Participant's Manual

E65/E66 Model Redesign

BMW Service

Aftersales Training

The information contained in this Participant's Manual is intended solely for the participants of this seminar run by BMW Aftersales Training.

Refer to the latest relevant "BMW Service" information for any changes/supplements to the Technical Data.

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Participant's Manual
E65/E66 Model Redesign

Redesign

More powerful engines

Adapted chassis and suspension

Optimized energy management

Improved iDrive operation

Information on this Participant's Manual

Symbols used

The following symbols are used in this Participant's Manual to facilitate better comprehension and to draw attention to important information.

⚠ contains information for better understanding of the described systems and their functions.

◄ identifies the end of an item of information.

Current content of Participant's Manual

In view of the constant further developments in the design and equipment of BMW vehicles deviations may arise between this Participant's Manual and the vehicles made available as part of the training course.

The background material refers exclusively to left-hand drive vehicles. The controls are in part arranged differently in right-hand drive vehicles than shown on the graphics in the Participant's Manual.

Additional information sources

You will find further information on the individual vehicle topic in the BMW diagnosis and repair systems as well as on the Internet under www.bmw.com.

Contents
E65/E66 model redesign

Objectives
E65/E66 model redesign

Guide for training, reference work for everyday practice

This Participant's Manual is designed to provide you with information on the changes to and new developments of the BMW 7 Series.

This manual is intended as an accompaniment to training and complements the course content specified by BMW Aftersales Training. The Participant's Manual can be used both a self-study tool as well as detailed reference material.

It is intended to provide the participants with an overview of the changes to and new developments of the new 7 Series as they prepare for technical training. It also covers service-related topics relating to engine variants and modifications.

Previous technical and practical knowledge of the BMW 7 Series and 5 Series will facilitate better understanding of the corresponding systems and their functions.

Models
E65/E66 model redesign

New engine variants

The model redesign of the E65/E66 Series is accompanied by a comprehensive revision of the engine programme. Only the N73 twelve-cylinder engine remains unchanged.

The power output and torque of the engines have been significantly increased.

The lines featuring new models are highlighted.

Series	Model	Engine	Cyl.	Power output (kW/bhp)	Torque (Nm)	Exhaust emission stage
E65/E66	730i	M54	6	170/231	300	EURO 3
E65/E66MU	**730i**	**N52**	**6**	**190/258**	**300**	**EURO 4**
E65/E66	735i	N62	8	200/272	360	EURO 4
E65/E66MU	**740i**	**N62TU**	**8**	**225/306**	**390**	**EURO 4**
E65/E66	745i	N62	8	245/333	450	EURO 4
E65/E66MU	**750i**	**N62TU**	**8**	**270/367**	**490**	**EURO 4**
E65/E66	760i	N73	12	327/445	600	EURO 4
E65/E66MU	760i	N73	12	327/445	600	EURO 4
E65/E66	730d	M57TU1	6	160/218	500	EURO 3
E65/E66MU	**730d**	**M57TU2**	**6**	**170/231**	**520**	**EURO 4**
E65/E66	740d	M67	8	190/258	600	EURO 3
E65/E66MU	**745d**	**M67TU**	**8**	**220/299**	**700**	**EURO 4**

MU = model redesign

Introduction
E65/E66 model redesign

Model upkeep for the 7 Series

The current BMW 7 Series has been on the market since Autumn 2001. During this period the E65 - together with the E66 long version - has surpassed even the successful predecessor model E38 in terms of sales figures.

Throughout the world the BMW 7 Series has sold three times as many units as the Audi A8 in this period.
The Mercedes S-Class has only sold roughly 10 % more units than the 7 Series.

The responsibility for this sales success lies predominantly with the US market, where the 7 Series can build on a loyal customer base, and in particular with the Asian market. It is in Asia that sales of the 7 Series have far exceeded expectations.

For the BMW marque the market introduction of the E65 in Asia involved far more than just a product launch - it rather represented the kick-off to a complete repositioning of the marque as the premium supplier of motor vehicles in the luxury sector.

The time is now right to intensify the strengths of the BMW 7 Series. The E65 and E66 will be reinvigorated thanks to a model redesign, as is undergone by all BMW model series after roughly half their life cycle. New engines, optimized chassis and suspension and fine-tuned design and iDrive will accentuate the quality standard, which is extremely high as it is.

The "new" 7 Series will be available to buy in the dealerships from the beginning of March 2005.

1 - The redesigned BMW 7 Series.
New engines also give rise to some new model designations.

From March 2005 as:

- 730i / 730Li
- 740i / 740Li
- 750i / 750Li
- 760i / 760Li
- 730d / 730Ld
- 745d

Available to buy from March 2005: The "new" BMW 7 Series

What's new about the 7 Series? - The most important features in brief

Exterior design

The body has been redesigned all round. The bonnet, boot lid, front side panels and front and rear lights have a more rounded and harmonious effect.

The kidney grilles now reach down to the lower edge of the front lights and the newly styled apron lends the 7 Series a friendlier appearance.

Even the headlight combination has been redesigned, the contour line with the direction indicators now cut at an angle and giving off a more elegant effect. The low double notches for the headlights in the bumper have been rendered superfluous.

The side view is now more elongated and dynamic. This effect is achieved by a more visually accentuated side skirt and the spoiler-like separation edge integrated in the boot lid.

The redesigned rear end is dominated by the rear lights, which have almost doubled in size, half of the rear lights now being integrated in the boot lid.

The previous light surround across the boot lid has been dropped and the reversing lights are now situated in the upper third of the rear light unit. They are flush-mounted inwards and visually connected to each other by a chrome trim strip.

Together with the newly contoured separation edge, the new rear end of the 7 Series has a more dynamic, more powerful and wider appearance.

Interior design

The primary objectives in redesigning the 7 Series interior were to increase the quality and harmony of all the individual elements and to improve ergonomics.

Expressed in more detail: Many individual parts have been given higher-quality paint (such as e.g. the fresh-air grilles), the rotary

switches for lights, controller and A/C control are now designed in pearl-effect chrome and the headliner trims are coated with structural soft paint in the corresponding headliner colour.

An "insular design" involves highlighting control elements or element groups by using contrasting function bars. Finally, new, higher-quality woods also contribute to the improved quality in the car interior.

Information and communication

2 - Different colours for different main paths improve the clarity and transparency of iDrive.

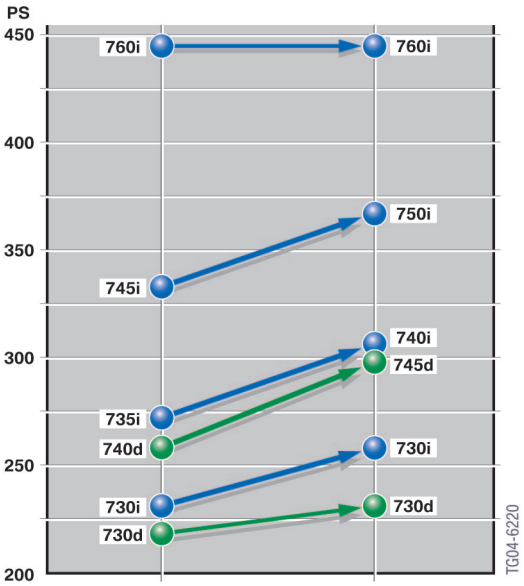
The modified iDrive user interface is colour-coded for improved differentiation. The different paths that can be selected are assigned fixed colour schemes (e.g. green type for navigation, blue type for communication).

Activated entries are now marked with a tick or check symbol and are thus immediately identifiable as active. The new, hierarchical structure means that there are no longer any hidden functions, the submenus being replaced by scrollable lists.

The modified controller now has a new menu button, which always returns the user to the starting point, and a freely programmable button for a frequently used entry.

Drive

The model redesign means that the power output and efficiency of virtually all the variants of the 7 Series are improved. Only the top-of-the-range 760i, which is supremely good as it is, is unaffected by the increased power output and efficiency.



3 - At 445 bhp the top-of-the-range 760i offers power in abundance - the other engine variants previously delivered power figures which were significantly below this level. Now the power spectrum within the 7 Series has been distributed more uniformly, 6- and 8-cylinders have undergone a significant increase in power to some extent

In the 730i the N52B30 6-cylinder engine already familiar from the 6 Series Coupé is making an entrance into the volume market. This forerunner of a whole engine generation is the first drive system in the world to be manufactured in magnesium-aluminium composite technology.

A weight advantage of 10 kg, improved VALVETRONIC and an innovative cooling concept with an electric coolant pump increase the power output in comparison with the predecessor engine by 12 % with simultaneously 6 % lower fuel consumption.

The redesigned 8-cylinder engines with 2-stage switch-over intake systems in the 740i and 750i have increased engine displacement and power output.

The increase in power of the diesel engines in the E65 can be put down to both a comprehensive technical redesign (air-gap-insulated manifold, piezo fuel injection technology, full aluminium crankcase, new supercharger generation in the 730d) and an increase in engine displacement from 3.9 to 4.4 l (745d).

The 6HP19/26/32 automatic transmissions have been optimized in terms of shift quality, spontaneity and shift times.

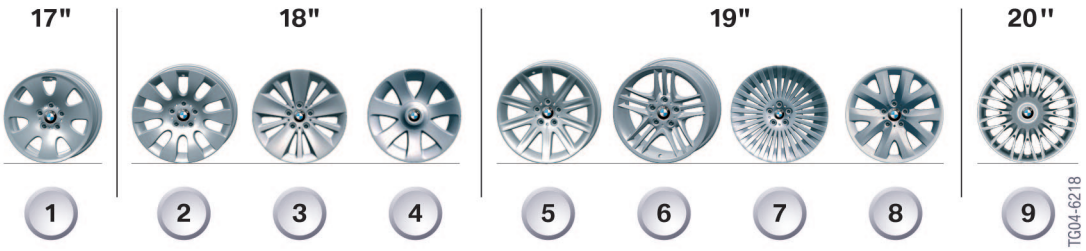
Chassis and suspension

The new, more powerful drive systems in the BMW 7 Series call for corresponding adaptations to the chassis and suspension. Thus the 730d and 740i have a 17" brake system and the 750i has a 17" high-performance brake on the front axle. The 8-cylinder diesel that has grown from 740d to 745d is now equipped with 18" brakes and 18" wheels.

The broad range of the most varied suspension variants has been revised and dramatically tightened up. The variety of previously freely combinable control systems has been reduced to three variants which can be clearly differentiated by the customer:

- A newly tuned standard suspension, with air suspension as standard in the long versions
- A comfortably, dynamically designed "Adaptive Drive" with Electronic Damper Control and Dynamic Drive
- A sport suspension containing the previous sports package and Dynamic Drive options

Further suspension modifications include a widening of the total toe on the rear axle by 14 mm, redesigned cruise control and standard steering wheel and a new wheel design.



4 - The wheel range for the BMW 7 Series as at March 2005:

1: Styling 165 alloy wheels, new standard wheel from 03/2005
2: Styling 91 alloy wheels, new standard wheel for 760i/760Li from 03/2005
3: Double spoke 174 alloy wheels; 8Jx18 with 245/50R18 (with runflat properties: Option 2BL, without runflat properties: Option 2BK)
4: Star spoke 175 alloy wheels; 8Jx18 with 245/50R18 (with runflat properties: Option 2C2, without runflat properties: Option 2C1)
5: Alloy wheels with tyre mixing, Styling 95; front: 9Jx19 with 245/45R19, rear: 10Jx19 with 275/40R19 (Option 268)
6: Styling 89 alloy wheels, standard wheel for 760iUS/760LiUS from 03/2005
7: Spoke styling 176 alloy wheels with tyre mixing; front: 9Jx19 with 245/45R19, rear: 10Jx19 with 275/40R19 (Option 2RD)
8: V spoke 126 alloy wheels with tyre mixing; front: 9Jx19 with 245/45R19, rear: 10Jx19 with 275/40R19 (Option 596)
9: Y spoke 149 alloy wheels with tyre mixing; front: 9Jx20 with 245/40R20, rear: 10Jx20 with 275/35R20 (Option 2EA)

Technical data

TG04-6219

The redesigned 7 Series and its competitors in figures.
For checking and comparing.

Dimensions and weights

		BMW E65 from 3/ 2005	BMW E65 (previously)	Audi A8	Mercedes S-Class	Jaguar XJ
Length	mm	5039	5029	5051	5043	5090
Width	mm	1902	1902	1894	1855	1860
Height	mm	1491	1492	1444	1444	1448
Wheelbase	mm	2990	2990	2944	2965	3034
Toe, front	mm	1578	1578	1629	1574	1556
Toe, rear	mm	1596	1582	1615	1574	1546
Boot capacity	l	500	500	500	500	470
Unladen weight	kg	1805 to 2105	1805 to 2115	1755 to 1940	1810 to 1980	1608 to 1734
Payload	kg	540 to 580	505 to 580	515 to 600	485 to 530	516 to 555
Standard tyres		245/55R17 245/50R18	245/55R17 245/50R18	235/60R16 235/55R17 255/45R18	225/60R16 225/55R17 S55AMG: front: 245/45R18 rear: 265/40R18	235/55R17 235/50R18 255/40R19

Performance data and competitors

6-cylinder models

6-cylinder		BMW 730i N52B30	Audi A8 3.0	Jaguar XJ6 3.0	Mercedes S350	VW Phaeton V6 4Motion
Cylinders / valves		R 6 / 4	V 6 / 5	V 6 / 4	V 6 / 3	V 6 / 4
Displacement	ccm	2996	2976	2967	3724	3189
Power output	bhp	258	220	238	245	241
at engine speed	rpm	6600	6300	6800	5750	6200
Max. torque	Nm	300	300	293	350	315
at engine speed	rpm	2500 - 4000	3200	4100	3000	2400
0 - 100 km/h	s	7.8	7.9	8.1	7.6	9.4
V max	km/h	244	242	233	246	239
Fuel tank capacity	l	88	90	85	88	90
Fuel consumption	l / 100 km	10.1 SP	9.6 SP	10.5 S	11.2 S	12.0 SP
Basic price	€		60,000	59,900	64,902	63,550

8-cylinder models

8-cylinder (1)		BMW 740i N62B40 TU	BMW 750i N62B50 TU	Audi A8 3.7 Quattro	Audi A8 4.2 Quattro	Jaguar XJ8 3.5
Cylinders / valves		V 8 / 4	V 8 / 4	V 8 / 5	V 8 / 5	V 8 / 4
Displacement	ccm	3999	4798	3697	4172	3555
Power output	bhp	306	367	280	335	258
at engine speed	rpm	6300	6300	6000	6500	6250
Max. torque	Nm	390	490	360	430	335
at engine speed	rpm	3500	3400	3750	3500	4200
0 - 100 km/h	s	6.8	5.9	7.3	6.3	6.7
V max	km/h	250	250	250	250	242
Fuel tank capacity	l	88	88	90	90	85
Fuel consumption	l / 100 km	11.2 SP	11.4 SP	11.7 SP	11.9 SP	10.7 S
Basic price	€			68,200	74,400	66,100

8-cylinder (2)		Jaguar XJ8 4.2	Jaguar XJR	Mercedes S430	Mercedes S500	Mercedes S55 AMG
Cylinders / valves		V 8 / 4	V 8 / 4	V 8 / 3	V 8 / 3	V 8 / 5
Displacement	ccm	4196	4196	4266	4966	5439
Power output	bhp	298	395	279	306	500
at engine speed	rpm	6000	6100	5750	5600	6100
Max. torque	Nm	411	541	400	460	700
at engine speed	rpm	4100	3500	3000	2700	2750
0 - 100 km/h	s	6.6	5.3	7.1	6.3	4.8
V max	km/h	250	250	250	250	250
Fuel tank capacity	l	85	85	88	88	88
Fuel consumption	l / 100 km	11.3 S	12.5 S	10.9 S	11.4 S	13.3 S
Basic price	€	74,100	88,800	75,922	82,650	118,784

