instruments within limits
2. COMM + intercom - off
3. Ignition key - off
4. Circuit breakers - off
5. Master switch - off
6. Fuel valve - off
8.6 Information on stalls, spins and any other useful pilot info

Recovery from unintentional spin and stall

There is no tendency of spontaneous uncontrollable spin entry if normal pilot techniques are used.

Should an inadvertent spin occur, the following recovery procedure should be used:

1. Throttle - retard to idle
2. Control stick - hold ailerons neutralized
3. Rudder pedals - apply full opposite rudder
4. Control stick - forward elevator control as required to break the spin
5. Rudder pedals - immediately after the stopping of a rotation neutralise the rudder
6. Recover from dive

Warning

Intentional spins are prohibited!
Flight in rain

When flying in the rain, no additional steps are required. Airplane qualities and performance are not substantially changed.

Feathering of the propeller

1. Shut off engine with ignition key (off position)

Engine restarting

Follow same engine start procedures as in 8.2.1

Caution

After extended soaring flight, the engine could be cooled down. Use the choke if engine fails to start initially.
9.0  Airplane Ground Handling and Servicing

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9.1 Servicing fuel, oil, coolant

Fuel check

2 x wing fuel tanks (13.2 gal each, 26.4 gal total) are an integral part of the wings, and fuel quantity sensors are located inside the wings. In addition, a coarse filter, fuel valve, and fine filter are parts of the fuel system.

For draining use the drain valve located on the bottom of the wing.

To fill up the fuel tank one person is needed

- Make sure the plane is set on parking brake
- Open fuel cap
- Pour in the fuel per specification
- Check visually the amount of fuel after pouring
- Close the cap
Oil quantity check

To service oil one person is required.

- Remove top cowling
- Make sure the ignition and both magnetos are OFF
- Open the oil tank cap
- Turn the prop 3-4 times counterclockwise standing in the front of aircraft until burp is heard
- Check the level of the oil by the dipstick
- Oil level on land of dipstick
- Add oil if necessary – land is NOT one quart, add small amount
- Close the cap
Coolant quantity check

To service the coolant one person is needed

- Remove the top cowling
- Open the cap of the coolant tank and add coolant to fill up the tank
- Make sure the ignition and both magnetos are OFF
- Turn the prop 3-4 times counterclockwise standing in the front of aircraft
- Make sure that there is no air inside cooling system
- Close coolant tank cap
- If necessary add coolant to the expansion tank
9.2 Towing and tie-down instructions

Towing

It is easy to tow the airplane a short distance by holding the blade root because the empty weight of this airplane is relatively low.

Suitable surfaces to hold the airplane airframe are the rear part of the fuselage before the fin, wing roots, and cockpit forward frame.

Caution
Avoid excessive pressure at the airplane airframe - especially at the wing tips, elevator, rudder, trim etc.

Caution
Handle the propeller by holding the blade root - never the blade tip!

Parking

It is advisable to park the airplane inside a hangar or eventually inside other weather proof space (such as a garage) with a stable temperature, good ventilation, low humidity and dust-free environment.

It is necessary to tie-down the airplane when parking outside.

When the plane must be tied-down outdoors for extended periods, it is advisable to cover the cockpit canopy, and if possible, the entire airplane using a suitable cover.
Tie-down

The airplane is usually tied-down after a flight day or when needed. This is necessary to protect the airplane against possible damage caused by wind gusts.

The airplane is equipped with tie-down bolts on the wing tips.

Procedure:
- Check: Fuel valve off, Circuit breakers and Master switch off, Ignition key off.
- Tie the control stick with the safety harness
- Close and lock cockpit
- Shut all the ventilation windows
- Tie-down the wings to the ground by means of the straps. It is also necessary to tie-down the fuselage rear (lace a rope through the fork).

Note

It is advisable to cover cockpit canopy, if possible the whole airplane, by means of a suitable covering material attached to the airframe for long term outside parking.
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Jacking

Because the empty weight of this airplane is relatively low it is easy
to lift the airplane using 2 persons.

