

APPENDIX AI

KITPLANES FOR AFRICA



AIRCRAFT LANDING GEAR CONSTRUCTION MANUAL

NOTE:	Please read the General Manual before proceeding. Please read through the entire Landing gear Construction Manual before proceeding.
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AMMENDMENT RECORD

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CONSTRUCTION SEQUENCE

1. Prepare the landing gear components for installation
2. Assemble main wheels
3. Assemble and install brake system to landing gear
4. Install main landing gear to the fuselage
5. Assemble and install the tail-wheel or nose-wheel

PART 1: PREPARATION OF LANDING GEAR

NOTE:	The undercarriage should be trial installed or "Dry fitted" to the fuselage before final assembly.
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TIP:	Leave the fitting of the bungee cords till final assembly, temporarily tie the suspension up with rope during dry fitting.
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1.1 Clean and prime all steel components. The main landing gear legs LML attach to the fuselage via two lugs on the bottom longeron tubes. The tail dragger uses the front two lugs while the tricycle uses the two rear lugs. Ream the holes in the landing gear mounting lugs to a snug fit on the 8mm bolts.

NOTE:	Main landing gear legs are not interchangeable between nose and tail-wheel configurations.
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1.2 If wheel spats are to be installed, drill and tap a 6mm hole 30mm deep into the centre of the threaded ends of the LMG-8 axles.

1.3 For the tail-wheel aircraft, use a grinder to round the corners of both leaves tail-wheel spring. The back end of the top spring should taper in a V shape. Use a flexible paint coat to protect the tail spring against corrosion.

1.4 Fit the axle into the axle housing. If necessary, ream the axle housing to 16mm ID. The axles should be a snug fit but still removable.

1.5 Ream the LML main gear leg mountings to take the BB1240 brass bushes, 2 for each leg. The bush must rotate in the leg. The bush should be trimmed to fit snugly between the fuselage mounting tabs.

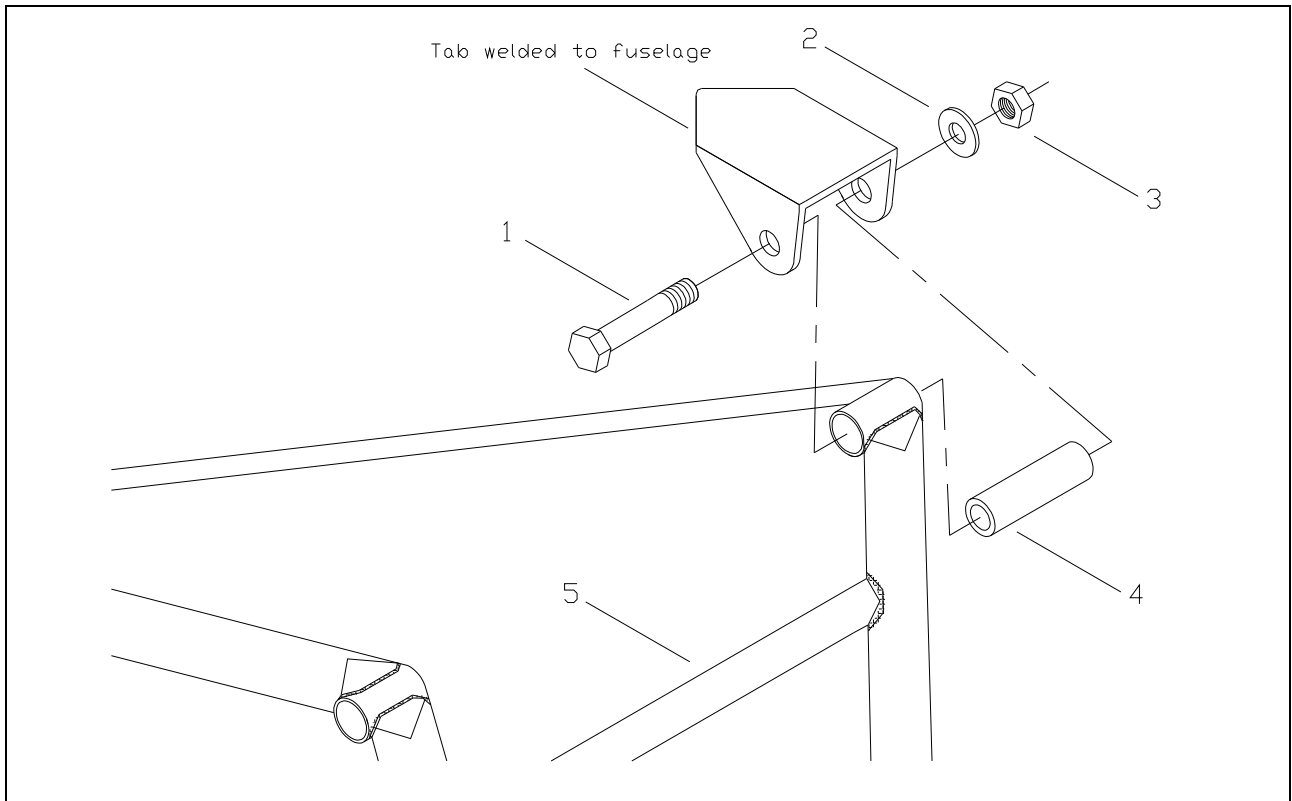


Fig #	Part #	Part description	Qty/Assy	Notes
1	B0870	Bolt 8 x 70	2	
2	W008	Washer M8	2	
3	NY008	Nylok M8	2	
4	BB1240	Bronze bush \varnothing 12 x 40mm	2	
5	LML-1L	Landing gear leg. T/d left	1	Left hand shown

PART 2: MAIN WHEEL ASSEMBLY

2.1 The hubs LMW-2 and brake drums LB-5 are machined without holes in the mounting flange, while the rims LMW-5A & B have four holes. Assemble the rims, hub and brake drum. Use the holes in the rim as guides to drill the hub for the 10mm bolts. Use a drill press and work accurately.

NOTE: See Part 3, Brakes. For disc brake rim assembly.

