

TechDrive

Volume 3 Number 4 December 2006

BMW
TechDrive
Magazine

For independent
BMW service
professionals



The Ultimate
Driving Machine®



Reprogramming **04** Saving The Heads **12** Hydrogen Under The Hood **20** Tech Briefs **26** Dealer Listing **27**

To our readers,

What could be more useful to independent service technicians who work on BMWs than a publication dedicated specifically to them?

That's the idea behind the magazine you're holding, *TechDrive*. BMW of North America both sponsors the publication and provides much of the information that's included. A big part of the rationale behind *TechDrive* is the belief that if you are able to diagnose, repair and maintain BMW vehicles properly and efficiently, your reputation and ours will be enhanced.

TechDrive's combination of feature service articles (written from both BMW tech information and interviews with successful independent BMW specialists), new technical developments, systems evolution, as well as the correct BMW replacement part, and service bulletins are intended to help you fix that BMW right the first time, on time. Our list of BMW dealers will assist you in finding Original BMW Parts.

There's more to this effort, including highly-informative and user-friendly web sites, which we'll explain in future issues.

We want to make *TechDrive* the most useful and interesting technical magazine you receive, and you can help us do that. Please email us at editor@techdrivemag.com and let us know what topics you'd like to see covered, and provide any other comments you might have. With your involvement, this publication can evolve into one of your most important tools.

Thanks for your continued interest.

For more information please email us at: editor@techdrivemag.com

Cover Photo:
The BMW V8 engine
with VALVETRONIC:
cylinderhead and valvetrain



Painting the body of the BMW 320si WTCC 2006

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A Publication For The Independent
BMW Service Professional

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24 Tech Briefs

These suggestions for technical problems are from service bulletins published by BMW, selected and adapted for independent repair shops.

27 Original BMW Parts... Nearby

Wherever you are in the United States, there's a nearby source of Original BMW Parts for your customers' BMW vehicles.



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Internet Options:

A “pass-thru,”
a PC,
an internet
connection,
two cables,
a steady
voltage source,
and you can
reprogram BMWs

When
reprogramming
first appeared,
only new car
dealers could
do it. Now,
anybody who
works on
cars can have
the capability.



Fixing BMWs Online

□ It's starting to happen: BMWs are showing up at your shop in need of reprogramming to correct a service program or to update a system. If you're turning them away because you're afraid to get into this high-tech operation, you're not only losing money, you may also lose those customers for good.

Since MY 2004, all carmakers provide a system that allows anyone who does service work—dealerships, aftermarket shops, and even do-it-yourselfers—to upgrade onboard computer systems.

As an independent BMW service center, you benefit from the fact that BMW has gone way beyond EPA requirements. You have access to reprogramming for most MY '96 and newer BMWs. The company's www.bmwtechinfo.com website is easy to access and use. For a relatively modest subscription fee (\$30 per day; \$250 per month; or \$2,500 per year), you get access to all the service and parts information BMW provides its

dealers, plus special programs for aftermarket shops. The site also lists programming updates available for BMW cars and SAVs.

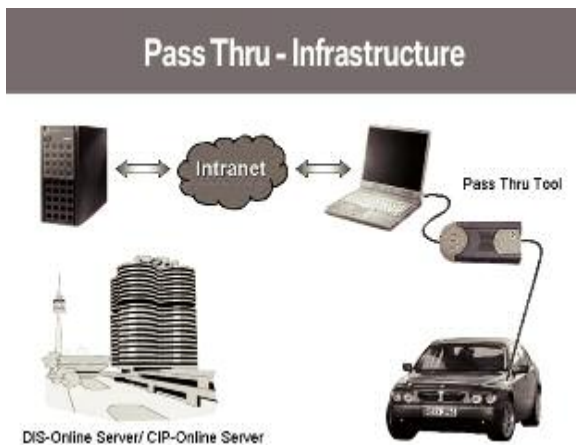
Reprogramming

Via the Internet, any shop can reprogram almost any BMW onboard computer. Access the BMW website, select the appropriate year, model, and engine, then download the software to reprogram the vehicle. The software is transferred from your PC to the vehicle using a “pass-through” (sometimes shortened to “pass-thru”) device. Pass-thru devices and cables are available from several aftermarket suppliers. Before you can reprogram a BMW, you must download and install some software drivers to your PC to support the downloading process. These drivers are available at no charge from BMW at www.bmwtechinfo.com



Besides giving you all the information available to dealers' service departments, TIS also provides what you need to do reprogramming.

REPROGRAMMING



BMW harnesses the power of the Internet to make reprogramming convenient to do.

Why Reprogram?

BMW sells vehicles around the world. When each BMW rolls off the assembly line, its onboard computers must control numerous operating functions. However, these functions vary widely and include:

- Complying with government regulations for emissions levels, fuel economy, safety, and any other requirements imposed by the country where the car will be sold or operated.
- Controlling the operation of the engine and transmission.
- Controlling chassis electronics such as ABS, Stability Control, etc.
- Operating onboard navigation systems, telephone communications, and other standard or optional electronic systems.

In the early days of computer systems, things were much simpler. BMW only needed a few standard control modules. As a vehicle moved down the assembly line, the onboard modules would be programmed for the vehicle's specific applications. This procedure not only added to the time and complexity of building a vehicle, it also forced BMW to stockpile all variations of the

programmed modules to have parts available to replace any defective or damaged units. Because of all the variations required, BMW was stockpiling hundreds of different versions of its computer modules. But in the "dark ages" of computerized engine management systems, which ran from the early '80s until the advent of OBD II, there was no other option besides programming modules at the factory.

Enter the power of the Internet. With its ability to carry anything electronic, anywhere, anytime, the Internet forever changed how data could be transmitted. All BMWs still are, of course, initially programmed at the factory. But with the right combination of hardware and software, control modules can be reprogrammed to meet new requirements virtually anywhere.

Reprogramming via the Internet is a cost-effective way for BMW to correct a programming error not yet discovered at the factory or to upgrade the performance of a system to a calibration even better than new.

