PEGASUS XL
OPERATORS HANDBOOK

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SOLAR WINGS Ltd.

PEGASUS XL-R OPERATORS HANDBOOK.

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PEGASUS XL-R
ROTAX 447 ENGINE

1. GENERAL.

1.1. The Pegasus trike unit in basic form is a simple load-carrying module designed to be compatible with a range of Solar Wings wings, and to allow pilots of even very limited experience to carry out a wide variety of operations. When mated with the XL wing the Pegasus can be used as a safe and reliable training machine. The frame of the trike is a monopole structure of aluminium tubes with a wire-braced tricycle undercarriage. The tandem seats are suspended in a seat frame.

UNDERCARRIAGE.

1.2. The rear wheels are fitted to stub axles which may be replaced easily and cheaply. The main axle itself is a wire-braced aluminium strut. The steering foot pedals (right foot pushed forward gives left turn and vice versa for the left foot) operate the nosewheel steering incorporating trailing-link spring suspension. The pneumatic tyres (12 psi) on all wheels are of low hysteresis rubber, of light weight, with anti-shimmy ribbed threads.

POWER UNIT.

1.3. The engine is a Rotax twin-cylinder two-stroke of 436.5cc rated at 39 bhp at 6,500 rpm. (max. rpm 7,000). The drive utilises a purpose built gear box with a 2.58:1 reduction and a standard two-bladed mahogany propeller. The power unit is mounted on four Lord anti-vibration rubbers.

FUEL.

1.4. Fuel is fed from a single 24.4 litre fuel tank fitted with a self venting but leakproof cap and mounted behind the monopole and below the engine. 4 star petrol should be mixed with a good quality two-stroke oil at a 50:1 ratio. The tank has a fuelcock and filter, and the external pipes are fire-resistant. Fuel content is measured from a sight-gauge on the side of the tank.

FILTERED FUEL ONLY SHOULD BE ADDED TO THE FUEL TANK.

ENGINE CONTROLS.

1.5. The primary throttle control is foot-operated (forward for full power and rearward for power off) and complemented by the friction-damped cruise control hand throttle (forward on and rearward off) on the port side of the seat frame. The mixture control is on the starboard side of the seat frame (rearwards for choke on/forwards choke off). An ignition kill-switch (up for on/down for off) is fitted on the front seat base bracket immediately below the pilot's knees. The engine start system is a pull-start running from a pulley close to the front pilot's feet.

FLIGHT CONTROLS.

1.6. Control in pitch and roll is provided by the conventional hang-glider control-frame and the steel and nylon wing-attachment.

Control frame forward for increased angle of attack.

Control frame rearward for reduced angle of attack.

Control frame to the right for a left turn.

Control frame to the left for a right turn.

1.7. The XL is an intermediate wing of the double-surface type, developed from the highly successful Typhoon free-flight wing. It was designed to meet the requirement for a wing module compatible with both side-by-side and tandem dual-control trikes, and has a considerable degree of pitch stability incorporated into its handling characteristics, a feature which promotes it as an ideal training wing. The hang-point at which the trike is attached to the wing may be selected from one of three points, a facility which allows the performance of the combination to be pre-selected. In common with the Typhoon series, its high roll-rate contributes to the effortless handling notable in all weather conditions, whether carrying two pilots or one.

1.8. The structure of the wing is similar to that of the fifth generation free-flight flex-wings, but the rugged strength required for operations with a trike has necessitated additional sleeving and a consequent increase in weight. As with the Typhoon, the 55% double-surface contributes with lower surface battens to the close control of an aerofoil disciplined by the usual preformed composite battens. The lower batten pockets themselves act as gates to resist the spanwise flow of air, diminishing induced drag, and the floating crossboom is concealed.

THE FRAME

1.9. All tubing used in the airframe is HT 30 TF aluminium alloy supplied by British Aluminium from aircraft quality billets using a special process of mandrel extrusion drawn to specifications agreed with the Civil Aviation Authority. The leading edges use 2.25 inch tube of 17 SWG staged down to 2.125 inch tube and then to 2.0 inch; the keel 2.0 inch tube is oversleeved with 2.125 inch tube; and the crossbooms 2.25 inch tube are inner-sleeved with 2.125 inch tube, and then further inner-sleeved with 2.0 inch tube. There are no welded components in the frame, and sheet fittings are plated, anodised or stainless steel. All bolts are of high tensile steel.

1.10. Rigging wires are either 2.5 mm or 3.0 mm 7x7 galvanised steel, clear plastic coated, facilitating unencumbered visual inspection. All flight wires are double-swaged, and the eyelets are of stainless steel.

