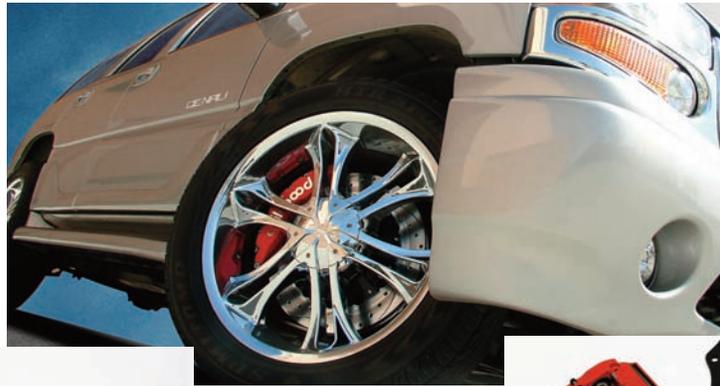


GMC DENALI BRAKES

Installing Wilwood four-wheel disc brakes on a GMC Denali SUV



A big vehicle such as this Denali requires large brakes, so a Wilwood part number 140-8992 front disc brake kit was ordered. The kit features huge 16-inch vented and slotted rotors with aluminum hats, TC 6R six-piston calipers, caliper brackets, BP-10 Smart Pads, and all of the hardware required to complete the installation.

In the '70s and '80s there was a push for Americans to buy small cars. The auto manufacturers were downsizing the cars, and were trying to make them more economical and fuel-efficient. This push for small cars was basically due to government rules that were making the auto manufacturers meet the Corporate Average Fuel Economy (CAFÉ) standards. The problem was the majority of American car buyers didn't want small cars, because they were slow and funny looking, and they could see that they weren't safe in an accident.

Flying in the face of Government intervention, the American Public decided to buy trucks and multi-passenger utility vehicles called SUVs, because they were big and safe. The car manufacturers saw this trend so they started making the



The Denali has an internal parking brake system so a Wilwood part number 140-8993 rear disc brake kit was ordered. The kit features 12.75-inch diameter drilled and slotted rotors with an internal parking brake drum, Superlite 4R calipers, caliper brackets, BP-10 Smart Pads and all of the hardware required to complete the installation.

SUVs very comfortable and equipped them with every luxury feature they could come up with. As this trend grew, many companies started making them bigger and bigger, and that also turned them into gas-guzzlers. The end result was the fuel economy went out the window. The Government ended up with exactly the opposite of what they wanted.

Over time and due to higher gas prices, the SUV market came back to reality and the auto manufacturers started building smaller SUVs that looked terrific and were more economical to drive. General Motors in particular came out with a series of engines that produce plenty of horsepower, but are economical at the same time. Since GMC used the same corporate engine, they started refining their entries into the SUV market upscale

from the Chevy and one of the really nice offerings is the Denali. It is a luxury offering that is big enough to be safe and small enough to have respectable fuel economy.

The Denali has a powerful engine combined with good handling for a vehicle of this size, so it has become popular with SUV buyers. The owner of the Denali in this story was pleased with his vehicle, but he felt the brakes could be improved. There was also a second reason for a brake change because he just installed large diameter wheels and the large windows in the wheels made the old unattractive brakes very visible. He was aware that Wilwood brakes could improve the Denali's stopping power plus they would look nice behind the wheels.

The owner of this Denali contacted his Wilwood dealer and ordered a Wilwood part number 140-8992 front brake kit that features 16-inch diameter rotors and TC 6R calipers. The rear brakes feature 12.75-inch diameter rotors with Superlite 4R calipers. The brake lines were also needed so he ordered Wilwood part number 220-8998 stainless steel braided front lines and 220-8999 stainless steel braided rear lines.

