Contents:

Vehicle Identification and VIN Decoder

Vehicle Identification Number (VIN), decoding

Some of the information in this manual applies only to cars of a particular model year or range of years. For example, 1984 refers to the 1984 model year but does not necessarily match the calendar year in which the car was manufactured or sold. To be sure of the model year of a particular car, check the Vehicle Identification Number (VIN) on the car.

The VIN is a unique sequence of 17 characters assigned by BMW to identify each individual car. When decoded, the VIN tells the country and year of manufacture; make, model and serial number; assembly plant and even some equipment specifications.

The BMW VIN is on a plate mounted on the top of the dashboard, on the driver's side where the number can be seen through the windshield. The 10th character is the model year code. The letters I, O, Q and U are not used for model year designation for US cars. Examples: E for 1984, F for 1985, G for 1986, H for 1987, etc. The table below explains some of the codes in the VIN for E30 cars.

Sample VIN: WBA AA13 1 9 L A E58064
position 1 2 3 4 5 6 7 8 9 10 11 12-17

VIN position	Description	Decoding information	
1	Country of Manufacture	W	Germany
2	Manufacturer	B	BMW AG
3	Manufacturing division	A	BMW
		S	BMW Motorsport
4–7	Series, model	AK74	318i, 4-cylinder 1.8 liter (M10)
		AK84	318iA, 4-cylinder 1.8 liter (M10)
		AJ93	318i, 4-cylinder 1.8 liter (M42)
		AF93	318is, 4-cylinder 1.8 liter (M42)
		BA73	318i, Convertible, 4-cylinder (M42)
		AA13	325i, 6-cylinder 2.5 liter (M20)
		AA23	325iA, 6-cylinder 2.5 liter (M20)
		AD13	325is, 6-cylinder 2.5 liter (M20)
		AD23	325isA, 6-cylinder 2.5 liter (M20)
		AB54	325e/es, 6-cylinder 2.7 liter (M20)
		AB64	325eA/esA, 6-cylinder 2.7 liter (M20)
		AE54	325, 6-cylinder 2.7 liter (M20)
		AE64	325A, 6-cylinder 2.7 liter (M20)
		BB13	325i Convertible, 6-cylinder 2.5 liter (M20)
		BB23	325iA Convertible, 6-cylinder 2.5 liter (M20)
		AK03	M3, 4-cylinder 2.3 liter (S14)
		AB93	325ix, 6-cylinder 2.5 liter (M20)
		AB03	325ixA, 6-cylinder 2.5 liter (M20)
		AE93	325ix 4-door, 6-cylinder 2.5 liter (M20)
		AE03	325ixA 4-door, 6-cylinder 2.5 liter (M20)
8	Restraint system	0	Manual belts
		1	Manual belts with supplemental restraint
		2	Manual belts with dual SRS airbags
9	Check digit		0 - 9 or X, calculated by NHTSA
10	Model year	E	1984
		F	1985
		G	1986
		H	1987
		J	1988
		K	1989
		L	1990
		O	European model
11	Assembly plant	A, F, G, K	Munich, Germany
		B, C, D	Dingolfing, Germany
		E, J	Regensburg, Germany
12-17	Serial number		Sequential production number for specific vehicle

Please read these warnings and cautions before proceeding with maintenance and repair work.

WARNINGS— (continued)

- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.

- Connect and disconnect a battery charger only with the battery charger switched off.

- Sealed or "maintenance free" batteries should be slow-charged only, at an amperage rate that is approximately 10% of the battery's ampere-hour (Ah) rating.

- Do not allow battery charging voltage to exceed 16.5 volts. If the battery begins producing gas or boiling violently, reduce the charging rate. Boosting a sulfated battery at a high charging rate can cause an explosion.

- The ignition system produces high voltages that can be fatal. Avoid contact with exposed terminals and use extreme care when working on a car with the engine running or the ignition switched on.

- Place jack stands only at locations specified by manufacturer. The vehicle lifting jack supplied with the vehicle is intended for tire changes only. A heavy duty floor jack should be used to lift vehicle before installing jack stands. See **2 Lubrication and Maintenance**.

