

BMW '02 Transmission Upgrades

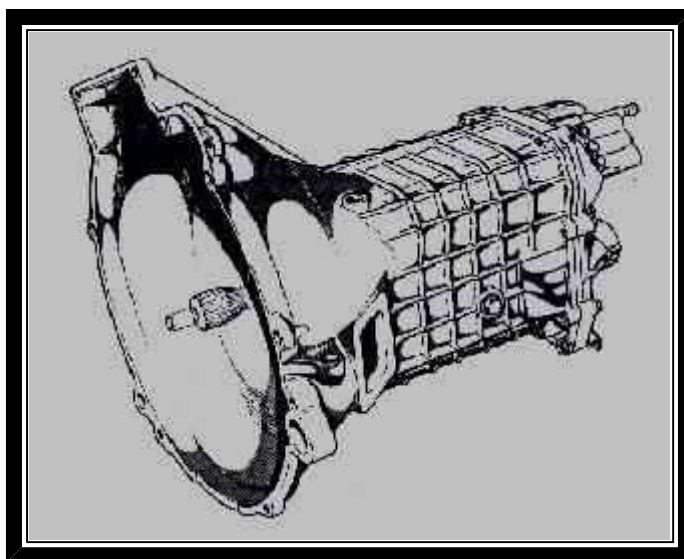


Table of Contents

[Installing a 320i five speed transmission into a 2002](#)

- o [Parts List](#)
- o [Conversion Procedures](#)

[Improving shifting](#)

- o [Rebuilding Shift Linkage](#)
- o [Installing a Short Shift Kit](#)

Installing a 320i five speed transmission into a BMW 2002

To start, let us point out that this is not, in most instances, a simple conversion. The transmission itself is not always easy to come by, and the installation of a 320i five speed into a 2002 requires a little patience and skill. Having said that, the overdrive 5 speed conversion is probably the best thing to do to a 2002 if it is driven much on the highways. The close ratio 5 speed conversion is also quite an improvement for track and competitive type events. We also don't recall the last time someone regretted installing a five speed into their 2002.

Parts list:

There are several different combination of parts that can be used to install the five speed. Listed below is a method very similar to the factory close ratio installation, and is our recommended method. Several other installation possibilities are also available, and may be discussed at a later date.

- 1 five speed transmission, either the overdrive Getrag 245/5, or the close ratio 245/10. The 245/5 OD unit can be found in '80-'82 320is residing in salvage yards. The 245/10 CR unit is much more difficult to get a hold

of; they occasionally appear in the Roundel classifieds or other 'specialty' sources.

- 1 320i style clutch slave cylinder, with accompanying metal line and rubber hydraulic hose

cylinder part no.: 21 52 1 116 300

line: 34 32 1 153 666

hose: 21 52 1 120 306

The line and hose may come with a used transmission. It is highly recommended that a new slave cylinder be installed. Due to the tight space, it's difficult to replace the cylinder once the transmission is installed.

- 1 320i style clutch throw out arm

arm: 21 51 1 204 229

This arm usually comes with a used transmission. Check the plastic pivot the arm rides on for excess wear.

- 1 2002 Automatic speedometer cable

Two versions of this cable are available. For pre-'75 cars, the cable is one long piece. For '75-'76 US models that still have the EGR/Reactor Service mileage switch box, only the lower half of the cable needs to be replaced. Of course, the earlier cable can be used to bypass the switch box altogether.

Cable, pre-'75 models: 62 12 1 351 720

Cable, lower half, '75-'76 models: 62 12 1 359 333

- 1 320i rubber transmission mount (either the 4spd or 5spd 320i mount will work)

mount, 320i 5 speed: 23 71 1 175 424

- 2 bolt-on transmission brackets -- these are pieces made by BMW which look just like the existing 4spd mounting brackets, but can be bolted or welded on into the new 5spd mounting position.

brackets: 41 12 1 808 830

Alternatively, these brackets can be fabricated -- just copy the existing 4 speed mounts.

- 1 2002 close ratio 5 speed mounting crossmember, or you can modify the existing 4 speed piece to work by shortening it. The factory piece can be used for both the overdrive and close ratio installations. Or the old 4 speed piece can be used, by trimming equal amounts of material from both ends until the crossmember is 215mm long.

crossmember: 18 21 1 101 620

- 1 either a 323i throw-out bearing, if you are using a 228mm clutch setup, or a 320i throw-out bearing, if you are using the 215mm clutch setup

323i bearing, for 228mm clutch: 21 51 1 204 525

320i bearing, for 215mm clutch: 21 51 1 225 168

If the 5 speed transmission you have has a 3 bolt output flange, we recommend replacing it with the 4 bolt version. It makes proper driveshaft creation simpler. The flange is expensive, but having it means that all you need to do for the driveshaft is to shorten the existing 2002 4 speed unit.

Four bolt output flange: 23 21 1 208 536

Conversion Procedures

If you are installing a close ratio transmission, then you can opt to purchase the shift platform and linkage from BMW, or shorten your old one by 3.125 inches. If you are installing an overdrive transmission, then you will need to shorten your old pieces by 3.5625 inches. To do so is simply a matter of cutting the old platform at the box section portion, and remove a piece that will cause the platform to be 3.5625 (or 3.125) inches shorter when welded back together. Don't forget to account for the width of the saw blade! BTW, the factory pieces are modified exactly this way -- they are cut and welded. The shift platform brace also needs to be shortened. The appropriate length for the brace, for the OD installation is 210mm as measured from the center of the bushing hole to the platform hole. A brace mounting bracket also needs to be fabricated to mount the brace onto the back of the transmission. The 320i transmissions do not have a provision for the brace. One of the 13mm rear cover bolts works as a place to mount the bracket.