Reprogramming allows BMW to:

- Significantly reduce its inventory costs because it only needs to have the basic module (hardware) on hand.
- Reduce dealership inventory costs because dealers don't need to stock modules.
- Improve customer service.
- Update onboard software without having to replace the module. Updates are used both to correct problems and improve performance.

- Add special equipment features to existing control modules.

You must also make several changes in your Internet browser settings to allow downloading BMW reprogramming. With the dangers of viruses and other online hazards, the initial settings for browsers won't allow large programs to be downloaded without your authorization. The changes are easy to make, but you have to do them in order.



Before reprogramming, a huge number of ECMs with different calibrations had to be stocked. Now, just a few are required.

Setting Up Your PC

Most modern PCs will support BMW reprogramming, but if you are still clanking away on an early PC, it might not have the power necessary. To reprogram, your PC must meet these requirements:

Operating System
Windows 98, ME, 2000, or XP Professional

Graphics
Resolution of 1024x 768 or better with 256 colors or better

Memory
At least 128 meg

Hard disk space
Approximately 10 gig, with at least 5 gig available

CPU
Pentium III or better \geq 500 MHz

Interfaces
One RS 232 serial interface available
Internet connection of at least 56K Bit

Browser
Netscape 4.7x or Internet Explorer V 5 or later
Microsoft Java Virtual Machine (can be downloaded from www.bmwtechinfo.com) If your shop has a server with multiple computer connections, you may need "administrator rights" depending on how your system is set up. You will also open up specific firewall ports as indicated in FAQs prior to subscribing.

Reprogramming Exceptions



Some older model BMWs cannot be reprogrammed or require special connectors.

The following BMWs cannot be reprogrammed using a pass-thru. Details on reprogramming these models can be found at www.bmwtechinfo.com:

- 318i for MY 1996-99
- Z3 roadster 1.9 MY 1996-98
- 840Ci MY 1996-97

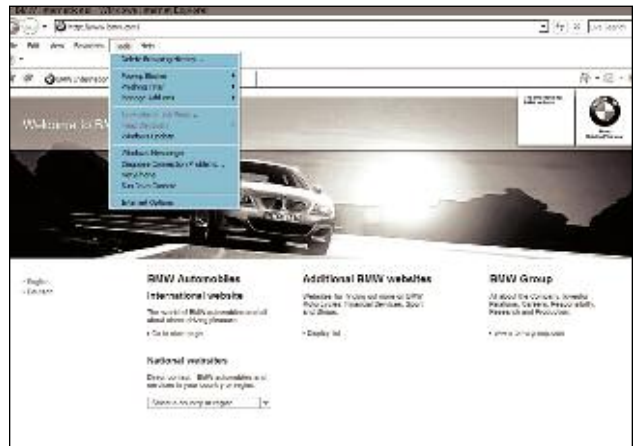
Some older BMWs require a special 20-pin BMW diagnostic connector adaptor download.

These vehicles include:

- 323i sedan up to MY 1998 and the 323i coupe/convertible up to MY 1999.
- 328i, 330i sedan up to MY 1998.
- 328i, 330i coupe/convertible up to MY 1999.
- M3 coupe/convertible up to MY 1999.
- Z3 roadster 2.8/3.0 up to MY 1998.
- M roadster/coupe up to MY 2000.
- 528i and 530i up to MY 1998.
- 540i/540i sport wagon up to MY 1997
- 740i up to MY 1997

The following steps illustrate the settings using Internet Explorer and Windows XP Professional SP1. Other versions may have slightly different wording, but these procedures should guide you through just about any system setup:

1. During any reprogramming session, you should disable any “pop up blocker” installed on your Internet browser.
2. Internet Tools: “Internet Options” is under the “Tools” heading. Click “Tools” and then click “Internet Options”



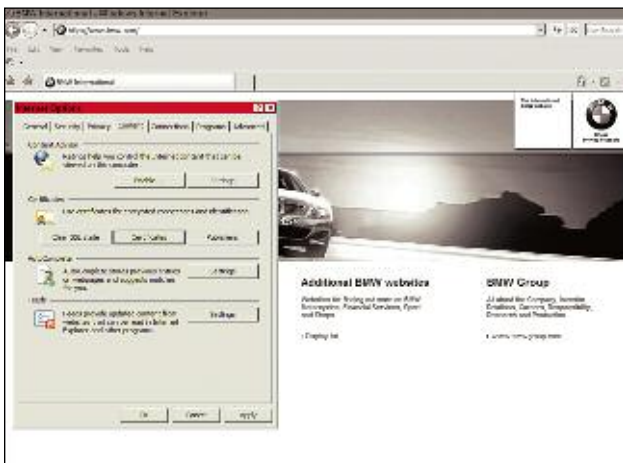
3. Security: Select the security box under the tools options. When the “Internet Options” box opens, select the “Security” tab. In the “Security Settings” box, select “Medium” as the “Reset Custom Settings” option. Then make sure the following are “approved” or “enabled:”

- Download signed ActiveX controls > **Prompt**
- Run ActiveX controls and plug-ins > **Enable**
- Script ActiveX controls marked safe for scripting > **Enable**
- Allow META REFRESH > **Enable**
- Active Scripting > **Enable**
- Allow post operations via script > **Enable**

After enabling these settings, click “OK” to close all dialog boxes.



4. Certificates: Click "Tools" and "Internet options" again, and select "Certificates." When the box opens, pick "Trusted Root Certification Authorities." A box with a long list of authorities will appear. Click "TC TrustCenter Class 2 CA" and then select "View."



You will see the "Certificates" box open up again. This time you want to pick "Details" and then "Edit Properties." In the box that is now displayed, select "General" then in "Certificate Purposes," you want to check "Code Signing." Now close all the boxes by clicking "OK" or "Close."

5. Activate Microsoft MV: Activating Microsoft MV is the last step. Now go back to "Tools" and select "Internet Options" again. This time you want to open the "Advanced" tab.

Find "Microsoft MV" and make the following selections:

- Java Console >Enabled
- Java Logging >Enabled
- JIT compiler for virtual machine >Enabled



You will have to restart or reboot your computer for all of the settings to take effect. The first time you reprogram, you must download the BMW Specific Driver, version greater than 0048, at www.bmwtechinfo.com.

