Installation Instruction
For
BMW 5 Series (E39)
1997 - 2003

Front Big Brake Upgrade

STOPTECH
HIGH PERFORMANCE BRAKE SYSTEMS

Document: 98-135-1470 **Rev. G_09-02-02**

APPLICATION DISCLAMER

Caliper Clearance

This kit will fit the stock E39 M5 wheels. Some 17" and most 18" wheels will clear the outer diameter of the caliper. The more critical clearance is the spokes of the wheel to the outer face of the caliper. Do not assume a 19, 20 or even 24 inch wheel will clear the outer face of the caliper. *A minimum distance of 56.75 mm, measured from the outer rotor face to the inside face of the wheel spokes is needed for the E39 5 Series Brake Upgrade Kit. This is the net metal-to-metal measurement. We recommend at least 2mm additional clearance to clear the ST-40 caliper.* See the Brake Outline Drawing page on our website for more specific measurements at www.stoptech.com.

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 may be required. Note- The Wheel Industry Council has issued guidelines advising wheel spacers not be used.

It is the responsibility of the customer to insure wheel spacers are properly specified and installed.

Brake Vibration - THIS IS IMPORTANT!

The most common cause of brake vibration is improper bedding of pads and rotors or improper pad selection for the specific driving environment. Rotor runout may also cause vibration, but precision manufacturing and inspection typically means runout is not an issue. Double disc grinding controls rotor thickness variation within 0.0003" and insures the rotor runout is within +/- 0.002" when installed on our aluminum hat. Under the most extreme conditions, any rotor may warp, but uneven pad deposition is a more typical vibration cause. If the system is not properly bedded in, or 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 to the rotors. Please read and understand the bed-in procedures included with this manual. If you have any questions, please contact the StopTech Customer Service Department for assistance.

STOPTECH is not liable for vibrations caused by extreme usage or improper break-in procedures.

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 reduce the problem. Anti-squeal lubricants are also available to reduce some of the noise. The reality is, performance pads are more prone to brake squeal.

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

Important Notices

Wheel Fitment:

Do not assume 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 rotor to the inner face of your wheel spokes and determine if a wheel spacer may be necessary. DO THIS BEFORE YOU INSTALL YOUR KIT!

Cleaning of Rotors:

The AeroRotors supplied with this kit are coated with a water soluable, 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. *If the rotor is not rusty, it's coated.* After cleaning, you will see the rotor immediately start to develop a slight rust color. This is normal and desirable as it indicates all the rust inhibitor has been removed.

