

# fast times

the newsletter of **Bavarian Autosport**

Fall 2007

## Bilstein's B16 *ridecontrol*® – the ultimate suspension for ultimate driving machines.™

Bavarian Autosport sells more Bilstein shocks for BMWs than anyone else in North America. So it's only natural that Bilstein's R&D department would send us an advance copy of their new B16 *ridecontrol* system to install and test on a North American BMW. That's exactly what we did in early August on a 2001 330i.



Bilstein's *ridecontrol* is a fully height-adjustable coil-over kit that can go from "normal" to "sport" mode instantly with the push of a button. A small computer changes the dampening characteristics of each shock on the fly. If you're driving down the road in normal mode and come upon a series of twists and turns that get your heart racing, just push the *ridecontrol*'s aluminum button and in milliseconds you are in sport mode. Push it again and, just as quickly, you are back in normal mode. That word "normal" is a misnomer, for other than the factory-like comfort, there is little that is normal about the way this 330i handles with the new suspension installed. Here's what the test pilots had to say:

"Once the installation was complete, the lift was lowered and we backed the 330i out of the garage. Since the B16 *ridecontrol* system is height-adjustable front and rear, you can dial in just how much lower you want the car to sit. We adjusted the kit on our test car to about 1.25" lower than stock. As a result, the car had a ground-hugging appearance and a slightly more aggressive stance (*left*), eliminating the gap between the tire and the fender. We hopped in and took it for a test drive in normal mode. It felt much tighter and handled the corners far better than the factory performance package setup that came on the car, yet the ride was incredibly comfortable – closer to stock than any coil-over kit we've ever tried. It didn't take long, however, before our itchy trigger-finger found its way to the aluminum button. We pushed it while at speed through a series of curves along the NH coast. The change was dramatic and instantaneous. The car really came to life in the corners, and it didn't exhibit any pitch under acceleration or hard braking. It felt as if the car were truly on rails! As we approached a section of road that was under construction, we pushed the button again. The system reverted to normal mode and we cruised over the bumps without shaking our fillings loose. When the construction was in the rear view mirror, we put



The B16 *ridecontrol* system includes shocks, springs, cables, controller and aluminum on/off button.

the system back into sport mode and took the car to our secret "test track" – a local highway exit that is essentially a 550-foot diameter circle track. We exited the highway at 75mph and maintained speed throughout the circle. The car remained incredibly level and we never heard a peep from the Kumho Ecsta tires. This is without a doubt the best suspension setup we have ever installed on a BMW."

*continued on page 2...*

## Kick ice with Hakkapeliitta 5 winter tires.



We've been touting the advantages of Nokian winter tires for years. With the Hakkapeliitta 5, Nokian has made numerous improvements to structure and tread pattern to enhance grip and improve winter driving safety (and fun!):

\* Slide prevention grooves in the shoulder area increase lateral grip

*continued on page 2...*

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### Installing the ridecontrol system.

The installation of the ridecontrol system is similar to other fully adjustable coil-over kits, except for the wiring. This requires running a cable from each shock to the ridecontrol ECU under the dash, connecting the ECU to power, ground and switched power, and mounting the aluminum button on the dash or console. We did not have to drill any holes to run the wires.

The front shock wiring was run along the lower control arms (figure 1), up inside the inner fender liner (easily removed for access) and into the passenger compartment behind the glove box.



Fig. 1

The rear shock wiring was run through the battery cable grommet into the passenger compartment (figure 2). From there it went under the rear seat and neatly tucked



Fig. 2



Fig. 3

up under the side threshold trim panels (figure 3), then under the forward kick panel and into the area behind the glove box.

The control unit fit neatly behind the glove box in a vacant cubby (figure 4).

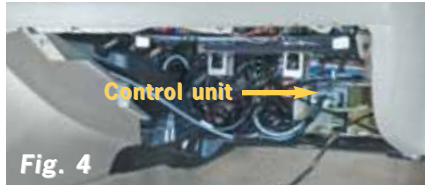


Fig. 4

The on/off harness and the front and rear wiring harnesses all met here and plugged into the control unit.



As for the aluminum on/off button, we did a custom install that replaced the cigarette lighter (figure 5). This included dremeling out a small amount of plastic on the underside of the ashtray and inserting a washer as a backing plate. This James Bond-style set-up allows you to keep the button out of sight until needed, leaving your dash and console looking completely stock. When you want to activate the sport mode, simply open the cover, reveal your secret weapon, press the button and watch it – and your passenger's eyes – light up.

