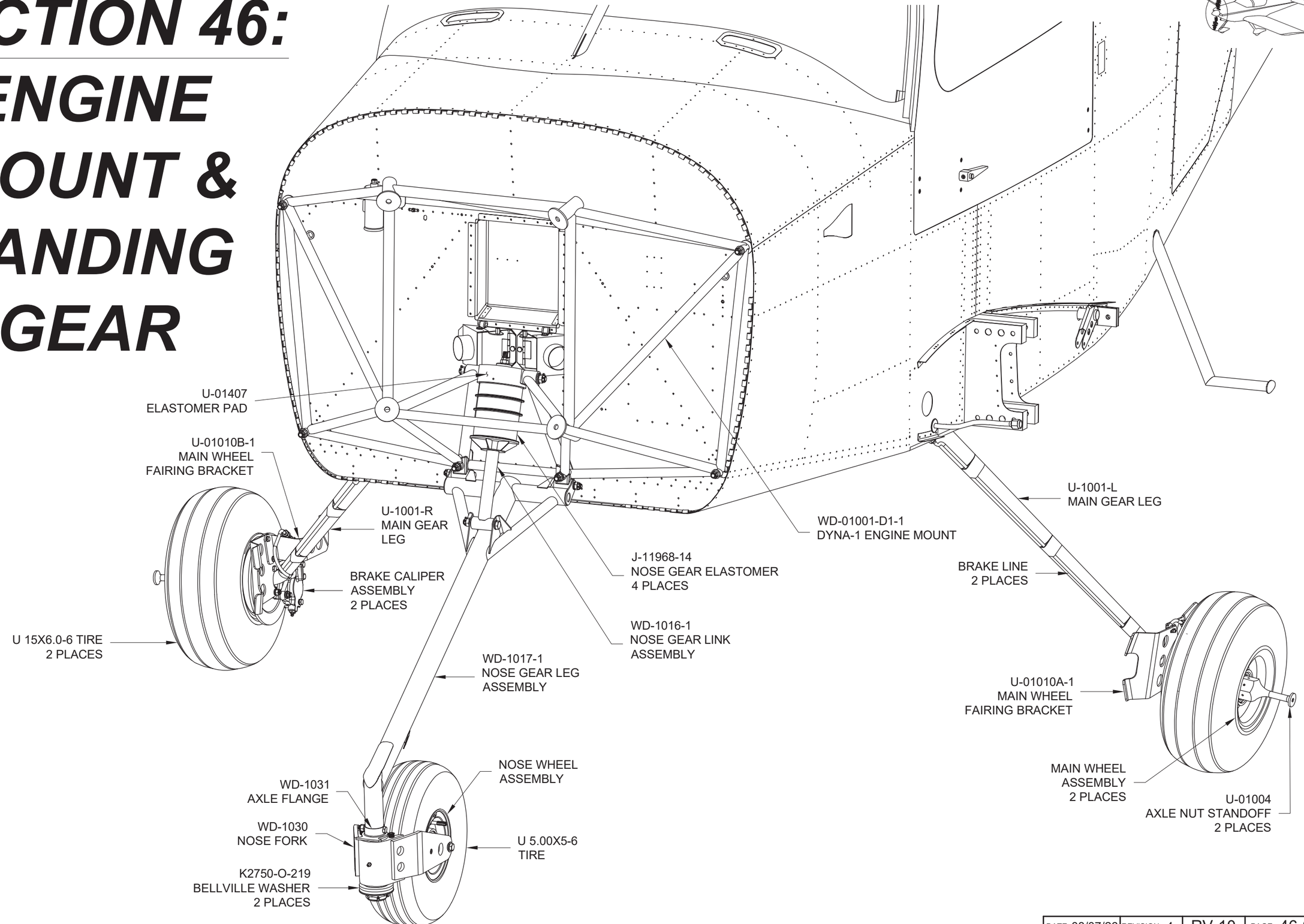
SECTION 46: ENGINE MOUNT & LANDING GEAR



NOTE: If you have purchased the optional Firewall Forward kit from Van's Aircraft, it is easier to complete Pages FF1-2 and FF1-3 of the Engine Installation section now, before the WD-01001-D1-1 Dyna-1 Engine Mount is installed.

Step 1: Using a 3/8" bit, final-drill one of the two 3/16" holes in the top of the Firewall Assembly common to the WD-01001-D1-1 Dyna-1 Engine Mount. Be sure to drill perpendicular to the vertical face of the Firewall Assembly. Temporarily bolt the engine mount to the Firewall Assembly using this hole and the hardware called-out in Figure 1.

Align the engine mount with the second 3/16" hole in the top of the Firewall Assembly and final-drill this hole using the same bit. Keep the engine mount in place while drilling to help maintain the alignment of the bit. Secure the engine mount to the Firewall Assembly, then final-drill the remaining four holes. Place a bolt in the holes after each is drilled.

Step 2: Remove the WD-01001-D1-1 Engine Mount from the Firewall Assembly, deburr the holes in the Firewall Assembly, then permanently bolt the engine mount in place using the hardware called-out in Figure 1.

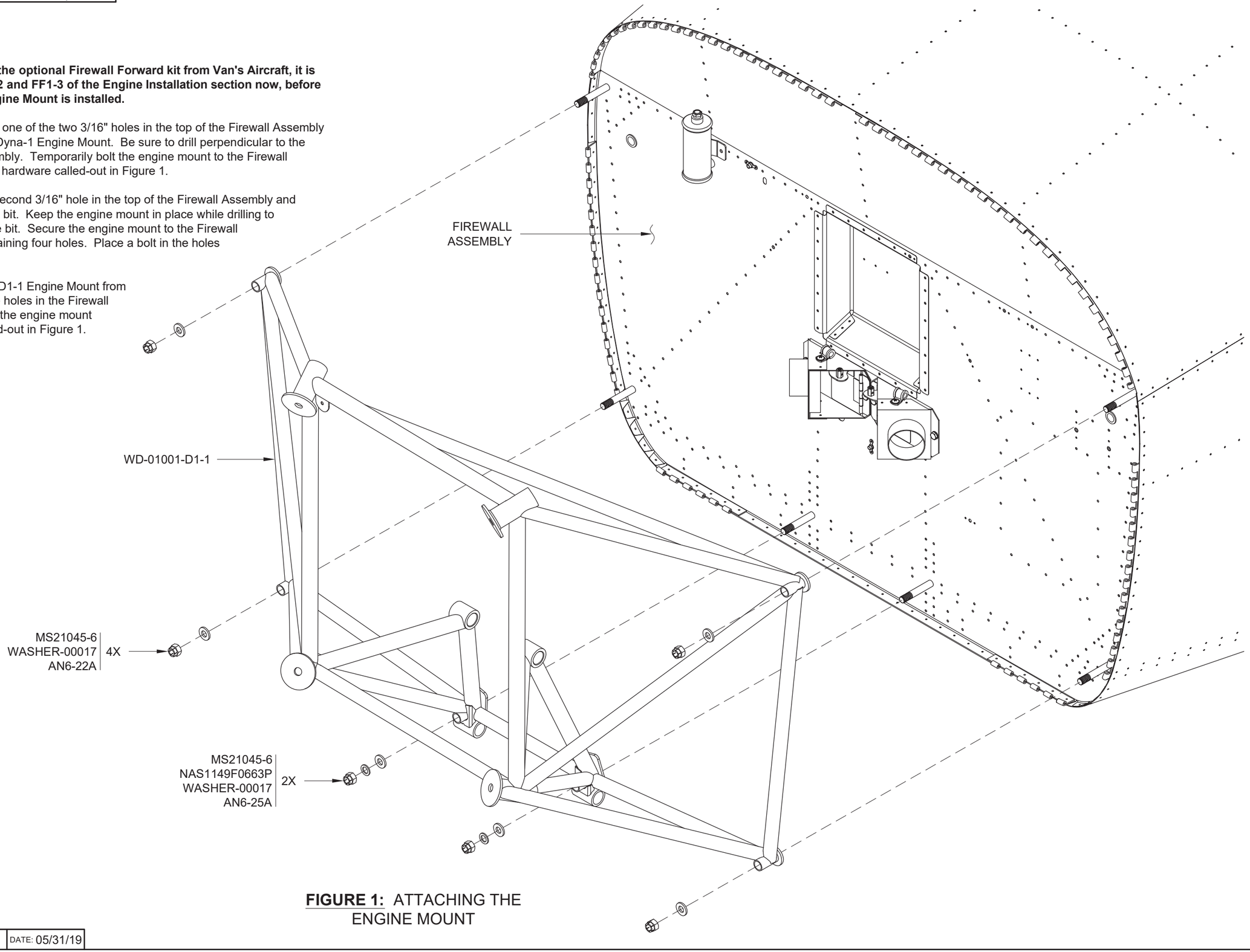


FIGURE 1: ATTACHING THE ENGINE MOUNT

NOTE: Follow the instructions in Steps 1-5 for both Main Wheel and Tire Assemblies.

