

Volkswagen Sport Tuning *for Street and Competition*

by Per Schroeder

**Street-Legal
Performance**

**Ideal Racing Set-Ups, from
Autocrosser to Road Racer**

**Bolt-On How-To: Aftermarket
Springs/Shocks to Exhaust Systems**

**Covers Volkswagen Models from the Early
Rabbit, Fox, and Scirocco to Today's High-
Performance Golf, GTI, Passat, Corrado, and Jetta**



Volkswagen Sport Tuning for Street and Competition

*Getting the Best
Performance from
Your Water-Cooled
Volkswagen*

by Per Schroeder

Jeff + Jeremy,
Thanks for your
help... couldn't
have done it
without it.

Per

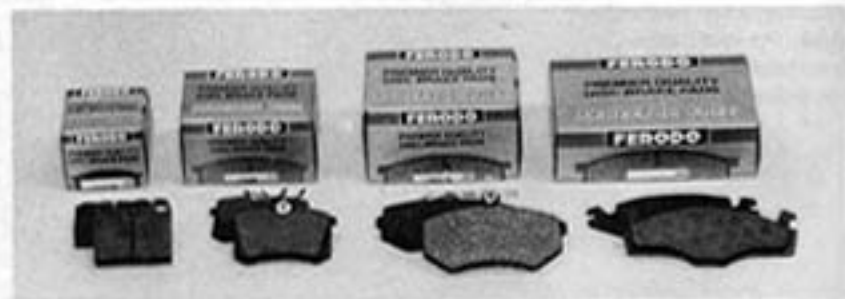


ROBERT BENTLEY
CAMBRIDGE, MASSACHUSETTS

GTI for longer lasting brakes. Rotors can even be cross-drilled to allow the gas that builds up under the brake pads to escape.

Whatever modification or maintenance you do on your brakes, remember this: brakes are vital for safe motoring, more than any other operating system on a car. Do not take short cuts and don't fail to recheck all fittings and lines that you have worked on. If, after reading your Bentley repair manual, you are unsure as to what needs to be done on a brake system, take your car to a reputable automotive repair shop. The money the mechanic charges you will be far less than what it could cost you if something you did causes an accident.

Fig. 4-2. Ferodo pads are a popular choice for street and autocross because they provide good high-temperature performance. They are available for many different applications, both front and rear, for VWs and other cars.



BRAKE PADS

Stock brake pads do an adequate job of slowing your car down. Unfortunately, certain aspects of their design are less than desirable: for example, the stock pad will start to fade after several hard stops, limiting the amount of performance driving you can do in one session. Stock pads also emit a large amount of black, sticky dust that is hard to clean off wheels. Thankfully, there are many direct-fit replacements available.

The old standby for high-performance brake pads, the Repco Metal Master, is being eclipsed by new products on the market. The Metal Master is a good pad for most applications and is readily available, but it has high brake pedal effort and is very hard on brake rotors. A similar type pad, the Mintex Silverline, is a good pad but has the same deficiencies as the Repco type. Ferodo has a good street and autocross compound, which has a high coefficient of friction for less pedal effort and good high-temperature performance. Its only downside is that it emits more brake dust than the Repco as the pad is used.

Carbon metallic pads are becoming *de rigueur* in road racing applications. Their high-heat capabilities and great stopping power make them excellent choices for I.T. racing. The pad itself is made up of carbon fibers and metallic particles held together with high-temperature binding agents. The carbon fibers give the pad its high heat resistance and some racing pads are completely made of carbon fiber filaments.