THE SAIL.

1.11. The XL sail was designed by the team which has produced 15 successful production aircraft since the start of the flex-wing industry. The fabric is cut to an accuracy of 1 mm from Dacron sailcloth, and is double-stitched Dacron, a stabilised polyester of a tight, almost non-porous, tear-resistant weave, has been selected by the manufacturers of many types of flex-wing as being the best available. Extra material is incorporated at high stress points.

1.11 Cont.
The aerofoil section is defined by preformed aluminium composite battens which use bungee caps to provide chord-wise tension. The clean lines of the aerofoil's leading edge owes much to the Mylar insert.

2. **RIGGING.**

2.1. Pilots should inspect their machines as they rig them, paying attention to the following:

a. Cables - kinks; missing or damaged thimbles; broken strands.
b. Tubes - bends; stress marks; cracks around holes.
c Steel components - bends; rust; fractures.
d. Moving Parts - seizure
e. Engine - bolts; throttle cables; seizure of carburettors.

2.2. The monopole upright should be raised and locked geometrically by pushing down on the seat-frame hinges. If there is some significant wind, fit the compression tube and tension the one-inch strap under the seat squab, and then run the engine: if the plugs are fouled, or if there is some other engine problem, remedial action can be taken without worrying about the control of the wing.

2.3. To convert the tandem seat for solo operation, release the velcro which secures the rear seat backrest to the upright monopole and locate the two webbing pockets built into the underside of the rear seat base. Lift the rear seat up and forwards until its base lines up with the front seat back-rest, then insert the two alloy tubes provided into the pockets and push fully home. The rear seat backrest can now be folded backwards to form a fairing secured by its velcro to the seat webbing. Ensure that the one-inch webbing under the seat squab is fully tensioned. After the rear seat harness is made secure, the aircraft is ready for single-seat operation.

2.4. Lay the wing in its bag, on clean ground and nose into winds. Unzip but do not remove the bag, and then locate and remove the batten bag and lay it to one side. Assemble the control frame and secure with the pip pin which is attached to the lower rigging, ensuring that the three sets of rigging wires (fore, aft and side) are unentangled and routed cleanly to their wing attachment points. Lay the control frame back on the glider.

2.5. Lift the glider nose from the bag and roll it through 180 degrees so that the control frame is underneath the glider. Release the remaining sail ties and locate the kingpost in its plughole through the top of the sail, ensuring that the crossboom tension cables pass to either side and are not twisted. Locate the top rigging kingpost plug onto the top of the kingpost, ensuring that the rigging wires are not twisted.

2.6. Spread the wings until the sail becomes taut by walking out each wing-tip, holding the end of the leading-edge tube and taking care not to lift the leading-edge above knee level. Never use the top rigging wires to open the glider, for this may damage the sail. If there is wind, incline the nose of the glider to the ground, and if the wind is moderate, consider the use of stakes.

2.7. Remove the battens from their bag, check them against the profile guide and lay each batten behind the correct batten pocket. Green indicates a starboard batten, red a port batten. The four straight battens are for the undersurface, and should be laid aside. Carefully insert the upper surface battens, in sequence moving inwards from the wingtips, taking care to ensure that the point of the batten does not run along the edge of the stitching as it is inserted, and that it locates over the front of the leading edge tube without the use of excessive force. Especial care is needed when locating the tip battens into their sockets, before fitting their elastic retainers.

2.8. The sail should now be tensioned. Reach into the keel pocket and locate and pull back the tensioning cables. Peer down the keel pocket to check that the cables are not twisted and that they pass to either side of the kingpost. Separate the two cables and while holding the port cable in the left hand together with the bolt, attach the tensioning lever to the tang of the starboard cable. Locate the tensioning lever's pivot in the rearmost hole in the keel and pull the lever rearwards until the bolt with the port cable tang in the left hand can be passed through its locating bush in the keel. Remove the tensioning lever from the tang of the starboard cable, attach the tang to the bolt, and then secure with the wing nut and locking ring.

2.9. The undersurface battens may now be inserted, with the cranked ends pointing to the rear and downwards, but this operation may be left, if wind strength permits, until the wing is standing on its control frame. The elasticated washout rods should now be located on their plugs, and checked as straight and secure. All batten elastics should now be fitted, the tip battens, together with those immediately inboard (one on each side), should have the elastic doubled. The nose batten is the last to be fitted. It is inserted from the front, and in the correct position it will have its front end located on top of the keel tube forward of the nose plate.