8-cylinder (3)		VW Phaeton V8 4Motion	Cadillac Seville STS	Lexus LS430	Maserati Quattro-porte
Cylinders / valves		V 8 / 5	V 8 / 4	V 8 / 4	V 8 / 4
Displacement	ccm	4172	4565	4293	4172
Power output	bhp	335	305	282	400
at engine speed	rpm	6500	6000	5600	7000
Max. torque	Nm	430	400	417	452
at engine speed	rpm	3500	4400	3500	4500
0 - 100 km/h	s	6.9	6.8	6.3	5.2
V max	km/h	250	240	250	275
Fuel tank capacity	l	90	70	84	90
Fuel consumption	l / 100 km	13.1 SP	13.9 S	11.4 S	18.9 S
Basic price	€	74,500	57,000	72,000	99,100

12-cylinder models

12-cylinder		BMW 760i N73	Audi A8 6.0 Quattro	Mercedes S600L	Mercedes S65 AMG	VW Phaeton W12 4Motion
Cylinders / valves		V 12 / 4	V 12 / 4	V 12 / 3	V 12 / 3	V 12 / 4
Displacement	ccm	5972	5998	5513	5980	5998
Power output	bhp	445	450	500	612	420
at engine speed	rpm	6000	6200	5000	4800	6000
Max. torque	Nm	600	580	800	1000	550
at engine speed	rpm	3950	4000	1800	2000	3000
0 - 100 km/h	s	5.6	5.1	4.8	4.4	6.1
V max	km/h	250	250	250	250	250
Fuel tank capacity	l	88	90	88	88	90
Fuel consumption	l / 100 km	13.7 SP	14.7 SP	14.9 S	15.0 S	15.7 SP
Basic price	€		106,900	129,398	196,620	102,500

Diesel models

Diesel (1)		E65 M57D30 TU2	E65 M67D44 TU	A8 3.0 TDI Quattro	A8 4.0 TDI Quattro	Mercedes S320 CDI
Cylinders / valves		R 6 / 4	V 8 / 4	V 6 / 4	V 8 / 4	R 6 / 4
Displacement	ccm	2993	4423	2967	3936	3222
Power output	bhp	231	299	233	275	204
at engine speed	rpm	4000	4000	4000	3750	4200
Max. torque	Nm	520	700	450	650	500
at engine speed	rpm	2000	2000	1400	1800	1800
0 - 100 km/h	s	7.8	6.8	7.8	6.7	8.2
V max	km/h	238	250	243	250	235
Fuel tank capacity	l	88	88	90	90	88
Fuel consumption	l / 100 km	8.2 D	9.5 D	8.5 D	9.7 D	7.7 D
Basic price	€			61,300	77,800	61,538

Diesel (2)		**Mercedes S400 CDI**	**VW Phaeton V10 TDI 4Motion**
Cylinders / valves		V 8 / 4	V 10 / 2
Displacement	ccm	3996	4921
Power output	bhp	260	313
at engine speed	rpm	4000	3750
Max. torque	Nm	560	750
at engine speed	rpm	1700	2000
0 - 100 km/h	s	7.8	6.9
V max	km/h	250	250
Fuel tank capacity	l	88	90
Fuel consumption	l / 100 km	9.6 D	11.4 D
Basic price	€	79,576	85,600

Contents
E65/E66MU complete vehicle

System overview
E65/E66MU complete vehicle

Exterior

Changes have been made to the front and rear ends in the context of the E65/E66 model redesign.

Front end

1 - E65/E66 front view

At the front end the headlights, the front grille, the bumper trim, the bonnet and the front side panels have been changed.

Thanks to the new styling, the new headlights with transparent direction indicators have a new visual appearance. The light rings around the high-beam headlights are now completely enclosed. The bi-xenon headlights are now included in the basic equipment specification, as is the headlight washer system. Adaptive directional headlights AHL are offered as options.

The fog lights are bigger and even more striking due to the fact that they are accommodated in separate openings.

Please refer to the chapter headed Exterior lights of this Participant's Manual for more details on the front lights.

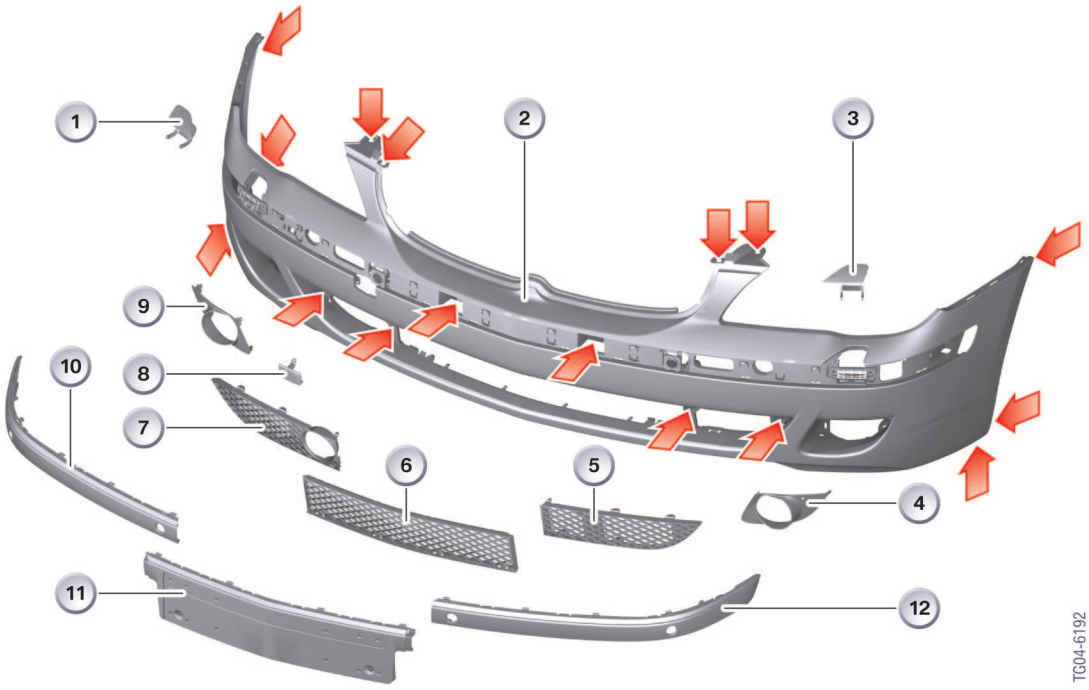
The bumper trim has a new design. The outer contour of the air intake lends the car a friendly appearance. The air intake in the bumper trim is equipped with three grilles. The openings are adapted for the brakes, new engines and ACC II (option).

The front grille is now wider (2x 14 chrome-plated vertical bars per kidney) and their outer contours run almost parallel to the headlight contours.

The front side panels have been modified in the area of the headlights. Owing to the new headlight shape and the new front grille, the bonnet has also been adapted to the new design. The bonnet and the side panels are still made of aluminium.

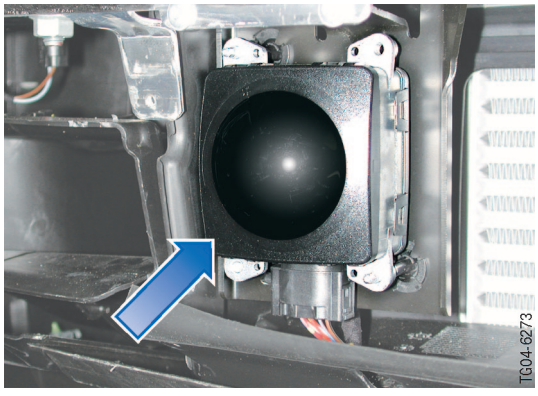
The wheel arch trims, bumper trim carriers and bonnet insulation trim have also been redesigned.

The basic procedure for removing/installing the modified parts at the front end remains as before. Please refer to the current repair instructions for further information.



2 - Attachment parts for front bumper trim

Index	Explanation	Index	Explanation
1	Right headlight washer system cover	7	Right grille
2	Bumper trim	8	Cover for bolted towing lug
3	Left headlight washer system cover	9	Right fog light trim
4	Left fog light trim	10	Front right rubbing strip with chrome strip and locator for two PDC sensors
5	Left grille	11	Number plate baseplate
6	Middle grille	12	Front left rubbing strip with chrome strip and locator for two PDC sensors



3 - ACC II transmit-receive unit

Active Cruise Control ACC II is offered as an option. The transmit/receive unit is located in the bottom right area of the front bumper trim.

Rear end

4 - E65/E66 rear view

Rear lights

The newly designed rear lights with fibre-optic technology tail lights give the car an exclusive night-time design with outstanding visibility. The outer contours of the rear lights in the side panels have stayed the same. The rear side panels have not been changed.

Bumper trim

The bumper trim has also been redesigned. The side rubbing strips are slightly shorter and no longer stretch to the wheel apertures.

On cars fitted with the trailer tow hitch option the bumper trim is cut out accordingly at the bottom and sealed with a cover.

The exhaust tailpipes are covered by the bumper trim.

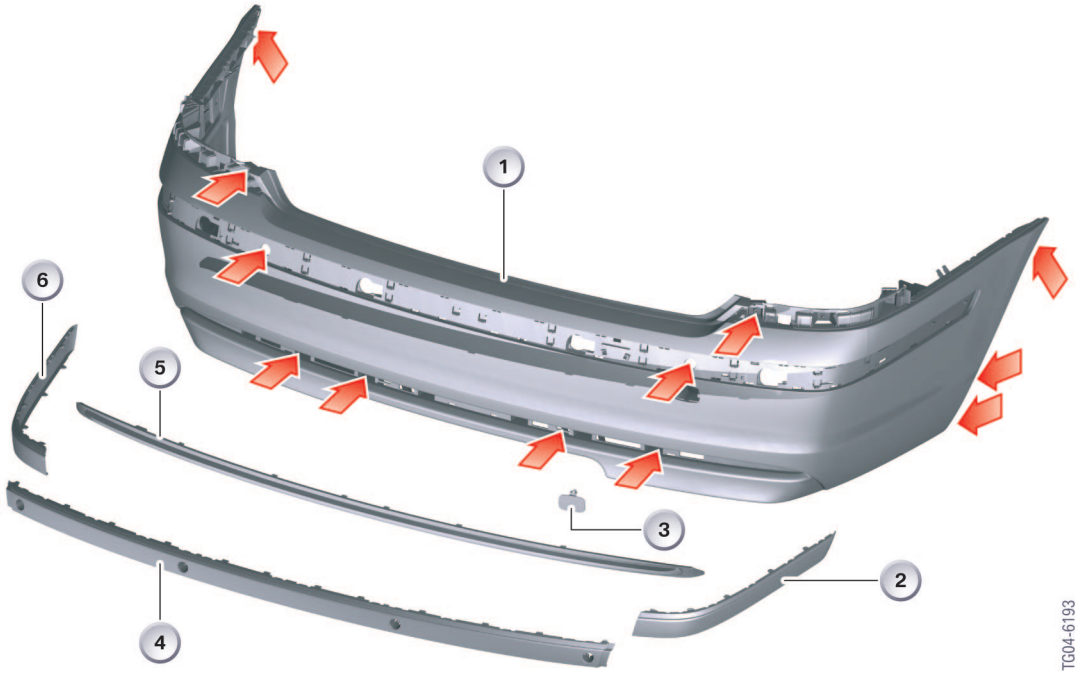
Boot lid

The design features of the boot lid have also been altered.

The three-part light surround has been replaced by two larger-sized rear lights which merge almost seamlessly into the rear lights in the side panels.

Other new features next to the BMW badge with chrome frame are the country-specific number plate trim and the long chrome strip which visually connects the reversing lights to each other. In addition, the new number plate lights and the new boot lid lock are integrated in the boot lid.

The boot lid trim panel is adapted to the new boot lid. The bulbs in the rear fog/reversing lights can be easily replaced by unclipping the corresponding trim panels. The boot lid lock is located to the right of the number plate light and is not longer directly visible.



5 - Attachment parts for rear bumper trim

Index	Explanation	Index	Explanation
1	Rear bumper trim	4	Rear middle rubbing strip with chrome strip and locators for four PDC sensors
2	Rear right rubbing strip with chrome strip	5	Impact absorber
3	Cover for bolted towing lug	6	Rear right rubbing strip with chrome strip

All three rubbing strips and the impact absorber can be removed from the outside.

The points at which the bumper trim is connected to the body have not changed (red arrows).

Structural changes to the front and rear bumper trims have increased the length of the car by 10 mm. Thus the new length is 5039 mm for the E65 and 5179 mm for the E66.

Interior

The interior is now even more harmonious and high-quality thanks to the use of new materials, colours and surfaces.

6 - New materials and surfaces enhance the superior-quality appearance of the interior

For example, all the trims and the fresh-air grilles which are in the immediate field of vision of the occupants are coated with superior-quality paint (titanium instead of dark silver).

The headliner trims are coated with structural soft paint in the corresponding headliner colour (beige, black or stone-grey).

The decorative trims now also come in new, superior-quality wood designs. "American walnut" replaces "black cherry" in the basic equipment specification. The fine wood design light or dark "variegated ash" is available as an option.

Many individual parts such as e.g. locking knobs, inside door handles, frames of drinks holders etc. are modelled in pearl-effect chrome.

Controller

7 - New controller

Index	Explanation
1	Leather insert
2	Controller in pearl-effect chrome
3	Titanium-painted controller trim

The increase in quality can also be seen from the example of the controller. The controller has a new shape and is made from a new material. It is designed in a so-called monosandwich with leather insert. The leather insert has a practical as well as a visual benefit for the customer in that it is equally pleasant to touch when hot or cold. The controller trim has a new shiny finish thanks to the titanium paint.

Steering wheel

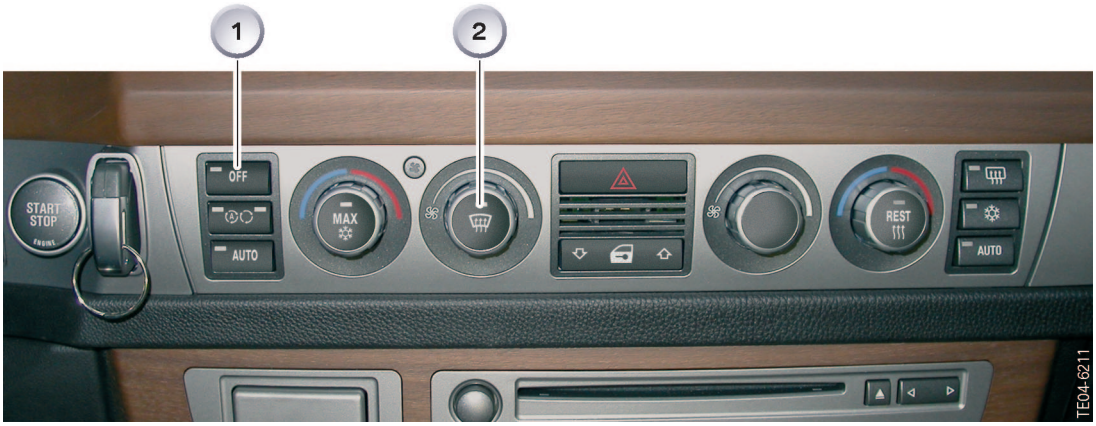
8 - Comparison of steering wheel design

The design of the steering wheel has also been changed. The airbag impact pad now has slightly curved edges at the top and bottom. The steering wheel comes in the same colour as the instrument panel trim.

IHKA controls and light switch centre

The IHKA controls and the light switch centre have been visually enhanced. The rotary knobs are modelled in pearl-effect chrome.

The buttons or the button groups and the rotary knobs are set off by a so-called insular design. The corresponding trims are coated with high-quality paint (titanium).



9 - Controls for High automatic climate control

The OFF button and defrost button have changed places.