Standardized Communications

Without getting too deep into programming issues, we should mention that reprogramming onboard modules is more difficult than reprogramming a typical PC. In fact, some people say that onboard programming shouldn't be called "software" but "firmware"! We'll let the computer people debate that, but we're going to stick with software because that's the term most people know.

As already mentioned, initially, only authorized BMW dealers could reprogram. But the federal EPA mandated that carmakers provide anyone who services vehicles access to reprogramming at a "reasonable cost." To ensure that all carmakers use a standardized system, EPA was assisted by the Society of Automotive Engineers (SAE), which developed the J2534 protocol. The process was similar to the development of OBD II in the early 1990s. EPA mandated the system and SAE developed the standardized access to OBD II using any scan tool.

REPROGRAMMING



A “Pass Thru” device links your PC to the vehicle's onboard computer for reprogramming. The hardware is an industry standard, so you only need one device to reprogram any vehicle.

We have to use a little “geek speak” to discuss J2534. The protocol is an “Application Programming Interface” (API). An API enables two different software systems to “handshake” or work together. If you have ever printed a document from your PC, you've used an API, probably without knowing it. An API is needed to allow any Windows-based program, like MS Word or Excel, to communicate with the built-in software that controls the printer. If Microsoft and the printer manufacturers had not agreed on an API, changing or upgrading a printer would not be a matter of “plug and play.” Instead, you would have to reprogram all the software in your PC to work with your new printer.

J2534 standardizes the reprogramming communications between all carmakers and their vehicles. You access the carmaker's website with your PC and your Internet access program to download the vehicle reprogramming software. Your pass-thru uses the J2534 API to transfer the reprogramming from your PC to the vehicle.

That's why you need only one pass-thru device to reprogram any vehicle from any manufacturer, but the specific upgrade for any vehicle can only be obtained from the individual carmaker's website.

When investing in any pass-thru device, make sure the manufacturer certifies that the product fully complies with J2534. The device will work

for your BMW customers, plus any other carmaker's vehicles your shop services.

Reprogramming A BMW

Although you can reprogram with a relatively slow 56k bit Internet connection, you will be online for a very long time. To save time, upgrade to a DSL or other high-speed Internet connection.

Even with a high-speed connection, reprogramming some vehicles can take several hours. In some cases, reprogramming via the Internet may be impractical. The E60 and later platforms with Navigation and premium audio could take up to 40 hours to reprogram! BMW is aware of the problem and is trying to reduce reprogramming times for these models.

A steady electrical supply to the vehicle must be maintained while reprogramming. If there is any disruption or loss of steady voltage in the power supply, the programming may stop or, worse, the new program can be incorrectly loaded, causing all kinds of problems.

To ensure constant power, the vehicle must be connected to an “intelligent” battery charger with a controllable power supply for constant voltage and high-amperage current. You can purchase a reprogramming charger from your local BMW dealer. The power source must be:

- Microprocessor controlled.
- Rated at 150 Ah with a 10 Ah or higher resolution.
- Capable of monitoring amperage draw and matching output to current draw. For example, if reprogramming puts a 30 amp draw on the vehicle's electrical system, the charger must be capable of maintaining a 30 amp flow into the battery.
- Minimum 12.4 volt/maximum 14.4 volt output.

- Power supply current of 45A with 0.05A or higher resolution.
- Non-sparking, with delayed switch on.

Complete the steps shown in “Before Your Program,” make the connections between your computer, your pass-thru, and the vehicle. Then go online to www.bmwtechinfo.com. Select the reprogramming for the BMW you are servicing, and start the download. You are now reprogramming

Before You Reprogram



Always set up the vehicle properly before you attempt to reprogram any BMW:

- The engine must be off and cool, transmission oil temperature less than 85° C (185° F).
- Correct and clear any fault codes stored in memory.
- Record any preset AM or FM stations so you can reset the radio after reprogramming.
- All electrical devices must be turned off.
- All onboard modules must be installed and operational.
- Never put any cables through an open window, the cables can be damaged during automatic window initialization.
- Park the vehicle where it will not be in the way because reprogramming can take several hours.
- An approved battery charger must be connected and turned on to guarantee uninterrupted power to the vehicle.
- Windshield wipers must be unobstructed because they can be activated during reprogramming.
- During programming, the car cannot be disturbed. Do not open any doors, windows, trunk, etc. Do not turn on any devices.
- On E65/E66 models, the fuel tank must be filled, or remove fuse F73 from the fuse box in the trunk. Programming vehicles with low fuel in the tank can damage the fuel pump. □

Saving



The Heads

With BMW's service kit, you can clean, not replace M60/M62 heads.



□ You can become a hero to any customer who owns a BMW with either the M62TU or S62 V8 engine that has a clogged secondary air system.

These engines are used on 7 Series (E38), 5 Series (E39), X5 (E53), and Z8 models. Instead of a staggering bill for replacing the plugged head castings, you can restore the passages by cleaning them.

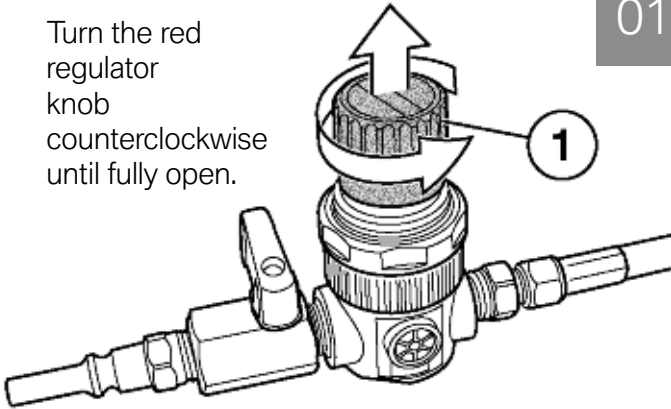
There's even a nostalgic benefit for you -- the chance to actually fix something. Yes, we can recite all the reasons why service work now is mostly diagnose and replace, instead of repair. But we still find a strong sense of personal satisfaction when we repair something and return it to working condition rather than removing the old part and installing a new one.

