

SPIRIT 15

Trike Wing

OPERATORS MANUAL

Serial number:

Date of manufacture:

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INTRODUCTION

The Spirit 15 Operators Manual

For your own safety and others, please read this manual in full and ensure you fully understand and are familiar with all aspects of this manual before attempting to rig, fly or tune the wing. If you have some doubt about any aspect of this manual then ask your instructor or call the factory for clarification.

Training

Flying a Trike (flexwing type microlight) requires training and the development of skills to ensure that every flight is undertaken with safety. For this reason it is absolutely imperative that a new pilot is properly trained by a qualified instructor.

SPECIFICATIONS

Wing area	15.3 m ²	(164 ft ²)
Maximum allowable take off weight	450 kg	(990 lb)
Flight load limits	+4g -2g	
Aspect ratio	6.9	
Nose angle	130°	
Minimum folded length	4.6 m	(15 ft 1 in)
Full folded length	6.1 m	(20 ft)
Weight of wing (without bag)	52 kg	(114 lb)
Wingspan	10.2 m	(33 ft 5 in)

Flying Specifications of new wing at 450 kg AUW at sea level

Stall speed	48 kph	(30 mph)
Minimum flying speed in perfect weather	60 kph	(38 mph)
Minimum flying speed in turbulent weather	70 kph	(44 mph)
Cruise speed range	80-110 kph	(50-69 mph)
Maximum allowable airspeed	136 kph	(85 mph)
Maximum angle of pitch	30°	
Maximum angle of bank	60°	

Note

Wings that are damaged in any way, dusty, wet, have patches or scuff marks or are stretched will have higher stalling speeds and will probably not meet the above flying specifications.

ASSEMBLY OF THE SHORTENED 4.6 m FOLDED WING

1. Remove the wing from the cardboard packing tube carefully. Ensure there are no nails or screws protruding from the cardboard tube before sliding the wing out.
2. Place the wing on a soft area such as a lawn. Where possible, place a cloth under the wing to prevent the lawn from leaving green scuff marks on the wing sail.
3. Unzip the bag and fold the bag flat and out of the way so that the wing can be moved around and assembled.
4. Undo the retaining Velcro straps and fold the wing leading edge pieces down flat.
5. Remove the protective padded covers noting where each one is fitted.
6. Find and identify the LH and RH leading edge end tubes. LH and RH are determined by standing behind the wing with the kingpost uppermost (or sitting in the pilots seat).

7. Slide each end tube into the wing sail end. Fit the end LE tube into the main LE tube and swivel into place in the slot until the washout batten faces backwards and upwards by approx 20°.
8. Attach the end strap over the slotted cap in the LE tube using a lever such as a large flat screwdriver or a small tyre lever. Ensure the strap is securely in place.
9. Now follow the standard rigging procedure.

RIGGING THE WING

1. Lie the wing down on soft level ground such as a lawn with the nose of the wing (large heavy end is the nose end if it is still in the bag) into the wind and with the wing bag zip uppermost.
2. Unzip the wing bag and fold it open leaving it under the wing. Remove the protective padded covers and Velcro straps. The wing should be lying on it's back with the A frame uppermost.
3. Remove the control bar from the batten bag and fit the round rubber protective wheels onto either end of the bar.
4. Open the A frame and fit the control bar making certain the bolts, nuts and safety rings are in place.
5. Lift the wing and turn it over so that the A frame is now underneath the wing.
6. Spread each leading edge wide open being careful not to scrape and damage the wing on the ground.
7. Remove the battens from the batten bag and place them on the ground behind the wing. The longest battens are in the centre and the shortest are at the wing tips. Carefully note which are LH and RH battens and do not mix them up as they may differ slightly and this will greatly affect the flight roll characteristics of the wing. They are marked with numbers 1 to 11- L and R.
8. Inspect the battens for damage or unusual bending. If necessary check the batten profile against a Spirit 15 Profile drawing.
9. Insert the curved upper battens into the batten pockets. Slide the battens in slowly and carefully and at no time force a batten through. If a batten gets stuck halfway in a batten pocket, then leave it there and go on to the next batten, coming back to the stuck batten later.
10. Place the large end batten (it is the folding batten) in place in the wingtip by placing the round open end onto the lug on the leading edge and the flattened end into the reinforced very end piece of the wing sail. Check that the flattened end of the batten is in the correct position inside the sail where there is a webbing reinforced corner. Pull on the batten centre section to (over centre) straighten it so that it applies tension to the wingtip.
11. Lift the kingpost and insert the lower kingpost pin into the hole in the wing keel. Ensure the spreader bar tensioning cables are on either side of the kingpost.
12. Tension the wing by pulling the spreader bar tensioning double cable backwards and attach the swan catch to the top rear adjustable channel. If the tension seems unusually heavy first check that the cables and thimbles are not twisted or caught on the sail or kingpost. Insert the clevis pin through the channel and swan catch and slide the safety ring through the hole in the end of the clevis pin. Ensure the safety ring cannot come loose and that the swan catch and clevis pin are safely in place.
13. Insert the flat part of the spring loaded batten ends in the folded over end of the trailing edge. Be careful with this task as it is possible to break the batten ends if not done with care.
14. Lift the nose and rear of the wing keel at the same time and allow the A frame to swing downwards and then balance the wing on the A frame. If the A frame does not easily swing down into place, the chances are that one of the side flying cables are twisted or caught on the sail. If that is the case, lie the wing flat on the ground again and lifting one

