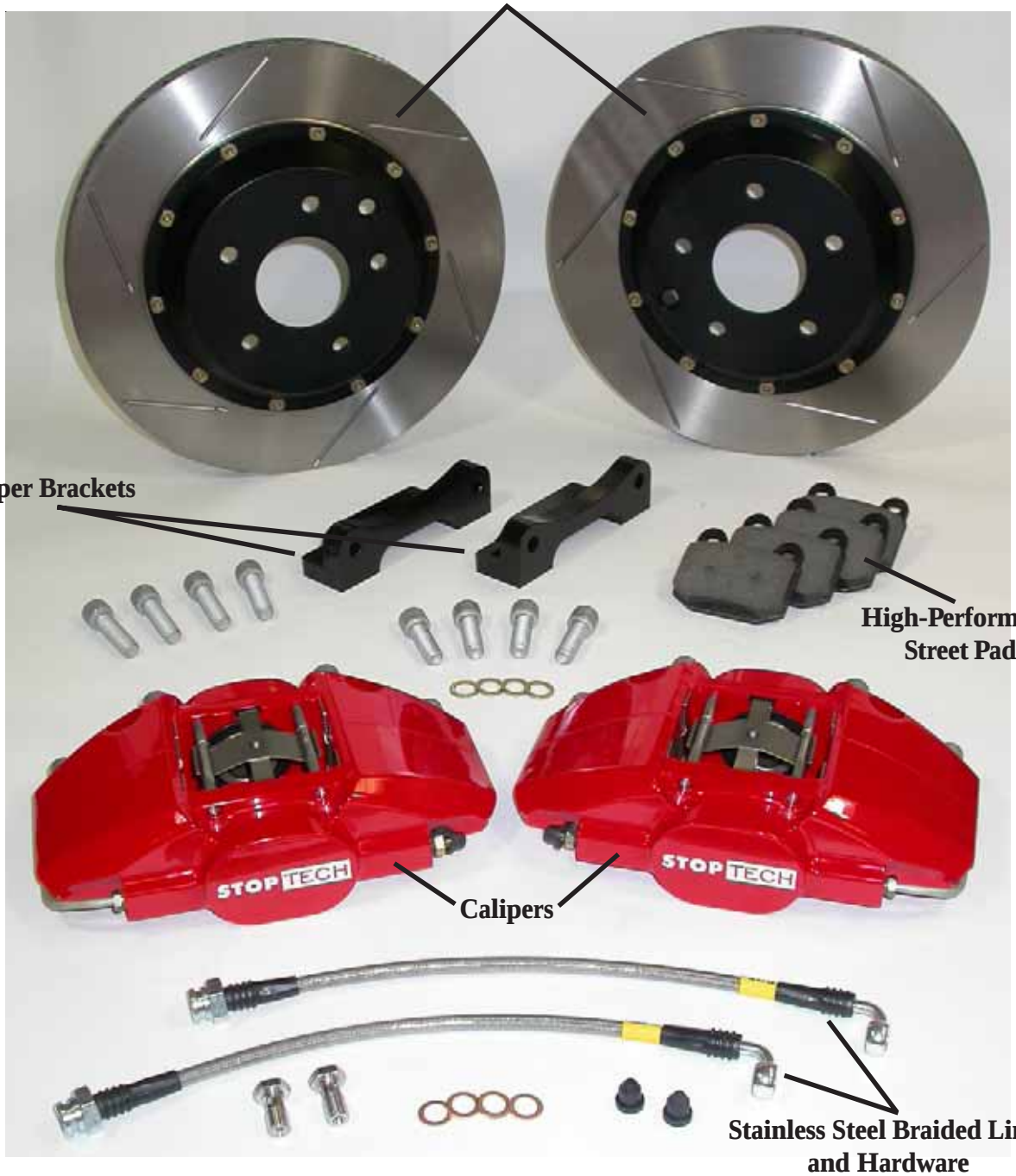
Installation Instructions
Audi S4
1999 - 2002

ST-22 Rear 328mm
Big Brake Upgrade

STOPTECH
HIGH PERFORMANCE BRAKE SYSTEMS

COMPONENT IDENTIFICATION



Audi S4 Rear Big Brake Kit

This is a representative photograph. The actual components in your kit may appear slightly different.

APPLICATION DISCLAIMER

Caliper Clearance

Most 17" wheels will clear the outer diameter of the caliper for a 328mm or 332mm rotor kit. For a 355mm kit, a minimum 18" wheel is typically required, and for a 380mm rotor kit, a minimum 19" wheel is needed. The more critical clearance, however, is the gap between the spokes of the wheel and the face of the caliper. Do not assume that a larger-diameter wheel will automatically clear the face of the caliper.