2.10. The wing may now be erected fully by raising it and pushing it back on its control frame. Do not lift the nose high while doing this, lest the rear of the tip battens sustain damage from contact with the ground. Hook the S-catch onto the rear pin of the nose channel and then, to tension the lower rigging, lever the S-catch forwards, locking it by passing the pip-pin through the S-catch and the S-catch channel.

2.11. The fully-rigged wing may now be moved off its bag and parked nose down. If there is to be a delay before fitting the wing to the trike, and if the wind strength is above 7 mph, the wing should be laid flat; if the wing is laid flat in winds above 16 mph the nose should be tethered.

2.12. Before mating the wing to the trike, complete the walk-around inspection of the wing as detailed in the pre-flight checks. Then position the wing on its control frame, into wind, with its nose on the ground. With the main tube of the trike folded down, and with the ignition switch checked off, wheel the trike in behind the wing, rolling the front wheel over the control bar. Lift the main tube high enough to connect to the hang-point on the wing, and secure with the bolt, wing nut and safety ring attached to the hang-point. There are three holes at the hang-point which allow preselected trim: for normal operations the middle or rear holes should be used, as advised by the Solar Wings agent or the Solar Wings factory. Move the propeller to the horizontal position, go to the nose of

2.12 Cont.
the wing, and then rotate the wing about its control bar until it is just past the horizontal and will not rotate further. Do not use force, and in strong winds maintain a firm grip on the wing. The front wheel will roll back behind the control bar, and the rear wheels should now be chocked. Lift the wing, either by the uprights or the control bar, and push down the seat frame hinges. Lift the seat squab and tension the webbing through the buckle. Fit the compression tube and secure with the pins and rings attached to each channel. If a back-up strap is fitted, pass it over the keel and fasten it with the wing nut and safety ring. The last action should be the securing of the control bar with the seat webbing strap, a sufficient measure in light winds. (This easy way to attach the wing to the trike, single-handed or with help, is demonstrated by the agency delivering the machine.)

3. DE-RIGGING.

3.1. The de-rigging procedure is a direct reversal of that for rigging: as with the preparation before flight, so also when de-rigging the pilot ought to carry out an inspection.

3.2. Remove the compression tube and release the one-inch webbing under the front seat. Lower the wing until the nose is on the ground. Unbolt the trike from the hang-point and wheel out the trike unit.

3.3. After detaching the wing from the trike, reverse the procedures listed in para's 2.4 to 2.11 above. When preparing the wing for stowage in the bag, furl the wing fabric carefully, ensuring that the protection patches are correctly positioned at the abrasion points. Rigging cables should be stowed simply and, especially at the control frame,logically.

3.4. Seal the fuel tank. Lower the monopole upright.

4. INSPECTION.

4.1. Remove the sealing cap from the fuel tank, and secure the cap. The machine is now fully assembled and is ready for the final pre-flight checks. Start at the nose and move around the wing making the following checks:

Nose catch secure and locked
Leading-edge spar undented
Cross-spar junction secure (zip flap closed)
Sail secure on tip
Washout rod secure and undamaged
Batten elastics secure
Luff lines secure
Crossboom tensioner secure
Keel pocket undamaged
Hang-point secure
Control frame locked
Control frame cables secure
Luff lines secure
Batten elastics secure
Washout rod secure and undamaged
Crossboom junction secure
Leading edge spar undented

4.1 Cont.
Nose catch secure and locked
Top rigging secure

4.2. After returning to the nose, move around the trike making the following checks:

Ignition off; engine controls closed
Compression tube secure
Front tyre inflated and in good condition
Front forks and suspension in good condition
Drag links secure
Axles secure
Rear tyres inflated and in good condition
Seat-frame secure
Cables secure
Control cables -- no kinks
Engine mountings secure
Exhaust secure
Carburettor secure
Propeller secure
Plugs and leads secure
Fuel tank secure; fuel pipe fitted; fuel contents

The aircraft is now ready for engine starting procedures.

