

010 General

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GENERAL

This section is intended to help the do-it-yourselfer get started. Tips on workshop practices, basic tools, and a quick reference guide to emergencies can be found here.

WARNING —

- *Do not use this manual unless you are familiar with basic automotive repair procedures and safe workshop practices.*
- *This manual illustrates the workshop procedures required for most service work; it is not a substitute for full and up-to-date information from the vehicle manufacturer or for proper training as an automotive technician.*
- *Note that it is not possible to anticipate all of the ways or conditions under which vehicles may be serviced or to provide cautions as to all of the possible hazards that may result.*

HOW TO USE THIS MANUAL

WARNING —

Your common sense and good judgement are crucial to safe and successful service work. Read procedures through before starting them. Think about whether the condition of your car, your level of mechanical skill, or your level of reading comprehension might result in or contribute in some way to an occurrence that might cause you injury, damage your car, or result in an unsafe repair. If you have doubts for these or other reasons about your ability to perform safe repair work on your car, have the work done at an authorized BMW dealer or other qualified shop.

The manual is divided into ten sections:

- 0 GENERAL, MAINTENANCE
- 1 ENGINE
- 2 TRANSMISSION
- 3 SUSPENSION, STEERING AND BRAKES
- 4 BODY
- 5 BODY EQUIPMENT
- 6 ELECTRICAL SYSTEM
- 7 EQUIPMENT AND ACCESSORIES
- ELE ELECTRICAL WIRING DIAGRAMS
- OBD ON-BOARD DIAGNOSTICS

0 GENERAL, MAINTENANCE covers general vehicle information (**010 General**) as well as the recommended maintenance schedules and service procedures to perform BMW scheduled maintenance work (**020 Maintenance**).

The next seven sections (1 through 7) are repair based and organized by three digit repair groups. Most major sections begin with a GENERAL repair group, e.g. **100 Engine-General**. These "00" (double zero) groups contain descriptive theory of operation and system troubleshooting information. The remainder of the repair groups within a section contain the service and repair information. The last two sections contain detailed electrical wiring schematics and OBD II scan tool and diagnostic information.

Warnings, cautions and notes

Throughout this manual are many passages with the headings WARNING, CAUTION, or NOTE. These very important headings have different meanings.

WARNING—

The text under this heading warns of unsafe practices that are very likely to cause injury, either by direct threat to the person(s) performing the work or by increased risk of accident or mechanical failure while driving.

CAUTION—

A CAUTION calls attention to important precautions to be observed during the repair work that will help prevent accidentally damaging the car or its parts.

NOTE—

A NOTE contains helpful information, tips that will help in doing a better job and completing it more easily.

Please read every WARNING, CAUTION, AND NOTE in **001 General Warnings and Cautions** and as they appear in repair procedures. They are very important. Read them before you begin any maintenance or repair job.

WARNING —

- *Never run the engine in the work area unless it is well-ventilated. The exhaust should be vented to the outside. Carbon monoxide (CO) in exhaust kills.*
- *Remove all neckties, scarfs, loose clothing, or jewelry when working near a running engine or power tools. Tuck in shirts. Tie long hair and secure it under a cap. Severe injury can result from these things being caught in rotating parts.*
- *Remove rings, watches, and bracelets. Aside from the dangers of moving parts, metallic jewelry conducts electricity and may cause shorts, sparks, burns, or damage to the electrical system when accidentally contacting the battery or other electrical terminals.*
- *Disconnect the battery negative (-) cable whenever working on or near the fuel system or anything that is electrically powered. Accidental electrical contact may damage the electrical system or cause a fire.*
- *Fuel is highly flammable. When working around fuel, do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.*
- *The fuel system is designed to retain pressure even when the ignition is off. When working with the fuel system, loosen the fuel lines slowly to allow the residual pressure to dissipate gradually. Take precautions to avoid spraying fuel.*
- *Illuminate the work area adequately and safely. Use a portable safety light for working inside or under the car. A fluorescent type light is best because it gives off less heat. If using a light with a normal incandescent bulb, use rough service bulbs to avoid breakage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.*
- *Keep sparks, lighted matches, and any open flame away from the top of the battery. Hydrogen gas emitted by the battery is highly flammable. Any nearby source of ignition may cause the battery to explode.*
- *Never lay tools or parts in the engine compartment or on top of the battery. They may fall into confined spaces and be difficult to retrieve, become caught in belts or other rotating parts when the engine is started, or cause electrical shorts and damage to the electrical system.*

GETTING STARTED

Much of the necessary maintenance and minor repair that an automobile will need can be done with ordinary tools. Below you'll find important information on how to work safely, a discussion of what tools will be needed and how to use them.

Safety

Although an automobile presents many hazards, common sense and good equipment can help ensure safety. Many accidents happen because of carelessness. Pay attention and stick to the safety rules in this manual.

