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Complete Vehicle

Model: E90

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Recognize the differences between the E46 and E90
- Familiarize yourself with the history behind the 3 series
- Remove the rear seat backrest
- Familiarize yourself with the component location of modules in the vehicle

E90 Complete Vehicle



BMW started the sport sedan category.

Now with the fifth generation 3 series, the E90, BMW has succeeded in raising the bar for other manufacturers to strive for.

The new 3 series is longer, wider, and lower than the previous generation E46 while retaining the same weight and even higher handling and performance characteristics.

The body is 25% more rigid than the E46 sedan.

The E90 comes equipped with two variants of a revolutionary new generation 6-cylinder engine; The N52B25 and the N52B30.

The interior of the vehicle has also not gone unnoticed. This “base” version BMW now receives many of the technological advances of its “bigger” siblings. These features include but are not limited to:

- Voice Recognition *
- iDrive *
- Comfort Access (from 9/2005) *
- ACC *
- Stolen Vehicle Recovery *
- MOST bus technology *
- Active Front Steering *
- IHKA *

* When adequately equipped

We'll start out by reviewing the BMW History of the original Sport Coupe concept.

E90 Heritage - 2002-2002tii



1968 - The legendary BMW 2002 was not only the predecessor to the 3 Series, but also the first automobile on U.S. soil to combine the practicality of a passenger vehicle, with the spirited driving characteristics of a sports car. In effect, the 2002 was the car that forever changed the thinking of an industry and the expectations of automotive consumers at large. A compact Sports Sedan with a powerful 2-liter engine, it offered impressive driving performance in an efficient and comfortable passenger vehicle. This was the best possible combination for a country of motorists with miles of new roads, but faced with high gasoline prices. The American public and automotive press greeted the concept, and the car, with overwhelming enthusiasm. It wasn't long before the 2002 reached cult status among automotive aficionados. The pattern was clearly established for the future 3 Series, and in turn, for the long term success of BMW in North America.

E90 Heritage - E21



1977 - After getting a taste of the 2002's magic, American auto enthusiasts were hooked and could hardly wait for more of the invigorating driving experience only to be found at the wheel of a BMW. When the 320i hit American showroom floors, enthusiasts became fanatics, and skeptics, true believers. As the successor to the 2002, the 320i was a big improvement, with a slightly larger size, even more refined handling, and better ventilation. However, it remained faithful to many styling cues unique to the 2002, like the forward-leaning grille, low waistline, and large glass area. Powered by a 110-hp, 2.0-liter, Bosch K-Jetronic fuel-injected, inline four-cylinder engine, the 320i was able to meet stricter emissions regulations without a catalytic converter, while preserving the spirited driving characteristics motorists had come to relish in the 2002 it replaced. The 320i was given both cosmetic and engineering updates until 1983 when its production run finally ended.

E90 Heritage - E30



1984 - With the release of the second-generation 3 Series, the 318i, BMW took a deliberate approach in evolving the car on which the success of all other models would hinge. At first, the changes were nearly all aesthetic, a more aerodynamic design being the most obvious. The previously forward-leaning grille was now more upright and connected to a gently sloping hood. But what stood out even more to consumers and critics alike was the improved fit and finish of the car. As the years passed, the 325i was offered alongside the 318i and featured increased engine power, and new safety features like ABS brakes and airbags. By the time the 318i and 325i had completed their production runs, the 3 Series had fully matured, gaining a full range of body styles, and a very loyal following.

E90 Heritage - E36



1992 - Having firmly established the 3 Series as the benchmark in the Sports Sedan class, the pressure was on BMW to hold off legions of would-be competitors. With this in mind, BMW engineers conceived and executed an entirely new car. The third-generation 3 Series, including both the four-cylinder 318i and six-cylinder 325i, was no longer a new interpretation of the 2002, but rather a clearly new, thoroughly modern design. This all-new 3 Series featured a sleek wedge-like shape that improved aerodynamics and reduced wind noise. In nearly all dimensions, it was larger than the earlier 318i. And the additional space paid off in both passenger room and driving dynamics. Technological innovations were a key part of the 325i's successful 7-year run, which was capped off by the re-badged 328i that featured a more powerful 2.8-liter engine, offering much more torque. From its sophisticated new suspension, to a VANOS variable valve timing system, traction control and side airbags, the BMW 325i was a machine on the leading edge of automotive technology.