leading edge at a time, open the zipped inspection hole at the Spreader bar and leading edge junction and straighten / release the wing cables

15. Lift the front flying cable off the ground and attach it to the nose channel using the swan catch. Insert the clevis pin through the channel and swan catch and slide the safety ring through the hole in the end of the clevis pin. Ensure the safety ring cannot come loose and that the swan catch and clevis pin are safely in place.
16. Place the nose of the wing onto the ground. If the wind is strong or gusty ask someone to hold the nose.
17. Pull one wingtip down at a time and looking into the end of the sail insert the washout batten into the slot in the leading edge. Lift the rear of the sail slightly and the bungee on the end of the washout batten should make it jump into place in the slot in the leading edge.
18. Slide the lower battens into place on the underside of the wing and place them behind the folded over piece at the end of the batten pocket.
19. Walk around the wing making certain that the kingpost, cables, safety rings, bolts, nuts, swan catches and battens are secure and in place.
20. The wing nose cone should only be positioned and attached to the Velcro strips after the undercarriage is connected to the wing – this is to prevent it from getting scuffed on the ground.

Note: Take the opportunity to inspect the centre Spreader bar junction before attaching the trike to the wing – once the wing is attached to the trike it is very much more difficult to inspect this point. Check that the keel webbing strap, brackets, bolts, nuts, split pins and particularly the cables are not twisted, are secure, undamaged and in the correct position.

DE-RIGGING THE WING

1. Reverse the rigging procedure for de-rigging.
2. When travelling with the wing, make certain it is really well padded before undertaking a journey – an unpadded wing could end up having a badly scuffed sail.
3. If the wing is packed wet or gets wet during transportation, open it up and dry it out within 5 days.

ATTACHING THE WING TO THE TRIKE

1. With the wing nose on the ground, roll the trike between the A frame downtubes.
2. Attach the trike hang unit to the wing hang block and secure with the M10 bolt, wing nut and safety clip.
3. Wrap the safety cable twice around the wing keel in front of the wing hang block and attach it to the trike pylon using the wing nut and safety clip.
4. Attach any additional cables, electrical and antenna wires at this time.
5. Lift the nose of the wing allowing the trike to roll backwards until the trike front wheel rolls over and behind the control bar.
6. Attach the wing nose cone to the front of the wing before lifting the wing off the ground.
7. Block the trike rear wheels and then lift the wing right up and lock the trike mast / pylon in place.
8. Insert and attach the necessary bolts, wing nuts, safety clips, pins, hooks and front tube to the trike and check they are correctly inserted and secure.

Note:

Get into the habit of always double checking every step of your assembly and rigging procedure to ensure that you do not leave a safety clip / nut / clevis pin half attached or off completely.

PRE-FLIGHT INSPECTION

Note:

Always follow the exact same procedure and route when doing a pre-flight inspection as this will help you develop a thorough inspection routine.

During your pre-flight inspection of the wing, use your hands to test the security of the various parts by touching, moving and sometimes pushing and pulling on them. In this way if there is a part that looks secure but is actually loose, you will notice it move.