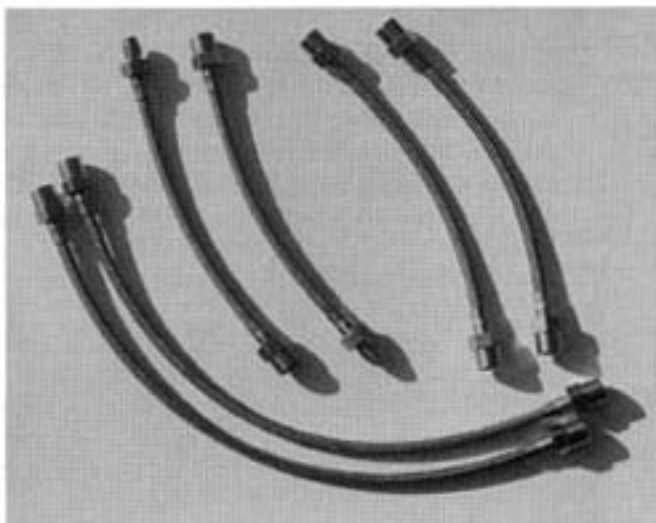
Performance Friction, a maker of carbon brake pads, has a good street and autocross pad called the HP. Priced slightly more than the Repco, this pad warms up much quicker than racing carbon pads and still has good heat-resistant properties, making it an excellent choice for the autocrossing car. Hawk, in addition to making many racing compound pads (such as their "blue" pads), makes a pad designated Y5, which is very popular with autocrossers and street enthusiasts. A newcomer in the VW brake pad arena is the Carbomet brand pad. Like the Performance Friction HP, the Carbomet is a carbon metallic pad with quick warm-up capabilities. It also has the advantage of

Fig. 4-6. Slotted rotors act similarly to cross-drilled rotors; while less prone to brake fade, they do have a tendency to wear pads quickly.



The rubber brake lines should be replaced with teflon-lined, braided stainless lines. The stainless line will not expand under the 300 psi pressure that brake lines are subject to. All of the energy of your foot on the pedal is transformed into brake pad pressure against the rotor, with minimal loss. With stock rubber lines the brake pedal is mushy to the touch, with little feel as to how the brakes are actually working. When you upgrade to stainless the pedal becomes firm and easy to modulate.

Fig. 4-7. Stainless braided brake lines will improve pedal feel and braking force because they expand less under pressure, unlike stock rubber lines.



On Volkswagens with rear drum brakes, you can upgrade from the drums to the discs. If you have upgraded the rear drum shoes to Repco or Ferodo, you will rarely notice a difference between the drums and discs. People who do need the added capabilities of the rear discs can change all of the appropriate parts. The parts you need include the discs, hub carrier, stub axle, and brake lines. These will be available at any salvage yard and can range from \$50 to \$300, depending on demand in your area.

Fig. 5-9. Velocity Tuning offers oversized throttle bodies for even more air-flow. The throttle body with the darker butterfly plate has a diameter 4 mm larger than the smaller unit, which is a stock A2 throttle body.