E90 Heritage - E46



1999 - The evolution of the 3 Series took another major step forward with the introduction of the 323i and 328i, the fourth generation of 3 Series. A sculpted new body design featured even cleaner lines, wider wheel arches, a more rounded roofline, and a distinct front end highlighted by "cutout"-styled lowered headlight lenses, giving the car a strikingly modern look. Beyond the new sheet metal, the new 3 Series had made significant gains in structural rigidity, passenger room, and safety features, one of the most significant being Dynamic Stability Control (DSC). Of course, engine technology also advanced, gaining both Double VANOS variable valve timing and dual resonance intake systems. In 2001, more powerful engine options became available in the new 325i and 330i, and two new models featuring all-wheel-drive were also introduced to the 3 Series lineup. The 325xi and 330xi brought a new dimension of performance and versatility to the segment-defining Sports Sedan. Over the next few years, minor cosmetic updates accompanied the 330i until March 2003, when an optional performance package offered a boost in engine power, sportier suspension, huge 18-inch low-profile tires, and an Alcantara-covered steering wheel. Overall, substantial technological and engineering advancements were made throughout the 3 Series lineup from 1999 to 2004. An optional DVD-based navigation system, rain-sensing wipers, automatic headlights, and a sophisticated new six-speed SMG (Sequential Manual Gearbox) transmission had all joined the 3 Series party by the close of the 2004 model year.

E90



2006 - Now 38 years after the 2002 that started it all, the all-new 3 Series is once again poised to make a legendary mark in automotive history. The all-new 3 Series incorporates all the trademarks of its predecessors: the double-kidney grille, the "power dome" hood, and the "Hoffmeister kink" in a progressive, sporty, yet elegant new design. Overall, the dimensions are significantly greater than the corresponding dimensions of the 325i and 330i it replaces, adding both interior passenger room and wheelbase length. As is the case with all previous 3 Series, innovative engineering is an integral part of the equation. The pioneering use of weight-saving magnesium in the crankcase, a newly developed double-pivot aluminum front suspension, a new five-link rear suspension made of lightweight steel, and the lighter, 25% stiffer body shell of the all-new 3 are the embodiment of this philosophy. Technologically advanced six-cylinder engines once again deliver silky-smooth response, with 255-hp on tap in the 330i's new 3.0-liter engine. On the inside, the all-new 3 Series continues the harmonious balance between sportiness and elegance, with an ergonomically designed cockpit for the driver and purposeful materials carefully choreographed to please the senses of all occupants. Every detail, from the roundel on the hood to the roundel on the trunk, qualifies the all-new 3 Series to carry on the storied tradition of the most celebrated Sports Sedan of all time.

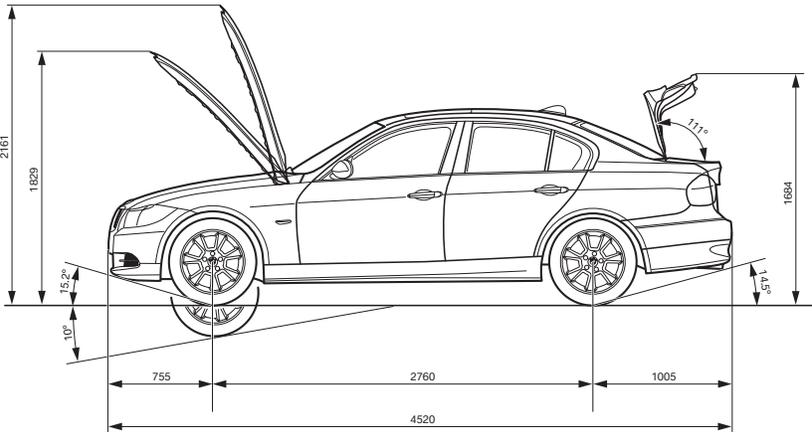
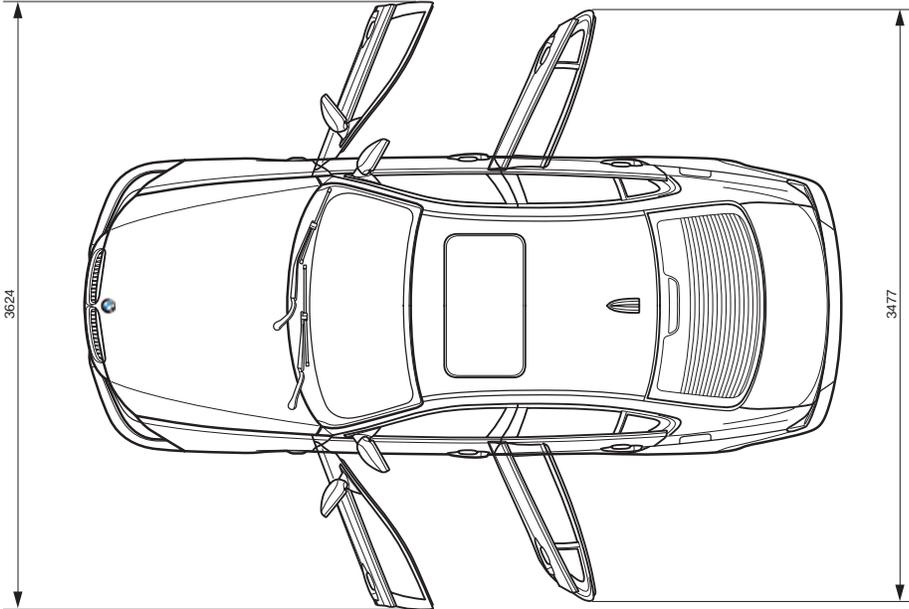
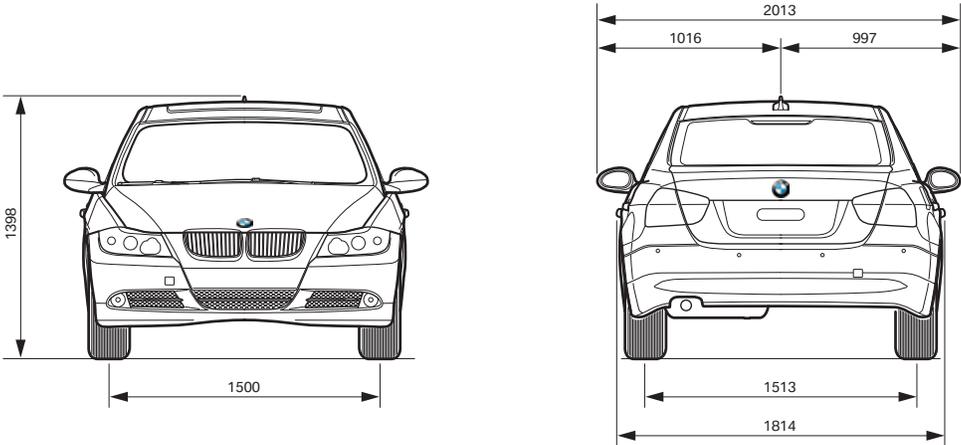
Evolution of the 3 Series