Bilstein's B16 ridecontrol system is currently available for the 3 series 99 thru 05 (except M and xi), 3 series 06 on and 5 series 04 on (except M5). Bilstein's suggested retail price for the ridecontrol system is \$3,150. Our introductory price is \$2,199.95.

**INSTALLATION NOTE for 3 series 99 thru 05 only:** While installing the B16 system on our 330i, we came up against one issue that bothered us: Because there are electrical cables coming out of the shock absorbers, Bilstein had to make the mounting studs on the B16 rear shocks larger in diameter than the studs on the stock rear shocks. As a result, the inner sleeves of the BMW shock mounts are too small to accept the ridecontrol mounting studs. Bilstein's instructions tell you to drill out the stock shock mounts. This is incredibly difficult even for experienced gearheads and turned out to be a real pain in the ass-embly, so we came up with a solution: we modified a set of our high-performance, blue urethane shock mounts (figure 2). This upgrade worked so well, that until Bilstein comes up with a different solution, we will include a pair of these blue urethane mounts free – a \$100 value – with any ridecontrol system for 3 series 99 thru 05, saving you a ton of time, headaches and money.

in cornering. The grooves' sharp edges stick firmly to the road, even during avoidance maneuvers.

❖ **Double block construction in the center of the tread** considerably increases the driving stability and enhances steering response. The new pattern ensures comfortable and quiet road contact.

❖ **Longer tread blocks in the shoulder area** ensure grip on snow and improve lateral stability on unfrozen roads.

❖ **Multi-layered tread structure** called quattrotread (inspired by summer performance tires) features four different rubber compounds to

improve tread contact and driving stability, and dampen road noise.



❖ **Driving safety indicators** clearly tell you the remaining tread depth of the main grooves in millimeters. Each Hakkapeliitta 5 also features four "snowflake" safety indicators on the center tread blocks. When the snowflakes wear off, the tire is no longer safe for winter use.

**Early Bird Special!** Now through October 31, we'll include a free set of TireCheck tire pressure indicators when you buy any set of four wheels with Hakkapeliitta tires.

See them at [www.BavAuto.com](http://www.BavAuto.com)...



## Product Focus:

### 4 reasons to buy 4-season Hex-O-Mats:



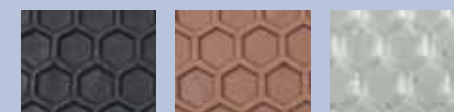
Hex-O-Mats are a great way to protect your carpet. Here are four reasons why:

1. **Safe and effective.** The unique, honeycomb pattern in the rubber compound traps dirt and water where it falls and gives your heels better traction – no slipping on a smooth surface.

2. **Custom fit.** Each set is made from custom BMW or MINI patterns and cut with computer precision. If your BMW was built in the last 40 years – or if your MINI was built in the last 5 – chances are we have a set of Hex-O-Mats that will fit your floor perfectly. We have most trunk patterns, too (right)!

3. **Lifetime Warranty.** If these mats or trunk liners ever wear out – even 10 years from now – we will replace them for free.

4. **They're on sale!** Normally \$49.95–99.95, during the month of October they are discounted to \$44.95–89.95. For more details, ask your phone rep or visit [www.BavAuto.com](http://www.BavAuto.com).



4 more reasons – choice of gray, black, tan or clear.

from our tech team

# ask "bavarian otto"

Over 200 years of BMW experience is just a phone call or e-mail away.



If you add up all the years the enthusiasts at Bavarian Autosport have been working on BMWs – and helping people like you work on theirs – it totals well over 200 years. That's a lot of BMW knowledge. And it's yours for the asking. Have a BMW question? Ask that savvy old BMW enthusiast, "Bavarian Otto" – just call 800.535.2002 or e-mail Otto@BavAuto.com.

## Foggy logic: Does 3 equal 5?

Dear Bavarian Otto,

I would like to replace the right fog light on my '92 525i. Can I use the instructions for the 3 series on your website (*below*) to do this?

### 3 Series 92 to 98 Fog Light Replacement

To install a fog light, insert a flat blade screwdriver through the front bumper grill and release the fog light retaining clip. Remove the fog light and disconnect the wiring harness. Installation is the reverse of removal.