Wilwood Engineering recommends that someone experienced and competent in the installation and maintenance of disc brakes should only install the disc brakes. It would be a good idea to spread out the brake kit and make sure the parts you have match the parts list on the instruction sheet. It is also important to make sure the kit you have is the correct one for your particular application. If you are mechanically inclined, work on your own vehicle and have brake installation experience you can probably do this installation at home. You will also need an adequate variety of tools such as a floor jack and jack stands, an impact gun, a good assortment of SAE and Metric wrenches and sockets, line wrenches, a foot-pound and an inch-pound torque wrench. It would also be advisable to have a bottle of Loctite 271, Teflon tape and Wilwood Hi-Temp 570 Racing Brake Fluid or Wilwood EXP 600 Plus Hi-Temp Racing Brake Fluid. We are going to show you how this installation is done so you can decide for yourself if you can perform it yourself or if it would be better to have a professional do it for you.



The Denali was raised up on a floor jack and then jack stands were installed underneath for safety. The hub-caps were removed and the lug nuts were disconnected with an impact gun and the correct size socket. After the lug nuts were disconnected, the large wheels and tires were removed.



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Before the rotor could be removed, the brake line brackets had to be disconnected. Here one of the small brackets was disconnected from the A-arm assembly. It is important to keep the brackets because they will be reused later.



There is another hose bracket located on the top of the spindle. Using a T-handle and a small socket, the retaining bolt was disconnected from the spindle. This bracket will also be reused later.



Using a ratchet wrench and the correct size socket, the Caliper bolts were removed from the original bracket assembly. A breaker bar may be necessary to break the bolts loose.



The caliper was lifted off of the rotor and was set to the side for now. It will be completely removed after the rubber line is disconnected from the steel line.



The rotor was lifted off of the hub assembly and was removed from the car.



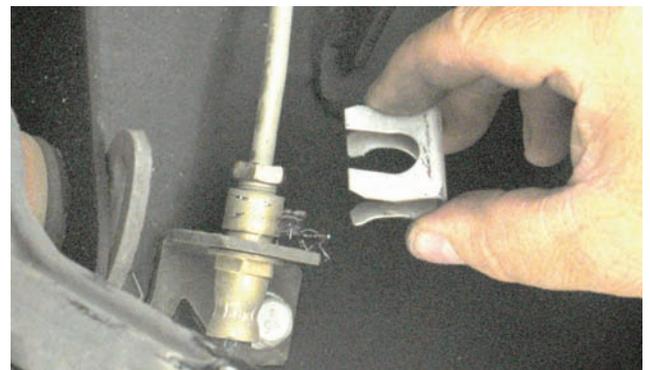
A M14-2.00 bolt outfitted with a M14 lock washer was placed through the hole in original caliper mounting ear and it was loaded with a 0.029-inch thick washer and a thin shim washer in preparation for mounting the caliper.



Here is the caliper mounting bracket after it was bolted to the original caliper mounting ears. Shims can be added between the bracket and mounting ears to center the caliper over the rotor.



The hard brake line was removed from the rubber hose using a line wrench. The line was loosened but it wasn't removed yet.



After the hard line was loosened from the rubber line, the spring clip retainer was removed.



The aluminum hat assembly was bolted to the rotor using the bolts and washers in the kit. The small hub bolts were coated with Loctite 271 before the connection was made and then the bolts were tightened in an alternating pattern to 144 in-lbs using an inch-pound torque wrench. The bolts that were just installed were safety wired together.



The assembled rotor was mounted on the hub assembly and then it was secured with two lug nuts.



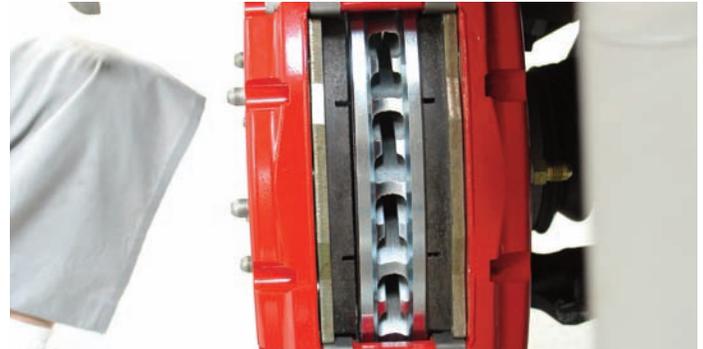
Before the caliper was mounted to the bracket assembly the studs were loaded with two spacers and a shim washer as seen here.