The table below compares the five generations of the 3 series.

	E21	E30	E36/4	E46/4	E90
Sales period	1975 to 1984	1983 to 1991	1991 to 1999	1999 on	Starts 3/2005
Length (mm)	4355	4325	4433	4471	4520
Width (mm)	1610	1645	1698	1739	1817
Height (mm)	1380	1380	1393	1415	1424
Wheelbase (mm)	2563	2570	2700	2725	2760
Toe, front (mm)	1388	1407	1418	1481	1500
Toe, rear (mm)	1401	1415	1431	1488	1513
Unladen weight, base model (kg)	1010	1045	1130	1360	1395
Maximum load (kg)	400	460	460	425	520
Boot capacity (l)		425	435	440	460
Trailer load, 8 % braked (kg)		1200	1100 to 1600	1250 to 1800	1600 to 1800
Engines (B = Petrol, D = Diesel)	R4 B R6 B	R4 B R6 B R6 D	R4 B R6 B R4 D R6 D	R4 B R6 B R4 D R6 D	R4 B R6 B R4 D later
Displacement (ccm)	1573 to 2315	1596 to 2494	1596 to 2793	1796 to 2993	1995 to 2996
Engine output (bhp) petrol/diesel/M version	75 - 143	90 - 170 86 - 115 195	100 - 192 90 - 143 321	105 - 231 136 - 204 343 / 360	150 - 258 163
0 - 100 km/h (s) standard models/M version	14.8 to 10.6	15.8 to 6.9	12.9 to 7.3	12.4 to 5.7	9.2 to 6.3
V max (km/h) standard models/M version	154 - 190	165 - 218 230	191 - 236 250	200 - 250 250	220 - 250

Note: All data given in the above table is based on the German Industrial Standard (DIN). The horsepower and torque rating vary depending on the standard used. US measurements tend to be lower.

Vehicle Data Views



Dimensions and Weights

		325i	330i
Engine configuration, cylinders/ valves per cyl.		Inline6/4	Inline6/4
Displacement	ccm/ci	2996/182	2996/182
Stroke/bore	mm	88.0 / 85.0	88.0 / 85.0
	in	3.46 / 3.35	3.46 / 3.35
Rated power	kW/bhp	160 / 215	190 / 255
	at	rpm	6250
Max. torque	Nm / lb-ft	250 / 185	300 / 220
	at	rpm	2750
Unladen weight (Manual)	kg/lbs	1490/3285	1550/3417
Max. payload	kg/lbs	520/1146	520/1146
Max. roof load	kg/lbs	75/165	75/165
Drag coefficient	Cd	.30	.30
Standard wheels		7 J x 16 cast aluminum	8 J x 17 cast aluminum
Maximum speed	mph	TBD	TBD
Acceleration 0-60	mph s	6.7 est.	6.1 est.
Tires		205/55 R16 W	225/45 R17 W
Fuel tank capacity	l	60	60
	g	15.85	15.85
Length	mm / in	4526.3 / 178.2	4526.3 / 178.2
Width	mm / in	1816 / 71.5	1816 / 71.5
Height	mm / in	1420 / 55.9	1420 / 55.9
Wheelbase	mm / in	2761 / 108.7	2761 / 108.7

