

Jaguar Update

[Home](#)

Adjustable Reaction Plate

January 7, 2008

I recently installed an adjustable reaction plate from [CoolCat Express Corp.](#) I've included some notes from that experience. I'm not affiliated with CoolCat in any way, just a satisfied customer.

!SAFETY FIRST!

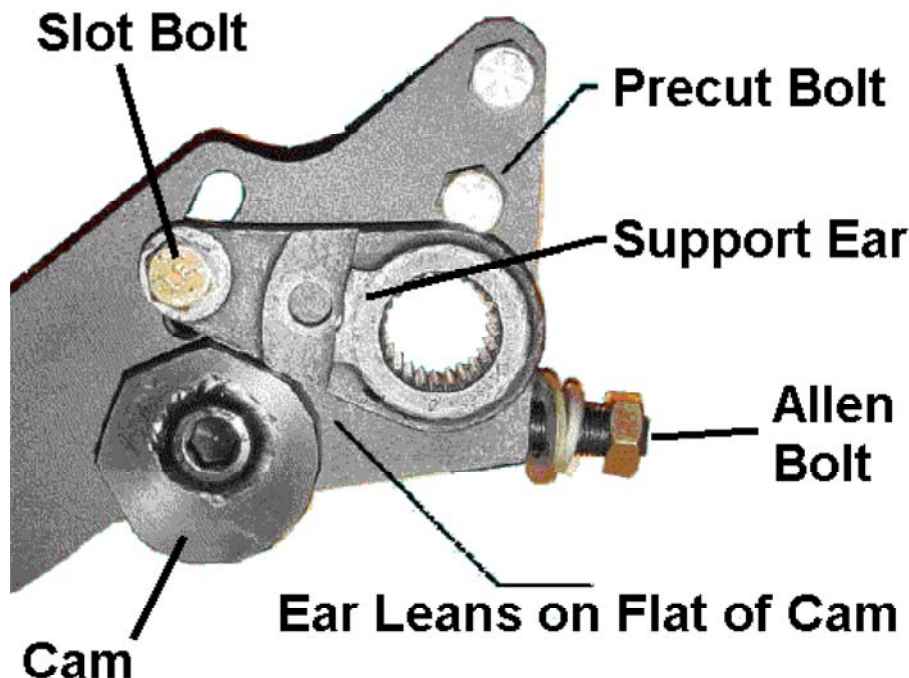
This job requires you to be under the vehicle. Be absolutely certain that the vehicle is properly supported. If the vehicle should fall, it could kill you. If you do not have the appropriate equipment, do not attempt this task; pay a professional to do it for you.

Background:



The front suspension of an E-Type Jaguar uses torsion bars instead of coil springs. The ride height of the front end of these cars is determined by how these torsion bars are set up during installation. Getting the correct settings that result in an optimal ride height can be a time consuming and frustrating task involving many hours of trial and error disassembly and re-assembly.

Installing an aftermarket reaction plate allows you to "dial in" some ride height adjustment without requiring the disassembly of the front suspension.

The picture below identifies the components of one side of the adjustable reaction plate as supplied by CoolCat.



Parts Glossary	
Slot bolt - bolt that passes through the adjustment slot in the reaction plate.	
Special Precut bolt - bolt that has an elongated flat across the bolt head.	

	
<p>Support Ear - the splined, teardrop-shaped bracket that retains the rear of the torsion bar.</p>	
<p>Large allen socket cap bolts - bolts that pass through the reaction plate tubes and frame rails.</p>	

I've included some notes that I followed when installing my reaction plate. No warranties are expressed or implied. Proceed at your own risk.

() Get the Car in the Air

To lift the rear of the car, I placed a set of car ramps under the rear wheels. The front of the car is supported by two jack stands located under the picture frame. Place these stands close together in order to keep the area in front of the torsion bars free. A second pair of jack stands is placed under the forward-most section of the floor where the firewall attaches. These stands provide a wide base and increase stability since the stands under the picture frame are very close together. Stability is really important, especially since we will be wrenching hard on the suspension bolts.