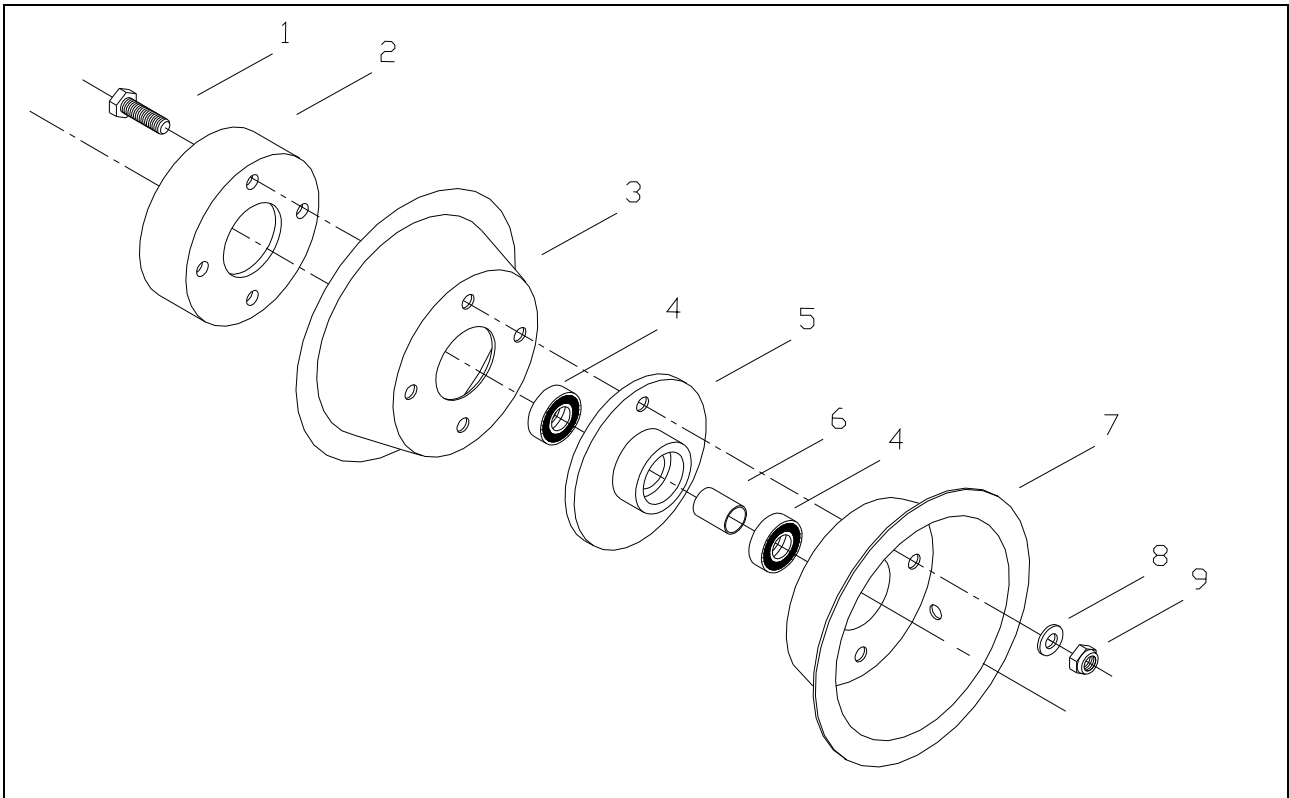


Fig #	Part #	Part description	Qty/Assy	Notes
1	B1O35M1	Bolt 10 x 35; rim, hub, brake drum	4	
2	LB-5	Brake drum	1	
3	LMW-5A	Rim 6", inner	1	
4	LMW-1	Bearing, 6205 DDU	2	
5	LMW-2	Hub, aluminium	1	
6	LMW-6	Spacer tube, ø 19 aluminium	1	
7	LMW-5B	Rim 6", outer. With valve hole	1	
8	W010	Washer M10	4	
9	NY010	Nylok M10	4	

2.2 Assemble the wheels. The outer rim with the hole for the inner tube air nipple attaches to the outside of the LMW-2 hub and vice versa. The LB-5 brake drum fits over the hub into the inner rim. The head of each 10mm bolt must be inside the brake drum and the nuts and washers on the outboard side. Install the inner tube and tyre before final assembly of the rim and tightening of the nuts. If the pre-punched holes in the rims have ridges on them they will need to be de-burred prior to assembly. Inflate to 1 bar.

2.3 Trim the LMW-6 spacer tube and insert in the hub. It should fit tight between the two main bearings to transfer torque loads on the bearings. Press the LMW-1 bearings into the hubs. Use a driver that fits the bearing outer rim, such as a large socket. Set the hub on a solid flat surface and tap the bearing into the hub until it is seated. Avoid getting any dirt or sand into the bearing seats.

PART 3: BRAKES

DRUM BRAKES

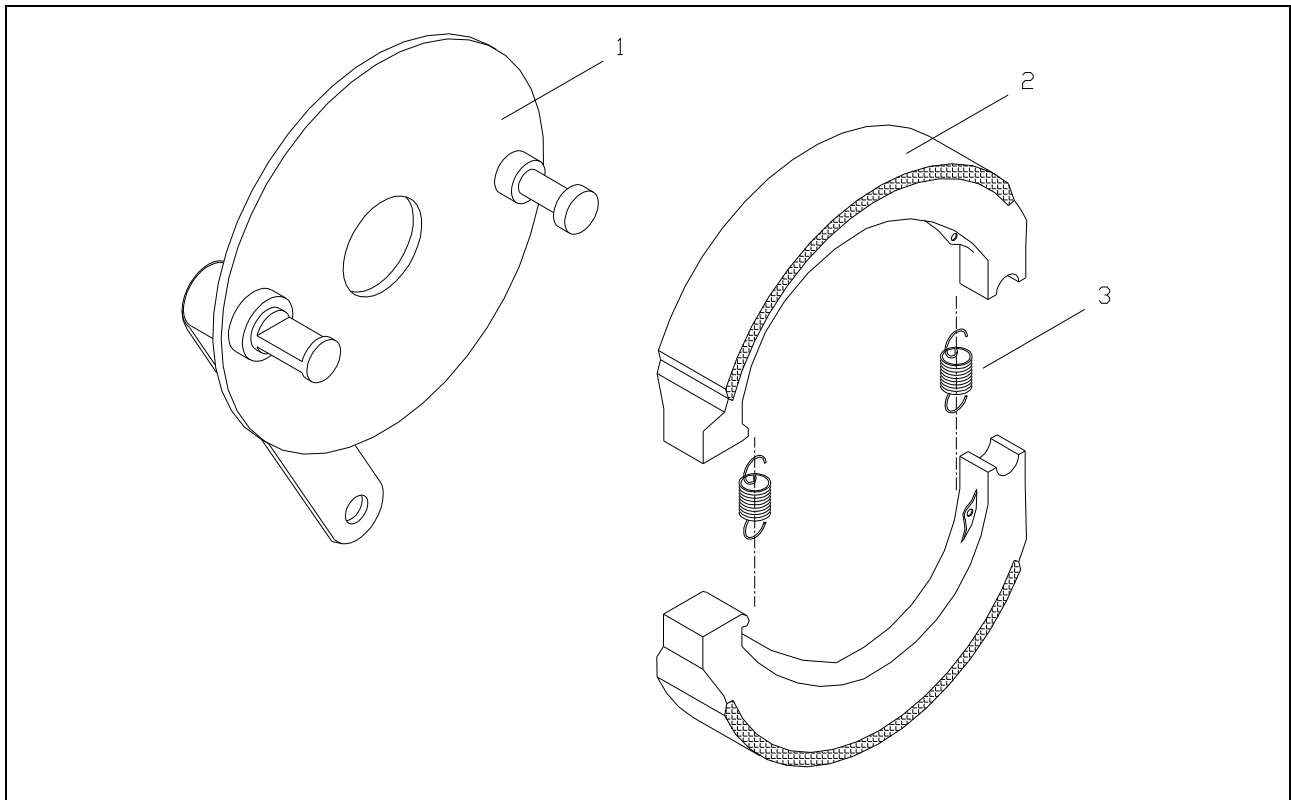


Fig #	Part #	Part description	Qty/Assy	Notes
1	LB-2L	Brake flange: left Hand	2	
2	LB-4	Brake shoes (set)	2	
3	LB-7	Spring, retain brake shoes	2	

3.1 Install the LB-4 brake shoes to the LB-2 mounting flange with the two LB-7 springs, ensuring that the spring is between the shoe and LB-2 (spring hook pointing away from LB-2). Operate the brake horn to ensure free movement and proper movement of the shoes. Fit the brake shoe assembly into the brake drums. This should be a loose fit, if necessary, evenly file or sand off some brake lining material.