Dominique

*Otto replies:*

*Though comparable, the procedure for replacing the fog light on your 525i is a little bit different than the procedure for a 325i, which we showed in the Summer 2004 issue of Fast Times ([www.BavAuto.com/newsletter](http://www.BavAuto.com/newsletter)). First, remove the towing eye cover, (the piece right next to the fog light toward the center of the car) by depressing the locking tab at the upper inside corner and lifting the cover out. Behind the cover is a single screw; remove that screw, then remove the light from the car and disconnect the wiring harness. Installation is the reverse.*

## Help me do it myself.

Dear Bavarian Otto,

I would like to know what kind of special tools I need to change the oil and filter on a 2002 745i. Today I went to two different oil changing places and was told they didn't have the correct tools to do my Bimmer. I always changed the oil in my 2000 328i myself and would like to do the same for my 745i. Can you help me figure it out? Thanks.

M. Sharon

*Otto replies:*

*The oil filter on your 745i is a bit different from your 328i. It is located on the bottom of the engine. It actually mounts through the oil pan, but this is not a big deal. The filter is housed inside a canister cup, similar to your 328i. And the canister cup unscrews just as the canister cover does on your 328i, but from the bottom. There is a drain plug in the bottom of the canister cup which you remove (use a 5mm Allen tool) to drain the oil from the cup before unscrewing it. (Don't worry – the housing area for the cup is sealed off from the oil in the pan, so you won't drain the entire pan when you remove the filter, just the oil in the cup.) Once the plug is removed from the canister cup and the oil is drained, just unscrew the cup and remove the filter. The oil pan itself drains just like the one on your 328i.*

## Oil change for hibernation?

Dear Bavarian Otto,

I will be storing my Z3 for the winter. I use synthetic oil and have gone about 2,000 miles since the last oil change. Should I change the oil? If yes, should I do it prior to storing the car or after I bring it out in the spring?

Ray L.

*Otto replies:*

*Driving the vehicle even 2,000 miles is long enough to build up some acids in the oil. Leaving these acids in contact with the engine's bearing surfaces for long periods without movement is not recommended. (The acids can corrode the surfaces.) If you are going to change the oil, change it just before final storage. You'll want the engine and the oil to be warm, so run the engine for just a few minutes with the new oil, then shut it down and put your Bimmer to bed. (P.S. Don't forget the BMW battery trickle charger!)*

## A happy reader gives back...

*We received this tip from Troy C. and thought we would pass it along in case anyone else out there is facing (or ever faces) the same situation.*

I am an avid reader of *Fast Times* and have gotten a lot of useful information from it. Now, it's my turn to give back. I have a '99 528i and I had a real problem with the windshield moulding cracking and falling apart. I went to the dealer and asked about replacing it. They told me that the windshield had to be removed before the moulding could be inserted. The part was \$35. They charge \$110/hr for labor and were quoting me a minimum of five hours, so somewhere between \$600 and \$700 for the job... *IF* the glass didn't crack when they pulled the windshield. They also tried to sell me adhesive to hold the moulding in place. I decided to check it out for myself. I went home and crumbled the old moulding off. What I found was that the moulding has an L-shaped metal shim in it. I got a pair of needle nose pliers, pulled on the shim and it came right out. I did that all the way around the window and the moulding was out in about 3 minutes. When I looked at the trough, I noticed a lot of dirt and debris. This, and the fact it came out so easily, told me that there was no adhesive holding it in. I bought the part and installed the whole thing myself in about 20 minutes. It just snapped right in! I had to remove two little foam blocks at the top of the window, but they came right out. This was the easiest repair I have ever done. Please let your readers know that they can save massive amounts of money with this do-it-yourself tip.

## Bavarian Profile



### Mike Ury

This is Mike's second stint with Bavarian Autosport. He first started with the company in July of 2002, worked for two years until July 2004, took a leave of absence for two years, then returned to us in July 2006. Prior to joining Bavarian, Mike was a professional mechanic for 17 years – ASE Certified Master Technician and SAAB Master Technician – working in several area dealerships and independent repair shops specializing in foreign cars. Over those 17

years, Mike worked on almost every BMW model at one time or another. He currently owns a fully restored and modified 1967 Mercury Cougar XR-7, a highly accessorized 1992 SAAB 900s, an almost mint 1970 Ford F100 Short Bed Ranger Sport Deluxe full-sized pick-up truck, and his latest acquisition – a 2006 Mazda MX-5 Miata Touring model. He hopes someday to own an M Roadster or M3 convertible. Mike holds a B.S. Degree in Business Administration from the Whittemore School at the University of New Hampshire.