() Remove the torsion bars and stock reaction plate

This task is well documented from other sources.

() Insert bolts into slots

Lay the adjustable reaction plate on the workbench, rear side down (the rear has the mounting tubes welded to the ends). Identify the bolts that are to pass through the slots in the reaction plate (slot bolts) to secure the support ear. I prefer to install the slot bolts from back to front so that the nuts are facing forward; I find it easier to tighten the nuts when installed this way.



Due to tight clearances, it's nearly impossible to work the bolts through from back-to-front after the reaction plate is in place. Therefore, install the bolts now (rear-to-front) before you place the reaction plate in the car. Loosely fit a nut on these slot bolts to hold them in place.

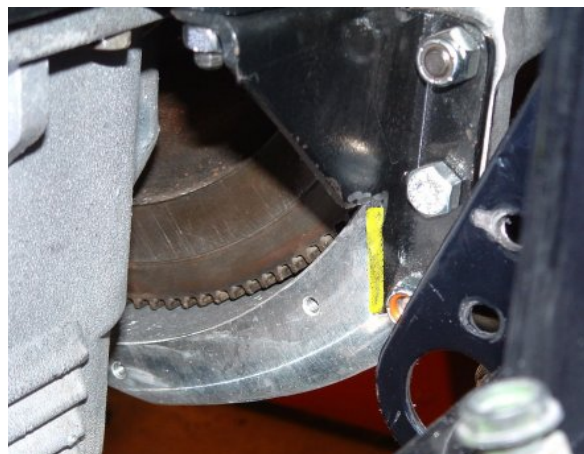


() Put Adjustable Reaction Plate in Place

The adjustable reaction plate fits in exactly the same position as the old, factory unit. The fit of these old cars is not precise; you may need to use a pry bar and/or hammer to get the reaction plate into position.

() Check Clearances

Check that the reaction plate does not interfere or touch any part of the engine/bell housing/transmission assembly. On my car, the LH and RH brackets that support the engine block to the bell housing were touching the reaction plate. Uncorrected, this would have caused a serious source of noise and vibration. I had to cut a notch in each of these brackets, and now have at least 3/8-inch clearance between these components. I suspect the 5-speed conversion must have positioned these parts a bit lower than the stock transmission.



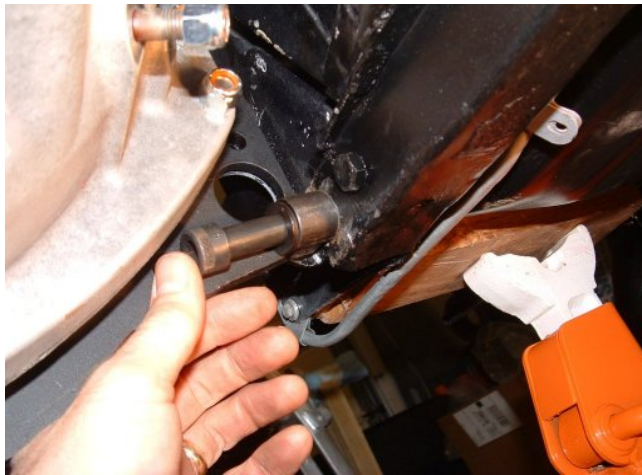


() Install Large Allen Bolts

Once you are satisfied that there is sufficient clearance around the new reaction plate, slip the two large allen socket cap bolts through the reaction plate mounting tubes and through the channel that runs under the car.

Tip: The washers that fit under the bolt head are a tight fit; I found it helpful to slide the washer down away from the head, towards the threaded end of the bolt, before feeding the bolt through the mounting tubes.

Do not tighten these bolts yet.



() Install Upper Bolts

Install the top-most bolts that pass through the subframe plate and reaction plate. I prefer to pass these bolts from back to front so that the nuts are accessible from the front.

Tighten these now.



() Tighten Large Allen Bolts

Go ahead and tighten the large allen bolts now.

Note: you cannot get an allen wrench on these bolts once the cams are installed.

() Mark, Grease and Install the Cams

I added some numbered labels to identify each cam step. I also highlighted the edge of the cam steps with a paint pen. Once these things are installed, it's tough to see under there; these small details can minimize mistakes later on.

