

## So You Just Bought an E60 (Version 3.0).....

*Changes from 2.8: Added emphasis for newbies on what this document means. Added a link from AB Able for rebuilt ZF mechatronics. The second is for VBX, Valve Body Express, who specialize in rebuilt valve bodies (mechatronics), and are now a division of Sonnax. Also corrected some mis-identification or various meaningful mistakes here and there. Comment on the Bentley Manuals. As always, typos get corrected when I see them and are not generally noted --banglenot*

Welcome. This is for new owners of a used BMW E60, or those considering buying one.

Because used E60 prices have dropped to the point that they're affordable luxury in the sub \$20K range [now as low as \$10K for the early year basic models], there are lots of new BMW buyers on this forum.

Many new owners are buying cars with mileage above 60K; some are above 100K. Most of them are off warranty at this point. Many of you are new to BMW, and many are concerned about whether the dealer is the right place to go or not. Some of the new owners are great, experienced mechanics; many are not.

As a result, there are many questions about this model.

- What can go wrong if I buy it?
- What maintenance do I need at [xx]K miles?
- My water pump/transmission/steering/shocks are having a problem or are failing – what do I do?
- Can I fix it myself, or do I need the Dealer?
- ...And so on.

This document is meant to summarize some of the issues on a used 5-series E60. [Read the endnotes](#), because that's where most of the useful references are.

There are usually detailed threads on each of these items, so we'll assume you'll search for them. Don't forget to search E39 and E46 forums as well – many components and a lot of the tech are carried forward. Many of the E39 and E46 matters will occur on the E60 as it ages towards 10+ years.

Also, this doesn't spend any time at all on the regular issues that accompany a used car, including accidents, strange noises, or that odd line of dried salt water across the middle of the seats. It assumes you're comfortable with internet and forum searches. We'll spend no time at all on cosmetic mods.

**A comment for the newbies we're scaring away: Welcome to BMW E60. The many items in this document do not mean that your E60 will immediately implode from all the listed items the day after you buy it. Many apply to specific models and engines. Some apply to all. Most are rare, with some more likely (like the electric water pump and the battery). If you buy a well-maintained E60, and continue to maintain it, it can give you 200K miles or more. Maintenance – before and after you buy it -- is the key to a long-lived E60.**

Documents like this discuss problems, so it sometimes looks like everything about the E60 is a problem. Lots of people take the E60 to well over 150-200K miles – just like they did the E39 before it. It helps to read success stories, and what it takes to get to a high mileage BMW: <http://forums.5series.net/e60-discussion-2/any-members-here-high-mileage-e60-101091/>

This document originated at <http://www.bimmerfest.com/forums/showthread.php?t=731460>. Comments are appreciated.

Many URL's are referenced in a series of endnotes on the last page.

*Lawyer Language: You take any and all responsibility for reading this document and using it or any other information to work on any BMW or other vehicle.*

## **First, For Some You, Don't Buy An E60:**

*This was written in December 2014 after reading posts from folks who really, really wanted an E60...so they spent their last nickel to get it out of the dealer's lot. For some, it's their first car. We know you love BMW's. So do we. But....*

We've been getting posts on Bimmerfest that go like this:

*"I just drove home from the (used car dealer/private party) with my new E60. It has 150,000 Mi on it, and it's really beautiful! HELP! The light on the dash went on, and its shaking, and Transmission Fault lit up and the clock doesn't say the right time! The guy said he didn't have the service records, but he maintained it religiously! What's happened????"*

What happened is a list of things. So take some advice from Ye Olde BMW Owner(s).

- 1. These cars can be very pretty longer than they can be reliable (without maintenance).** This is the most important point. They're not Hondas (thank god). They're complicated, with a pretty specific list of things that go wrong as they age. If you buy one with, say, 150K, certain things have worn out, and others are about to. We assume these items have not been maintained. We all know the list. You probably don't.
- 2. Bought from a Dealer? Very high mileage BMW's are very rarely (read "never") sold by BMW dealers.** They know, and if they get one, it's off to the Auction for it. That BMW at the Toyota dealer, if you're really lucky, was a trade in from a little old lady for a new Camry. Far more likely? It's an auction car. No records, no reliable owner history. Could be a bargain. Could be a money pit.
- 3. NEVER buy a 150+Kmi BMW unless you know how to fix it (or can learn).** You can't afford to have the major things fixed. Paid \$10K for the 530 and the transmission crapped out? It's \$5K or more for a reman. You saved up your bucks to spend 50% of the purchase value on a major fix.
- 4. NEVER buy a himile E60 without the service records.** Look until you find one that has them. You can get the ones BMW has (maybe) until the car left the Dealer system -- but that was probably when it dropped out of warranty, years ago. A reliable owner keeps their records. Buy from someone who did.

Just look until you find it.

5. **NEVER buy a himile BMW without an independent inspection by a shop that knows them.** If the owner won't let you do that, well, don't buy it. Keep looking. Part of managing risk is knowing when to not take it on.

Anything else you have to watch for in a used car? You have to watch for it with a BMW. The major difference is that it costs more when you find it 😞. Buy it with your eyes wide open, or don't buy it at all.

Thanks, and good luck in your search. 🙌 Now that your eyes are hopefully open, continue your learning about this fine car.

By the Way: Yes, we'll all help you when you limp into the Forum with an empty wallet. We may feel a bit sorry for you, but, well....we'll always help where we can.

Oh, and with a hat tip to Gangplank on the Bimmerfest E60 Forum, with a couple of edits:

Service Schedule (if no records expect all of this in first year + any worn out items)

- Oil Service every 5,000 [most do 7500-8000—Banglenot] miles (BMW says 15,000 between Inspections but oil is cheap, motors are expensive) Indy: \$100-120
- Brake Fluid Flush every 2 years Indy: \$250
- Coolant Flush every 2 years Indy: \$150
- Power Steering Flush every 3 years Indy: \$100-200
- Inspection I every 30,000 miles: Dealer: Tear up most of the money in your wallet.
- Inspection II every 60,000 miles + transmission fluid change w/ pan. Indy: tranny fluid/filter is \$700 or so (if they agree to do it). Tear up the rest of your money.

