

# Mason Engineering E46 Rear Suspension Subframe Support Installation Instructions

## Both Standard and X-Design Models

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There has always been an inherent design flaw in the factory design of the BMW E46 rear mounting hard points for the sub frame. The rear differential transmits the torsional load from the engine through the sub frame, then into the chassis. Repeated torsional loads placed upon the rear sub-frame will often cause a weld crack failure of the welded spots in the monocoque sheet metal. Especially under racing conditions, the E46 mounting points can rip out from their spots in the sheet metal. BMW attempted to fix this problem by placing a cross member on the front two mounting points of the sub frame, placing the bushing and the stud in double-shear, thus reducing the twisting action on the sheet metal. An unfortunate side effect of this corrective action is that the load from the front of the sub frame now gets transmitted to the left rear of the sub frame hard points.

The Mason Engineering E46 Rear Lower Strut Brace eliminates this problem and also significantly improves the handling and performance of your BMW, particularly under racing conditions keeping the chassis in square under load

### Recommended Installation Tools

- (2) 12" long boy series drill bit 1/4" for hole saw and  $1^{3}/_{32}$ " = .406 dia.
  - Long boy drill bits are available from Wholesale Tool at [www.wttool.com](http://www.wttool.com)
- 1 1/2" hole saw – ideally the pilot drill bit should be the same diameter as the long series drill bit
- Optional tools:
  - 12mm x 1.5 thread pitch tap & thread cutting fluid
  - $1^{3}/_{32}$ " (0.4062" or 10.5mm) drill bit

### Important Notes:

- **Mason Engineering always recommends that all installations be completed by a professional technician**
- **The lower floor/sub-frame requires an already installed Mason Engineering 3 piece rear tower bar**
- **Installing Mason Engineering parts on your BMW could possibly violate or void the manufacturer's warranty; all liability is assumed by the customer.**

**Step 1:** From the underside of the vehicle remove the 2 rear sub frame hex bolts. These two hex bolts secure the rear sub frame to the chassis. The factory bolts will not be used in the installation of your Mason Engineering lower floor/subspace frame support.

**Step 2:** Using the recommended 1/4" long boy drill bit and working from the underside of your vehicle, carefully drill up through center of the



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sub frame mount holes and through the floor to make “pilot holes” for use in positioning the 1/4" hole saw.

**Step 3:** From the inside of the trunk center the 1 1/2" hole saw over your drilled pilot holes to cut through the top layer of floor sheet metal. These holes allow access to the top of the sub frame mount hard points.



**Step 4 (option 1):** The sub frame mount holes are only partially threaded; there is approximately 1/4" of non-tapped hole at the trunk end of the hole. To install your Mason Engineering lower floor/subspace frame support it is necessary to thread the remainder of the hole. After the cut outs in the floor sheet metal are removed, use the 13/32" (0.406" or 10.5mm) drill bit to carefully drill out the existing holes in preparation for tapping.

**Step 4 (option 2):** Alternatively you can eliminate the need to tap hard point threads by using an electric drill to enlarge the unthreaded section to allow the 9" long stud to be fully installed. Our customers have found this method produces an installation equally secure to the thread tapping option.



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**Step 5:** Using a 12mm x 1.5 thread pitch hand tap, tap out the unthreaded portion of the sub frame mount holes. **Thoroughly clean finished threaded holes.**



**Step 6:** Install the included special 9" long fully threaded 12mm aircraft alloy 4140 chromolly steel rod, 125,000 PSI-R32C into the tapped out holes to verify proper threading all the way through the sub frame mounting hole.

**Step 7:** Prior to installing the lower floor/subspace frame support you must thread the 9" long steel rods completely flush with the subfloor.

**Step 8:** If you have not already uninstall your Mason engineering 3 piece rear tower bar do so now.

**Step 9:** Position the lower floor/subspace frame support. Working from the underside of your vehicle; thread the 9" long fully threaded 12mm steel rods into the tapped out holes on the lower floor/subspace frame until hand tight.

**Step 10:** Reusing the bolts originally provided with the 3 piece rear tower bar reinstall the rear tower bar joining it with the lower floor/subspace frame to create one complete assembly.



**Step 11:** Seat all bolts until tight. Take care to avoid over-tightening which can result in gauling or stripping of the bolts. Mason Engineering recommends a test drive of your vehicle followed by a recheck of all connections ensuring they are correct.

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