- Aerosol cleaners and solvents may contain hazardous or deadly vapors and are highly flammable. Use only in a well ventilated area. Do not use on hot surfaces (engines, brakes, etc.).

- Do not remove coolant reservoir or radiator cap with the engine hot. Danger of burns and engine damage.

CAUTIONS—
*See also **WARNINGS** on previous page.*

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized BMW dealer or other qualified shop.

- BMW is constantly improving its cars and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized BMW dealer parts department for the latest information.

- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly, and do not attempt shortcuts. Use tools appropriate to the work and use only replacement parts meeting BMW specifications. Makeshift tools, parts and procedures will not make good repairs

- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque specification listed.

- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond or lake. Dispose of in accordance with Federal, State and Local laws.

- The control module for the anti-lock brake system (ABS) cannot withstand temperatures from a paint-drying booth or a heat lamp in excess of 203°F (95°C) and should not be subjected to temperatures in excess of 185°F (85°C) for more than two hours.

- Before doing any electrical welding on cars equipped with ABS, disconnect the battery negative (–) terminal (ground strap) and the ABS control module connector.

- Always make sure ignition is off before disconnecting battery.

- Label battery cables before disconnecting. On some models, battery cables are not color coded.

- Disconnecting the battery may erase fault code(s) stored in control module memory. Using special BMW diagnostic equipment, check for fault codes prior to disconnecting the battery cables.

- If a normal or rapid charger is used to charge battery, the battery must be disconnected and removed from the vehicle in order to avoid damaging paint and upholstery.

- Do not quick-charge the battery (for boost starting) for longer than one minute. Wait at least one minute before boosting the battery a second time.

- Connect and disconnect a battery charger only with the battery charger switched off.

- Sealed or "maintenance free" batteries should be slow-charged only, at an amperage rate that is approximately 10% of the battery's ampere-hour (Ah) rating.

- Do not allow battery charging voltage to exceed 16.5 volts. If the battery begins producing gas or boiling violently, reduce the charging rate. Boosting a sulfated battery at a high charging rate can cause an explosion.

Section 1

1

FUNDAMENTALS

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2 FUNDAMENTALS

Fundamentals

Introduction

Although BMWs are sophisticated and complex machines, nearly all basic maintenance and most repairs can be accomplished by any interested owner with basic mechanical skills and the right information. While some of the repairs covered in this manual are complicated and require special knowledge and equipment, most of the care that is required in the lifetime of the average BMW is well within the capabilities of the do-it-yourselfer.

This section of the manual is dedicated to helping the beginner get started smartly and safely with BMW maintenance and repair. The section begins with a **General Description** of the car, broken down into its individual systems, and a discussion on **How To Use This Manual**. It is a simple directory of the kind of information you can expect to find, and where to find it.

Safety and **General Advice For The Beginner**, include tips on mechanic's skills and workshop techniques that can help the beginner do a faster, complete, and more thorough job. **Tools** describes the basic tools needed to do 90% of the procedures in this manual, and includes advice on how to buy tools wisely and use them effectively.

Finally, and once again of interest to any owner, this section ends with a quick reference guide to emergencies—what to do when the car won't start or when a warning light comes on, including basic troubleshooting and information on how to gauge the seriousness of a problem.

4 FUNDAMENTALS

1. General Description

BMWs are sophisticated examples of today's automotive engineering, blending advanced design and manufacturing to provide an outstanding combination of performance, roadholding, and reliability.
necessary maintenance and repair can be accomplished by the average owner using this manual. While the complexity of the car may seem to make this a difficult challenge for the novice mechanic, it can be simplified and more easily understood by viewing the car as an assembly of simpler systems, each performing its own independent functions.

1.1 Body

The body is the basic building block. All of the BMW models covered in this manual feature unitized body construction, meaning that they do not have a separate frame.

A complex body shell, shown in Fig. 1-1, is the main structural platform to which all the other systems are attached. Subassemblies attach engine, drivetrain, suspension, and steering systems to the basic body structure.

The doors, the instrument panel, the seats, and other interior trim pieces are also added to the body shell. Other parts of the body shell function as mounting points for the other major and minor subsystems. For more information, see **BODY AND INTERIOR**.