Lifting the car

- The proper jacking points should be used to raise the car safely and avoid damage. The jack supplied with the car can only be used at the four side points (arrows) just behind the front wheels or just in front of the rear wheels.

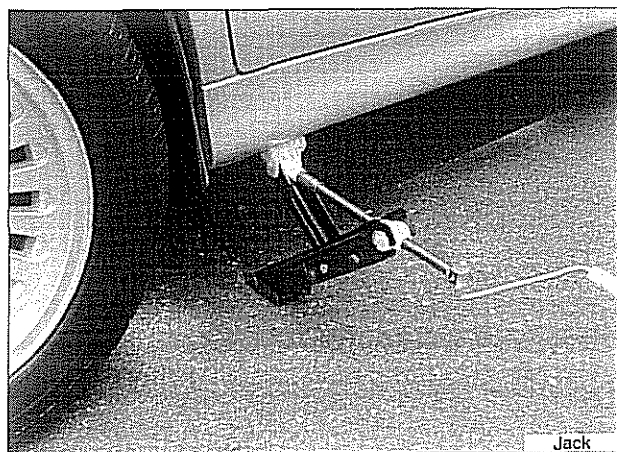


WARNING —

- *Never work under a lifted car unless it is solidly supported on jack stands that are intended for that purpose.*
- *When raising the car using a floor jack or hydraulic lift, carefully position the jack pad to prevent damaging the car body.*
- *Watch the jack closely. Make sure it stays stable and does not shift or tilt. As the car is raised, it may roll slightly and the jack may shift.*

Raising car

- Park car on flat, level surface.
- If changing a tire, loosen lug bolts before raising car. See **Changing a tire.**
- Place jack into position. Make sure jack is resting on flat, solid surface. Use a board or other support to provide a firm surface for jack, if necessary.
- Raise car slowly while constantly checking position of jack and car.
- Once car is raised, block wheel that is opposite and farthest from jack to prevent car from unexpectedly rolling.



WARNING—

- Do not rely on the transmission or the parking brake to keep the car from rolling. They are not a substitute for positively blocking the opposite wheel.
- Never work under a car that is supported only by a jack. Use jack stands designed to support the car. See **Tools**.

Working under car

- Disconnect negative (-) cable from battery so that car cannot be started. Let others know what you will be doing.

CAUTION—

Prior to disconnecting the battery, read the battery disconnection cautions given in **001 General Cautions and Warnings**.

- Raise car slowly as described above.
- Use at least two jack stands to support car. Use jack stands designed for the purpose of supporting a car. See **Tools**.

WARNING—

- A jack is a temporary lifting device and should not be used alone to support the car while you are under it.
- Do not use wood, concrete blocks, or bricks to support a car. Wood may split. Blocks and bricks, while strong, are not designed for that kind of load, and may break or collapse.

- Place jack stands on firm, solid surface. If necessary, use a flat board or similar solid object to provide a firm footing.
- Lower car slowly until its weight is fully supported by jack stands. Watch to make sure that the jack stands do not tip or lean as the car settles on them.
- Observe all jacking precautions again when raising car to remove jack stands.

ADVICE FOR THE BEGINNER

The tips that follow are general advice to help the do-it-yourself BMW owner perform repairs and maintenance tasks more easily and more professionally.

Planning ahead

Know what the whole job requires before starting. Read the procedure thoroughly, from beginning to end, in order to know just what to expect and what parts will have to be replaced.

Workshop practices

Keeping things organized, neat, and clean is essential to doing a good job. When working under the hood, fender covers will protect the finish from scratches and other damage. Make sure the car finish is clean so that dirt under the cover does not scratch the finish.

Any repair job will be less troublesome if the parts are clean. For cleaning old parts, there are many solvents and parts cleaners commercially available.

For cleaning parts prior to assembly, commercially available aerosol cans of parts cleaner or brake cleaner are handy to use, and the cleaner will evaporate completely.

WARNING —

Most solvents used for cleaning parts are highly flammable as well as toxic, especially in aerosol form. Use with extreme care. Do not smoke. Do not use these products indoors or near any source of heat, sparks or flame.

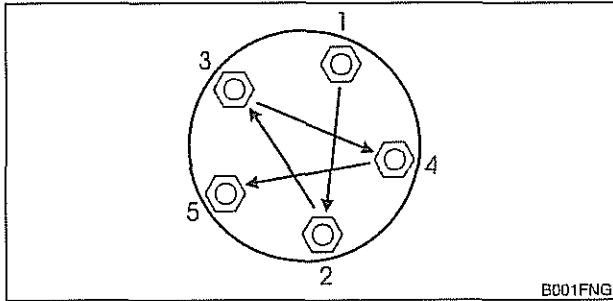
Non reusable fasteners

Many fasteners used on the cars covered by this manual must be replaced with new ones once they are removed. These include but are not limited to: bolts, nuts (self-locking, nylock, etc.), roll pins, clips and washers. Genuine BMW parts should be the only replacement parts used for this purpose.