## Identifying your E60

Read the E60 Wiki<sup>1</sup> at the top of the Bimmerfest E60 forum. It'll give you a good overview of models and (this is important!) engine types. Also, look for the M54, N52, N54 and N62 engine descriptions on Wikipedia. Three things are fundamental to identifying the E60 over its production run, and getting the right parts, bulletins and forum advice for them:

**First**, of course, is the model, which in the US is the 525, 528, 530, 535, 545 and 550, and the X5 and M5. The M5 is beyond the scope of this document.

**Second**, the manufacturing date (mm/YYYY), is on the driver's doorframe or decoded through the VIN. This overlaps and may be different than the model year – for example, a 2007 might have a manufacturing date of November 2006. The manufacturing date is what defines changes related to parts, service bulletins and design alterations. It's often worthwhile to talk to the parts supplier with your VIN in hand to make sure you get the right part, due to changes that happen throughout the year of your car's manufacture.

**Third**, understand the engine types, since each type has peculiarities and problems that appear again and again in its maintenance.

**Want help?** Learn how to describe your E60 on the forum. The wrong way: “My new Bimmer broke. Help!” As kind as most folks are to render aid, this is just annoying, so don’t do it if you want an answer. The right way: “My 2007 530xi with the N52 engine and automatic transmission, with 67,000 miles, has a (description) when I’m (description) with it. The BMW codes are XXXXX and YYYYY. What should I do?” And remember that same/similar engines are used on multiple BMW’s of the same era. For example, the N54 is used on various 3 series models as well as the E60 535. So, reading relevant 3 series forums can help in identifying problems.

Always get the codes if you can. Remember: typical code readers supply the basic generic OBD codes. So P0700 says “transmission fault”. Says exactly that for a Ford or Chrysler as well.

The E60 has 30+ controllers with more than two hundred BMW specific codes across them. To read them you need a BMW compatible code reader. See the section below on BMW codes. You’ll need to get the codes, if any, to get accurate help.

Want to know the theory and ops of the E60? Look here for a long list of detailed training docs. You’ll be amazed at how sophisticated this car is:

<http://www.bimmerfest.com/forums/showthread.php?t=709712>

AND, puzzled by the endless list of German acronyms? A colleague on the E39 Forum collected a long list of BMW terms and issues. Pretty much most terms that apply to the E39, the previous 5 series, are relevant in the E60. A lot of great info. Here, and thanks to bluebee for the info:

<http://www.bimmerfest.com/forums/showthread.php?t=454814&highlight=e39+acronyms>

Finally, this doc assumes you can do good enough searches to find the referenced docs. It also uses USA measures.

We hope this helps you enjoy your E60.

## **You’ve Just Bought a Used Higher Performance Luxury Car. Get Used to It.**

No, it’s not a Veyron, but it is a pretty nice piece of German auto engineering. So, it’s gonna cost ya to own it. Could be no more than any other 6+ year old car, or it could be a helluva lot. How much depends on two key items: Maintenance to this point, and your ability to DIY (Do It Yourself) going forward.

Dealers are extraordinarily expensive, since that pretty building doesn’t come for free. Independent BMW specialists (“Indys”) are usually a far better cost choice. A good indy will discuss problems with you in great detail, and will sometimes use aftermarket parts you source (but some resist this, so ask nicely) and charge you for labor alone. DIY is by far the cheapest, and a good DIY’er can own an E60 for not much more than any other sedan.

**NOTE:** Figure dealer costs are about 1.5 - 2X for most parts listed in this DIY document, and labor is about the same as your parts cost. So, as an example, a 530 waterpump/thermostat replacement costs you \$450 or so for aftermarket parts from a reliable supplier. The dealer will charge \$900-1200 for the same job.

**Fluids:** Before we begin, we're assuming that certain fluids<sup>2</sup> get used, such as BMW 5-30 oil; Pentosin hydraulic fluid; BMW Coolant; ZF Transmission Fluid. There are aftermarket alternatives as well. Feel free to seek them out as long as you confirm compatibility with the E60. For simplicity, we'll use the list above.

**Codes:** Also, you need two new tools to work on these cars. First, get a code reader that accurately reads BMW codes. Many people here use INPA<sup>3</sup> and DIS; others are using Bavarian Technic; and a newer item for the Iphone/Ipad/Android is the Carly App (formerly BMWhat, but you know the BMW trademark department was on them like wolves for infringement once they got noticed). There's a long list of unique codes from the several dozen controllers and sensors in the E60. Your Autozone reader may get some, but it won't get all of them. Also, when you go to a dealer or indy, ask for a complete BMW code printout during whatever diagnosis they do. Here's a code list some of us use: <http://engine-codes.com/make/bmw>.

Why do code readers matter? There are two levels of memory in the ECU's (most of them). Transient events occur and get recorded. But it takes a number of repeated events before a code lights your SES light. Also, events that occur enough to light your SES but go away (such as forgetting to tighten your gas cap) will self-extinguish.

Also, if you want to do your own work, buy a Bentley manual. They're about \$100 for the two volumes online (used). Used is fine, of course. It's designed for folks who haven't done much with the car and want to learn the mechanics. Also, torque tables, etc. There are resources online that do the same job, but they're much harder to use<sup>4</sup>.

**Torque Wrench:** If you don't have it already, the second new tool is a good quality accurate (preferably digital) torque wrench. This is not your granpa's cast-iron Crown Vic. The N52 engine is partially magnesium with single-use aluminum bolts in many locations (note that the M54, used in the 2003-6 525/530, and the N62, used in the 545/550, do not use magnesium in their engines; the N54 turbo uses the M54 alusil/cast iron liner base engine structure, but has certain N52-derived items (such as the electric water pump). The N52/magnesium was not deemed suitable for turbo apps. There're very few things that can crap up your mechanical day more than twisting the head off an aluminum bolt, or stripping the threads out of a magnesium engine, because you imagine your arm is magically calibrated in foot-lbs.

Disk rotors can warp if the bolts aren't properly torqued. 10 Newton-Meters torque is a lot less than you think it is, and 85 ft lbs on the disk rotors is a lot more. Torque and torque sequences are very important on BMW's. Your arm, accompanied by a muttered "that's about right", is not a torque wrench.

**Videos:** There are some great videos out there, since parts suppliers have learned that they attract visitors to their site. As of the date of this document, Bavarian Auto does a fine series<sup>5</sup> on E60 common repairs, including suspension and brake replacement.

