

## Upgrading Porsche Brakes

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In previous drivers education articles, we've talked about brakes and upgrades you can make to enhance your braking capabilities at the track. These involve basics such as fresh, high temperature brake fluid and recently bled brakes, removing the front backing plates, piping air into the brake rotor, recent rubber or stainless mesh-covered brake hoses, and the choice of brake pads. In this article, we'll cover why you might want to upgrade your brakes and discuss what's involved.

First, why upgrade brakes? Porsche brakes from the factory are pretty darn good. The problems you can run into at the track with a stock Porsche braking system can be anticipated in advance and, for the most part, addressed. However, if you've taken the actions mentioned previously, and still find yourself towards the end of the day with a soft brake pedal, you should first consider how you're braking, as you may be over braking. Ask an instructor to help you with when and how much to brake. So, let's assume your braking system is in pristine shape, you know where and how much to brake, and your pedal still gets soft towards the end of the day. You may be a candidate for an upgrade. Of course if you are sharing your Porsche at the track, that puts additional stress on the brake system. Question: If you install larger brakes, will you stop quicker? Answer: Not really. The physics say you'll stop in about the same time with larger brakes as with your stock brakes, everything else equal. What changes with larger brakes is that you now have a larger brake pad area and larger rotors, which translates into longer wearing brake pads and cooler overall running. But wait, your brain is shouting, if bigger brakes won't stop much quicker than stock brakes, why does the factory use larger rotors with larger multi-piston'd calipers in it's racing machines? The answer touches on another reason to upgrade, and that is when you make a significant change, typically with a larger engine, to your Porsche's performance. Some vintage racers, whose rules prohibit brake upgrades, have started using titanium heat shields on their brake pads to minimize heat transfer from the pads to the calipers, thus extending the length of time between brake bleeding.

So, everything considered, you've decided that you want to upgrade your brakes. When upgrading your brakes, there are a fair number of choices of calipers which can be used, ranging from Porsche calipers (from 930's, 944's, 928's, C2/4's, 993tt, etc) to non-Porsche calipers, i.e., Wilwoods and others. Here, I'll generally describe the upgrade from 911SC brakes to 930 brakes, to illustrate what goes into a brake upgrade.

Before you start, understand that parts alone can run from \$1000 to \$5000+, depending on the upgrade. One of the first questions to ask is what will the new brakes mean to your wheels? Will they still fit? In our upgrade, the 7" or 8x16" 944 Fuchs on the front and 9" Fuchs on the rear can handle the larger 930 caliper without the need for spacers, and the 6" or 7" Fuchs require thin

spacers. Other wheels can also fit without spacers. However, if we wanted to upgrade to big red Porsche caliper's, that would require 17" wheels. So your choice of caliper may require the added expense of new wheels. Next, the calipers. In our 911 to 930 brake upgrade, the 930 brakes that were introduced on the 1978 930 turbo are the production version of the 917 racing brakes. You can buy the calipers used (roughly \$800 to \$1600 per set of 4) or you can still buy them new from Porsche for around \$2800 (list) per set. The calipers may require machining or adaptors to fit. In our example, the front calipers fit with a thin washer as a spacer and the rear calipers required machining. For rotors, some can be a direct replacement, and others require a hat to fit the rotor to the strut. In our example, the 930 rear rotor is a direct bolt-on to the 911 . The stock Porsche 930 rotor has cast-in holes, which are superior to drilled rotors, and there are vendors offering slotted rotors also. The front rotors are a bit more complicated, as they must fit the 1978-1980 930. These models used a floating rotor setup where the rotor floats between two hats connecting it to the hub. In addition, you don't have to get the floating rotors, you can also get non-floating rotors. For street usage, the non-floating rotors will work fine, and will be quieter. At the other extreme, for pure track usage, the floating rotors are better, as they allow some rotor play for better brake performance. Another consideration is the master cylinder. With larger brakes, you'll be moving more volumes of brake fluid, which may require a larger master cylinder. Here, we upgraded to the 23mm turbo master cylinder. You'll need new hex bolts and may also need adaptors to mount the calipers.

You may find that you need to use a thin (1/16", 1/8", 3/16", or metric equivalents) spacer with your wheels, and these are available from a number of sources in both aluminum and steel. If you do use a spacer, use the thinnest one you can, and make sure there's enough threads left for the lug nuts to stay securely on.

Upgrading a major system, like your brakes, is not a trivial or inexpensive decision.

Written by Bill Gregory for the "Challenge", monthly publication of the Connecticut Valley Region, Porsche Club of America.