Some bolts are designed to stretch during assembly and are permanently altered, rendering them unreliable once removed. These are known as torque-to-yield fasteners. Always replace fasteners where instructed to do so. Failure to replace these fasteners could cause personal injury or vehicle damage. See an authorized BMW dealer for applications and ordering information.

Tightening fasteners

When tightening the bolts or nuts on a component, it is always good practice to tighten the bolts gradually and evenly to avoid misalignment or over-stressing any one portion of the component. For components sealed with gaskets, this method helps to ensure that the gasket will seal properly.



Where there are several fasteners, tighten them in a sequence alternating between opposite sides of the component. Repeat the sequence until all the bolts are evenly tightened to the proper specification.

For some repairs a specific tightening sequence is necessary, or particular order of assembly is required. Such special conditions are noted in the text, and the necessary sequence is described or illustrated. Where no specific torque is listed, **Table a: General bolt tightening torques in Nm (max. permissible)** can be used as a general guide for tightening fasteners.

WARNING —

Table a: General bolt tightening torques in Nm (max. permissible) is a general reference only. The values listed in the table are not intended to be used as a substitute for torques specifically called out in the text or in manufacturer's information.

NOTE —

- Metric bolt classes or grades are marked on the bolt head.
- Do not confuse wrench size with bolt diameter. For a listing of the common wrenches used on various bolt diameters, see **Basic tool requirements**.

**Table a. General bolt tightening torques in Nm
(max. permissible)**

Bolt Class (according to DIN 267)						
Bolt diameter	5.6	5.8	6.8	8.8	10.9	12.9
M5	2.5	3.5	4.5	6	8	10
M6	4.5	6	7.5	10	14	17
M8	11	15	18	24	34	40
M10	23	30	36	47	66	79
M12	39	52	62	82	115	140
M14	62	82	98	130	180	220
M16	94	126	150	200	280	340
M18	130	174	210	280	390	470

Gaskets and seals

Gasket are designed to crush and become thinner as the mating parts are bolted together. Once a gasket has been used, it is no longer capable of making as good a seal as when new, and is much more likely to leak. For this reason, gaskets should not be reused.

Some gaskets and seals are directional. Make sure that these are installed correctly. In places where a shaft must pass through a housing, flexible lip seals are used to keep the lubricating oil or grease from leaking out past the rotating shaft. Seals should never be reused once they have been removed. When removing a seal, be careful not to damage the metal surfaces.

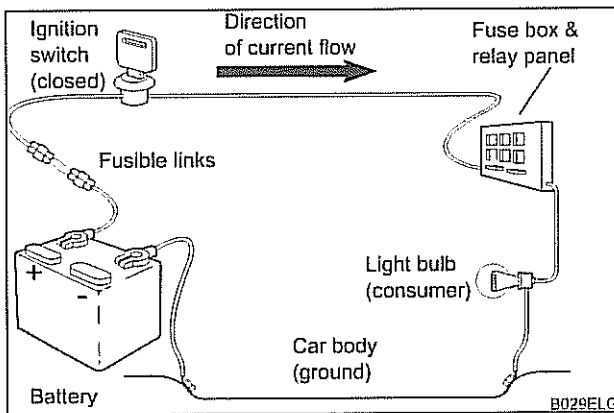
The key to seal installation is to get the seal in straight without damaging it. Use a seal driver that is the same diameter as the seal housing to gently and evenly install into place. If a proper size seal driver is not available, a socket of the right size will do.

Some seals are directional and special installation instructions apply. Make sure a seal is installed with the lip facing the correct way. Note the installation direction of the old seal before removing it.

Electrical testing

Many electrical problems can be understood and solved with only a little fundamental knowledge of how electrical circuits function.

Electrical current only flows in a complete circuit. To operate, every electrical device in the car requires a complete circuit including a voltage source and a path to ground. The positive (+) side of the battery is the original voltage source, and ground is any return path to the negative (-) side of the battery, whether through the wiring harness or the car body. Except for portions of the charging system, all electrical current in the car is direct current (DC) and flows from positive (+) to negative (-).



Switches are used to turn components on or off by completing or interrupting the circuit. A switch is "open" when the circuit is interrupted, and "closed" when the circuit is completed. See **600 Electrical System-General** for electrical troubleshooting.

Wire repairs

Repairs to a wiring harness require special care to make the repair permanent. The wire ends must be clean. If frayed or otherwise damaged, cut off the end and remove enough insulation to complete the repair. If the wire is too short, splice in a new piece of wire of the same size and make two connections.

Use connectors that are designed for the purpose. Crimped on or soldered-on connectors are best. Crimp connectors and special crimping pliers are widely available. If soldering, use needle nose pliers to hold the wire near the solder joint and create a "heat dam". This keeps the heat and the solder from traveling up the wire. Always use a solder made specifically for electrical work (rosin core).