Step 1: Pull the bearings from the Main Wheel Assembly by removing the snap-rings that are retaining them. Pay close attention to how the bearings, grease seal rings, and grease seal felts are installed so that they can be reinstalled in the same way. See Figure 2.

Step 2: Split the Main Wheel Assembly by removing the bolts holding the Brake Disk and the Inner and Outer Wheel Halves together.

Step 3: Dust the U 15X6.0-6IT Tube (not shown in Figure 1) and the inside of the U 15X6.0-6 Tire with talcum powder, then mount the tube and tire on the Inner and Outer Wheel halves. The red dot on the tire is installed next to the valve stem of the tube (see Figure 2). Bolt the wheel halves and the brake disk together, and torque to 150 in-lb unless otherwise specified by the wheel manufacturer.

Step 4: SLOWLY inflate the tire to 25 psi. Deflate it fully and re-inflate it SLOWLY a couple more times to work out any wrinkles in the tube. It's a good idea to do this with the valve core removed; in the event a finger gets pinched the tire can be quickly deflated. The final inflation pressure is 42 psi.

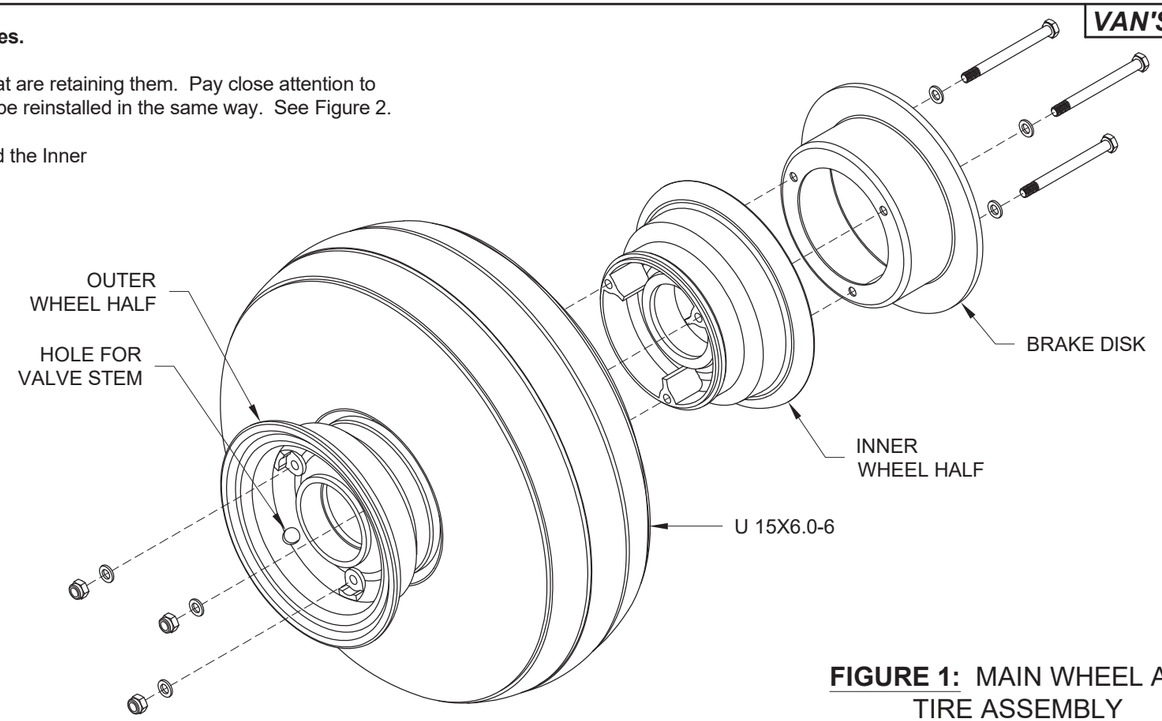


FIGURE 1: MAIN WHEEL AND TIRE ASSEMBLY

Step 5: Be sure the bearings are fully greased with Aeroshell #5 or equivalent. Reinstall the bearings, grease seal rings, and grease seal felts in the same order that they were removed. Make absolutely sure that the smaller grease seal ring is installed on the outboard side of the Main Wheel and Tire Assembly, and the two larger grease seal rings are installed on the inboard side as shown in Figure 2.

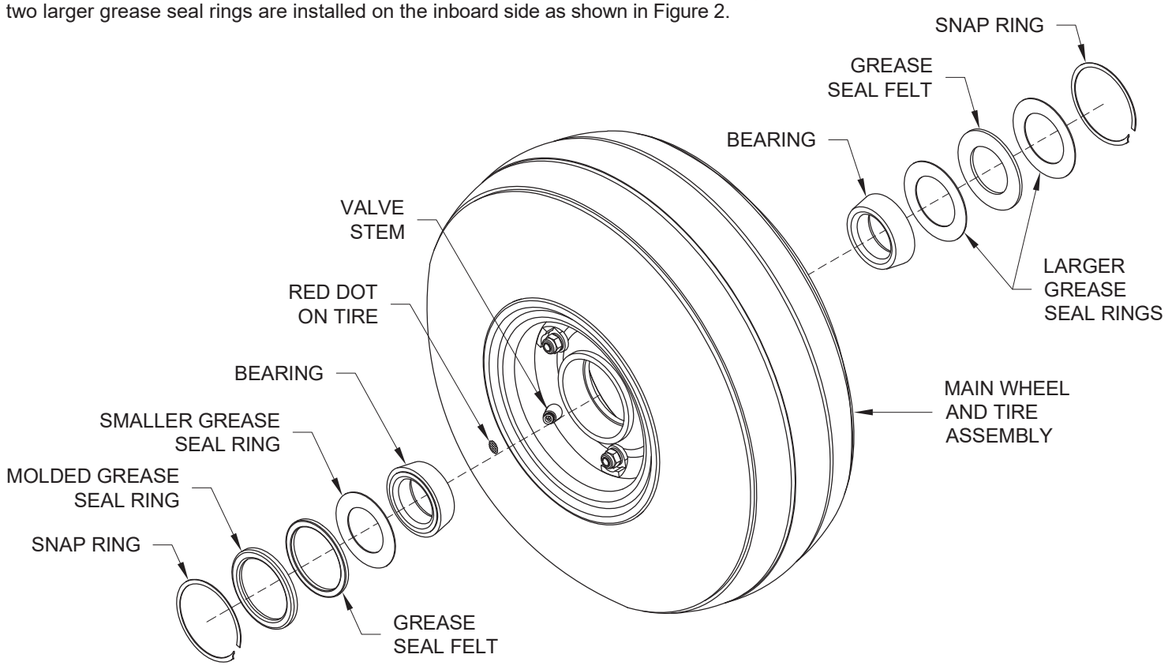


FIGURE 2: INSTALLING BEARINGS IN THE MAIN WHEEL AND TIRE ASSEMBLY

Step 6: Split the Nose Wheel Assembly by removing the bolts holding the two Wheel Halves together.

Step 7: Remove the nut and washers from the valve stem of the U 5.00X5-6IT Tube (not shown in Figure 3). Dust the tube and the inside of the U 5.00X5-6 Tire with talcum powder, then mount the tube and tire on the Wheel Halves. The mark indicated in Figure 3 on one of the wheel halves should be aligned with the notch for the valve stem in the opposite wheel half. As before, the red dot on the tire is installed next to the valve stem. Bolt the wheel halves together.