Index	Explanation	Index	Explanation
1	Switch off automatic climate control (new position)	2	Left interior air supply controller and defrost button (new position)

Conversion

1 - Overview of conversion parts

The previously manufactured E65/E66 cars can be converted to the new visual design.

For this purpose, the following conversion kits are offered, depending on options, steering, short or long version and engine.

Body kits

Left-hand drive/right-hand drive	Equipment	Kit number (as at 11/2004)
LHD	Bi-xenon, without PDC	0 032 849
LHD	Bi-xenon, with PDC	0 032 850
LHD	Bi-xenon, with AHL, without PDC	0 032 851
LHD	Bi-xenon, with AHL, with PDC	0 032 852
RHD	Bi-xenon, without PDC	0 032 853
RHD	Bi-xenon, with PDC	0 032 854
RHD	Bi-xenon, with AHL, without PDC	0 032 855
RHD	Bi-xenon, with AHL, with PDC	0 032 856

The body kit contains e.g. both bumper trims incl. attachment parts, headlights, front fog lights, rear light cluster, bonnet, boot lid, front side panels etc.

Sill trims are available for the short and long versions:

- E65, kit number: 0 032 857
- E66, kit number: 0 032 858.

Radiator kits

Engine	Kit number
N62	0 395 754
N73	0 395 755
M67	0 395 756

Restrictions

No conversion kits are offered for cars with Option 235 Trailer tow hitch. Nevertheless, the customer will still be able to convert their car by:

- Deciding to purchase a new trailer tow hitch, or
- Foregoing trailer towing.

Likewise no conversion kits are offered for cars with Option 541 Active cruise control, as ACC II is not backwards-compatible.

Cars in the US national-market specification cannot be converted either!

The offer is only applicable to E65/E66 cars with the following engines:

- M57
- M67
- N62
- N73

Only white direction indicators are offered on a worldwide basis.

The conversion kits are suitable for Basic and Chromeline.

⚠ No conversion kits are offered for the car interior. ◄

Contents
E65/E66MU drive

System components
E65/E66MU drive

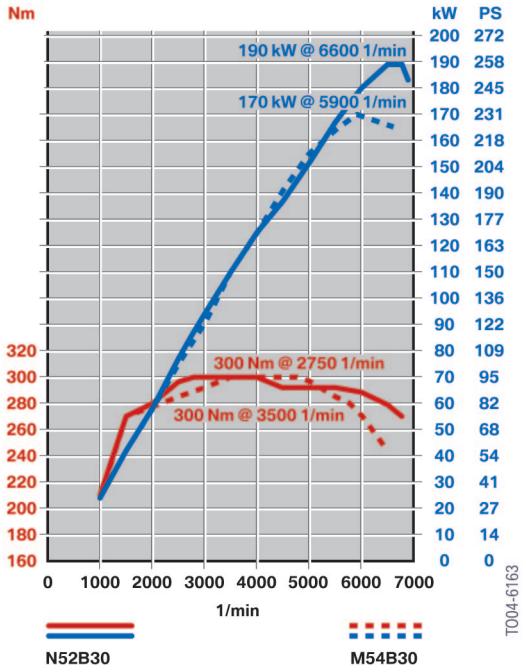
N52 engine

The M54B30 engine is replaced by the N52B30 engine.

The N52B30 engine is known from the E63/64 model series. The following areas are adapted vehicle-specifically:

- Programming of Digital Motor Electronics (DME).
- Air intake duct in the car.

Technical data/history



1 - N52B30 full-load diagram

The N52B30 engine is used in the following model series:

Series/Model	Engine	kW/bhp at rpm	Nm at rpm	Exhaust emission stage	Engine control
E60/530i	N52B30	190/258 6600	300 2500 - 4000	EURO 4	MSV 70
E61/530i	N52B30	190/258 6600	300 2500 - 4000	EURO 4	MSV 70
E63/630i	N52B30	190/258 6600	300 2500 - 4000	EURO 4	MSV 70
E64/630i	N52B30	190/258 6600	300 2500 - 4000	EURO 4	MSV 70
E90/330i	N52B30	190/258 6600	300 2500 - 4000	EURO 4	MSV 70
E65MU/730i	N52B30	190/258 6600	300 2500 - 4000	EURO 4	MSV 70

N62TU engine

The N62 engine is replaced by the N62TU engine. The N62TU engine features changes from its predecessor in the following areas:

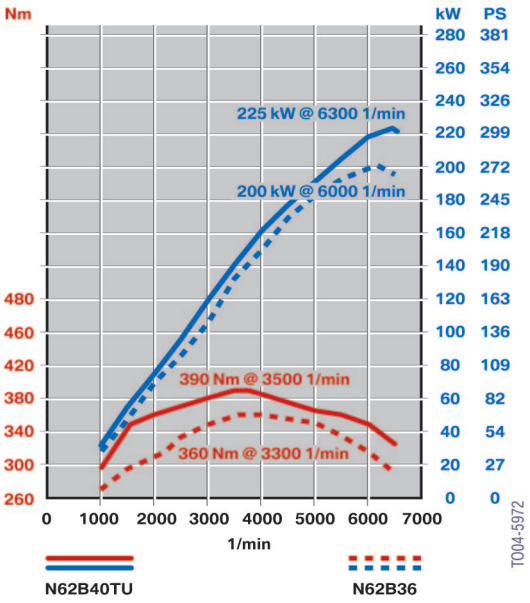
- Air intake duct
- Differentiated intake system (DISA)
- Crankshaft
- Oil dipstick
- Oil pump
- Inlet and exhaust valves
- Spark plugs
- DME 9.2.2

The secondary-air system is only used in the US market.

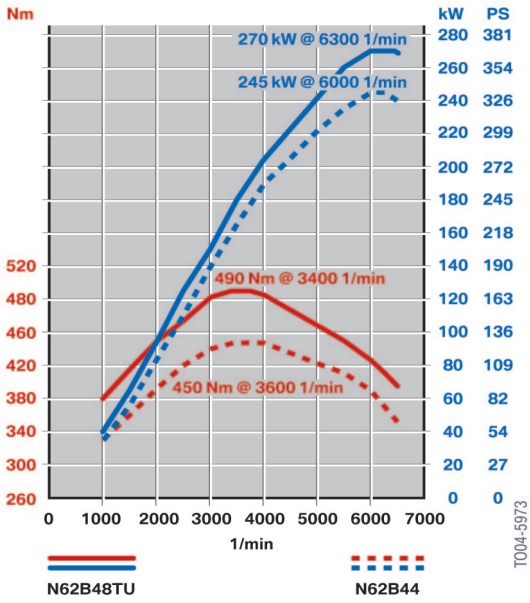
Technical data/history

The N62 engine is used in the following model series:

Series/ Model	Engine	kW/bhp at rpm	Nm at rpm	Exhaust emission stage	Engine management
E65/ 735i	N62B36	200/272 6200	360 3700	EURO 4 LEV II	ME 9.2 + VALVETRONIC ECU
E65/ 745i	N62B44	245/333 6100	450 3600	EURO 4 LEV II	ME 9.2 + VALVETRONIC ECU
E60/ 545i	N62B44	245/333 6100	450 3600	EURO 4 ULEV II	ME 9.2.1 + VALVETRONIC ECU
E63/ 645i	N62B44	245/333 6100	450 3600	EURO 4 ULEV II	ME 9.2.1 + VALVETRONIC ECU
E64/ 645Ci	N62B44	245/333 6100	450 3600	EURO 4 ULEV II	ME 9.2.1 + VALVETRONIC ECU
E53/ X5 4.4i	N62B44	235/320 6100	440 3700	EURO 4 LEV II	ME 9.2.1 + VALVETRONIC ECU
E53/ X5 4.8i	N62B48TU	265/360 6200	490 3400	EURO 3 LEV/MDV	ME 9.2. + VALVETRONIC ECU
E65MU/ 740i	N62B40TU	225/306 6300	390 3500	EURO 4 ULEV II	ME 9.2.2 + VALVETRONIC ECU
E65MU/ 750i	N62B48TU	270/367 6300	490 3400	EURO 4 ULEV II	ME 9.2.2 + VALVETRONIC ECU



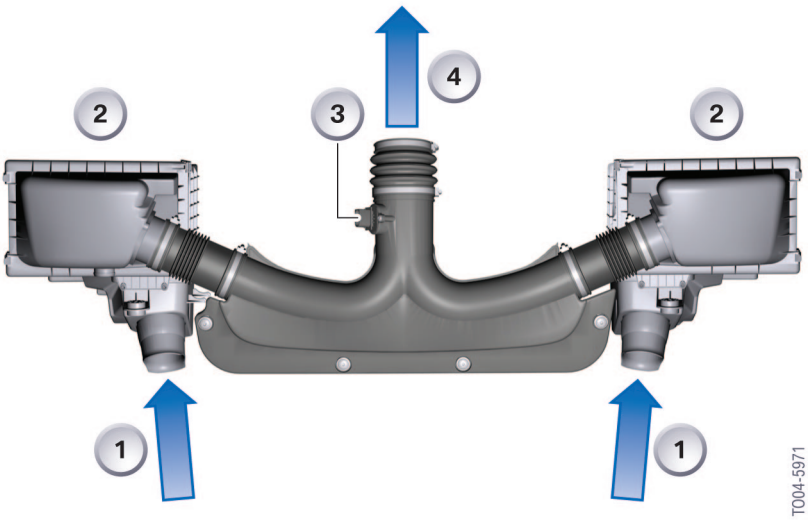
2 - N62B40TU full-load diagram



3 - N62B48TU full-load diagram

Air intake duct

The N62B48TU engine has a greater displacement and thus a higher air throughput rate than the N62B40TU engine. A larger, two-channel air intake duct is therefore used in the N62B48TU engine. The N62B40TU engine retains the single-channel air intake duct with an air filter.

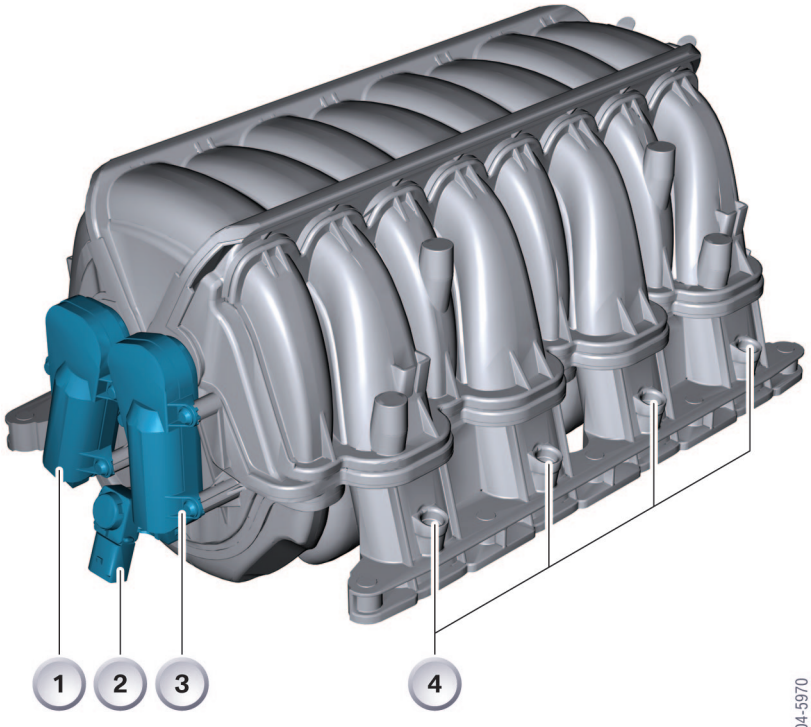


4 - N62B48TU air intake duct

Index	Explanation	Index	Explanation
1	Raw air intake	3	Hot-film air-mass meter (HFM)
2	Intake silencer	4	Clean air flow to intake system

Differentiated intake system (DISA)

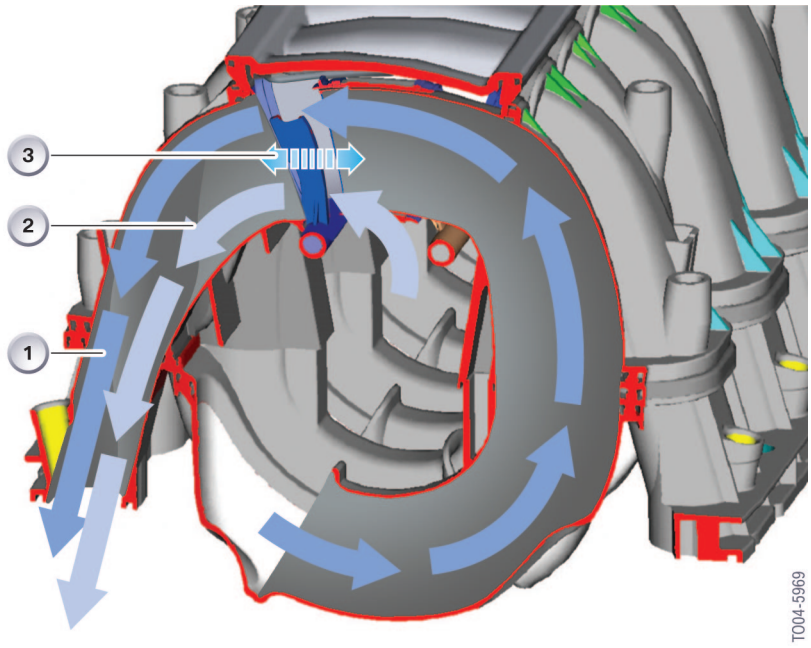
The previous fully variable intake system (DISA) is no longer used in the N62B40TU and N62B48TU engines. A two-stage intake system (DISA) is used instead.



5 - Differentiated intake system (DISA)

Index	Explanation	Index	Explanation
1	Servomotor, cylinder bank 1	3	Servomotor, cylinder bank 2
2	Differential pressure sensor	4	Bores for fuel injectors

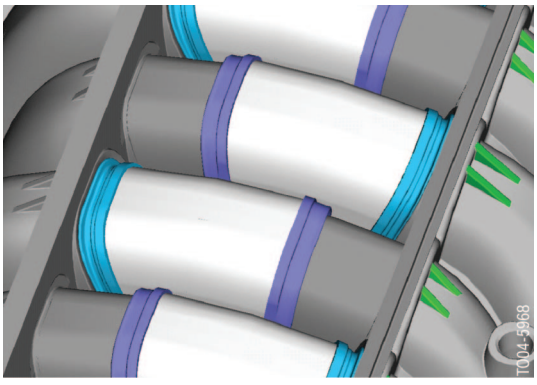
Functional principle



6 - Sectional view of intake system. The intake passages are shown by arrows.

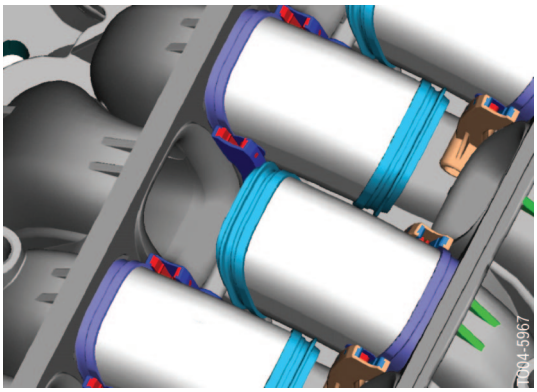
Index	Explanation	Index	Explanation
1	Long intake passage	3	Direction of movement of sliding sleeves
2	Short intake passage		

In the intake system a sliding sleeve (3) is located at the intake manifold for each cylinder. The displacement of the sleeves determines whether the intake passage is long (1) or short (2).



7 - Sliding sleeves closed = torque setting

At idle a long intake passage is set (torque setting).



8 - Sliding sleeves open = power setting

From 4700 rpm (N62B48TU) or 4800 rpm (N62B40TU) the sleeves are pushed back and a short intake passage is thereby set (power setting). When there is no flow, the sliding sleeves remain in their respective position.