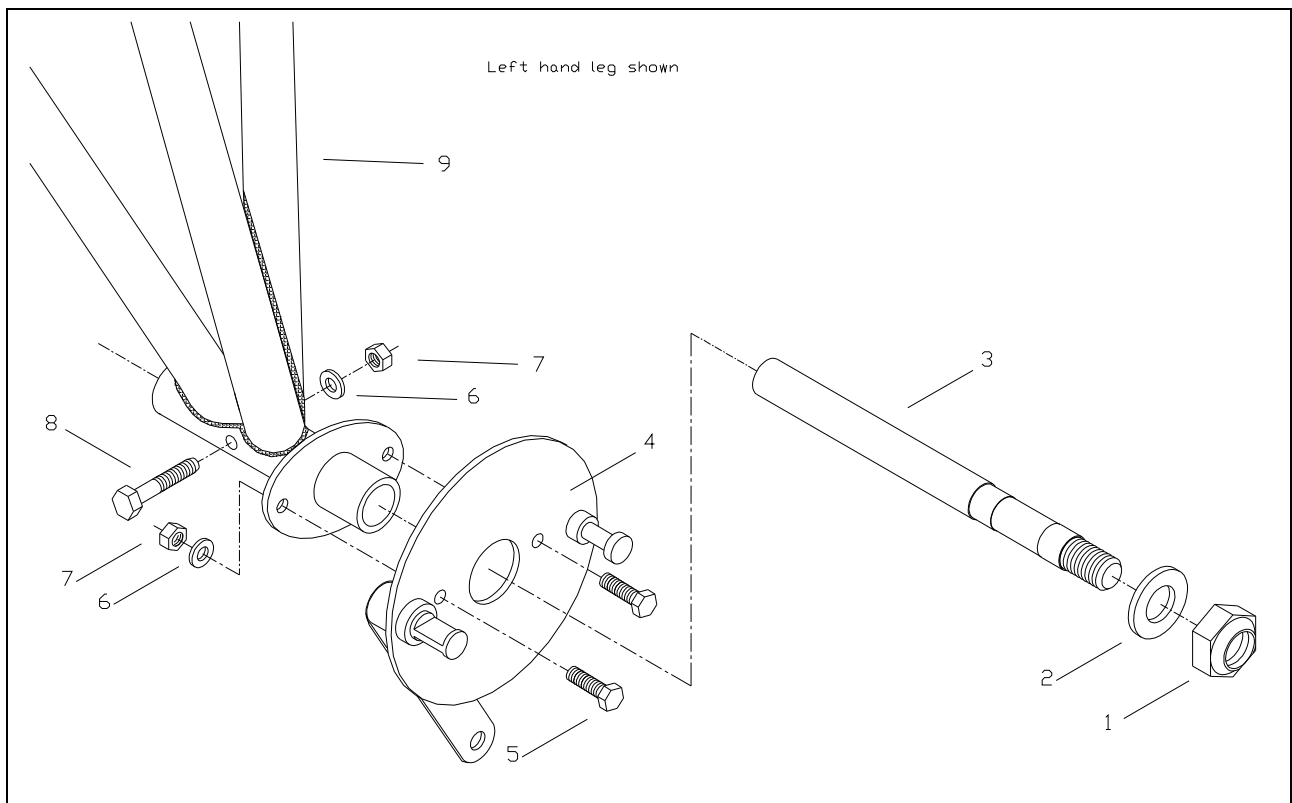


Fig #	Part #	Part description	Qty/Assy	Notes
1	NY014	Nylok m14	1	
2	W014	Washer M14	1	
3	LMG-8	Axle	1	
4	LB-2L	Brake backing plate. left	1	
5	B0620	Bolt 6 x 20	2	
6	W006	Washer M6	3	
7	NY006	Nylok M6	3	
8	B0645	Bolt 6 x65	1	
9	LML-1L	Landing gear leg. Tail dragger LH	1	

3.2 Insert the axle into the main gear leg tube. Drill a 6mm hole through the housing tube and axle, 15mm from the inboard end*, to take the B0645 bolt, de-burr and fit the bolt and washer and nylok nut.

NOTE:	* The hole placement for the axle bolt is incorrect in the drawing!
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3.3 Locate the LB-2 backing plate against the flange welded onto the main landing gear legs. Make sure that the left backing plate is on the left landing leg and vice versa. The brake levers point downward and back. Slide the wheel and brake drum over the shoes. Align the mounting flange in relation to the datum (belly longeron of the fuselage). While rotating the wheel slowly, pull the brake lever to displace the brake shoes and the brake backing plate will centre itself. Using the holes drilled in the flange on the legs, mark the backing plate for drilling. Recheck the markings by rotating the wheel and applying brakes. Drill two 6mm holes through the backing plate. Bolt the backing plate to the flange with two B0620 6x20mm bolts.