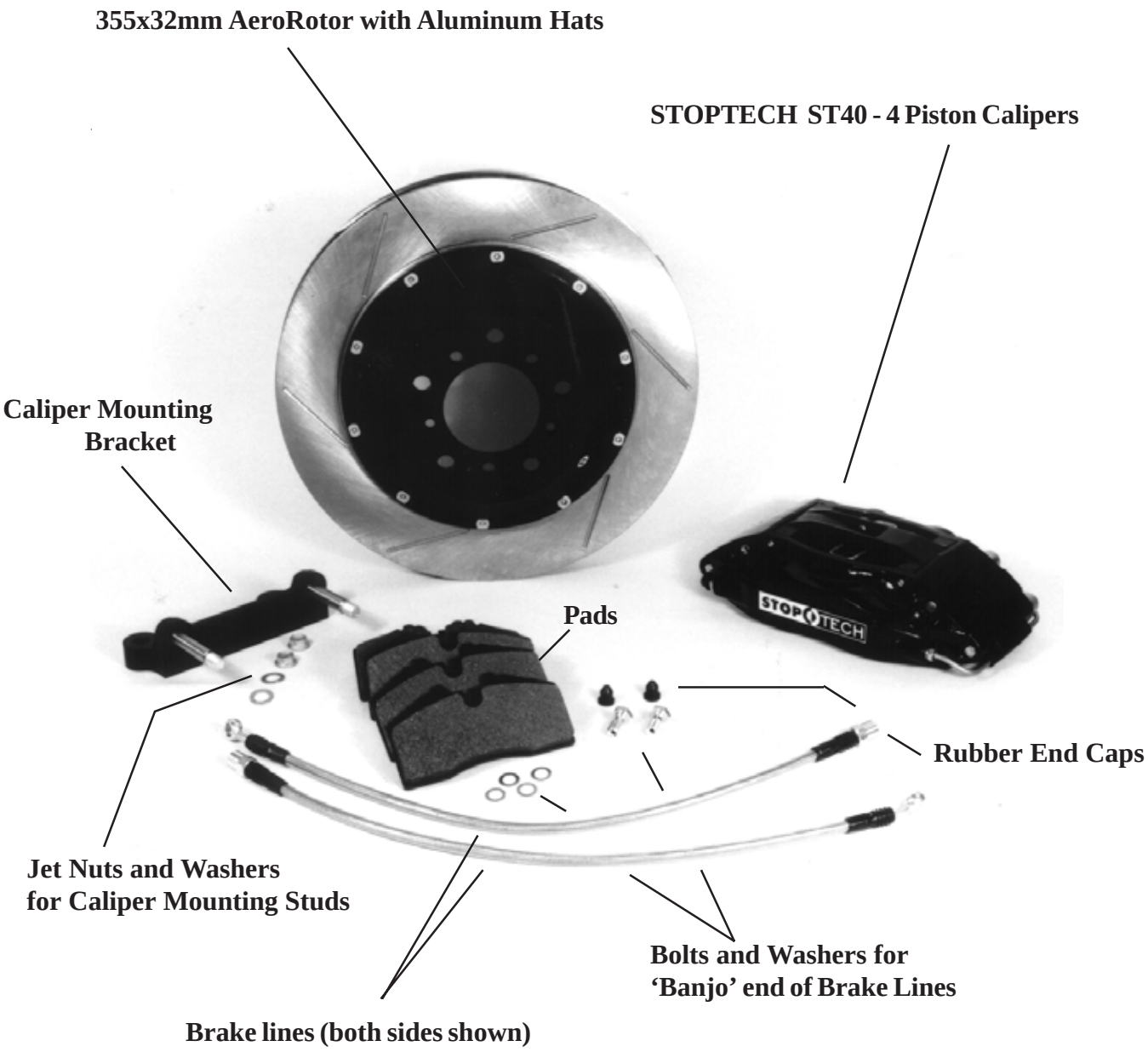
Rotor and Pad Break-in:

Proper rotor and pad break-in is essential to the performance of your new brake system. Failure to properly break-in the brakes will seriously impact how well they work and how long they last. The number one cause of brake vibration is uneven pad material deposition on the rotor. Proper break-in will greatly minimize such problems.

Follow the break-in procedures listed later in this manual as closely as possible.

If you have any questions about wheel fitment, rotor cleaning or break-in of a particular pad type, please call our Customer Service Department at (310) 325-4799 x105, or send an email to support@stoptech.com

COMPONENT IDENTIFICATION



One Corner Shown

BMW 5 Series (E39) ST-40 Front Axle Kit

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 technical mechanic, with proper equipment install the Big Brake Kit as 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, whether sanctioned or not, on or off the street, is 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 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 is NOT responsible for any damage, consequential or otherwise, for equipment failure or mal-performance after installation.

Please *believe us*, it will be better to read and understand this ENTIRE Installation Manual, including the Break-In Proceedures before starting the installation.

NOTE- Some different models or years may use different size fasteners. Every effort has been taken to correctly identify the proper size tool for each job. Occasionally, the manufacturer may use an alternate fastener. Check that each tool correctly fits the fastener before loosening or tightening.

Tools and Equipment Required

17mm, 18mm sockets, ½" drive suggested
14mm open end wrench
11mm flare nut wrench
11mm stubby wrench
½" socket and ratchet (6 point is preferable, though 12 point will be sufficeint)
Torque wrenches capable 10-90 ft/lb setting
5mm Allen (hex) wrench
Small drip tray or several rags
Small funnel
Brake bleed bottle
1 pair of jack stands
Rotary cutting tool (e.g., Dremel) or tin snips
Non-marring leather or plastic hammer

Tools and Equipment Required (Continued)

DOT 3 or 4 Brake Fluid. Check manufacturer's recommendation for compatibility. STOPTECH recommends flushing brake fluid every 1-2 years. If not done recently, the installation of a brake kit is an excellent opportunity to refresh your brake fluid.

Kit Includes The Following

1 pair of ST-40, 4 Piston Calipers

1 set of high performance brake pads

1 pair of 355 X 32mm AeroRotors™, mounted to anodized billet 7075-T6 aluminum hats, using floating drive pins and Inconel® anti-rattle hardware

1 pair of 6061-T6 aluminum caliper adapter brackets, with stainless steel mounting studs pre-installed using thread locker.