Varying the intake passages controls the pressure wave in the intake manifold in such a way as to produce a boost effect in the high rpm range.

The sliding sleeves are driven by a servomotor assigned to each cylinder bank. The two

servomotors together with the differential pressure sensor form a single component.

The 12V servomotors are actuated by the DDE via a PWM signal. While the sliding sleeves are open (power setting), the servomotors are actuated with a 5 % PWM signal in order to hold the sleeves in their open position. The servomotors do not have position feedback. The sleeves can be inspected visually through the throttle valve opening. The sleeves are opened and closed once when the ignition is turned on. This prevents the sleeves from seizing during extended operation in the torque setting.

The bores for the fuel injectors and the connections for crankcase and tank ventilation are located on the intake system (DISA). The intake system is made of glass-fibre-reinforced plastic.

Crankshaft

The N62B40TU engine has a cast crankshaft; due to the increased demands, the N62B48TU engine has a steel crankshaft. In the interests of reducing power loss (oil churning losses in the crankcase), the crankpin width has been reduced from 42 mm to 36 mm. The connecting rods are adapted accordingly.

Oil pump

The geometry of the oil pump is vehicle-specifically adapted. Oil churning losses in the crankcase are further reduced by the modified design of the oil deflector.

Oil dipstick

The E65 Facelift model series is equipped with an electronic oil level display. The dipstick has a modified handle in black.

This eliminates the need for the customer to check the engine oil level twice.

Inlet and exhaust valves

The stem diameter has been reduced from 6 mm to 5 mm. The moving masses reduced in this way result in a higher maximum number of revs.

Spark plugs

The previous surface-gap spark plugs with 2 ground electrodes have been replaced by spark plugs with the spark position brought forward and a hook electrode.

This enables better ignition of the fuel/air mixture. In the new spark plugs the centre electrode is made of platinum (replacement interval: every 100,000 km).

Digital Motor Electronics DME

The N62TU engine is equipped with the Digital Motor Electronics (DME) ME 9.2.2. The functions of the ME 9.2.2 are already known from the previous ME 9.2 of the N62 engine.

The pin assignment of the ME 9.2.2 has not changed in relation to the ME 9.2.1. An ME 9.2.2 control unit and a VALVETRONIC control unit are used to run the N62.

The following changes have been made:

- New processor (Green Oak type, clock frequency 56 MHz)
- Lambda oxygen sensor LSU 4.9
- Hot-film air-mass meter HFM 6
- Software for electronic oil level measurement.

Lambda oxygen sensor

An LSU 4.9 oxygen sensor is used as the control sensor for each cylinder bank. Compared with the LSU 4.2 oxygen sensor previously used, the LSU 4.9 oxygen sensor reaches operational readiness twice as fast. Full operational readiness is reached after 10 seconds (LSU 4.2 = 20 seconds). This rapid starting capability is made possible by the use of a smaller ceramic element. The outer dimensions of the oxygen sensor remain unchanged.

The previous opening for the supply of ambient air (reference air measurement) has been dispensed with. The new sensor differs from the LSU 4.2 in that a porous layer permeable by air is used instead of a reference air channel. The function stays the same. The ambient air is directed to the measuring element via the connecting cable.

Hot-film air-mass meter (HFM)

The HFM 6.4 is used in the N62TU engine. The HFM 6.4 was fitted for the first time in the M57TU engine (E65 model series).

The sensor signal is already digitized in the HFM 6.4. The digitized signal is sent to the DDE.

M57D30TU2 engine

The M57D30TU2 engine developed from the M57D30TU1 EURO 4 is used in the E65MU. This engine is characterized by significantly reduced weight and increased power with simultaneously reduced fuel consumption.

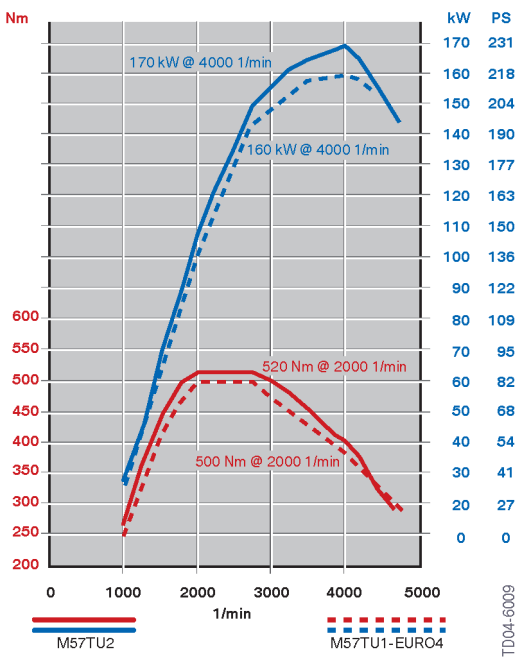
The engine has been changed from the M57D30TU1 EURO 4 in the following respects:

- DDE 626
- Step 3 type exhaust turbocharger
- PIEZO injectors
- Fitted camshafts
- Aluminium crankcase
- A/C drive without tensioning pulley.

Many of the new features have also been introduced in the M67TU engine and are described in detail in the relevant Participant's Manual.

Technical data/history

The redesign of the M57TU engine gives it a more ample torque curve over the entire rpm range and increased rated power.



9 - M57TU1 and M57TU2 full-load diagram

The M57D30 engine from TU1 is used in the following model series:

Series/ Model	Engine	kW/bhp at rpm	Nm at rpm	Exhaust emission stage	Engine management
E46/ 330d	M57D30TU1	150/204 4000	410 1500-3250	EURO 3	DDE 5.0
E46/ 330d	M57D30TU1	150/204 4000	410 1500-3250	EURO 4	DDE 506
E83/ X3 3.0d	M57D30TU1	150/204 4000	410 1500-3250	EURO 3	DDE 506
E53/ X5 3.0d	M57D30TU1	160/218 4000	500 2000-2750	EURO 3	DDE 506
E65/ 730d	M57D30TU1	160/218 4000	500 2000-2750	EURO 3	DDE 506
E60/ 530d	M57D30TU1	160/218 4000	500 2000-2750	EURO 3	DDE 508
E60/ 530d	M57D30TU1 EURO 4	160/218 4000	500 2000-2750	EURO 4	DDE 509
E60/ 535d	M57D30TU1 TOP	200/272 4400	560 2000-2250	EURO 4	DDE 606
E65MU/ 730d	M57D30TU2	170/231 4000	520 2000-2750	EURO 4	DDE 626

Digital Diesel Electronics (DDE)

DDE 626 is used, offering additional functions for PIEZO injectors and electronic oil level measurement.

Exhaust turbocharger

The turbocharger belongs to the third development stage - Step 3 type. It features electrical adjustment of the guide vanes.

Efficiency is further improved through optimization of the thermodynamics and the electric actuator.

Fuel injectors

The M57TU2 is now equipped with PIEZO injectors instead of SV injectors. Because of their fast needle movements and short switching times, PIEZO injectors are ideally suited for multiple injections. They are also lighter and more compact and have a low power demand. In all, they improve fuel consumption, pollutant emissions and acoustics.

Their function and design are described in detail in the M67TU.

Cylinder head

The valve diameters have been increased and the intake ducts adapted accordingly.

Camshaft

Fitted camshafts are now used, as is already the case in the M57D25TU1 engine. These camshaft offer advantages with regard to weight and manufacturing possibilities. Here recourse is had to the construction kit and the identical part from the M57D25TU1 engine is used.

Fitted means that the individual parts are manufactured separately and then installed together. The procedure is the same as that for the M67TU and is described in closer detail there.

Crankcase

The crankcase is manufactured from a chilled aluminium casting and has thermally joined cast iron bushes. This reduces the weight by 20 kg. The main bearing caps are made of sintered metal. A moulding on the contact surface to the crankcase enables significantly higher transverse forces to be transmitted. The bearing cap is thereby also precision-positioned in the longitudinal and transversal directions.

Oil level measurement

The E65MU is equipped with an electronic oil level display. The oil dipstick has an inconspicuous black handle because it is only intended for Service.

Belt drive

The A/C drive has an elasti-belt, thus eliminating the need for a tensioning pulley.

Transmission

Automatic transmissions

The GA6HP19/26/32Z automatic transmissions have been optimized for all the model series in the following respects:

- New linings on the shift clutches
- Use of new fine filters in the hydraulic system
- Newly designed converter connection

The newly designed transmission control unit GS 19.11 is used for the automatic transmissions. Compared to its predecessor (GS 19.04) it offers the following advantages:

- New processor with higher computing capacity and flash memory expanded from 512 KB to 1 MB
- Designed to withstand higher temperatures
- Electromagnetic compatibility considerably improved
- Reserve for further functions
- Optimization of shift quality, shifting time and hysteresis tuning.

The control unit is located on the mechatronics module in the transmission. The housing and the pin assignments have not been changed.

Rear differential

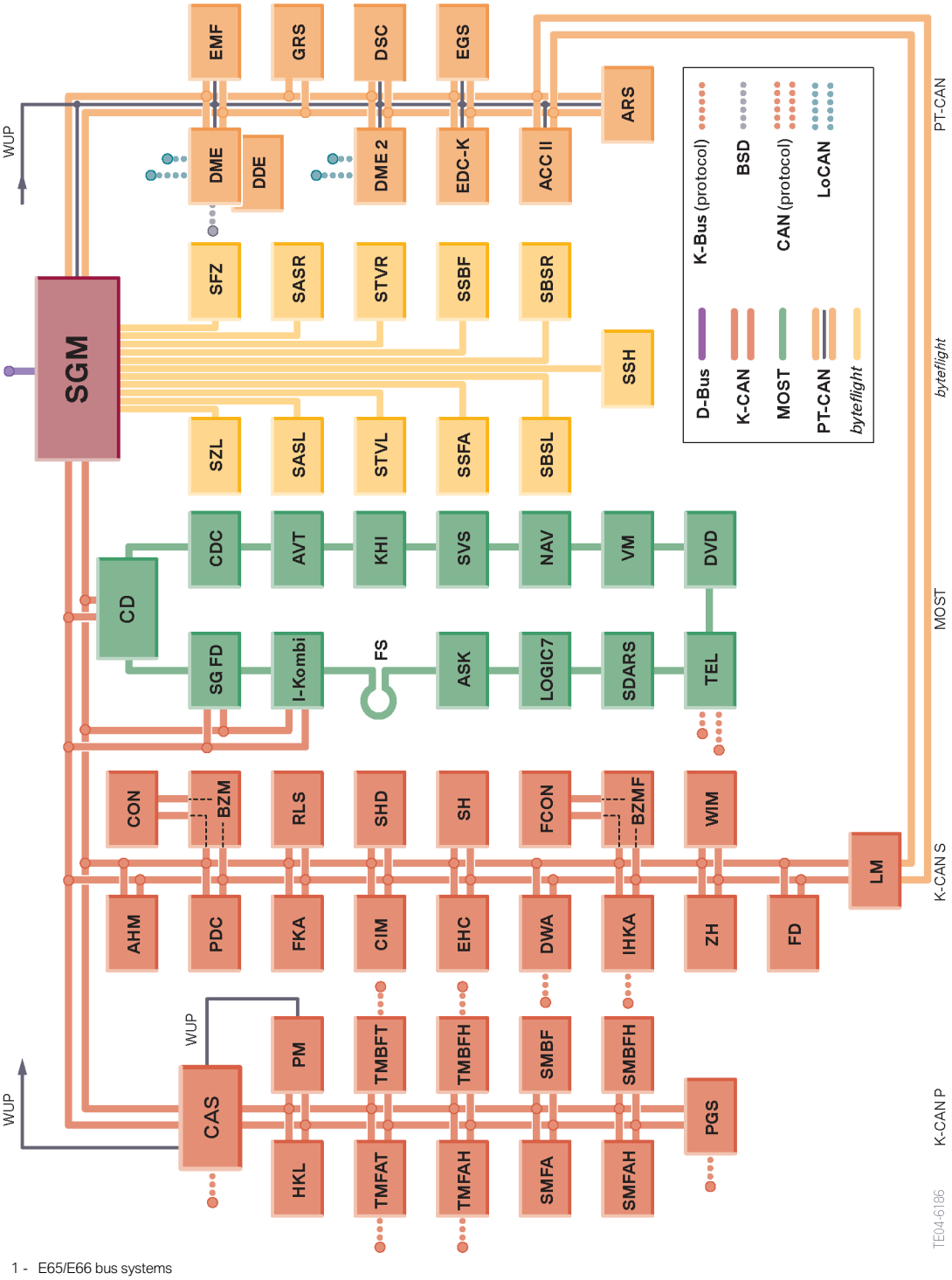
The gear ratio of the rear differential has been adapted to the modified engine variants:

- N52B30 engine: differential 215 K (i = 4.10)
- M67TU engine: differential 230 K (i = 2.92).

Contents
E65/E66MU bus overview

System overview
E65/E66MU bus overview

Bus overview



1 - E65/E66 bus systems

Index	Explanation	Index	Explanation
WUP	Wake-up line	DVD	Digital Versatile Disc
CAS	Car Access System	VM	Video Module
HKL	Boot lid lift	NAV	Navigation system
TMFAT	Door module, driver's side	SVS	Voice recognition system
TMFAH	Door module, driver's side, rear	KHI	Headphones interface
SMFA	Seat module, driver	AVT	Aerial amplifier
SMFAH	Seat module, driver's side, rear	CDC	Compact Disc Changer
PGS	Passive-Go control unit	SGM	Safety and Gateway Module
SMBFH	Seat module, passenger side, rear	SZL	Steering column switch cluster
SMBF	Seat module, passenger	SASL	A-pillar satellite, left
TMBFH	Door module, passenger side, rear	STVL	Door satellite, front left
TMBFT	Door module, passenger door	SSFA	Driver's seat satellite
PM	Power Module	SBSL	B-pillar satellite, left
AHM	Trailer module	SSH	Rear seat satellite
PDC	Park distance control	SBSR	B-pillar satellite, right
FKA	Rear-compartment air conditioning	SSBF	Passenger seat satellite
CIM	Chassis Integration Module	STVR	Door satellite, front right
EHC	Electronic ride-height control	SASR	A-pillar satellite, right
DWA	Anti-theft alarm system	SFZ	Satellite, vehicle centre
IHKA	Integrated automatic heater and climate control	DME	Digital Motor Electronics
ZH	Auxiliary heater	DDE	Digital Diesel Electronics
FD	Rear-compartment display	DME2	Digital Motor Electronics 2
LM	Light Module	EDC-K	Continuous Electronic Damper Control
WIM	Wiper module	ACC II	Active Cruise Control II
BZMF	Switch cluster, centre armrest, rear	ARS	Dynamic Drive
FCON	Rear-compartment controller	EGS	Electronic transmission control
SH	Independent heating	DSC	Dynamic Stability Control
SHD	Slide/tilt sunroof	GRS	Yaw rate sensor
RLS	Rain and Light Sensor	EMF	Parking brake
BZM	Centre console switch cluster	D-Bus	Diagnosis bus
CON	Controller	K-CAN P	Body CAN peripherals
CD	Control Display	K-CAN S	Body CAN system
SG FD	Control unit, rear-compartment display	MOST	Media Oriented System Transport
I-KOMBI	Instrument cluster	***byteflight***	***byteflight***
FS	Flash connector	PT-CAN	Powertrain CAN
ASK	Audio system controller	K-Bus	Body bus (protocol)

Index	Explanation	Index	Explanation
LOGIC7	Top-HiFi amplifier	BSD	Bit-serial data interface
SDARS	Satellite radio	CAN	CAN (protocol)
TEL	Telephone	LoCAN	Local Controller Area Network

Vehicle electrical system changes

Changes in the E65/E66 bus diagram in 03/2005

Adaptive directional headlights and light module

When adaptive directional headlights were introduced, it was necessary to connect the AHL control unit to the PT-CAN.
The AHL control unit will be dispensed with in 03/2005 because this function is to be taken over by the LM light module. The light module receives the information from the PT-CAN (yaw rate, road speed and steering angle) via a direct PT-CAN connection.