To determine the actual metal-to-metal distance from the stock rotor face to the inside of the wheel spokes, refer to the StopTech website at www.stoptech.com, and click on the 'Wheel Fitment' link on the "Technical Information" page. BEFORE printing out a copy of the wheel fitment drawing for your vehicle, click on the 'How do I use the charts?' link at the top of the page, and review the instructions carefully, to ensure that you have a full understanding of how to accurately measure the critical wheel clearances. Only then should you click on the link for your vehicle, and print out the appropriate wheel fitment drawing, to use as a measurement template.

It is very important that you verify the accuracy of the scale of the printout by matching both a width and length dimension on your vehicle. Dimensions are shown in millimeters, but one dimension in each direction is also shown in inches, and StopTech recommends adding at least 2mm of additional clearance to these dimensions. Follow the instructions carefully, to produce a fitment template, and take care to ensure that your measurements are very precise. If you have any questions or difficulties, please contact the StopTech Customer Service Department on (310) 325-4799 - extension 105, or send an e-mail to support@stoptech.com.

Note: Final fitment of the wheel to the caliper is the responsibility of the customer.

Wheel Spacers

Wheel spacers can provide extra clearance to the outer face of the caliper. This will also space out the entire wheel, widening the track width of the vehicle. Fender clearances should be checked on lowered cars, and longer lug studs or wheel bolts are usually required.

Note: The Wheel Industry Council has issued guidelines advising that wheel spacers not be used. It is the responsibility of the customer to ensure that wheel spacers are properly specified and installed.

Caliper, Hat and Bracket Finish Disclaimer

Many wheel-cleaning solutions contain strong acids that may damage the finish on any caliper or aluminum anodized finish, especially the plating on the hardware. Check for adverse effects by trying a small amount of the cleaner in question on an inconspicuous area. Avoid over-spraying, and rinse cleaning solutions off as quickly as possible. StopTech is not liable for damage to calipers, hats or bracket finishes, due to corrosive chemical exposure.

APPLICATION DISCLAIMER (Cont'd.)

Brake Noise

Certain brake pad compounds make more noise than others. Proper anti-squeal shim plates between the caliper pistons and backing plate of the pad help to reduce the problem. Anti-squeal lubricants are also available, to reduce some of the noise. The reality is that performance pads are more prone to brake squeal.

Note: The customer is responsible for any squeal-related problems due to pad selection.

Brake Vibration - THIS IS IMPORTANT!

The most common cause of brake vibration is improper bed-in of pads and rotors, or improper pad selection for the specific driving environment. Rotor run-out may also cause vibration, but precision manufacturing and inspection typically mean that run-out is not an issue. Modern production methods ensure that the rotor run-out is within +/- 0.002" when installed on a StopTech aluminum hat, and it controls thickness variation to within 0.0003". Under the most extreme conditions, any rotor may warp, but uneven pad deposition is a more typical cause of vibration. If the system is not properly bedded-in, or if street pads are run on an open track, uneven pad deposits will occur, causing an ever-worsening vibration. Failure to immediately address a pad deposition/vibration issue may lead to permanent damage of the rotors. Please read and understand the bed-in procedure included in this manual. If you have any questions, please contact the StopTech Customer Service Department on (310) 325-4799 - extension 105, or you can e-mail directly to support@stoptech.com.

Note: StopTech is not liable for vibrations caused by extreme usage or improper bed-in of pads and rotors.

Important Notices

Wheel Fitment

Do not assume that your wheels will fit. An outline drawing of your StopTech Big Brake kit is available on our website at www.stoptech.com. Measure the distance from the outer face of your stock caliper to the inner face of your wheel spokes, or make a template according to the instructions on the website, to determine if a wheel spacer is necessary. DO THIS BEFORE YOU INSTALL YOUR KIT!

Cleaning of Rotors

The AeroRotors supplied with this kit are coated with a water-soluble, environmentally friendly rust inhibitor. This coating MUST BE WASHED OFF WITH SOAP AND WATER before installation. Brake cleaner is not as effective as soap and water. Even if it doesn't look as if anything is coming off the rotor, the rust inhibitor is there, and must be entirely cleaned. Rotors will quickly rust without protection, so if the rotor is not rusty, it's still coated. After cleaning, you may see the rotor start to develop a slight rust color. This is normal, and indicates that all of the rust inhibitor has been removed.

Rotor and Pad Bed-in

Proper rotor and pad bed-in is essential to the performance of your new brake system. Failure to properly bed-in the brakes will seriously impact how well they work, and how long they will last. The number one cause of brake vibration is uneven pad material deposition on the rotor. Proper bed-in will greatly minimize such problems. Follow, as closely as possible, the bed-in procedure detailed later in this manual, or refer to the StopTech website at www.stoptech.com for further information.

