

essex

"Race Parts For Your Car"

Radi-Cal™ Front Competition Brake System Installation Guide: McLaren MP4-12C, 650S, 720S



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

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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

The components of this system are anodized aluminum and plated 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) :

(1) Caliper (Essex#;AP#): 13.05.20057; CP9661-3S4L

(1) Disc assembly: 13.04.20084; CP4284-157GA disc with 13.03.01086 hat

(1) Caliper Bracket: 13.03.02064 with attached studs

Hardware:

(4) M12 small OD washers (#10.02.00009)

(4) M12 jet nuts (#10.02.00008)

(4) M12x35mm Socket head cap screws (10 10155)

(1) Tube of Loctite 271 (red)

(4) Copper crush washers (use with OE brake lines)



Box Two (Right/Passenger):

(1) Caliper (Essex#;AP#): 13.05.20056; CP9661-2S4L

(1) Disc assembly: 13.04.10084; CP4284-156GA disc with 13.03.01086 hat

(1) Caliper Bracket: 13.03.02064 with attached studs

NOTE: Essex provides pad tension kits as standard with this system and installed on the calipers. We do not recommend using the original pad retention blocks as supplied by AP Racing which will be found inside the caliper boxes included with the system. The pad tension kit properly locates the brake pads on the disc while the original blocks might allow the pads to overhang the outside edge of the disc.

Required tools

Torque wrenches capable of 150in/lbs to 444 lb.-ft.(for center-lock hubs)

Breaker bar- OEM caliper bolt

T30 torx bit - disc retaining screws

E14 socket - OE caliper bolts

14mm Flare/line wrench-brake line removal at caliper

7mm socket - brake duct screw

10mm hex socket w/ratchet - bracket to upright

6mm hex key wrench/socket- Caliper bridge bolt

14mm socket- Caliper stud nuts, banjo bolt

7/16"/11mm box end wrench- Caliper bleed screw

Bungee cord/rope/hanger etc - to hang OE caliper out of the way

Rags- Brake fluid

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 make absolutely sure it does not alter the dimensional relationship between the caliper bracket and hub face.

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)

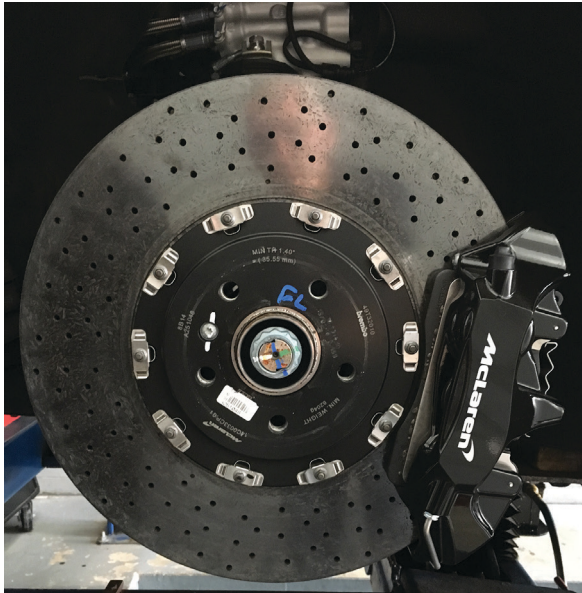
- Apply the parking brake and chock the rear wheels if lifting on the ground.
- Put a shop towel under your driver windshield wiper. Don't remove it until the job is done and you've torqued your wheels properly.
- Put on your gloves and eye protection.
- Slightly loosen front wheel lug nut(s), but do not remove.
- Lift the front 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 front wheel(s).

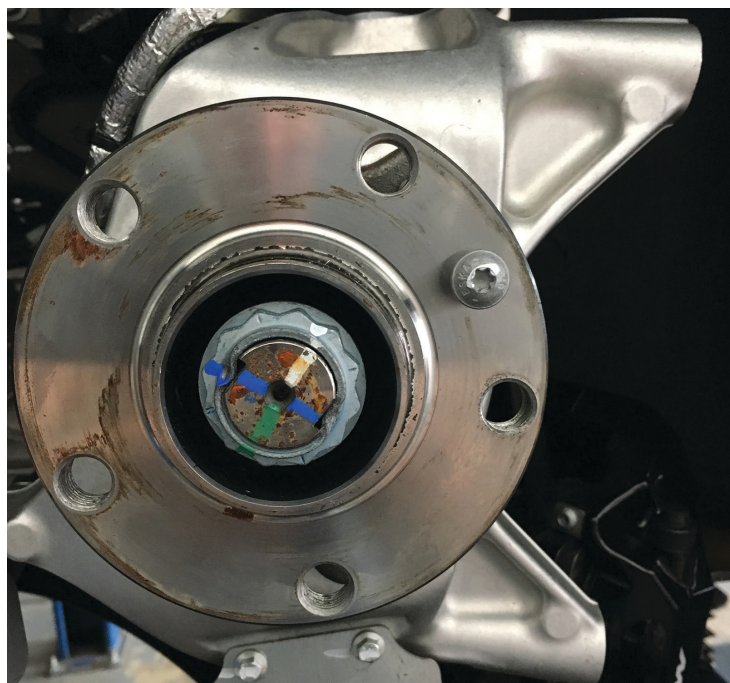
Step 3 - Partially remove OE caliper

- Remove the pad wear sensor from the brake line.
- Using a 7mm socket, remove the screw holding the brake duct to the caliper.
- With a E14 torx bit, remove the two bolts holding the caliper to the upright.
- Carefully lift the caliper off the OE disc making sure the pads do not fall out.
- Remove the pads from the caliper and hang the caliper out of the way using a bungee cord/rope, making sure there is no tension on the brake line