NOTE —

Twisting wires together to make a repair is not recommended. Corrosion and vibration will eventually spoil the connection and may lead to irreparable damage to sensitive electronic components.

Insulate the finished connection. Electronics stores can supply heat-shrinkable insulating tubing that can be placed on to the wire before connecting, slid over the finished joint, and shrunk to a tight fit with a heat gun or hair dryer. The next best alternative is electrical tape. Make sure the wire is clean and free of solder flux or other contamination. Wrap the joint tightly to seal out moisture. See **600 Electrical System-General** for more information.

BUYING PARTS

Many of the maintenance and repair tasks in this manual call for the installation of new parts, or the use of new gaskets and other materials when reinstalling parts. Most often, the parts that will be needed should be on hand before beginning the job. Read the introductory text and the complete procedure to determine which parts will be needed.

NOTE—

For some bigger jobs, partial disassembly and inspection is required to determine a complete parts list. Read the procedure carefully and, if necessary, make other arrangements to get the necessary parts while your car is disassembled.

Genuine BMW parts

Genuine BMW replacement parts from an authorized BMW dealer are designed and manufactured to the same high standards as the original parts. They will be the correct material, manufactured to same specifications, and guaranteed to fit and work as intended. Most genuine BMW parts carry a limited warranty.

Many independent repair shops make a point of using genuine BMW parts, even though they may at times be more expensive than parts from other sources. They know the value of doing the job right with the right parts. Parts from other sources can be as good as BMW parts, particularly if manufactured by one of BMW's original equipment suppliers, but it is often difficult to know.

BMW is constantly updating and improving their cars, often making improvements during a given model year. BMW may recommend a newer, improved part as a replacement, and your authorized dealer's parts department will know about it and provide it. The BMW parts organization is best equipped to deal with your BMW parts needs.

Non returnable parts

Some parts cannot be returned, even for credit. The best example is electrical parts, which are almost universally considered non returnable. Buy electrical parts carefully, and be as sure as possible that a replacement is needed, especially for expensive parts such as electronic control units. It may be wise to let an authorized BMW dealer or other qualified shop confirm your diagnosis before replacing an expensive non returnable part.

Information you need to know

Model

When ordering parts it is important that you know the correct model designation for your car. Models covered in this E39 manual are the 525i, 528i, 530i, 540i in Sedan and Station Wagon body styles.

Model year

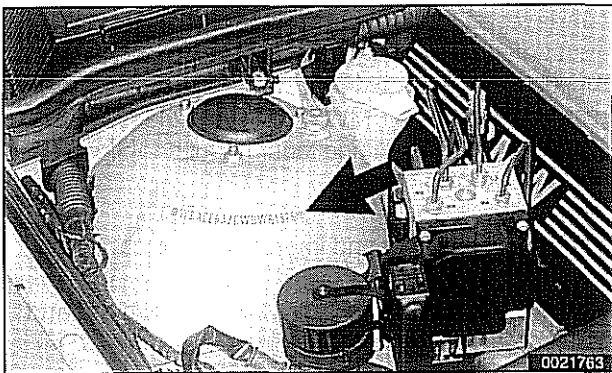
This is not necessarily the same as date of manufacture or date of sale. A 1999 model may have been manufactured in late 1998, and perhaps not sold until early 2000. It is still a 1999 model. Model years covered by this manual are 1997 to 2002.

Date of manufacture

This information is necessary when ordering replacement parts or determining if any of the warranty recalls are applicable to your car. The label on the driver's door below the door latch will specify the month and year that the car was built.

Vehicle Identification Number (VIN)

- This is a combination of letters and numbers that identify the particular car. The VIN appears on the state registration document, and on the car itself. One location is on the right front strut tower in the engine compartment (**arrow**), another in the lower left corner of the windshield.



Engine code

5 Series car covered in this manual are powered by 6 and 8 cylinder engines. For information on engine codes and engine applications, see **100 Engine-General**.

Transmission code

The transmission type with its identifying code may be important when buying clutch parts, seals, gaskets, and other transmission-related parts. For information on transmission codes and applications, see **200 Transmission-General**.

SERVICE

BMW dealers are uniquely qualified to provide service for BMW cars. Their authorized relationship with the large BMW service organization means that they have access to special tools and equipment, together with the latest and most accurate repair information.

The BMW dealer's service technicians are highly trained and very capable. Authorized BMW dealers are committed to supporting the BMW product. On the other hand, there are many independent shops that provide quality repair work. Checking with other BMW owners for recommendations on service facilities is good way to learn of reputable BMW shops in your area.

TOOLS

Most maintenance can be accomplished with a small selection of tools. Tools range in quality from inexpensive junk, which may break at first use, to very expensive and well-made tools for the professional. The best tools for most do-it-yourself BMW owners lie somewhere in between.