The E90:

- is 2.2 inches longer than the E46
- is 3 inches wider than the E46
- is .8 inches higher than the E46
- has 6% more interior space and 12% more trunk space than the E46
- has remained the same weight as that of the E46
- increased the wheelbase by 1.4 inches from the E46.

Body

Hood and Engine Compartment

The hood is made of steel and has no sound insulation on the inside. As on the E46, the hood can be set in the service position with the aid of special tool 51 2170.

In the engine compartment, the vehicle identification number is punched on the right hand wheel arch and the bodysell number on the left-hand wheel arch.

The filter for the heating/air conditioning system is accessible from the engine compartment. The AUC sensor is now mounted on this filter housing in the vicinity of the bulk-head.



E-box Cover, AUCII Sensor, and Microfilter Housing

The DME control unit is located in the E-box. The filter housing of the heating/air conditioning system must be removed first in order to access the E-box.

The E-box cover features new clips and is no longer screw-mounted.



E-box in Engine Compartment (left)

Index	Explanation
1	DME control unit



DSC and Brake Reservoir (right)

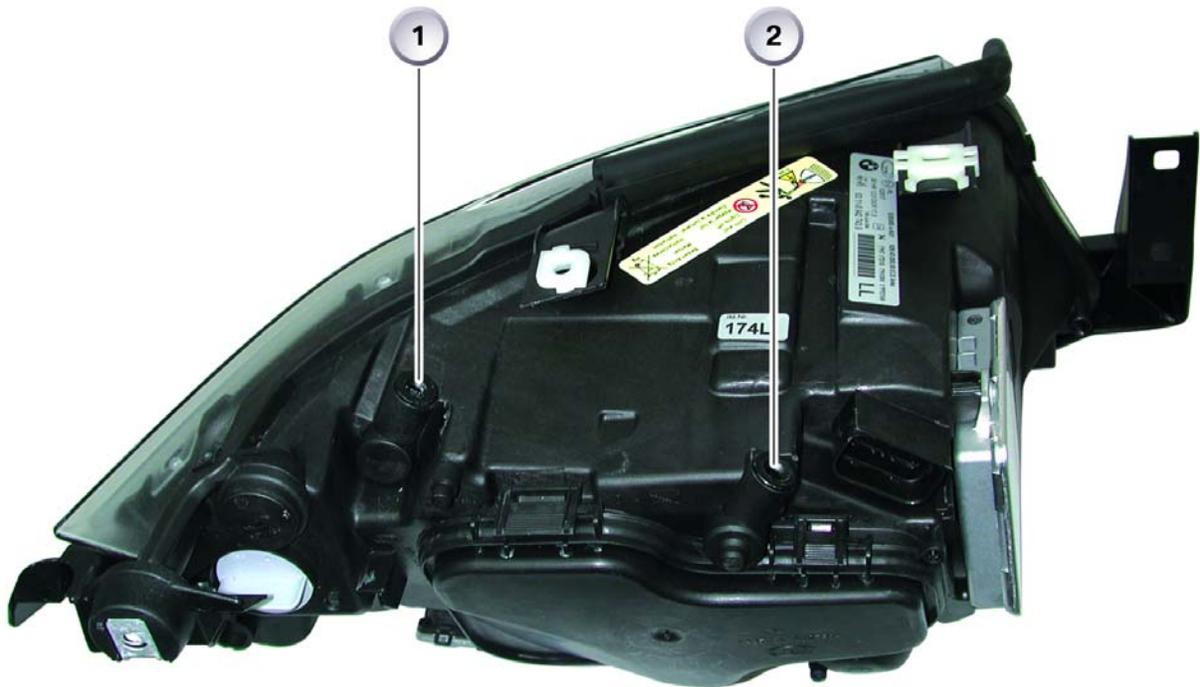
Index	Explanation
1	DSC control/hydraulic unit

Headlight System

The E90 is equipped as standard with halogen headlights. Bi-xenon adaptive headlights are optionally available.

