KIS4 Cruiser

BUILDERS MANUAL

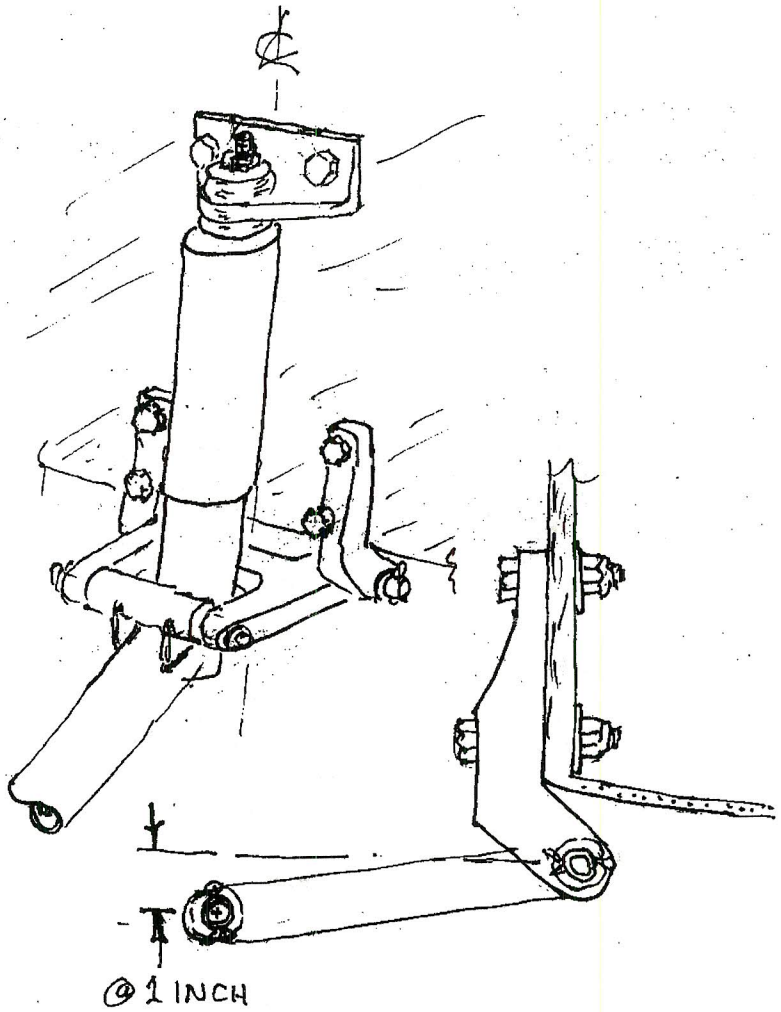
S/N 4052

CASTORING NOSE WHEEL SUPPLEMENT

4PNGASUP

FOUR PLACE CASTERING NOSE GEAR ASSEMBLY SUPPLEMENT - May 26, 1998

Many of the four place kits are now being provided with a castering version of the nose gear, much like the very successful new two place gear. These gear assemblies are shipped almost completely assembled and ready to install. The basic approach is to use the assembly as a template for drilling the required mounting holes through the fire wall. Place the nose gear assembly roughly in place on the firewall as shown in the attached sketch.



Center the top bracket at roughly the expected height, and secure with tape or other temporary means. Set the gear leg vertical to fuselage centerline, and push the linkage and "L" shaped brackets up into position. Raise these legs up until one or both are limited by the inner "bend" radius contacting the lower edge of the firewall. Both should be at roughly the same height, but the position of the assembled linkage is more important than for both to contact the bottom edge of the firewall simultaneously (however if there is a great difference side to side recheck your positioning before drilling any holes, and contact the factory if you cannot resolve this problem). Verify where the bolt holes will break through the back of the firewall and ensure that clearance exists for a generous washer, and no other components will be damaged when the holes are drilled.