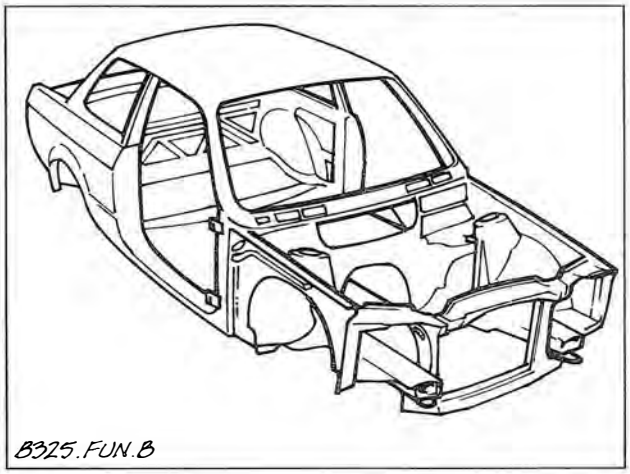

Fig. 1-1. BMW unitized body

1.2 Engine

The engine produces the power to move the car. It burns a precise mixture of fuel and air, converting the fuel's stored energy into mechanical work, and delivering that mechanical work in a useful form.

All of the BMW engines covered in this manual are of reciprocating-piston design and operate on the four-stroke cycle. The combustion of the air/fuel mixture creates tremendous pressure in a closed space above a piston. This pressure forces the piston downward in its cylinder, translating the energy of combustion into mechanical force.

The crankshaft converts each piston's up and down motion into rotating motion, in much the same way that the up-and-down motion of a person's legs rotates the pedals of a bicycle. The power transmitted in this rotary form can then be used to move the car. The four-stroke cycle, the heart of how and why this all happens, is illustrated in Fig. 1-2.

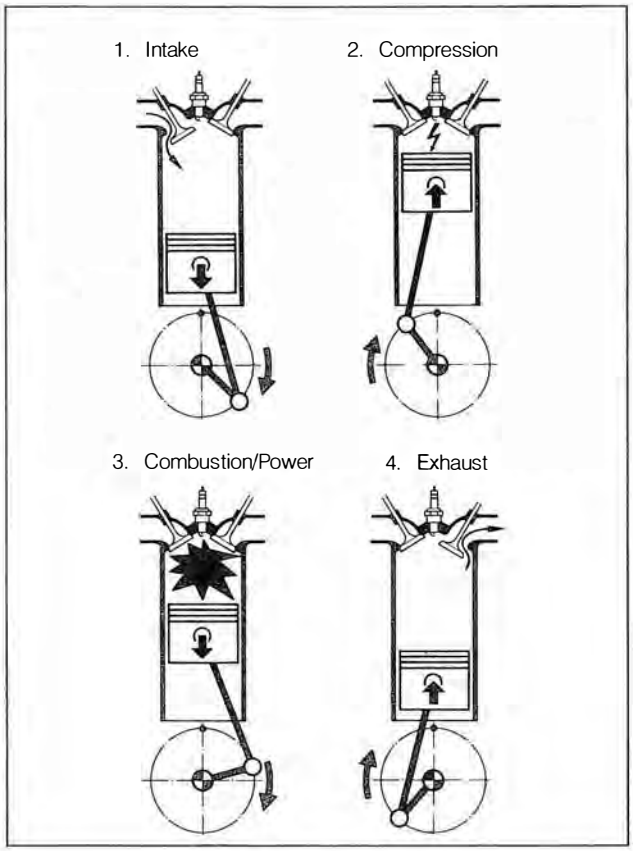

Fig. 1-2. The four-stroke cycle.

Intake Stroke. The piston, traveling downward, creates low pressure inside the cylinder. With the intake valve open, this low pressure causes the fresh air/fuel mixture to rush in. When the piston is near the bottom of its travel, the intake valve closes, sealing the air and vaporized fuel in the cylinder.

Compression Stroke. As the piston begins its upward travel in the sealed cylinder, the air/fuel mixture is compressed to a small percentage of its original volume, creating a very flammable mixture in a very small space. This space is referred to as the combustion chamber. Just before the piston reaches the top of its travel, the air/fuel mixture is ignited by a precisely timed spark, and burns very rapidly.