BRAKE PEDALS

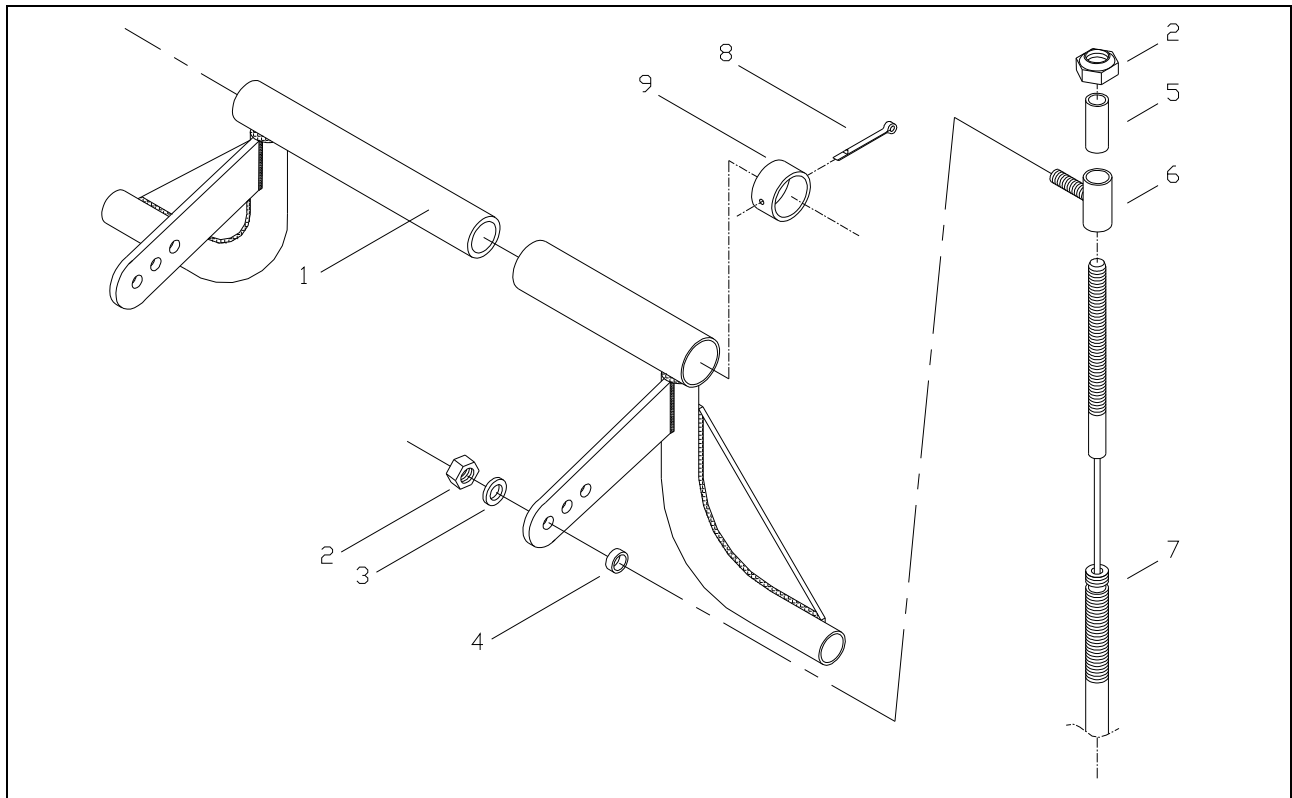


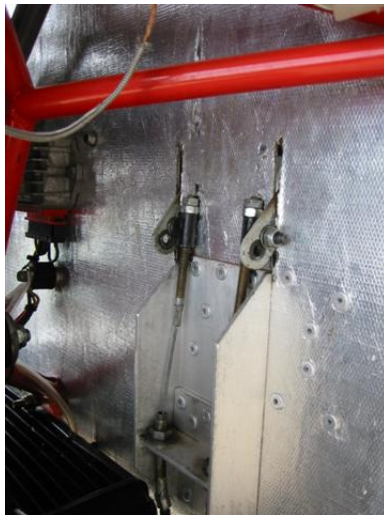
Fig #	Part #	Part description	Qty/Assy	Notes
1	LB-1	Brake pedal. Two part	1	
2	NY006	Nylok M6	4	
3	W006	Washer M6	4	
4	BB8003	Bronze bush ø 8 x 3mm	2	
5	FBR-5	Nylon tube ø 8 x 20mm	2	
6	LB-9	Pivot bolt	2	
7	LBL-6	Brake cable – left	1	
8	LB-8	Collar ø 19 x 10mm	1	
9	SP002	Split pin	1	

3.4 Slide the brake pedals (LB-1) through the tube welded onto the firewall horizontal brace, with the tabs on the brake pedals pointing forward into the engine compartment. Slide the LB-8 collar onto the end of the brake pedal and drill a 2.5mm hole through the collar and rudder pedal for a split pin.

3.5 The LBL-6 and LBR-6 brake cables cannot be fitted until the firewall has been installed. The brakes will also be disconnected when covering the fuselage. The shorter brake cable is used on the left. The left cable is routed from the drum brake lever up along the inside of the rear landing leg tube for tail-wheel, front tube for nose-wheel, into the engine compartment and to the left brake pedal. Route similarly for the right. Avoid any sharp bends in the cable. After covering, a small hole is burned with a soldering iron where the cable should enter and exit the fabric covering on the gear legs.



3.6 Attach the brake cables to the brake horn. The swaged cable end on the inner cable is inserted through the slot in the fitting on the backing plate. The outer cable is fitted into the recess. Insert the cable end into the brake drum lever through the slot in the horn and turn it back into position.

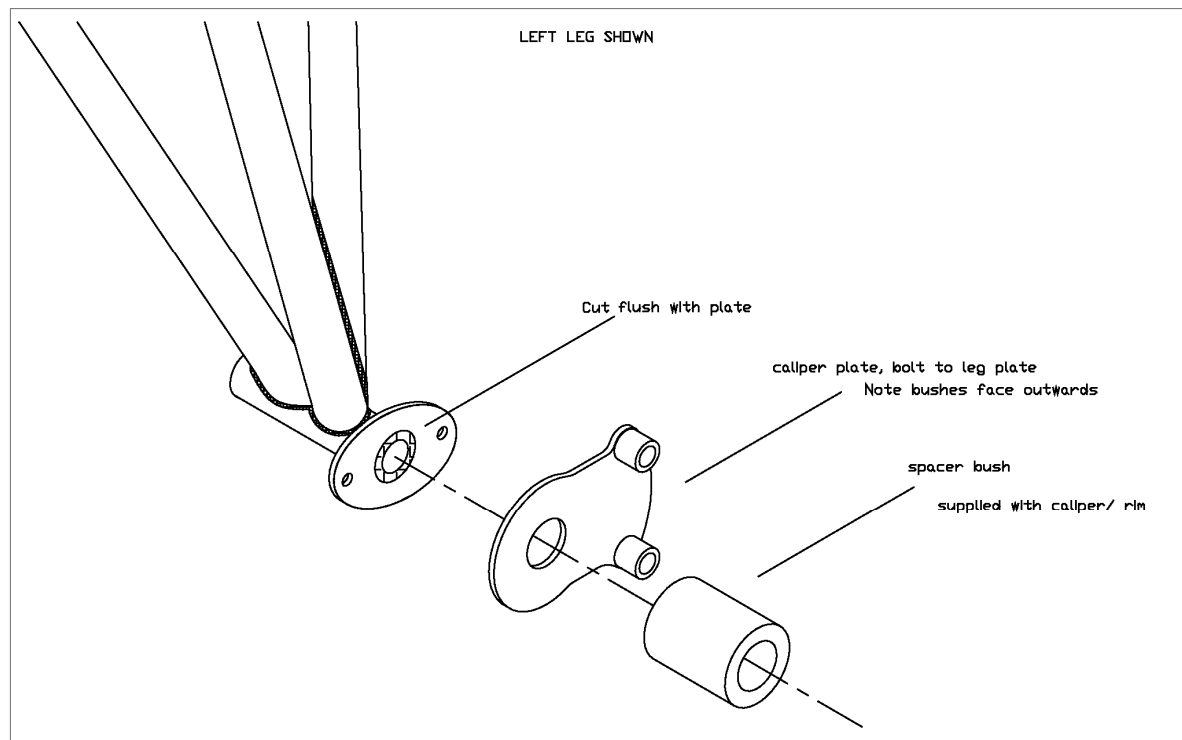


3.7 Cut 2 slots in the firewall for the toe brake pedal cable tabs to fit through.

3.8 Install the two LB-12 25x50mm firewall support angles on the firewall so that they form a channel. Drill two 6mm holes that correspond to the width of the brake pedal tabs on the LB-11 angle. Route the inner cable of the brake cable through the 6mm hole. Lock the outer cable housing to the angle, allow for maximum adjustment on cables as they stretch and the brakes wear. Locate the position for the LB-11 angle within the LB-12 channel, drill and rivet into position.

