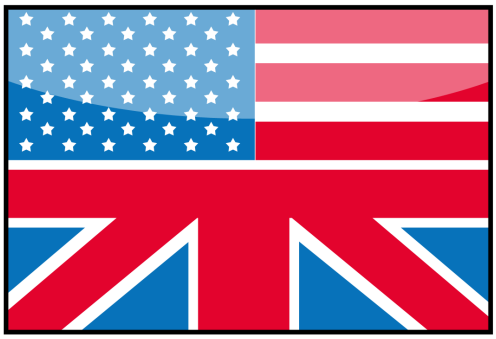

essex

"Race Parts For Your Car"

# Rear Competition Brake System Installation Guide: 1995-1999 BMW M3 rear Radi-CAL™ system

13.99.00094

Version 1.0

**Warning: Essex Competition kits are for *off-road use only*. The components in these systems are not designed for use on public roads.**

# Disclaimer of Warranty

By purchasing this product and opening this box, purchaser expressly acknowledges, understands and agrees that they take, select and purchase this brake system, parts, and equipment from Essex Parts Services, Inc., its affiliates, suppliers, distributors, and agents (collectively, "Essex") "as is" and "with all faults." The entire risk as to the quality and performance of this brake system, parts, or equipment is with the purchaser. Should the goods prove defective following their purchase, the purchaser assumes the entire cost for all necessary servicing or repair or any resulting liability. Essex is not responsible for any damage, consequential or otherwise, for equipment failure or mal-performance after installation.

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# Installation

The brake system on any vehicle is a safety device. It is strongly recommended that any personnel performing brake-related replacement or maintenance operations should be competent and certified, using proper tools and equipment.

# Brake to Wheel Clearance

This brake system is compact but the high offset design of some factory wheels prohibits their use without aftermarket wheel spacers and extended wheel studs/bolts. Some aftermarket wheels may fit over the brake kit without spacers but it is up to the consumer to verify that his or her wheels will work with the kit. Essex has wheel templates available for download at www.essexparts.com. ***The customer is solely responsible for verifying wheel fitment.***

# Brake Noise, Vibration, and Harshness (NVH)

Brake noise can be caused by many factors. Following the bed-in procedures outlined in this manual will help reduce brake noise to the extent possible, but keep in mind that high performance brake pads do tend to make more noise than typical OEM pads. The customer is solely responsible for any NVH related problems with the brake system (squealing, scraping, vibration, judder, etc.).

# Caliper, Bracket, and Hat Finish

Some components of this system are anodized aluminum or coated steel, and as such are subject to corrosion when introduced to corrosive agents such as brake fluid, road salt, wheel cleaners, certain soaps, etc. Use caution when cleaning and servicing the system components.

# What's in the Boxes?

Your brake system is packaged in two separate boxes.  With the exception of attachment hardware, driver (left) and passenger (right) components have been intentionally separated for ease of installation:

## Box One (Left/Driver)

- Left CP8350-32S4L AP Racing four piston caliper (#13.05.20020)
- Left 13.04.20134 assembly includes AP Racing J Hook brake disc (#CP3870-139GC) with attached anodized aluminum hat
- Left anodized aluminum caliper mounting bracket assembly with studs (identical to the right hand bracket on this application) (#13.03.02101)
- Four M10x1.5x60 hex head bolts w/integrated washer (#10.02.00090), to fasten caliper to bracket.
- Four M10 hex head caliper bracket mounting bolts (fastens caliper bracket to upright) (#10.02.00072)
- Four M10 washers for the above bolts (#10 10154)
- One tube of Loctite 271 (red)
- One pair of rear Spiegler Stainless Steel Brake lines (left and right side lines are identical) (13.02.10148), including rubber caps for sealing off brake hard line

## Box Two (Right/Passenger)

- Right CP8350-33S4L AP Racing four piston caliper (#13.05.20021)
- Right 13.04.10134 assembly includes AP Racing J Hook brake disc (#CP3870-138GC), with attached anodized aluminum hat
- Right anodized aluminum caliper mounting bracket assembly  with studs (identical to the left hand bracket on this application) (#13.03.02101)