When you are assured of this positioning drill clearance holes and install appropriate 5/16 bolts nuts and washers. To temporarily secure this part of the assembly (the top bracket should still be only temporally retained in position)

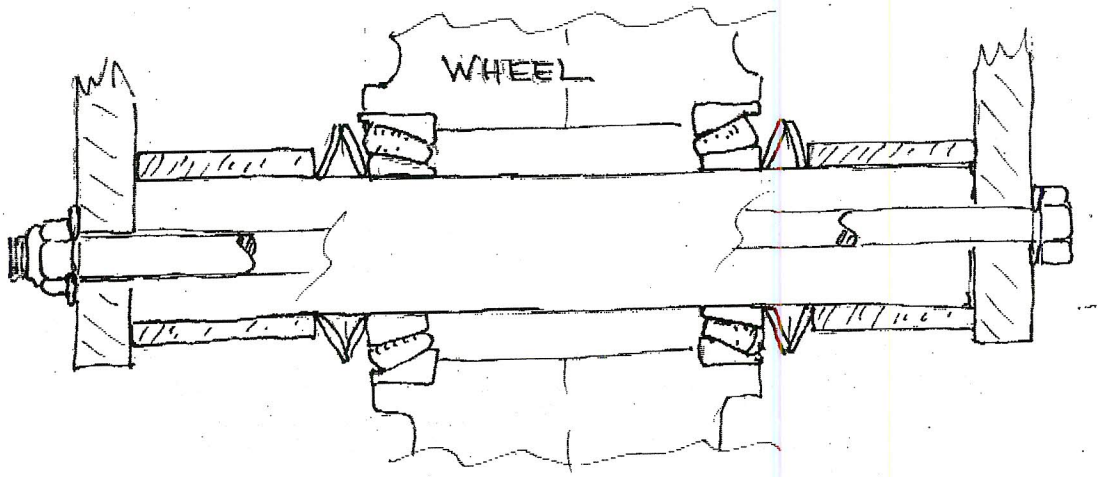
With the fuselage supported, and no weight on the gear leg, the upper bracket should be positioned vertically such that the outer end of the lower "H" link is roughly one inch below horizontal. Check the back side of the firewall where these upper bolt holes will come through to assure that fiberglass stiffening lay-ups are present. Also check the location of the wheel when the assembly is suspended in this position to estimate the static height of the front of the airplane. With the static load we would expect roughly one inch of strut compression and about a half inch of tire deflection. Under static conditions the aircraft

should sit just a few degrees nose high. If either of these conditions appear seriously amiss we would suggest you contact the factory

When the vertical position is established use the bracket as a template and drill clearance for and install two 3/8 inch bolts nuts and washers to attach the top bracket

MOUNTING THE WHEEL

The wheel can be mounted at any time, but may be advantageous to delay it to reduce the weight of the assembly during handling and mounting. The wheels being shipped at this time employ tapered roller bearings which require a preload for proper operation. Four Belleville spring washers are used in the installation to provide an adjustable preload. Two washers are installed on each side of the wheel "flare to flare" as shown on the sketch. A tubular spacer is also installed on each side as shown and the center bolt tightened to compress the spring washers and load the bearings. Torquing the bolt all the way down may provide excessive preload for too much friction and premature bearing failure.



The rubber seal on the bearing may mask the proper preload, so lubricate this seal and rotate the wheel numerous times to get the preload which secure the inner race from rotating on the axle but not overload the bearing.

PIVOT FRICTION

The castering pivot point for the fork of the front wheel also utilizes a Belleville spring washer system to adjust the friction for damping "shimmy". The castellated nut at the bottom of the gear leg should tighten the spring force against the fork until it takes about 20 to 30 pounds of force at the axle to turn the wheel. This preload should be checked from time to time, particularly if any tendency to shimmy is noted.

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FOUR PLACE CASTERING NOSE GEAR

The photos below show a prototype assembly of the new castering version of nose gear four the four-place cruiser. This assembly is significantly simpler to install and has fewer parts and mechanical complexity as compared to the steerable version of the nose gear. The castering nose gear is also slightly lighter in weight than the steerable version. The castering gear also uses up slightly less space between the fire wall and engine components.

As you can see from the pictures, the castering gear is very much like the new gear for the two place KIS. The major changes were incorporated to provide the greater ride height of the four place and accommodate the higher gross weight of the larger plane. Unfortunately airfoil tubing of greater section with adequate wall thickness for the higher weight is not available, so a 2-inch diameter round tube is used in this location. This will benefit from an airfoil shaped fairing to minimize aerodynamic drag in this location (as will the steerable version). A two-spring stack to provide a varying spring rate, and an automotive shock absorber to dampen the spring mass system provides suspension inside the telescoping tube assembly. The upper mount and a simple leading link assembly at the bottom of the firewall provide positioning.

The close up picture on the right shows the positioning lower link. This link pits on the arms mounted to the lower face of the firewall, and locate the pivot point below and aft of the firewall. This linkage system keeps the basic tube from turning and controls the direction of movement as the gear is compressed by landing loads.