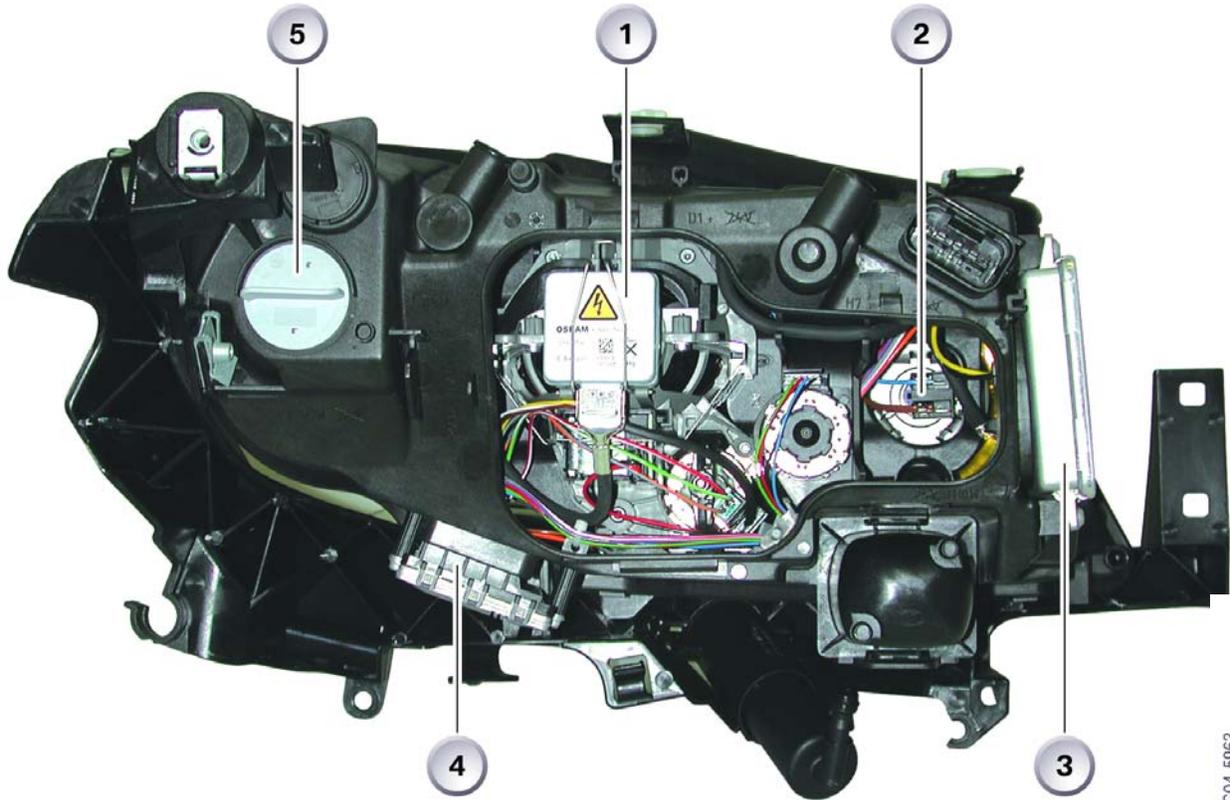
It is not necessary to remove the headlights in order to replace the bulbs. Service openings are provided in the wheel arch covers. If, for any other reason it is necessary to remove the complete headlight system, the bumper trim panel should be removed to prevent it being damaged.

Two headlight adjusting screws are provided (horizontal/vertical adjustment). Adjusting screws are also provided to adjust the gaps between the complete headlight assembly and the body.



Headlight Unit

Index	Explanation
1	Light adjusting screw, vertical
2	Light adjusting screw, horizontal



TG04-5963

Headlight Unit Opened

Index	Explanation
1	Ignition unit for bi-xenon headlights
2	High beam halogen lamp
3	Bi-xenon headlight control unit
4	Adaptive headlight control unit
5	Direction indicator lamp

Front Bumper

The trim panel can withstand impacts of speeds of up to 4 km/h. The bumper carrier absorbs forces at speeds between 4 km/h and 8 km/h while deformation elements absorb the forces between 8 km/h and 15 km/h. The engine supports are only affected by impacts at speeds in excess of 15 km/h.

The bumper system therefore consists of the trim panel with the carrier behind it as well as the deformation elements behind that. If applicable, the PDC sensors and fog lights are accommodated in the trim panel.



Front Bumper

Front End

After removing the bumper trim panel, the complete front end, including the bumper carrier, headlights, air ducts and bonnet locks, can be removed.

The bowden cable assembly can be disconnected at its parting point. The screw connections to the engine support must be released and the electrical connections to the headlights unplugged.



Front End

Rear Tail Lamps

The rear light clusters of the E90 are equipped with conventional bulb technology. LEDs are not used. They are designed as two-piece units with one part secured in the trunk lid and the other part in the rear side panel.

Four lamp bulbs per rear light cluster serve the brake light, direction indicator light, reversing light, tail light and rear fog light.