# Required tools

Torque wrenches capable of 150in/lbs to 90 lb.-ft.
Breaker bar- OEM caliper bolt and wheel removal
Medium-large flat head screw driver-pad rattle clip
16mm box wrench/socket-OE caliper carrier
17mm box wrench/socket-caliper bracket to trailing arm
7mm allen/hex socket/key-OE caliper pins
6mm allen/hex socket/key-disc retaining bolts, caliper bridge bolt
11mm, 14mm, 17mm, flare wrenchs-brake line removal/installation
17mm socket- Wheel lug nuts
12mm socket- Caliper to bracket screws
4mm hex key - pad retaining screw
7mm hex wrench - pad retaining nut
7/16”/11mm box end wrench- Caliper bleed screw
Rags and catch pan/- Brake fluid
Scotchbrite or small wire brush-cleaning hub faces
Brake fluid cleaning solution
Small Funnel- Brake fluid
Eye protection
Gloves
2 or 3 500ml bottles of brake fluid- Essex recommends AP Racing R3 or R4 brake fluid
Pair of jack stands- If you can’t figure this out, drop the other tools and walk away!

# Note on brake ducts

Essex cannot verify fitment or compatibility of our system with third-party brake duct systems, so please fit and use them at your own risk. If you do plan to use brake ducts in conjunction with our system, please ***do not bolt anything between the caliper bracket and the upright***. The caliper bracket was precisely designed to bolt directly against the upright without any shims, spacers, etc. If you are bolting a brake duct to the upright, please attach it on the back side of the upright. Also, please make sure that you are maintaining enough thread engagement on the bolts holding the caliper bracket to the upright (part#10 10155).

# Installation procedure

## Step 1-Wash both brake discs with soap and water

The discs in our system are coated with a water soluble rust inhibitor that must be removed prior to use. Use soap and water to clean them. Dish detergent works well. The discs will start to rust immediately (as they do when you wash your car), so please don’t be alarmed when that occurs.

## Step 2-Lift and secure vehicle, remove wheel(s)

- Put a shop towel under your driver windshield wiper. Don’t remove it until the job is done and you’ve torqued your wheels properly.
- Put on your gloves and eye protection.
- Chock the front wheels.
- Slightly loosen rear wheel lug nuts, but do not remove.
- Lift the rear of the car on a flat, clean, and stable surface per manufacturer recommendations.
- Secure the vehicle on two jack stands, or one if you’d like to install one side at a time.

***Never leave your vehicle supported with only a floor jack. ALWAYS USE JACK STANDS.***

- Remove rear wheel(s).

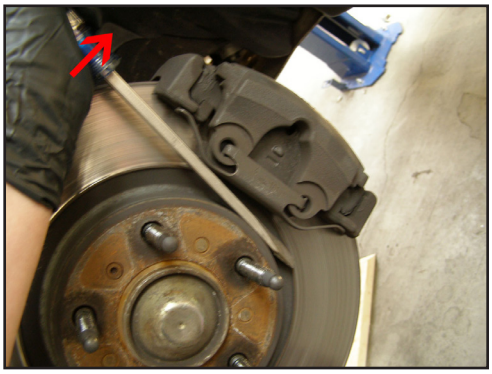
## Step 3-Detach hard line brake connection

Warning- Brake fluid is corrosive, flammable, and will damage painted and anodized finishes. Clean up all spills immediately.

- Place a tray and/or rags below the brake hard line connection on inner fender well.
- Locate the Spiegler line kit and remove the black rubber cap/plugs.
- Before removing the OEM brake line, take careful note (or a picture if necessary) of the routing. The Spiegler brake line kit included with our system will replace all soft lines and be installed in the exact same orientation.
- Using your line/flare wrenches, disconnect factory brake line from hard line connection.
- Immediately cap the hard line with the provided black rubber caps to halt brake fluid loss.
- On the trailing arm, remove both connections at the small hard line.
- Cap the end of the OEM caliper side brake line to prevent brake fluid spillage with the supplied rubber line cap.
- Clean up any brake fluid spills.

## Step 4 - Remove OE caliper

- Remove brake pad anti-rattle clip with med-large flat head screwdriver by prying up and out to release the locking tabs in the caliper. Be careful, spring clip is under pressure and could go flying.
- Remove brake pad wear sensor (if applicable).
- Locate and remove the two caliper carrier bolts attached to spindle and remove carrier.