**Be Neither Cheap Nor Stupid:** Cheap means don't reuse single use parts (aluminum bolts, locknuts, hoseclips and so forth) to save a few pennies. Never re-use fluids, like ZF transmission fluids, and make sure your dealer/indy uses fresh fluid every time (mostly a problem with the "lifetime fill" nonsense on ZF transmissions).

"Neither cheap nor stupid" also means knowing where your replacement parts come from. Use name brands (Brembo, Lemforder, Pagid etc) from reliable suppliers (Pelican, BavAuto, Autohauz, OEMbimmerparts etc) who have established a name for themselves among the BMW community. Don't buy parts from unknown sources. There are fakes out there, or badly done rebuilds. Go to a parts site with a long history with BMW's, who can stand behind a good reputation. Good parts are cheap compared to the labor to re-install and the damage if cheap parts fail.

Check out this resource from Bimmerfest, located at <http://www.bimmerfest.com/forums/showpost.php?p=8935328&postcount=10>.

*SilberVoegel created an app that searches many different sites by part number and posts their current prices. Very useful and can save you a bundle. Still being tweaked, but check it out. If he sets up a tip jar, leave a few bucks for the time and money you save.*

Finally, "Don't Be Stupid" means know how to work safely; using only a floor jack to hold a 3500 lb car six inches above your face is probably the textbook definition of stupid. Rather than becoming a Darwin Awards entry, take it to a dealer/indy if you can't work safely.

**Levels of DIY:** In each comment below, **DIY** is added as **Easy**, **Moderate**, **Hard**, or **Leave it to the Dealer/Indy**, and the rough cost just for parts from good aftermarket stores.

- **Easy:** you can reach it from above or the side and don't have to take much apart.
- **Moderate:** harder to reach, disassembly required, should know how to wrench with decent tools.
- **Hard:** requires skill and experience, and may require special tools. Yes, you can do it, but this needs preparation and research to make sure you get the job done right.
- **Leave It To the Dealer/Indy:** Only a small percentage of amateur mechanics want to take this on.
- **Cost** assumes you looked around for good quality stock<sup>6</sup> parts sources like Autohauz, Bavarian Autoparts and thectsc.com (for ZF parts), rather than simply buying from the dealer. Nothing wrong with dealer parts except the cost. We don't discuss upmarket parts, since there's an endless number of alternatives and debates.

## Maintenance

First, how was it maintained? Get the records and read them very carefully.

If it was maintained to BMW dealer spec, fine – but many folks here feel that BMW dealer specs are barely adequate, and in cases like ZF transmission maintenance, woefully inadequate. If it was not even maintained to BMW specs, consider another car. The BMW maintenance schedule is available everywhere. A better one is Mike Miller's *Roundel* schedule.

Below is what the consensus here is about what should be done on your average E60 (not the M5). It generally follows Roundel's Mike Miller in his "BMW Old-School Maintenance Guide"<sup>7</sup>. Mike requests that it not be shared, so email him at Roundel and ask for a copy if you want it. Someone who followed Miller's guidance is passing on a well-maintained car.

- **Air filters:** 25K. DIY: Easy, \$60 for all three. Good place for the newbie to start, since it'll get the hood open and a wrench or two in your hand.
- **Oil/filter:** every 8K miles, with whatever 100% synthetic oil that meets BMW's spec<sup>8</sup>. There are many quasi-religious debates of the best oil, and you're welcome to search them out. If the previous owner changed them every 15K Miles, fine. But you probably want to do better while you own it. Remember, with oil it's as much about the hours driven rather than the mileage; many short trips are much rougher than fewer long ones. Cheapest solution: Mann filter online and Mobil 1 0-40 LL-01 Euro Formula for \$30 at nearest big box store. More expensive: BMW 5-30 LL-01, basically Castrol in a BMW bottle, about \$55. As a minimum, always use LL-01 spec (BMW LongLife), and always use 100% synthetic. DIY: Moderate, \$50-60.
- **Brake Fluid:** change/flush every 2-3 years. DIY: Moderate, \$30. Any big name brand DOT4 is fine. Racing fluids are nice and won't hurt anything, but almost never necessary on a non-tracked car. Note that ABS braking systems should have ABS valve cycling to get all the old fluid and any air out of the system, but you can do a satisfactory flush without this.
- **Radiator Coolant:** Change every 2-3 years, with BMW coolant. Use the right spec coolant to prevent corrosion. You have to bleed the system. Units with electric pumps (N52 and N54 engines) have an electronic bleeding process. The others use various bleed screws. DIY: Easy, \$40-50.
- **Power Steering Fluid:** Mike says change around 30K, but most on here go to 50K. DIY: Easy, \$20, with the turkey baster method. No matter what BMW says, it's not "Lifetime Fill". Don't confuse ATF with Penstosin Hydraulic Fluid.
- **Transfer case and Differential Fluid:** Mike believes in 30K, but 50-60K is more common. DIY: Moderate, since on newer cases there is no drain plug and you have to suck out the old fluid. \$40. Also not "Lifetime Fill".
- **Plugs:** BMW says 100K. Mike says most non-turbo engines: 50-70K. Turbo (N54 engine on 535 series): 45-50K. DIY: Easy-Moderate, depending on experience; cost \$10-20 per plug. This is easy on the 525-535 series, harder on the 545 and 550 N62 engines.
- **Brakes:** If the car you're buying has 60K, the pads/rotors should have been replaced at least once, more likely pads twice, rotors once. A typical example of a complete set of parts for all four wheels is \$500-600. Pads Only: \$100+. DIY: Moderate-Hard, depending on your experience, cost: \$500-600. Good video at Bavarian Auto<sup>9</sup>. Use cross-drilled and slotted if it makes you smile when you look at them.
- **Transmission Fluid:** At 60K, the ZF fluid and filterpan should have been replaced at least once. Do not accept BMW's "lifetime fill" statement about the ZF transmissions. ZF itself does not recommend lifetime fill. Pan replacement has been done very often by forum members, but the risk of breaking off a pan bolt is enough to recommend a dealer/indy assume the risk unless you're an experienced wrench. DIY: Hard-Leave It To the Dealer/Indy; Cost: \$300 parts, \$200 labor at the Indy. But get it done.
- **Battery:** Yes, this is a maintenance item. Batteries last about 4-5 years. If your E60 is at 60-80K, you'll need one soon. DIY: Easy-Moderate. Cost: \$150-300. You'll need to get it registered at

an Indy, for about \$50. E60's have dozens of computers. A weak battery causes numerous transient and peculiar errors and faults<sup>10</sup>.