4.3. The preflight checks for the XL, apart from the final pre-start checks, may be incorporated with the rigging procedures in paragraphs 2.4. to 2.12. above. However great care should be taken with wings which are left fully rigged, for checks cannot be omitted on that account, and the full inspection procedures should be followed. The design brief for the XL called for easy inspectability, so those components not open to view may be reached from zipped inspection panels. Attention should be paid to the following:

a. The symmetry of the wing and the vertical angle of the kingpost.

b. All tubes straight, undented and without cracks.

c. All cables unkinked, unfrayed and with undamaged sleeves.

d. All nuts and bolts secure and locked appropriately.

e. All quick-release fittings secure.

f. Hang-point undamaged, heart-bolt and back-up strap secure.

g. All sail seams intact, with no frayed stitching.

h. No tears in the sail.

i. Double check g. and h. in sail areas of high stress. Particular areas of high stress are:

1. Both tip fabric areas including tip webbing and cord fastening.

4.3 Cont.

2. Both leading edge upper surfaces.

3. At the nose of the wing check that the securing screws and grommets have not become detached from the sail.

4. The trailing edge stitching, grommets and shock cords.

5. Keel pocket, particularly at the point of attachment to the upper surface.

6. Keel pocket to keel tube fastening.

7. The point of attachment in the root area of the undersurface to the upper surface.

8. All cable entry and exit points with particular regard to the rear upper rigging cable entry.

9. The area above the cross spar centre box.

j. Sail tension settings correctly aligned and symmetrical.

k. Battens undistorted, undented and in good condition.

5. POST FLIGHT CHECKS.

5.1. No sortie is complete until the post-flight checks are finished. This has particular importance after a heavy landing.

WING.

a. All tubes straight and undented; all flying wires undamaged.

b. Wingribs and battens undistorted, undamaged.

c. No bolts bent or cracked.

d. Sail untorn: check especially where wires pass through the sail.

TRIKE.

a. No leaks from fuel system and engine.

b. No splitting, denting or delamination of the propeller.

c. No cracking in tyre treads, nor evidence of creep around the rim.

d. Remove any grass build up on the lower axle cables.

e. Front springs elongation.

f. No bolts bent or cracked.

6. ENGINE STARTING.

6.1. The engine should not be started without a pilot being strapped into a seat. Any passenger should also be strapped in and briefed. All controls should be checked closed and ignition should be off.

6.2. Ensure that the engine is primed with fuel. Unless the engine is hot, apply full choke. Check visually that the propeller area is clear and call "Clear Prop" loudly. Switch on the ignition when the area is clear, take hold of the starting handle, pull gently until it is felt to engage and lock, and then pull forcefully. Repeat until the engine starts. If the engine refuses to start, close the controls and switch off the ignition before investigation.

6.3. When the engine starts, increase the rpm to a little above tickover and gradually decrease the choke until the engine idles normally with the choke fully closed. Warm up the engine. Before flight full-throttle check is carried out for at least two minutes. The front of the aircraft should be held securely. During this operation the pilot must be mentally prepared to switch off the ignition at very short notice. If the engine is stopped after a period of running, the ignition should be switched off at tickover. Switching off at high rpm floods the engine and makes restarting difficult.

6.4. The engine maintenance manual should be consulted for information on **Gearbox oil levels and specification** carburettor tuning, timing etc.

7. AIRWORTHINESS OPERATING LIMITATIONS.

The CAA. requires the pilot to respect the following limitations:

a. The aircraft is to be flown only under visual flight rules (VFR).

b. The minimum equipment required to operate under VFR. conditions is:

1 - Air speed indicator, and 1 - Altimeter (the altimeter may be a wrist altimeter worn by the pilot).

c. Aerobatic manoeuvres including whipstalls, stalled spiral descents and
negative g,s are not permitted

d. Do not pitch nose up or nose down more than 45 degrees from the horizontal.
Do not exceed more than 60 degrees of bank.

e.

Max empty weight	150 kgs.
Max take off weight	350 kgs.(365kgs plastic tank)
Min total occupant weight	55 kgs.
Max total occupant weight	192 kgs.
Max number of occupants	2

When flown solo the aircraft must be flown from the front seat only.

Vne.	67 mph.
Max wind operating conditions	28 mph.

Cross winds of up to 14 mph. at max auw.
11 mph at min auw.
Have been safely demonstrated.

No baggage allowed.

8. **FLIGHT CHARACTERISTICS.**

8.1. **Pitch:** Whether flown solo or dual, pitch control is very smooth and positive, progressive and slightly damped, providing good "feel" at all times and in all manoeuvres.

8.2. **Roll:** Similarly, whether flown solo or dual, roll control gives no difficulty to even inexperienced pilots, being responsive, progressive, light and smooth. There is no necessity to high-side the bar in turns.

8.3. **The Stall:** The stall speed with a very light pilot may be as low as 23 mph. but dual with two 90-kilo pilots this will rise to 31 mph. The stall on the Pegasus XL is very gentle, whether with power on or off, and gives only a very slight buffet in advance. Recovery is immediate, with very little height loss. This applies also to stalls in turns, plenty of warning being given of the stall approach, and there being no tendency to break away suddenly. To become dangerous, a stall would have to be forced violently.