First prepare two suitable jacks to support the airplane.

The airplane should be lifted by the following parts:
- To jack the rear of the fuselage grab the fuselage near the aux-
iliary tail skid, lift it upward and support.
- To lift the wings, push on the wings lower surface at the main
spar. Do not lift by the wing tips.

Levelling

Refer to the Operating, Maintenance and Repair Manual for U-15
Phoenix for more details about levelling.

Road transport

The airplane may be transported in a suitable trailer. It is neces-
sary to dismantle airplane before loading to avoid damage to
roadway signs.
Airplane Assembly

Note

No special qualification needed for assembling/disassembling.

Degrease and clean all connecting parts and grease again using suitable lubricants.

- **Horizontal Tail Unit (HTU) Installation:**

  Set the HTU on the two main pins and at the same time insert the elevator control bell into automatic gripping.

  Then screw the front screw and secure with safety pin.
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- **Wing Installation:**

  Set the left wing on the pins and check automatic connection of control rods. Connect the fuel lines and fuel sensor.

  ![Left Wing Installation](image1)

  Then secure the rear auxiliary pin.

  ![Rear Auxiliary Pin](image2)

  Follow with the right wing, insert the wing in automatic connection device and secure the rear auxiliary pin.

  ![Right Wing Installation](image3)
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Insert the main eccentric pin, turn it 180 ° to tighten both halves of the wing together.

Then secure the main pin with a bolt through the handle and at the rear with a safety pin.

Check control system and fuel gauge function. Use an adhesive tape to cover the gap between the center section and the wing root.

Wingtip Installation

Slide wingtip into wing end to a snug fit. Open door on undersurface of wing. Install spar pin and swivel up into wire cage. Close and secure door.

Note: If wingtip spar pin is not seated fully, door will not close.
Airplane Disassembly

Follow the Assembly steps in reverse order.
Cleaning and care

Use cleaning detergents to clean airplane surface. Oil spots on airplane surface (except the canopy!) may be cleaned with appropriate degreasers. Boating supply companies such as West Marine carry a large supply of cleaners and wax cleaners such as Maguiers which are designed for use on gel coat surfaces.

The canopy should be cleaned only by washing it with lukewarm water and mild detergents, using clean, soft cloth sponge or deerskin. Then use suitable polishers such as Plexus with a microfiber cloth to clean the canopy. Do not use glass cleaners with ammonia.

Caution

Never clean the canopy under "dry" conditions (it will scratch) and never use gasoline or chemical solvents!

Upholstery and covers may be removed from the cockpit, brushed or washed in lukewarm water with mild detergents. Dry the upholstery before reinstalling inside the cockpit.

Caution

For long term storage cover the canopy to protect the cockpit interior from the direct sunshine.
10.0 Required Placards and Markings

10. Required Placards and Markings ................................................................. 77
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Caution

The owner (airplane operating agency) of this airplane is responsible for placards readability during airplane service life.
10.1 Airspeed indicator range markings

Airspeed indicator system calibration

<table>
<thead>
<tr>
<th>V IAS [kts]</th>
<th>δV [kts]</th>
<th>V CAS [kts]</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>-2.7</td>
<td>35</td>
</tr>
<tr>
<td>43</td>
<td>-1.6</td>
<td>42</td>
</tr>
<tr>
<td>49</td>
<td>-1.1</td>
<td>47</td>
</tr>
<tr>
<td>54</td>
<td>-0.5</td>
<td>53</td>
</tr>
<tr>
<td>59</td>
<td>0.0</td>
<td>59</td>
</tr>
<tr>
<td>65</td>
<td>0.5</td>
<td>65</td>
</tr>
<tr>
<td>70</td>
<td>1.1</td>
<td>71</td>
</tr>
<tr>
<td>76</td>
<td>1.6</td>
<td>77</td>
</tr>
<tr>
<td>81</td>
<td>2.2</td>
<td>83</td>
</tr>
<tr>
<td>86</td>
<td>2.7</td>
<td>89</td>
</tr>
<tr>
<td>92</td>
<td>3.2</td>
<td>95</td>
</tr>
<tr>
<td>97</td>
<td>3.8</td>
<td>101</td>
</tr>
<tr>
<td>103</td>
<td>4.9</td>
<td>107</td>
</tr>
<tr>
<td>108</td>
<td>5.4</td>
<td>113</td>
</tr>
<tr>
<td>116</td>
<td>7.0</td>
<td>123</td>
</tr>
</tbody>
</table>
Airspeed limitations