Step 8: SLOWLY inflate the tire to 25 psi. Deflate it fully and re-inflate it SLOWLY a couple more times to work out any wrinkles in the tube. Inspect for a good seat around the wheel rim. The final inflation pressure is 40 psi.

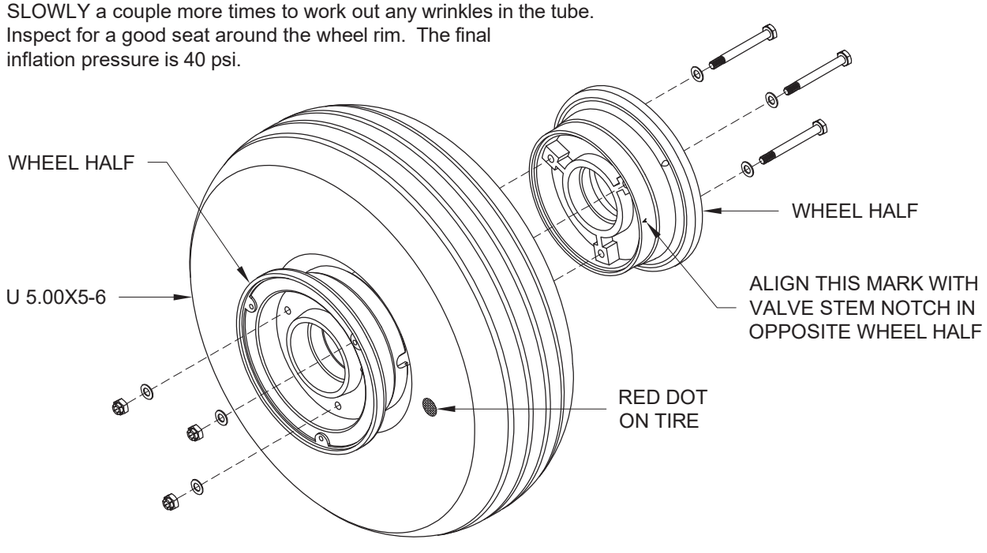


FIGURE 3: NOSE WHEEL AND TIRE ASSEMBLY

NOTE: The instructions for the installation of the main gear are given for the left side of the fuselage. The right side is the mirror of the left. Install both main gear at the same time.

The fuselage will have to be lifted high enough to slide in the U-1001 Main Gear Legs and mount the Main Wheel and Tire Assemblies.

Step 1: Slide the U-1001-L Main Gear Leg into the WD-01021-L-1 Landing Gear Mount as shown in Figure 1.

A hole is drilled through the upper end of the landing gear mount socket. The hole on the top side of the socket is drilled to final size while the corresponding hole in the bottom side is drilled undersize. Align the hole in the main gear leg with the hole in the top side of the socket. As shown in Figure 1, insert a Ø.311 (7.9mm) drill bit through the assembly until it "bottoms out" on edges of the smaller hole. (The side of the fuselage will prevent inserting the drill bit if it is already in a drill motor.) Now attach a drill motor and final-drill the smaller hole.

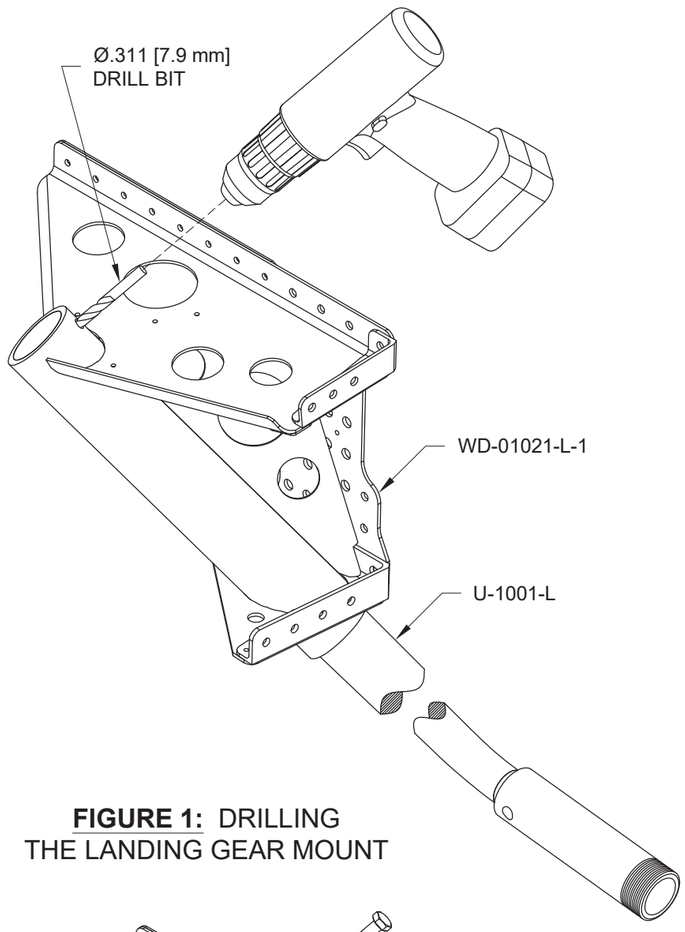


FIGURE 1: DRILLING THE LANDING GEAR MOUNT

Step 2: Remove the U-1001-L Main Gear Leg from the WD-01021-L-1 Landing Gear Mount and deburr the holes.

Step 3: Apply a film of wheel bearing grease to the surfaces of the U-1001-L Main Gear Leg that are not powder coated and that will contact the WD-01021-L-1 Landing Gear Mount socket.

Slide the main gear leg into the landing gear mount socket, then secure the main gear leg using the hardware called-out in Figure 2.

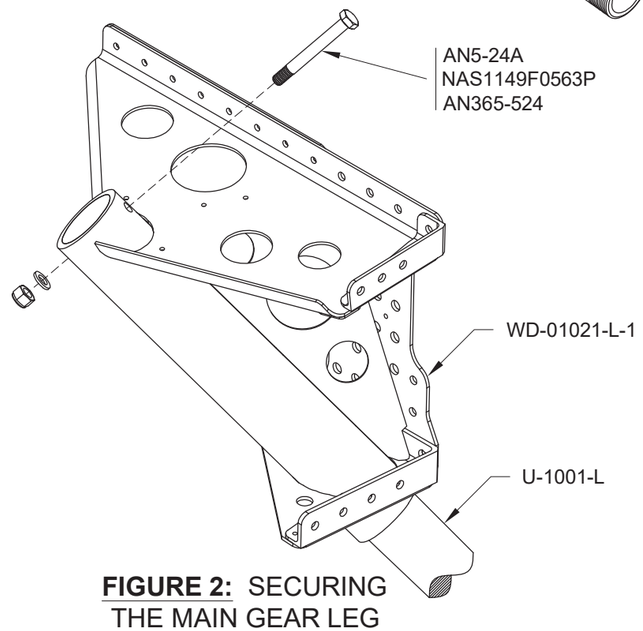


FIGURE 2: SECURING THE MAIN GEAR LEG

Step 4: Slide one of the U-1003 Brake Mounts onto the U-1001-L Main Gear Leg axle as shown in Figure 3.

The hole on one side of the brake mount is still undersize and needs to be final-drilled. Align the holes in the brake mount with the holes in the axle, insert a 3/8" drill bit through the assembly, and final-drill the smaller hole.

Remove the brake mount and deburr the holes.

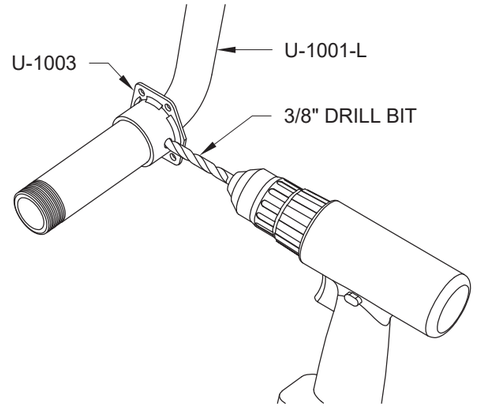


FIGURE 3: DRILLING THE BRAKE MOUNT

Step 5: Attach two K1000-3 nutplates to the U-01010A-1 bracket as shown in Figure 4. Countersink the nutplate rivet holes and install using AN426AD3-5 rivets.