Safety Notice

Improper handling of a vehicle, especially while raised and supported by jack stands, ramps or other mechanical means, can cause serious bodily injury or even death. It is strongly recommended that a trained, experienced mechanic, with proper equipment, install the Big Brake Kit supplied by StopTech LLC. StopTech LLC assumes no liability, expressed or implied, for the improper installation or use of this product or its components.

Liability No Warranty

Automobile racing and performance driving, whether sanctioned or not, on or off the road, are dangerous. Products used in such environments/applications are subject to stresses and conditions outside of normal use, wear and tear. All equipment sold or provided by StopTech LLC is sold WITHOUT WARRANTY, EXPRESSED OR IMPLIED. No warranty or representation is made to the product's ability to protect the user from injury or death. The user assumes all risk. StopTech LLC is NOT responsible for any damage, consequential or otherwise, for equipment failure or malperformance after installation. Under no circumstances is StopTech liable for labor charges or loss of use.

Contact StopTech

If you have any questions about wheel fitment, rotor cleaning, or bed-in of a particular pad type, please call StopTech's Customer Service Department on (310) 325-4799 - extension 105, or you can e-mail directly to support@stoptech.com.

Audi S4 Rear Axle Kit

Note: It is important to read and understand this ENTIRE installation manual, including the break-in procedures, before starting the installation.

Kit Contents

Your StopTech Big Brake kit includes the following:

1 pair of ST-22 two-piston calipers, sized specifically for the vehicle
1 set of high-performance street pads (not suitable for track use)
1 pair of 328 x 28mm two-piece rotor assemblies
1 pair of aluminum caliper adapter brackets
2 pair of M12 x 1.75 socket-head cap screws
2 pair of 12mm washers
1 pair of stainless steel brake lines
1 pair of banjo bolts
2 pair of copper crush washers
1 pair of rubber end caps
1 capsule of Loctite 262

Tools and Equipment Required

Some different models or years of vehicle may use different sized fasteners. Every effort has been taken to correctly identify the proper sized tool for each job. Occasionally, the manufacturer may use an alternate fastener. Check that each tool correctly fits the fastener before loosening or tightening it. The following tools and equipment will be needed:

14mm wrench (in some cases, 9/16" may be required)
11mm box wrench (in addition, an 11mm flare wrench is also recommended)
10mm wrench or socket
10mm Allen (hex) wrench
8mm Allen (hex) wrench
Vise-grip or pliers
Needle-nose pliers or small flat-blade screwdriver
Torque wrenches capable of 10-85 lb-ft settings
Small drip tray or several rags
Small funnel or suitable means of filling master cylinder reservoir
Brake bleed bottle
1 pair of jack stands or other means of supporting vehicle
DOT 3 or 4 Brake Fluid. Check manufacturer's recommendation for compatibility. StopTech recommends flushing brake fluid every 1-2 years, or more often under severe usage conditions. If not done recently, the installation of a brake kit is an excellent opportunity to refresh your brake fluid, or to upgrade to a higher-performance fluid, such as Motul 600.

Step 1
Raise Vehicle, and Remove Wheels

Note: All photographs show a left-hand side installation, unless otherwise noted. Some of the images in this manual may not be of the vehicle noted, but they give a proper representation of the correct installation. StopTech recommends working on one side of the vehicle at a time, so that reference can be made to the other side, if any uncertainty arises during the installation.

A level, stable and clean surface, suitable for supporting the vehicle on jack-stands, should be used for the installation.

Warning: Never leave any vehicle supported with only a jack. Always use jack-stands.

For a rear kit installation, block the front wheels, and release the parking brake, then break loose the lug nuts on both rear wheels before jacking up the car.

Refer to the owner's manual to identify the correct location of the jack for raising the vehicle. Jack up the vehicle, and secure it on a pair of jack stands, again referring to the owner's manual for jack location joints.

After securing the vehicle at a convenient height, remove the front wheels.

To make it easier to access the brake line fittings, turn the steering either toward or away from the side that you're working on, depending on the orientation of the caliper.

If you're installing a leading caliper, turn the steering toward the side that you're working on, and if you're installing a trailing caliper, turn the steering away from the side that you're working on. This will make it easier to access the caliper bolts.

Step 2
Disconnect Parking Brake Cable

Grip the end of the parking brake cable, using a vise-grip or a pair of pliers.

Activate the caliper lever arm, using channel-lock pliers or a clamp to reduce the tension, then remove the cable end from the lever.

Remove the parking brake line retaining spring clip, using needle-nose pliers or a small flat-blade screwdriver.