Airspeed limitations and their operational significance are shown below:

<table>
<thead>
<tr>
<th>Airspeed</th>
<th>IAS [kts]</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{NE}$</td>
<td>120</td>
<td>Do not exceed this speed in any operation.</td>
</tr>
<tr>
<td>$V_B$</td>
<td>97</td>
<td>Do not exceed this speed except in smooth air, and then only with caution.</td>
</tr>
<tr>
<td>$V_A$</td>
<td>97</td>
<td>Do not make full or abrupt control movement above this speed, because under certain conditions the aircraft may be overstressed by full control movement.</td>
</tr>
<tr>
<td>$V_{S1}$</td>
<td>42</td>
<td>Stall speed</td>
</tr>
</tbody>
</table>
Airspeed indicator markings

Airspeed indicator markings and their colour-code significance are shown below:

<table>
<thead>
<tr>
<th>Marking</th>
<th>Range or value [IAS kts]</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green arc</td>
<td>42-96</td>
<td>Normal Operating Range</td>
</tr>
<tr>
<td>Yellow arc</td>
<td>97-119</td>
<td>Maneuvering must be conducted with caution and only in smooth air.</td>
</tr>
<tr>
<td>Red line</td>
<td>120</td>
<td>Maximum speed for all operations.</td>
</tr>
</tbody>
</table>
10.2 Operating limitations on instrument panel

See 10.3 and 10.4 for required instrument panel placards.

10.3 Passenger warnings

The warning placard: “This aircraft was manufactured in accordance with Light Sport Aircraft airworthiness standards and does not conform to standard category airworthiness requirements.” is placed on copilot side of instrument panel.

The aircraft was manufactured in accordance with Light Sport Aircraft airworthiness standards and does not conform to standard category airworthiness requirements.

LOCK
BEFORE FLY
## 10.4 No intentional spins

The placard: “No intentional spins” is placed on co-pilot side of instrument panel.

<table>
<thead>
<tr>
<th>Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>No intentional spins or aerobatics</td>
</tr>
</tbody>
</table>

## 10.5 Empty weight

Empty weight ........................................ 708 lb

## 10.6 Maximum takeoff weight

Maximum takeoff weight of U-15 Phoenix is 1320 lb. The following placard is to be placed in a visible area of the cockpit.

<table>
<thead>
<tr>
<th>Empty weight 708 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never exceed 1320 lbs Max. TakeOff Weight</td>
</tr>
</tbody>
</table>

## 10.7 Maximum and minimum weight of crew

The following placard is to be placed in a visible area of the cockpit.
10.8 Allowable weight of the load in any luggage area

The following placard is to be placed in the baggage area.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum baggage area weight</td>
<td>100lbs</td>
</tr>
<tr>
<td>Maximum map shelf weight</td>
<td>10lbs</td>
</tr>
</tbody>
</table>

10.9 Seat for solo operations of two seated gliders

Seat for solo operations is either LEFT or RIGHT seat.
11.0 Supplementary Information

11.1 Familiarization flight procedures

For familiarization flight procedure, refer to the Flight Training Supplement.

11.2 Pilot operating advisories

No any other pilot operating advisories.

12.0 Maintenance Manual

Maintenance manual containing routine, inspection and repair maintenance procedures for the aircraft and engine and propeller is provided with each U15 Phoenix.