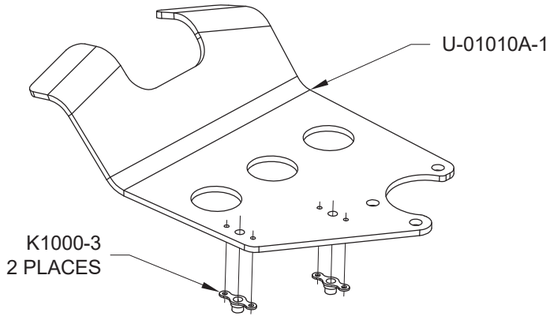


FIGURE 4: INSTALLING NUTPLATES

Step 6: Make six (three per side) U-1008-1 Spacers from ST4130-058X3/8. Each spacer is 19/32" long.

Step 7: Build the Brake Mount Assembly using the parts and hardware shown in Figure 5. The Torque Plate is supplied with the brakes.

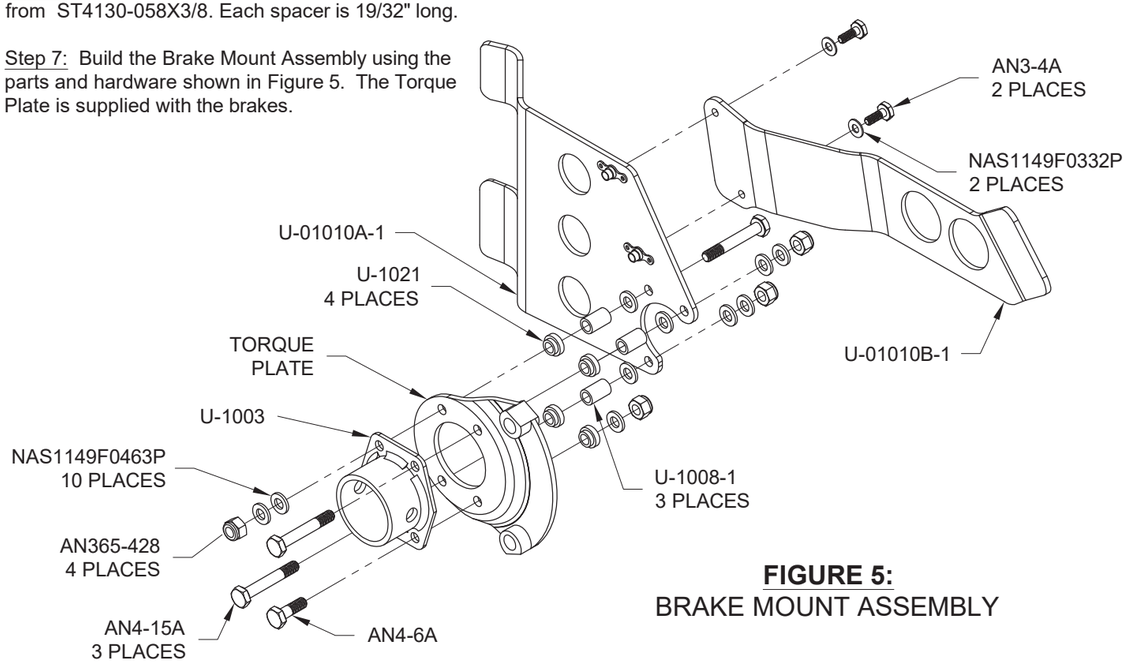


FIGURE 5: BRAKE MOUNT ASSEMBLY

Step 1: Slide the Brake Mount Assembly on the axle of the U-1001-L Main Gear Leg and secure it in place using the hardware shown in Figure 1.

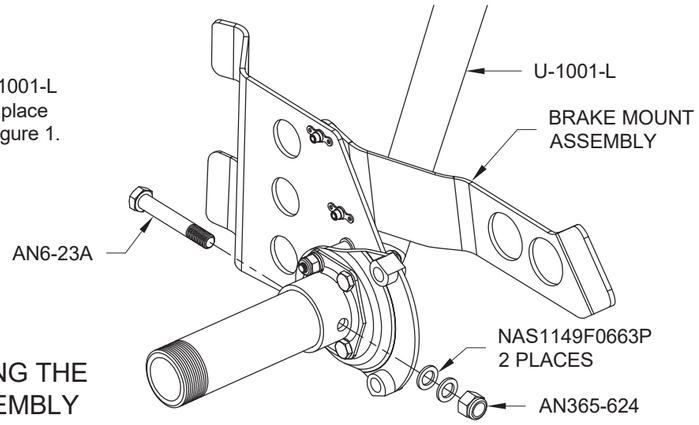


FIGURE 1: INSTALLING THE BRAKE MOUNT ASSEMBLY

Step 2: Slide the U-1005 Spacer and one of the Main Wheel and Tire Assemblies onto the axle of the U-1001-L Main Gear Leg. Thread on the U-1004A Axle Nut Standoff and carefully tighten it until there is no side play in the wheel, but it still rotates smoothly.

Step 3: Thread the U-01004 off the axle while counting the number of full turns required to remove it (a mark on the top side of the U-01004 will make it easier to keep track of a full turn).

Remove the Wheel and Tire Assembly, then thread the U-01004 back on the same number of turns that was required to remove it.

Center-punch the axle through one of the holes around the U-01004 (the hole opposite to the one selected will also have to be accessed, so don't select the top hole). Without moving the U-01004, match-drill the selected hole into the axle using an 1/8" drill bit. Insert an 1/8" pin (or another drill bit) to hold the U-01004 in position, then center-punch and match-drill the axle from the opposite side of the U-01004. Remove the pin and run the drill bit clear through the axle and U-01004.

Remove the U-01004 and deburr the holes.