- **Gasoline:** Yes, gas. Cheap gas has an effect on these cars. The fuel filter can get clogged (located under the driver side rear seat, and a >\$150 part). Injectors can get clogged with bad gas. Also, these cars don't like regular and Plus is iffy, particularly in hot weather where the ECU retards the ignition timing to prevent knocking. Get 93 octane Premium, from a reputable outfit. It's only \$3.00 to 5.00 more per tank, and you really can notice the difference. Use a bottle of Techron every 5-10K miles. Doesn't hurt, and does help.

## Going Forward:

Like any car, E60 models have certain known failure points. If you buy one, check these items for past repairs. Each of them has a higher probability of failure on the cars noted, based on forum complaints. That doesn't mean yours will fail; but these are the items people complain about most often.

- **Water Pump Failure:** 525, 530, 535 (six cylinder engine)<sup>11</sup>. The electric water pumps on certain engines (N52, N54) are known to suffer electronic failure, usually at more than 50K miles. This is one of the few items people replace preventatively, since pump failure results in a tow every time. DIY: Hard, since it's difficult to reach, but many people replace their own. Usually replace the thermostat at the same time. Cost: about \$450, assuming pump and thermostat, but not hoses. Mike Miller recommends E60 coolant hoses at 150K. New: Bimmerfest member phaduman found a possible preventative fix for pump failure, caused by a loosening capacitor lead on the dry side. Check it out if you have the chops to try it out: <http://www.bimmerfest.com/forums/showthread.php?p=8306027&posted=1#post8306027>
- **Coils:** with one for each cylinder, these are the cause of annoying problems. Often a code will clearly call out the failing cylinder. Sometimes, you need to swap a coil to another position to pinpoint the problem, particularly with marginal ones (and it seems that coils most often seem to fail a little bit at a time, to everyone's irritation). DIY: Easier than changing the plugs on the N52 engine. On the N62, it's harder due to difficulty reaching the near-firewall units. Cost: \$40-60 each.
- **Headlight Wire Rot:** All models. The wiring insulation in the Hella light modules flakes off and exposes the bare wires. This one is increasing in frequency as certain models age (and is pissing off a lot of owners). It seems to be accelerated by hot climates and vibration. Since light pods cost \$500-1000 each, it's an expensive problem. Some DIYer's have disassembled and rewired their lights; others use shrinkfit insulation or brush-on liquid insulation. Doesn't happen to everyone. Tip: make sure you inspect the pods when buying – they have caps (to access some bulbs) on the back that can be opened to see the condition of the wiring. If found, negotiate for it, or walk. In the meantime, be very gentle when replacing bulbs to avoid further damage.
- **Coolant Tube:** 545, 550 (N62 eight cylinder engine). The seal eventually leaks on this part, requiring replacement. DIY: Hard. Cost: parts are relatively cheap, but getting to them is a real challenge. Dealer/Indy labor is the expensive part of this one.
- **DISA Valves:** 525, 530, 535. Problems above 75K miles have occurred on both the M54 and N52 engines. The DISA valves control low RPM airflow to the intake manifold. They fail because of poor design. Symptoms are rough idle, low torque at lower speeds, reduced gas mileage<sup>12</sup>. For the M54, there is a repair kit<sup>13</sup>. The N52 is a replacement only. May throw no codes and



confuse you and your mechanic for awhile, as it's mistaken for bad coils, other vacuum leaks, etc. Some have identified a 2AAC code.

- **Valve Guide Seals:** 545, 550. This is a rare, but expensive problem on the N62 engine, usually above 100K miles. Symptom is oil consumption and a "puff of white smoke" out the tailpipe on acceleration. DIY: No. Dealer or indy. Cost: \$2.5-5K, mostly 25-30 hours of labor.
- **High Pressure Fuel Pump:** 535. The HPFP was a recall on early 535's. It can apparently be a repeat failure. DIY: No. Dealer/Indy.
- **Turbo:** 535. BMW's twin turbo made a big difference in 535 performance. But, no surprise, new technology resulted in new problems. The best advice on an early production 535 is to make sure all tech has been updated, including turbo assemblies, and do research on the model /production timeframe you're considering to see how it has fared. Later E60 535 production is more reliable as bugs were worked out. The basic engine is a good one, however. DIY: No.
- **Upper Control Arm Bushing:** All models<sup>14</sup>. Wears out, and if not replaced already, a 60K car will need them soon. At 100K, it's almost certain they're worn out. The bushing may appear OK, but these things wear out. DIY: Bushing only, for most people, is not a DIY, as it requires a hydraulic press to remove/install bushings in the control arms. Parts are around \$120 for the front axle. Alternative DIY is upper control arms with preinstalled bushings: Moderate-Hard, but can be done in your garage. Advantage of new arm is a new ball joint at the same time as the bushing (for the 5Xxi). NOTE: the Four Wheel (Xi) drive control arm does not have a ball joint on it. Cost: \$340 for both. Makes a big difference in returning your BMW to the tight steering/handling you bought it for.
- **Tie Rods:** All models. These wear out, like on any other car. At 60K, have them preinspected prior to purchase, or looked at the next time your car is at the mechanic. Unlike the E46 models, they last a long time, but failure is a catastrophic event involving high speeds into trees, etc. So, standard practice to look them over every time they go in or you work on the front end. DIY: Moderate. Cost: \$300 for both.
- **Shocks/Struts:** Though wear time varies with the roads, etc. At 60K they're aging, and at 100K they're likely worn out. DIY: typical suspension: moderate-hard, needing spring compressors. Cost: Sachs (oem) strut cartridges: \$350 per pair; rear shocks: \$110 per pair.
- **Water In the Trunk:** All models. Accidentally leaning on the keyfob trunk/boot opener sometimes results in opening the trunk while it's raining. Also, some have complained about leaking gaskets next to the rear window. Result is to get certain electronics wet and cause intermittent problems. When purchasing, inspect under the spare for water or rust. Cost to repair varies widely. The MPM that was deployed in the spare tire well was supposedly integrated into another unit after 9/2005, but next time you have the trunk open, take a look.
- **Sunroof Drains:** All models. The sunroof drains water out through tubes that exit out the rear wheel wells, under the splash covers. They occasionally clog over time. This causes water to exit the sunroof into the car as the sunroof area fills with water. Easy DIY by exposing the drain exit points and widening their covers. Note that there are also front drains that can clog, located under the cabin filters and draining near the front wheel wells. Regular PM is to vacuum out the filter area once a year. You'll be surprised how much stuff collects there. Here's a discussion of how and where to clean them:  
<http://www.bimmerfest.com/forums/showthread.php?t=691644&page=3>
- **Rough Engine Idle:** All models. There are a number of causes for this, but in the absence of consistent codes a place to begin is a couple of tanks of premium with a bottle of Techron in each tank. After that, if the problem persists, there's a list of possible causes, including CCV, coil packs, bad/clogged injectors and vacuum leaks.