Clogged air passages typically set a BMW fault code 80 or 81. Start by checking the operation of the air pump, one-way valve, solenoid valve, and other components. If all parts are operating properly, then the passages are plugged.

According to BMW, clogged air passages can occur at any time after the engine has 35,000 miles or more on the odometer. The primary culprit is burning low-grade gas that doesn't have an adequate amount of detergent additives. BMW currently recommends that its customers only use "Top Tier" gasoline. A list of oil companies that dispense "Top Tier" gasoline can be found at www.toptiergas.com.

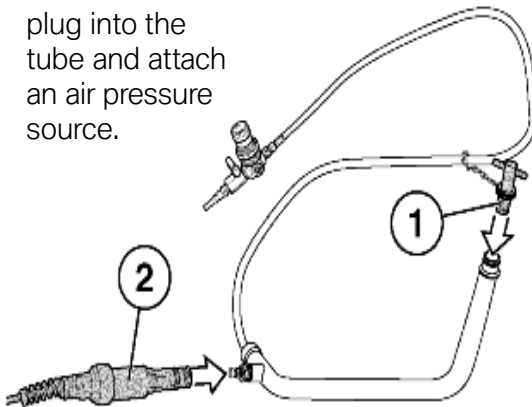
HEADS

Turn the red regulator knob counterclockwise until fully open.



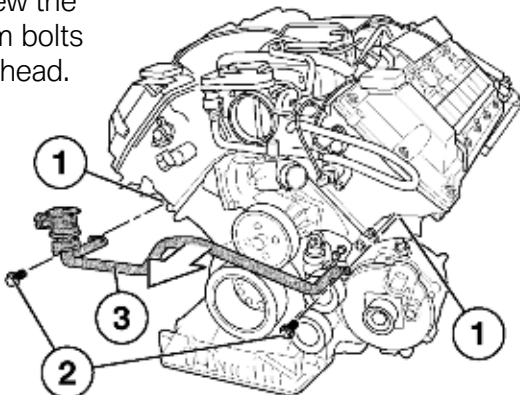
01

Then insert the plug into the tube and attach an air pressure source.

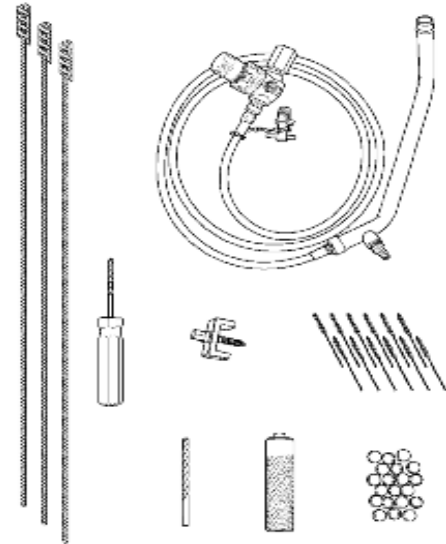


02

After removing the fan, unscrew the 10 mm bolts in the head.



03



The Kit

You will need BMW's special tool kit, PN 99 00 0 006 668, to clean the secondary air passages on the M62TU or S62 engines. The kit includes:

- Cylinder head back pressure diagnostic tool
- Set of 4mm nylon final clean up brushes
- Core plug installer
- Core plug remover
- Drill bit to enable use of core plug remover
- Reamer for 4mm air passages.
- Set of 10mm brass brushes to clean out main air supply passage.

You can order replacement nylon clean up brushes (set of 12, PN 82 11 0 416 754) and replacement brass brushes (set of 3, PN 82 11 0 416 755). The repair kit does not include replacement 12 mm main secondary air passages core plugs. These plugs must be ordered separately (3 per vehicle, PN11 12 1 736 330).

Calibration

Your initial tests of the air pump, one-way valve, and other components are "diagnosis

by elimination.” If all the other components operate properly, the secondary air passages must be plugged. The first step in cleaning the passages is to confirm that the passages are blocked by testing with the Cylinder Head Back Pressure Diagnostic Tool, which is part of the special tool kit.

Open the red knob on the regulator, then insert the plug into the end of the tube and tighten until secure. Attach a pressure gauge or DISplus unit to the fitting on the tool. Connect shop air to the end of the tool.

Open the yellow flow control valve until the system reads 3.5 bar (50 psi). Then press down on the regulator knob to lock the reading. Shut off yellow flow control valve, disconnect the pressure transducer and remove the plug from the end of the pipe.

Testing

Remove the fan assembly from the engine. Remove the two 10mm bolts (#2 in the next illustration) securing the delivery tube to the cylinder heads at the position shown. Move the tubing out of the way so you have access to the ports.

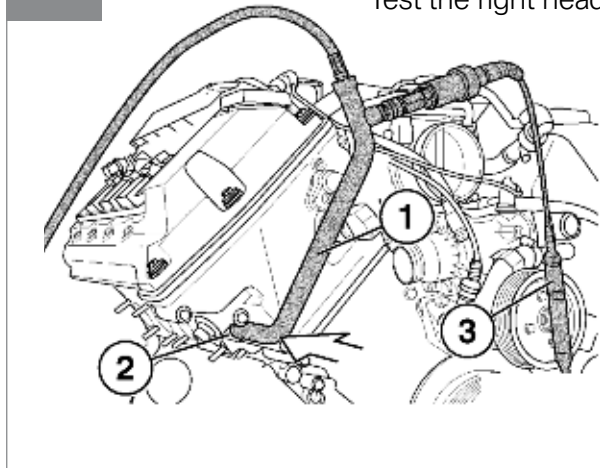
Insert the tool into the right cylinder head secondary air supply passage. Connect the pressure gauge or DISplus to the tool, connect shop air, and open the yellow flow control valve to allow the free flow of regulated air to pass through the head. Observe backpressure reading. If the backpressure is more than 1.10 bar (16 psi) the passage is blocked. Repeat the backpressure test for left head.