Slide the parking brake cable out of the caliper mounting flange.

Step 3
Disconnect Stock Brake Line

Warning: Brake fluid will damage most painted surfaces. Immediately clean spilled brake fluid from any painted surface. Also ensure that the cap is securely installed on the master cylinder. If it is loose or removed, it is likely that more fluid will drip during brake installation.

Place a drip tray or rags beneath the inboard brake line connection to the chassis. If the area around the connection is dirty, clean it using brake cleaner or an appropriate cleaning agent.

Use a 14mm wrench to hold the brake line fitting in place, while using an 11mm flare wrench to loosen the hard line fitting.

Remove the hard line fitting, and place one of the rubber caps over the end of it, to control fluid loss during the installation.

Step 4
Remove Stock Caliper, Rotor, and Dust Shield

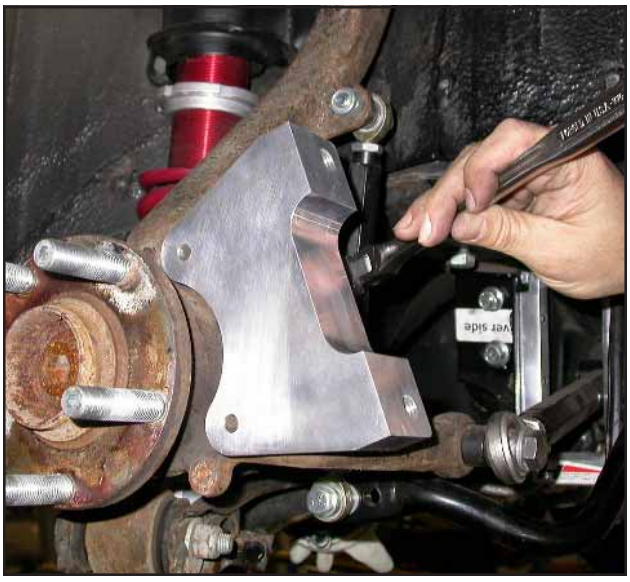
Remove both stock caliper bolts, using an 8mm Allen wrench, then remove the caliper from the rotor.

Note: If the rotor is worn, it may be difficult to remove the caliper. In this case, simply remove the caliper and rotor together.

Remove the three dust shield bolts, using a 10mm wrench or socket, then remove the dust shield from the hub.

Step 5
Install Caliper Bracket

Place a few drops of the supplied Loctite 262 on the end of the threads of the stock caliper mounting bolts.



Install the caliper bracket, using the stock caliper mounting bolts.

Torque the bolts to approximately 50-55 lb-ft.

Step 6
Install AeroRotor Assembly

AeroRotors *MUST* be cleaned with soap and water prior to installation. Not doing so will damage the rotors and pads, and will prevent the brakes from performing properly.

Even though the rotors may look clean, the rust inhibitor is in place, and it must be removed. Not cleaning the rotors will severely impact the performance of your new brake system.

Warning: Do not skip this step!

Install the hat and rotor assembly, ensuring that the rotor is seated squarely on the hub face. If necessary, clean the face of the hub, using a wire brush or similar means.

If necessary, place a wheel bolt in one of the holes, to prevent the rotor from falling off.

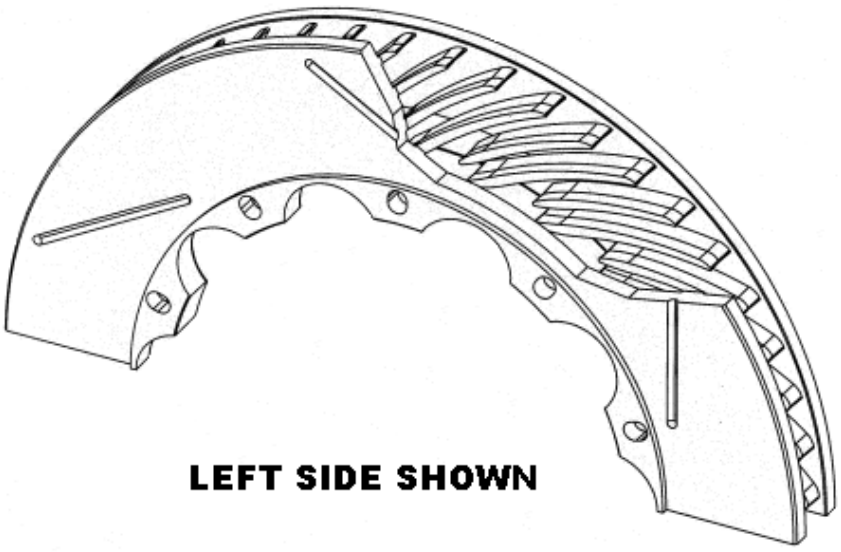
Note: Take care to ensure that the rotor assembly is on the correct side of the car, as reversing the rotors will severely decrease the cooling capacity of the system. The rotors are clearly marked "L" and "R" with orange tags on the rotor hats. If the tags are not legible, the vanes inside the rotor should lean to the rear of the car on the top side of the rotor (see the following pages for more-detailed images).