Many reputable tool manufacturers offer good quality, moderately priced tools with a lifetime guarantee. These are your best buy. They cost a little more, but they are good quality tools that will do what is expected of them. Sears' Craftsman® line is one such source of good quality tools.

Some of the repairs covered in this manual require the use of special tools, such as a custom puller or specialized electrical test equipment. These special tools are called out in the text and can be purchased through an authorized BMW dealer. As an alternative, some special tools mentioned may be purchased from the following tool manufacturers and/or distributors:

Specialty tool suppliers

Assenmacher Specialty Tools
6440 Odell Place
Boulder, CO 80301
303-530-2424
sales@asttool.com
<http://www.asttool.com>

Baum Tools Unlimited, Inc.
P.O. Box 5867
Sarasota, FL 34277-5867
800-848-6657
sales@baumtools.com
<http://www.baumtools.com>

Specialty tool suppliers

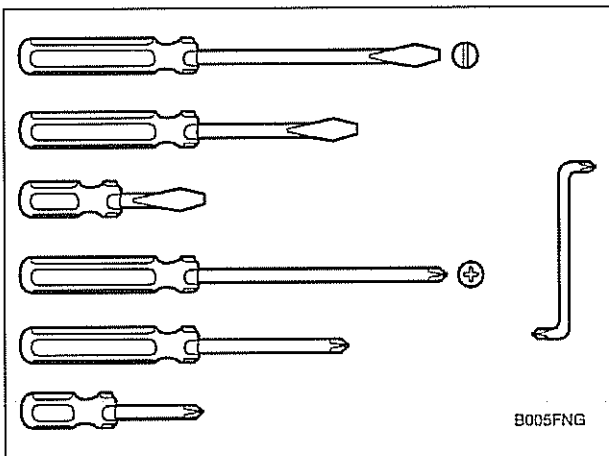
Peake Research, Automotive Products Division
 P.O. Box 28776
 San Jose, CA 95159
 408-369-0406
support@peakeresearch.com
<http://www.peakeresearch.com>

Basic tool requirements

The basic hand tools described below can be used to accomplish most of the simple maintenance and repair tasks.

Screwdrivers

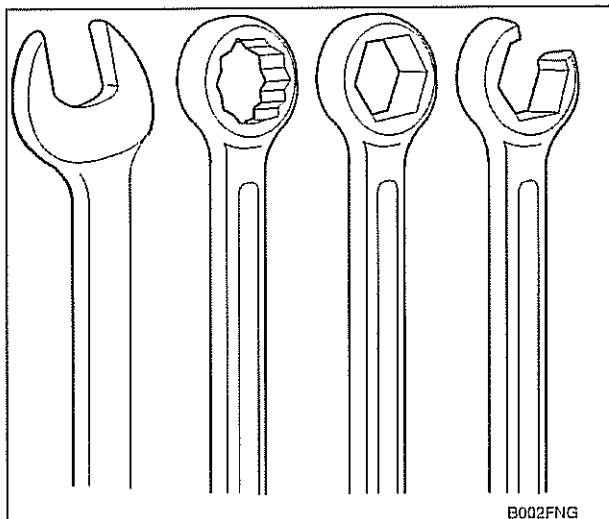
- The common flat-blade type, Phillips type, and Torx® type screwdrivers will handle almost all screws used on BMWs. Two or three different sizes of each type will be required, since a screwdriver of the wrong size will damage the screw head.

**Wrenches**

- Wrenches come in different styles, including open-end, 12 point box-end, 6 point box-end and flare nut. The basic open-end wrench is the most widely used, but grips on only two sides. The box-end wrench has better grip on all six sides of a nut or bolt.

A 12 point box-end can loosen a nut or bolt where there is less room for movement, while a 6 point box-end provides better grip. For hex fasteners on fluid lines, like brake lines and fuel lines, a flare-nut wrench offers the advantages of a box-end wrench with a slot that allows it to fit over the line.

The combination wrench is the most universal. It has one open-end and one box-end. 10 mm and 13 mm wrenches are the most common sizes needed. A more complete set of wrenches would include 6 mm through 19 mm sizes.



Sockets

Sockets are used with a ratchet handle for speed and convenience and can be combined with extensions and universal joints (swivels) to reach fasteners more easily. The most common socket drive sizes are 1/4 inch, 3/8 inch and 1/2 inch.

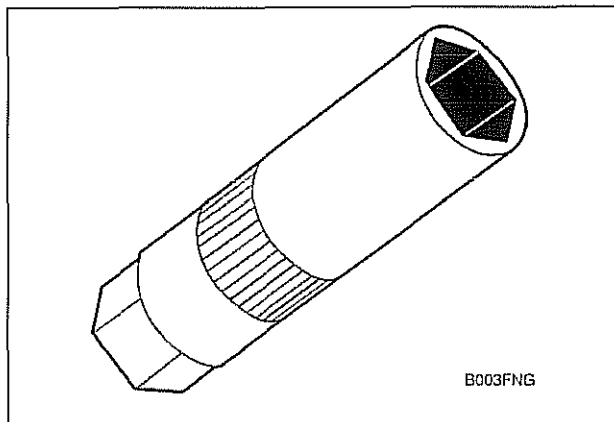
Sockets come in 6 point and 12 point styles. The 6 point offers a better grip on tight nuts and bolts. 6 mm to 19 mm sockets are the most needed sizes. Below is a list of typical bolt diameters and the corresponding wrench sizes.