If either head has blocked passages (backpressure reading greater than 1.1 bar/16 psi), the head must be removed for cleaning. Before pulling the heads, BMW recommends that you do both an engine compression test and a cylinder leakdown test that would show if additional engine work is needed. Running on poor quality fuel isn't the only possible cause of blocked air passages in the head. A severely worn

– Continued on page 18

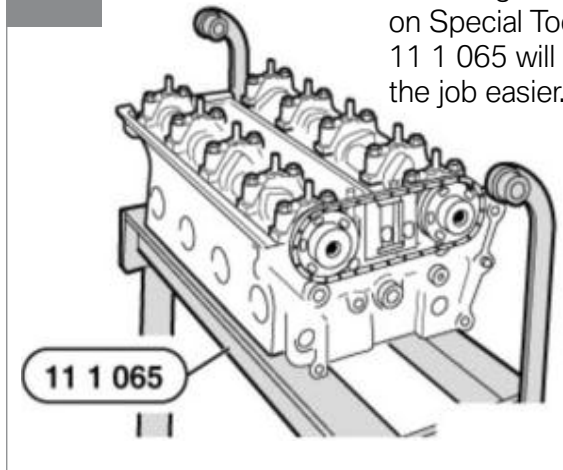
04

Test the right head first.



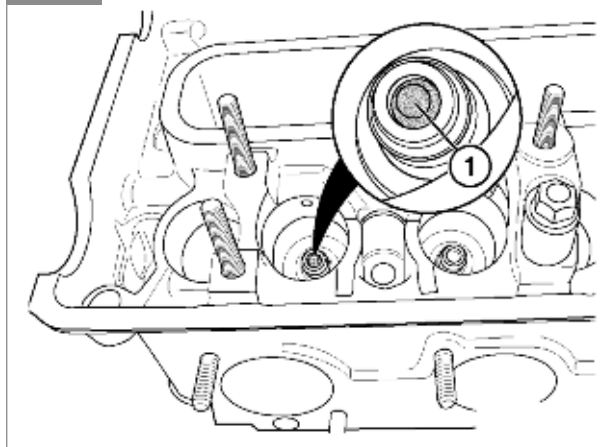
05

Mounting heads on Special Tool 11 1 065 will make the job easier.



06

Make sure the valve stem is flush with the top of the guide.



ORIGINAL BMW REMANUFACTURED

WHY BUY ORIGINAL?

REPLACE — We replace more parts than aftermarket brands.

ENGINEERED — Designed to meet original OEM drawings.

MANUFACTURED — Made with same OE components as factory parts.

ASSEMBLED — Completely assembled from components and not just repaired.

NEW — Fully performs as new unit.

QUALITY, RELIABILITY AND VALUE

The quality, reliability and value of the Original BMW Remanufactured A/C Compressor wasn't meant to be taken lightly. It is not only an exact replacement for the original unit, it's also remanufactured and tested to meet the same strict specifications as the original, so it performs just as well. And like all remanufactured parts, it's covered by a two-year warranty. In fact, the only detectable difference you'll find between a Original BMW Remanufactured A/C Compressor and a new one is the price. Which we're sure you'll find quite refreshing.

IT'S ALL IN THE PROCESS

Remanufacturing Process (Original BMW)

1. Dismantle core and clean all components.
2. Replace key components 100% with new OE part.
3. Test all other critical components.
4. Replace components that do not meet specs.
5. Assemble, test and box.

Rebuilt Process (Typical Aftermarket)

1. Identify damaged part or parts.
2. Replace damaged part with non-OE part and clean.
3. Re-assemble, test and box.



REMANUFACTURED A/C COMPRESSORS



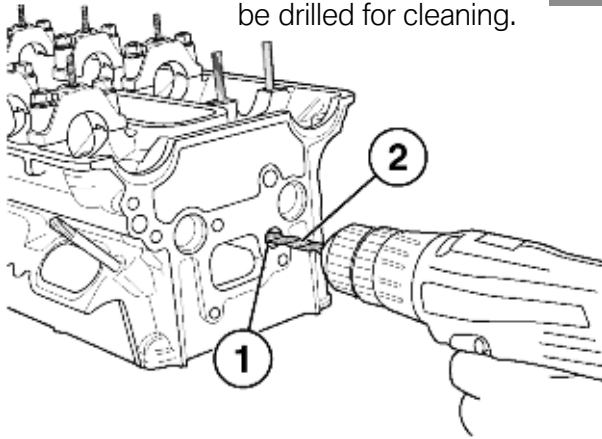
Remanufactured for BMW by

DENSO

Available only through your local BMW Dealer

07

The core plug must be drilled for cleaning.



– Continued from page 15

engine can also cause the condition. If only one head is blocked, but the head has heavy carbon deposits, the other head probably also has heavy carbon buildup, even though it didn't show a blockage. You should pull both heads to remove the carbon.

Remove the heads according to BMW's standard procedure as described in Repair Instruction 11 12 505/506. Mount the heads on the fixture (Special Tool 11 1 065) and disassemble them. Use the special tools as required to remove the camshafts, bucket tappets, exhaust valve retainers, exhaust valve springs, and exhaust valve guide seals. Always position the removed parts so that you can reinstall each valve in its original cylinder, and all the other parts in their original locations.

Push on the valve stem until the edge of the stem is flush with the top of the valve guide. Secure a dial indicator to the side of the valve face and measure valve movement within the guide. Movement should be no more than 0.5 mm. If the movement is greater than 0.5 mm, the guides are worn and must be serviced.

Using the drill bit supplied in the tool kit, drill a hole in the 10mm core plug for the main secondary air supply passage located in the rear of the head.

Using the core plug remover from the tool kit and a 10 mm socket, thread the removal tool into the hole you just drilled. Continue to turn the screw clockwise until the plug is removed.