Left-Side Rotor

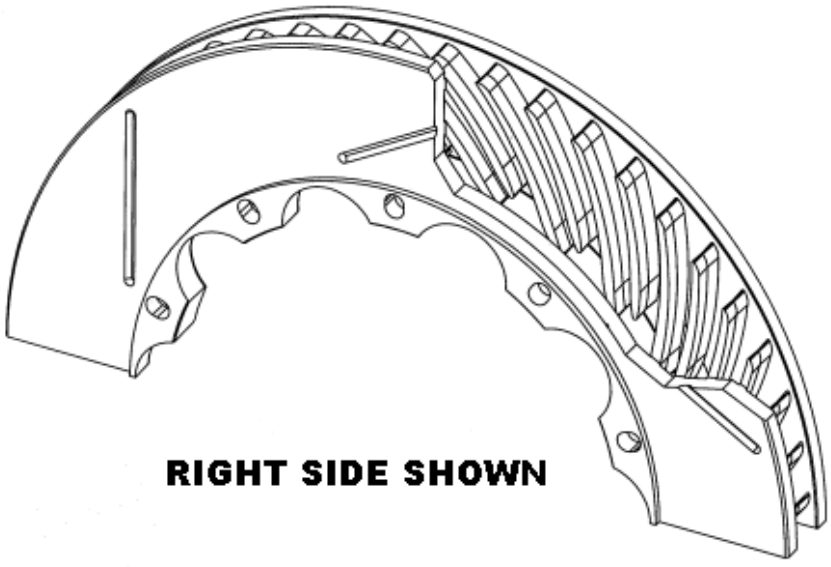
Driver's Left

Right-Side Rotor

Driver's Right

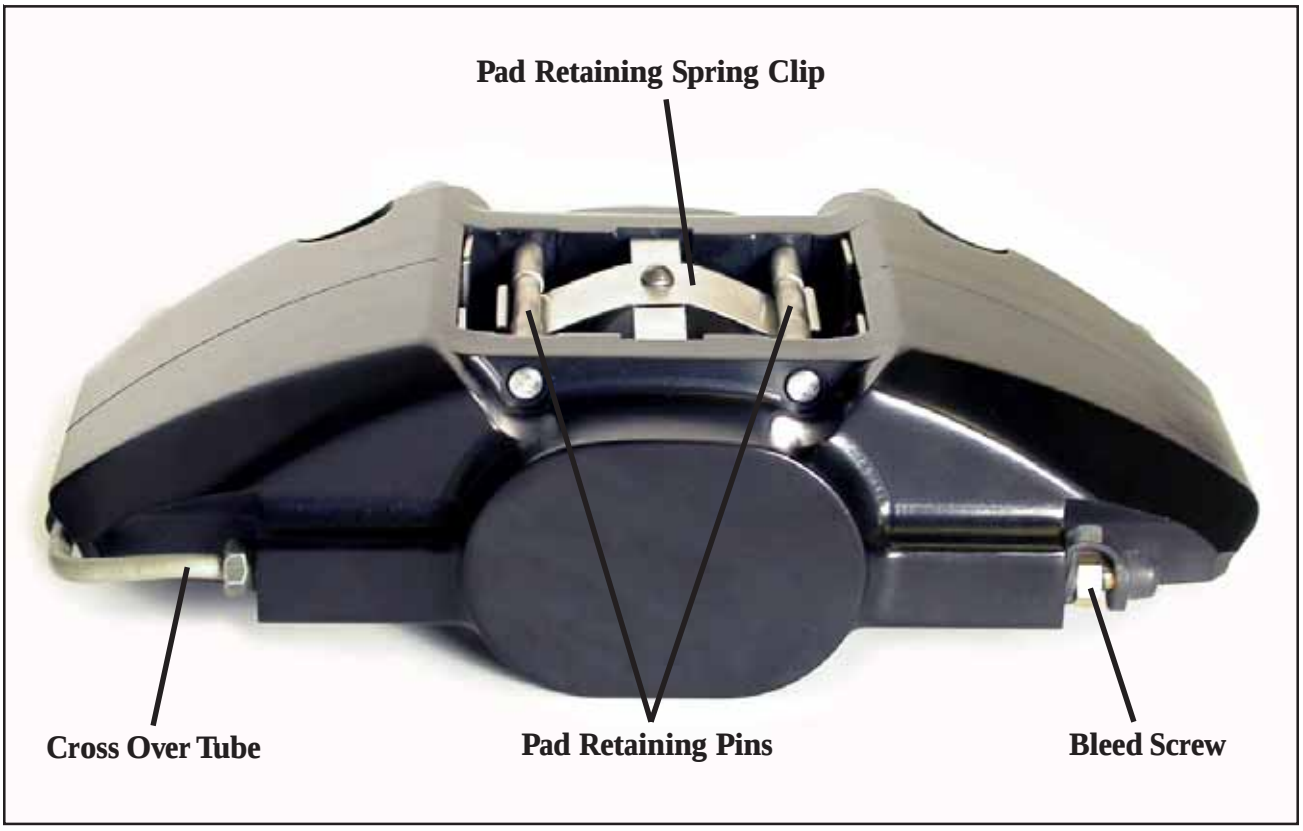


LEFT SIDE SHOWN



RIGHT SIDE SHOWN

Caliper Component Identification



The ST-22 original equipment caliper uses a pad that is common to two-piston opposed calipers. The Friction Materials Standards Institute (FMSI) number for the pad backing plate is D961.

For further pad information, please see the StopTech website at: www.stoptech.com.

Step 7
Install Caliper and Pads

Place a drop of Loctite 262 on each of the caliper bolts, and place a washer onto each. Install the caliper onto the adapter bracket, orienting it so that the bleed screws are on the top side of the caliper.

Seat the caliper bolts, using a 10mm Allen wrench, then tighten them to 40-45 lb-ft of torque.

