

# THE ULTIMATE SLOWING MACHINE

Installing Wilwood four-wheel disc brakes on a 2004 BMW M3



The Wilwood Engineering part number 140-8797 front disc brake kit for the BMW includes the Billet Narrow SL6 Radial Mount calipers, the 13.06-inch slotted rotors, the aluminum hat adapters, the caliper brackets, the BP-10 Smart Pads and all of the hardware required to finish the installation.

There is an old marketing strategy that says if you win races on Sunday you will sell cars on Monday. The American car companies did that in the '60s and they found out that it really worked. BMW has always been competing with Mercedes Benz for car sales in Germany and later in the United States, so BMW decided to try that old marketing strategy out in 1986 by entering several race prepared E30 M3 coupes in the World Touring Car Championships. In order to homologate the car for racing, 5000 street versions had to be built and they had to be equipped with the same performance features used on the racecar. A 2.3-liter 195 horsepower dual overhead cam four-cylinder engine that was capable of producing 340 horsepower when it was modified for racing powered the M3. The M3 was designed by the factory engineers for road racing and needless to say the Mercedes racers were very unhappy. The BMW was successfully winning races and championships until the car was discontinued in 1992.

When the E30 M3 was discontinued an E36 M3 debuted with a powerful six-cylinder engine. These cars were very popular in Europe and Germany but they didn't make the trip to America until the 1995 model year and they became popular with the BMW enthusiasts. This car was fast, handled well and it could be ordered with a variety of nice options. The six-cylinder dual over

The Wilwood Engineering part number 140-8798 rear disc brake kit includes the Billet Dynapro calipers, the 12.27-inch slotted rotors designed to be used with the BMW internal parking brake mechanism, caliper brackets, BP-10 Smart Pads and all of the hardware that is required to complete the installation.

head valve engine was developing 240 horsepower.

In 2000 a new BMW E46 M3 was released and it continued in the racecar tradition. The M3 featured good handling and a 3.2-liter engine that developed 343 horsepower. The owner of the 2004 BMW in this story drives it for daily transportation in Southern California, so it can be going bumper to bumper on the freeway or zip-ping through the California mountain roads, both of which are hard on brakes. He has also attended a few BMW track days at some of the local racetracks and he realized that improved brakes would be a welcomed addition. He noticed that some of the cars that were doing well on the track were equipped with Wilwood disc brakes so he visited the Wilwood Website and found a front and rear brake kit that would turn his car into the "Ultimate Slowing Machine". He selected a Wilwood part number 140-8797 front brake kit that features Billet Narrow SL6 Radial Mount Calipers and 13.06-inch slotted rotors. The rear features Wilwood part number 140-8798 and it features Billet Dynapro calipers and 12.27-inch slotted rotors. The rotor works directly with the BMW internal drum parking brake mechanism. Brake hoses are also required to finish off the installation so a set of 220-8799 hoses were ordered for the front and 220-8800 hoses were ordered for the rear.

Installing the brakes on the car was the next step. Wilwood Engineering recommends persons experienced in the installation and proper operation of disc brake systems should only perform the installation of this kit. A hobby builder can install this kit if he has good mechanical ability, car building experience and a good assortment of tools. In order to complete this installation you need a floor jack and jack stands, an assortment of metric wrenches and sockets, line wrenches, a socket wrench, an impact gun and a foot-pound and inch-pound torque wrench.



The front of the BMW was raised up using a floor jack and then jack stands were placed underneath it to keep it elevated. Using an impact gun and the correct size socket, the lug bolts were disconnected so the wheels and tires could be removed.



After the wheels and tires were removed, you can see the original disc brake setup. The original calipers are connected to the hub's mounting flange.



The two bolts that secure the original caliper to the mounting ears were disconnected. After they were removed, the caliper could be lifted off of the rotor.

Before the installation begins it would be a good idea to spread all of the parts out so you can make sure that all of the parts are included in the kit. Check the components with the parts list on the instruction sheet to make sure everything is there. It would also be a good idea to have Teflon tape, Loctite 271 and Wilwood Hi-Temp 570 Racing Brake fluid or Wilwood EXP 600 Plus Super Hi-Temp Racing Brake Fluid on hand. We will show you the entire installation so you can decide whether you can do the work yourself or if you should have a professional do it for you.