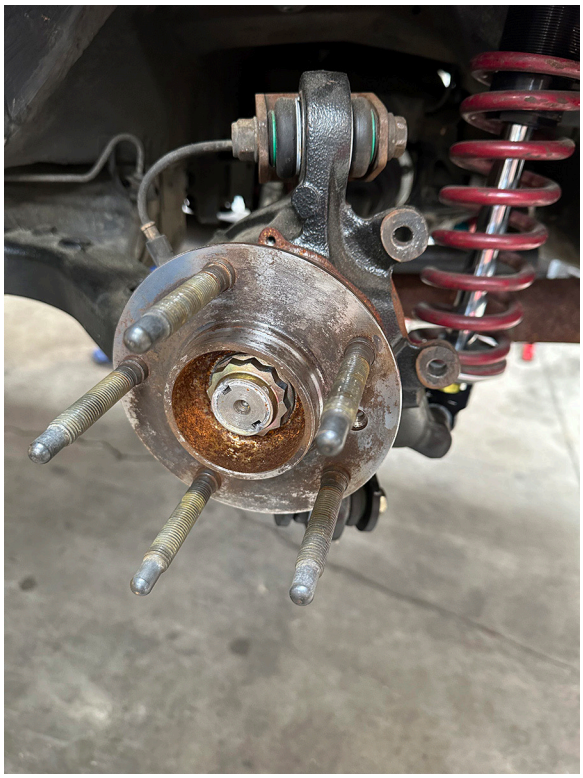


## Step 5 - Remove OE brake disc

- Remove disc retaining bolt with 6mm allen.  Tip:  Use penetrating oil and tap the hex into the bolt to make sure its completely seated.
- Remove OEM disc from hub.
- Using some scotch brite pad, cleaner (WD-40 works well) and rags, clean the hub face and flange to remove any surface rust rust and provide a nice clean and flat surface for your new discs to seat.

## Step 6 - Remove OE Parking brake and backing plate

- The Essex-AP racing rear brake kit requires removal of the factory backing plate and parking brake mechanism behind the OE disc.  Remove all associated parts as well as the backing plate.  When completed, it should look like the picture.



## Step 7 - Install Essex Caliper bracket

- Using scotchbrite and/or wire brushes, clean any surface rust from the caliper mounting ears on the trailing arm. Pay special attention to the inboard side as the Essex bracket will be mounted opposite of the factory caliper.  Its important to have a clean, flat surface to mount the bracket.
- The left and right caliper brackets are identical for this application.
- Apply one small drop of red Loctite™ 271 (red) to the threads of the hex head bolts included with our system (#10.02.00065).  Please be aware that excessive use of red loctite will make removal extremely difficult..
- Using a 17mm wrench/socket and the supplied washers (#10 10156), attach the caliper bracket to the inboard side of the upright and secure with the socket head bolts in the orientation shown.  Make sure that the bracket sits flat against the machined face of the spindle and there is no contact with any suspension componenets or hardware.  Torque to 50lb.-ft.

## Step 8 - Install AP Racing J Hook racing brake disc

- Install the AP Racing Heavy Duty J Hook 2-piece disc over the wheel studs. To ensure proper airflow and cooling, make sure the discs are on the proper side of the car per the pics below. The J Hook slot pattern and internal vane design can both be used as reference points.

*Ex: Driver side/left hand brake disc:*


*Ex: Passenger side/right hand brake disc:*


## Step 9 - Install AP Racing CP8350 rear brake caliper

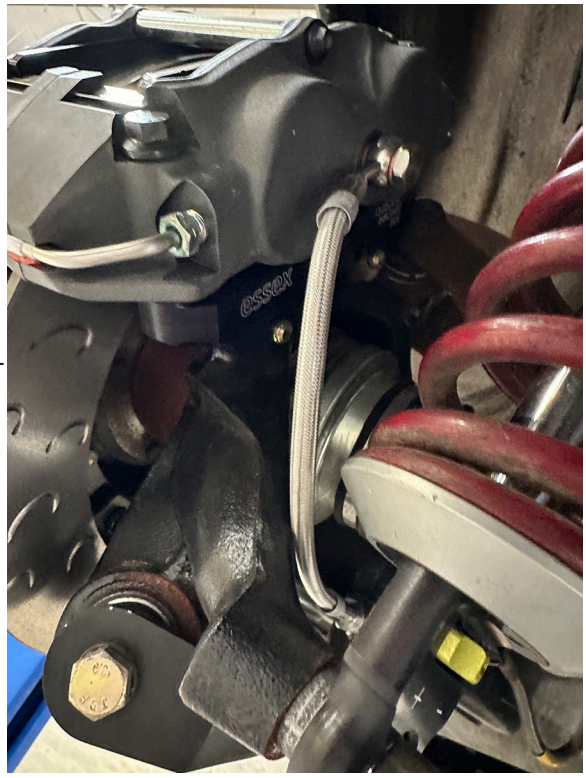
- Verify that you are putting the caliper on the correct side of the car. The bleed screws should always be at the top of the caliper. LH/Driver's side shown.