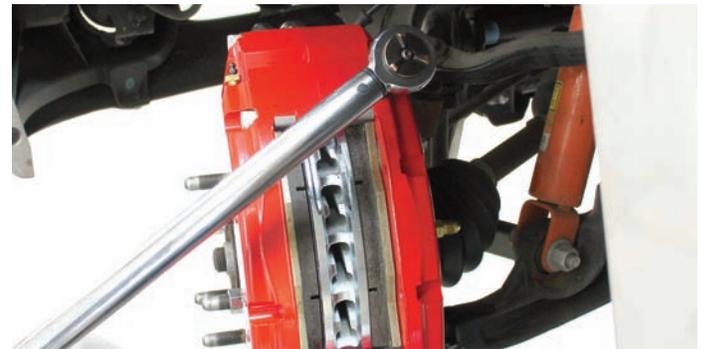
The caliper inlet fitting threads were wrapped with Teflon tape and then the fitting was screwed into the caliper body.



The caliper was placed on the bracket studs and then the washers were installed followed by the locknut. Here the nuts are being tightened in preparation for checking the caliper to rotor centering.



The caliper was centered and then the brake pads were installed. Here's a view of the caliper to rotor spacing after the brake pads were installed.



After the brake pads were properly installed and centered, the caliper nuts were tightened to 47 ft-lbs using a foot-pound torque wrench. The caliper bracket bolts were coated with Loctite 271 and they were tightened to 90 ft-lbs.



The two bridge bolts were installed along with the wire spring clip. The spring clip can be tricky to get in place.



After the spring clip was properly mounted, the two bridge bolts can be tightened using a small socket wrench and an Allen T-handle.



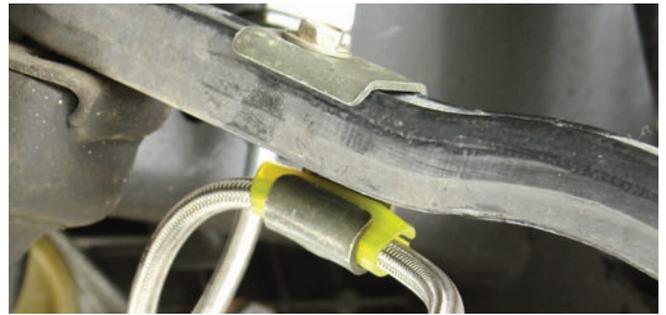
At this point the caliper and rotor are finished, but the brake lines still have to be hooked up. Looking at this system it is obvious that it will be far superior to the original brake system.



The hose brackets that were previously removed were reinstalled on the new Wilwood part number 220-8998 stainless steel braided line.



Using an adapter, the stainless steel braided line was hooked to the hard line and both were tightened to avoid leaks. The original clip retainer was reinstalled.



The hose clip was reused with the new braided line and was connected to the original mounting point on the A-arm. A small piece of plastic was installed between the bracket and line to protect it from damage.



The other bracket was connected to the spindle assembly. The brackets were removed, spread apart enough to get the new hose and plastic protector inside and then the bracket was squeezed back together to secure the hose.



Here is the stainless steel line running to the caliper inlet fitting. It is important to make sure all of the connections are tight.



Here is the front brake system complete and ready to go. The brake system features the huge red TC 6R caliper and the 16-inch drilled and slotted rotor. The next step is installing the rear brakes.



The front of the car was placed back on the ground and the rear was lifted and jack stands were placed underneath for safety. The hubcaps were removed and then the lug nuts were disconnected. After the lug nuts were disconnected the tires and wheels were removed.



Using a breaker bar and the correct size socket, the caliper bolts were removed.



After the bolts were disconnected, the caliper could be removed from the bracket. For now the caliper was just moved out of the way while the new brakes were installed.



The heavy rotor was lifted off of the axle studs. You can see the original caliper in the background. It will be removed when the new lines are being installed.