shifter platform, for CR installations only: 25 11 1 204 147
shifter platform brace, CR tranny only: 23 41 1 766 125

The same process applies for the shift linkage. It is recommended that the later (post-3/74) style linkage be used, as it is easier to cut and weld, as well as easier to service. The shift rod needs to be cut and shortened by the appropriate amount. The 320i shift rod can be used, but instead of shortening it by 3.5625 (or 3.125) inches, shorten it such that the final length of the rod is 74mm measured from the center of the connecting pin to the center of the other pin. If you have the earlier style linkage, you'll also need a matching lower shift lever and shift knuckle on the back of the transmission (if it didn't come with the 320i transmission) to match the newer shift linkage. A short shift kit of your choice can be added in place of this if desired. Beware that short shift kits may not be available for a 2002 5 speed conversion, and that you may need to shorten the supplied shift rod too.

shift linkage rod, CR tranny only: 25 11 1 204 359

Creating the proper driveshaft is probably the trickiest part of this conversion. This is not a do-it-yourself cut and weld operation, unless you have access to a lathe, balancer, and welder. Finding a driveshaft shop that will touch, much less modify, a BMW driveshaft with permanent style U-joints is difficult. Nevertheless, the shaft needs to be modified such that the *front* half of the driveshaft is shortened by 3.5625 (or 3.125) inches. Note that the final length of the front half of the driveshaft needs to be the required amount shorter. This can be different than telling the shop that you need 3.5625 inches removed from the shaft. The rear half of the driveshaft stays the original length. Make sure you use a driveshaft with good U-joints. If a 6 bolt driveshaft coupling is used, the front flange of the 320i driveshaft needs to be transferred over to the 2002 driveshaft as well.

A couple of other minor pieces: The reverse light switch wires will need to be extended. The lower half of the 320i harness works very well for this, but any generic wire with spade connectors will work. If your driveshaft coupling and/or center support bearing are marginal or bad, now would be the time to

replace them. One other thing -- the top of the 320i 5 speed transmission has a small protrusion that is used for a clip to keep the reverse light wiring from moving around. When the transmission is installed in a 2002, this protrusion comes extremely close to the brake line that is at the top of the transmission tunnel. It is recommended that this protrusion be cut or ground down, to maximize the clearance with the brake line.

Transmission removal and installation procedures will not be discussed here -- most 2002 repair manuals cover this operation adequately. Basically, proceed with a standard removal and installation of the 4 speed, but with these details/modifications:

Once the old transmission is out, first of all, check and replace if necessary, the clutch, pressure plate, and pilot bearing.

Hint: fitting the transmission to the engine is much easier if the rear of the engine is pushed over towards the passenger side. The layout of the 2002 motor mounts tends to tilt the rear of the engine towards the driver's side when the transmission is removed.

The next task is to clearance the transmission tunnel for the new clutch slave cylinder location. The best way to do this is with a "dead-blow" hammer or filled mallet, but any decent hammer will work. Fit the 5 speed transmission to the engine, and locate into its approximate location. Exactly where and how much the transmission tunnel needs to be hammered in will be evident. Several hammer blows in the area next to the accelerator pedal should be all that is necessary. If done properly, the indentation should not be noticeable from inside the car.

Pull up the carpeting in the area of the transmission tunnel, next to the existing transmission mounting tabs. This is to allow the drilling of holes or welding for the new mounting tabs.

Next, fit the 320i transmission mount to the new or modified mounting crossmember. This requires that the mounting hole be enlarged from 8mm to 10mm. Refit the transmission to the engine again. With a jack, hold up the rear of the transmission. This is the all-important locating the new mounting tabs procedure. First of all, the bottom of the rubber transmission mount, as mounted onto the transmission, must be 80mm above an imaginary horizontal line running across the bottom of the two frame rails that run under the floor on either side of the car. Fit the crossmember and new mounting tabs to the rubber mount. This will give a good idea as to where to mount the new tabs. Before drilling holes or welding, install the modified driveshaft. Make sure that the shaft is straight when installed, and is not stressing the coupling, otherwise vibrations are certain to occur. Make sure that the left-to-right alignment is satisfactory, and the up-and-down alignment is satisfactory as well, keeping in mind that the bottom of the rubber mount should be around 80mm above the imaginary line across the frame rails. (see picture in factory manual if you need clarification) Once you are certain that the transmission is aligned properly, scribe the location of the mounting tabs onto the tunnel.

Remove the transmission (for the last time) and drill the mounting holes or weld the tabs into place. Prime and paint as necessary to prevent rust. You may remove the old tabs if you wish, but this is not necessary. Lightly grease the splines of the input shaft, as well as the clutch arm pivots. Don't forget to install the release bearing! Install the clutch slave cylinder onto the transmission, as well as the line and hose. If you are using a new metal line, it will need to be bent into shape. Mount the shifter platform, using new bushings if necessary. Install the transmission onto the motor one last time, and proceed as per the manual, substituting in new parts where necessary.

Replace the speedometer cable. Bleeding the new clutch cylinder may be tricky. Best results are

obtained by having the car level (front and rear and the same height) and someone pumping the clutch pedal. Make sure that the bleed nipple is pointing downward, otherwise the cylinder is installed upside-down. Once this bleeding procedure is accomplished, the installation is complete, and the car can be test-driven. Be sure to use a good quality gear oil to protect your "new" transmission!

Improved Shifting

TBD

Rebuilding Shift Linkage

TBD

Installing a Short Shift Kit

TBD

Contributors:

Erik Frank

Ben Thongsai

Last updated 01/05/97

[© Copyright 1997. bimmers.com, Inc.](http://www.bimmers.com)