Common bolt diameters and wrench sizes

M5	8 mm
M6	10 mm
M8	12 mm or 13 mm
M10	17 mm
M12	19 mm
M14	22 mm

Spark plug socket

- ▶ A 5/8" deep-well socket for spark plugs includes a rubber insert to both protect the spark plug from damage and grip it for easier removal.

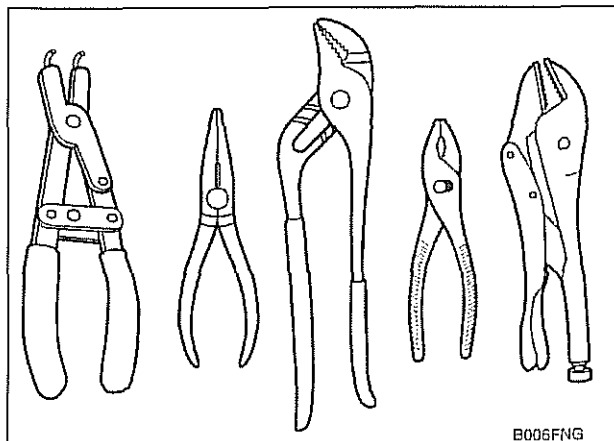


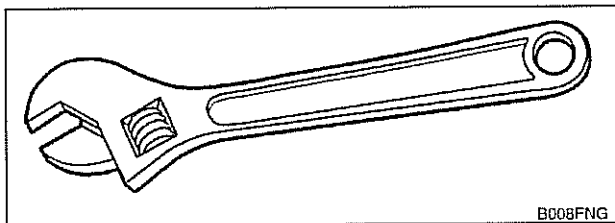
Pliers

- ▶ There are many types of pliers including snap-ring, needle-nose, adjustable-joint, slip-joint (Channel-lock®), and locking (Vise-Grip®) most of which are used for holding irregular objects, bending, or crimping. Some have special applications.

Needlenose pliers are used for gripping small and poorly accessible objects, and are useful for wiring and other electrical work. Locking pliers such as the Vise-Grip® are useful because of their tight grip.

Snap-ring and circlip pliers with special tipped jaws are used to remove and install snap-rings or circlips. Channel-lock® or water pump pliers have adjustable jaws that can be quickly changed to match the size of the object being held to give greater leverage.





- ◀ An adjustable wrench can be a useful addition to a small tool kit. It can substitute in a pinch if two wrenches of the same size are needed to remove a nut and bolt. Use extra care with adjustable wrenches, as they tend to loosen, slip, and damage fasteners.

Compared to a wrench of the correct size, an adjustable wrench is always second best. They should only be used when the correct size wrench is not available. Choose one of average size range, about 6 to 8 inches in length.

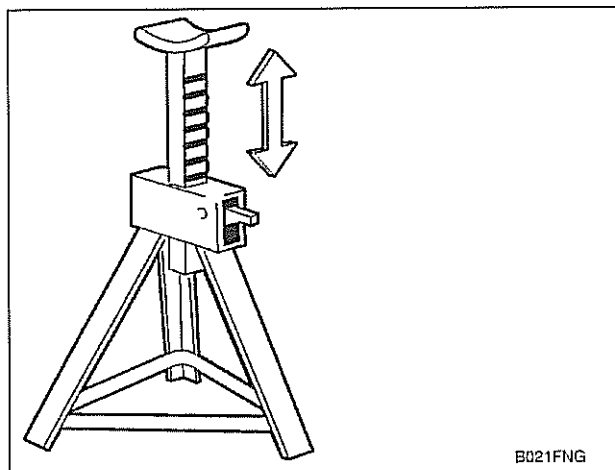
Jack stands

- ◀ Strong jack stands are extremely important for any work that is done under the car. Use only jack stands that are designed for the purpose. Blocks of wood, concrete, bricks, etc. are not safe or suitable substitutes.

WARNING —

A jack should be used only to raise the vehicle, not to support the car for a long period. Always use jack stands to support a raised vehicle.