- **Vacuum Leaks:** As these engines age, certain plastic parts begin to age, dry and crack. There is a list on the E39, referenced at <http://www.bimmerfest.com/forums/showthread.php?t=595709>, that discusses their experiences with the problem. These are the previous generation of 6 cylinder 5 series, so many (but not all) the problems are similar. If you start to get a problem caused by aging plastic or rubber, it will occur at high mileage for the most part. Thanks to poolman at the E39 forum for this info.
- **Alternator:** Threads on alternator problems are increasing as E60 mileages increase, since the units have several mechanical wear points. On 545 and 550 units, there are complaints that the coolant tube slow leaks will drip on the alternator, damaging it. There are some comments that new units are a better reliability choice than rebuilds. Overall, on 525 and 530 engines, there appear to be few complaints, though.
- **CCV:** This is the oil separator, condensing oil vapor and returning it to the oilpan. It has a higher failure rate (per complaints on forums), due to heat-related cracking over time, causing vacuum leaks. Over 100K miles, give it a look if you're getting a rough engine idle. Also, early models lacked the tubing insulation, resulting in water condensate mixing with the oil condensate in cold climates. Replace the entire assembly and hoses if you're working on it. DIY: Moderate. Parts: Complete kit from ECS Tuning \$200-300.
- **Cracked Valve Cover:** Rare. Seems to be a couple of instances on the 535. Look for oil seeping around the middle of the cover.
- **Valve Cover Gasket:** Most models. Some valve cover gaskets eventually seep, a problem on most 5 series BMW engine types. DIY: Moderate, 1-2 hours. Everything is reachable and the parts are cheap, but it's a thoughtful torque wrench job. Many people have replaced their own.
- **Various Oil Leaks:** very minor on the N52 and N54, more common on the N62 as it ages past 70K miles. N62: Valve cover gaskets, front timing cover, alternator bracket gasket (thanks, HF@ bimmerfest). Fixes are usually DIY, and fixing what is an annoyance rather than a serious problem, but sometimes complex and sometimes knuckle busting. Many DIY threads on the subject.
- **Computers, Controls and Electrical Systems:** There are dozens of sensors and controllers on the E60. In general, they remain stable and reliable for a very long time. However, they are highly interconnected, and a failure of one unit might be clearly defined with code, or may affect others with multiple codes posted. Two common problems have floated to the top: First, a weak battery will cause multiple random faults, though the good news is that a new battery will immediately rectify the random glitches. Second, water in the trunk or battery compartment can flood certain trunk resident components and cause them to fail. This can be much harder to pinpoint and fix. With a BMW code reader, and using the wiring diagrams at <http://www.bmw-planet.com/diagrams/release/en/e60e61/index.htm>, you can often isolate the electrical problems. However, computer and network related problems can be very tough, and often the dealer/indy is the only solution. Some money can be saved via BMW parts recyclers for the less complex devices. Some of the more complex ones, such as the CAS, require the VIN # to be programmed into the unit to install it. Good news: computer/network problems are rare. Bad news: get ready to open your wallet when they do.
- **Current Draw:** Usually encountered as a dead battery in the morning, caused by an electronic/electrical component that has not shut down properly. Though rare, these can be maddening to fix. This is a dealer/indy matter, unfortunately. They have specific procedures using amp meters to check for draw, or failure of a particular controller to "sleep" properly. This

may be the single most maddening failure on the E60, since no “didn’t go to sleep” codes seem to be generated.

- **Alignment:** Front and rear need to be done when new tires, or suspension work is done. Car must be weighted properly. For non-BMW owners, it’s a surprise that rear tires can wear a lot if not aligned. So, do it right. Sears, or your average tire shop is not the right place to do BMW’s. Alignment is not some magic process on these cars. But it’s not the quality of the equipment. It’s the understanding of weight, and four wheel alignment, and doing it right that matters, not processing a lot of cars per day. Alignment is cheap compared to the cost of good tires.
- **Steering Angle Sensor:** Your steering wheel is monitored for its position, and used by various systems, including Active Steering. On some models, an Active Steering Code can be fixed by cleaning the optical sensors in the steering wheel. Look for the Active Steering DIY’s, or Steering Angle Sensor. A repair posting is in the endnotes.<sup>15</sup>
- **Serpentine Belt Failure Causing Engine Failure:** This is a rare, but serious event that happens if there’s oil leakage onto the serpentine belt. Sometime the belt will weaken and shred. When it does, it can wrap around the nearest pulley shaft and drive metal past the shaft gasket into the oil pan. If the pieces are confined to the pan (usually by stopping immediately upon seeing the oil pressure light come on), the pan *may* be able to be dropped and cleaned. If however, the pieces clog the oil pump, damage can be serious. Bottom line on this one is to fix any oil leak that affect the serpentine belt, and replace the belt when it does.<sup>16</sup>

E61 Additional Common Issues (suggested by several E61 owners):