8.4. **Trim:** The Pegasus XL may be flown with the same hang-point setting, whether dual or solo. No ballast is required for single-seat use when the payload is above 55 kg.

8.5. **Take-Off:** At sea level, on firm ground with grass of moderate length, the take-off run in zero wind with two 90-kilo pilots may be 180 Metres. A single-seat pilot in the same conditions 40 Metres. The take-off run is considered to be the ground distance covered until the aircraft reaches a height of 15 metres above the average elevation of the runway used. These figures could be shorter if the take-off should be from tarmac, but longer if from wet ground. A significant headwind would reduce the length of the take-off run considerably. Crosswind components of up to 11 mph at Min Auw. and 14 mph at Max Auw. are within limits.

8.6. During the take-off run, the aircraft should be held at zero angle of attack, accelerates smoothly to 30 mph (with two 90 kg pilots) where the control bar should be pushed steadily forward. When the wing reaches about 18 degrees nose-up the trike lifts and rotates quickly on the main wheels until it adopts a 10 degree angle. The bar must then be pulled back to maintain a climb speed of about 35 mph. High-angle climb-outs near the ground should be avoided, for with an engine failure the aircraft will immediately adopt a glide angle of similar magnitude to the climb angle preceding the failure.

8.7. Take-off, when two-up, requires full power. Lift-off depends on the all-up weight, ambient temperatures, etc, but with two 90-kilo pilots may be around 33 mph. Climb-out should be made on full power and with the bar held in a little to hold an airspeed of around 40 mph until a safe height has been reached. At this speed the aircraft will round out nicely into a glide if the engine should fail.

8.8. A useful guide in the event of engine failure is that the aircraft will tend to assume immediately the same angle for the glide as was the angle of the climb: high angle climb-outs close to the ground are therefore

8.8 Cont.
likely to be dangerous. When the required flight altitude is reached the aircraft may be levelled out and throttle reduced to that required to maintain level flight.

8.9. It is normal for the aircraft to be flown solo from the front seat, no ballast being required if the payload is above 55 kg. Most operations may be carried out as when the aircraft is flown dual, but for take-off the full-power setting may have to be reduced to achieve a safe climb angle. The single-seat stall speed with a 90-kilo pilot is around 24 mph.

8.10. **Cruise Control.** The hand-operated cruise control should not be used during take-off and landing. In other phases of flight the engine rpm can be set with the cruise control lever and then the pressure on the foot pedal may be removed until an increase in rpm is required. Thereafter, the rpm will always return to the cruise setting when foot pressure is removed. To obtain the full rpm range on the foot pedal, the cruise control lever must be in the fully-off position.

8.11. Stability, which is a notable feature on Solar Wings designs, is owed in part to the pendular weight distribution which increases both stability and lightness of control as the trike weight is increased, and in part to the fully-defined camber reflex section designed to give the wing inherent stability without reliance on the pendular loads.

8.12. Turns are initiated by lowering the nose slightly to increase airspeed, then by moving the trike in the required direction, easing the nose up, and tightening the turn as the roll comes on. For roll-out the trike is moved towards the other wingtip, and the nose is lowered as the horizon levels. Co-ordinated turns can be achieved with a maximum bar movement of 3 inches, and straight and level flight, helped by the wing's positive pitch characteristic, is very relaxed.

8.13. To achieve a stall, the bar must be pushed fully forward to the limit of its travel. The aircraft will mush, and then produce a clean pitch-down with no tendency to drop a wingtip. Recovery is immediate, with or without power. No pilot has yet managed to spin a Pegasus XL combination but, if a spin ever is achieved, the standard technique of reducing the spin inertia by moving the weight towards the centre of the spin will initiate recovery.

8.14. As the thrust line is set low, the effect of reducing power is to lower the nose of the aircraft, and an increase in power will cause it to rise. There is thus no need to alter the bar position as power is adjusted for this is automatically compensated, and the aircraft will stabilise with no tendency to oscillate in pitch.

8.15. The approach to land may be made with or without power, but in either case the approach speed should be well above the stall speed: for example, with two 90-kilo pilots it should be at lease 40 mph. Obviously, wind gradient may require a much higher speed than this. The Pegasus trike is designed to land with the rear wheels touching down slightly before the nosewheel does. Once firmly on the ground aerodynamic braking may be achieved by pulling in the control bar.