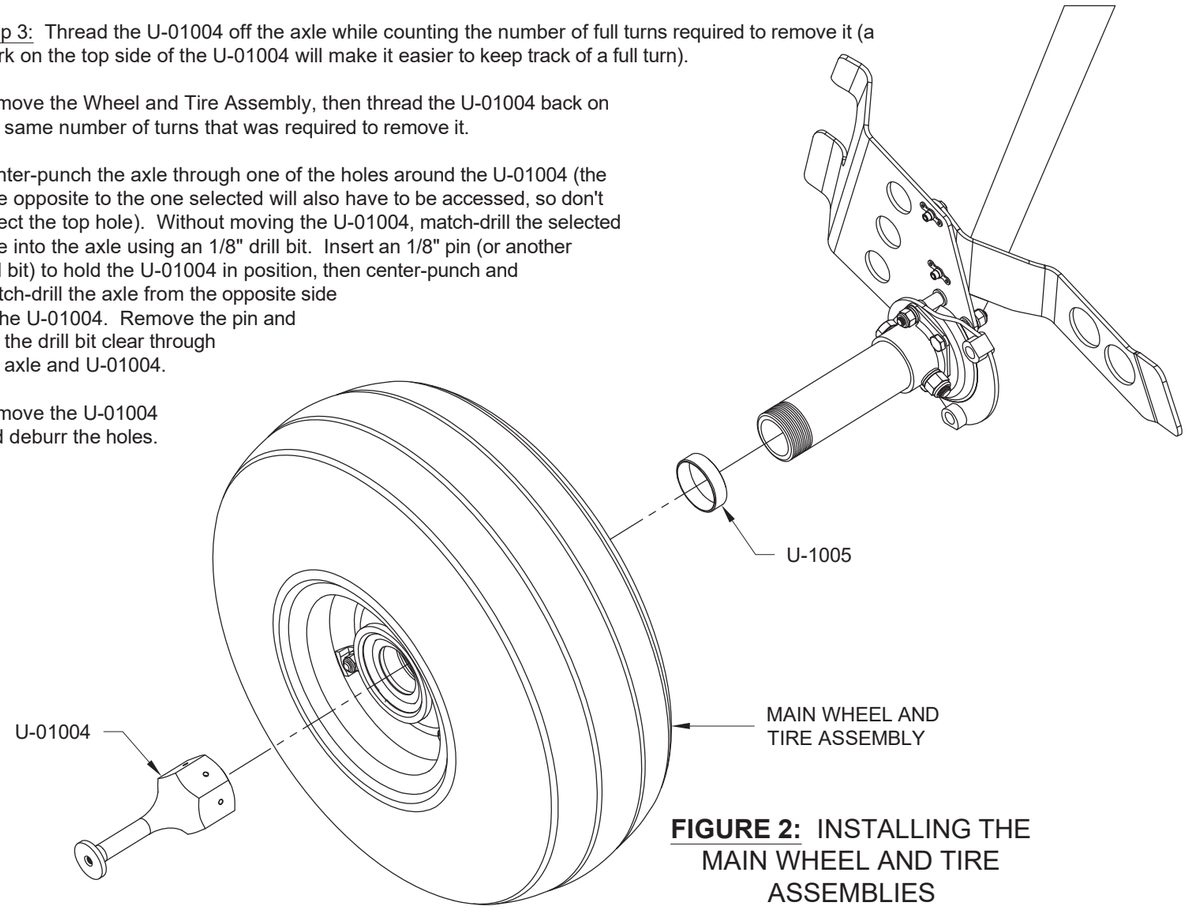
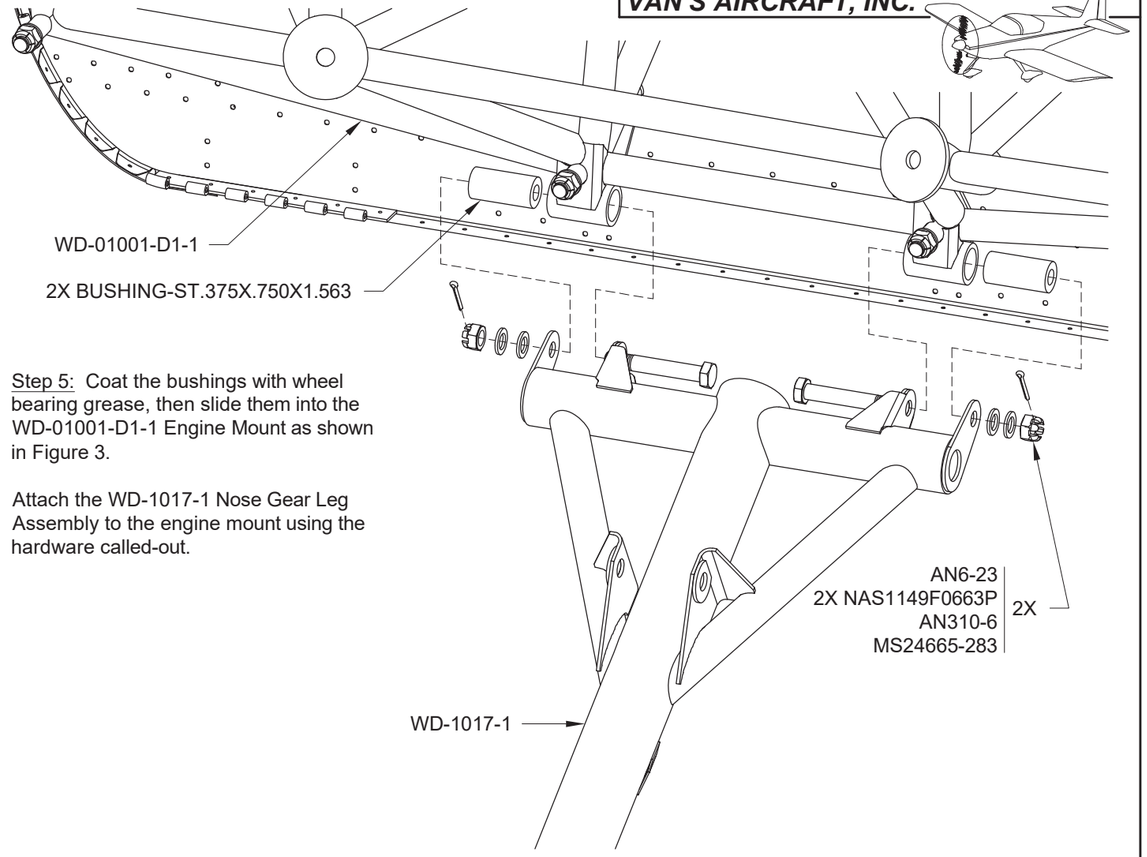


FIGURE 2: INSTALLING THE MAIN WHEEL AND TIRE ASSEMBLIES

Step 4: Reinstall the Wheel and Tire Assembly and the U-01004 Axle Nut Standoff, then secure the axle nut with an MS24665-360 cotter pin (not shown). The cotter pin will have to be bent slightly to clear the wheel while it is being installed.

NOTE: The fuselage can now be lowered onto the main gear.



Step 5: Coat the bushings with wheel bearing grease, then slide them into the WD-01001-D1-1 Engine Mount as shown in Figure 3.

Attach the WD-1017-1 Nose Gear Leg Assembly to the engine mount using the hardware called-out.

FIGURE 3: ATTACHING THE NOSE GEAR LEG ASSEMBLY

Step 6: Thread the screws and the MS15002-1 Grease Fitting into the WD-1030 Nose Fork as shown in Figure 4.

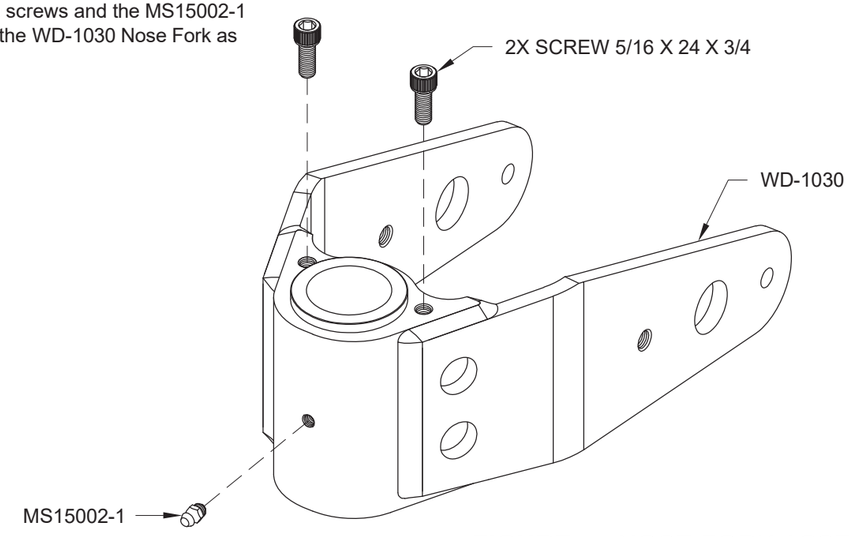


FIGURE 4: NOSE FORK ASSEMBLY

NOTE: Do not apply grease or other lubricant between the Elastomers and the shaft of the WD-1016-1 Nose Gear Link Assembly.

Step 1: Bolt the U-01407 Elastormer Pad to the WD-01001-D1-1 Engine Mount using the hardware called out in Figure 1. If necessary, remove excess powder coat from the ends of the engine mount bushings to allow the flanged bushings and elastomer pad to swivel freely.

Step 2: Install the WD-1016-1 Nose Gear Link Assembly, J-11968-14 Elastomers, SPRING-00003, and U-01420 Link Assembly Cap. Slide on the washer and thread on the nut enough to compress the spring and remove any gap between the elastomers and pad. The final amount of spring compression is determined only after the nosewheel is installed.

Step 3: Attach the bottom of the WD-1016-1 to the WD-1017-1 Nose Gear Leg Assembly using the hardware shown in Figure 1.

