
E36 M3 KONI STRUT CARTRIDGE INSERT PROCEDURE

(Last updated 6 Feb 2003)

Koni doesn't make complete struts for the M3, so you have to cut apart your stock casings and bolt in the Koni cartridge inserts. There are no published instructions that I know of, other than what comes with the Konis (very generic).

(As of early 2001 Koni is now advertising a complete M3 coilover strut, in addition to their cartridge inserts. Unfortunately I haven't been able to examine one of these yet.)

IMPORTANT: There have been some reports of stock strut casings that are slightly smaller in diameter than "normal," possibly only along some part of their length. These struts are not differentiated by part number, and at least one owner reports having one of each type on his car. My "normal" casings are between 52.0 and 52.4mm in OD (outside diameter) depending on where along them the measurement is taken. If yours are significantly smaller than this anywhere along their length then the Koni cartridges may not fit inside. You can check this measurement with the struts still on the car. If your casings turn out to be smaller it may be possible to enlarge their ID with suitable tools, but that's not covered in these instructions. Otherwise you can buy some old take-off M3 struts to use instead of your own.

TOOLS & SUPPLIES
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- Jack and jack stands
- Vernier calipers
- Set of 3/8" drive metric sockets, extensions, ratchet handle, etc.
- Usual hand tools (screwdrivers, pliers, hammer, etc.)
- Breaker bar for above (or air impact gun & sockets)
- Set of allen sockets
- Torque wrench
- 22mm 1/2" drive deep pattern socket (see last section below)
- Strut spring compressors
- Air cutoff tool or strut cutter* or hacksaw
- Bench vise
- Bench grinder or air cutoff tool
- Electric drill, 3/8" or larger chuck, with normal drill bits
- 14mm or 9/16" reduced-shank drill bit
- Punch
- Wood block
- Drain pan
- Bentley or Haynes shop manual (for general procedures and torque values).

* Courtesy of Ron Stygar, here's an inexpensive online source for a strut cutter: www.bobstools.net/Store/LS31500.html or else you can find one at Sears for somewhat more money.

PROCEDURE

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- Remove the complete strut assemblies from the car.
- Using a spring compressor plus suitable hand tools, take the assemblies apart. (See special tool instructions at end; for the stock shocks you'll use an allen socket instead of the 11mm hex socket.) Carefully note the order and orientation of the various washers, plates, etc. Mark them! Unscrew the plastic clip that secures the ABS and brake sensor wires to the strut casing. Reserve these parts for reuse.

TIP: When using the spring compressor, wrap the jaws where they hold the spring coils using fabric electrical tape (the old fashioned sticky/gummy kind, not the smooth vinyl tape). This will stop the jaws from slipping, and also protect the spring's paint finish.)

TIP: If you don't have the Parts CD yourself, have your dealer print out the exploded view of the strut assembly from his parts computer, very useful.

- Take your donor struts, use soft jaws or a cloth to protect their finish, and clamp them upside down in a bench vise. Use a punch to mark the geometric centre of the convex bottom of the strut. Try to be accurate, this will be important later.

- Now use a small drill bit (about 1/8" or 3mm is good) to drill into the strut at the punch mark you made.

WARNING: When you get through, hydraulic fluid and gas under pressure will escape through this hole. Wrap a rag around the area, but it'll still spray you. Now hold the strut upright over a basin, and pump the shaft in and out until as much hydraulic fluid is expelled as possible.

- Pull the black plastic cap off the top end of the strut body if you haven't already. This reveals the end of the strut casing where its metal end is welded or crimped on.

- Now you will need to cut this end off. Make your cut about a half inch from the end, far enough down to clear all traces of the original crimp or weld. You will cut all around the circumference of the casing. To help keep your cut straight, wrap the strut tube with masking tape and follow the tape's edge with your cut. I used an air cutoff tool with abrasive wheel, but a hacksaw will do the job. You can also buy a strut cutoff tool at most auto parts stores or at Sears. It looks like an oversized pipe cutter and isn't very expensive. Here's a link (thanks Chester Wong) to one: <http://www.autotoolexpress.com/exstrutcutto.html>

- Once your cut is complete, you will be able to pull off and discard the strut casing's end cap and withdraw the shaft and all internal parts, leaving only the empty bottom casing. Deburr the cut edge with a file.

- Now drill out the pilot hole in the strut casing bottom to the specified size (14mm or 9/16"). You will need a fairly powerful drill for this.

- At this point clean up and degrease the empty strut casings. I sent mine out to be bead blasted and powder coated, a deal for \$50 the pair at a local specialty paint shop. "Safety Yellow" was a pretty good match to the Koni yellow color.