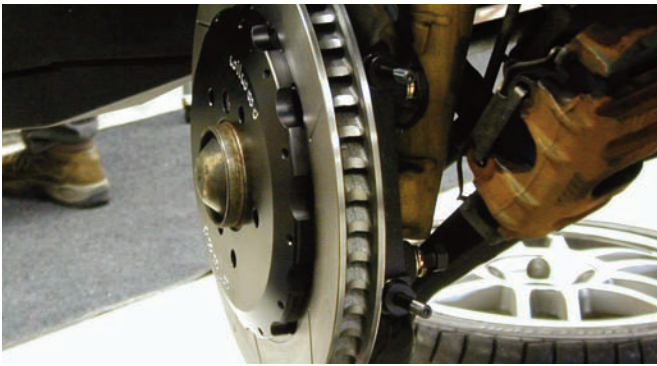
Using an impact screwdriver, the screws that secure the rotor to the hub assembly were disconnected.



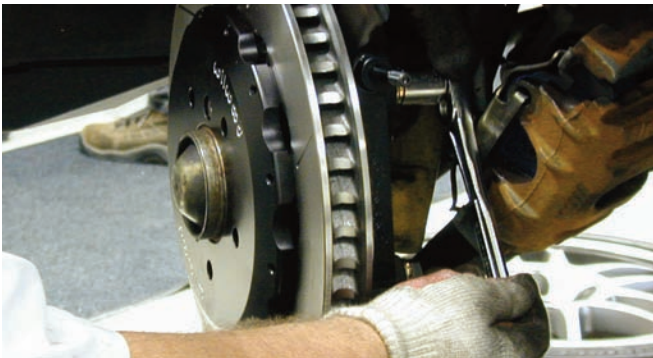
After the rotor was removed, you can see the mounting ears that the caliper bracket will bolt onto.



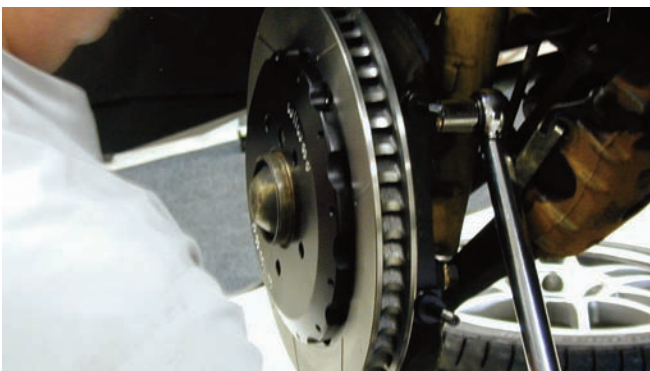
The rotor was connected to the hub assembly using the bolts and washers in the kit. The bolts were coated with Loctite 271 and then they were tightened in an alternating sequence to 85 in-lbs. After the rotor was assembled it was placed on the hub mounting flange and it was connected with the original screws.



The caliper mounting bracket was held against the original mounting ears and then the bolts and washers were connected. Under the head the original washer was used and between the caliper and mounting ears a flat washer was used.



After the bolts were finger tight, they were tightened a little more with a socket wrench.



The caliper to rotor centering was checked and when it was determined that it was fine, the caliper bolts were coated with Loctite 271 and then they were tightened to 65 ft-lbs.



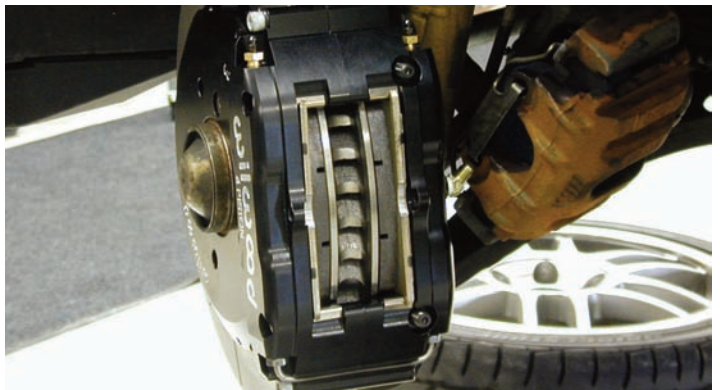
Before the caliper was installed, flat washers were loaded on the mounting studs. These washers can be used to raise or lower the caliper.