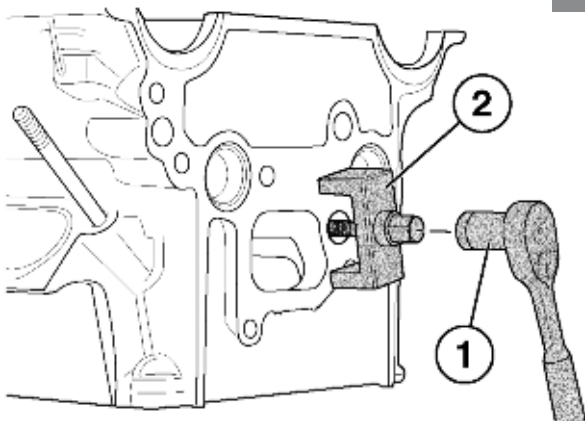
On the right side head, remove the plug from the front of the head the same way you removed the plug from the rear of the other. On the left side head, there is no front plug, only a rear core plug.

Chuck the 10 mm brass brush from the kit into a drill and clean out the main secondary air delivery passage. Blow out the passage with an air nozzle and shop air and repeat. Repeat the brushing and blowing out with shop air until there is no more carbon in the passage.

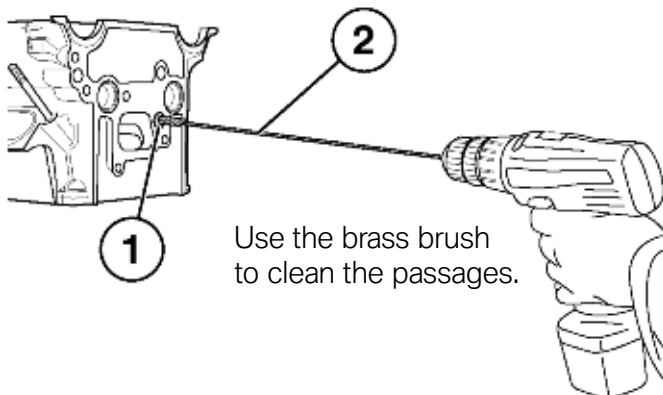
Locate the secondary air distribution ports (1) under the removed exhaust valve. Insert the reamer tool (2) from the special tool kit into the port. Slowly rotate the reamer clockwise until

08

Pull the core plug.



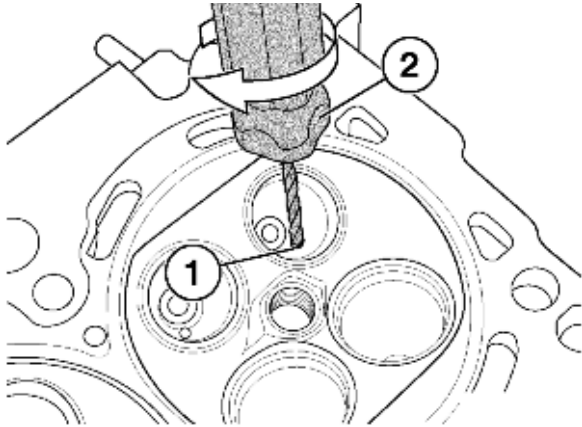
09



Use the brass brush to clean the passages.

10

The secondary air passages must also be cleaned.



no resistance is felt and the tool goes to the bottom of the passage. Repeat the reaming process for all eight ports in the cylinder head.

After reaming each secondary air passage, clean the passage using the 4mm nylon brushes from the tool kit. Chuck the brush into a drill and clean each passage. Blow out the passage with air until all material is removed from the passage.

Using the core plug installer (3) from the tool kit and a suitable hammer, install the new core plugs into the secondary air distribution passages. Core plugs (PN 11 12 1 736 330) have to be ordered separately (Qty: 3 per vehicle).

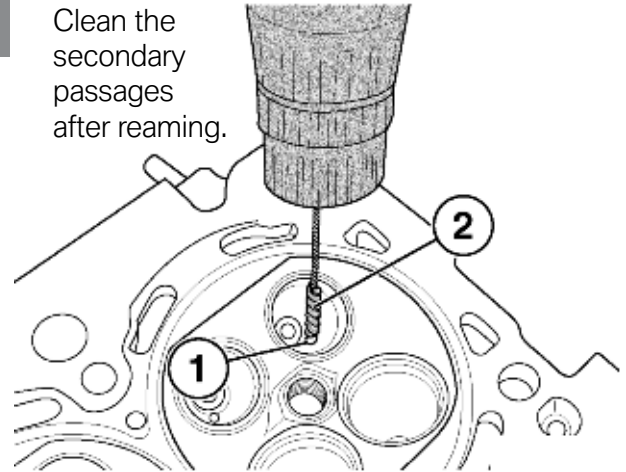
Before reassembling the heads, recheck the backpressure. You should get a reading of no more than 1 bar (14.5 psi). A steady flow of air should also come out of each of the eight secondary ports. If the reading is high, there is still blockage in the passages and you will have to repeat the cleaning process.

Install the protective sleeve (PN 11 1 960) over the end of the valve stem and place the new valve seal on the sleeve. Press the valve seal in place using special tool PN 11 1 200. Reassemble the heads and reinstall them on the engine using the proper bolt tightening procedure.

Finally, clear the 80 or 81 codes, test drive, and your customer's BMW is ready to go with its secondary air system as good as new.

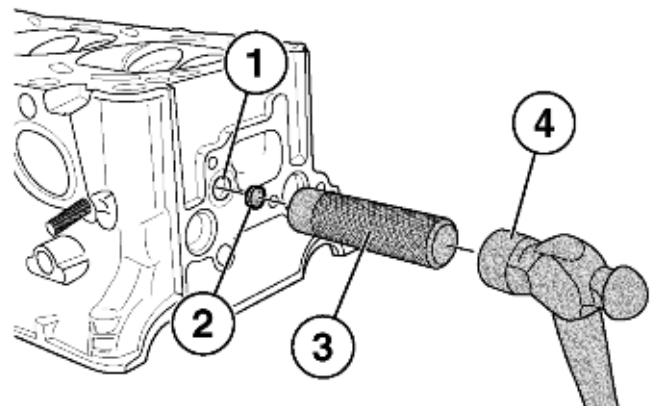
11

Clean the secondary passages after reaming.