The LM light module has a direct connection to the PT-CAN only in cars with the Adaptive direction headlights option.

ZH auxiliary heater

When diesel engines were introduced, it was necessary to extend the system to include a ZH auxiliary heater control unit.

MOST

The KHI headphones interface KHI and LOGIC7 control units have changed places in the MOST ring.

VM

The new Hybrid video module or Hybrid Drive video module is used in the EU version. The designation VM Video Module is now the generic term for all video modules:

- Hybrid video module (CVBS)
- Hybrid Drive video module (CVBS/RGB)
- Video module 5 (RGB)
- Drive video module 5 (CVBS).

PT-CAN

Active Cruise Control II ACC II is used instead of Active Cruise Control ACC.

Changes in the E65/E66 bus diagram since 03/2004

There have already been some changes in the bus structure on account of the changes in the ISIS in 03/2004.

These changes in particular are:

K-CAN S

Dropping of the RDC control unit (tyre pressure control) because this function is taken over by the Run Flat Indicator software in the DSC. In the E67 the RDC continues to be used as a control unit because of the PAX tyres.

Dropping of the KHA module (headphones connection) as a control unit on the K-CAN. The jacks of the headphone connections for rear-compartment entertainment are connected directly to the KHI (headphones interface).

MOST

Extension of the MOST rings to include the SDARS control unit (Satellite Digital Audio Radio Services) because this system is used in US vehicles in 03/2004.

byteflight

The satellites are connected directly to the SGM (Safety and Gateway Module) through integration of the SIM in the gateway module. The star structure of the ***byteflight*** has been retained. The SGM serves as the gateway for the entire bus systems.

PT-CAN

The PT-CAN has been extended to include the following systems:

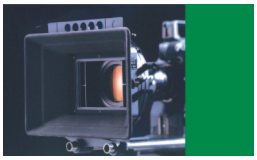
DDE (Digital Diesel Electronics)

Use of the DDE on the PT-CAN was deemed necessary when diesel engines were introduced. The LoCAN engine bus is not required at the DDE control unit (no VVT).

DME2 (Digital Motor Electronics)

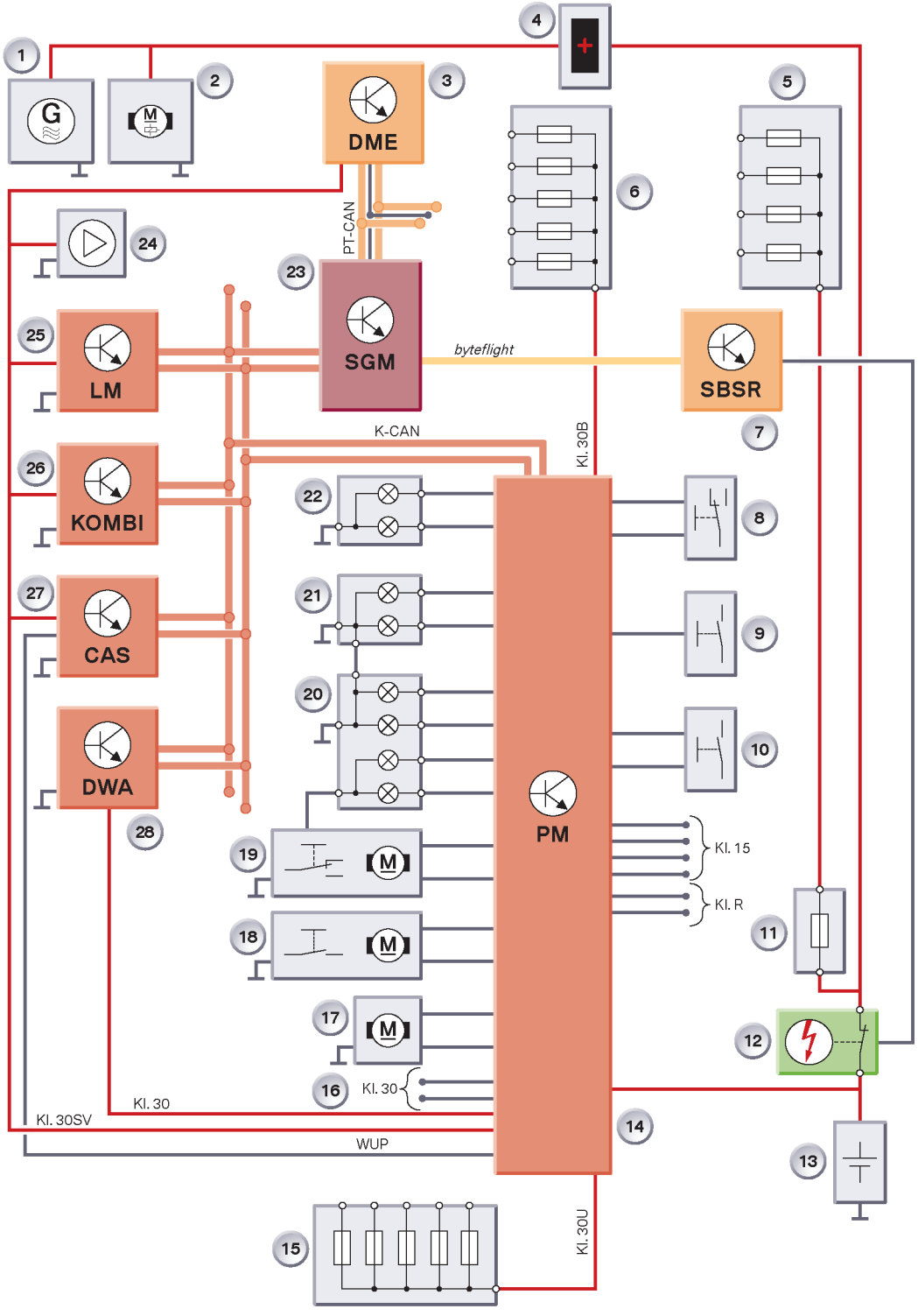
A second DME control unit on the PT-CAN was deemed necessary when the 12-cylinder engine was introduced in the 760i/iL.

Contents
E65/E66MU energy management



System overview
Energy management E65/E66MU

System circuit diagram



1 - System circuit diagram of the power supply in the E65/E66

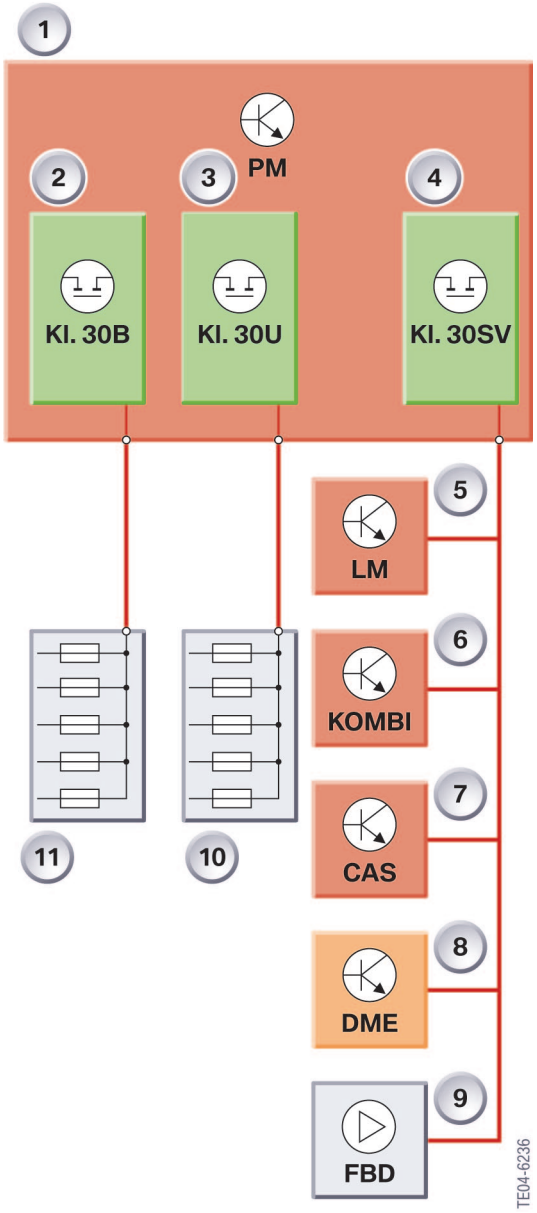
Index	Description
1	Alternator
2	Starter
3	Digital Motor Electronics DME
4	Jump start terminal point
5	Fuse box, engine compartment
6	Power distribution box, front
7	B-pillar satellite, right
8	Battery switch
9	Interior lights button
10	Boot lid button
11	Fuse (250 A)
12	Safety battery terminal
13	Battery
14	Power module
15	Power distribution box, rear
16	Terminal 30 for emergency siren and infrared remote control
17	Central locking of fuel tank flap
18	Central locking of boot lid
19	Soft Close Automatic
20	Load/consumer deactivation, body (VA_K)
21	Load/consumer deactivation, roof, front and rear (VA_D)
22	Interior lights (IB)
23	Safety and Gateway Module SGM
24	Remote control receiver FBD
25	Light Module LM
26	Instrument cluster
27	Car Access System CAS
28	Anti-theft alarm system DWA
PT-CAN	Power Train Controller Area Network
K-CAN	Body Controller Area Network
byteflight	***byteflight***
Kl. 30B	Continuous positive
Kl. 30Ug	Continuous positive
Kl. 30SV	Terminal 30 Special loads/consumers
Kl. R	Terminal R
Kl. 15	Terminal 15
WUP	Wake-up line

Functions
Energy management E65/E66MU

Changes in energy management

The CAS and DME control units are no longer powered by separate outputs on the power module. These control units are combined together with the light module, the instrument cluster and the remote control receiver on a common connection.

This output is known as Terminal 30 Special loads/consumers (Kl. 30SV). This terminal can be switched by means of a hardware alteration in the power module.



Index	Explanation
1	Power module
2	Terminal 30B
3	Terminal 30U
4	Terminal 30SV (Special loads/ consumers)
5	Light Module LM
6	Instrument cluster
7	Car Access System CAS
8	Digital Motor Electronics DME
9	Remote control receiver
10	Power distribution box, rear
11	Power distribution box, front

1 - Terminal 30SV in the power module

New deactivation strategy

In the previous concept of power module deactivation, only the path of terminal 30 loads/consumers (term. 30B and term. 30U) was de-energized in the event of a closed-circuit current fault. Only the current at term. 30U and term. 30B was evaluated to detect this fault.

What is new is that terminal 30SV can now also be switched. However current measurement is not possible at terminal 30SV. Increased closed-circuit current consumption is detected indirectly by monitoring bus communication on the K-CAN.

If bus communication is present without reason, terminal 30SV is briefly disconnected from the power supply.

In this way it is possible to rectify possible problems caused by faulty software because the control units should switch back into sleep mode properly after the restart. The information on a problem however is stored in the power module and the workshop can search for a fault in the affected control units at terminal 30SV.

Disconnection of term. 30SV is performed only if term. 30B and term. 30U were already disconnected beforehand or at the same time and if none of the light functions (parking lights, hazard warning system) is switched on.

⚠ The Digital Diesel Electronics DDE continues to be powered via the distribution box in the engine compartment. ◄

Deactivation strategy in event of excessive closed-circuit current

1. Reset of terminal 30U and terminal 30B in event of violation of the closed-circuit current threshold (as previously)
2. Disconnection of terminal 30U and terminal 30B in event of renewed violation of the closed-circuit current threshold (as previously)
3. Reset of terminal 30SV for 10 seconds (new) if the bus users on the K-CAN (PM, CAS, LM, instrument cluster, DWA) have not gone to sleep within 5 minutes of terminals 30U and 30B being disconnected.

The "Term. 30SV reset" procedure is carried out only once within a closed-circuit current monitoring phase as this action causes the entire vehicle electrical system to be cut in (high current consumption).

Deactivation strategy in event of too many wake-up operations

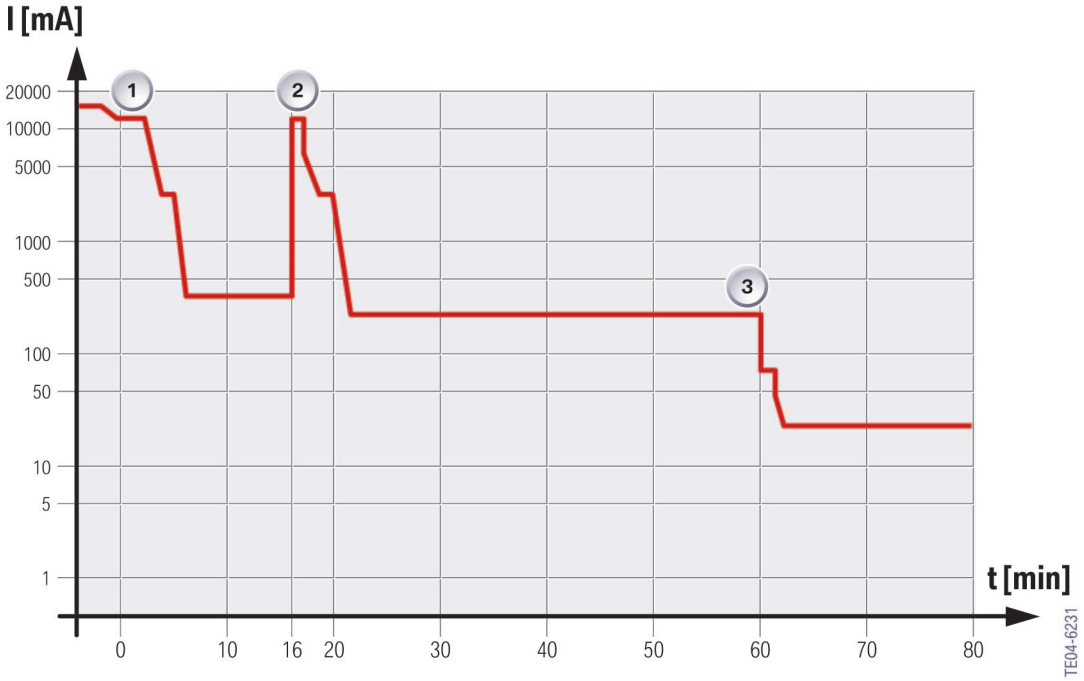
1. Disconnection of terminal 30U and terminal 30B if the wake-up counter threshold is reached, currently 30 wake-up operations
2. Reset of terminal 30SV for 10 seconds (new) if the bus users on the K-CAN (PM, CAS, LM, instrument cluster, DWA) have not gone to sleep within 5 minutes of terminals 30U and 30B being disconnected.

⚠ The connected control units are not operational during the period when term. 30SV is deactivated. The car cannot be unlocked with the remote control during this phase.

It is still possible to open the car door with the mechanical key, but this results in an alarm being triggered if a movement in the passenger compartment is detected as the anti-theft alarm system is still armed and responds as if for example a window has been broken. The anti-theft alarm system is deactivated by inserting the ID sensor in the CAS slot, whereby disarming is signalled to the anti-theft alarm system if the vehicle electrical system is activated. ◄

⚠ The instrument cluster retains the data on account of the brief disconnection (10 seconds). Only the clock is slow by the corresponding time. ◄

Normal sleep procedure without closed-circuit current violation



2 - Sleep procedure without closed-circuit current violation

In a "normal" car sleep procedure, the CAN bus goes to sleep a few minutes after "terminal R OFF". After 16 minutes the PM sends the signal to deactivate the loads/ consumers and the bus is woken up briefly in the process. The "VA_Roof" driver is deactivated and the CAN bus goes to sleep again. After 60 minutes have elapsed (codable value if no telephone/EGS logs in as a load/ consumer in stationary mode 16 minutes) the "VA_Body" driver is also deactivated, by means of which a current of approx. 200 mA for relay activation for VA_K is likewise omitted. The power module then goes into closed-circuit current monitoring mode.