8.16.All microlight aircraft should be flown on finals with a high airspeed, to allow for wind gradient, and to provide greater controllability in the rough air which may lie close to the ground. The XL glide path can be controlled precisely with small variations of power. Excess airspeed decays fairly quickly, so the float is short and spot landings are accurate. The flare should be initiated at a low level, and there must be sufficient speed to ensure that the trike rotates into a nose-up attitude. This rotation can be assisted with a very short burst of power, and then after touchdown the nosewheel can be lowered gently by gradually decreasing the wing's angle of attack.

8.17. High airspeed on finals is of even greater importance for engine-off landings, so the approach speed cannot be allowed to decay, and there must be a margin to permit rotation before touchdown.

8.18. High crosswind components should be avoided by new flex-wing pilots: skills do not always match the capabilities of the aircraft. Crosswind landings with low components, up to 5 mph, should not cause problems, even to the relatively inexperienced, so long as the pilot lowers the upwind wingtip immediately the three wheels retain firm contact with the ground.

9. MAINTENANCE.

9.1. The Pegasus trike has been designed to permit easy inspectability, and operators should have no difficulty in assessing problems or recognising damage if visual checks are carried out conscientiously. General care should include: Washing down the tube work with warm water and a light detergent followed by rinsing with fresh water. Fabric sponged with warm water and a mild detergent and rinsed with fresh water. The pod and wheel spats washed and polished using commercially obtainable shampoos and polishes. The cockpit area should have all litter removed.

9.2. Apart from the consequences of heavy landing, or of exceeding flight limitations, the major factors for attention are corrosion and fatigue. There is no inherent fatigue problem with the Pegasus trike, but excessive loads and vibration can weaken the structure, and a regular watch for hair-line cracks, most likely in areas under high stress, such as around bolt holes, will give warning. All trike components can be replaced with no difficulty: repairs can be undertaken by the Solar Wings factory.

9.3. Careful attention to the recommended rigging and derigging sequences will protect the wing from the risk of unnecessary damage. The wing must always be transported inside its bag, and the bag zip must face downwards to prevent the entry of rainwater. During transportation, or when stored on slings, the wing must be supported at its centre and at two points not more than one metre from each end. Supports should be softly padded, and any support systems used for transport, such as roof racks, must use attachment straps which are sufficiently secure to eliminate the possibility of damage from vibration and abrasions.

9.4. Discoloration of the metal may indicate corrosion. Salt is the most common cause, particularly after winter road journeys, or during seacoast

9.4 Cont.
operations. Parts affected by salt must be stripped and thoroughly cleaned before reassembly. Corroded components must be replaced, and the cause of the corrosion identified and eliminated.

9.5. The Dacron sailcloth may be cleaned with warm soapy water, but strong detergents must not be used. Thorough rinsing with plenty of clean water must follow. Never use chemical solvents. Ultraviolet radiation from strong sunlight can ultimately reduce the strength of Dacron, but this may be reduced to an acceptable level by careful consideration of the wing's use and exposure. In its bag the wing is fully protected.

9.6. **LUBRICATION.**

TRIKE. The rear axle bearings should occasionally be lubricated using a commercial lithium based grease. Frequency of greasing will depend entirely on the amount of taxiing time.

The rear steering bar, foot throttle, cruise control and choke lever pivots should be lubricated with machine oil weekly.

All other bearings are life sealed and require no additional lubrication.

Refer to the engine manufacturers handbook for gearbox lubrication details.

WING. The hang point strap nylon bearing requires to be sprayed monthly with a commercial silicon spray.

9.7. **RECOMMENDED INSPECTION SCHEDULES.**

TRIKE AND WING: Major complete strip down and inspection: 200hours.

Solar Wings strongly recommends all parts to be visually inspected and assessed by an approved Solar Wings or BMAA inspector and repairs to be carried out as outlined in section 10.

TRIKE: ENGINE:

Engine: For inspection schedules refer to the engine manufacturers manual.

Engine mountings: Cracks, bond failure and reduced stiffness: 25hours
Engine controls: Cable fraying, adjustment and operating freedom:25 “
Engine electrical connections: Tightness and corrosion: 25 “
Engine airfilters: Clean and re-oil as per Filter manufacturers instructions:(Maintenance periods are a function of environment and are therefore cleaned upon inspection) or a minimum of: 50hours

FUEL SYSTEM:

Fuel filters: Clean or replace if necessary: 25hours.
Fuel lines: Cracks, end fitting security and joints. 25 “
Fuel tank including vents: Clean and check vent function: 25 “
Fuel pump diaphragm: Check for cracks and signs of perishing: 50 “
Fuel tank: Remove and flush out with clean petrol. 10 “