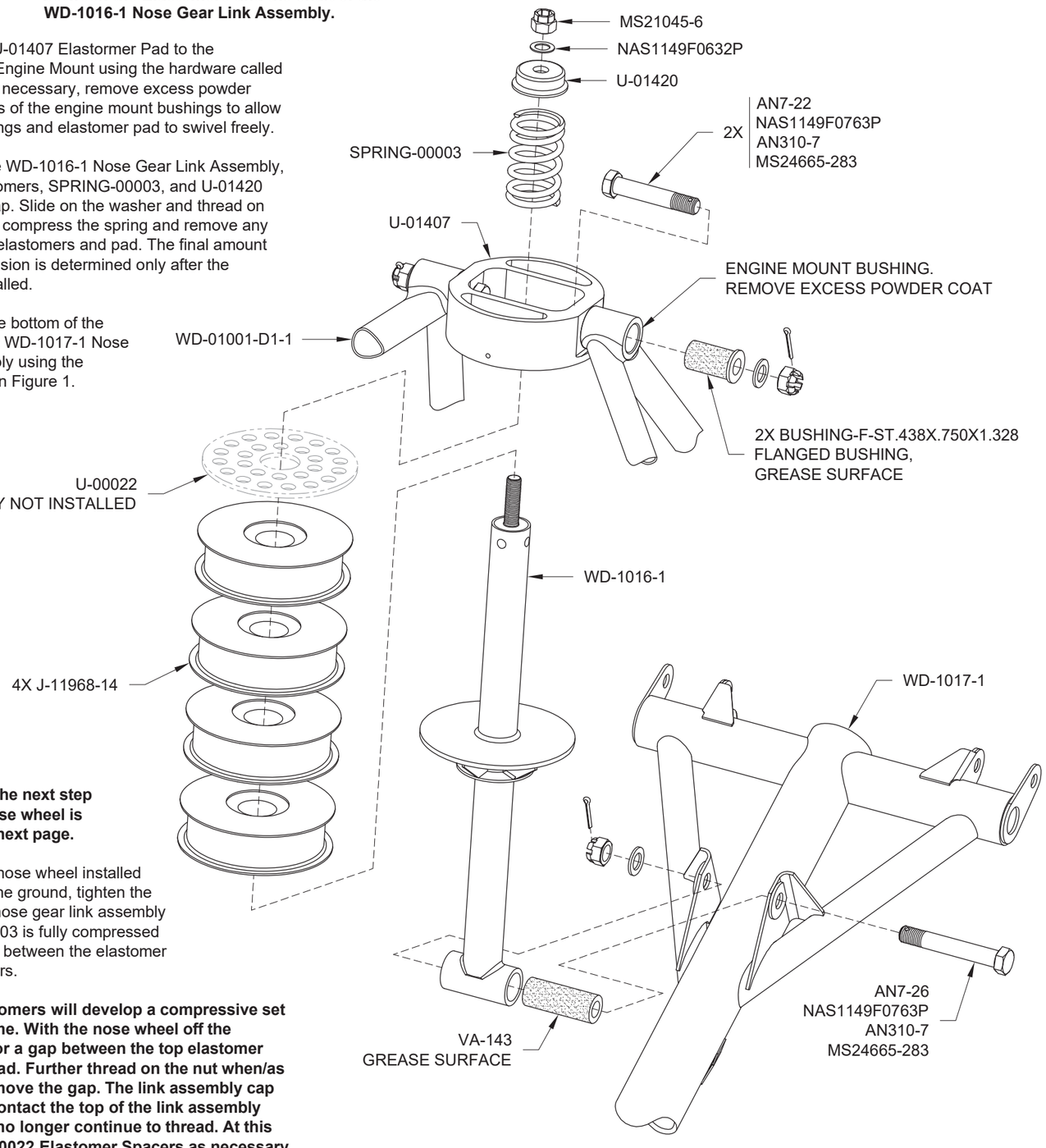


FIGURE 1: INSTALLING THE NOSE GEAR LINK ASSEMBLY

NOTE: Perform the next step only after the nose wheel is installed on the next page.

Step 4: With the nose wheel installed and just clear of the ground, tighten the nut on top of the nose gear link assembly until SPRING-00003 is fully compressed and no gap exists between the elastomer pad and elastomers.

NOTE: The elastomers will develop a compressive set with use over time. With the nose wheel off the ground, check for a gap between the top elastomer and elastomer pad. Further thread on the nut when/as necessary to remove the gap. The link assembly cap will eventually contact the top of the link assembly and the nut will no longer continue to thread. At this point, install U-00022 Elastomer Spacers as necessary (3 max.) to remove the gap.

Step 5: Slide the WD-1031 Axle Flange onto the WD-1017-1 Nose Gear Leg spindle and secure it to the spindle using the hardware shown in Figure 2.

Next, slide on the Nose Fork Assembly, the two K2750-O-219 Belleville Washers (see Figure 3), and the 5710-243-060 Washer. Finally, thread on the MS21025-24 Nut.

Step 6: Thread safety wire through the holes used to secure the Nose Wheel and Tire Assembly to the Nose Fork Assembly, then attach a spring scale to the end of the safety wire. Tighten the MS21025-24 Nut until a force of 26 lbs begins to rotate the Nose Fork Assembly around the spindle. Secure the nut with the cotter pin called-out in Figure 2.

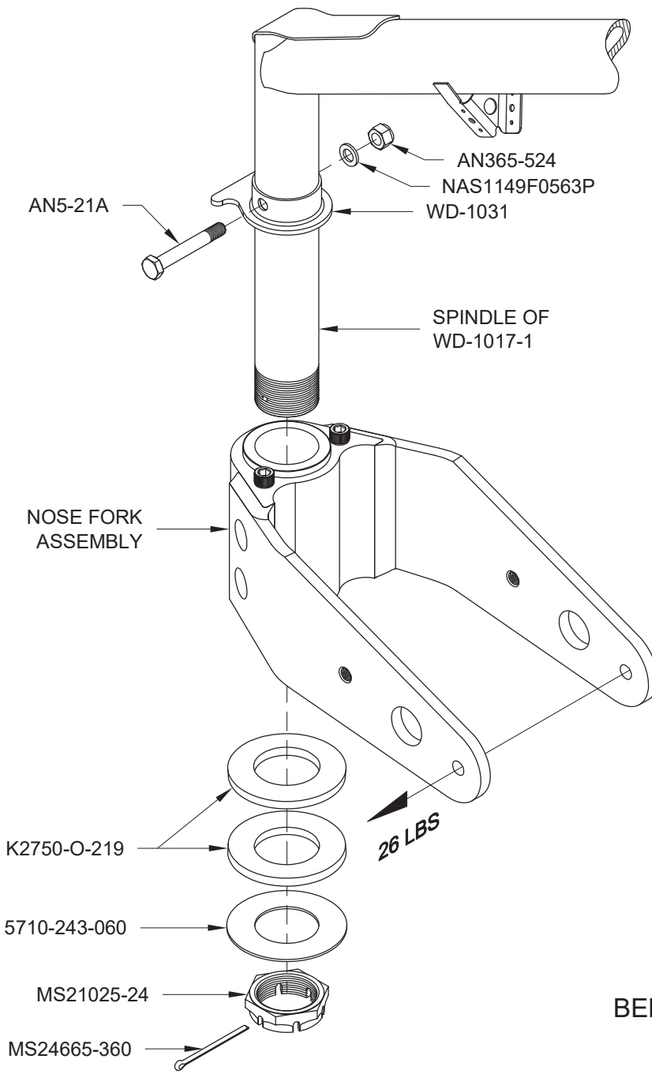


FIGURE 2: INSTALLING THE NOSE FORK ASSEMBLY

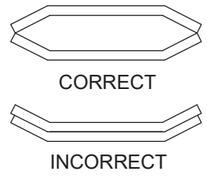


FIGURE 3:
BELLEVILLE WASHER ORIENTATION
(NOT TO SCALE)

NOTE: Coat only the outer perimeter of the seal with grease where it contacts the Nose Wheel Assembly. Do not apply grease to the outer seal surface face.

Step 1: Clean, dry and fully grease the bearings that came with the Nose Wheel Assembly with AeroShell Grease 5 or equivalent. The bearings have an integral rubber grease seal. See Figure 3. This seal MUST have a coat of grease on its perimeter where it contacts the Nose Wheel Assembly.