Slide the brake pads into position in the calipers, taking care to ensure that the friction side of each pad is facing the rotor.

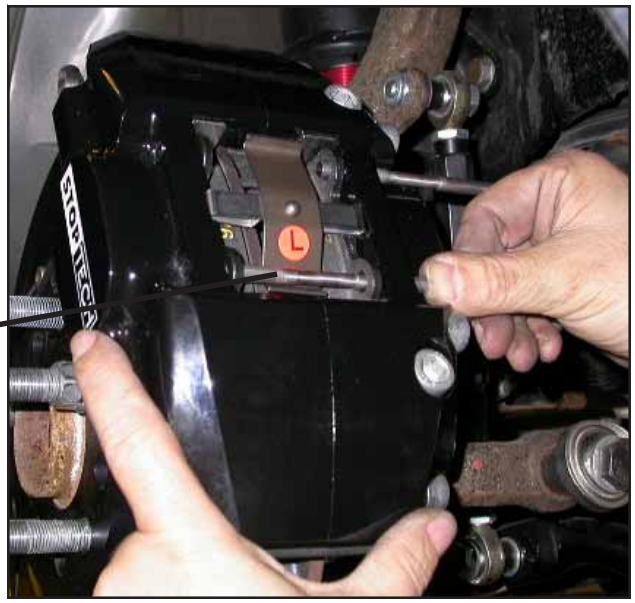
(Yes, they have been installed backward before!)

Start both pad-retaining pins through the holes, from either side of the caliper.

Step 7 (Cont'd.)
Install Caliper and Pads

Install the pad-retaining assembly by placing the pad-retaining spring clip over the brake pad chamber.

Holding the spring clip in place, slide the lower pad-retaining pin into the groove at the bottom end of the spring clip, and push it through to the inboard side of the caliper.

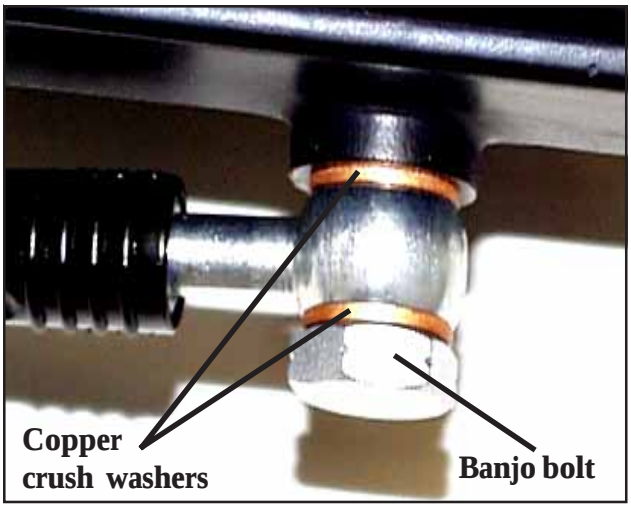


When the pin is fully in place, the spring clip should seat into the recessed notch of the pin.

Slide the upper pad-retaining pin into the groove at the top end of the spring clip, and push it through to the inboard side of the caliper.

