Pedal Ratios and How to Find Them

Decades ago, four-wheel drum brakes were standard, power-assisted brakes were an extra-cost option, and depending on how old your project vehicle is, disc brakes may not have even been offered. These days, most new cars and trucks come standard with power disc brakes, even the lowest priced examples. Wilwood does not make vacuum boosters or hydro-boost units, but we do

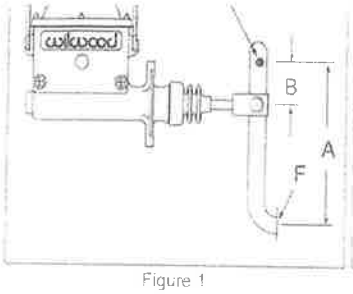


Figure 1

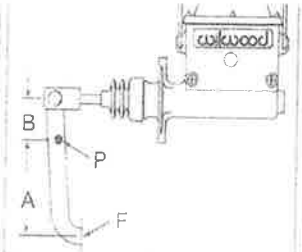


Figure 2

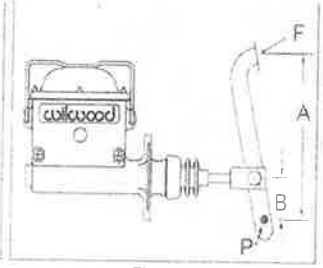


Figure 3

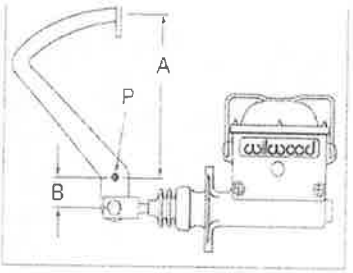


Figure 4

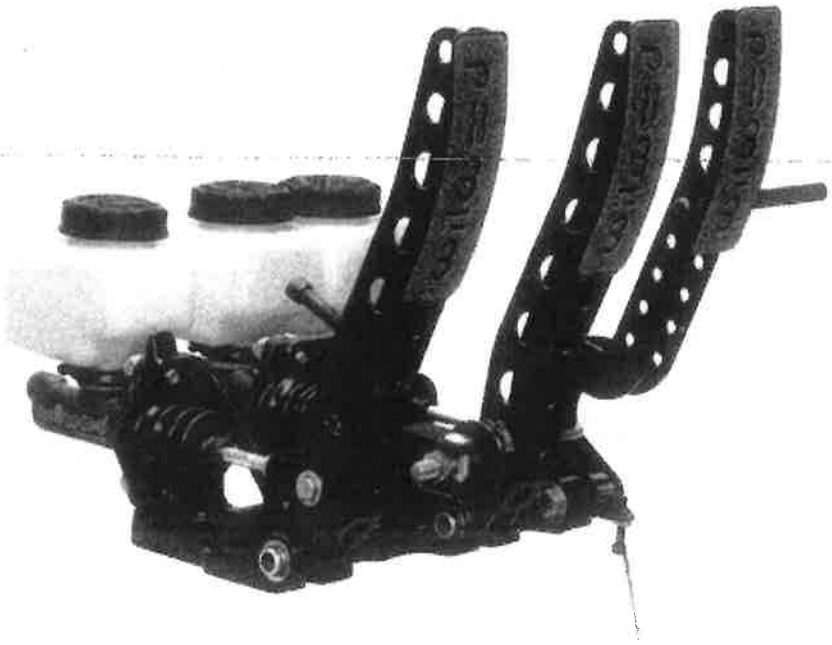
The hardest part of finding the pedal ratio on a car is usually measuring under the dashboard. Luckily, since you only need a rough measure for the ratio, there is no need for a micrometer or a set of calipers. A tape measure, your eyeballs, and a notepad are more than good enough. Typical non-boosted ratios range from 6:1 to 7:1, with booster pedals using 4.5:1 to 5:1.

The pedal ratio is simply the distance from the center of the pedal pivot point to the middle of the footpad (A), divided by the distance from the pedal pivot to the master cylinder pushrod (or the hole it attaches to) (B). On these diagrams covering the four different configurations of brake pedals, F is always the footpad, and P is the pivot. If you measure 12-inches from pivot to center of the pad and 2-inches pivot to push rod, that is a 6:1 ratio. For reverse-mounted master cylinders, the pivot is between the pushrod and the footpad, but the math is the same. No matter which type of pivot and pedal relationship your car uses, the math for figuring the ratio is the same (unless there is a bell crank involved).

As measurement A increases, or B decreases, the brake force into the master cylinder will increase without additional effort at the pedal. However, the pedal travel will increase as well.

Back when power brakes were just an option, the factory would have different pedals, or different mounting holes, or other ways to provide two different ratios. If you are restoring or resto-modding an old car and finding the brakes seem to take a lot of leg muscle, you may have mismatched a power brake ratio pedal with non-power brakes. Fixing it requires moving the pivot or master cylinder pushrod. But be careful, because the pushrod needs to have a straight shot (off by less than a few degrees) into the master cylinder to work correctly.

Many 1960s and 1970s cars from GM and others mounted the power booster at a slight angle, aiming the pushrod at a hole lower in the pedal arm for a lower ratio. Power-assisted brakes can make do with ratios of 4.5:1 or lower, which on a 12-inch long pedal would put the pushrod about 2 5/8-inch from the pivot.



Wilwood's pedal assemblies are designed strictly for manual brake cars (though our master cylinders work for either) and are primarily intended for dedicated race vehicles. Ratios available include 5.1:1, 6:1, 7:1, and 10:1 for various types of racing.

The Wilwood 10:1 pedal is designed for off-road race vehicles using non-boosted brakes with large piston area calipers. The rough terrain often causes brake pad knock-back, and a large-bore master cylinder pumping greater fluid volume moves the caliper pistons back into place quickly. Unfortunately, this necessitates a big pedal ratio to produce good line pressure without power brakes or a tremendous amount of leg effort.

With the proper brake pedal leverage ratio, adequately sized master cylinder bore, and the right Wilwood brakes at each wheel, you should be able to race all day without getting a sore leg.