Start at the LH wingtip:

1. Check the end strap is securely in place on the plastic end piece and the positioning self tapping screw is in place securely.
2. Check that the wingtip batten is in place and the over-centre middle junction is correctly engaged.
3. Check the washout batten is in place and is underneath the second end batten and holding it up.
4. Check the upper end battens are correctly inserted and are secure at the spring loaded rear end.
5. Check the sail end for tears and unusual wrinkles.
6. Look inside the sail and check the leading edge for anything out of place any unusual distortion of the sail or leading edge tube.

Move along the leading edge to the spreader bar / leading edge junction:

1. Open the inspection zip and inspect the junction brackets, bolts, nuts and cables for security.
2. Make certain the cables are not twisted or damaged in any way and are attached securely to the bolts.
3. The nuts must be secure on the bolts and there must be at least one or two threads showing above the nut.
4. Check the leading edge and spreader bar tubes for distortion or damage.
5. Check the sail for damage or scuff marks.

Move along the leading edge to the nose of the wing:

1. Check that the leading edge tube is not distorted between the spreader bar junction and the nose.
2. Move the nose cone out of the way and inspect the nose plates for twisting or any unusual signs of wear.
3. Check all 4 bolts and nuts are secure.
4. Check that the 2 nose battens are attached to each other and are in place on the top nose plate.
- 5.
6. Check the upper landing cable is securely attached and that it is not tearing or pulling on the sail.
7. Look up at the top of the kingpost and check that the side-to-side and nose cables are securely in place.
8. Check that the adjustment channel on the underside of the nose junction is securely attached.
9. Check that the lower landing cable is securely attached to the swan catch and that the swan catch is securely held in place with the 2 clevis pins.
10. Check the split pin and safety ring are securely in place on the 2 clevis pins.
11. Check the ends of the keel and leading edges for wear or distortion.
12. Look along the length of the keel to make sure it is not bent or distorted.

13. Attach the nose cone and make sure the Velcro is still working and will hold it securely in place.

Move to the A frame:

1. Look at the entire length of the side, nose and rear flying cables and check for twists, kinks and loose strands. The cables must not be overly strained but at the same time must not be too loose.
2. Check that the end of each cable is secure, not twisted and undamaged.
3. Check the condition of the control bar and ensure it is straight and undamaged.
4. Check the securing bolts are in place and the nuts and safety rings are properly attached.
5. Check the lower junctions of the A frame are secure.
6. Check all bolts and nuts are secure and in good condition.
7. Check that the downtubes are straight and undamaged.
8. Standing on the seat of the trike, check the top junction point where the A frame attaches to the keel for security.
9. At the same time check the hang point, stop rings, safety cable and the attachment bolts, nuts, wing nuts and safety rings and clips for security.
10. If you did not inspect the spreader bar centre junction before the wing was attached to the trike, do so at this point. Check that the keel webbing strap, brackets, bolts, nuts, split pins and particularly the cables are not twisted, are secure, undamaged and in the correct position.
11. Check the sail for tears and unusual wrinkling.

Now inspect the RH wing in the same manner as you did the LH wing but starting at the spreader bar / leading edge junction and ending at the RH wingtip.

Move along the trailing edge of the wing:

1. Check that each upper and lower batten is in place and correctly attached.
2. Check the luff lines and the top of the rear landing cable are not twisted and are securely attached.
3. At the rear of the wing keel:
4. Check that the lower rear flying cable is securely attached and undamaged and not twisted.
5. Check that the sail keel pocket strap is securely attached and the sail is undamaged.
6. On the top rear of the wing keel check that the rear landing cable and spreader bar tensioning cables are not twisted and are undamaged and securely attached to the D shackle.
7. Check the D shackle, the adjustable channel and swan catch are all securely attached by means of the bolts, nuts, clevis pins, split pins and safety ring.

Finally stand back a few meters:

Look at the overall shape of the wing and make certain that the LH and RH sides look symmetrical.

TUNING THE WING

Note:

1. The Spirit 15 wing should fly straight and level without any pilot input with a cruising speed of between 80 kph (50 mph) and 100 kph (62 mph).
2. Before making any adjustments to the wing, first check that the wing is in the standard condition and that the battens all conform to the Spirit 15 batten profile.

