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LPC-1033

INSTALLATION OF CONVENTIONAL LANDING GEAR ON PIPER PA-22 SERIES AIRCRAFT STC SA45RM

LOG OF REVISIONS

Revision	Date	Pages affected	Remarks
Initial Release	01-22-75	All	
Revision B	12-18-91	All	Rewritten with changes
Revision C	09-29-00	All	Rewritten with changes
Revision D	09-14-02	5	Step 34 – dwg callout correction

INTRODUCTION

To convert your Piper PA-22 Tri-Pacer to the conventional gear configuration of the PA-20 is not a difficult undertaking. It requires a good welder, a mechanically inclined mind and ingenuity. We supply the parts and instructions. If they are followed you will have no difficulty with your approval and you will have a faster airplane, in lots of opinions, a nicer looking ship, improved handling and lower maintenance. It makes a wonderful little airplane.

INSTRUCTIONS

1. Remove cowling, gear inner and outer fairing on the gear. Loosen wrap around cowling aft of firewall.
2. Prepare airplane for hoisting, hoist and remove the nose gear and nose gear mount. (Do not remove bottom bolts from mount if hoisting from engine lifting eye.)
3. Remove your Tri-Pacer gears, brake system, handle, master cylinder, parking brake and related lines. You may also remove the brackets holding the lines and pulley by carefully hack-sawing and grinding.

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4. Your PA-20 gear will fit the original hydra-sorb shock strut and the forward fitting of the PA-22 gear. Check your blueprint, LPC-1024 for installation requirements. Using the new gear as a jig, hold in approximate position on the airplane and mark the U channels for removal. Remove the necessary U channels. Grind or file all of the excess welds off of the cross tube where the forward gear fitting will be positioned. Bolt the forward fitting to the gear and install gear on the airplane. Make sure the gear is centered in both the rear and front forward fittings. It will be necessary to form the tubes at the forward fitting slightly to obtain a flat surface and proper alignment for the gear fittings. If necessary, this may be done by heating. Check measurements carefully per instructions in blueprint. Refer to drawing LPC-1031. Take proper fire precautions and weld fittings to fuselage as much as possible with gear installed. Remove gears and finish weld. You may want to incorporate Step No. 23 at this point.
 5. You can now replace the gear and allow weight on the gears for stability.
 6. Install step by measuring 4" inboard from the door frame along the top longeron that supports the hydra-sorb unit, and 4" aft of the rear gear fitting on the lower longeron of the fuselage. Remove enough fabric so that the step slides over the longeron and butts to the top longeron. Weld step to both longerons. If your PA-22 is equipped with auxiliary fuel tank under the seat the measurement along the longeron may be decreased to 2 ½" or enough to clear your fuel pump.
 7. Mark rudder pedal clamps 1, 2, 3 and remove the rudder pedal controls from the airplane. Watch the shims under each hold down clamp and replace as they were originally as this will save you time when reinstalling.
 8. There are two attach brackets that hold the ruder pedal control that will need rework. This is shown on drawing LPC-1081. The parts are taped together and marked with P/N L1032-1 and -2.
- NOTE: On some early model PA-22's the ruder pedals are originally set at approximately 4" from the front tube member. If your airplane is in this category you will not need to weld in P/N L1032-1 and -2 or rework your rudder cables.
9. Use brake cylinder mounting plates (L1047) as template to cut holes in aluminum floorboard to allow hydraulic hoses to fit freely. These holes are just right of the welded lugs and should be about 1 ½" in diameter. Use left side for single brakes and right side for dual brakes.
 10. Your hold down clamp on the rudder pedal will be moved back and the front bolt will fit in the hole of the original rear bolt. This should move the center of your control back 1 ½". Locate and drill the rear hold down holes. The center hole will still be in the original U channel. Bolt in place temporarily and weld parts L1032-1 and -2 per

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drawing LPC-1081. Torque tube may be removed for finish welding, then reinstalled.