- 4ea. 7/16-20 Jet Nuts
- 4ea.12mm washers
- 2 pair of copper washers
- 1 Caplet of 262 Loctite
- 1 pair of stainless steel covered Teflon brake lines.
- 1 pair of Banjo Bolts
- 1 pair of rubber end caps

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, and 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 will not be held liable for damage to calipers, hats, brackets or hardware finish due to corrosive chemical exposure.*

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

Step 1

Jack up car

Apply parking brake and block rear wheels.

Break loose the lug nuts on both front wheels with a 17mm or appropriate size socket before jacking up the car.

Refer to the Owners Manual for correct location for jacking up the vehicle. Jack up the vehicle and secure on a pair of jack stands, or one side at a time with one jack stand.

NEVER LEAVE ANY VEHICLE SUPPORTED WITH ONLY A JACK. ALWAYS USE JACK STANDS.

Note: All Photographs Show Left Side Installation

Step 2

Remove Wheels

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

To simplify wheel removal - hold foot at bottom of wheel while removing the lower (last) lug.

Stock 2000 - 2002 M5 wheel

Step 3

Remove Inner Brake Line Connection

WARNING - *Brake fluid will damage most painted surfaces. Immediately clean spilled brake fluid from any painted surfaces.*

Place a drip tray or several rags directly below the inboard brake line connection. If the area around the connection is dirty, clean with brake cleaner or appropriate cleaning agent first.

Hint - The fittings may be more accesible if the wheels are turned toward the side you're working on.

Use an 11mm flare nut wrench to loosen the hard line fitting from the stock brake line. Once the fitting is loosened, you may use a stubby or standard 11mm wrench to finish removing it.

Step 3 (Continued)

Quickly push one of the supplied rubber caps over the end of the hard line. This will control fluid loss for the duration of the installation.

Note - The hard line and fitting will remain in the spring clip on the lower side of the mounting bracket which is attached to the chassis of the car.

Slide the inboard brake line fitting clear of the bracket.

Step 4

Remove Stock Caliper

Loosen the stock caliper mounting bolts with an 18mm wrench or socket. **Save these bolts** since they will be reused later to install the caliper adapter brackets.

Hint: It may be helpful to turn the steering opposite of the side you are working on so the wrench handle sticks out clearing the rear of the wheel well. Full lock may slightly straighten if the steering wheel not held.

Remove the brake pad wear sensor by pulling straight out of the brake pad.

Remove the caliper with stock line attached. Watch out for fluid dripping from the end of the brake line.

Step 5

Remove Stock Rotor

Remove two hex head screws in the rotor using a 5mm Allen Wrench

Rust and corrosion may make these bolts difficult to remove. Be careful not to strip the bolt heads. If the bolts do not come loose easily, try a penetrating thread lubricant. If the head is stripped, it may be necessary to remove the bolt with a left twist drill bit or an extractor tool such as the Sears Craftsman #52152.

If the rotor doesn't come loose easily, strike it on the outer diameter with a non-marring hammer. **Install a wheel bolt to prevent the rotor from falling in an un-controlled manner.**

Step 5 Continued

Steering knuckle with caliper and rotor removed.

Clean up any surface rust from the hub with an abrasive pad or wire brush. A small amount of anti-seize paste may be applied around the hub flange to ease future rotor removal.

Step 6

Install Caliper Bracket

Install the caliper adapter bracket to the steering knuckle using the stock caliper mounting locations and mounting bolts. There is a left and a right bracket and they are labeled. Be sure to install the correct one. The pre-installed studs face rearward, and the bracket mounts on the outboard side of the stock caliper mounting points. Place a few drops of 262 Loctite on the threads of the bolts before installing them.

Torque caliper bracket bolts to **80-85 lb-ft of torque**

Installed bracket

Hint: Turn the steering opposite of the side you are working on so the wrench handle sticks out, clearing the rear of the wheel well.

Step 7

Install the AeroRotor Assembly

Important: Rotors MUST BE WASHED with SOAP AND WATER before installation. Wash both inner and outer rotor faces and scrub thoroughly with an abrasive pad.

Check the clearance between the rotor and the backing plate. It may be necessary to bend or tap back the lower edge of the backing plate to clear the rotor.

It may also be necessary to snip a tiny section from the lower corner of the backing plate. Slide the caliper onto the bracket to see if there is interference. If so, cut the backing plate with a high-speed rotary cutting tool (e.g., Dremel) or tin snips.