- **Panorama Roof Drains:** Like the sedan, rear drains easily get clogged due to valves at the end; can result in leaks and potentially cause extremely expensive to repair water damage to low-mounted electronics in rear. When buying, make sure to check for signs of water/water damage to modules in trunk/spare tire well. Supposedly easy to resolve by removing the drain outlet rubbers.
- **Rear Self-Leveling Suspension Compressor Failure:** Particularly an issue on pre-LCI cars; among other issues, compressor intake hose is liable to crack, which can eventually destroy the compressor as it sucks in debris and dirt. Check for error codes and assess whether compressor properly lifts car when weight is applied in the rear. Good idea to fix prophylactically if the old-style hose is present.
- **Tailgate Wiring Issues:** Tailgate wiring harness can become worn over time leading to frayed wires. There are threads with suggested fixes available to search.
- **Tailgate Window Switch:** reported failures, not much detail provided.
- **Diversity Module:** Also called Diversity Amp/Amplifier or Antenna; very common failure point. Symptoms of diversity module issues include, among other things, bad FM reception, short or nonexistent key remote range, iDrive failure to save radio presets and other settings. Basically, the module is located in a supposedly waterproof black 'box' inside the rear spoiler (in the E61; it’s located elsewhere in the E60). In fact, the box does not seem up to the task and even later TSBs and revisions don't seem to conclusively resolve this issue. The module itself is a ~\$300 part and is easy to replace if it's completely dead; sometimes it can be fixed by cleaning corrosion with 90%+ isopropyl. Might not be a bad idea for a new owner to check it out prophylactically.

[Other Problems to be provided as documented]

## Special mention: The ZF Transmission

The ZF Automatic Transmission deserves special mention. It's a fine unit, used on BMW, Bentley, Jaguar, Rolls and many other high end Eurocars.

However, BMW has always had an odd view of the ZF hydraulic fluid, labeling it "Lifetime Fill" for many years. Many BMW experts, like Mike Miller, heatedly disputed this, and strongly believe the ZF needs new fluid and filter every 60K miles (at most). People familiar with the ZF in other cars see recommended maintenance at shorter intervals, as well. Even BMW recently stated that a fluid/filter replacement should occur at no greater than 100K miles.

The problem with this is that the ZF is the most expensive single assembly on the car. A rebuilt unit for the E60 is \$3-5K, and a new one is \$7+K. Many owners complain of ZF problems as the car reaches towards 100K – though to be fair, some owners claim it's rock solid to 200K Miles.

The final nail in the "lifetime fill" coffin comes from ZF's website: *'Regular maintenance intervals will substantially increase the automatic transmission's service life and, precisely for that reason ZF recommends regular oil changes every 80 000 to 120 000 km or after 8 years - depending on the usage.'* That's 48K-72K miles, for us metric challenged folk in the USA. Not 100K miles, and certainly not "lifetime fill". Finally, here's a vid of the change procedure, from ZF. Note the recommended change interval. It's a whole lot less than BMW's recent 100K miles – which they decreased from "lifetime" in the last few years. <https://www.youtube.com/watch?v=ZRrgmfM8VIQ>

There is a debate about this issue (what a surprise...). If the fluid is never changed, some claim, changing it above 100Kmi may result in wear deposits being flushed out by new fluid and clogging up the very tiny hydraulic vales and ports on the mechatronics. Old-school transmission guys will thus claim it's a bad idea to change fluid *for the first time* at high mileage. We invite you to do your own research on this matter.

Here's the ZF change procedure:

[http://www.zf.com/media/media/document/brands\\_3/service\\_information/sitematrix~1/transmission/cars\\_4/englisch\\_3/modelluebergreifend\\_1/ZP\\_SI\\_Oelwechselkit\\_EN.pdf](http://www.zf.com/media/media/document/brands_3/service_information/sitematrix~1/transmission/cars_4/englisch_3/modelluebergreifend_1/ZP_SI_Oelwechselkit_EN.pdf)

And, with kudos to KyleB on 5series.net, here's his excellent detailed rebuild procedure:

<http://forums.5series.net/diy-do-yourself-14/kylebs-6hp19-service-thread-137584/>

**Remanufactured Transmissions:** it is BMW policy to replace any warranty failure with a remanufactured ZF transmission, not a new one. ZF has a rebuild facility in the US as well as Germany for this purpose. This makes sense, as ZF can rebuild a transmission far more reliably than a BMW dealer can. However, out of warranty, BMW dealers apparently suggest a new ZF transmission when it fails. Not surprising, perhaps.

There's a long list of detailed ZF transmission links in endnotes, for those who want the details (thanks to ajm8127 at bimmerboost.com for many of these)<sup>17</sup>

So, if you're buying an E60 with 60K miles on it, you should be concerned about the maintenance of the ZF. It's very likely that the fluid and filter has not been changed. In fact, thanks to BMW claiming Lifetime Fill for so many years, many mechanics will say that it never has to be changed, or shouldn't – or even refuse. They're wrong, and many transmissions have their lives shortened because of this belief. **If you get one below 100K miles, change the fluid. Above that, do your own research.**

Briefly, change the fluid/filter at 60-70K if you want to keep the car. It is very likely that the ZF will fail faster without regular fluid/filter changes. Change it every 40-50K miles thereafter.

That said, there are a few common problems with the ZF transmission, at least according to the DIY postings on this and other similar Forums.

**Performance Issues:** This includes surging, inconsistent shifting, delayed upshifts/downshifts. Many of these performance issues were corrected by loading new software releases, since the ZF is extensively computer controlled. Some problems are not fixed with software, and when the question becomes "should I replace my transmission to fix this" the answer can get really expensive. Note that the only solution BMW dealers seem to take to internal ZF transmission problems is to replace the entire thing with a remanufactured or new one. With the exception of the mechatronics sleeve, BMW dealers don't seem to do much work inside the ZF. Less costly solutions are mechatronics and actuators, below.

**Mechatronics Sleeve:** This is the sleeve around the electronic connector to the transmission. They often leak fluid. There is no information available to us about how much leaks out before a transmission fault is posted, so even though many Mechatronics sleeves have been replaced, there is no way to tell if a lot of fluid leaks out, or just a few drops. In any case, if it leaks it needs to be replaced. Kits are available from thectsc.com for \$85. DIY: Hard. Numerous forum members have done this work, but generally, leave this to a dealer or indy to do unless you're an experienced wrench.

