

e38 740iL BC Racing Coilover Info

Quick Summary of Post Install Results

This install was with BC Racing BR-Series coilovers, linear (not digressive) dampers, with Street setup (not extreme low etc), and with Swift Springs - 6kg front and 5kg rear, the lowest you can go. ChatGPT suggests 3kg in the front and 4kg in the rear to be slightly stiffer than OEM, so as you can see the BC Coilovers will be quite a bit stiffer! For my car on old, original EDC dampers with 130k miles on them, and OEM Sport springs, the default ride height, as measured from center of wheel to edge of wheel arch, were 17.25" at the front and 16.25" at the rear. After install, with Swift Springs, with the coilovers set to max ride height, the numbers were 15" at both front and rear. So the front was lowered 2.25" and the rear was lowered 1.25". This is the MINIMUM lowering with this BC Racing setup. Note that BC Racing indicates a minimum on the front of 1" of lowering and 0" on the rear using their own springs. This was not my experience, but may be due to the Swift springs.

On driving the car with this new setup some things become immediately clear:

1. The old shocks and the shock mounts were toast.
2. Clunks from the front and rear are gone, and were due to the top hats and bearings being shot. I had already replaced all other suspension components.
3. The spring rates are fine - any stiffer would probably be too stiff, so don't worry about selecting the lowest possible spring rate.
4. The car rolls side to side a lot less than previously when cornering.
5. The ride is much "firmer" - not stiffer, just more planted and less wafty, and floaty. It is a considerable improvement.
6. The car takes small potholes and road irregularities much more compliantly - soaking those up with little to no cabin effect.
7. The car nose dives far less (almost not at all) on hard braking
8. The min lowering is just perfect - it removes the huge gap at the front wheel and lowers the rear just enough to close the gap. If you want slammed you can adjust it down much further.
9. On full soft for the dampers front and rear the car is definitely firmer and less bump compliant than the original EDC dampers. Some larger bumps at freeway speed are felt more but are still well absorbed. But remember that the EDC dampers are pretty soft, even in their soft and medium settings, though they do go to Firm above 100kph (62mph).

Overview of e38 740iL Suspension

The e38 was sold in the US from 1995 to 2001. It was sold in several different variations, including the 740i, 740i Sport, 740iL, 740iL Sport and the 750iL and 750iL Sport. Each of these models had the same front and rear suspension architecture, with the front suspension being a

McPherson strut (damper is load bearing) and the rear being a multi-link system (damper is not load bearing). Each model had different shocks and coil systems to a degree. This can be seen in the table below.

	Standard Springs and dampers	Harder damping and stiffer/lower springs	Standard Springs and dampers	Standard springs and EDC dampers (could have SLS)	Stiffer front springs, same rear springs and shocks as 740iL
740i	Yes				
740i Sport		Yes			
740iL			Yes		
740iL Sport				Yes	
750iL					Yes
750iL Sport					Yes (2001)

Overview of Shock/Damper Options

As you can see from the table above, there were various spring length and stiffness, and different shock options, from regular, to sport to EDC to SLS (rear only). For the purposes of this paper, a 2001 740iL Sport with EDC dampers front and rear, and no SLS, was the car used for the coilover install. However, all of the info here applies to all models listed above, and may just require tying off of the SLS system if SLS rear dampers are installed.

The main driver for installing coilovers was multi-fold:

1. The original shocks were at the end of their lives, with over 130k miles. The EDC system worked, but the dampers were spongy (causing wallowing on the road) and there were knocking sounds on bumps from the top hats front and rear. Going over speed bumps in parking lots resulted in a weird shimmy-ing forward of the front wheels as they slid down the back side of the bump. Ultimately this was worn top hats on the struts. Note that on virtually all e38s, even with low miles, the shocks are not functioning as intended and need to be replaced. Time and heat is just as much the villain as number of miles.
2. Coilovers allowed adjustment of both ride height and damping characteristics post-install. This meant the user did not need to choose these as part of a system and then live with them for the next 60k miles. There are far too many stories on line of people buying one set or another of springs and shocks for the e38 and then being dissatisfied (too firm or too soft or too high or too low). Coilovers allow a level of adjustment post install that solves this problem.