Be sure the rotor assemblies are on the correct side of the car. Reversing the rotors will severely decrease the cooling capacity of the system. The vanes inside the rotor should lean to the rear of the car on the top side of the rotor. The rotor hats are labeled.

Left Side AeroRotor

Driver's Left

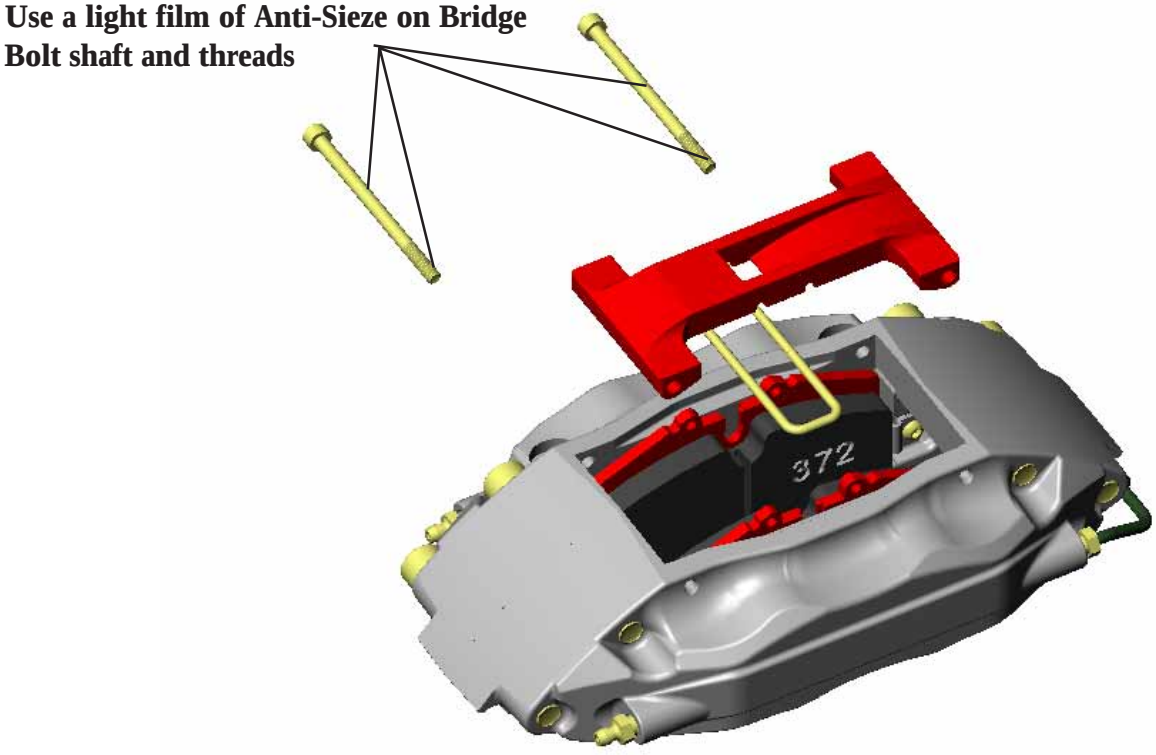
Outboard Side

(Rotors shown may not be representative of product supplied with a specific kit)

Right Side AeroRotor

Driver's Right

Caliper Component Identification



The ST-40 caliper uses a Porsche style pad.

The Friction Materials Standards Institute (FMSI) number for the pad backing plate is

D372

Please see the FAQ section of our website for further pad interchange information. www.stoptech.com

Step 8

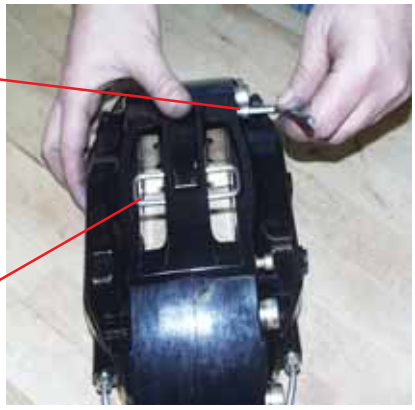
Install the ST-40 Caliper

If not already done, remove the Jet Nuts and washers from the studs of the caliper adapter bracket. Determine the left and right side calipers. The calipers are marked on each box.

As a check, the bleed screws always go to the top of the caliper.

Remove the 2 bolts holding the caliper bridge using a 5mm Allen wrench.

Remove the caliper bridge, taking note of the direction in which it is installed and the location of the pad retaining wire clip, which typically, but not always, stays attached to the bridge.