**Mechatronics Replacement:** The mechatronics unit consists of the control electronics and computer controlled hydraulic valves (actuators). It can be replaced as a single unit, and the replacement DIY is actually easier than doing the actuators alone. It's more expensive, with a rebuilt unit costing around \$1500 from thectsc.com. Sonnax and others are alternative sources. See the Endnotes. We haven't priced it from them. Replacement is a two hour job for an experienced DIY'er.

**Actuator Replacement:** One solution that we're seeing more often is replacing the electromechanical actuators<sup>18</sup>. This is becoming an option for experienced DIY'ers. This involves a parts kit from thectsc.com, for \$500-600, and the ability to remove, do a partial disassembly and a reassembly of the Mechatronics unit, plus replace the fluid. One member did this job in his driveway. Results have been reported as good. So, this is a DIY, but one that should be taken by experienced wrenchers. Alternatively, an indy experienced in ZF transmissions should be able to do it. **There are also transmission places that specialize in ZF transmissions. Use one that is authorized by ZF. Check with ZF to confirm. Seriously; you don't want Bubba's Transmission Repair to be doing this.** Expect that parts will be \$1K or so with pan and fluid, and labor at least \$300-500.

**Note:** Actuator replacement does not require that the transmission be removed; in fact, it can be done by a good backyard mechanic. But "good" is the key word here. Don't try this the first time you pick up a wrench, please. **If you want to dive into the mechatronics beyond the actuators and the rubbers that**

interface to the turbine unit, you better be a *very good* wrench. Also, consider that a ZF authorized shop has an expensive test rig to test all valves and electronics; so you take a measure of risk by not having it. Your call.

## Symptoms of Problems:

Below are a few of the repeating problems and their initial symptoms. This should help guide new owners when/if these problems occur. Note that none may ever occur, but the list below is in descending order of probability

**Electronic Water Pump Failure:** All N52 and N54 engines with electrically driven waterpumps. Not relevant to M54 or N62 engines. Display will suddenly warn of overheat problem in yellow, then almost immediately turn red and warn driver to pull over and not open the hood. The car will need to be towed for repair; it cannot be driven. The good news is that the warning is so clear that it's very unlikely engine damage has occurred.

**Battery Failure Due to Age:** All models. Early signs are failure of the clock to keep it's time, and odd transient codes or warnings. Battery life is typically 4-5 years. The Bimmerfest E60 forum has a detailed thread on where to buy battery replacements from alternative sources. Yes, the new battery should to be registered on an E60 ECU network. This can be done at an indy/dealer, or via INPA. Carly (formerly BMWwhat) has a subroutine to register batteries now.

**Transmission:** All models. As each shift occurs, the car hesitates for a very short time, or alternatively the car surges forward very slightly as each shift occurs. Acceleration is no longer uninterrupted and smooth. Starts very mildly, and gradually becomes more noticeable. Requires, in order of probability, (1) new fluid and filter; (2) reprogramming; (3) new actuators; (4) new mechatronics or (5) new transmission.

**Battery Draining:** All models. Car battery is relatively new, but is drained when you try to start the car. After charging, it drains again. Assuming the battery is OK, this is a tough analysis, since there are a number of modules that can cause it by not shutting off ("sleeping") properly. Doesn't happen often, thankfully. You'll need a dealer/indy to diagnose it.

**Front Suspension Issues:** All models. (1) Groan/squeal from front end when going over speed ramps or otherwise when front end is full compressed. Usually occurs when weather is cold. This is the front stabilizer rubbing against the stabilizer rubber mounting. (2) Steering wheel moving slightly, "floating" or slightly sloppy steering feeling, or rumbling sound from front end at higher speeds. Possibly the Thrust Arm bushings in cars over 60-80K miles. (3) Front end seems to get stiffer than normal on rough roads, crashing on bumps and holes; or, alternatively, the front end seems to float up and down. Either of these are probable strut failures.

**Water in Headliner Around Sunroof, or Water on the Floor Under the Dash:** All models. Clogged sunroof drain lines (common) and clogged drains in airvent intake area at the bottom of the windshield (less common).

**Water in Trunk:** Failure of Micro Power Module, Park Distance Control and other electronics that were located on the floor of the wheelwell in early models, perhaps due to a Munich engineer being hungover one day while designing this part of the E60. Applies to E60's built before 9/05 for the most part, but check your trunk and relocate the modules if there. Happens due to clogged sunroof drains, or accidentally pressing the trunk open button on the keyfob when it's raining out. After cleaning out the sunroof drain tubes, solution is to relocate the electronics out of the wheelwell and into the fenderwell on the left side of the E60 sedan. Some later models still have the RDC (tire pressure monitor) control unit in the spare tire wheel well. Move it. Quick job, and several threads available to do this.

**Sunroof Metal on Glass Sound:** All models. Sound of metal hitting glass, a ringing when you drive over bumps. Usually when the sunroof is open at an angle. Caused by dirt in wind deflector bearings preventing the deflector from moving to its proper position. Most easily fixable with a strip of adhesive black Velcro material along the top center of the wind deflector.

**Turbo-related:** Model: 535's. Engine Noise, Rattles, Hard Starts, No Starts, Power Losses and so forth. 535 Turbos, in the early days, were problematic. Some still are.

**Codes:** All Models. Said before, say again: you must get a code reader capable of reading BMW codes. Most auto parts shop OBD code readers do not read the majority of BMW codes. Get a printout of the codes, then clear them and read them again.

### Other Considerations:

The E60 is generally a very well-built car. With good maintenance, it'll last over 200K miles and 10+ years. And, after all, an old BMW is still a BMW, isn't it?

It's not cheap to own, but neither is it a money pit, particularly if you do your own work or find a good Indy. But if you expect Honda-level maintenance, buy a Honda.

Right now, the non-turbos (525, 530, 545, 550) are stable designs with relatively minimal failures. The turbos, particularly in the first years of introduction, have more failures. Expect E60 535's to cost more to maintain, sometimes considerably more.

One key point: the E60 *must* be maintained with replacement fluids at regular intervals. If you use Mike Miller's (Roundel) schedule, the E60 can last for a very long time.

Enjoy.