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



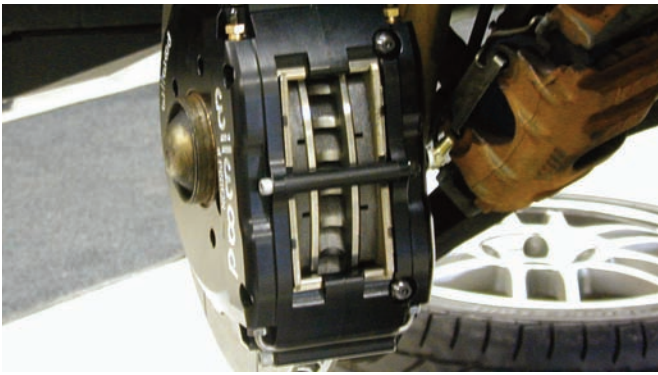
The caliper was placed on the mounting studs until it was fully seated and then the brake pads were installed.



Here you can see that the rotor is centered in the caliper and the radius of the brake pads matches the radius of the rotor.



The mounting washers and locknuts were connected to the studs and then the nuts were tightened to 35 ft-lbs using a foot-pound torque wrench.



After the caliper was secure and the brake pads were seated, the bridge bolt was connected to keep the pads in place.



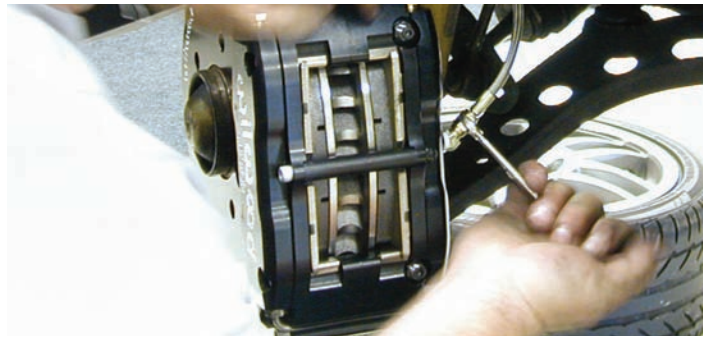
The original rubber caliper line was disconnected from the steel hard line using a line wrench.



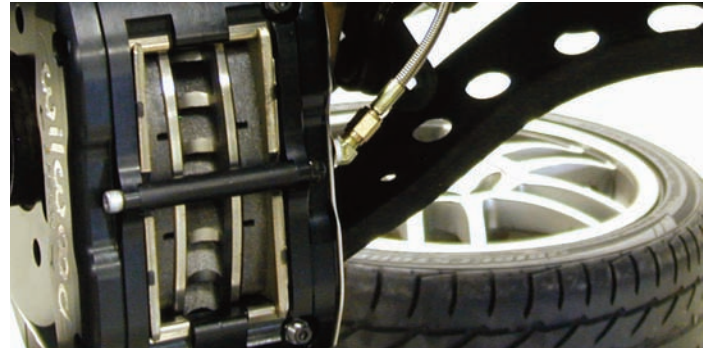
The steel line was moved away from the mounting bracket and an adapter fitting was connected. The blue fitting is just a cap to keep the fluid from leaking out.



The hole in the original hose bracket was slightly under size for the adapter fitting so it was enlarged with a drill motor and a step drill.



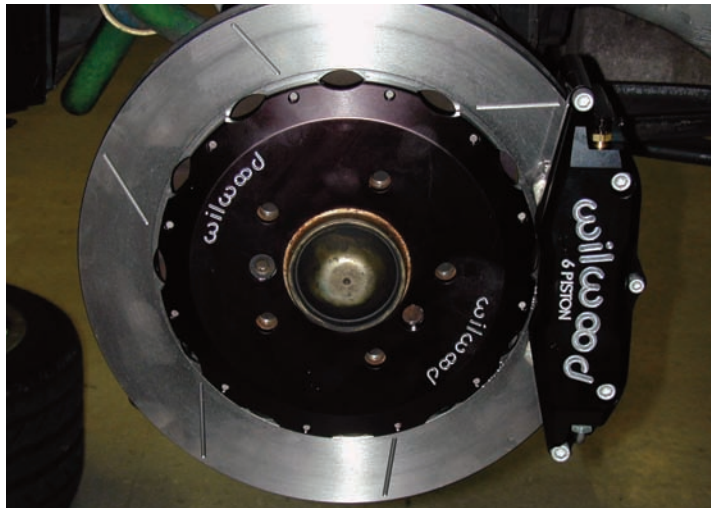
The Wilwood 220-8799 brake hose was connected to the inlet connection in the Caliper using a line wrench.