Wire pad retaining clip

Note direction of bridge vane - it points downward toward the smaller diameter piston on the E39 5 Series upgrade calipers.

Note- In order to stiffen the caliper, the bridge is a snug fit and the bolts may be tight when removing. Keep turning bolts gently with pressure applied in the direction of removal. After removing the bolts, it may be necessary to tap the bridge out from the inside of the caliper with a plastic or leather hammer or similar tool. The handle of a tool works well for this. With use, the bridge will become easier to remove and install.

- Slide the caliper over the mounting studs with bleed screws facing up.

Install the Jet nuts onto each stud with one 12mm washer under each nut.

Tighten the nuts to **40-45 lb-ft of torque** using a ½" socket (6 point is preferable, but 12 point will work).

Step 9

Install Brake Pads

Slide the pads into position through the outboard side of the calipers. Be sure the friction side of the pad is facing the rotor (Yes, they have been installed backward before).

Make sure the pad retention clip is installed in the caliper bridge.

Re-install the bridge by sliding it into position and rocking it until one of the bolt holes lines up. It may be necessary to gently tap the bridge into place with a plastic or leather hammer. Insert the top bolt and start the first few threads using a 5mm Allen wrench.

Note: Although the photographs show the bolts being inserted from the inboard side, a recent caliper design allows the bolts to be inserted from the outboard side, speeding up pad changes by making the bolts easier to remove and install.

Gently press the opposite side of the bridge with the palm of your hand until the second bolt engages the hole. With pressure still applied, start the second bolt.

Torque each caliper bridge bolt to **8 to 10 lb-ft of torque.**
DO NOT OVER TORQE THE BRIDGE BOLTS!

Step 10

Install the Stainless Covered Teflon Brake Line

(Photo below may not represent orientation on vehicle - shown for reference only)

Install the Banjo bolt with a copper washer on each side of the Banjo fitting on the brake line, and thread into the inlet port of the caliper.

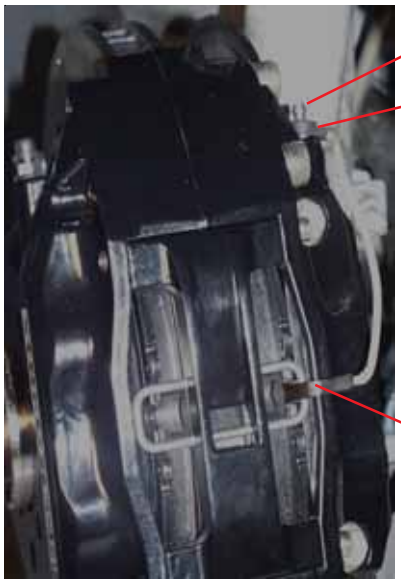
While holding the line pointing straight up, use a 14mm socket or wrench to tighten the Banjo bolt to **10-14 lb-ft of torque**

Make sure the washer supplied with the brake line is installed over the end of the inboard line fitting as shown. This washer is to keep the fitting from passing through the chassis bracket positioning the brake line.

Remove the rubber cap from the end of the hard brake line.

Slide the inboard end of the new stainless line into the existing bracket hole the stock brake line came out of. Use both hands to align the fittings, as the spring clip may keep the hard line fitting from easily lining up. Start the hard line fitting into the new line several threads by hand before using an 11mm wrench to tighten the fitting. While tightening, hold the stainless brake line fitting in place with a 14mm wrench.

Install the retainer on the bleed screw and
insert the wear sensor into the pad as shown.



Re-route the brake wear sensor wire between the strut and the rotor backing plate. Re-position the rubber retainer that clips over the bleed screw by sliding the entire black rubber covering about 2" toward the front of the car. Hold the sensor end firmly, and slide the cover incrementally, compressing the cover, then sliding the opposite end away. If your sensor wire is old, the insulation may tear. You may purchase a new pad wear sensor assembly at your local BMW dealer. They are not expensive.

Turn the wheels lock-to-lock and be sure the brake line is not binding. If necessary, loosen the banjo bolt and re-orient the brake line.

Check Brake Line Clearance

- Turn the wheels lock-to-lock and be sure the brake line is not binding in any way. Also check there is no interference with any suspension components, including the CV boot and axel/drive shaft. If necessary, loosen the Banjo bolt and slightly re-align the brake line.

If the brake line is not properly routed, a catastrophic failure could occur. If you are unsure that the line is routed properly and safely, do not drive the car. Please call our Tech Support Dept. for assistance if you have any doubt as to the brake line routing.