# How easy is this?! do-it-yourself

## “My car won’t start!”: Diagnosing fuel and ignition problems on BMWs and MINIs. *1/1/1*



One of the most frequent “calls for help” that Bavarian Otto receives is “My BMW won’t start”. This is an incredibly frustrating situation, whether the car is sitting in the garage or in the shopping center parking lot. However, before we can suggest what might be causing the no-start situation, we must perform some basic and simple diagnostic tests. The results of these tests will lead us in various directions. Follow along with Otto as we run through the initial diagnostic tests.

### Tools of the trade.

In order to perform these tests you’ll need a few basic diagnostic tools:

- A basic multi-meter that can test for DC voltage and resistance (ohm testing).
- Mechanic’s stethoscope (part #52750, \$21.95).
- Fuel pressure tester (part #2150, \$89.95)
- Fault code reader (either part #SR300, \$149.95 or part #CS 1500, \$129.95).
- Applicable Bentley repair manual.

**NOTE:** If testing indicates that you have circuitry/wiring problems that must be traced, and you need more detail than what is offered in your Bentley repair manual, we can order the BMW ETM (Electrical Troubleshooting Manual) for your BMW. The ETM is the vehicle’s complete wiring diagrams.

### Diagnostic Flow.

**BEFORE YOU BEGIN:** Verify that there is fuel in the tank and that none of the fuses are blown. If the vehicle is a 1988 or later model it is wise to use the appropriate engine management fault code reader tool to check for any stored fault codes before we start further diagnostics. Whatever is

causing the no-start situation may have generated a fault code that will tell you where to go next, saving much time and effort. If no codes are present that relate to the no-start, continue on to step #1.

**1)** Does the starter crank and turn the engine over?

YES – go to step 7

NO – go to step 2

**NOTE:** If the starter is cranking but the engine is not turning over, you likely have a faulty starter motor or solenoid and the starter/solenoid assembly needs to be replaced.

**2)** Do you hear a “click” from the starter when the key is turned to the START position?

YES – go to step 10

NO – go to step 3

**3)** Check battery condition. Do the headlights come on nice and bright? Does the blower motor work at full speed? Does the horn honk loudly? With your voltmeter, check battery voltage; the voltage should be at least 12.0 volts (*figure 1*).

Battery OK – go to step 5

Battery low – go to step 4



Fig. 1

**4)** Place a charger on the battery or apply jumper cables and wait 10 to 20 minutes, or replace the battery, as applicable. Return to step 1.

**5)** Check for voltage at the starter solenoid “turn-on” wire. This will be a small gauge wire that is typically connected to the starter

solenoid via a ring terminal or a spade type push-on terminal. On BMWs through the mid to late ‘90s, this wire is typically black and yellow. On later models the color is typically black.

Check for 12 volts between the wire and ground, when the ignition key is turned to the START position (*figure 2*).



Fig. 2

12-volts YES – Replace starter and solenoid

12-volts NO – go to step 6

**6)** With no voltage at the solenoid “turn-on” wire, we must diagnose from the ignition switch START

terminal, through the wiring, to its ultimate end at the solenoid connection. This will require wiring diagrams for the specific year and model of your BMW. These are available through the Bentley repair manuals and the BMW ETMs (Electrical Troubleshooting Manual), which contains the complete vehicle wiring diagrams. Both of these resources are either in-stock or available by special order through Bavarian Autosport.

**7)** Test for ignition spark and fuel injector pulse.

**Spark** – The spark can be tested by using a spare spark plug or a specific spark tester tool. If a spark tester tool is not available, unplug one of the spark plug wires from its spark plug and insert the spare spark plug into the end of the removed wire. Use a



Fig. 3

pair of insulated pliers to hold the side of the plug (the metal part) against something metal to ground it (e.g. the valve cover

or intake manifold). Have a helper crank the engine and see if there is a spark occurring at the tip of the plug (*figure 3*). On later model BMWs that have Direct Ignition systems (coil on plug), this can be accomplished by removing one coil and connector boot assembly, inserting a spark plug and assuring that the plug is grounded (as noted above) and also that the metal part of the coil is grounded (a jumper wire can be used to ground the coil).

**Injector Pulse Signal** – To test whether the fuel injectors are opening and closing, you will need the mechanic’s stethoscope mentioned at the beginning of this article. Touch the listening end of the stethoscope to the body of one of the injectors (*figure 4*). Have your helper crank the engine; you should hear a very distinct and rapid “tap, tap, tap” as the injector opens and closes.