Note: the AP calipers are labeled as leading, but will be mounted in a trailing configuration. Any directional arrows or handed notations on the caliper/packaging should be reversed when installed correctly.

- Using a 7mm hex wrench and 5mm hex key, remove the pad retention bolt and tube from the top of the caliper.
- Secure the caliper to the bracket using the flanged ARP bolts with a 13mm socket. Torque to 40lb-ft.

## Step 10 - Install Spiegler Stainless brake line

- The Spiegler line kit is a 4 line kit in this application. Locate one of the lines with the banjo fitting, a banjo bolt and 2 crush washers.
- Install the banjo bolt on the end of the brake line with a copper crush washer on both sides of the line banjo fitting. Hand-thread the bolt into the inlet port on the caliper.
- Route the female end to the hard line on the trailing arm and insert the brake line into the bracket with one of the included washers. These add extra tension and prevent any rattling. Hand-tighten the tube nut into the Spiegler line. Use the 11mm line wrench and 14mm box wrench to tighten the connection. Do not overtighten as this could deform the threads of the tube nut.
- Locate one of the female-female lines and repeat above procedure on the other end of the trailing arm hard line. Then route the other female end up to the bracket on the inner fender. Remove the rubber cap and thread the tube nut into the Spiegler fitting. Again, do not overtighten.
- Make sure the brake lines are not binding, rubbing or coiled excessively. If line seems twisted, use the supplied plastic blocks and a pair of pliers to twist fitting so that the line is not overly twisted. See brake line packaging for instructions.
- Make sure all tube nut connections are snug and leak free. Torque the banjo bolt with a 14mm socket to **18-22 ft.-lbs.**



## Step 11 - Install brake pads (DO NOT SKIP THIS STEP)

- Slide the included AP Racing brake pads into the calipers.
- Make sure the pads sit flush or very slightly above the top edge of the disc and do not over hang by a large amount or sit low on the face. See picture to the right of properly aligned pads in the caliper.
- If you do not install your pads during this step, you will potentially have a big mess on your hands when you attempt to bleed your brakes!
- Using the 7mm wrench and 4mm hex key, reinstall the pad retention bolt/tube removed in Step 7 above.


## Step 12 - Repeat steps 3 thru 11 on the other side of the vehicle

## Step 13 - Bleed the brake system

For use with our system, Essex recommends AP Racing R3 brake fluid or AP Racing R4 brake fluid. Both are always in stock and available through Essex and our distributors. We recommend purchasing three bottles (standard 500ml size) of your preferred fluid to complete the installation.

The goal of bleeding the brakes is to remove all of the old fluid from the system, replacing it with your new fluid. With a single brake fluid reservoir (which your car has), fluid in the front and the rear of the car will mix. You therefore need to bleed all four corners of the car. The caliper bleeding sequence is to start with the corner of the car furthest from the master cylinder (mc), and work your way closer to the mc: Passenger rear, driver rear, passenger front, driver front. The proper bleeding sequence is the outer bleed screw, followed by the inner bleed screw (furthest to closest to master cylinder). Use a 7/16"/11mm box end wrench on the caliper bleed screws, and an appropriate bleeder bottle (available through Essex).

When loosening and tightening the bleed screws during this process, just snug them and do not over-tighten. The final torque value on your last tightening of the **bleed screw should be 150 lb-in.**