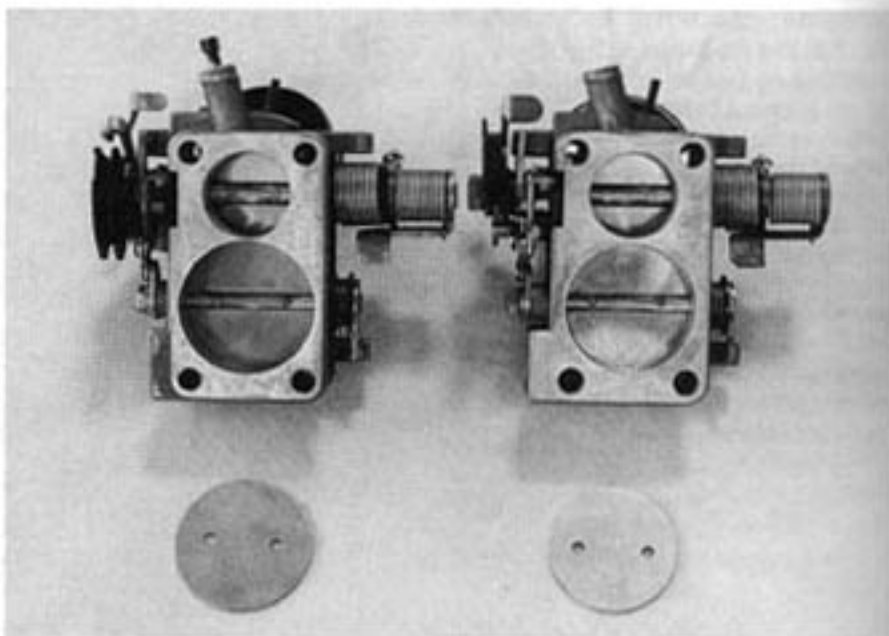
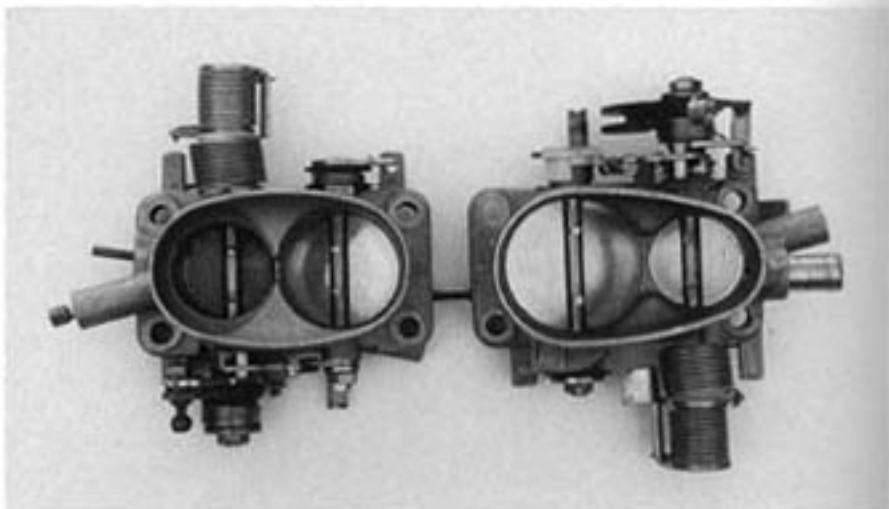


Fig. 5-10. A Rabbit (A1) throttle body vs. an A2 or Neuspeed throttle body. Notice how much larger the butterfly plates are. This should only be used if you also machine the intake manifold to match; don't use an adapter plate.



For very large engines (larger than 2.0 liters for 4-cylinder or turbo, larger than 2.8 for 6-cylinder), it is sometimes beneficial to upgrade the factory throttle bodies such as are used on the A2 and A3 cars. The European Corrado VR6 comes with a larger 2.9-liter engine; it also has a larger throttle body that can be fitted if you increase the displacement of your VR6 engine. For turbo-charged and large displacement A2 and A3 4-cylinders, Velocity Tuning sells throttle bodies that have been bored out with larger butterflies fitted, increasing the amount of air that can be sucked into the combustion chamber.

To increase airflow into the cylinder head, you can port match the intake manifold to head surface within one inch of the gasket on either the manifold or cylinder head. You can grind out portions of either the manifold or the cylinder head that do not perfectly match up with the other part, using the gasket as a template and grinding the manifold or head to match it. The most precise gaskets for this purpose are the factory stock units. They have more precise positioning of the ports and their holes are usually larger than non-factory parts.

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by Per Schroeder

Volkswagen Sport Tuning for Street and Competition is the most up-to-date hands-on book available on buying, tuning and modifying your Volkswagen. This book will serve as an indispensable guide and technical reference on how to get the best performance out of your Volkswagen for autocrossing, road racing, and street-legal driving. Whether you have an early "pocket rocket" or a brand-new Jetta, this book will help you hop up your car for serious sport driving. From bolt-on how-tos to specific modifications allowed in racing classes, whether you're a novice street enthusiast or a seasoned racer, you'll be able to enhance your Volkswagen's performance cost-effectively for street or competition driving.

Make the modifications that are right for your-driving needs. You'll find the most comprehensive sport tuning information on the following topics:



- Buying your water-cooled Volkswagen
- Choosing the right modifications for your car
- Step-by-step installation of aftermarket springs/shocks, stress bars, brakes, computer chips, camshafts, exhaust systems, and many other performance parts
- Race prep for the ultimate competition performance



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