Apply some grease to the stepped cam surface. This will make it easier to adjust the cam when it is under the load of the torsion bars.

Do not place any grease on the surface that faces the reaction plate; this is a clamping surface and we don't want the cam to rotate after it is tightened.

Install the cam on the reaction plate, but leave the nut a little loose so that the cam can rotate easily.



() Grease and Install the Support Ear

Remove the nut that was temporarily installed on the slot bolt, and place one of the supplied thick washers over the exposed threads of this bolt. This washer **must** be installed between the support ear and the reaction plate. This washer acts as a spacer to take up the distance vacated by the subframe plate now that the support ear is leaning over instead of pointing straight up.



Place a small amount of grease on the shoulder of the support ear where it passes through the reaction plate. Place the shoulder of the support ear through the subframe plate and reaction plate. Feed the slot bolt through the support ear. Place a washer, lock washer and nut on the slot bolt.

Do not tighten the slot bolt; rather, leave it loose enough so that the support ear can rotate through the arc.



() Rotate Cam to Highest Setting

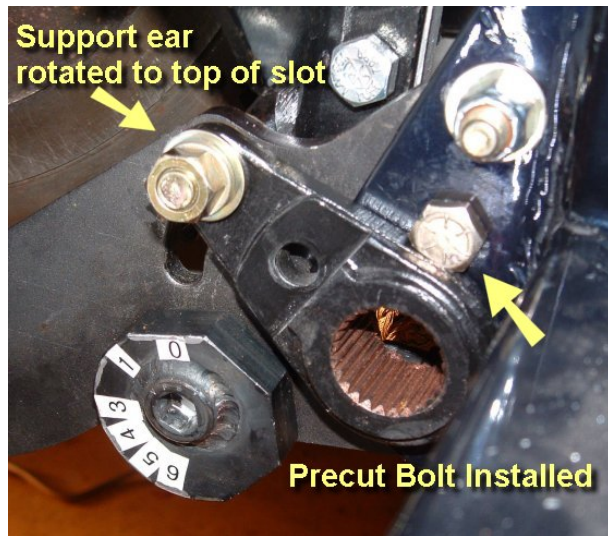
Rotate the cam to its highest setting. This will move the support ear so that the slot bolt is at the upper extreme of the slot. Having the cam and support ear at the highest setting will ensure that the head of the special pre-cut bolt (next step) will not impede adjustment later on.

() Install Special Pre-cut Bolt

With the support ear at its highest setting, install the special pre-cut bolt through the subframe plate and reaction plate. This bolt must pass from front to rear, and the elongated flat of the bolt head must

rest against the support ear. No washer is to be used under the bolt head.

Tighten the nut on the special pre-cut bolt.

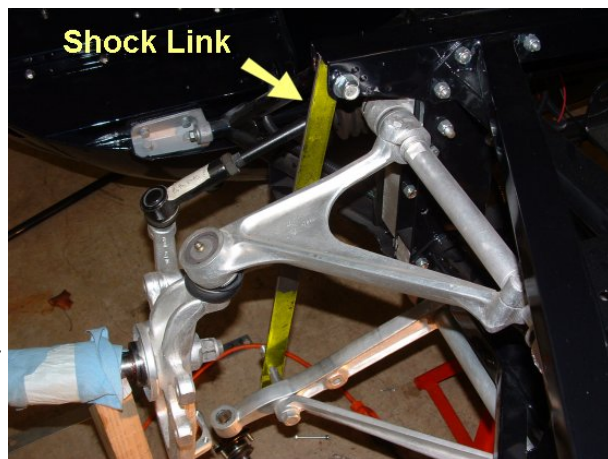


(j) Determine Shock Link Length: Your Mileage May Vary!

The shock link is a metal bar that is temporarily fitted in place of the shock absorber during the torsion bar installation. The distance between the mounting holes of this bar will dictate the car's final ride height.

The shop manual calls for a shock link with 17-13/16 inches between the holes. Using this setting is supposed to give a factory-recommended ride height for a car running fresh factory torsion bars.