3.9 The brake cables are attached to the brake pedal tabs through the LB-9 pivot bolts. Install the LB-9, tighten the nuts just enough to ensure that the pivot bolts are free to pivot in the brake pedal tabs. Install a nylon sleeve (a piece from LMG-7) into the pivot bolt and route the threaded end of the cables through the pivot bolts. The brake pedals and braking action can be adjusted by turning the nut on the threaded fitting on the cable in or out as necessary.

DISC BRAKES



3.10 If disc brakes are to be fitted, modify the main landing gear leg axle tubes as shown above; cut the axle tube off flush with the outer surface of the mounting plate. Locate the calliper plate in position with the bushes outwards and to the rear, clamp in position, mark through the mounting plate and drill 2 x 6mm holes. De-burr all the modifications and treat for corrosion. Fit the axles and spacers supplied with the callipers and rims.

NOTE:	See the Matco pdf file included in the Builders Manual CD for guidance on fitting the brake master cylinders.
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3.11 For hydraulic brake toe master cylinder installation, consideration must be given to building wells into the firewall for adequate rudder/brake pedal clearance.

PART 4: MAIN LANDING GEAR

4.1 Install the main wheels on to the axles. When installing the wheel, make certain the axle housing seats against the bearing. Tighten the axle nut down just snugly enough to remove any side play. Take care not to over tighten the nut and damage the bearings.

4.2 After covering, bolt the landing gear legs to the fuselage using the four 8mm bolts. When the gear is disassembled for painting, removal of the axle is not necessary.

4.3 Prepare the two shock cords from the LMG-1 shock cord. Mark the supplied length of chord halfway, bind with tape and cut with a sharp blade. The length of the shock cord supplied is enough to form five loops around the landing gear truss each side. Use the LMG-2 hose clamps to form loops on one end of the shock cords. Tape some insulation tape around the chord where the clamps will be installed. Allow 25mm excess at the other end of the hose clamp, then stretch the chord out 10% and tighten the clamp. Install an LMG-3 cable tie on both sides of the clamp for extra safety.

NOTE:	Final shock cord installation will be done after covering.
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4.4 Install the loops in the shock cord chord over the forward hooks on the landing gear truss. Wind the chord around the inboard section of the gear leg five times. Clamp the other end of the shock cord to a structural member for easy adjustment until the correct tension has been established. Tightening up can easily be done by simply loosening the clamp and shortening the cord as necessary. The shock cord should keep the gear against the fuselage when empty and standing still on all its wheels.

WARNING:	The shock cord forms a vital part of the suspension system. Do not be tempted to set it too tight and cutting it shorter. Use all the cord provided. Hard landing forces would otherwise not be absorbed and instead would be transferred to the fuselage, possibly causing damage!
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When the aircraft is built up to empty weight, grip the wing at the wing lift strut and rock the aircraft from side to side. If the shock cords are correctly installed, the wheels will not tend to lift off the ground. The shock cords will need to be re-tensioned after the first few landings.

4.5 After cover and painting, position the LMG0-4 shock rubber pad under the centre of the main landing gear truss work to prevent metal to metal contact and wear where the landing leg touches the fuselage at the end of each shock cord arm. Glue with contact adhesive and tie in place with cable ties on each end of the pad.

6. Install the LMG-5 gear limit safety cable. When the loop is swaged there should be approximately 100mm travel available at the ends of the landing gear shock cord arms. This will prevent the landing gear from collapsing in case of failure of the shock cord.

PART 5: TAIL WHEEL OR NOSE WHEEL

TAIL WHEEL

5.1 Prepare the parts by rounding all corners and complete the corrosion protection on the steel parts. Ream the two holes on the ends of the rudder steering horn (bottom of the rudder) and the LTW-3 tail wheel fork horns to 3.5mm. NOTE that the distance between the holes on both rudder and tail-wheel horns should be the same.

5.2 Bolt the LTW-1 tail wheel leaf spring to the fuselage mount with one 8mm bolt in front. Drill one 6mm hole each side of the leaf spring through the welded-on tab at the bottom of the rudder post. Ensure that the tail spring is centred in relation to the fuselage and that the two holes will clear the sides of the spring by 0.5mm. Duplicate these holes in the LTW-2 plate supplied in the kit. De-burr all the sharp edges. Using the LTW-2 plate as a template, make two spacers out of the nylon block supplied. The spacers fit between the spring and the fuselage. Use the loose plate below the spring and clamp the tail spring rear end with two 6mm bolts. Do not over tighten the nuts as this will cause the plate to bend.