Here is a closer look at the braided steel hose connection and the direction of the inlet fitting. You can wrap Teflon tape on the fitting and make sure the aircraft style fitting is tight to avoid any leaks.



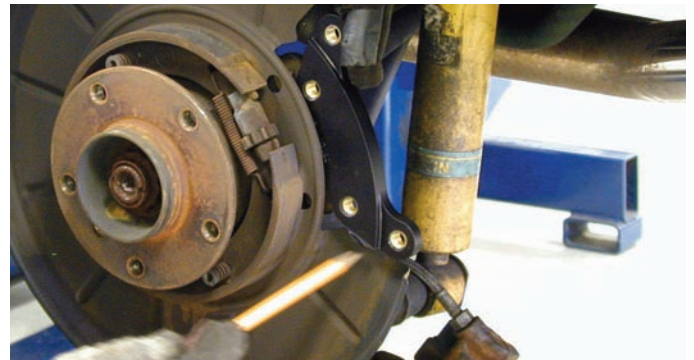
The steel line and adapter fitting were reinstalled in the frame bracket and the Wilwood line was connected. The original brake clip can be used to hold the line in place.



Here is the brake finished and ready for bleeding. This large six-piston caliper should produce plenty of stopping power.



The front of the car was lowered and the rear was raised up to access the rear brakes. The wheels and tires were removed to reveal the original rear brake system.



The caliper bracket was connected to the mounting ears to determine where the dust shield will have to be cut to allow the use of a larger rear caliper.



The two bolts that secure the caliper to the bracket were removed with a large breaker bar. After the bolts were disconnected the caliper was removed from the rotor.



After the dust shield was marked, the area to be removed was cut off using a sharp hand shear.



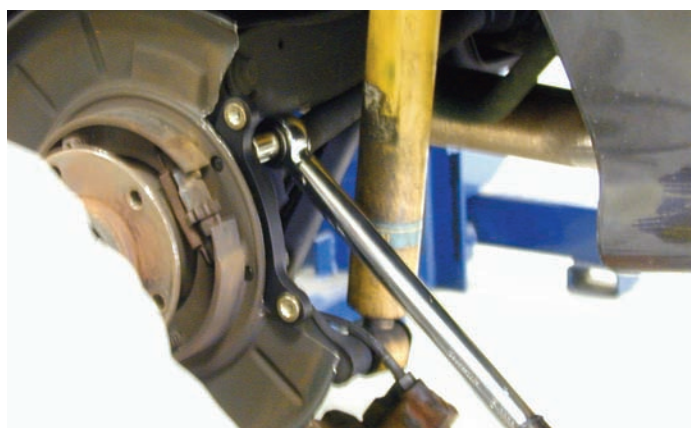
Using an impact screwdriver, the screws that secure the rotor to the hub assembly were removed.



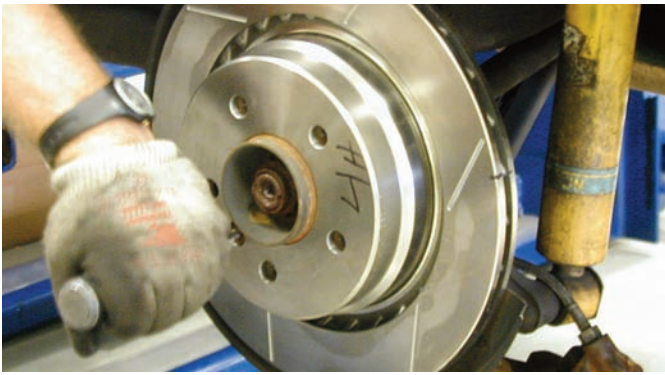
Here is the dust shield after the material was removed. This should allow enough clearance for the new caliper.