3. If the wing is not new, check the condition of the frame especially the outer leading edge tubes. The best is to remove the leading edges and check that they have the same bend in them and when under load they flex equally.
4. Do not exceed the adjustment limitations.
5. Do one adjustment at a time and test fly each time to measure the effect of each change.
6. Note all adjustments and changes in the log book.
7. Only tune the wing in perfect flying weather.

TUNING THE WING FOR A TURN.

If the wing has a turn at all speeds:

1. Each wingtip has a slotted plastic end cap with a webbing strap over it. The plastic end is kept in place and at the correct angle with a small self-tapping screw. By adjusting a wingtip down, the lift on the end of that wing will be increased and that will lift that wing in flight. Adjust the screw down by 2 mm at a time. Do not exceed 6 mm away from the original hole.
By adjusting the wingtip up, the lift will be decreased on that side and the wing will drop on that side. Adjust the screw up by 3 mm at a time. Do not exceed 6 mm away from the original hole.
Adjust one wingtip at a time and test fly after each adjustment.
2. By tensioning one leading edge of the wing, the angle of attack on that side will be increased which will lift that wing.
Remove the wing from the trike and de-rig it.
Remove the outer leading edge on the side of the wing to which it is rolling.
The outer leading edge can be tensioned by changing the position of the adjustment bolt at the join of the outer leading edge to the main leading edge.
Make one adjustment at a time and do not tension more than 10 mm.

If the wing has a turn at high speeds but at low speeds the turn is not so pronounced

1. Increase the camber (curve) of the end 3 top curved battens (battens number 9, 10 and 11) on the side to which the wing is turning (the low wing side) and decrease the camber (flatten) of the end 3 curved top battens on the opposite side (high wing side).
2. What also helps is if the end 4 top curved battens (batten numbers 8, 9, 10 and 11) are given some reflex on the side to which the wing is turning (the low wing side). To achieve this bend the rear end (trailing edge end) of each batten upwards at a point 150mm (6") from the rear end of the aluminium tube. Bend the tube a maximum of 20 mm (3/4") up.
3. Do these adjustments in small increments.

ADJUSTING THE CRUISING SPEED

1. Move the wing hang block forward on the wing keel will speed the wing up.
2. Put more tension onto the spreader bar tensioning cables by moving the top rear swan catch one hole backwards will speed the wing up.
3. Tension up both leading edges as described previously will speed the wing up.
4. Swivel both wing tips down equally will speed the wing up.

General

The handling of the wing is affected by many different aspects:

1. As the sail gets older and stretches, the wing will be slightly slower but lighter to handle.

2. Tensioning the leading edges increases the cruise speed, lightens the pitch control, but the roll becomes heavier and slower. The wing can also be flown slower at the bottom end and faster at the top end.
3. Tensioning the spreader bar tensioning cables has the same effect.
4. Tensioning the top curved battens by putting stronger springs into the battens will also have the same effect as well as giving the top surface a very clean and wrinkle free appearance.
5. To summarise a tighter wing is more efficient and faster but more difficult and slower to handle.

ANNUAL INSPECTION

1. An annual inspection is a very thorough inspection which must be carried out every 12 months or every 100 hours whichever come first by a factory and CAA approved wing inspector.
2. Before undertaking the annual inspection, contact the factory and obtain all the latest modification and maintenance updates.
3. Check the wing log book to see how many hours the wing has flown and what modifications and maintenance has been undertaken.
4. An annual inspection does not take the place of the maintenance schedule – both must be undertaken.
5. If any part looks suspect from wear, corrosion or damage – then that part must be replaced even if not yet called for in the maintenance schedule.
6. Strip the wing if necessary to inspect difficult to see or suspect parts.
7. Use a magnifying glass to inspect small blemishes and marks.
8. Do a very thorough inspection and do not sign a wing off as fit to fly unless all the maintenance has been correctly done and you are satisfied with the condition in all respects – remember, peoples lives depend on your decisions.

The wingtips:

1. Check the end strap is secure and in place on the plastic end piece and the positioning self tapping screw is in place securely.
2. Remove and check the wingtip batten. Replace it in it's correct position and ensure the over-centre middle junction is properly engaged.
3. Check the washout batten is in place and is underneath the second end batten and holding it up. Pull it out slightly to ensure the bungee is not perished and is still functioning correctly. Check the washout batten for cracks or bends.
4. Check the upper end battens are correctly inserted and are secure at the spring loaded rear end. It is not necessary to remove them, but check that the plastic ends are in good condition.
5. Check the sail end for tears and unusual wrinkles.
6. Look inside the sail and check the leading edge for anything out of place any unusual distortion of the sail or leading edge tube.