## Endnotes and Useful References:

---

<sup>1</sup> Can be found here: [http://www.bimmerfest.com/wiki/index.php/BMW\\_E60](http://www.bimmerfest.com/wiki/index.php/BMW_E60) The Wiki for the N52 Engine (525, 530): [http://en.wikipedia.org/wiki/BMW\\_N52](http://en.wikipedia.org/wiki/BMW_N52) For the N54 (535): [http://en.wikipedia.org/wiki/BMW\\_N54](http://en.wikipedia.org/wiki/BMW_N54) For the N62 (545, 550): [http://en.wikipedia.org/wiki/BMW\\_N62](http://en.wikipedia.org/wiki/BMW_N62)

<sup>2</sup> There's much discussion on the "right" fluids. We recommend BMW approved fluids or better – meaning it meets BMW's specs at the minimum. If you want to use a non-BMW fluid (such as oils and coolants), don't just grab something off the shelf at Autozone. Research it and start with something 100% equal to the BMW product. If you can do better and maintain compatibility, go ahead. A great place to get educated on oil is [www.bobistheoilguy.com](http://www.bobistheoilguy.com). For the ZF, however, we strongly recommend you use exclusively the ZF longlife fluids from BMW or from ZF suppliers, such as <http://thectsc.com>. There are debates (aren't there always?) on alternatives to ZF, do your research.

<sup>3</sup> INPA is a BMW software product, owned by BMW and not sold by them to the public. Not that we recommend anyone buy pirated copies, of course. There are many locations to discuss BMW coding software, but this is a good start: <http://www.bimmerfest.com/forums/showthread.php?t=561237> Remember, INPA can screw up your car if you use some of the active/modifying functions. Until you understand it, just use it to read codes and engine data. Don't try to (for instance) adjust your VANOS on your first day using it.... Note that most versions of INPA floating around out there don't have the N62 module, so if you have an N62, confirm before you download.

<sup>4</sup> [http://bmw.workshop-manuals.com/5\\_Series\\_E60/530i\\_N52\\_SAL/index.php](http://bmw.workshop-manuals.com/5_Series_E60/530i_N52_SAL/index.php) for an electronic manual; and <http://www.bmw-planet.com/diagrams/release/en/e60e61/index.htm> for a wiring diagram.

<sup>5</sup> Links to Videos: <http://blog.bavauto.com/category/bmw-5-series/5-series-e60/>

<sup>6</sup> An excellent online parts catalog is <http://www.realoem.com/bmw/select.do>. If you have the part number, searches for competing parts prices are easier. That said, buy from reputable suppliers to avoid fakes or badly done rebuilds. If you buy from Ebay, please let us know so we don't drive or ride in your car.

<sup>7</sup> Email [techtalk@roundel.org](mailto:techtalk@roundel.org) for a copy. While you're at it, join the BMW Car Club of America. You get a \$500-1000 cash rebate on new car purchases if you're a member for a year.

<sup>8</sup> Which can be found here: <http://www.bmwusa.com/Standard/Content/Owner/SyntheticEngineOils.aspx>

<sup>9</sup> Bav Auto Video: <http://blog.bavauto.com/10012/>

<sup>10</sup> Bav Auto Description: <http://blog.bavauto.com/13260/bmw-e60-e61-5-series-battery-removal-how-to-remove-525i-530i-545i-550i-etc/>

<sup>11</sup> Bav Auto Video: <http://blog.bavauto.com/14581/>



---

<sup>12</sup> There is a very good explanation of the DISA at  
<http://www.bimmerfest.com/forums/showthread.php?t=751038>

<sup>13</sup> Here:  
[http://germanautosolutions.com/bmw\\_solutions/disa\\_products/m54\\_m52tu/m54\\_disa\\_repair\\_kit/product\\_m54\\_disa\\_repair\\_kit.php](http://germanautosolutions.com/bmw_solutions/disa_products/m54_m52tu/m54_disa_repair_kit/product_m54_disa_repair_kit.php)

<sup>14</sup> Bav Auto Video: <http://blog.bavauto.com/14581/>

<sup>15</sup> Here's the Steering Angle Sensor fix, from the M5 board: <http://www.m5board.com/vbulletin/e60-m5-e61-m5-touring-discussion/204192-steering-angle-sensor-diy-fix-worked.html>

<sup>16</sup> Here's a thread discussing Serpentine Belt Failure on Bimmerfest:  
<http://www.bimmerfest.com/forums/showthread.php?p=8224999&posted=1#post8224999>

<sup>17</sup> ZF Items: Application Chart:  
[http://www.zf.com/na/content/media/u...ion\\_Chart\\_.pdf](http://www.zf.com/na/content/media/u...ion_Chart_.pdf)

Difference between first and second generation ZF 6HP Transmission:  
<http://www.sonnax.com/publications/t...-my-generation>

Spare Parts Catalog:  
[http://www.zf.com/na/content/media/u...21\\_Catalog.pdf](http://www.zf.com/na/content/media/u...21_Catalog.pdf)

Sonnax Valvebody and Mechatronic Service Guide:  
<http://www.sonnax.com/system/pdfs/37...AutoChoice.pdf>

VBX (Valve Body Express): [valvebodyexpress.com](http://valvebodyexpress.com)

ZF Mechatronic Replacement:  
<http://www.zftranspart.com/images/custom/mecha.pdf>

Parts List w/ Exploded diagrams:  
<https://www.automaticchoice.com/Catalogue/zf6hp21.pdf>

Note: The differences between the 6HP21 and 6HP19 seem to only be the number of friction plates. Here is the same diagram for the 6HP19 for reference:  
<https://www.automaticchoice.com/Catalogue/zf6hp19.pdf>  
and for the 6HP26/6HP28:  
<https://www.automaticchoice.com/Catalogue/zf6hp26.pdf>

Repair manual for 6HP26:  
<http://www.scribd.com/doc/20322431/Repair-Manual>

Technicians Guide:  
<http://www.scribd.com/doc/149103113/ZF6HP26-automatic-transmission-manual>

---

Sonnax ZIP Kit:

Parts Summary: <http://www.sonnax.com/system/announc...6-GEN2-ZIP.pdf>

Technical Booklet: <http://www.sonnax.com/system/instruc...IP-Booklet.pdf>

Quick Guide: <http://www.sonnax.com/system/tech/ZF...-ZIP-Guide.pdf>

<sup>18</sup> Can be found at <http://thectsc.com> and (perhaps) your BMW dealer – though since BMW seems to take an all or nothing view of the ZF, actuators may not be available.