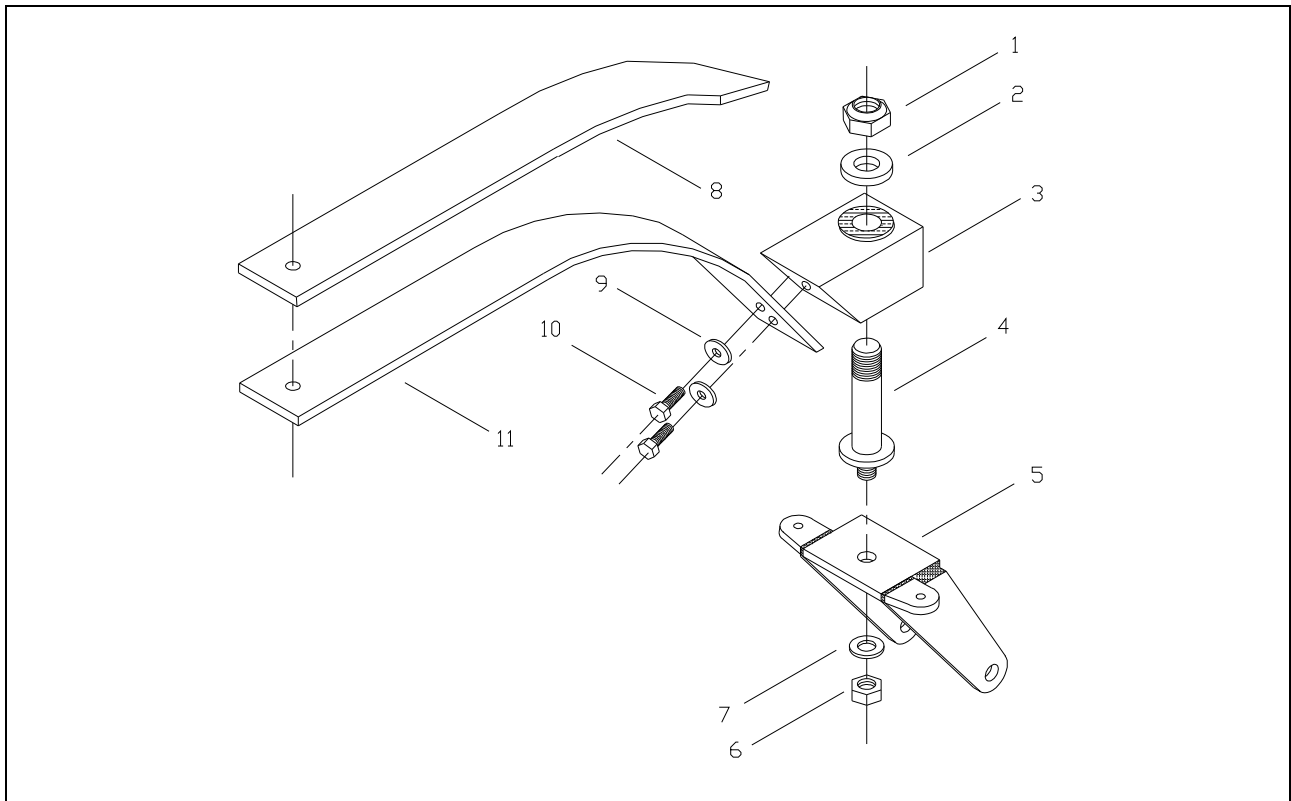


Fig #	Part #	Part description	Qty/Assy	Notes
1	NY016T1	Nylok M16	1	
2	W016	Washer M16	1	
3	LTB-1	Steering block with bronze bush	1	
4	LTB-4	Pivot shaft	1	
5	LTW-3	Fork, tail wheel	1	
6	NY010	Nylok M10	1	
7	W010	Washer M10	1	
8	LTW-1A	Doubler spring	1	
9	W008	Washer M8	2	
10	B0825T1	Bolt 8 x 25	2	
11	LTW-1	Leaf spring	1	

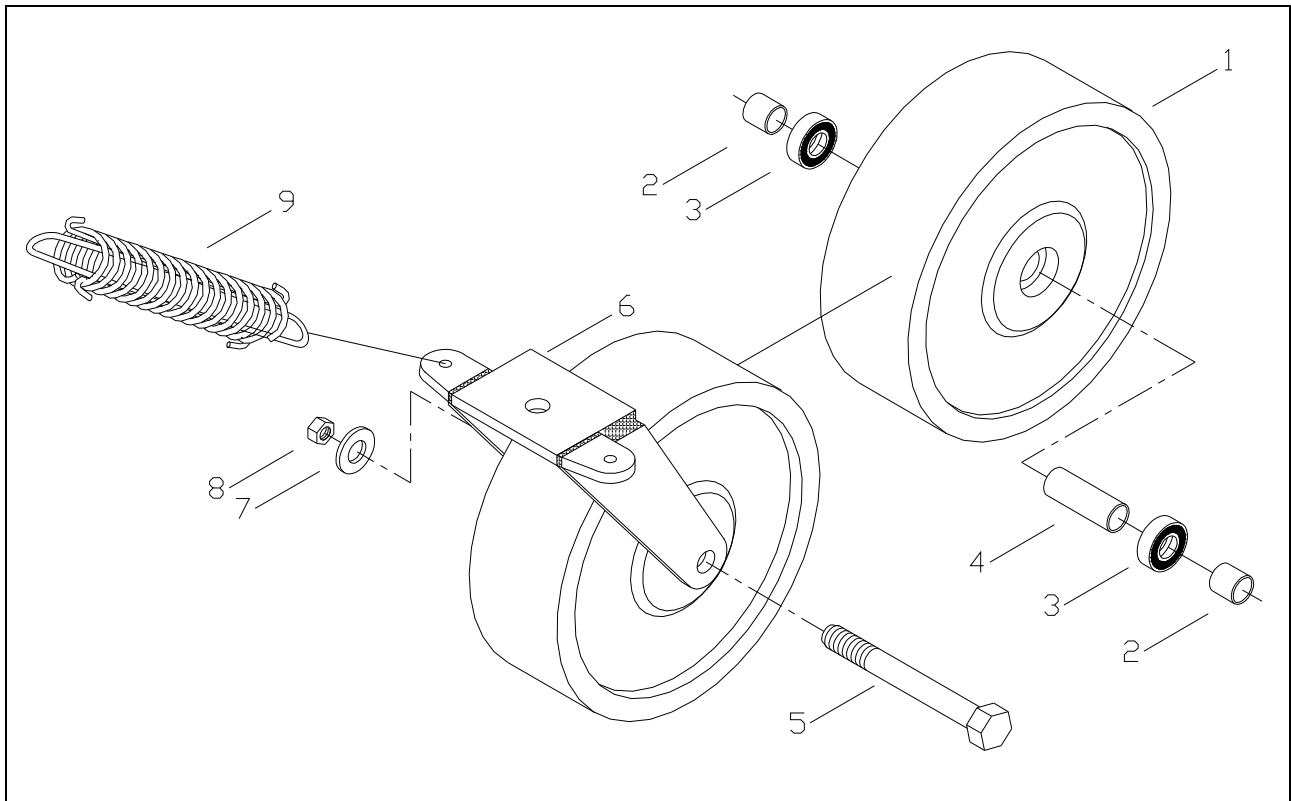


Fig #	Part #	Part description	Qty/Assy	Notes
1	LTW-4	Tail wheel \varnothing 150mm		
2	LTW-8	Steel spacer \varnothing 12.7mm.	2	Between fork & bearing
3	LTW-9	6002 bearing	2	
4	LTW-8A	Steel spacer. \varnothing 12.7mm	1	Between bearings
5	B1090	Bolt 10 x 90	1	
6	LTW-3	Fork, tail wheel	1	
7	W010	Washer M10	1	
8	NY010	Nylok M10	1	
9	LTW-5	Spring, compression	2	

5.3 Assemble the tail wheel and bolt the assembly to the rear of the LTW-1 tail wheel leaf spring. The LTB-4 pivot shaft must be perpendicular to the ground to ensure castor and steering action. If not perpendicular, shim the leaf spring mounting as required. Drill, tap and fit a grease nipple to the LTB-1 steering block for LTB-4 shaft lubrication.