Detection of a closed-circuit current violation

During closed-circuit current monitoring the power module measures the voltage value every 5 seconds and the current value every 60 seconds. The power module goes into increased closed-circuit monitoring mode in the event of a closed-circuit current violation (I > 80 mA). Here the power module determines the present current value every 1.5 seconds over a waiting period of 8 minutes. During this period the vehicle electrical system is given the opportunity to accept a normal closed-circuit current again. If during the 8 minutes a current is detected which is below the closed-circuit current threshold of 80 mA for longer than one minute, the waiting period is started again and the power module goes into closed-circuit current monitoring mode again.

If the closed-circuit current violation persists after the waiting period has elapsed, the shutdown counter is started (90 seconds). Then a general reset is performed. General reset means that all loads/consumers supplied by the power module with the exception of terminal 30SV and the anti-theft alarm system are disconnected from the battery for 30 seconds. Then the closed-circuit current is monitored for a further 8 minutes. If the closed-circuit current violation persists, the shutdown counter is started again (90 seconds). Then all the loads/consumers are deactivated (with the exception of terminal 30SV and the anti-theft alarm system).

If a further closed-circuit current violation is indirectly determined via bus activity over a time period of 5 minutes, a one-off reset of terminal 30SV is performed for 10 seconds.

Example: Sleep behaviour with closed-circuit current violation

3 - Sleep behaviour with closed-circuit current violation

Index	Explanation
1	Terminal R "OFF"
2	After 16 minutes the PM sends the signal to deactivate the loads/consumers and the bus is woken up briefly in the process. The "VA_Roof" driver is deactivated and the CAN bus goes to sleep again.
3	After 60 minutes have elapsed (codable value if no telephone fitted 16 minutes) the "VA_Body" driver is also deactivated. The power module then goes into closed-circuit current monitoring mode.
4	Closed-circuit current violation with 500 mA The current violation at the end of the waiting period of 8 minutes persists.
5	Entry in the fault memory with the associated current value. The CAN bus is woken up and the shutdown counter started for 90 seconds. A general reset is performed for 30 seconds when the shutdown counter expires. Simply the terminal 30SV driver and the power supply for the anti-theft alarm system are not disconnected.
6	The current violation at the end of the second waiting period of 8 minutes persists. The CAN bus is woken up again and the shutdown counter started again for 90 seconds.
7	Term. 30U, term. 30B and all other drivers are disconnected from the battery when the shutdown counter expires. Sole exception: term. 30SV and the power supply for the anti-theft alarm system are not disconnected.
8	One or more control units (LM, instrument cluster, CAS, DME) is/are active for longer than 5 minutes.
9	Reset of terminal 30SV for 10 seconds (if no light function is active).
10	Normal sleep procedure.

Measures for maintaining battery starting capability (SoC)

Electric loads/consumers in stationary mode

Certain loads/consumers may be active even when closed-circuit current monitoring of the power module is already running. This is necessary for various reasons:

- Legally required electric loads, e.g. parking lights, hazard warning system
- Convenience for the customer, e.g. radio function, telephone

These loads/consumers must be excluded from the closed-circuit monitoring system in order to avoid misinterpretation in the power module. For this purpose, these loads/consumers must log in with the power module. In turn, the power module recognizes the activity and accepts the higher power consumption. When these systems are deactivated, the corresponding control units log off from the power module.

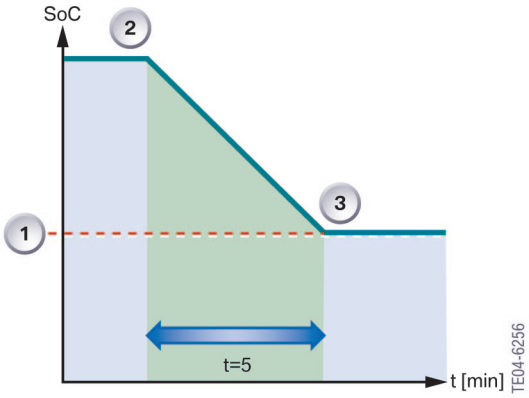
Disconnection of term. 30

In the previous concept of power module deactivation, terminal 30 (term. 30U and term. 30B) was not disconnected in the case of a car **without** a closed-circuit current violation. A slow drop in the capacity of the car battery (SoC = state of charge) below the starting capability limit without a discernible reason was possible and this effect was counteracted by no action of the power module.

The following function is new:

When loads/consumers are logged off, a codable waiting time (currently 5 minutes) ensues from the point "terminal R OFF". Term. 30U and term. 30B are disconnected from the battery when the state of charge drops below the starting capability limit.

This disconnection is not preceded by a "general reset".



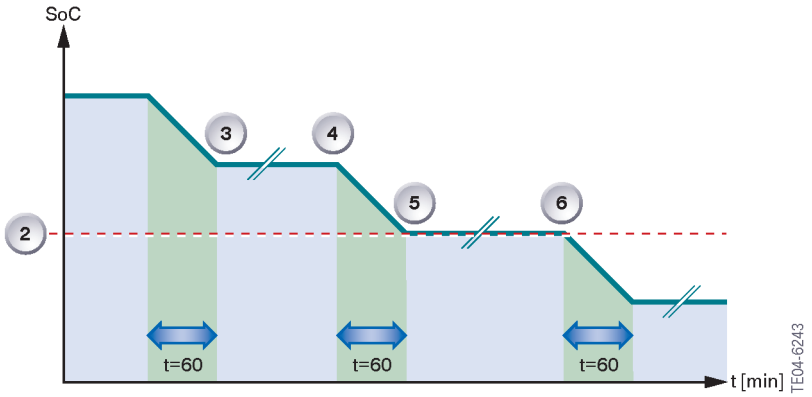
4 - Disconnection of term. 30U and term. 30B.

Index	Explanation
1	Starting capability limit
2	Terminal R "OFF"
3	Disconnection of term. 30U and term. 30B

Shortening of run-on time

In the previous concept of power module deactivation in a car with a closed-circuit current fault, a further battery disconnection on account of a closed-circuit current violation takes place only after a run-on time of 60 minutes (16 minutes).

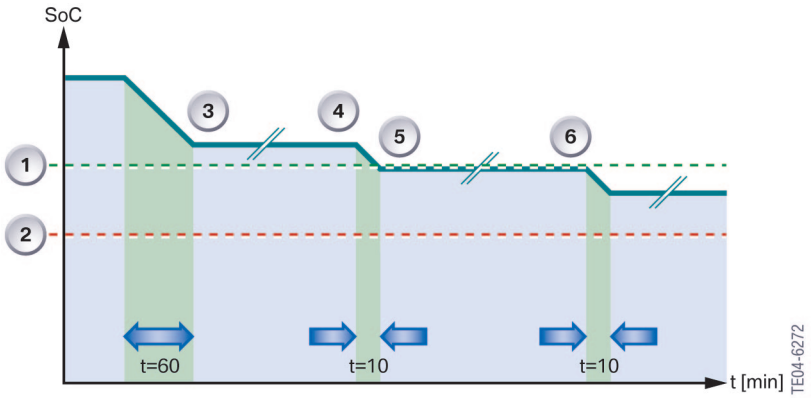
As a result of this long run-on time the state of battery charge could drop far below the value of the starting capability limit without an intervention by the power module.



5 - State of battery charge drops below the starting capability limit

The improvement of the new deactivation strategy becomes apparent with a renewed activation of the loads/consumers (by a terminal change or unlocking of the car) in the event of a previously ascertained closed-circuit current violation or an extended starting capability limit which has already been reached.

In this case, closed-circuit current monitoring already begins after 2 minutes (normally 60 minutes). Together with the fixed waiting period of 8 minutes, it would therefore take a maximum of 10 minutes until the shutdown counter is started.



6 - State of battery charge does not drop below the starting capability limit

Index	Explanation
1	Extended starting capability limit
2	Starting capability limit
3	1st deactivation by power module
4	Change of terminal status or unlocking by remote control
5	2nd deactivation by power module
6	Change of terminal status or unlocking by remote control

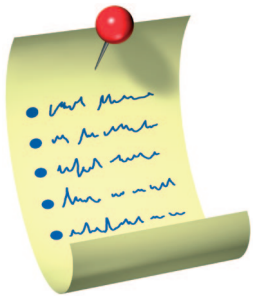
The entire function of the shortened deactivation is codable. The shortened run-on time is reset again as soon as the power module has registered an "engine running" status once.

Summary
E65MU energy management

Points to remember

The most important facts relating to BMW 7 Series energy management are summarized in the following table.

This list outlines the main points in concise form and provides the opportunity of rechecking the most important facts provided in this Participant's Manual.



Points to remember for everyday theoretical and practical applications.

	Terminal 30SV
	CAS, DME, instrument cluster, LM and FBD are powered via a common output on the power module --> Terminal 30 Special loads/consumers (term. 30SV)
	Properties of terminals
Term. 30U and term. 30B	Closed-circuit-current-monitored, brief disconnection (reset) and permanent deactivation are possible
Term. 30SV	Bus-monitored, one-off, brief disconnection (reset) possible (approx. 10 seconds)
	Shortening of run-on time
	The run-on time of the terminals has been reduced in the event of a previously ascertained closed-circuit current violation from 60 minutes to 10 minutes.

Contents
E65/E66MU exterior lights

System overview
E65/E66MU exterior lights

System circuit diagram

Since the system circuit diagram for the exterior lights is very complex, the fold-out page has been chosen as the means of representation.

You will find the fold-out page at the end of this Participant's Manual.

Index	Explanation	Index	Explanation
1	Additional direction indicator, left	27	Safety and gateway module SGM
2	Direction indicator, front left	28	Trailer module AHM
3	Stepping motors	29	Power module PM
4	Parking light, left	30	Rain/light sensor RLS
5	High beam shutter, left	31	Comfort Access CA
6	Bi-xenon high beam/low beam headlight, left	32	Ride-height sensor, rear
7	High beam light, left	33	Direction indicator, rear right
8	Front fog light, left	34	Tail light, right 1
9	Stepping motor controller SMC for adaptive directional headlight, left	35	Brake light, right
10	Control unit for bi-xenon high beam headlight, left	36	Rear fog light, right/brake force display, right
11	Front fog light, right	37	Tail light, right 2
12	High beam light, right	38	Reversing light, right
13	Bi-xenon high beam/low beam headlight, right	39	Licence plate light, right
14	High beam shutter, right	40	Raised brake light
15	Parking light, right	41	Number plate light, left
16	Stepping motors	42	Reversing light, left
17	Direction indicator, front right	43	Tail light, left 2
18	Stepping motor controller SMC for adaptive directional headlight, right	44	Rear fog light, left/brake force display, left
19	Control unit for bi-xenon headlight, left	45	Brake light, left
20	Additional direction indicator, right	46	Tail light, left 1
21	Dynamic Stability Control DSC	47	Direction indicator, rear left
22	Digital Motor Electronics DME/ Digital Diesel Electronics DDE	48	Hazard warning switch
23	Brake light switch BLS	49	Light module LM
24	Car access system 2 CAS 2	50	Light switch
25	Steering column switch, high beam/ direction indicator lights	51	Ride-height sensor, front
26	Steering column switch cluster (SZL)		

System components
E65/E66MU exterior lights

Involved components

The following system components are installed for the exterior lighting:

- Control units
  - Light module
  - Power module
  - Stepping motor controller
  - Control unit for bi-xenon headlight
- Headlights (with parking lights/low beam/ high beam and direction indicators)
- Fog lights
- Front additional direction indicators
- Rear light cluster
  - Tail light
  - Brake light
  - Rear fog light
  - Reversing light
  - Direction indicator
  - Raised brake light
- Lights operating unit
- Steering column switch cluster
  - Steering column switch, high beam/ headlight flasher
  - Steering column switch, direction indicator lights
- Sensors.

Control units

Light module

The LM light module contains the complete functions for controlling the exterior lights. Cars with adaptive directional headlights no longer have a separate AHL control unit. The functions of the AHL control unit are integrated in the LM. The housing and the plug coding of the LM are not changed. The LM receives the information from the PT-CAN (yaw rate, road speed and steering angle) for controlling the adaptive directional headlights via its own PT-CAN connection.

Power module

The power module provides the power for the light module (special loads/consumers terminal).

SMC

The stepping motor controller is located on the side on the bi-xenon headlight.

The stepped motor controller controls and monitors the movement of the stepping motors of the adaptive directional headlight and headlight vertical aim control.

Bi-xenon control unit

The bi-xenon control unit is mounted on the bi-xenon headlight. It provides the voltage supply and ignition voltage for the bi-xenon lamp.

Headlights

The E65/E66 has new headlights. The headlights have a new contour line and a completely new internal design. Front direction indicators are only available in white on a worldwide basis.

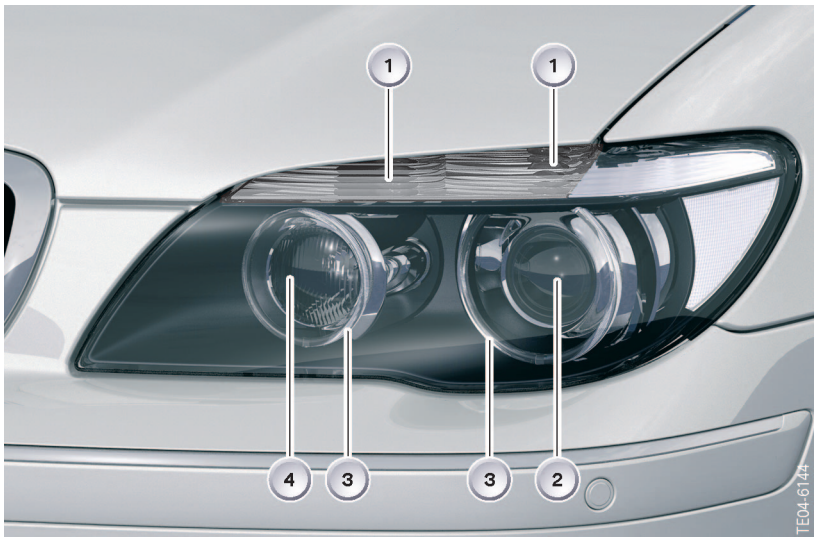
The following two headlight variants are used:

- Standard equipment
  with bi-xenon headlight
- Option
  with adaptive directional headlight Option 524 (AHL)

The version with a halogen headlight is no longer offered.

The points connecting the headlight to the body have remained the same.

Bi-xenon headlights

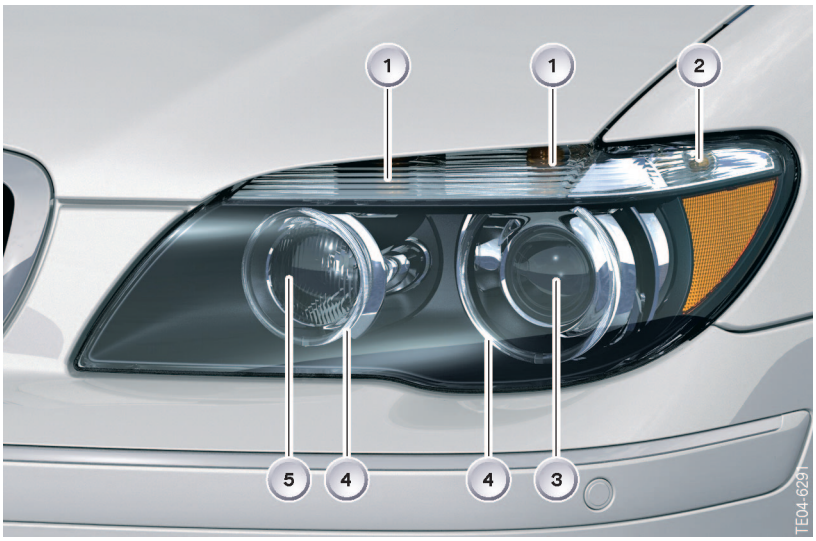


1 - Bi-xenon headlights, EU version

Index	Explanation	Index	Explanation
1	Front direction indicator	3	Parking light rings
2	Bi-xenon high beam/low beam light	4	High beam light

The light for the parking light rings is generated by a common bulb and directed via the fibre optics to the parking light rings.