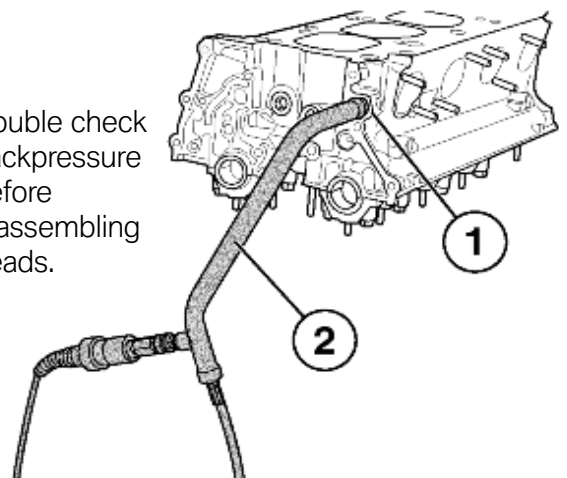
12

Reinstall the core plugs.



13

Double check backpressure before reassembling heads.



Hydrogen 7 Is The Ultimate Hydrogen Under The Hood





The 6-liter, 12-cylinder engine in the BMW Hydrogen 7 runs on either hydrogen or gasoline. Sophisticated control systems allow the driver to switch between fuels without any disruption in performance.

“Green” Luxury Sedan

□ BMW has made a major leap in alternative fuel technology with the introduction of its developmental Hydrogen 7 car. The vehicle is “bi-fuel,” capable of running on either hydrogen or gasoline. The driver can make a seamless switch between fuels as the car is running. In hydrogen mode, the car emits virtually nothing but water vapor, while providing the performance and comfort 7-series owners expect.

Although there is a tremendous amount of research into alternative fuel technology, many experts believe hydrogen is the only energy source that could potentially replace fossil fuels for automotive use. Hydrogen is one of the most common elements in the universe. It is part of every atom of water and is found in most organic compounds which means hydrogen is easily recycled and has no bad effects on the environment. In theory, hydrogen fuel could be used forever. The water vapor released by burning hydrogen would be recycled by the environment, available to be extracted over and over again for use as a fuel.

It will be years before you see a hydrogen powered BMW in your service bay. Despite the fact that hydrogen is abundant, there are still many difficult problems to be resolved before hydrogen can realistically replace petroleum. However, the fact that BMW has the first hydrogen-powered luxury car on the road is a big step toward drastically cutting the world’s need for fossil fuels to operate our vehicles.



Special equipment is needed to refuel a hydrogen powered car, but the process is essentially the same as filling up any gasoline or diesel powered vehicle.

HYDROGEN CAR

In addition to a conventional gas tank, the BMW Hydrogen 7 car has a specially designed hydrogen storage tank. The hydrogen tank holds about 34-37 gallons of liquid hydrogen, stored at -250°C . (-418°F). Dual walls, consisting of multiple layers of aluminum and fiberglass provide the insulation needed to keep the hydrogen liquid.



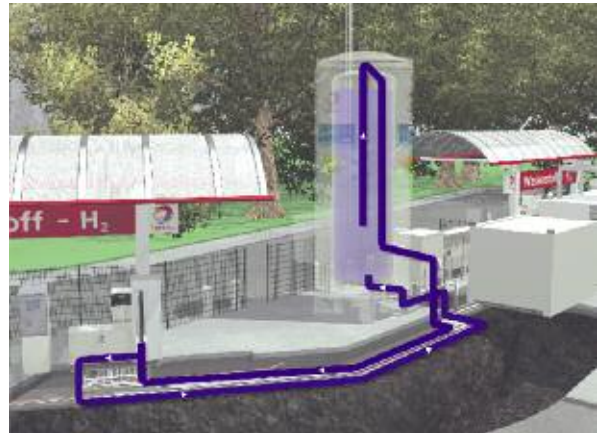
Engine Modifications

BMW Hydrogen 7 is powered by a twelve-cylinder, internal combustion engine. The car reaches 100 km/h (62 mph) in 9.5 seconds and has a top speed of 230 km/h (143 mph). The car has a range of about 125 miles when using hydrogen, plus another 310 miles when switching over to gasoline.

By adapting conventionally gasoline powered engine to also use hydrogen, BMW eliminated the technology hurdles that the development of a dedicated hydrogen engine would face. When running on gasoline, the engine uses a direct fuel injection system. In hydrogen mode, the hydrogen is mixed with air in the intake manifold before being injected into the engine. The Hydrogen 7 stores liquid hydrogen in its tank. The liquid is converted to a gas when it is injected into the intake manifold.

BMW developed new injection valves to blend the hydrogen with the air in the manifold. The valves are larger than conventional gasoline injection valves and are designed to handle a wide variation in volume flow than a typical gasoline injection valve.

Hydrogen burns up to ten times faster than gasoline, which forced BMW engineers to develop a complex fuel management system for the Hydrogen 7. Using BMW's exclusive fully variable VALVETRONIC valve management system, plus BMW's variable double-VANOS camshaft adjustment, the onboard computers optimize hydrogen combustion.



One major barrier to hydrogen use is the need for a completely new infrastructure to produce, distribute, and dispense hydrogen fuel.

The gasoline is stored in a conventional gas tank. Storing the hydrogen required the development of a unique, low pressure tank that keeps the hydrogen in a liquid state at very low temperatures.

Offering BMW performance, quality, and comfort, but with virtually no emissions at all, the Hydrogen 7 represents a major development in alternative fuel technology. With BMW's approach, when these cars start showing up at your shop, you won't have to learn a completely new technology like you would for fuel cells and electric powered cars. All you have to do is think hydrogen instead of gasoline as the power source, just about everything else remains the same. □



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TechBriefs

Current suggestions for technical problems from BMW service bulletins.

No Crank, No Start E90/E91 (3 Series), E60/E61 (5 Series), E63/E64 (6 Series)

If there is a no crank/no start situation, check to see if the SRS (Supplemental Restraint System (airbags) and red brake lights are the only lights illuminated when the ignition key is "on." If these are the only lights, the problem may be a faulty IBS (Intelligent Battery Sensor). Verify the cause by disconnecting the IBS. The IBS is on the negative battery terminal. Follow the white/blue and gray wires from the IBS and disconnect at connector X13895 (3-pin connector with 2 wires). If the vehicle starts, the IBS is faulty and must be replaced.