My car has slightly oversized (0.800) torsion bars, and I want the ride height to be about an inch lower than stock. Getting the shock link measurements that will give me the ride height I like will involve some trial and error (see [sidebar](#) below).



Sidebar: The heavier torsion bars that I've selected are just a bit stiffer than stock. Using the stock shock link with these heavier bars would make the car ride higher than stock. Plus, since I wish to run a lower-than-stock ride height, I will certainly need to use a shock link that is shorter than 17-13/16 inches. But how much shorter? That's the \$10,000 question (and why I'm installing the adjustable reaction plate)!

I initially had the front suspension completely installed with the new, heavier torsion bars and with the factory (non-adjustable) reaction plate using a shock link measuring 15-7/8 (Vs 17-13/16) inches between the holes. This resulted in a ride height that was approximately 1-1/8 inches too low. I then installed the adjustable reaction plate. With the same shock link (15-7/8) and with the cam dialed to setting 0 (lowest setting), I installed one torsion bar. The shock link was then removed and the cam was stepped through each setting. The shock link measurements were taken for each cam setting. Here are the results:

Setting 0: 15-7/8 (same as shock link)
Setting 1: 16-1/4
Setting 2: 16-7/16
Setting 3: 16-11/16
Setting 4: 17-1/8
Setting 5: 17-7/16
Setting 6: 17-11/16 (just shy of factory link length of 17-13/16)

Based on these figures, I felt confident that the height I was after was available using one of these settings.

(k) Pick an Initial Cam Setting

For my application, I decided to use the lowest cam setting as my starting point. Your mileage may vary.

Insert a 3/8-inch Allen wrench into the cam and rotate it to the initial setting (I used setting 0). The support ear must now be rotated down to this setting. Be certain that the support ear is resting **firmly** on the **flat** of the cam that corresponds to your initial setting.

Snug up the bolt on the cam to prevent it from moving during the torsion bar installation.

() Install Shock Link

Place the shock link spacer bar where the shock normally installs.

() Orient and Prep Your Torsion Bars

The torsion bars are "handed", i.e., one bar fits on the left-side of the car, and one fits on the right. Double check the bars by looking for a stamped "L" or "R" on the back end of each bar. Also, the bars have a front end and a back end; the front end has a groove running the circumference of the splined area. Place a nice coating of antisieze compound on the splines.

() Install Torsion Bars

Make sure that the support ear is resting squarely and firmly against the cam. If it is not firmly against the cam, you will not get an accurate height setting.

Feeding the torsion bar from the front of the car, insert the rear end of the bar through the support ear. Continue to push the bar through the support ear until the rear splines of the torsion bar are all the way out the back side of the support ear.



Now turn your attention to the front of the torsion bar. Slide the bar forward and align the front end of the bar with the back of the splined hole in the lower control arm. Chances are, the bar will not want to slide into the lower control arm because the splines are not lined up. This is because there are 25 splines on the rear of the torsion bar, and only 24 on the front.

You will have to rotate the bar one rear spline at a time until the splines in the front line up. They will line up eventually. Patience counts! Just be sure you continue to rotate the bar in the same direction as you do this trial and error task!

Once aligned, you will have to hammer the torsion bar into place. I place a long, pointed drift into the recession at the rear end of the bar and drive it in with a heavy hammer.



() Remove Shock Link

() Install Keeper Screw

Install the long screw that passes through lower control arm and prevents the torsion bar from moving fore and aft.



() Rotate cam to an Initial Setting

For my application, I guessed that rotating the cam to setting two would be a good initial position.

() Tighten All Nuts and Bolts

() Lower Car to Ground/Measure Height

After getting the car back on its wheels, you will need to roll the car forward and back to settle the suspension in order to get an accurate ride height measurement.

() Re-adjust if Necessary

Subsequent adjustments can be made without disassembly of the suspension by loosening the nuts retaining the ear and cam, and rotating the cam with an allen socket. It's best to get the car on a lift for this operation, as a long breaker bar may be needed for leverage. Make sure that the ear always rests on a flat of the cam.