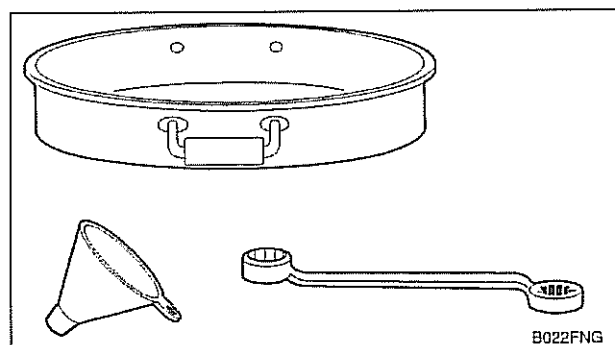
Jack stands are available in several styles. The best ones are made of heavy material for strength, have a wide base for stability, and are equipped to positively lock in their raised position. Get the best ones available.



Oil change equipment

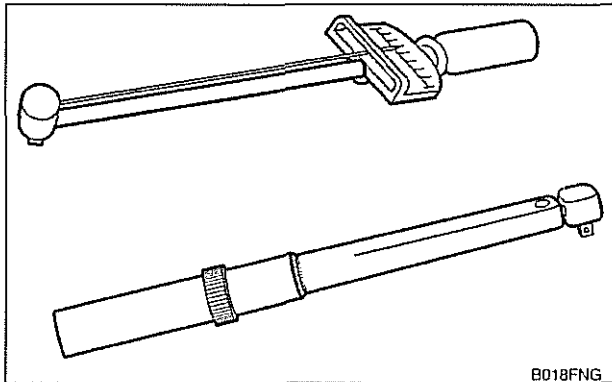
- ◀ Changing engine oil requires a 17 mm socket or wrench to loosen and tighten the drain plug and a drain pan (at least 8 quart capacity). A wide, low drain pan will fit more easily under the car. Use a funnel to pour the new oil into the engine.

BMW engines use an oil filter canister with a disposable filter cartridge insert. A 36 mm socket or wrench is required to remove the oil filter canister cover. See **020 Maintenance** for oil change instructions.



Torque wrench

A torque wrench is used to precisely tighten threaded fasteners to a predetermined value. Many of the repair procedures in this manual include BMW-specified torque values in Newton-meters (Nm) and the equivalent values in foot-pounds (ft-lb).



- Several types of torque wrenches are available. An inexpensive beam-type (top) is adequate but must be read visually. A ratchet-type (bottom) can be preset to indicate (click) when the torque value has been reached. They all do the same job, but offer different convenience features at different prices. The most convenient ones have a built-in ratchet, and can be preset to indicate when a specific torque value has been reached. Follow the wrench manufacturer's directions for use to achieve the greatest accuracy.

A torque wrench with a range up to about 150 Nm (110 ft-lb) has adequate capacity for most of the repairs covered in this manual. For recommended torque values of 10 Nm or below, the English system equivalent is given in inch-pounds (in-lb). These small values may be most easily reached using a torque wrench calibrated in inch-pounds. To convert inch-pounds to foot-pounds, divide by 12.

Digital multimeter

- Many of the electrical tests in this manual call for the measurement of resistance (ohms) or voltage values. For safe and accurate tests of sensitive electronic component and systems, a multimeter or digital volt/ohm meter (DVOM) with high input impedance (at least 10,000Ω) should be used. Some meters have automotive functions such as dwell and pulse width that are useful for troubleshooting ignition and fuel injection problems.

CAUTION—

Vehicle electronic systems may be damaged by the high current draw of a test light with a normal incandescent bulb. As a general rule, use a high impedance digital multimeter or an LED test light for all electrical testing.



BMW special tools

Many repairs covered in this manual call for the use of BMW special tools. Many of the BMW special tools mentioned in this manual are simply the best thing to use to do the job correctly. In these cases, the tool is identified with a BMW part number. See your authorized BMW dealer parts department for information on how to order special tools.

There are some jobs for which expensive special tools are essential, and not a cost-effective purchase for a one time repair by the do-it-yourself owner. This manual includes such repairs for the benefit of those with the necessary experience and access to tools. For the do-it-yourselfer, the need for special tools is noted in the text, and whether or not BMW dealer service is recommended.

EMERGENCIES

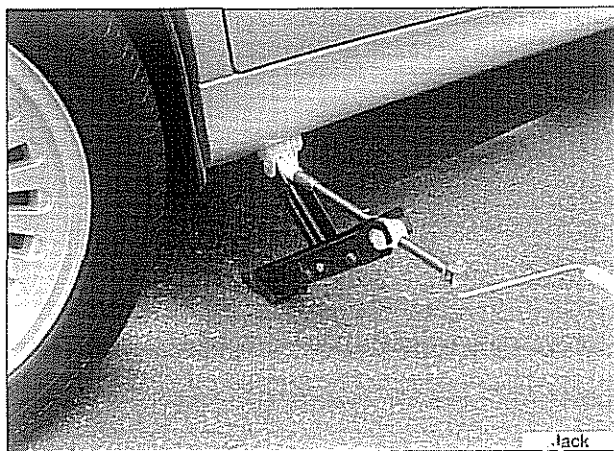
Changing a tire

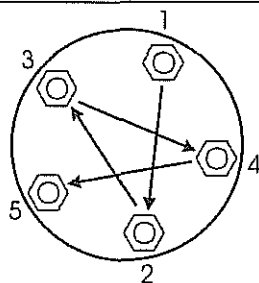
- Stop car on as flat a surface as possible, in a place where you can be easily seen by other drivers. Avoid stopping just over the crest of a hill.