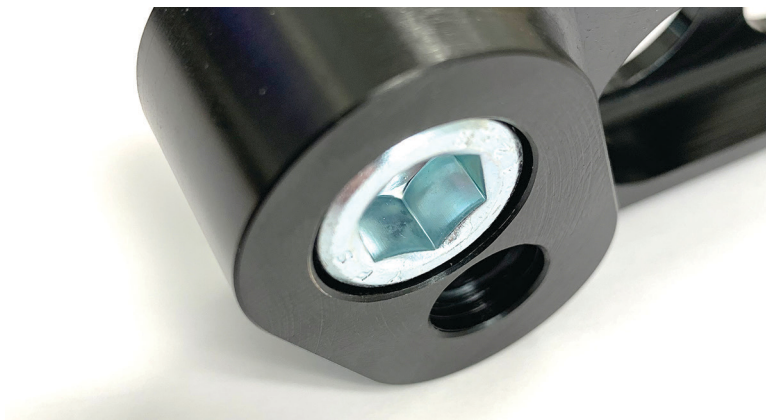
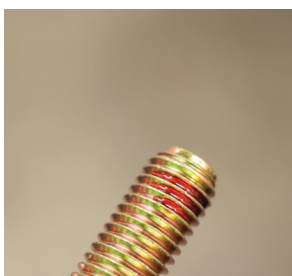
Step 4 - Remove OE brake disc

- Using a T30 torx bit, remove the disc retaining screw.
- Remove OEM disc from hub.
- Using a wire brush, cleaner (WD-40 works well) and rags, clean the hub face and flange to remove any rust and provide a nice clean and flat surface for your new discs to seat.



Step 5 - Install Essex caliper bracket

- Apply one small drop of red Loctite™ 271 (red) to the threads of the socket head cap screws included with our system (#10.02.00045). Please be aware that excessive use of red loctite will make removal extremely difficult.
- Using a 10mm hex socket, attach the caliper bracket to upright. **Torque to 70lb.-ft.**
- Inspect the bracket and be certain its sitting flat against the upright.



Step 6 - Install AP Racing J Hook racing brake disc

- 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.
- Install the AP Racing Heavy Duty J Hook 2-piece disc over the hub and secure with the OE retaining screw.

Ex: Driver side/left hand brake disc:

Driver Side Disc



Ex: Passenger side/right hand brake disc:

Passenger Side Disc



Step 7 - Install AP Racing CP9661 brake caliper

- Verify that you are putting the proper caliper on the correct side of the car. The smallest pistons should be on the leading edge of disc in normal forward rotation. There is also an arrow near the AP part number that indicates forward disc rotation.
- Slide caliper onto bracket studs making sure it seats flat onto bracket.
- Using a 14mm socket and the supplied washers (#10.02.00009), secure the caliper to the caliper bracket with the jet nuts (#10.02.00008). **Torque to 40 lb-ft.**



Step 8 - Install brake line

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

- Using an 14mm box wrench, loosen and remove the banjo bolt on the back of the OE caliper.
- Place one of the provided crush washers on either side of the brake line banjo and thread the bolt into the AP Racing caliper. Plug the inlet port on the OE caliper and remove it (and the bungee) from the wheel well. Wipe up any spilled brake fluid quickly.
- Clip any sensors/wires back onto the OE line.
- Turn the steering wheel lock-to-lock, and make sure the brake line is not touching anything, binding, or rubbing. If necessary, slightly loosen the banjo bolt at the caliper, and adjust the routing of the line until there is no interference.
- **Torque banjo bolt to 18-22lb ft.**



Step 9 - Install brake pads (DO NOT SKIP THIS STEP)

- This system comes standard with our pad tension kits in order to reduce rattle and keep the pads as low on the disc as possible. We do not recommend using the standard pad retaining blocks (located in the caliper boxes) due to slight pad overhang on this application.
- Using a 6mm hex wrench, remove the two pad bolts securing the pad tension blocks/springs from the top of the caliper.
- Slide your new brake pads into the calipers. 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 a 6mm hex wrench, reinstall the pad tension blocks removed in Step 8 above. **Torque to 11 ft/lbs (15Nm)**. Make sure the pads are sitting just slightly above the OD of the disc as pictured.



Step 10 - Repeat steps 3 thru 10 on the other side of the vehicle

Step 11 - Bleed the brake system

For use with our system, Essex recommends AP Racing R3 brake fluid or AP Racing R4 brake fluid. We recommend purchasing three bottles (standard 500ml size) of your preferred fluid to complete the installation. DO NOT MIX Castrol SRF with any standard brake fluid. If you are running SRF in your car a complete fluid flush is necessary to prevent contamination.

The goal of bleeding the brakes is to remove all of the old fluid from the system, replacing it with fresh 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: Generally Passenger rear, driver rear, passenger front, driver front, but a quick glance at the hard lines will tell you for certain. The proper bleeding sequence is the lower bleed screw, followed by the upper bleed screw. 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 furthest caliper away from the master cylinder), 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 pump the pedal a few times slowly and then hold pressure on 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. Do not allow your friend to lift the pedal until the bleed screw is closed. Repeat this process a few times 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 initial 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 12 - 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 13 - Safety check

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

Step 14 - Bedding and preparation

Properly preparing your new brake pads before heavy use is extremely important. Please visit www.essexparts.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 www.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.