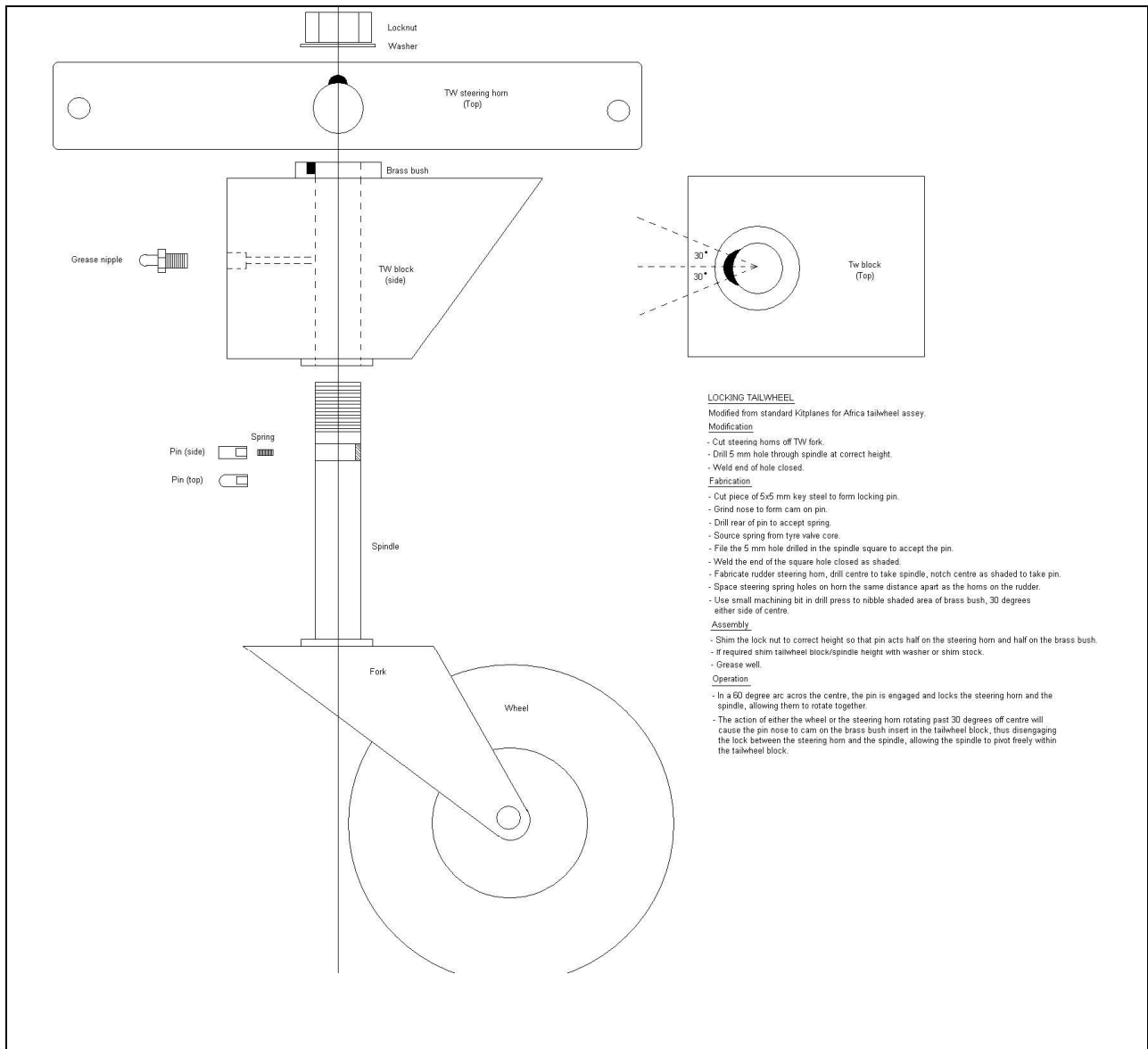
5.4 Manufacture two rudder spring connectors. The flat bar connectors fit between the rudder spring horns and the LTW-5 spring. Drill the pilot holes in the rudder horns to 6mm. The lower holes in the connector strip are drilled to 8mm to accept a bronze bush. Fasten the connectors to the fork with the 6 x 16mm bolts. Install the LTW-5 tail wheel steering springs (pull out to meet both horns). Both sides should be of equal length to ensure that the tail wheel turns the same amount in both directions. The finished spring assembly should cause both springs to be slightly in tension when the rudder and tail wheel are straight. Work the rudder pedals and check for full and free operation. The tail wheel should turn 25 – 30 degrees to each side with full rudder applied.

WARNING: Do not over tension the rudder springs as damage to the rudder can occur.

5.5 OPTIONAL LOCKING TAILWHEEL

The standard tail wheel on the Bushbaby, Explorer and Safari is fixed. It follows the rudder and does not break away and castor.

A locking tail wheel is available as an optional extra or can be fabricated by the builder by modifying the supplied tail wheel block.