The spreader bar / leading edge junction:

1. Open the inspection zip and inspect the junction brackets, bolts, nuts and cables for security.
2. Make certain the cables are not twisted or damaged in any way and are attached securely to the bolts.
3. The nuts must be secure on the bolts and there must be at least one or two threads showing above the nut.
4. Check the leading edge and spreader bar tubes for distortion or damage.
5. Check the sail for damage or scuff marks.

The nose of the wing:

1. Check that the leading edge rube is not distorted between the spreader bar junction and the nose.
2. Move the nose cone out of the way and inspect the nose plates for twisting or any unusual signs of wear.
3. Check all 4 bolts and nuts are secure.
4. Check that the 2 nose battens are attached to each other and are in place on the top nose plate.
5. Check the upper landing cable is securely attached and that it is not tearing or pulling on the sail.
6. Look up at the top of the kingpost and check that the side-to-side and nose cables are securely in place.
7. Check that the adjustment channel on the underside of the nose junction is securely attached.
8. Check that the lower landing cable is securely attached to the swan catch and that the swan catch is securely held in place with the 2 clevis pins.
9. Check the split pin and safety ring are securely in place on the 2 clevis pins.
10. Check the ends of the keel and leading edges for wear or distortion.
11. Look along the length of the keel to make sure it is not bent or distorted.
12. Attach the nose cone and make sure the Velcro is still working and will hold it securely in place.

The A frame:

1. Look at the entire length of the side, nose and rear flying cables and check for twists, kinks and loose strands. The cables must not be overly strained but at the same time must not be too loose.
2. Check that the end of each cable is secure, not twisted and undamaged.
3. Check the condition of the control bar and ensure it is straight and undamaged.
4. Check the securing bolts are in place and the nuts and safety rings are properly attached.
5. Check the lower junctions of the A frame are secure.
6. Check all bolts and nuts are secure and in good condition.
7. Check that the downtubes are straight and undamaged.
8. Standing on the seat of the trike, check the top junction point where the A frame attaches to the keel for security.
9. At the same time check the hang point, stop rings, safety cable and the attachment bolts, nuts, wing nuts and safety rings and clips for security.
10. If you did not inspect the spreader bar centre junction before the wing was attached to the trike, do so at this point. Check that the keel webbing strap, brackets, bolts, nuts, split pins and particularly the cables are not twisted, are secure, undamaged and in the correct position.
11. Check the sail for tears and unusual wrinkling.

The trailing edge of the wing:

1. Check the upper and lower battens are in place and correctly attached.
2. Check the luff lines and the top of the rear landing cable are not twisted and are securely attached.
3. At the rear of the wing keel:
4. Check that the lower rear flying cable is securely attached and undamaged and not twisted.
5. Check that the sail keel pocket strap is securely attached and the sail is undamaged.
6. On the top rear of the wing keel check that the rear landing cable and spreader bar tensioning cables are not twisted and are undamaged and securely attached to the D shackle.

7. Check the D shackle, the adjustable channel and swan catch are all securely attached by means of the bolts, nuts, clevis pins, split pins and safety ring.

The wing tubes, brackets and hardware

If these components show any sign of corrosion, damage, distortion and unusual or excessive wear, they must be replaced immediately.

Corrosion, particularly with wings at sea level, is something to be aware of. Corroded parts must be replaced.

The cables, Nico press sleeves, thimbles and never kinks

The cables and related parts usually become damaged from transportation and the rigging and de-rigging of the wing.

Slide a cloth down each cable feeling for loose strands and kinks.

Inspect each Nico press sleeve for slippage and/or corrosion.

Check each thimble for distortion, flattening or wear where it touches a bolt, shackle or tang.

Replace suspect or corroded cables.

The wing sail

Inspect the entire sail for sun (ultra violet light) damage, scuffing, tears and loose stitching. Test the top surface of the sail and the stitching separately for strength.

The strength of the stitching is particularly important.

If the wing sail has been patched, check that it has been undertaken by a reputable company.

Feel along the trailing edge to establish that the Dynema cord is still intact.

No scratch, scuff mark, tear or damage is permitted on the sail trailing edge at all.