Here is a close look at the internal parking brake assembly. This is a useful assembly so it will be retained, which means the original parking brake cables remain intact.



The caliper will be mounted to the original caliper mounting ears using a pair of M-14-2.00 x 40 mm bolts loaded with M14 I.D. x 21mm O.D. lock washers. After the bolts pass through the bracket they should be loaded with a 0.029-inch thick washer before the connection is made.



The bolts were installed finger tight and then they were tightened with a socket wrench to check the caliper to rotor centering.



The Wilwood drilled and slotted rotor was installed on the axle flange and was pushed back to mount it on the centering ring. If you look close you can see the caliper bracket mounting studs in the background. This rotor has an internal drum assembly for the parking brake assembly.



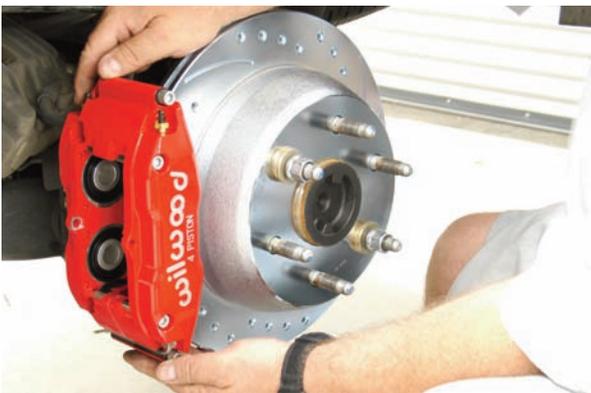
The rotor was connected to the axle assembly with two opposing lug nuts so the rotor to caliper centering could be done.



Before the caliper was installed, the caliper bracket studs were loaded with a 0.035-inch thick washer.



The caliper inlet fitting threads were wrapped with Teflon tape and then the fittings were screwed into the calipers.



The large 4-piston Superlite caliper was installed over the studs. The bridge bolt was removed before the caliper was placed over the studs in preparation for installing the brake pads.



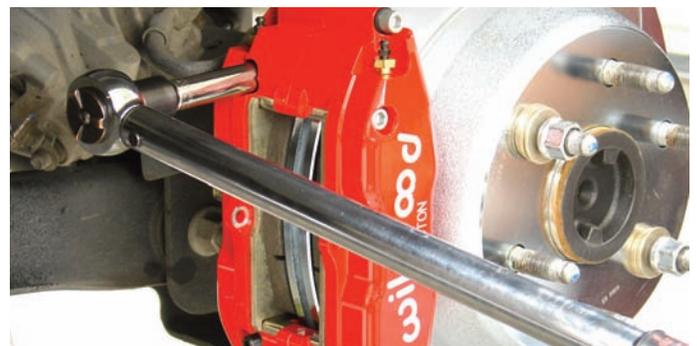
The caliper was attached to the studs using the two 0.057-inch thick washers and two self-locking hex head nuts. The rotor to centering should be checked and adjusted if necessary at this point. Shims between the caliper bracket and the original mounting ears can be used if necessary.



After the caliper was centered, the BP-10 brake pads were installed. The pads are designed for street performance use.



The brake pads are centered over the rotor and the radius of the brake pads match the radius of the rotors. At this point everything is looking good.



After the centering is correct and the radius of the pads match the rotor radius, the caliper mounting nuts were tightened to 35 ft-lbs using a foot-pound torque wrench.



Now the caliper mounting bracket bolts were tightened to 90 ft-lbs using a foot-pound torque wrench.



The caliper center bridge pad retainer bolt was re-installed and it was tightened with a small socket wrench and a T-handle.



Here is the finished brake assembly featuring the red Superlite four-piston caliper and the drilled and slotted rotor.



The hose connection was made from the caliper to the hard line. At this point the old caliper can be removed. The brake system will require bleeding and the pads will have to be bedded in.



The Denali looks terrific with the large diameter wheel and low profile tires. The brakes add to the truck appearance and it stops better than ever.

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