The colour of the bulbs for the front direction indicators is silver in the EU version and orange in the US version.

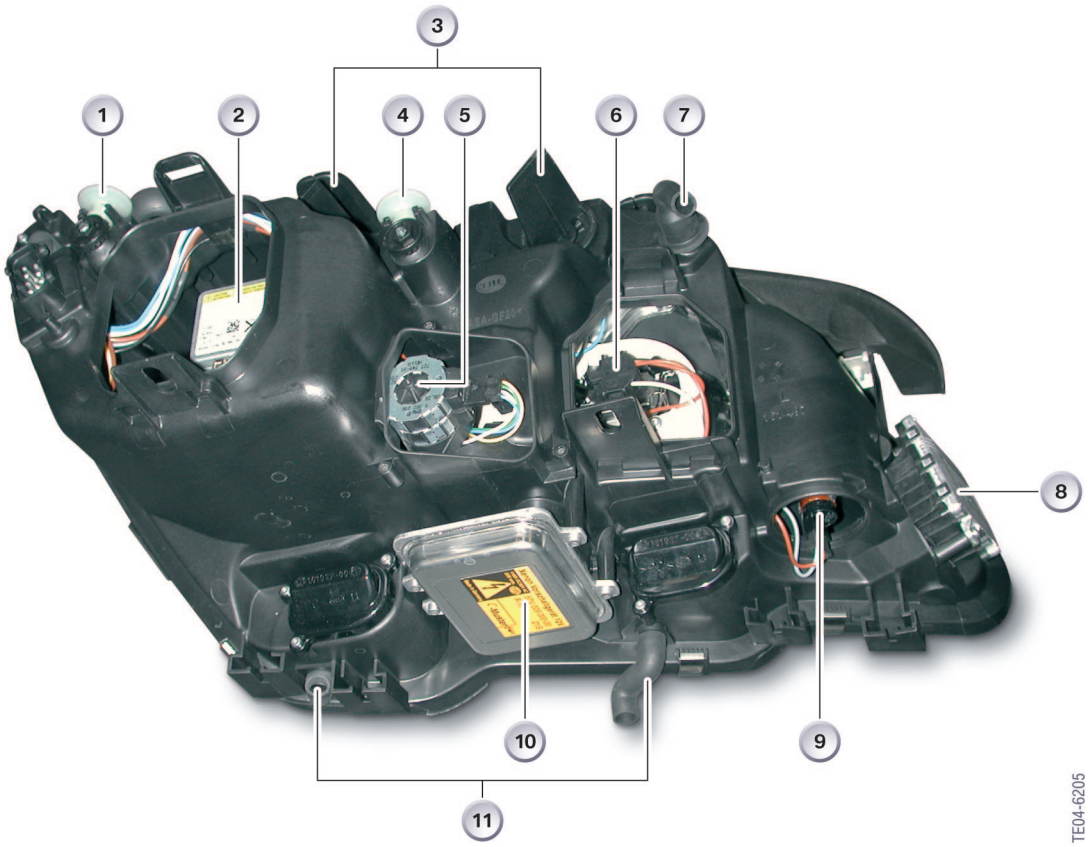


2 - Bi-xenon headlights, US version

Index	Explanation	Index	Explanation
1	Front direction indicator	4	Parking light rings
2	Side-marker lamp	5	High beam light
3	Bi-xenon high beam/low beam light		

The power specifications of the front lights in the EU/US versions are summarized in the table below:

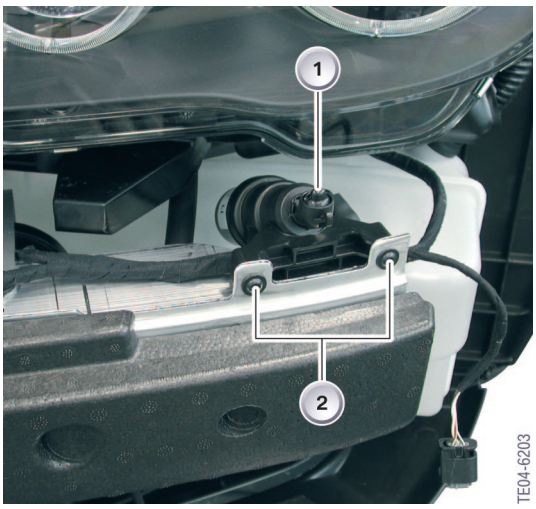
Light	Number (per car)	Power [W] (per light)
Front parking light	2	10
High beam light	2	55
Bi-xenon	2	35
Front direction indicator	4	21
Additional direction indicator	2	5
Fog light	2	55
Side-marker lamp (US only)	2	5



3 - Design of bi-xenon headlight

Index	Explanation	Index	Explanation
1	Adjusting screw	7	Ventilation hose
2	D1S lamp (replaceable)	8	Stepping motor controller SMC (replaceable)
3	Direction indicator (replaceable) EU version: silver bulb US version: orange bulb	9	Bulb for parking light (replaceable)
4	Adjusting screw	10	Control unit for bi-xenon light
5	Stepping motor (replaceable)	11	Ventilation hose
6	Bulb for high beam light (replaceable)		

Headlight washer system

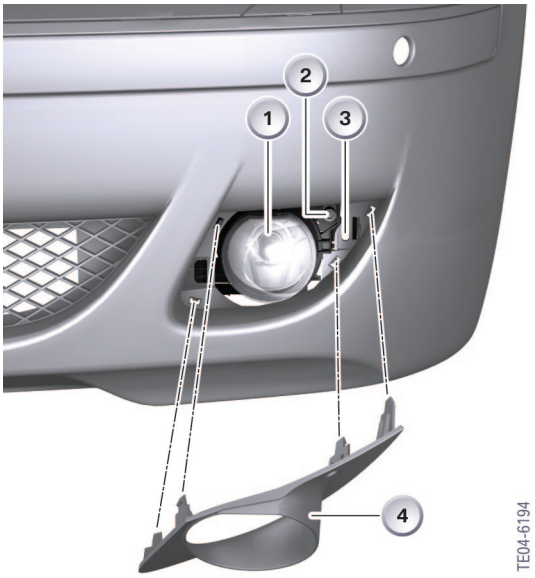


4 - High-pressure nozzle for headlight washer system

Index	Explanation
1	High-pressure nozzle
2	Retaining screws

From March 2005 the headlight washer system will be included in the basic equipment specification in all E65/E66 models. The high-pressure nozzle is no longer attached to the headlight but rather attached to the carrier of the bumper trim. The nozzle is aligned in such a way that only the lens in the area of the low beam light is cleaned. The shape of the nozzle and its cover cap have been adapted to the new design.

Front fog light



5 - Front fog light

Index	Explanation
1	Fog light
2	Adjusting screw
3	Retaining screw
4	Fog light trim

The front fog light is a modified front fog light from the E60 with a new housing and a new trim.

The procedure for removing the fog light has changed. It is necessary to remove the front assembly underside protection in order to remove the fog light. Then unclip the fog light trim and release the retaining screw. Finally unclip the fog light towards the rear.

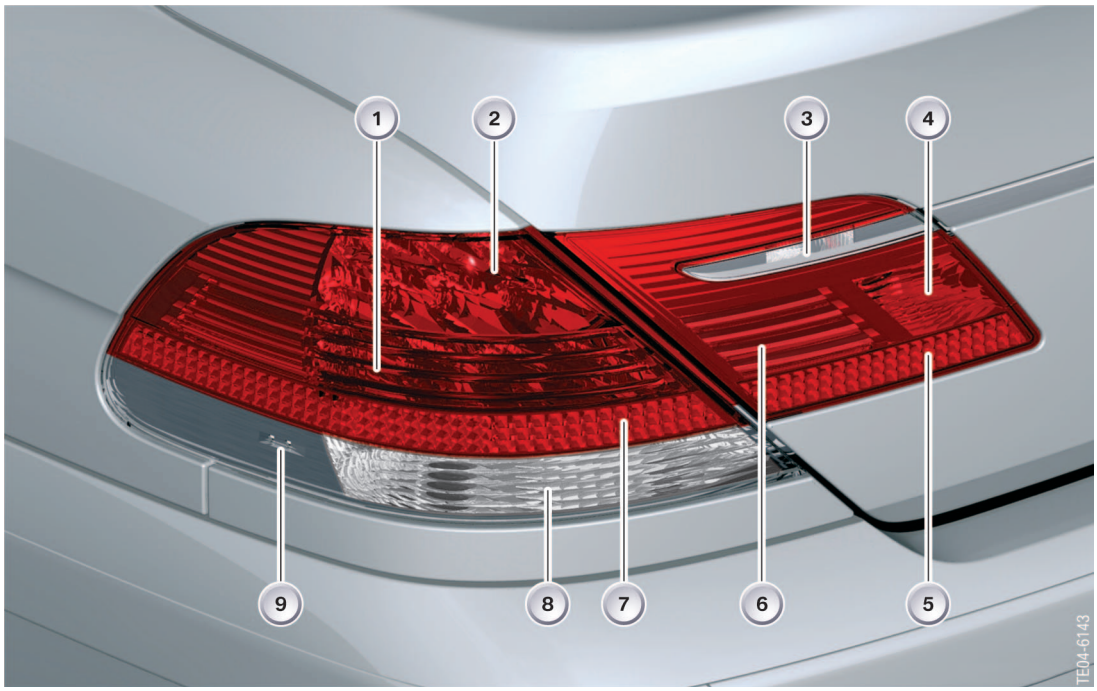
Rear light cluster

Design

The rear light cluster of the E65/E66 is split into two parts (formerly three parts). One part is integrated in the side panel of the body while the other part is integrated in the boot lid. The outer contour and the mounting of the rear lights in the side panel have not changed.

However the internal design has been completely changed.

The rear lights in the boot lid are newly designed. Only white direction indicators and silver bulbs for the rear direction indicators are available on a worldwide basis.



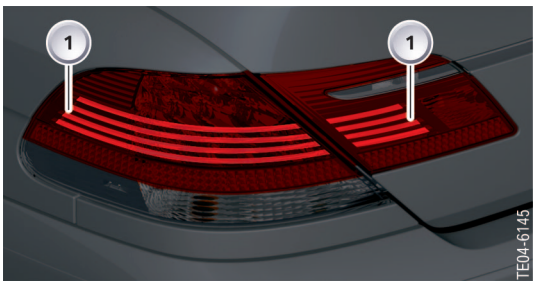
6 - Left rear light cluster

Index	Explanation	Index	Explanation
1	Tail light 1	6	Tail light 2
2	Brake light	7	Rear reflector 2
3	Reversing light	8	Rear direction indicator
4	Rear fog light/brake force display	9	Side marker (US version only)
5	Rear reflector 1		

The power specifications of the rear lights in the EU/US versions are summarized in the table below:

Light	Number per car	Power [W] (per light)
Tail light 1	2 x 4 LEDs	
Tail light 2	2 x 4 LEDs	
Brake light	2 x 16 LEDs	
Reversing light	2	16
Rear direction indicator	2	21
Rear fog light/brake force display	2	21
Rear side marker	2 x 2 LEDs	

Tail light



7 - Left tail light

Index	Explanation
1	Supply points for fibre-optic waveguides

The tail lights of the E65/E66 are implemented with fibre-optic waveguides.

Each of the two tail lights (right or left side of the car) comprises two fibre-optic modules. The fibre-optic modules are each made up of four fibre-optic waveguides.

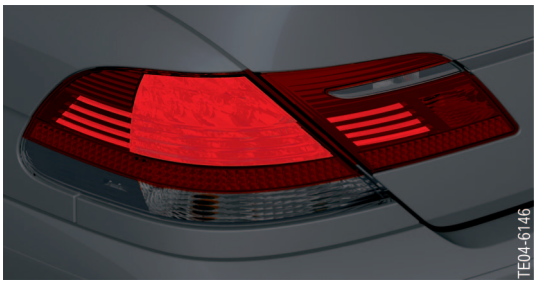
The four fibre-optic waveguides are arranged one on top of the other and each supplied with light by an LED. The light generated by the LEDs is introduced into the fibre-optic waveguides, where it is reflected outwards.

The advantage of fibre-optic technology lies in the fact that LEDs have a significantly longer service life and a lower energy requirement than conventional bulbs. Furthermore, the illumination of the tail light is considerably more uniform than that of a bulb, which is bright in the middle and grows much darker towards the edges. Another reason for using this technology is that the design simply looks better.

Because the four LEDs are connected in series, the entire rear light section must be replaced if one LED fails.

⚠ The principle of generating the parking light with fibre-optic waveguides has already been successfully used in the E39. ◄

Brake light



8 - Left brake light

The left and right brake lights are each generated by 16 LEDs. The LEDs are connected in parallel, i.e. if one LED fails the other LEDs remain operational. The LED module can be replaced. When the brake light is actuated, tail light 1 is also switched on - even if the light was not switched on. The high-mounted brake light remains unchanged.

Rear fog light/brake force display

9 - Rear fog light/brake force display

The rear fog lights are also used for the brake force displays (two-stage brake lights).

The car speed must be > 5 km/h for the brake force displays to be activated.

And at least one of the following conditions must also be satisfied:

- Braking deceleration > 5 m/s^2 and/or
- Control intervention by the anti-lock braking system.

The information on car speed, braking deceleration and control intervention by the anti-lock braking system is received by the light module in the form of CAN messages from the DSC. The light module activates the brake force display when the above-mentioned conditions are satisfied.

The brake force display remains activated until the driver actuates the brake lever.

Rear side marker

The US version is equipped with two extra LEDs which shine through openings in the side trim directly as a side-marker lamp.

These LEDs cannot be replaced.

Contents
E65/E66MU audio/TV systems

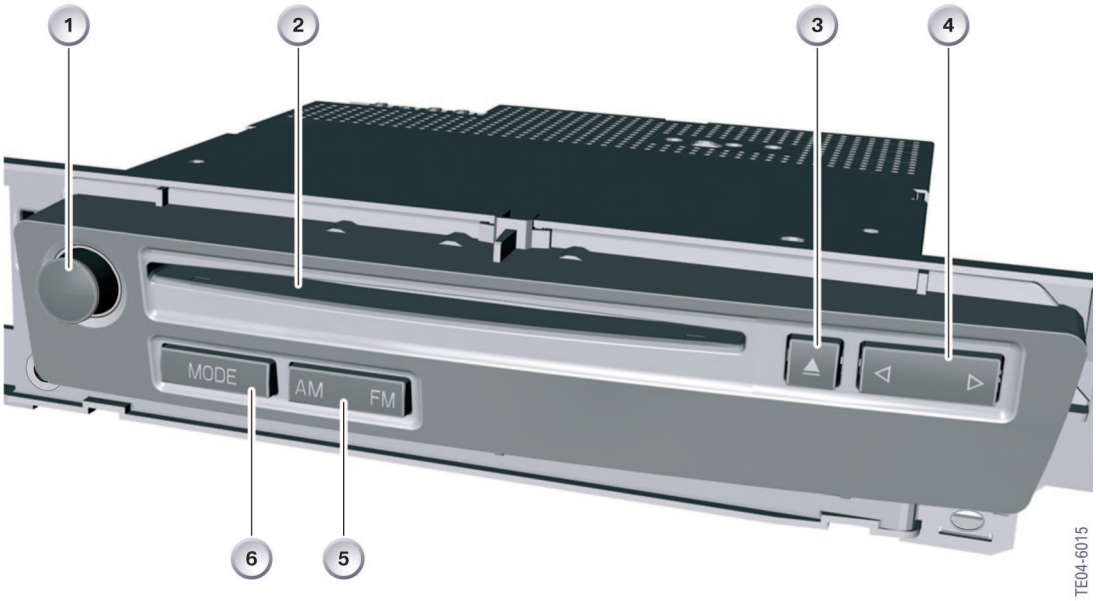
System components
E65/E66MU audio/TV systems

General description

This section covers the new features of the audio and TV systems of the E65/E66. It is divided into the following chapters:

- ASK
- CD changer
- TV function with DVB-T.