Remove the air conditioning filter housing to expose the master cylinder reservoir

Unclip the filter cover and remove microfilter. Set cover and microfilter aside.

Release the 3 plastic clips holding the microfilter housing to the air duct. The forward two clips may be popped with your fingers. The rear clip requires a large, flat-bladed screwdriver.

Squeeze the wire retaining clip to release the filter housing from the post. Then lift the housing up at the forward edge and wiggle it free. Shake out any debris such as dead leaves or twigs.

Note, when re-installing the air box, be sure the inlet is clipped on the bottom edge before engaging the 3 top fasteners.

NOTE: Complete brake installation on the other side of vehicle and make sure both sides have pads installed before bleeding brakes.

Step 11

Bleed the Brakes

Bleed the brake system using an 11mm wrench on the bleed screws:

The sequence for bleeding the brakes should be:

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

Note: The calipers and lines will need to fill with fluid, quickly draining the brake fluid reservoir. Keep a close watch on the fluid level when initially bleeding the system. Do not allow the reservoir to run dry and draw air into the master cylinder. Doing so may require the brake system to be serviced by a certified brake technician. After bleeding, with a constant pressure applied to the brake pedal, check all connections for leaks.

Note:

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 12

Check Wheel Clearance and Install Wheels

Check wheel to caliper clearance before driving - see Note below!

Many wheels are balanced with adhesive weights. With stock M5 wheels, if two rows of weights are located directly behind the spokes, the second row will interfere with the caliper. If necessary note weight and location and place a new piece of the same weight further outboard to clear the caliper. Have wheel balance checked if any vibrations are noted.

Install the wheels using wheel manufacturer's torque specifications, or the OE torque specicifation listed in the Owner's Manual. It may be necessary to snug the bolts before lowering the vehicle and then torque the wheel bolts when the car is on the ground.

> ***Note: If using slotted rotors, align the wheel so slots show between the spokes (purely aesthetic, but why cover them up?)***

Step 13

Test Brake System

Carefully test-drive the vehicle in a safe area at low speed to insure all components are working correctly. If there is any question as to what you feel, hear or see during this slow drive, consult a professional mechanic or brake technician for advice, or call the STOPTECH Customer Service Dept. at 310-325-4799 X 105.

After ensuring brake system has been correctly installed, follow pad and rotor break-in procedures on following pages.

We know you had a choice in selecting a big brake upgrade for your BMW E39 5 Series, THANK YOU for choosing StopTech.

We proudly support our fine products. For any assistance or questions, please contact our Customer Service Departmant
at
(310) 325-4799 extension 105
or email us at
support@stoptech.com.

STOPTECH
HIGH PERFORMANCE BRAKE SYSTEMS

AeroRotor™ Installation & Break-in Procedure

READ THIS NOW

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

The majority of brake system problems are due to improper installation and/or break-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 PERMENANT DAMAGE TO YOUR NEW ROTORS.

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

StopTech coats non-plated AeroRotors with a water soluable, environmentally friendly rust inhibitor that MUST be cleaned before use. A non-plated rotor looks like bare metal, 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 Scothbrite works well to scrub with. When cleaned and rinsed properly, the surface of the rotor will immediately show a light rust color which is normal.

Break in your new pads and rotors by carefully following the procedure described below and on the opposite side of this page.

Breaking in rotors and pads is critical to the optimum performance of your new brakes. When breaking in new parts, you are not only heat cycling the pads, but depositing a layer of pad material onto the rotor face as well. If not broken 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 CAD plating is worn off rotor faces BEFORE starting the break-in procedure. Do not use brakes aggressively until plating is worn off, typically several miles of driving.

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

(Please see other side)

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www.stoptech.com

Note-
Bedding of pads should not be done in wet weather or wet road conditions.

After completeing 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 series of stops, the exact speed is not critical. Accelerate to appoximately 60 and begin the braking cycle. 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 cycle.
DO NOT COME TO A COMPLETE STOP, AS YOU WILL IMPRINT PAD MATERIAL ONTO THE ROTOR, CAUSING A VIBRATION.

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

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

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

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

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

After the first break 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 with a cool down in between each cycle.

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

DO NOT COME TO A COMPLETE STOP WHEN THE SYSTEM IS HOT AND LEAVE YOUR FOOT ON THE PEDAL. PAD MATERIAL WILL IMMEDIATELY TRANSFER TO THE ROTOR CAUSING A VIBRATION.

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