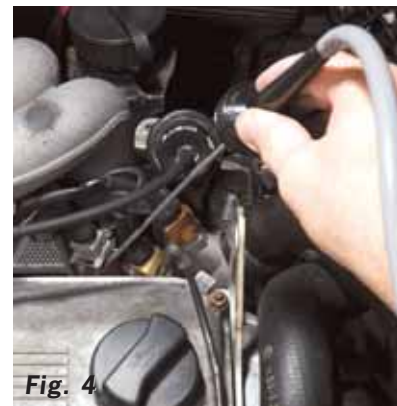


Fig. 4

Spark OK and injector signal OK – go to step 11

Spark OK, no injector signal – There is likely a wiring problem or the ECU may be faulty. Follow

the procedures for testing the Engine Control Unit (ECU) harness plug input/output as outlined in the appropriate Bentley repair manual.

*No spark, injector signal OK* – go to step 15

*No spark, no injector signal* – go to step 8

**8)** In most cases, if there is no spark and there is no injector signal, we have a problem with the main engine management system; it is not sending an ignition signal nor an injector signal. This may be due to a lack of main input power to the ECU, in other words, it is not turning on. It could also be that one or more of the critical input signals is faulty and the ECU is not able to generate the spark and fuel outputs. (Of course, you could also have a faulty ECU, but this is not as common as the “parts replacers” would have you believe.) We will now test some of the critical ECU input signals.

**8a)** Main input power to ECU – Using the Bentley repair manual or the applicable wiring diagrams, determine what pin(s) is the main power input for the ECU (the “turn-on” wire). Check for 12 volts from this pin in the ECU connector plug to ground, when the key is in RUN and START.

*YES* – go to step 9

*NO* – go to step 8b

**8b)** Using the wiring diagrams, determine where the ECU main input power is originating. Test for 12 volts at the origination point for the ECU main input power. On BMWs up through the mid-90s there is a main ECU power relay. The applicable Bentley repair manual will detail the location of the relay. Test the output side of the relay socket (the wire that feeds the ECU main power input – *figure 5*) for 12 volts when the key is in RUN and START – typically terminal #87 or #87a.



*YES* – You will now need to trace the wiring from the relay socket to the ECU connector harness to determine why the power is not arriving at the ECU connector harness (likely an open circuit or a short in the wiring).

*NO* – Determine if there is constant 12 volts at terminal #30, in the relay socket. If not, trace the circuit for the wire at terminal #30. This should be a constant 12 volts regardless of key position. If you do have 12 volts at terminal #30, determine if there is 12 volts at terminal #86, in the relay socket, with key in RUN and START.

*YES* – The relay is likely faulty.

*NO* – Trace this circuit back to the ignition switch, including the switch itself. The switch should be sending 12 volts to terminal #86 when in RUN and START. If not, you likely have a bad switch or a short or open circuit in this wire run.

**9)** If we have 12 volts to the main power input for the ECU, but no spark or injector signal, we may be missing a critical input signal for the ECU. As noted above, there is also the possibility of a faulty ECU. Before replacing an ECU, we must diagnose all other possibilities. If all else is proper, the last move is to install a known good ECU. For the ECU to generate the spark and injector output, a critical input is the crankshaft position sensor and/or camshaft position sensor signal. Perform the sensor testing as outlined below. If the sensors test as OK, we will have to perform more in-depth diagnostics, and these tests will be outlined in the Bentley repair manuals. The crankshaft and/or camshaft position sensor design and mounting varies through the years and models of BMW production and is detailed in the Bentley manuals. Here we describe the general differences and appropriate diagnostics to be performed:

**Early Motronic** – Found on 6-cylinder, single and double cam, Motronic models (distributor cap mounted directly to the front of the cylinder head) up through the mid to late ‘80s, such as: 325e/es and 528e thru 11/86; 533i, 535i thru 88; 633csi, 635csi and L6 thru 5/87; 733i, 735i and L7 thru 87; and also the M3, M5 and M6 thru 93. On these applications, the crankshaft position sensor is mounted in the transmission bell housing, on the driver’s side. There are two sensors mounted in this area. The sensor that is more toward the front of the car is the RPM sensor that reads the ring gear teeth. The more rearward sensor is the position sensor that reads a single pin on the side of the flywheel, behind the ring gear. You may have a faulty sensor or the pin may be missing from the flywheel. Follow the sensor’s wire up to the connector plug. Unplug the connector and test the sensor by checking the internal resistance of the sensor. The three terminals in the sensor’s plug housing are numbered 1, 2 and 3. Terminals 1 and 2 should have 960 +/- 10% ohms; all other combinations should have 100,000 to infinity ohms (see Bentley manual for additional detail). If the sensor fails the ohm test, replace it. If the ohm test is OK, remove the sensor and look through the sensor’s mounting hole. Have a helper slowly turn the engine (using the front crankshaft hub nut/bolt) and look for the