A flap can be removed in the luggage compartment trim panel for the purpose of replacing the bulbs. The lamp carrier is accessible. It is clipped into the rear light cluster and carries all the lamp bulbs.

It is necessary to undo three lock nuts in order to remove the rear light units in the side panels.

The inner trim panel of the boot lid must be detached in order to remove the rear light units in the boot lid.



Rear Tail Lamps

Index	Explanation
1	Reversing light
2	Tail light
3	Rear fog light
4	Brake light
5	Direction indicator lamp

Rear Bumper System

The rear bumper panel is secured with screws from the wheel arch side and from the underside. There are also two screws behind the covers in the upper area.

Great care must be taken when working with the side plug connections as they can be easily damaged.

The steel carrier which features two crash boxes and is screw-mounted to the body is located behind the bumper trim panel.

The trim panel is designed such that it can withstand small impacts at speeds of up to 4 km/h without damage. The bumper carrier absorbs forces at speeds between 4-8 km/h. The crash boxes deform and absorb impacts at speeds up to about 15 km/h. The sheet metal components of the vehicle structure are only affected by impacts at higher speeds.

The sensors for the PDC are additionally integrated in the bumper trim panel.



Rear Bumper

Rear Hatch

The trunk lid is made of steel. It is equipped with two gas-charged piston springs.

The trunk lid lock as well as part of the tail light units are integral. The inner trim panel must be detached in order to remove these parts. The inner trim panel is secured with plugs.

Stop pads and slots in the hinges are provided for the purpose of adjusting the boot lid. A bowden cable connects the boot lid lock to the lock barrel.

Luggage Compartment

The E90 is equipped with run-flat tires as standard, there is no spare wheel in the luggage compartment. The battery and control units for PDC, AHM, and Comfort Access are located on the right-hand side.

If the vehicle is equipped with a Top-HiFi amplifier and/or CD changer, they are arranged on the side panel on the left side of the luggage compartment. A telephone control unit is additionally located in the center next to the satellite radio tuner.

The luggage compartment has a capacity of 330 liters. By folding down the rear seats, the capacity can be increased to 1,150 liters.

Moonroof (SHD)

A glass slide/tilt sunroof is standard equipment on the E90.

For servicing purposes, the glass panel can be adjusted or removed and installed by means of well-accessible screws. The visor can also be detached. It is spring-mounted in the cassette.

The electric motor is held by screws. A new feature is that the control unit is no longer located on the motor but rather it is integrated in the FZD.

The wind deflector and water drain channel can also be detached without having to remove the sunroof cassette from the vehicle.

There are currently no provisions for replacing the cable assemblies. In this case, the entire sunroof cassette should be replaced.

The SHD requires initialization following assembly. This is achieved by pressing the push-button in the tilt position. The system is initialized after 20 seconds.



Front Door

The front door is made from steel. It features a side impact protection system together with its anchoring.

The door handle is painted in the car color. Only the driver's door has access to locking and unlocking using a mechanical key.

Only one screw needs to be undone in order to remove the door handle. The door handles with comfort access are additionally equipped with a plug for the antennas.

The door trim panel is attached to the door by means of three mounting screws. Unlike the E46, there is no airbag integrated in the door trim panel. The side airbag is now incorporated in the seat.

A sound insulation mat that also keeps away moisture is adhered to the back of the door trim panel.

Another new feature is the clip-mounted window that is connected by means of clips to the power window regulator.



Door Trim Panel

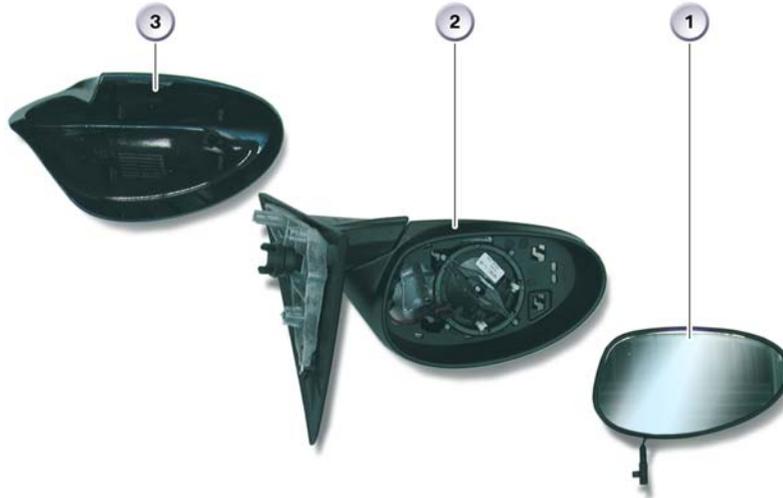
Index	Explanation
1	Door trim panel
2	Door panel trim
3	Switch cluster



Window Regulator

Index	Explanation
1	Plastic clip for glass
2	Screws for electric motor

The outside mirror is secured with three screws to the door. A new feature of the outside mirror is a central connector that facilitates disassembly and assembly operations. If necessary, the mirror glass and housing of the outside mirror can be removed individually.