3. Coilovers save considerable weight. The BC Racing BR series with Swift springs weigh 10lbs in the rear, vs almost 16lbs for the OEM EDC dampers and springs.
4. Coilovers tend to be shorter in total length, due to different spring rates and technologies, making install much easier than the OEM shocks.
5. Many coilovers come as a fixed unit, allowing the user to just remove the old system and install the new coilover system, without having to use spring compressors and buy multiple parts for the top of the spring/damper system. Install is much quicker and easier.
6. Coilovers are spring and damper matched. Trying to put together a spring and damper from two different companies risks having a system that is not ideally matched.
7. Note that for BC Racing BR Series coilovers the max ride height results in about 1" of lowering both front and rear. Given that the e38 starts off very high in front and too high in the rear, this seemed acceptable and was probably going to be the minimum drop the user would apply anyways.

The options for replacing the EDC system and springs were limited.

1. Refurbish EDC shocks in Poland
 - a. This was investigated but the price was still over \$500 per shock, not including shipping. This would have taken a month or so with the car out of action, and feedback on the results has been spotty at best. Some work fabulously and others fail on install.
2. OEM EDC Shocks.
 - a. These do in fact come back in production occasionally and at the time of writing this paper the front and rears were available for a total cost of \$5500.
 - b. This involved removing the old spring/shock system, removing the spring and then reinstalling the spring and new strut mount system before installing in the car.
 - c. So disadvantages were cost and time to install, and advantage was keeping the original EDC system
3. Regular Shocks (e.g. like the 740i Sport)
 - a. The total for all 4 corners was about \$1500, for Bilstein B6 and Eibach springs (as used by M539).
 - b. This would require installing the springs and dampers into a system before installing in the car.
 - c. Advantages were price and a decent ride with known dynamics - sporty enough without being too harsh. Disadvantages were a more difficult install than coilovers and no adjustability - your stuck with the damping and ride height.
4. BC Racing Coilovers (or pick your set)
 - a. With Swift Springs these were \$1800 with tax and shipping, as of July 2025. So about the same as Regular shocks and significantly lower cost than the EDC replacements. Note that as of August 2025 the Swift Spring option is \$100 (or 25%) higher, due to Trump's tariffs on imports from certain countries.
 - b. These come as a unit so install is quick and easy. No spring compressors etc.
 - c. Coilovers allow adjustment of damping and height - two huge benefits. And are lighter weight.

- d. BC Racing coilovers specifically allow adjustment of ride height without changing spring preload.

The author chose BC Racing Coilovers, for price, ease of install, and ability to modify damping and ride height post-install. Here is an overview of key aspects of the install and finished setup and ride characteristics, to allow other e38 owners to make an easier decision about what to do when it comes time to replace their dampers (and potentially springs).

Overview Of install

The instructions that come with the coilovers are “adequate” but are missing several key details that help with install and ride height setting. The removal of the old EDC system and the install of the coilovers is as shown in many online videos. This one is probably the best for the rear in terms of NOT doing a bunch of steps that are not necessary ([e38 Rear Shock Install](#)). This paper will not go over the major steps, but will instead focus on key areas that will speed up install and make the ride more satisfactory. For reference this is the BC Racing BR Series coilovers for the e38 with linear damping, and the Swift springs upgrade. In the image below, the front are on the left and the rears are on the right. The fronts have camber adjustment plates and come with new tie rods. It is strongly suggested that one buys the damping extenders (\$51) on the right of the image below, for the rears so that damping adjustments are possible after the rear seats have been reinstalled. See below for how these were installed.



Front Suspension

These are the key steps that helped with install.

1. The tie rod must be fully removed so that the new one can be installed
2. Make sure to install the tie rod before final bolting in of the coilover or you will never get the tie rod into its relevant holes.
3. You do NOT need to remove the brake caliper. However you do need to have a jack to support the wheel hub so that it does not overly stretch the brake cable.
4. You do not need to remove any other suspension components, like control arms, etc.
5. To remove the original shocks/spring system, the top 3 nuts are loosened and removed and the bottom squeeze bolt is removed, and the squeeze/pinch area is lubed and the shock is twisted numerous times to loosen its grip before removal.
6. Support the wheel hub with your jack and then slowly lower the jack in small increments, pushing down on the wheel hub to lower the shock out of the mount area. Keep doing this in increments until the shock/spring can be moved to the outside of the wheel arch, so that the top clears the wheel arch and then can be pulled up and out of the pinch area. Twisting the shock clockwise and counter-clockwise to remove it will help in getting it to free itself. Put a cloth around the top of the shock top hat to prevent it scratching the side of the wheel arch.
7. For the BC Coilovers, there must be at least 80mm of the damper in the lower housing. The documentation says 80mm for a macpherson strut, which this is. The reason for such a large length is because the strut is a load bearing member of the suspension system.
8. Unfortunately it is basically impossible to know how much of the damper is inside the lower housing, unless the damper is fully removed before install and measurements are taken. This is in fact the best option, and then the user can use basic math to figure out how much of the damper is in the housing for various height settings.
9. Note that for the front suspension the coilover damper is not flat at the bottom but has a protruding cylindrical portion at the bottom. Do not make the mistake of measuring from the bottom of this cylinder, and instead measure from the bottom of the threads, which are about 1" higher up the damper.
10. Once the front is installed, to figure out how much of the damper is in the lower housing, insert a measuring tape into the open bottom of the strut housing and measure from the center cylinder at the bottom of the damper to the bottom edge of the cylindrical housing - in other words how far up inside the housing the damper is. My tape measure would not fit between this inner cylinder and the wall of the strut housing, so using this simplified method of measuring to the inner cylinder will work for anyone that has a "normal" tape measure. Take this measurement and subtract it from the total length of the damper housing - measure from the bottom of the height adjustment collar to the bottom edge of the cylindrical housing. And then subtract 1" - the distance from the edge of the threads on the damper to the bottom of the center cylinder of the damper. So, if the lower housing total length is 8.25", and the bottom of the damper is 3.15" inside the cylindrical housing, then the math is $(8.25" - 3.15" - 1" = 4.1")$. That 4.1" is the amount