reference pin. If the pin is missing, the flywheel must be replaced. If the pin is present, the sensor may still be faulty (even though it tested OK in the resistance test). Swap the position sensor with the RPM sensor, both in the bell housing and at the connector plugs (both sensors are the same part). Check for spark and injector signal (*step 7*). If signals are present, does the engine start now? If so, purchase a new sensor and replace the one that is now in the RPM position (was originally the position sensor). If no spark or injector signal after the swap, the ECU may be faulty.

**Late Motronic** – 6 cylinder, single cam, Motronic models, such as: 325i/is/ix thru 91; 325ic thru 92; 325 88 thru 91; 528e 12/86 on; 535i and 735i/il 89 on; and 635csi 6/87 on. On these applications, the crankshaft position sensor is mounted to the front of the passenger side of the timing cover and reads a toothed wheel at the front of the crankshaft. Similar to the

early Motronic (*above*), we must test the resistance of the sensor. The sensor’s plug has three terminals; resistance between terminals 1 and 2 should be 540 +/- 10% ohms (*figure 6*). If the sensor fails this test replace it. Does the engine start now? If not, check for spark and injector signal (*step 7*). If no spark or injector signal after replacing the sensor, the ECU may be faulty. If the sensor tests OK in the resistance test, check the full length of the sensor’s wiring, up to the plug. It is very common for the insulation to separate at the sensor or at the plug, or for the wire to be chaffed by the water pump pulley. If you find potential faults in the harness, repair the harness and replace the sensor.



**Twin cam engines** – The twin cam 4-cylinder, 6-cylinder and V8 engines use combinations of crankshaft and camshaft position sensors. For these applications, it’s best to refer to the applicable Bentley repair manual for mounting position and test parameters. Additionally, these applications will typically generate fault codes that can be accessed by using one of the fault code readers available through Bavarian Autosport (part #CS 1500, \$129.95, and part #SR 300, \$149.95).

**10)** If you hear a “click” at the starter when the key is turned to START, this means that the circuit from

*continued on page 6...*

# How easy is this?! do-it-yourself

(continued from page 5)

the ignition switch to the starter solenoid is OK. The “clicking” is indicating that the solenoid is attempting to energize the starter. Either the solenoid or starter is faulty, or there is not enough battery power getting to the main starter motor input terminal. We will now test the solenoid, the starter motor and the battery power to the motor. **Note:** Removing the battery cable will wipe out the radio presets and require you to enter a security code before you can use the radio again. To prevent this, use the Memory Saver (part #295A, \$9.95).

Go to step 3, to determine if the battery is OK. If step 3 determines that the battery is OK, remove, clean and re-install both the positive and the negative cable clamps at the battery. Also check the connection of the negative cable where it is bolted to the chassis (near the battery). Remove, clean and re-install the positive cable connection at the starter. If the positive cable is coming from the battery in the trunk or under the rear seat, locate the junction block under the hood (the applicable Bentley repair manual will detail the location) and perform the same “remove, clean and re-install” of the cable connections. Locate the engine ground cable and perform the same steps. If the starter solenoid still just clicks when the key is turned to START, replace the starter.

**11)** We will now test for fuel pump operation. (**Important!** Read the **SAFETY NOTE** at the end of Step 11.) Remove the fuel hose where it connects to the fuel rail (or to the pressure regulator assembly or fuel filter, whichever is more convenient. See the applicable Bentley repair manual for detailed locations). If there is fuel under high pressure at the connection (when you open the connection), you can assume that the pump is running. As a 100% determination, place the open fuel line in a suitable container and turn the key to RUN (Ignition). The pump should run for a couple of seconds and pump fuel into the container. Note that the pump should not continue to run, if the engine is not running. Re-connect the fuel line after testing.

**YES, fuel pump is running** – Remove the spark plugs and verify that they are clean and dry. Re-install and test to see if the engine will start using starting fluid. If so, you may have a faulty fuel pressure regulator – perform fuel delivery and pressure tests as outlined in the applicable Bentley repair manual (figure 7).