Air Conditioning System Blows Warm 3 Series (E90, E91, E92) Produced Up To August 15, 2006

Customers may complain that the air conditioning system initially works properly, but after driving on a long trip (approximately more than 1 hour), the system starts to blow warm air. This usually happens under extreme humid conditions. If the A/C is turned off for 10 to 15 minutes, the system will work properly. First check for and correct any fault codes. If there are no fault codes, hot air leaks between the evaporator and housing wall, flowing past the evaporator sensor, may cause the evaporator sensor to read high.

To correct the problem:

1. Remove the lower panel located under the glove box assembly.
2. Remove the evaporator sensor located on the passenger side of the evaporator housing.

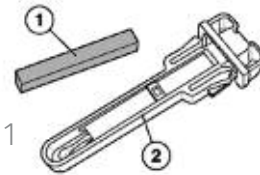


Figure 1

3. Affix a strip of self-adhesive foam, P/N 64 11 9 142 491, to the side of the sensor. Make sure the surface of the sensor (Figure 1, Number 2) is clean. Place the foam strip on the side of the sensor, between the plastic ribs opposite electrical connector as shown in Figure 2.

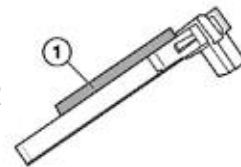


Figure 2

4. Make sure you do not cover the tip of the sensor.
5. Reinstall the temperature sensor.
6. Reinstall the lower dash panel.
7. Check the system for proper functionality.

Battery Safety Terminal E60 (5 Series)

Make sure the Battery Safety Terminal (SBK) is properly tightened to 15 Nm (11 ft.lb.) when servicing the battery or the battery switch.

A loose connection can blow the safety terminal, cause the battery terminal to overheat, or set a fault code for high resistance in the firing circuit.



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so he could start his trip

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...but that knock off part
won't fit and it's 4:30.

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TechBriefs

GPS Incorrect E46 (3 Series Coupe) with Navigation System and Telematics Control Unit (TCU)

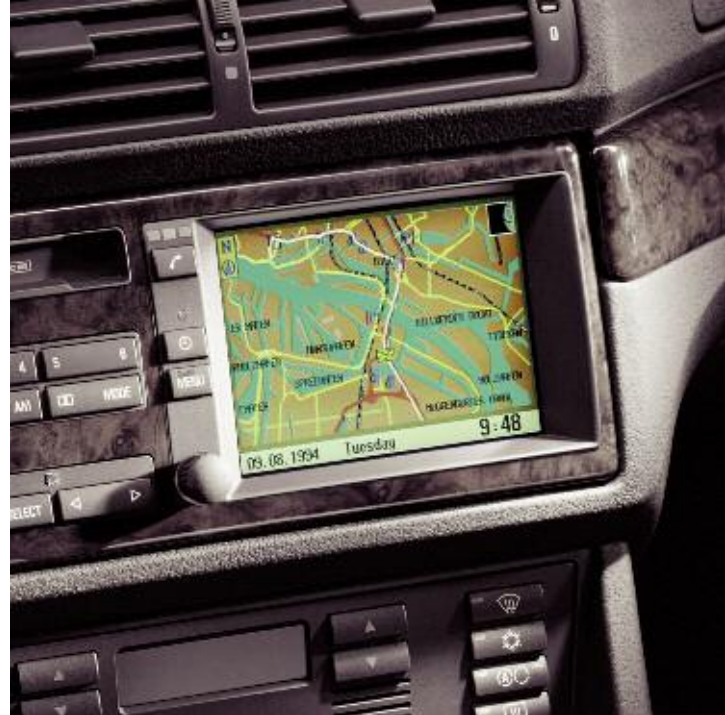
If the navigation system shows the wrong vehicle position, or has no GPS signal at all, the TCU may be interfering with the navigation system. Verify that you are in an area with a good GPS signal by comparing with a known good vehicle. Then check the GPS reception signal of the problem system:

- Switch on the Board Monitor
- Press the "MENU" button
- Select "Settings"
- In "Settings", press and hold the "MENU" button for approx. 8 seconds
- Select "GPS"
- Press "Function"
- Press "GPS-Tracking Function"

If the displayed S/N value is 4 or less, pull fuse #39 (behind the glove box) to disconnect the TCU and recheck the S/N value. If the displayed S/N value remains 4 or less, troubleshoot the Navigation system and the GPS antenna.

If the S/N value increases to 10 or higher on the majority of the visible satellites, a replacement GPS antenna, P/N 65 90 8 374 297 must be installed behind the instrument cluster:

- Remove the instrument cluster.
- Remove the trim panel for the pedal assembly.
- Remove the side trim panel on the A-pillar.
- Remove the entrance cover strip on the driver side.
- Remove the rear seat.
- Remove the trim on the rear seat backrest (driver side).
- Remove the side section of the rear seat (driver side).
- Remove the left rear light.



- Remove the trunk floor mat and the left trunk trim.
- Remove the Navigation computer.
- Disconnect the original GPS antenna cable from the Navigation computer and tie it back to the wiring harness. Cover the cable and the connector with tape.
- Mount the replacement GPS antenna to the plastic bracket in the area behind the instrument cluster above the air duct.
- Connect the end of the GPS antenna cable to the coax extension cable and attach to the body with tape. Run the cable down the A-pillar on the existing wiring harness. Make sure that the coax extension cable doesn't get damaged when re-installing the instrument cluster.
- Run the coax extension cable along the left side of the body all the way back into the trunk area to the Navigation system and tie it to the existing wiring harness.
- Connect the coax extension cable to the Navigation system.
- Re-install all interior parts in the opposite order they got removed, making sure that the cables do not get damaged.
- Re-install the instrument cluster.
- Re-install the Navigation computer.
- Test the Navigation system for proper function and re-check the GPS reception signals. □

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