Outside Mirror

Index	Explanation
1	Mirror glass
2	Mirror housing cover
3	Mirror housing



Index	Explanation
1	Emergency key 1
2	Spare key
3	Identification transmitter 1
4	Identification transmitter 2
5	Emergency key 2

Rear Door

Two trim covers must be removed on the rear door in order to access the mounting screws of the door trim panel. The roller sun blind of the quarter window must be additionally removed before the door trim panel can be detached.

There is adhesive film located behind the door trim panel. The locks and window regulators are accessible after removing the film.

Interior

Front Seat

The E90 is available with basic seats and sports seats. Electrically adjustable versions are also available. The seats (sports seat only) are further enhanced by a memory function as well as a backrest width adjustment option (similar to M3 E46).

A new feature is that the side airbag is now integrated in the front seat. The seat must be removed in order to dismantle the side airbag. All covers and connectors are then accessible allowing the side airbag to be removed (sports seat).

Particular attention must be paid to ensure correct cable routing of the side airbag. Bends and chafing must be avoided.



Seats in the E90

Index	Explanation
1	Basic seat
2	Sports seat
3	Side airbag

Rear Seat

The rear seat bench is clipped on.

The backrest of the seat is a force-absorbing part and is therefore screw-mounted on the lower portion and fixed in position with two locks on the top section. These locks must be removed along with the backrest.



Latches for the Top of the Backrest

The control unit for the electric fuel pump (EKP) is located under the right-hand backrest on the E90.

The ISOFIX bracket is accessible after removing the bench seat. ISOFIX is installed as standard on the E90 and serves the purpose of mounting child safety seats in the rear compartment.

Split folding rear seats are available as an option. The seat backrest is then split 2/3 to 1/3. The headrests snap in place.

Note: The plastic clips have to be installed on the backrest latches. Care must be taken when reinstalling the backrest that they do not fall out of place.

Instrument Panel

The instrument panel is a one-piece unit. There are two variants of dashboard covers available:

- Vehicles with CID
- Vehicles without CID



Instrument Panel (vehicle with CID)

The steering wheel, glove compartment, and footwell trim panels must be detached in order to remove the instrument panel.

The fresh air grills are clip-mounted while two screws secure the instrument cluster to the instrument panel. The slot for the identification transmitter as well as the starter button are clipped. The radio and heating/air conditioning control panel are also clipped into the instrument panel. The decorative strip is also clipped on. The CID must also be removed in order to access the mounting screws of the instrument panel.

The solar sensor is clip-mounted (twist lock). A number of control units are also located in the area of the instrument panel.

The footwell module is located on the left hand A-pillar under the left footwell trim panel.

The CAS is also positioned under the instrument panel on the driver's side while the junction box is arranged on the passenger's side behind the glove compartment. The control units for CCC, CID as well as the control module for the heating/air conditioning system are also mounted in the control panel.



Index	Explanation	Index	Explanation
1	Ventilation grille, left	6	Heating/air conditioning control panel
2	Ventilation grille, center and right	7	Car communication computer (CCC)
3	Central information display (CID)	8	Steering column switch cluster (SZL)
4	Light switch	9	Igniter pellet with connection
5	Instrument cluster		

Roof Liner

Two control units are clipped into the roof liner of the E90. The roof functions center (FZD) is located in the front area and the ultrasonic passenger compartment protection (USIS) in the rear.

The headliner is installed at the production plant before the windscreen. To provide sufficient space for removal and installation without damage being incurred, it is recommended to remove at least one front seat.

Center Console

No parts of the instrument panel need to be removed in order to dismantle the center console. The covers at the rear end of the center console and selector lever must be removed in order to access the screw connections. There are also two mounting screws located in the front area beneath the instrument panel.