Get the sail repaired or replaced if necessary.

The battens

If there is uncertainty as to the condition of the battens, then remove them and measure them against the Spirit 15 batten profile.

The hang point

This component must be in good condition, must move freely and not be worn.

Overall shape

Look at the overall shape of the wing and make certain that the LH and RH sides look symmetrical.

MAINTENANCE

The sail

The wing sail must be tested and replaced when the sail and stitching no longer meets the minimum strength requirements.

The top sail material limit is measured with a smooth needle 2.5 mm dia and using a force of 2 kg.

The stitching must be tested using a sharpened pencil which can be forced under the threads - with a force of 8 kg the threads must not part.

All wing tubes, battens, brackets, fittings, hardware and cables

The entire wing structure must be completely stripped down when a thorough maintenance inspection is called for.

All components must be replaced as listed and also whenever corrosion, cracks, dents, or damage of any sort is detected.

SPiRiT 15 maintenance schedule

WING PART	MAINTENANCE PERIOD
STRIP THE ENTIRE WING	Every 500 hours or 5,000 landings whichever comes first
SAIL AND STITCHING - inspect & test	Every 100 hours or 1,000 landings whichever comes first
SAIL - replace	Every 1,000 hours or 10,000 landings whichever comes first
LEADING EDGES - replace	Every 1,000 hours or 10,000 landings whichever comes first
KEEL - replace	Every 1,000 hours or 10,000 landings whichever comes first
CONTROL BAR - replace	Every 1,000 hours or 10,000 landings whichever comes first
DOWN TUBES - replace	Every 1,000 hours or 10,000 landings whichever comes first
SPREADER BARS - replace	Every 1,500 hours or 15,000 landings whichever comes first
KINGPOST - replace	When necessary
BATTENS - replace	When necessary
NOSE PLATES - replace	Every 500 hours or 5,000 landings whichever comes first
A-FRAME FITTINGS - replace	Every 1,000 hours or 10,000 landings whichever comes first
ALL OTHER FITTINGS - replace	When necessary
ALL CABLES - replace	Every 1,000 hours or 10,000 landings whichever comes first
ALL HARDWARE - replace	Every 1,500 hours or 15,000 landings whichever comes first
HANG BLOCK BUSHES - replace	Every 300 hours or 3,000 landings whichever comes first
HANG BLOCK - replace	Every 1,000 hours or 10,000 landings whichever comes first

SPARE PARTS LIST

PART No:	PART DESCRIPTION	QTY PER WING
SP.0000	Whole Wing	1
SP.1000	Battens (set)	1
SP.1002	Spring fork for battens	22
SP.1003	Battens spring	22
SP.1010	Keel batten	2
SP.1020	Top batten #1	2
SP.1030	Top batten #2	2
SP.1040	Top batten #3	2
SP.1050	Top batten #4	2
SP.1060	Top batten #5	2
SP.1070	Top batten #6	2
SP.1080	Top batten #7	2
SP.1090	Top batten #8	2
SP.1100	Top batten #9	2
SP.1110	Top batten #10	2
SP.1120	Top batten #11	2
SP.1130	Bottom batten #1	2
SP.1140	Bottom batten #2	2
SP.1150	Bottom batten #3	2
SP.1160	Bottom batten #4	2
SP.1170	Tip batten (assembled) - L-585	2
SP.2000	Sail (complete with mylar and nose cone)	1
SP.2100	Sail (only)	1
SP.2200	Nose cone	1
SP.2300	Mylar inner LE	2
SP.3000	Frame (assembled)	1
SP.3100	Keel tube (assembled)	1
SP.3110	Keel tube (w/o brackets)	1