left in the shock housing, and must be 80mm minimum, or 3.15". Adjust the shock's height as needed ensuring that at least 80mm are left in the housing.

Rear Suspension

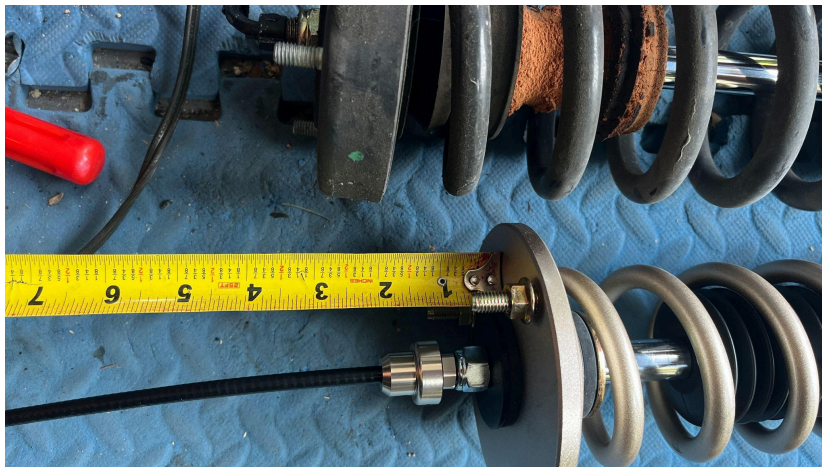
Steps to assist with Install.

1. As noted above, this video is one of the better ones for the removal of the OEM shocks and springs. [e38 Rear Shock Install](#)
2. The general order of things is as follows:
 - a. Remove the rear seats and the rear shelf and speaker box
 - i. Do NOT remove the center seat, but do remove its headrest
 - ii. Do NOT undo or remove the seatbelts to thread them through the seats
 - iii. Do NOT actually remove the seats - you are just unbolting them and pulling them up and off their brackets and then laying them on the rear bench where the rear seat cushion normally goes. The seatbelts will still be attached.
 - b. DO remove the C-pillars - you will either not be able to remove the rear shelf or you will break something if you do not
 - i. For the C-Pillars, there are 3 screws that need to be removed. It is highly likely that the brackets that hold these on are broken. You can attempt replacement of these brackets ([Rendition A/B/C Pillar Fix](#)) or just reinstall without them - the C-Pillars will basically be held in by pressure from the headliner and the rear parcel shelf.
 - c. Remove the speaker box - don't forget the electrical connector at the back left (left looking forward!)
 - d. Inside the wheel well, remove the wheel lining, and then:
 - i. Left Side: disconnect the two nuts for the filler hose and move the hose out of the way. See video.
 - ii. Right Side: disconnect the one nut for the box at the top of the wheel well and then move out of the way. See video.
 - e. Using the video above, cut a suitably sized block of 2x4 to fit inside the suspension system. When the shock bottom is removed from its perch the wheel hub will not fall as you would expect but will instead try to rise up, making removal of the oem shock/spring almost impossible without removing control arms etc. Inserting the wooden block before removing the bottom bolt will prevent this from happening.
 - f. Once the block is inserted, loosen the bolt holding on the bottom of the strut, and then hammer the strut off its perch. Loosen the 3 bolts at the top of the shock body inside the car and then lower the strut/spring system down and out. See video for the full method.
 - g. For the rears of the BC Coilovers, the suspension is not a MacPherson strut and the damper/spring system is not load bearing. Therefore the amount of the damper that must be in the lower mount is much smaller than at the front, and is

only 25mm. At this maximum height setting the bottom of the damper is about at the half way point of the little hole cut in the side of the lower mount. See Image below. At this setting the rear wheel height is 15 inches, measured from center of wheel to wheel arch. This is about a 1.25" drop. Make these initial settings before install to make life easier.