The second pin will 'click' into place when the spring clip is properly seated on the smaller diameter of the pin.

Step 8
Attach Stainless Steel Brake Line



Install the caliper end of the stainless steel brake line by first placing a copper crush washer on either side of the banjo fitting, then inserting the banjo bolt into the caliper.

Tighten the banjo bolt to approximately 14 lb-ft, using a 14mm wrench or socket.

Do not use a torque wrench, as overtightening the bolt can strip the aluminum threads, causing irreparable damage to the caliper.

Route the brake line as shown in the photograph to the right, then insert the inboard end of the stainless steel brake line into the hard line bracket.

Step 8 (Cont'd.)
Attach Stainless Steel Brake Line

Remove the rubber cap from the hard line, and screw the stainless steel brake line onto the hard line fitting by hand for a few turns.

Use a 14mm wrench to hold the stainless line inboard fitting, while using an 11mm flare wrench to tighten the hard line fitting.

Note: The photograph above shows a right-hand side installation.

Install the shorter inboard stainless line in the same manner, but leave the fittings on both ends of the hard line loose until both ends are started. Then tighten all fittings.

Check to ensure that the brake line is not binding in any way, nor interfering with any suspension component, including the CV boot and axle/drive shaft.

If necessary, loosen the banjo bolt, and realign the brake line, or loosen the inboard end of the line, and slightly re-clock the fitting.

Step 9
Secure Parking Brake Cable

In some cases, the parking brake cable may be completely removed. If the cable is to stay in place, however, secure the end of the parking brake cable to the strut or any other suitable spot on the suspension, using several cable ties.

Ensure that the end of the parking brake cable is held securely in place, and that it is not interfering with the movement of any other component.

Step 10
Bleed Brakes

Complete the installation on both sides of the vehicle before bleeding the system.

Warning: Double-check that the stainless steel brake lines you've just installed are not binding in any way, nor interfering with any suspension component, including the CV boot and the axle/ drive shaft. Adjust each line, if necessary, by loosening the banjo bolt, and realigning the brake line, or by loosening the inboard end of the line, and slightly re-clocking the fitting.

Note: The calipers and lines will need to fill with fluid, quickly draining the master cylinder reservoir. Keep a close watch on the fluid level when initially bleeding the system. Do not allow the master cylinder reservoir to run dry, and to draw in air. Doing so may result in the brake system needing to be serviced by a certified brake technician.

Bleed the brake system, using an 11mm box wrench to loosen the bleed screws. The sequence for bleeding the brakes should be:

1. **Right outboard bleed screw**
2. **Right inboard bleed screw**
3. **Left outboard bleed screw**
4. **Left inboard bleed screw**

Though a torque wrench is typically not used on bleed screws, as a reference, the torque for bleed screws should be approximately 100-140 lb/INCH.

After initially bleeding the system, gently tap the caliper body with a non-marring mallet to dislodge any small air bubbles, then re-bleed the brakes.

After bleeding, apply constant pressure to the brake pedal, and check all connections - including bleed screws, and both ends of the brake line - for leaks.

Warning: Brake fluid will damage most painted surfaces. Immediately clean spilled brake fluid from any painted surface, including the caliper. Though caliper paint is designed to resist harsh chemicals, prolonged exposure will damage the finish.

Step 11
Reinstall Wheels

It is very important to check the wheel-to-caliper clearance before installing wheels!

Note: Some wheels are balanced on the inside, with adhesive-backed lead weights. If the weight is on the outboard edge, behind the spokes, it may interfere with the caliper. If necessary, note the weight and location of the lead, and place a new piece of the same weight further inboard or outboard, to clear the caliper. If you rotate the tires regularly, check the lead weight positions on all four wheels, and also on the spare, if it is full-sized.

Reinstall the wheels, and torque the lug nuts to your wheel manufacturer's specifications. It may be necessary to snug the bolts before lowering the vehicle, and to then torque the wheel nuts when the car is on the ground. Alternatively, an assistant may depress the brake pedal while you tighten the wheel nuts to the proper torque setting.

Carefully test-drive the vehicle in a safe area, at low speed, to ensure that all components are working correctly. Then follow the pad and rotor bed-in procedure on the following pages.

STOPTECH
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AeroRotor Installation & Bed-in Procedure

READ THIS NOW

FAILURE TO READ, UNDERSTAND AND FOLLOW THESE PROCEDURES WILL CAUSE PERMANENT DAMAGE TO YOUR BRAKE ROTORS, AND WILL KEEP THE SYSTEM FROM WORKING AT ITS FULL CAPACITY.