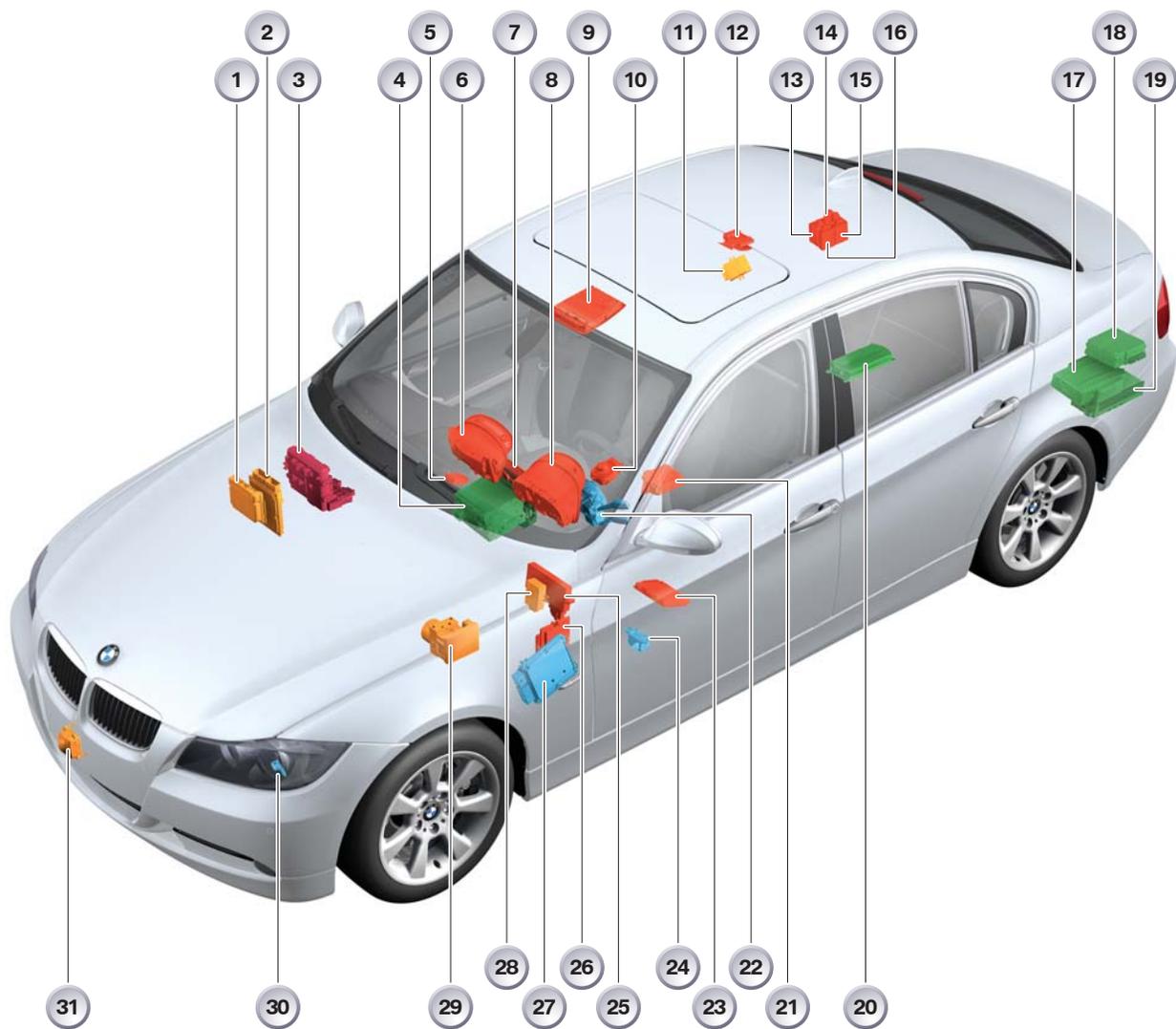
The MRS5 control unit and, if fitted, antennas for the CAS are arranged under the center console.



Center Console

Index	Explanation	Index	Explanation
1	Handbrake boot	3	Stratified-temperature adjuster rear compartment
2	Center console trim panel	4	Center console

Control Unit Locations



Legend for Control Unit Locations

Index	Explanation	Index	Explanation
1	Sequential manual gearbox (SMG)	17	Top-HiFi system
2	Digital motor electronics (DME)	18	Video module (VM)
3	Junction box (JB)	19	CD changer (CDC)
4	Car communication computer (CCC)	20	Telephone/telematics control unit (TCU)
5	Passenger's seat module	21	Multiple restraint system (MRS)
6	Central information display (CID)	22	Steering column switch cluster (SZL)
7	Integrated automatic heating/air conditioning (IHKA)	23	Driver's seat module
8	Instrument cluster	24	Sensor, dynamic stability control (DSC)
9	Roof functions center (FZD)	25	Comfort access system (CAS)
10	Controller (CON)	26	Footwell module (FRM)
11	Electric fuel pump (EKP)	27	Active steering (AFS)
12	Ultrasonic interior sensor (USIS)	28	Longitudinal dynamics management (LDM)
13	Comfort access (CA)	29	Dynamic stability control (DSC)
14	Trailer locking module	30	Cumulative steering angle sensor
15	Trailer module (AHM)	31	Active cruise control (ACC)
16	Park distance control (PDC)		