- Make sure brake pads are secured in all calipers.
- Open the top of your brake fluid reservoir, and make sure it is mostly full. At no point during the bleeding process should you allow the level of brake fluid to go below the minimum level marking.
- Have some rags and brake cleaner handy, and place a drip pan or cardboard below the caliper you are bleeding
- Position your box end wrench over the lower bleed screw on the passenger rear caliper, followed by the hose from your bleeder bottle.
- With a friend behind the wheel and working the brake pedal, loosen the bleed screw and have your friend pump the brakes to the floor 5 or 6 times to flow some of the old brake fluid out of the system
- You should see some air bubbles flowing through the bleeder hose. Have your friend hold the brake pedal to the floor, and snug the bleed screw back up.
- Check the fluid in your reservoir, and refill to the max line if necessary.
- Tell your friend, "pressure." S/he will apply pressure to the brake pedal. Loosen the bleed screw. The pedal will slowly drop to the floor as fluid flows out of the bleed screw. When the pedal hits the floor your friend holds it there, and tells you, "down." Tighten the bleed screw. Repeat this process until no more air bubbles are flowing out of the caliper. On your friend's final press, close the bleed screw when his foot is half way to the floor.
- Check the fluid in your reservoir, and refill to the max line if necessary.
- Repeat this procedure on the upper bleed screw on the passenger rear.
- Repeat the above procedure in the prescribed caliper order, continually checking the fluid level in your reservoir. It will drain quickly, so keep a close eye on it.
- When you are done bleeding, wipe up any brake fluid on the calipers, lines, etc. with brake clean and rags. It will destroy the finish of any painted surface it touches.
- Fill your fluid reservoir to the max line and tighten the cap.
- Have your friend apply pressure to the brake pedal, while you examine the connections at all corners of the car for leaks.
- Due to the internal fluid passages in the Radi-CAL™ calipers, air can sometimes get trapped inside the caliper. We recommend doing a quick re-bleed of the calipers after the intial test drive to be sure all of the air is bled out.

**Please note: After bleeding the system, there will remain a small amount of residual brake fluid inside the bleed screws and/or around the threads. As the calipers heat up, this fluid will force its way out and may look like the calipers are leaking. This is perfectly normal and will go away after a short time. If you experience a spongy pedal or continue to see fluid leaking after a day or so then re-torque the bleed screws to the proper 150 in/lbs.**

## Step 13 - Install wheels

Check wheel clearance before tightening. At times adhesive wheel weights inside the wheel barrel could potentially come into contact with your calipers.
Torque your wheels to manufacturer's recommendation.

## Step 14 - Safety check

Drive the car at low speeds in a safe location to ensure proper functioning of the brakes.

## Step 15 - Bedding and preparation

Properly preparing your new brake pads before heavy use is extremely important. Please visit www.essex-parts.com/learning-center for detailed bedding information in both written and video format.
The goal of bedding-in your brake pads and discs is to mate them together properly and prepare them for heavy use. When prepared properly, or bed-in, your pads will transfer a thin layer of material to the disc face (transfer layer). The pads in your caliper will then actually ride on that thin layer of pad material you've put down on the rotor, rather than rubbing directly on the iron rotor face. A good transfer layer is going to give you superior brake pedal feel, less noise, superior pad wear, and lower the chances of cracking your discs.

### Important Notes- PLEASE READ!

First, make sure you have a safe location to perform a proper bed-in. You need a stretch of asphalt with long straights, good visibility, and no potential obstructions. Make sure you are in a position to safely, legally, and repeatedly hit the necessary speeds to perform the bed-in procedure. A controlled racetrack is the best place to perform this procedure. AP Racing and Essex in no way suggest or condone speeding or breaking the law in your car, nor do we take responsibility for any damage or injury that occurs as a result of using our product or these procedures. You are performing the bed-in procedure at your own risk. For complete details, please read the Disclaimer of Warranty located on the previous page of this document.

### Bed-in Procedure:

**During these procedures, it's critical that you never come to a complete stop with your foot on the brake pedal.** If you have brake ducts on your car, you may want to block them off to allow your brake system to heat up easily.
The procedure outlined below is a generic procedure for most types of mild race pad. Please check your pad manufacturer's recommended bed-in procedure.

1. Accelerate to approximately 60mph and then decelerate down to 5 mph. If your car has ABS, you should try to hold the brakes at a point just before ABS intervention.
2. Once the car slows to 5mph, immediately accelerate back up to about 60mph, and brake again to roughly 5mph.
3. Repeat this series of stopping and accelerating 8 to 10 times. Again, do not come to a complete stop with your foot on the brake pedal.
4. Cool the brake system down by cruising at 45mph+ for 5 to 10 minutes.
5. Visually inspect your discs. They should be a blue/grey color (instead of shiny silver), and have an even layer of pad material across and around the entire rotor face.
6. If the pads don't have a layer of pad material on them, perform another series of stops in the manner outlined above.

For more details, photos, theory discussion, and video instruction on bedding-in brakes, please visit essexparts.com/learning-center

## Notes:

**Thank you again for choosing Essex and AP Racing. If you need any assistance, please call customer support at 704-824-6030 Mon-Fri 8am-5pm, or email support@essexparts.com**