- Slip the Koni shock insert into your strut casing. It's a snug fit and will probably not go all the way down by hand. Use a wood block and mallet against the top cap of the Koni shock body (not the shaft) to tap the cartridge into the casing. Look through the bottom hole you drilled to see how far in it is. Once you get it far enough down, the bolt that goes in the bottom hole can be used to draw the cartridge down (now you see why the hole had to be accurately centered). Gently tap/draw it in until it seats, be patient. Torque the bottom bolt to spec, making sure its special washer has the concave surface toward the casing.

- Put the original black plastic caps back on the top end of the strut casing, they'll hide your cut edge nicely.

- You now have a Koni strut, ready to reassemble in the conventional way.

- On assembly I recommend that you replace the rubber spring seats in the top and bottom spring perches, they're cheap. Don't forget to put back the rubber bump stop on the shock shaft, and the dust sleeve. Make sure all the washers and plates go together in the correct order and orientation.

NOTE: If using shorter springs, such as H&R or similar, cut the rubber bump stops at the first ridge from the bottom to shorten them, or cut an equivalent amount from the top instead (may be better). Otherwise you can hit the bump stops prematurely in hard cornering.

- Once you've assembled the strut and torqued the top nut (using my method, see below, or your own), make sure the bearing plate turns freely. If not, something's put together wrong, BZZZT! Try again.

- The small black plastic inner caps that normally block the hole in the top of the strut bearing plate will no longer fit, since the Koni's adjustment tab sticks up too far. If you drill a clearance hole in the cap you can make it fit very tidily, and still adjust the shock without removing the cap.

- When remounting the completed strut assemblies in the car you must replace the following hardware with new (BMW uses cheapo crimped locknuts that only work once):

The 2 lower strut to steering knuckle bolts (or, use Loctite red on the original bolts)

Locknut on upper strut to steering knuckle pivot bolt

Locknut on swaybar link bolt.

Or you can replace the original one-time locknuts with Nylocks, which would be the preferable solution.

- If you have a 96 or later M3 the Koni adjusters will be hard to access with the white knob supplied, because the strut reinforcing plates interfere. I ground a relief slot in these plates adjacent to the adjuster using a die grinder. However if you have a 95 M3, or any

year of non-M E36 car, there were no reinforcing plates installed. The E36 strut towers are a known weak point, so be sure to add them. The P/N is 31 31 2 489 795 (qty 1 per side).

- Make sure that everything is torqued to spec per the Bentley or Haynes shop manual. This isn't an area where you want to make mistakes and have something come loose.

E36 M3 STRUT ASSEMBLY TOOL/TECHNIQUE ^^

When you put the strut assemblies back together using the Konis, you have the same problem torquing the big top nut as with stock struts: how to keep the shock shaft from turning. But with Konis it's extremely important to secure the shaft as you torque this nut, since otherwise you may end up turning against the stop on the Koni's internal adjustment mechanism, and can break it. Very expensive error!

TIGHTEN THE NUT BY HAND. DO NOT USE AN AIR IMPACT WRENCH!

Newer Konis have a hex head on the shaft which you can use to keep it from turning. The Koni instructions show using a simple open end wrench to hold the shaft while torquing the nut, but in the BMW strut assembly the hex end is deeply recessed into the bearing plates and you can't get to it that way. Based on an idea by Bob Stommel, here's how to make a special concentric socket tool.

Buy a 22mm deep pattern 1/2" drive socket (or the appropriate size if the nut on your shock is different.) At the square drive end, grind a pair of flats at 180 degrees to one another so that you can put an open end wrench on them. I used a bench grinder to do this.

Now take a 3/8" drive extension and pass it down through your modified socket. Attach an 11mm socket for the Koni's shaft to the bottom of the extension, and a ratchet handle to the top, with the 22mm socket captured in between.

Note: if assembling Bilstein or stock struts instead of Konis, substitute the appropriate size hex driver instead of the 11mm socket.

Thread the large central nut on to the Koni shaft. Position the small socket on its extension over the shaft hex, then drop the 22mm socket down so that it engages the large nut. Using the ratchet handle you can now hold the shock shaft stationary, while turning the nut with an open end wrench on the 22mm socket's flats.

I've recently (Jan 2003) found an online source for a ready-made socket that works in the same way as the DIY version above. Go to:

www.victoryproductdesign.com/tools_main.htm

and look for the Front Strut Socket Adapter.

Questions, suggestions, errata?
E-mail me at neil.maller@gte.net

Neil
96 M3