11. While relocating the rudder bar, the first step of modification to the brake system can be made. Cut the present rudder pedal bars off about 4" above the torque tube. This should be done for two pedals if you are installing a single brake system or all four if for dual brakes. If you have dual brakes, see Step No. 21.
12. Insert the brake pedal "T" supports into the tube, deburring the inside if necessary, and adjust to the proper heights shown in drawing LPC-1050. Clamp in place and drill two 1/4" holes in each pedal unit perpendicular with the torque tube. Bolt in place with AN4-12A bolts and hardware provided.
13. Position L1047 brake cylinder mounting plate in the aircraft making sure that the cutouts are forward under the engine mount attachment bolts. The ground angle on the plate allows the engine mount bolts to be removed if necessary. Locate the plate using the center hole vacated by the rudder torque bar and center hole in the mounting plate. Square the plate and mark the two outboard holes. Drill and bolt in place. The two top holes will have to be drilled through the floorboard. These holes will coincide with two small clips attached to the forward longeron. Install proper hardware and secure entire plate.
14. Install 49 X 4 Weatherhead fitting into bottom of brake cylinders with threaded end pointing down at approximately a 45° angle. (This is not critical and will probably have to be changed slightly when installing brake lines.)
15. Attach brake cylinders to mounting brackets on plate using AN3-7 bolts and hardware. (Before installing brake cylinders check each mounting hole with a bolt to see if easy insertion can be made. If not, ream the hole with a #10 drill as this is sometimes filled with paint.)
16. Bolt brake pedals to rudder pedal supports using AN4-40 bolts and proper hardware.
17. Bolt the brake cylinder clevis into the brake pedal as shown, making sure the brake cylinder is perpendicular.
18. Install brake lines as shown in drawing LPC-1081. Lines should be assembled to determine where the copper line will be located. After this location is determined bend the copper line to conform to the larger brace tube it goes under and fasten in place with the tube clamps provided. This line should be as close to the floorboard as possible. Permatex all male fittings and reinstall brake hoses.
19. Install parking brake valve as shown in drawing LPC-1058 and instructions.
20. Install reservoir per drawing LPC-1081

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21. If you have ordered dual brakes follow Steps 11 and 20. At Step 14 install an AN816 in the top of the cylinder and 49 X 4 Weatherhead in the bottom part. Using the two long hoses screw the 1/8" pipe fitting into the left cylinder and other end into the AN816 fitting. (See drawing LPC-1051.) Install rest of hoses as in Step No. 18.
 22. Rework rudder control cables per drawing LPC-1029. When rudder cable is reinstalled the "T" bar of the rudder pedal should set at an angle about 10° aft of 90° in relation to the floorboard. This may be adjusted by the holes in the -2 fittings and will allow room for the left brake to be depressed when using full left rudder. The pigtails on the rudder cable may be omitted if the aileron interconnect system is not to be used (see following note).
- NOTE: Under the provisions of STC SA45RM, only the PA-22 150 and 160 hp models with fixed pitch propellers licensed in the normal category may disconnect the rudder-aileron interconnect system. For all other PA-22 models that have the system disconnected, one must obtain separate FAA approval. When reworking the system disconnect the existing spring which is located between the rudder cable pigtail and turnbuckle. Replace with the spring and hardware as provided in Kit #6. Connect the lower ends of the two springs #120 to the bottom of the longerons as shown in drawing LPC-1028. Attach the upper ends to cables. Secure the old spring and the pigtail to the fuselage longeron with black vinyl tape as shown in drawing LPC-1028.
23. Replace U channel fabric strips to accommodate new gear and to close up the hole left by the removal of the original gear. It is advisable to use the gear inner pan P/N L1037-1 and -3 as template for placement of U channels. See drawing LPC-1024 for outline of pans. A U channel should be welded in the approximate center of the space left by the removal of the PA-22 gear.
 24. Install the aluminum form strips P/N L1044-1 using self-tapping screws into the U channel. The angle on the form strip fits just under the longeron. This angle may be cut where it fits over the 3/8 x 3/8 U channel and the rear gear fitting of the original gear if this fitting is left on.
 25. You may fit the landing gear belly fairing P/N L1037-1 and -3 under the gear well and form the outside edge to the fabric U channel. These were left straight to allow for variations that may have been made when welding the U channels. Fit only. Install on Step No. 31 after fabric work has been completed.
 26. Remove the tail skid. Remove enough fabric from the tail post to allow welding fitting P/N L1027-2 to the tail post. Using the hole where the tail skid was removed, bolt the tail wheel spring in place. Using the spring as a jig, bolt the U channel and rear fitting together. Line up in a straight line with the fuselage and weld in place.

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Make sure tail wheel sets straight vertically also. Weld L1024-1 discs over open holes left by removal of tail skid.