WARNING—

If a tire goes flat while driving, pull well off the road. Changing a tire on a busy street or highway is very dangerous. If necessary, drive a short distance on the flat tire to get to a safe place. It is much better to ruin a tire or rim than to risk being hit.

- Turn on emergency flashers, and set out flares or emergency markers well behind car. Chock wheel (wheel chock located in trunk) diagonally opposite to the one being changed. Passengers should get out of car and stand well away from road.
- Take jack and tools from tool area beneath trunk mat. Remove spare tire from tire storage tray.
- Loosen wheel bolts while car is on ground, but leave them a little snug.
- Place jack in lifting point nearest wheel being changed. Use a board to provide a firm footing for jack if ground is soft. Raise car only far enough so that the wheel is fully off ground and then remove wheel nuts and wheel.
- Install spare wheel. Install wheel nuts and tighten them hand tight using lug nut wrench.





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- ⚠ Lower car. With all wheels on ground, fully tighten nuts in a crisscross pattern. Torque wheel nuts when installing wheel. Check inflation pressure of spare tire.

Tightening torque

Wheel to wheel hub

120 Nm (89 ft-lb)

Jump starting

Cars with discharged or dead batteries can be jump-started using the good battery from another car. See owner's manual for proper instruction on jump starting. When jump-starting the engine, always note the following warnings.

WARNING —

- *Battery acid (electrolyte) can cause severe burns, and will damage the car, clothing, and you. If electrolyte is spilled, wash the surface with large quantities of water. If it gets into eyes, flush them with water for several minutes and call a doctor.*
- *Batteries produce explosive and noxious gasses. Keeps sparks and flames away. Do not smoke near batteries.*
- *Do not jump-start the engine if you suspect that the battery is frozen. Trapped gas may explode. Allow the battery to thaw first.*
- *Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.*

Indicator and warning lights

Many vehicle systems are self-monitored for faults while driving. Generally, a red warning lamp that comes on during driving should be considered serious. If you cannot immediately determine the seriousness of the warning light, stop the vehicle in a safe place and turn the engine off as soon as possible. Consult the owner's manual for additional information on the warning lamp and the recommended action.

If the Malfunction Indicator Lamp (MIL) (Check Engine or Service Engine Soon warning light) comes on or flashes, it indicates that an emissions-related fault has occurred. Faults such as a bad oxygen sensor or a dead fuel injector can cause the exhaust or evaporative emissions to exceed a specified limit. When these limits are exceeded, the MIL will be turned on. The engine can be safely driven with the light on, although the emission systems should be checked as soon as possible. See **OBD On-Board Diagnostics** for

more information on the Check Engine Light and the on-board diagnostic system.

Towing

The cars covered by this manual should be towed with a tow truck using wheel lift or flat bed equipment. Do not tow the car on all four wheels except for very short distances to move it to a safe place.

CAUTION—

Do not tow with sling-type equipment. The front spoilers and bumper covers may sustain damage.



- To access threaded towing eye socket, pry open trim on front or rear bumper.

NOTE—

A towing eye is provided in the luggage compartment tool kit. The towing eye can be screwed into the front or rear bumper.



- Install towing eye into threaded hole.

- Standard transmission: Do not tow with rear wheels on ground unless absolutely necessary.
- Automatic transmission: Have rear wheels placed on dollies, or use flat bed truck. Use towing eye for winching vehicle on flat bed.

CAUTION—

Automatic transmission fluid (ATF) does not circulate when the car is towed. Severe transmission damage may result.

NOTE—

- Be sure transmission fluid has been topped off before starting tow.
- Always tow car with transmission lever in N (neutral).
- ATF draining and filling is covered in **240 Automatic Transmission**. Be sure to read the filling and draining procedure, as special service equipment is required to check the fluid level.

Spare parts kit

Carrying a basic set of spare parts can prevent a minor breakdown from turning into a major repair annoyance. The list below is a good place to start.

Spare parts kit - basic

- Polyribbed drive belt(s)
- BMW engine oil: one or two quarts
- BMW engine coolant: 1 gallon of premixed 50/50 BMW anti-freeze and water
- Fuse assortment: 7.5A, 10A, 15A, 20A, 30A, 50A
- Radiator hoses: upper and lower

Spare parts kit - additional contents

- Exterior lighting bulbs: headlight, brake light, turn signal, and taillight
- Wiper blades or blade inserts
- Brake fluid: new, unopened bottle, DOT 4 specification
- Main relay for DME system