TRANSMISSION:

Propeller: Check for leading edge damage, delamination and splits:25hours
Propeller: Check propeller fasteners for tightness: 10 “
Gearbox bearing: Check for play: 50 “
Gearbox oil level: 10 “

FRAME:

All tube work: Check for bent and damaged tubes:	50hours
Drag links and all fixing: Elongation of holes and tube damage:	50 "
Seat frame and seat belts including hinge plates and dome bolts:	
Tube cracks and elongation of holes:	25 "
Seat base bracket: check for damage and welds:	50 "
Hang point bolt and bush: Check for wear and damage:	25 "

CABLES:

All cables: Check for broken strands, thimble damage and stretch:	25hours

STEERING:

Front forks: Check for straightness, elongation and cracks:	25hours
Connecting link: Check for cracks, and rod end security:	25 "
Rear steering bar pivot: Check for cracks and straightness:	25 "

WHEELS AND TYRES:

Tyres: Check for splits, perishing and pressures:	25hours
Wheel hubs: Check for damage:	25 "
Wheel bearings: Check for play and grease:	25 "

BODYWORK:

Pod: Check for Splits and general soundness:	50 "
Spats: Check for splits and general soundness:	50 "
Side fairing: Check for general soundness:	50 "

WING: FRAME:

Visual check on all exposed parts and those parts accessible through inspection zips: Check tube and fastener condition:	25hours.

CABLES:

Lower: Check for broken strands, thimble damage and stretch:	25hours.
Upper: Check for broken strands, thimble damage and stretch:	25 "
Restraint: Check for broken strands, thimble damage and stretch:	25 "

FASTENERS:

All fasteners: Check for wear, straightness and signs of fatigue:	25hours.

NOTE: These inspections do not obviate the need for the Pre-flight and Post flight inspections outlined in sections 4 and 5 and the heavy landing inspection outlined in para. 9.8.

9.8. **HEAVY LANDING INSPECTION:**

After a heavy landing the inspections outlined in section 4 and 5 should be undertaken paying particular attention to the following points:

Hang point bolt.
Hang point bracket
Monopole hang point bush.
All tube work.
Undercarriage cables and thimbles.
Stub axles.
Front forks and springs.
Wheels and tyres.

10. REPAIR.

10.1. WING.

No repairs are to be undertaken by the operator.

Sail repairs are only to be undertaken by the Solar Wings factory.

Repairs by replacement only.

Replacement parts must be obtained from Solar Wings Ltd. or a Solar Wings appointed agency.

Bent aluminium tubes must never be straightened, always replaced.

Frayed cables and cables with damaged or twisted thimbles must be replaced.

10.2. TRIKE.

No repairs are to be undertaken by the operator.

Repairs by replacement only.

Replacement parts must be obtained from Solar Wings Ltd. or a Solar Wings appointed agency.

Bent aluminium tubes must never be straightened, always replaced.

Frayed cables and cables with damaged or twisted thimbles must be replaced.

11. TUNING THE WING.

11.1. An XL should be bought only from Solar Wings appointed agencies. These are responsible for the completion of the post-assembly inspection, the tuning of the wing, and a test flight before the customer takes delivery. The agencies are tasked also with the instruction of the customer in maintenance procedures, tuning, rigging and derigging, and with the demonstration of the procedures for mating the XL to the Pegasus trike

11.2. At delivery the XL will be tuned to standard settings. Before any changes are made, the overall appearance of the wing, its symmetry and its rigging wires, should be checked, and the ribs and battens must be compared with the patterns supplied.

11.3. **Pitch Adjustment.** If it appears that an adjustment to pitch control may be necessary, a Solar Wings agent should be consulted.

11.4. **Roll Adjustment.** If it appears that an adjustment to roll control may be necessary, a Solar Wings agent should be consulted

11.5. **Leading Edge Sail Tension.** Standard sail tension is fixed on the XL. In general, a slack sail improves manoeuvrability and softens the

11.5 Cont.
handling, but reduces maximum speed. A tightened sail flattens the aerofoil curve, increasing performance, but stiffening the handling.

11.6. **Reflex Retention.** The XL reflex-retention system in produced by the combination of the angle of the washout rods, the hold-up strap on the rear keel, and the luff lines. None of these components may be modified without reference to the factory. These reflex-retention safe guards are supplemented by the nose angle (the angle of sweep) and the large angle of aerodynamic twist in the wing profile.