The majority of brake system problems are due to improper installation and/or bed-in of the rotors and pads. By reading and understanding the following, you will avoid the most common causes of poor brake performance and vibration. FAILURE TO READ AND UNDERSTAND THIS MAY CAUSE SERIOUS PERMANENT DAMAGE TO YOUR NEW ROTORS.

Wash Non-Plated AeroRotors with SOAP AND WATER before installation.

StopTech coats non-plated AeroRotors with a water-soluble, environmentally friendly rust inhibitor that MUST be cleaned off before use. A non-plated rotor looks like bare metal, while plated rotors are bright silver in color, and do not need to be washed. Even though you may not see a change in the rotor color, if the rotor is not rusty, the rust inhibitor is there. Use soap and water, NOT BRAKE CLEANER to wash the rotors. A small piece of Scotchbrite works well for scrubbing. When cleaned and rinsed properly, the surface of the rotor may show a light rust color, which is normal.

Bed-in your new pads and rotors by carefully observing the procedure described on this and the following page.

Bed-in of rotors and pads is critical to the optimum performance of your new brakes. When bedding-in new parts, you are not only heat-cycling the pads, you are also depositing a layer of pad material onto the rotor face. If not bedded-in properly, an uneven layer of pad material will be deposited onto the rotor, causing vibration. *Virtually every instance of a "warped" rotor is attributed to uneven pad deposition.*

Note: Plated rotors must be driven with gentle braking, until the CAD plating is worn off of the rotor faces, BEFORE starting the bed-in procedure. Do not use brakes aggressively until the plating is worn off, typically after several miles of driving.

Typically, a heavy-braking street driver will experience approximately 1 to 1.1G's of deceleration. At this rate, the ABS will be activated on such equipped vehicles. A moderate braking effort is needed to properly bed-in rotors and pads. If ABS intervention or lockup were represented as 100% brake effort, a stopping force of approximately 70-80%, just short of ABS intervention or lockup, is a general estimate of the pedal effort you are trying to achieve.

(Continued on next page)

Rotor and Pad Bed-in (Cont'd.)

Note: Bedding-in of pads should not be done in poor weather conditions, nor on wet roads.

After completing the installation, make a series of 10 stops from 60 to 5-10 MPH. At the end of each stop, immediately accelerate to 60 again for the next stop. Run all stops in one cycle.

During the 60 to 5-10 MPH cycle of stops, the exact speed is not critical. Accelerate to approximately 60, then begin braking. As you approach 5-10 MPH, it is not necessary to watch the speedometer. Keep your eyes on the road, and approximate your speed at the end of each stop.
DO NOT COME TO A COMPLETE STOP, LEAVING YOUR FOOT ON THE BRAKE PEDAL, AS YOU MAY IMPRINT PAD MATERIAL ONTO THE ROTOR, CAUSING A VIBRATION.

If racing or higher-performance pads are being used, add four stops from 80 to 5-10 MPH, and if full race pads are being used, add four stops from 100 to 5-10 MPH.

There are several indicators to look for while bedding-in the system:

On the 8th or 9th stop, there should be a distinct smell from the brakes. Smoke may also be evident after several stops.

Also on the 8th or 9th stop, some friction material will experience "green fade." This is a slight fading of the brakes. The fade will stabilize, but will not completely go away until the brakes have cooled.

After the bed-in cycle is finished, there will be a blue tint on the rotor, with a light gray film on the rotor face. The blue tint indicates that the rotor has reached the proper bed-in temperature, and the gray film is pad material starting to transfer onto the rotor face. This is normal!

After the first bed-in cycle shown above, the brakes will still not be operating at their best capacity. A second or third bed-in cycle is typically necessary before the brakes really start to "come in." A "cycle" is a series of stops, followed by a cool-down.

StopTech does not endorse speeding on public roads. If going above the legal speed limit, do so in a safe area, away from traffic, and at your own risk.

After the final stop of each cycle, drive as much as possible without using the brakes, to cool off the system. Ideally, the brakes should be allowed to cool to ambient temperature before using them again.

DO NOT COME TO A COMPLETE STOP WHEN THE SYSTEM IS HOT, WHILE LEAVING YOUR FOOT ON THE BRAKE PEDAL. PAD MATERIAL MAY TRANSFER ONTO THE ROTOR, CAUSING A VIBRATION.

If you have any questions about rotor and pad bed-in, any aspect of your StopTech brake kit, or brakes in general, please contact the StopTech Customer Service Department at (310) 325-4799, extension 105, or e-mail us at support@stoptech.com

Thank you for selecting StopTech.

We realize that you had a choice when selecting a big brake upgrade for your vehicle, and we know that you'll be happy with our system.

We proudly support our fine products. For any assistance or questions, please contact our Customer Service Department at
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