SP.3116	Cap od 48 x id 42 (nose)	3
SP.3117	Cap od 54 x id 42 (back)	1
SP.3120	Nose plate (top)	1
SP.3121	Nose plate (bottom)	1
SP.3122	Nose channel	1
SP.3123	Nylok nut M6	9
SP.3124	Washer M6	9
SP.3125	Ear clevis pin dia 6 x 25	2
SP.3126	Clevis pin dia 6 x 25	4
SP.3127	Safety ring (large)	4
SP.3128	Split pin 1.6-16	7
SP.3129	Bolt M6 x 70 (shank 59)	5
SP.3130	Hang block (assembled)	1
SP.3131	Man bronze bush (id 10.0)	2
SP.3132	Ertalyte bush (id 54)	2
SP.3133	Stop ring	2
SP.3135	Flat nut M6	2
SP.3136	Safety Ring (small)	2
SP.3137	Hang block body	1
SP.3141	Allen key countersunk bolt M6 x 70 (shank 47)	2
SP.3142	Allen key bolt M10 x 85 (shank 68)	1
SP.3143	Lock nut M10	7
SP.3150	Rear channel	1
SP.3151	Bolt M8 x 70 (shank 45/55)	3
SP.3152	Lock nut M8	10
SP.3153	Washer M8	15
SP.3200	LE complete (assembled)	2
SP.3210	LE tube #1	2
SP.3216	Bolt M6 x 60 (shank 40)	2
SP.3217	Bolt M10 x 82 (low head) shank 68	2
SP.3218	Washer 10	8
SP.3219	Saddle washer	2
SP.3220	LE tube #2	2
SP.3222	Washout bush (with hole dia 19)	2
SP.3223	Stop support tip batten	2
SP.3224	Washout tube dia 19 (L=470)	2
SP.3225	Bungy cord dia 5/6 (L=500)	2
SP.3230	LE tube #3	2
SP.3231	Slot cap od 45 x id 42	2
SP.3232	Bolt M6 x 55 shank 35	2
SP.3300	Spreader bar (assembled)	1
SP.3310	Spreader bar tube	2
SP.3314	Bush dia 14 x 1.5 (L=62)	4
SP.3315	Bush dia 14 x 1.5 (L=62)	4
SP.3316	Bush dia 14 x 1.5 (L=60)	4
SP.3317	Bolt M8 x 90 (shank 72)	4
SP.3318	Plate	3
SP.3319	Channel plate	1
SP.3320	Bolt M8 x 32	1
SP.3321	Castle nut M8	5
SP.3322	Limit belt	1
SP.3330	Spreader bar tension cables (assembled)	1
SP.3335	Long shackle L=45 (bend)	1
SP.3336	Swan catch	2

SP.3400	King post (assembled without cables)	1
SP.3401	King post airfoil tube (L=1100)	1
SP.3402	Top of kingpost	1
SP.3403	Top of kingpost cap	1
SP.3404	Bottom plug	1
SP.3405	Thread pin (M8 x 85)	1
SP.3410	Front landing cable (assembled)	1
SP.3420	Side to side landing cable (assembled)	1
SP.3424	Bolt M8 x 88 shank 79	2
SP.3500	A-frame (assembled)	1
SP.3501	Upright (L=1670) airfoil tube	2
SP.3503	Top bracket	1
SP.3504	Top plug for upright	2
SP.3505	Bottom plug (fork)	2
SP.3506	Bottom sleeve for upright	2
SP.3508	Bolt M8 x 55 (shank 45)	2
SP.3509	Sleeve stainless steel dia 10 x 0.8 x 35	2
SP.3510	Bolt M8 x 46 (shank 31) hole dia 2.0	2
SP.3520	Control bar (assembled)	1
SP.3521	Control bar tube 28.2 x 1.6 (L=1490)	1
SP.3522	Side plug	2
SP.3523	Bolt M8 x 40 (shank 28) hole 2.0	2
SP.3524	Control bar cable dia 3.0	1
SP.3525	Sleeve dia 6 x 1 x 24 stainless steel	2
SP.3526	Control bar wheel	2
SP.3527	Control bar rubber cover (L=200)	2
SP.3600	Front flying cables (assembled)	1
SP.3602	Short shackle	1
SP.3700	Side flying cables (assembled)	2
SP.3710	Front side flying cable (L=2875)	2
SP.3720	Rear side flying cable (L=2880) assembled	2
SP.3800	Rear flying cables (assembled)	1
SP.3900	Rear landing cable and luff lines (assembled)	1
SP.3907	Carabino	6
SP.4000	Wing & batten bag and padding set	1
SP.4010	Wing bag	1
SP.4020	Battens bag	2
SP.4030	Cables bag	2
SP.4040	Upright protection keel/ king post protection	5
SP.4060	Hang block - a-frame protection	2
SP.4070	Velcro tension strap	4
SP.4080	Spreader bar side protection	2
SP.4090	Spreader bar centre protection	1