27. Install fork, Scott P/N 1140 in bottom tube of rudder, align, drill #10 hole and bolt in two places with AN3-12A bolts. Install tail wheel.
28. Repair the nose gear cutout in the bottom cowling shown in drawing LPC-1042 making sure the cowling flange is continued across the bottom of the cowling as shown in the drawing or you may choose to leave the bottom cowl as is. A new PA-20 style cowl, P/N L1041, is available if you do not want to patch up the existing cowl.
29. Wire brush and apply corrosion protection (zinc chromate or epoxy primer) to all areas that have been welded.
30. Repair fabric where necessary.
31. Remove gear, if it has been replaced, and install inner belly pan P/N L1037-1 and -2 using at least four (4) number 4 self tapping screws. Remove the two nose wheel control rod plates and rivet on two 3 1/2" round galvanized steel plates of .018 thickness or heavier, making sure a proper seal between firewall and plate. Cover landing gear per standard practice.
32. Replace gear and inner fairing P/N L1037-3 and -4. You may remove the original rear gear fitting by sawing off the two ears. It is not advisable to remove the complete fitting. Rough edges may be smoothed and contoured by grinding or filing.
33. Rework the original landing gear fairings (that fit from gear to fuselage) to fit the new gear. This can be done by removing 5" from the center, forming slightly to fit the rear gear fitting and riveting together with three 3/32 rivets and attach to gear with five (5) #6 PK screws. New PA-20 style fairings, P/N L1120, are available if you do not want to rework the existing fairings.
34. Refer to Bulletin 1675, Wheel and Brake Eligibility List. Verify that you have the proper wheels, brakes, torque plates, and axle spacers required for the type of landing gear installed on your airplane. If the original drum type brakes are to be reused, install them as on the original landing gear. Refer to drawing LPC-1092 and step 35 for installation of Cleveland disc type brakes.
35. (For Cleveland disc type brakes only) Install torque plates on landing gear with longer legs of brake assembly anchor bolt retainers facing inboard. Orient the torque plate as shown on drawing LPC-1092. Install each torque plate with 6 each AN4-6A bolts and AN365-440 (MS20365-440) locknuts. AN960-416 or AN960-416L washers may be needed underneath the locknuts. If wheel pants are to be installed,

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attach flange mounting brackets at this time (longer bolts may be needed with wheel pant brackets). Torque mounting nuts to 80 to 90 in-lbs.

36. Remove nuts from each wheel assembly to split wheel. Mount eligible tires (see Bulletin 1675) on wheels along with appropriate tubes. Mount tires and assemble wheels in accordance with Cleveland Wheels and Brakes (Parker Hannifin Corp.) Maintenance Manual AWBCMM0001-1/USA (available from Univair or Parker Hannifin Corp.). Inflate tires to 22 psi.

NOTES: 4 ply or 6 ply tires may be mounted (do not mix different ply tires or different size tires on same aircraft). 8.00 X 6 tires may interfere with some brake assemblies, especially the dual piston brake assemblies. It is recommended that 6.00 X 6 or 7.00 X 6 tires be used with the dual piston brake assemblies.

37. Slide appropriate inboard axle spacers on axles of landing gear (see Bulletin 1675). Slide wheel assemblies with tires onto axles followed by outboard axle spacers. While rotating the wheel, hand tighten the axle nut to properly seat bearings. When the bearings are seated, hand tighten the nut until it stops and back off nut to nearest hole. If wheel pants are to be installed, attach axle mounting bracket at this time. Insert cotter pin and safety the axle nut. A maximum of two threads on the axle nut may extend beyond the end of the axle.
38. (For Cleveland disc type brakes only) Remove the back plate tie bolts holding the brake assembly halves together and slide the cylinder assembly and pressure plate onto the torque plate. Slip the back plate assembly between brake disc and wheel. Position to align holes and reinstall the back plate tie bolts. Torque tie bolts to value listed in Cleveland Wheels and Brakes Maintenance Manual.
39. Connect brake line from landing gear to brake assembly. Bleed brakes. Repeat cycle until all air has been purged from the brake system.
40. With the aircraft still on jacks, apply brake pressure to check for system leakage. Repeat 3 to 4 times.
41. With pressure at 0, rotate each wheel to check for binding or excessive drag.
42. If wheel covers are desired, use Cleveland or Univair covers listed in Bulletin 1675. Install with AN526-832-4 screws and AN936A8 lock washers. If wheel pants are desired, install them now.
43. Remove airplane from jacks. Install all parts, fairings, etc. that have not previously been accomplished and give final inspection.
44. Reweigh the aircraft and prepare new weight and balance sheet.

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45. Attach new LPC Airplane Flight Manual Supplement to existing Piper Airplane Flight Manual
46. On PA-22-108 Colt ONLY: Change placard from utility to normal category and place on the instrument panel in full view of the pilot:

THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE
IN COMPLIANCE WITH THE APPROVED AIRPLANE FLIGHT MANUAL.
NO AEROBATIC MANEUVERS (INCLUDING SPINS) ARE APPROVED.

47. Condition brake linings per PRM No. 13A included in the wheel and brake kit prior to first flight.