After the rotor was removed, you can see the internal drum parking brake mechanism. The Wilwood rotors will work with this brake system.



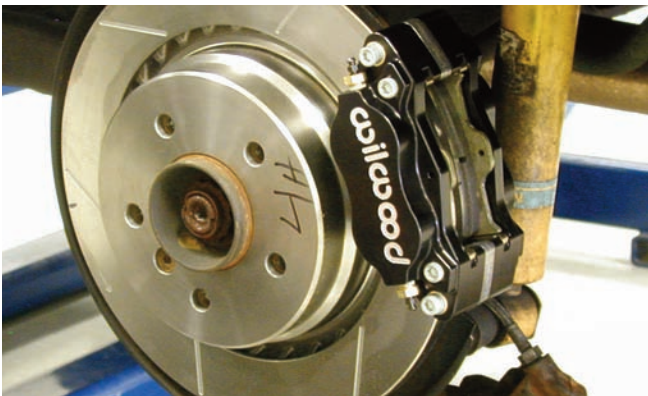
The caliper mounting bolts were coated with Loctite 271 and then they were tightened to 30 ft-lbs using a foot-pound torque wrench.



The rotor was placed on the hub assembly and then the original screw was used to secure it. Some parking brake shoe adjustments may be needed to get the shoes close to the hub assembly.



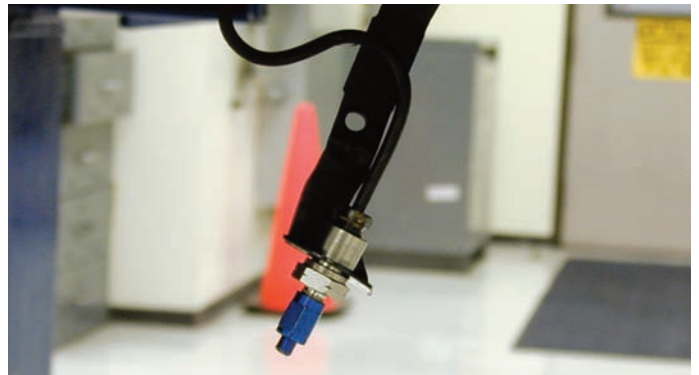
The caliper inlet fitting was covered with Teflon tape and then the fitting was screwed into the caliper.



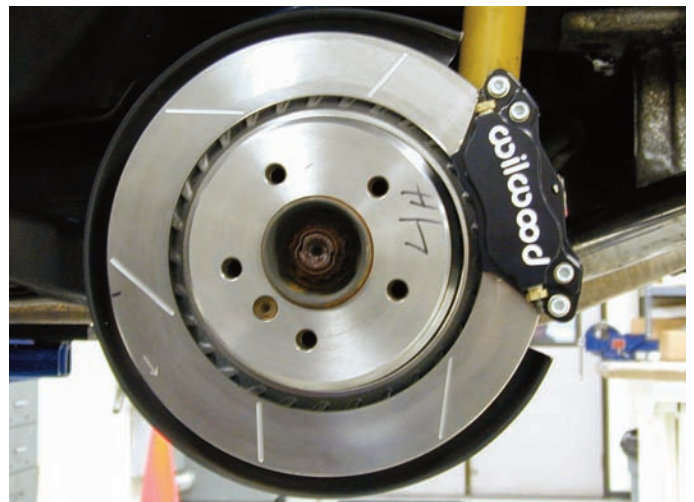
The caliper was connected to the bracket assembly using the screws and washers in the kit. The caliper to rotor centering should be checked and adjusted with shims if it is necessary.



After the caliper is centered over the rotor, the mounting bolts were coated with Loctite 271 and then they were tightened to 30 ft-lbs.



The rear hose bracket was modified to accept the adapter fitting. The bracket was reinstalled in the car and the Wilwood 220-8799 hose kit was installed following the methods used on the front hoses.



Here is the rear brake assembly finished and ready for action on the street or on the track. The four-piston rear brakes will work perfectly with the larger six-piston front brakes to provide perfect front to rear brake bias. Now the brake bleeding and pad bedding can begin.

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