**NO, fuel pump is not running** – go to step 12.

**SAFETY NOTE:** If the fuel pump is operating, there will be up to 75psi of pressure in the system. A large quantity of fuel will be delivered in a short time. Make sure you have an adequate size con-

tainer and there are no open flames or potential ignition sources (e.g. cigarettes, cell phones) nearby. Also make sure the key is in the OFF position. Wear safety glasses and wrap the fuel hose connection with a rag to catch any pressurized fuel.



**12)** Using a voltmeter, test for 12 volts between the positive and negative wires for the fuel pump (figure 8). (**Note:** On most external pumps this can be done with the wire terminals still connected to the pump: on applications that use a harness plug, remove the plug and test the wires in the plug terminals.) You should have 12 volts, for a few seconds, when the key is turned to RUN (ignition). If you repeat the test, wait a minute or two between tests for the fuel pump output to reset. (This is because the fuel pump output will turn off if the engine is not running, as a safety measure.)



**YES, 12-volts** – You likely have a faulty fuel pump. Apply 12 volts directly to the pump to verify that it does not run.

**NO, 12 volts** – go to step 13.

**13)** Verify that the fuel pump fuse is not blown. (The Bentley repair manual will detail the fuse location). As a 100% test, check the fuse with an ohmmeter. Use the Bentley repair manual to locate the fuel pump relay. Jumper the relay as outlined in the Bentley manual (terminals #30 & #87 in the relay socket – figure 9) and repeat the testing in step 12, but without turning the ignition key. There should be a continuous 12 volts as long as the jumper is in place. Remove jumper wire when testing is complete.



**YES, 12-volts** – Fuel pump relay is likely faulty.

**NO, 12-volts** – go to step 14.

**14)** Test for 12 volts at terminal #30 in the fuel pump relay socket. There should be continuous 12 volts regardless of key position.

**YES, 12 volts** – You likely have a short or open circuit between terminal #87 in the relay socket and the fuel pump connection. Further wire/circuit testing will be required.

**NO, 12-volts** – You likely have a short or open circuit between terminal #30 in the relay socket and the battery power connection at the origin of the input wire. Further testing will be required.

**15)** On single coil models, test for 12 volts at the coil positive input wire (typically green, see Bentley manual for specific models) when the key is in both the RUN and START positions (figure 10).



**YES, 12 volts** – The coil may be faulty, the ECU may be faulty or there may be a wiring problem between the negative wire from the coil and the ECU. Follow the ECU harness plug input/output testing as outlined in the Bentley manual (centering on the negative coil wire). There is likely a wiring problem or the ECU may be faulty. If the harness plug testing is OK, you may wish to replace the coil as a first step. If this does not cure the problem, the ECU may be faulty.

**NO, 12 volts** – You may have a faulty ignition switch, start relay (automatic transmission only), neutral safety switch (automatic transmission only) or a wiring problem in the circuitry between the switch and the coil input wire. Use the wiring diagrams in the applicable Bentley repair manual for further circuitry testing.

**NOTE:** On multi-coil models, test for coil input using the wiring diagrams in the Bentley manual.

Due to the limitations of space, this article should by no means be considered definitive, but it should give you a good foundation for identifying the cause of most common no-start problems. If, after you have performed the diagnostics described here, you are unable to determine why your BMW or MINI won't start, feel free to “Ask Bavarian Otto”: e-mail Otto@BavAuto.com and he'll get back to you as soon as he can. For a more immediate response, give us a call at 800.535.2002 during our normal business hours: Mon–Thu 8 am–9 pm; Fri 8 am–7 pm; and Sat 9 am–4 pm.

## How easy is this?! do-it-yourself

### Installing PIAA windshield wipers on a 3 series 99 thru 05. ✂

PIAA windshield wipers are by far the most popular of all the wipers we sell, and for good reason – they leave behind a microscopic layer of silicone as they wipe, allowing water to bead up for easier wiping and clearer vision. However, many owners of the 3 series 99 through 05 have trouble with the installation of these wipers due to the design of the original BMW wiper arms. Here's how to do it:

**1** To remove the original wiper blade, press the lock release tab and push the blade and plastic adapter down and out of the U-shaped hook at the end of the wiper arm. Don't let the metal arm snap down onto the windshield!