Step 2: Insert the bearings into the Nose Wheel Assembly as shown in Figure 1.

Step 3: Slide the U-00024 Axle through the bearings, then slide the U-00711 Axle Spacer over the end of the axle and thread on the axle nut as shown in Figure 1.

NOTE: Integral grease seals produce some drag and make the wheel feel stiff when rotated and tend to cause the bearings to spin with the wheel rather than remain stationary with the axle. The tendency to reduce the axle nut torque until the wheel spins freely allows the grease seal and the bearing cone to improperly rotate with the wheel. The higher rolling drag is completely normal for this bearing. It is important that the axle nut torque be sufficient to keep the seal from rotating with the wheel, but no more than necessary so as not to cause excessive drag. Properly installed, the bearings will produce between 18 and 26 inch pounds of torque (drag).

Step 4: Tighten the axle nut until all play is gone and the wheel rotates freely. Rotate the wheel back and forth while tightening the nut to help seat the bearings. The rubber seal on the bearing must remain stationary while the wheel rotates around it. If the seal spins with the wheel, tighten the nut until the seal stops spinning. When the bearings are fully seated and the bearings seals no longer rotate with the wheel, tighten the nut to align the next available slot/hole combination in the nut and axle.

Step 5: Install the U-00712 Axle Nut Pin by inserting the bent end of the pin into the hole in the axle and then pulling the remainder of the pin over the circular, nonhexed portion of the nut. Refer to Figure 2.

Step 6: Bolt the Nose Wheel and Tire Assembly, and the axle to the Nose Fork Assembly using the hardware called-out in Figure 1.

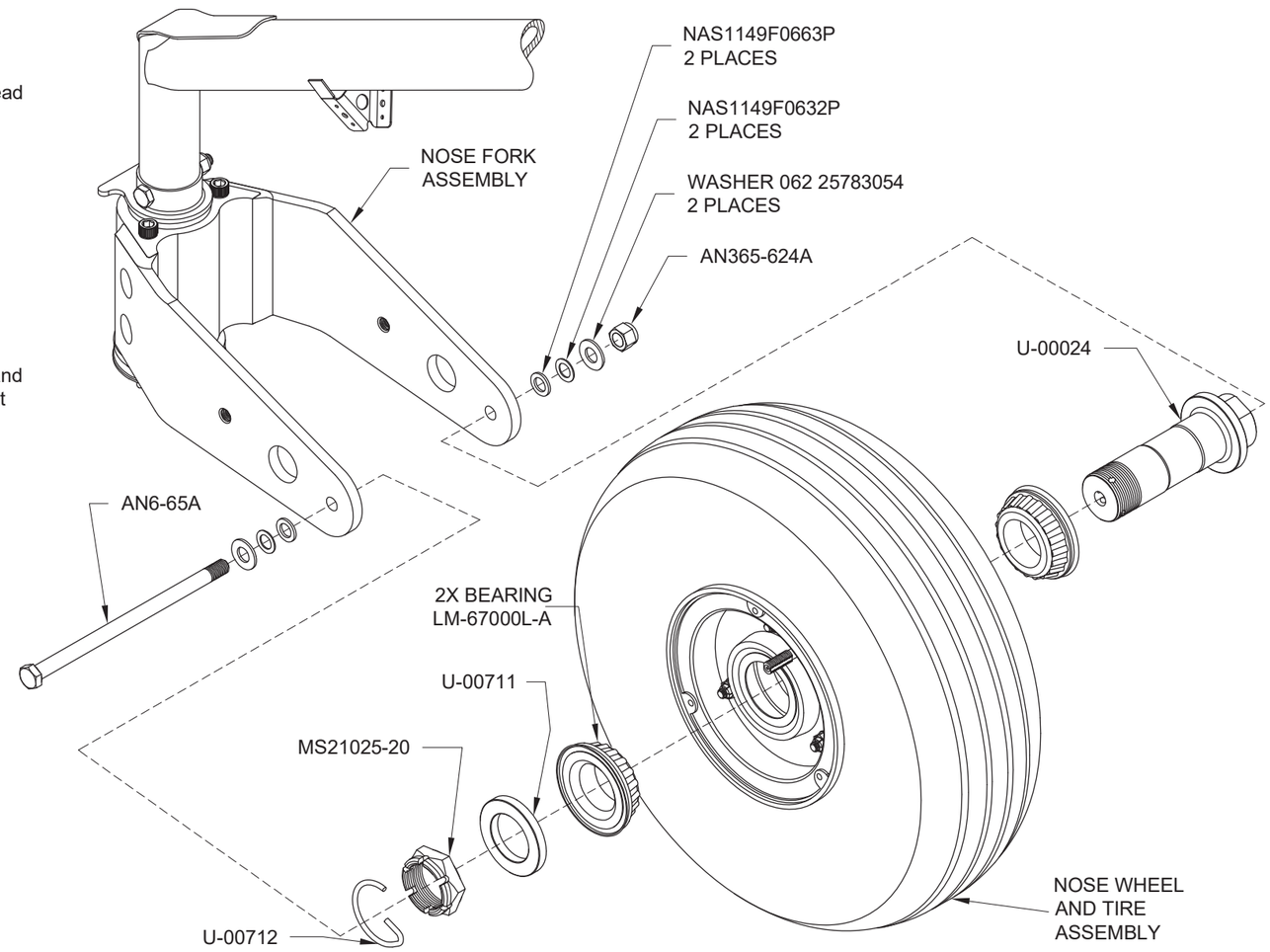


FIGURE 1: INSTALLING THE NOSE WHEEL AND TIRE ASSEMBLY

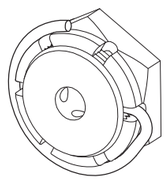


FIGURE 2: INSTALLED AXLE NUT PIN

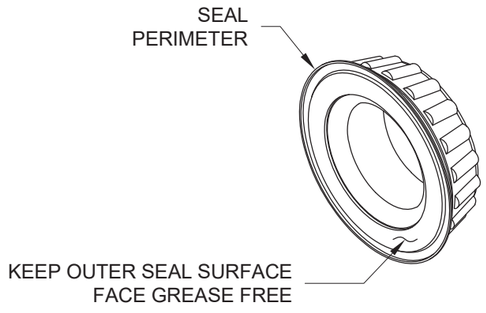


FIGURE 3: WHEEL BEARING

Step 1: Tighten the WD-1016-1 Nose Gear Link Assembly nut as described on Page 46-06, Step 4.

Step 2: Remove the U-01010B-1 Wheel Pant Bracket. Set up the brake assembly as shown in Figure 1. Apply a thread sealant, such as Lubon #404 or equivalent, to the pipe threads of the AN823-4D Tube/Pipe Adapter before threading it into the top of the brake caliper.

Step 3: Slide the studs of the brake caliper through the clamp plate and torque plate. Position the back plates behind the brake disk, then bolt the brake caliper and back plates together using the hardware called out in Figure 1.