NOSE WHEEL

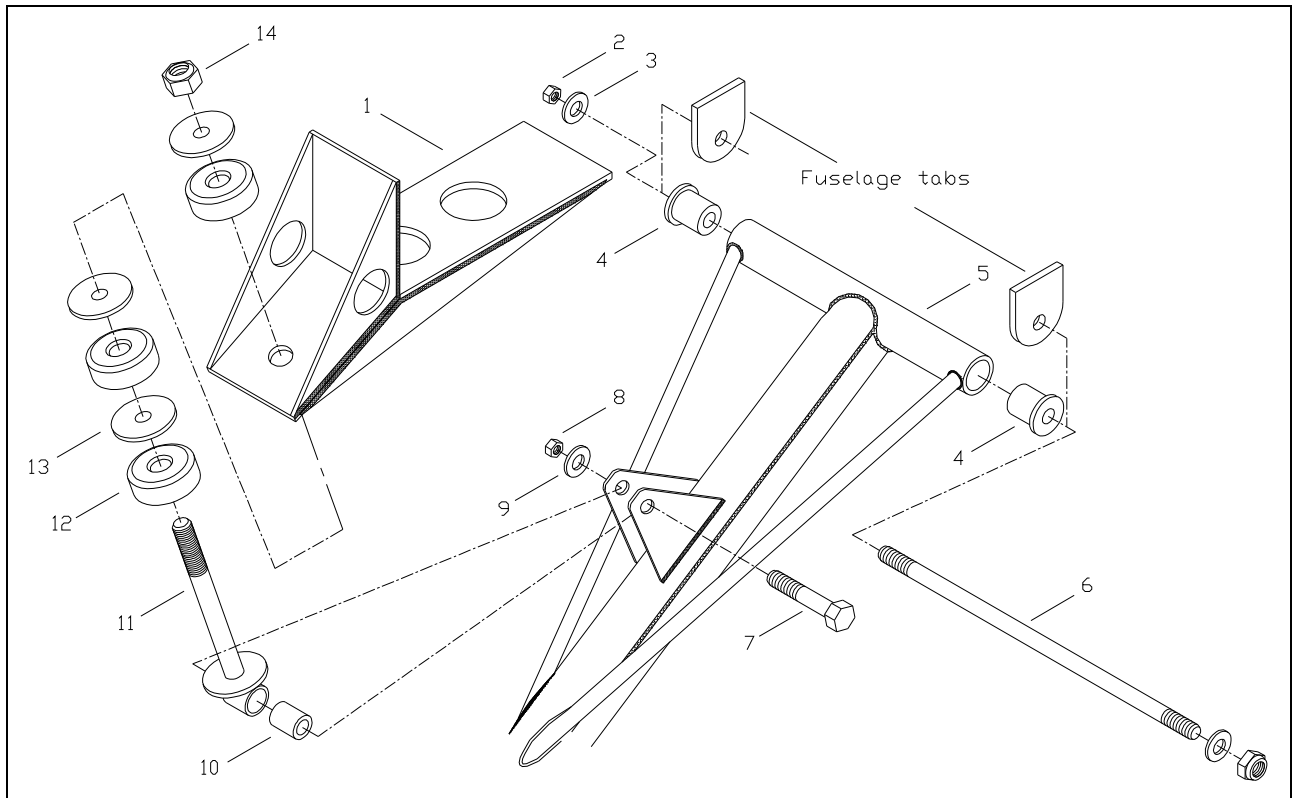


Fig #	Part #	Part description	Qty/Assey	Notes
1	LNW-13	Suspension bracket	1	
2	NY010	Nylok 10mm	2	
3	W010	Washer 10mm	2	
4	LNW-16	Nylon bush	2	
5	LNW-5	Shock strut	1	
6	LNW-18	Pivot rod. Ø 10mm	1	
7	B1050	Bolt 10 x 50	1	
8	NY010	Nylok M10	1	
9	W010	Washer M10	1	
10	BB1620	Bronze bush ø 16 x 20mm	1	
11	LNW-7A	Guide	1	
12	LNW-14	Compression rubbers	4-6	Same as EM-5
13	FW012	Fender washer M12 x 40 x 3mm	4-6	
14	NY012	Nylok M12	1	

5.5 Bolt the LNW-13 suspension bracket to the firewall and belly. Insert the LNW-16 nylon bushes into the LNW-5 nose strut and bolt to the fuselage tabs, torque till snug but still able to swivel. Assemble the LNW-14 compression rubbers and LNW-12 washers onto the LNW-7A guide and install between the suspension bracket and strut. Snug but do not over compress the compression rubbers.

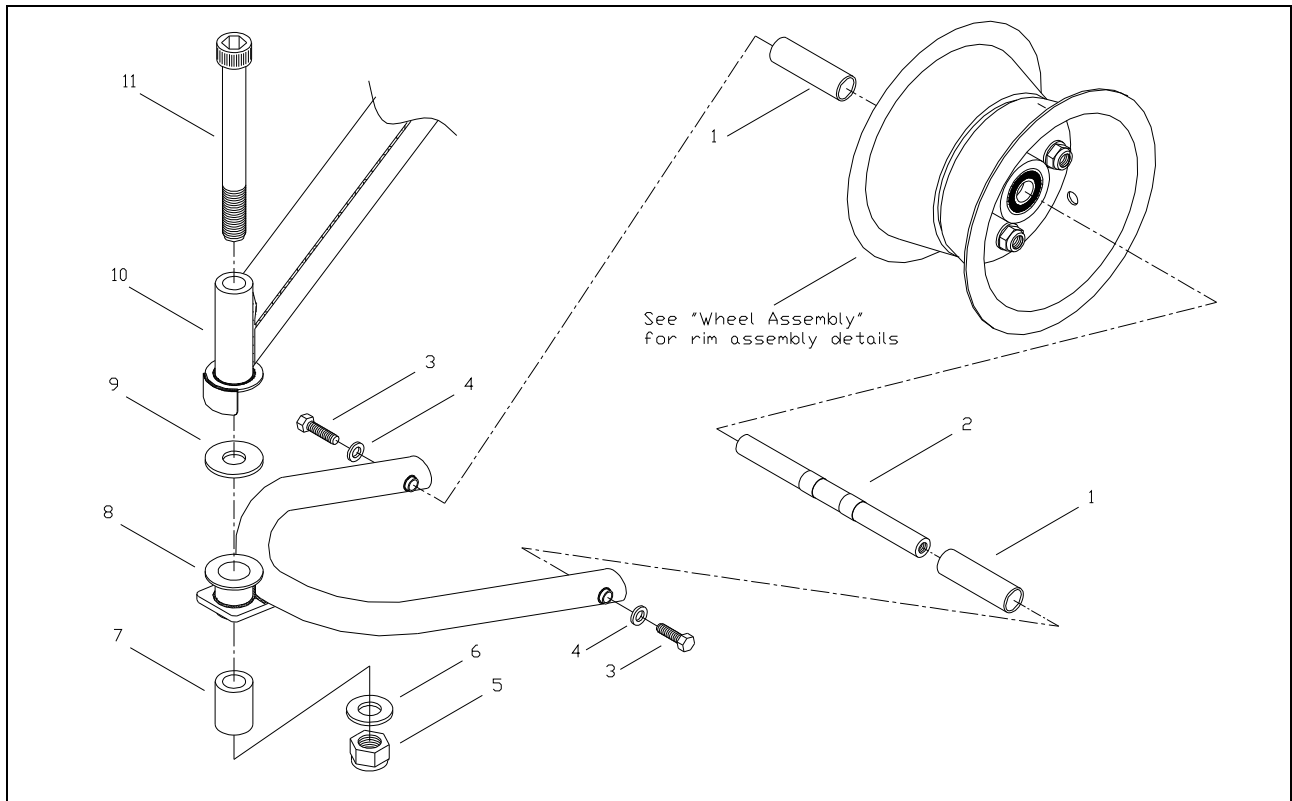


Fig #	Part #	Part description	Qty/Assy	Notes
1	LNW-10	Spacer tube.	2	Between rim & bearing
2	LNW-9	Axle, nose wheel	1	
3	B0825	Bolt 8 x 25	2	
4	W008	Washer M8	2	
5	NY016	Nylok M12	1	
6	W012	Washer M12	1	
7	BB2144	Bronze bush	1	
8	LNW-2	Fork weldment, nose gear	1	
9		Bronze washer	1	Part of BB2144
10	LNW-5	Shock strut	1	
11	C16150	Cap screw M16 x 150	1	

5.6 Drill small 1.5 mm holes in the trailing ends of the nose-wheel fork to take safety wire lockings for the axle bolts. Drill 1.5mm holes through the heads of the B0825 axle bolts.

5.7 Assemble the front wheel rim and tyre. Insert axle into the wheel hub, fit an LNW-10 spacer each side and position the assembly in the nose fork.

5.8, Dry fit the axle bolts to ensure that the axle bolts are long enough to take the shear load on the shank and not the thread. If necessary, counter drill the threaded ends of the axle. Be sure to leave at least 15mm of thread in the axle end. When fitted the bolts must not bind at the end of the thread, they should tighten onto the fork. Apply loctite and thread the B0825 bolts into the axle. Torque the axle bolts to 25nm. Safety wire-lock the axle bolts, taking care to lock them pulling clockwise.

5.9 Grease and fit the fork to the strut according to the diagram, torque till snug but ensure easy fork turning.