- h. Install coilover in reverse. For my car it was easier to attach the coilover at the top first and then insert the bolt at the bottom of the strut. This allowed a second person to stand on the wheel hub and push it down about an inch to get the bolt lined up. Doing the bottom bolt first and then releasing the wood block didn't allow the finesse of getting the top three bolts into the top holes of the car.
- i. Once the coilover is installed remove the wooden block, and then replace the box at the top of the wheel well and then install the wheel liner.

Rear Coilover Factory Default Setting (3.5" drop)



Rear Coilover Max Height Setting (1" or less drop)



Rear Coilover Lower Mount with Damper Bottom at Half Way Point of Hole (Max Height)



Post Install Stance - Front Wheel



Post Install Stance - Rear Wheel



Post Install Stance - Side View



Install Of Rear Parcel Shelf with Damping Extenders

The damping extenders are an optional item from BC Racing that allow adjustment of the rear damper settings after the rear seats have been installed. They are a long metal cable with an attachment nut at one end and a dial (to make adjustments) at the other. They connect to the top of the rear struts damping dial and extend the dial to outside the rear parcel shelf (see picture above).

Right above the shock tower is a thick sound and vibration absorbing pad. This sits flush against the top of the strut top, and must be drilled to allow the extender to fit through it. Use a $\frac{3}{8}$ drill bit to make the hole and push the adjustment knob through it.



The next challenge is getting the extender by the solid plastic speaker box (that sits flush on top of the insulating pad) and into a position that allows the user to make adjustments, without being obtrusive. After trying several different pathways under and around the speaker box, the only real option was to route the cable under the speaker box, toward the front corner of the C-pillar,

and through the indent in the metal seat back through which other electric cables were running. There is one of the indents on both sides of the car, and they provide the only route for the cable to exit from under the speaker box and parcel shelf without being pinched. After coming out through this gap, the cable can run upward between the back of the seat back (not the side) and the parcel shelf/speaker box (see image below). If the cable is routed to the side of the seat back, between the seat and the C-pillar, then the adjustment knob is impossible to grab properly, and the turning of the adjustment knob is very hard.

Cable Going Under Spkr Box and Via Wiring Gap



Close Up of Cable Routing



Cable Exiting Between Seat Back and Parcel Shelf



Close Up of Cable Position behind Seat



Getting an Alignment After Install?

Definitely get an alignment after install of these coilovers. My 740iL had been recently aligned on the old suspension. Below you can see the before and after settings, where camber was only off slightly, but toe was somehow way off front and rear.

BMW : E38 Sport Suspension 18" Wheel Adjust

Front : Left

Actual	Before	Specified Range
-0.7°	-0.9°	-1.1° -0.1°
5.1°	5.1°	5.7° 6.7°
0.11°	-0.40°	0.03° 0.20°
14.0°	14.3°	
13.4°	13.4°	
		-2.25° -1.25°

Camber
Caster
Toe
SAI
Included Angle
Turning Angle Diff.

Front : Right

Actual	Before	Specified Range
-0.7°	-0.6°	-1.1° -0.1°
5.1°	5.2°	5.7° 6.7°
0.11°	-0.43°	0.03° 0.20°
14.3°	14.1°	
13.6°	13.5°	
		-2.25° -1.25°

Front

Cross Camber
Cross Caster
Total Toe

Actual	Before	Specified Range
0.0°	-0.3°	-0.7° 0.7°
0.0°	-0.1°	-0.5° 0.5°
0.21°	-0.83°	0.07° 0.40°

Rear : Left

Actual	Before	Specified Range
-1.4°	-1.9°	-1.5° -1.4°
0.16°	-0.21°	0.07° 0.23°

Camber
Toe

Rear : Right

Actual	Before	Specified Range
-1.5°	-1.7°	-1.5° -1.4°
0.19°	-0.33°	0.07° 0.23°

Rear

Total Toe
Thrust Angle

Actual	Before	Specified Range
0.35°	-0.54°	0.13° 0.47°
-0.02°	0.06°	-0.20° 0.20°