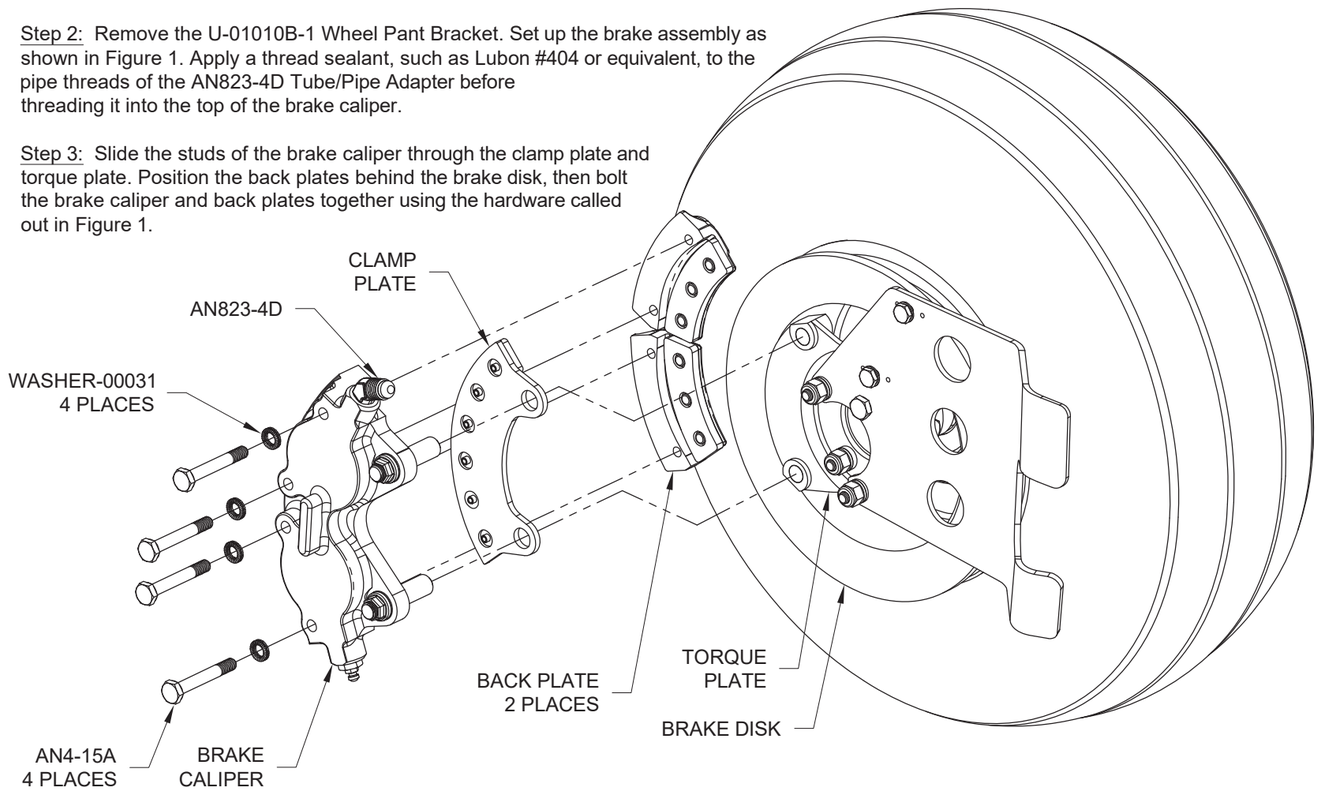


FIGURE 1: INSTALLING THE BRAKE ASSEMBLY

Step 4: Reinstall the U-01010B-1 Wheel Pant Bracket. Make a brake line (from AT0-032X1/4) to run from the fluid fitting on the bottom of the fuselage to the fluid fitting on the brake caliper as shown in Figures 2 and 3.

Slide an AN818-4D Nut and an AN819-4D Sleeve onto the brake line, flare the end, then secure it to the fluid fitting on the bottom of the fuselage. Bend the brake line so that it runs down the forward side of the U-1001-L Main Gear Leg as shown in Figure 2.

Step 5: As shown in Figure 3, bend the brake line around the bottom of the U-1001-L Main Gear Leg, cut the brake line to length, slide on an AN818-4D Nut and an AN819-4D Sleeve, flare the end, then secure it to the fluid fitting on the brake caliper.

Step 6: Secure the brake line to the U-1001-L Main Gear Leg with "Friction Tape" (found at most hardware stores) in at least four places. First wrap the tape around the main gear leg alone, then wrap it around the brake line as well.

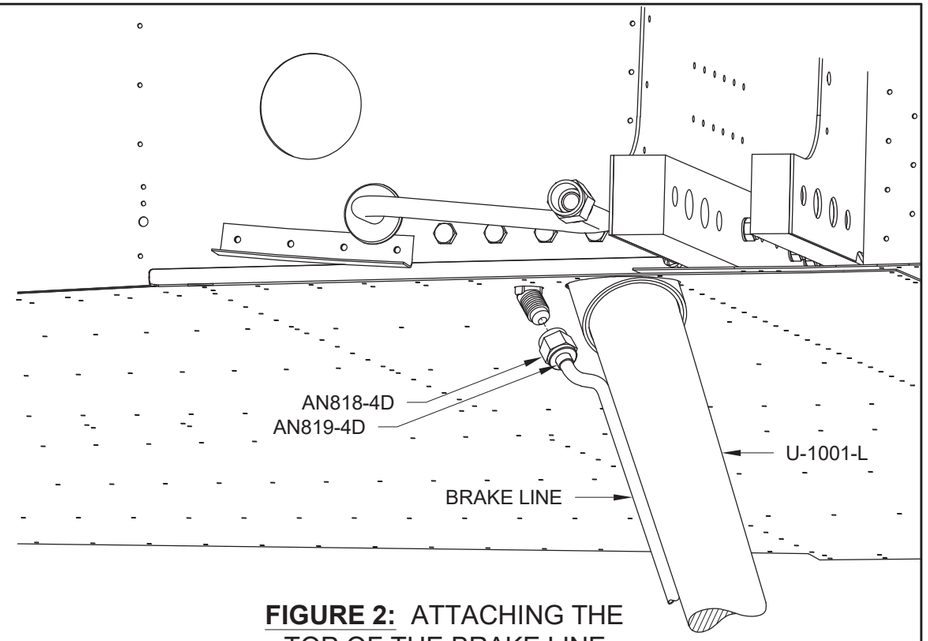


FIGURE 2: ATTACHING THE TOP OF THE BRAKE LINE

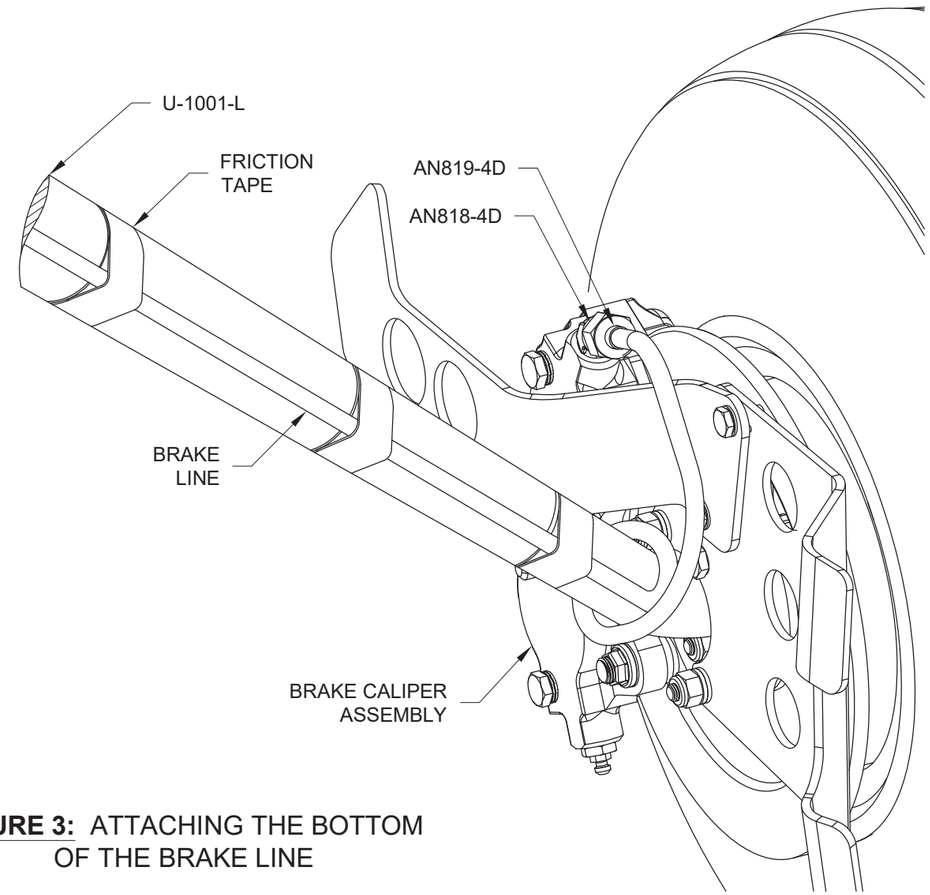


FIGURE 3: ATTACHING THE BOTTOM OF THE BRAKE LINE