11.7. **Warning.** Those operators who wish to tune XL wings should contact a Solar Wings agency for additional advice. Before any tuning is attempted, a careful and thorough check of the airframe is essential. A sudden indication that the wing requires tuning may be the result of damage caused in an unreported accident or heavy landing.

GENERAL INFORMATION SHEET

TRIKE:

Length (erect):	102 ins	260 cm
Length (fold down):	102 ins	260 cm
Width:	69 ins	175 cm
Track:	63 ins	160 cm
Height (erect):	100 ins	255 cm
Height (fold down):	70 ins	178 cm
Weight (dry):	200 lbs	91 kg
Max Hang Point Load:	664 lbs	302 kg
Minimum payload:	121 lbs	55 kg

ENGINE:

Model.	Rotax 447
Capacity	436.5 cc
Max Rpm.	7000 Rpm.
Max Continuous Rpm	6500 Rpm.
Max Cylinder head Temp.	235 Degrees centigrade
Fuel Tank Capacity.	24.4 Litres.
Usable Fuel.	24.05 Litres
Unusable Fuel.	0.35 Litres.

FILTERED FUEL ONLY TO BE ADDED TO THE FUEL TANK.

Fuel Petrol/Oil Mix Ratio:

Normal Use 50:1

NOTE:

For all other engine data refer to the engine manufacturers handbook supplied as a supplement to the aircraft operators handbook.

RUNNING GEAR.

Tyre Pressures.	22 psi

PLACARDS AND LOCATIONS:

Placard.	Location.
Flight Limitations.	Upperside of base tube in front of Front Pilots seat.
Engine Limitations.	Upper side of base tube in front of Front Pilots seat.
Aircraft Weights.	Upper side of base tube in front of Front Pilots seat.
Fuel Type and Mix Ratio.	Adjacent to Fuel filler cap.
Fuel Capacity.	Adjacent to Fuel level indicator.
Fuel Cock On/Off Positions.	On Fuel Filter Bowl.
Ignition Switch On/Off Positions.	On Ignition Switch.

WING.

Wing Span:	34 feet
Nose Angle:	121 degrees
Sail Area:	188 sq.ft
Aspect Ratio:	6.15
Weight	48.3 kg

RECOMMENDED COMPONENT LIFE:

Crossbooms	1000 hours
Leading Edges	900 hours
Kingpost	1000 hours
Control Frame	1000 hours
Keel	500 hours
Rigging Wires	On inspection; one year; 500 hours

PERFORMANCE:

Wings Level Stall Speed at max. auw:	31 mph
Height Loss during Recovery at max. auw:	50 ft
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Wings Level Stall Speed at min. auw:	24 mph
Height Loss during Recovery at min auw:	20 ft.
30 Degree Banked Stalls at max auw:	31 mph
Height Loss during Recovery at max. auw:	70 ft
30 Degree Banked Stalls at min. auw:	29 mph
Height Loss during Recovery at min. auw:	20 ft.
Descent Rate Power Off at max. auw:	467 fpm
Take Off Distance at max. auw:	566 ft.
Flight manoeuvre loads:	+4 g. –2
Vne:	67 mph
Cruise:	52 mph

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APPENDIX 1. OPERATORS HANDBOOK.

PEGASUS XL-R.

ROTAX 447 AIR COOLED ENGINE.

FOOT OPERATED BRAKE.

DESCRIPTION:

To prevent the aircraft rolling further than desired during taxiing on hard surfaces and slight inclines, a simple foot operated brake acting on the front wheel tyre, has been introduced. The brake also acts as an added safety feature during engine run-up. The mechanism consists of a spring return, foot operated lever, which pivots on the left fork and applies frictional force via a metal tubular arch to the top of the front tyre.

OPERATING LIMITATIONS:

TAXIING:

(i) The foot, brake **should not** be applied at speeds above 15 mph.

(ii) To avoid the possibility of tipping the aircraft over, **do not apply the foot brake when the aircraft is being turned during taxiing.** The foot brake should only be applied whilst the aircraft is travelling in a straight line.

(iii) Due to the drop in braking efficiency **in wet and icy conditions, extra stopping distance should be allowed for.**

ENGINE RUN-UP:

(i) Operators should note that above **5000 engine rpm** the aircraft may tend to creep forward.

(ii) Due to the drop in braking efficiency in wet and icy conditions, allowances should be made by the operator for creep to occur at a **lower rpm** than stated in (i) above.

INSPECTION:

The amount of wear that takes place on the tyre and footbrake will vary from one aircraft to another, depending on the type of surface the aircraft normally takes off and lands on. **Close inspection** of the contact area of the brake should be made at intervals of **no more than 5 hours.**

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