Fig. 1

**2** Choose the appropriate plastic adapter from those provided (figure 1). Snap the adapter onto the blade's adapter mount bar. Pay attention to the proper position of the blade, (i.e. don't install the adapter upside down if the wiper blade has a spoiler).

**3** Slide the blade over the "U" hook on the arm then slip the plastic mounting adapter up and into the "U" hook, being sure to securely lock it in place.

**4** This is where many have trouble – positioning the outer end of the blade into the guides on the wiper arm (unique to the 3 series 99 thru 05). If installing a PIAA Super Silicone with spoiler, gently position the spoiler in front of



Fig. 2

the upper tab on the wiper arm, then position the outer tip of the blade between the two lower tabs on the arm (figure 2). If installing a

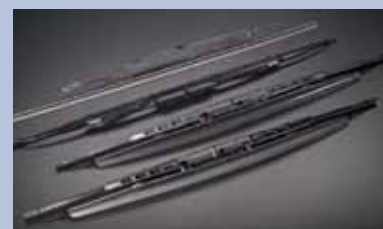
**October Special!** Save \$1 on every PIAA wiper blade. Sale ends October 31, 2007.

PIAA Super Silicone blade without a spoiler, remove the alignment tab from the outer end of the original wiper (found between the lower guide tabs on the wiper arm) and install it onto the PIAA wiper (figure 3).



Fig. 3

**5** Once the PIAA Super Silicone blade is installed, use the included windshield cleaning wipes to clean the windshield thoroughly. Let dry for 10 minutes, then wipe with a cloth. Run the PIAA Super Silicone blades on the windshield for 5 minutes. This applies the initial silicone layer to the windshield. Your PIAA Super Silicone wiper blades are now ready for use.



### "Which wiper is right for me?"

Here's a brief comparison of the various wipers we offer:

- Replacement rubber inserts – inexpensive; a pain to install.
- Original BMW – most expensive; easy to install.
- Bosch Excel – low cost; better wiping than BMW blades.
- Bosch Icon – moderate cost; frameless design looks cool.
- PIAA Super Silicone – higher cost; easy to install; best wiping performance by far.
- PIAA Super Sporza – same as Super Silicone but has spoiler.

## How easy is this?! do-it-yourself

### Proper procedure for cleaning and oiling a reusable air filter. ✂

When you use a K&N or aFe lifetime air filter, it will be in need of cleaning and re-oiling after about a year of use, (sooner in heavy service or dirty conditions). The procedure is certainly not difficult, but it requires a little planning – you will need to have the filter out of the car for about 24 hours before it can be re-installed.

You will also need a filter recharge kit (cleaner and oil). Here are the proper steps, shown with an aFe panel filter that we removed from a 98 740i.



Fig. 1

**1** Gently tap the filter on the ground or into your sink or cleaning area to dislodge any loose dirt and debris (see figure 1). Do not use compressed air to clean the filter!

**2** Spray the cleaning fluid generously over the entire filter surface, on both sides. Let sit for about 10 minutes (figure 2).



Fig. 2



Fig. 3

take up to 24 hours, depending on conditions.

**3** Rinse the filter with running water, from both sides, until the water runs clear and the filter is visibly clean (figure 3). Then let the filter dry. This can take up to 24 hours, depending on conditions.

**4** Apply the fresh filter oil to the filter surface (figure 4). Be careful not to over-oil the filter media. Only apply small amounts at a time and give sufficient time for the oil to wick into the media. Apply the oil lightly to every other rib and let the filter sit for about 15 minutes so the oil can wick into the filter media. If there are areas that are still dry, apply small amounts of oil to them and allow the filter to sit again. When the media is completely oiled, re-install the filter.

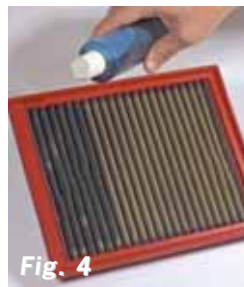


Fig. 4

### Get a free filter restore kit when you buy any aFe filter or intake!

Includes cleaner and oil. A \$13.95 value! Act now – offer ends October 31, 2007.



### Enter our photo contest...



You could win \$100 and be in one of our catalogs!

Prizes are offered in 27 categories. Every winner receives a \$100 Bavarian Autosport savings certificate, good towards the purchase of any products we sell. For a list of categories and rules, go to [www.BavAuto.com/photocontest](http://www.BavAuto.com/photocontest).

Send in your pics today – the deadline is October 31, 2007!