Audio system controller (ASK)



1 - Audio system controller

Index	Explanation
1	Rotary pushbutton for switching on/off and volume control of audio system
2	CD drive slide-in compartment
3	Eject button
4	Search button
5	AM/FM button
6	MODE button

In addition to the new trim shape and paint finish, the audio system controller now has two extra buttons:

- AM/FM button
  for directly switching the radio to and between AM/FM reception
- MODE button
  for changing next audio source.

The MD drive (Option 651) is also offered instead of the CD drive as an option. The MD drive is included in the standard equipment specification in the Japanese version.

CD changer

2 - CD changer

Option 672 is offered for the E65/E66 in the form of a new "CD changer for 6 CDs" (CDC). The CD changer is a user in the MOST network. It differs from the device previously installed in that it supports the playback of CDs with MP3 and WMA files.

The MP3/WMA files are decoded in the CD changer.

What is MP3?

- Stands for MPEG Layer 3 (MPEG = Moving Pictures Expert Group)
- Is a music compression method. It is based on the formats originally designed for digital sound or picture transmission (MPEG 1 or 2)
- It requires 8 to 12 times less storage space for virtual CD quality. Approximately 10 audio CDs in compressed form can be stored on a standard 640 MB data CD.
- It was developed by the German Fraunhofer Institute for integrated circuits (Fraunhofer IIS Audio).

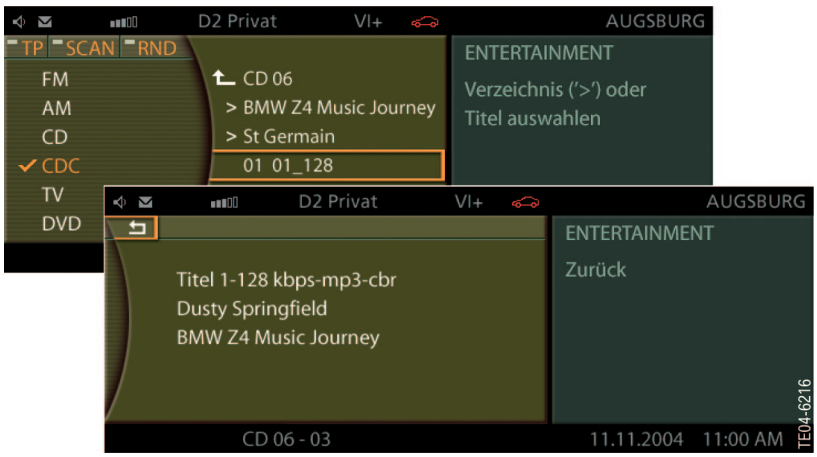
What is WMA?

- Like MP3, Windows Media Audio (WMA) is a compression method for audio data that produces a sound with more detail than MP3 at low bit rates (up to approx.112 kbit/s).

Operation, display and playback

The CD changer is operated by means of the controller.

Information such as folder name, music track or artist are shown in the central display. Detailed information based on ID3 tags can also be represented. ID3 tags contain additional information that is added to the music data.



3 - Display of ID3 tags

If the car is equipped with the Stereo or HiFi speaker system, the decoded data of the CD is sent as digital signals via the MOST to the ASK. Here they are converted to analogue data and output via the amplifier and the speakers.
If a 'Top-HiFi' system (Logic7) is installed, the decoded audio data are transmitted in digital form via the MOST from the CD changer directly to the Top-HiFi amplifier, from where it is output.

"CD mixed operation" is also possible, i.e. the CDs are played back even when the CD changer is simultaneously holding CDs with MP3 files, WMA files and "normal" audio data.

TV function with DVB-T

Digital television

Digital television is the transmission of the previously analogue video and audio signals for television broadcast in digital form.

In Europe and most other countries in the world, transmissions are broadcast using the DVB standard (Digital Video Broadcasting). Japan and the USA use different standards.

The video and audio data is digitized and compressed prior to transmission. A television picture of 216 Mbit/s studio quality can be compressed using MPEG-2 (Moving Picture Experts Group, 2nd generation) to 3-4 Mbit/s. Despite the lower data rate, an equivalent perceived image quality is obtained. The compression (like MP3 compression) inherently involves data loss. The digital data are transmitted with virtually no losses. Due to the substantial MPEG compression, up to 4 digital TV channels can be transmitted using DVB-T within the band width previously occupied by a single analogue TV channel.

Digital television can be broadcast via cable (DVB-C), satellite (DVB-S) or terrestrial transmitter (DVB-T). For mobile reception, BMW uses DVB-T. A major advantage of digital television is the error-correction capability and, consequently, the improved picture quality. One error-correction method is the use of multi-source signals. These are received from different transmitters and then overlaid. The multi-source signals are brought about by signal reflection (e.g. by large buildings) and on analogue televisions cause the well-known "ghosting" effect.

Digital video compression has achieved widespread use as a result of the DVD (Digital Versatile Disc). Video DVDs also use the MPEG-2 standard.

Hybrid video module

The hybrid video module (CVBS) enables the reception of terrestrial analogue and digital television signals. It replaces the combination of Video module 5 (analogue TV tuner) and the set-top box (digital TV receiver).

The range of functions of the hybrid video module is the same as the Video module 5.

Changeover between digital and analogue television is performed automatically. The switch from digital to analogue signal is discernible by the increase in picture noise. Additional programmes which are not transmitted by analogue means can also be received via the digital television.

The same aerial structures on the rear window are used to receive both analogue and digital signals because the signals are transmitted in the same frequency bands.

The TV function can be ordered as an separate option (Option 601).

The hybrid video module is fitted in the boot, on the left behind the trim panel.

The Video module 5 will continue to be fitted in countries where there is no digital TV reception.

Hybrid drive video module

The hybrid drive video module is used in cars with rear-compartment displays.

The range of functions is the same as that of the hybrid video module with the exception that the TV can be watched in the rear display while the car is being driven.

It processes both CVBS and RGB signals and has a third TV aerial. The hybrid video module has 2 TV aerials.

Contents

Display and control elements E65/E66MU

System components
E65/E66MU display and control elements

iDrive

Controller

1 - New controller

Index	Explanation
1	Controller
2	Button for main menu
3	Button for speech processing system

The operating principle of the controller has not changed.

The controller can be moved in eight directions to select the submenus. The controller is turned/pressed to select the functions. By pressing the menu button, the customer returns from each submenu immediately to the main menu. The customer can use the freely programmable button to call up a frequently used function more quickly.

Central display

2 - Main menu

The graphics of the user interface in the central display have been modified. The main menu still features the eight submenus, four of which (Communication, Navigation, Entertainment, Air Conditioning) are now colour-coded. Even the new shape of the controller is now depicted in the main menu.

⚠ A detailed description of the main menu and selecting the individual submenus and functions can be found in the Owner's Handbook for the BMW 7 Series. ◄

3 - Communication, Navigation, Entertainment and Air Conditioning are colour-coded

The colours assigned to the submenus are the same as in the E60:

Submenu	Colour
Communication	Blue
Navigation	Green
Entertainment	Orange
Air Conditioning	Red

The submenus BMW Assist, On-board Data, Help and Settings are all depicted in standard brown.

The changes in the structure of the submenus will be shown using the Entertainment submenu as an example.

Entertainment submenu

4 - Entertainment submenu

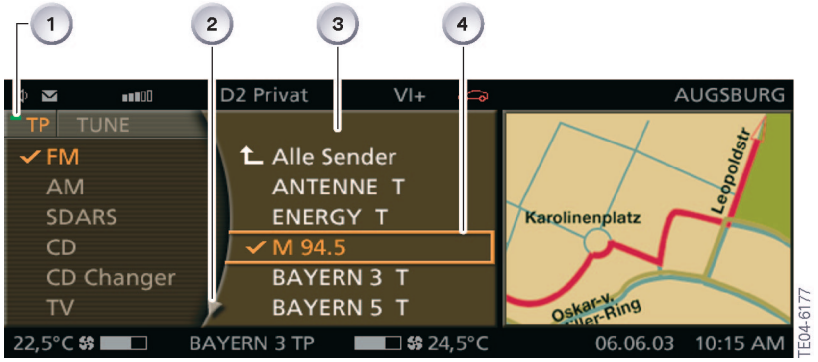
The Entertainment submenu is structured in accordance with the two-list principle. The left list contains the higher-level functions and the right list the lower-level functions. The list which is active is displayed in a lighter shade. There is no background graphic.

⚠ Switching between the two list is performed by turning the controller and not by pushing in the desired direction. ◄

An arrow appears for the scroll function if the lists contain more lines than can be shown in the display. The activated function is marked by a tick or check symbol. The toolbox (e.g. Traffic Program TP) is always located in the same place. The activated toolbox is indicated by a green LED.

5 - Activated function is indicated by a tick/check

Index	Explanation	Index	Explanation
1	Activated function is indicated by a tick/check	3	Current position in submenu
2	Active list	4	Passive list



6 - Scrollable list in the Entertainment submenu

Index	Explanation	Index	Explanation
1	Toolbox activation is indicated by a green LED	3	Active list
2	Scrollable list	4	Current position in submenu

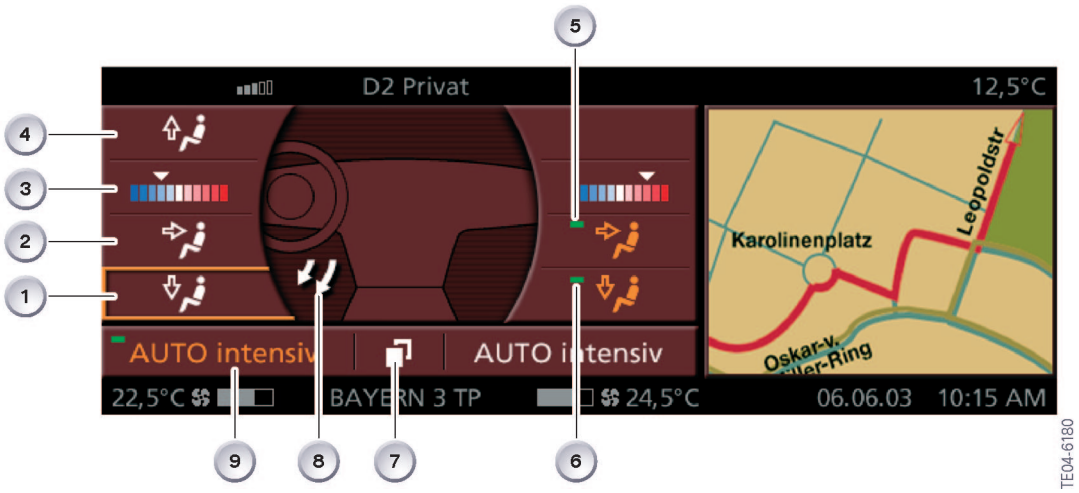
7 - Comparing the old and new Entertainment menus. No background graphic and no submenus in the new Entertainment menu

Air Conditioning submenu, Air distribution function

The air distribution settings for driver and front passenger are displayed on one side (previously on two sides). The established symbols are used for air distribution. The activation of an air distribution button is indicated by a green LED - orange symbols.

The automatic program can be set in the following three stages:

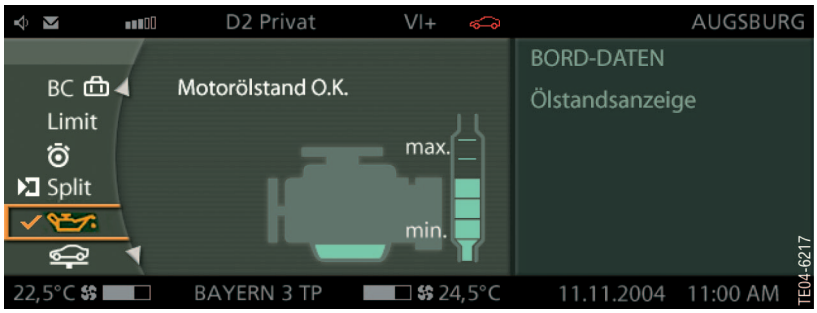
- Soft
- Medium
- Intensive.



8 - Air Conditioning submenu, Air distribution function

Index	Explanation	Index	Explanation
1	Bottom air distribution (driver) not active; current position on side	6	Bottom air distribution (front passenger) is active
2	Middle air distribution (driver) not active	7	Back to Air Conditioning submenu
3	Air temperature setting	8	Graphic representation of position of air distribution in car (preview principle)
4	Top air distribution (driver and front passenger) not active	9	Automatic program (driver's side) is active
5	Middle air distribution (front passenger) is active		

Engine oil level display



9 - Engine oil level is indicated in the central display

The E65/E66 is equipped with an electronic oil level display. The present oil level is indicated in the central display when the car is moving or when it is stationary with the engine running. To activate the "Engine oil level" display in the On-board Data submenu, select the Oil level function.

Possible indications:

- "Engine oil level OK"
- "Oil level at minimum. Top up 1l engine oil"
- "Oil level below minimum. Top up 1l engine oil"
- "Engine oil level too high"
- "Measurement not possible at present".

The dipstick is still fitted and has a modified handle in black. The customer only receives a description of the engine oil level display in the central display in the Owner's Handbook.

Instrument cluster

10 - Revcounter in the E65 with N52 engine

The revcounter has been increased to 7500 rpm in E65/E66 cars with N52 engines.

Contents
E65/E66MU test questions

Test questions
E65/E66 model redesign

Questionnaire

Check what you have learned.

In this section you have the opportunity of checking what you have learned.

1. E65/E66 cars which were manufactured prior to the model redesign can be modified to the new visual appearance. With which engine variants is this possible?

- ☐ M54
- ☐ N62
- ☐ N73
- ☐ M57
- ☐ M67

2. The car is equipped with the option adaptive directional headlights. To which bus systems is the LM light module connected?

- ☐ K-CAN P
- ☐ K-CAN S
- ☐ MOST
- ☐ ***byteflight***
- ☐ PT-CAN

3. Which control units are powered via Terminal 30 Special loads/consumers?

- ☐ PDC
- ☐ LM
- ☐ DME
- ☐ DWA (anti-theft alarm system)
- ☐ CAS
- ☐ Instrument cluster
- ☐ ASK

4. What are the properties of Terminal 30 Special loads/consumers?

- ☐ Closed-circuit-current-monitored
- ☐ Bus-monitored
- ☐ Brief disconnection up to 10 s (reset) is possible
- ☐ Permanent deactivation is possible

5. Under what conditions is the brake force display activated?

☐ Road speed > 5 km/h and car deceleration > 5 m/s^2

☐ Road speed > 5 km/h and car deceleration < 5 m/s^2

☐ Road speed > 5 km/h and ABS control intervention

☐ Road speed > 5 km/h, car deceleration > 5 m/s^2 and ABS control intervention

6. Which audio files can be played by the new CD changer?

☐ MP3 files

☐ WMA files

☐ MP3 and WMA files

7. With which video module is digital TV reception possible?

☐ Hybrid video module

☐ Hybrid Drive video module

☐ Video module 5

☐ Drive video module 5

8. Which intake system is installed in the N62B40TU and N62B48TU engines?

☐ 2-stage intake system (DISA)

☐ Fully variable intake system (DISA)

9. Which injectors are installed in the M57TU2 engine?

☐ SV injectors

☐ PIEZO injectors

10. Which of the following statements is correct?

☐ The E65MU model series has an electronic oil level display. There is no oil dipstick.

☐ The E65MU model series has an electronic oil level display. The oil dipstick has an inconspicuous black handle because it is only intended for Service.

Answers to questionnaire

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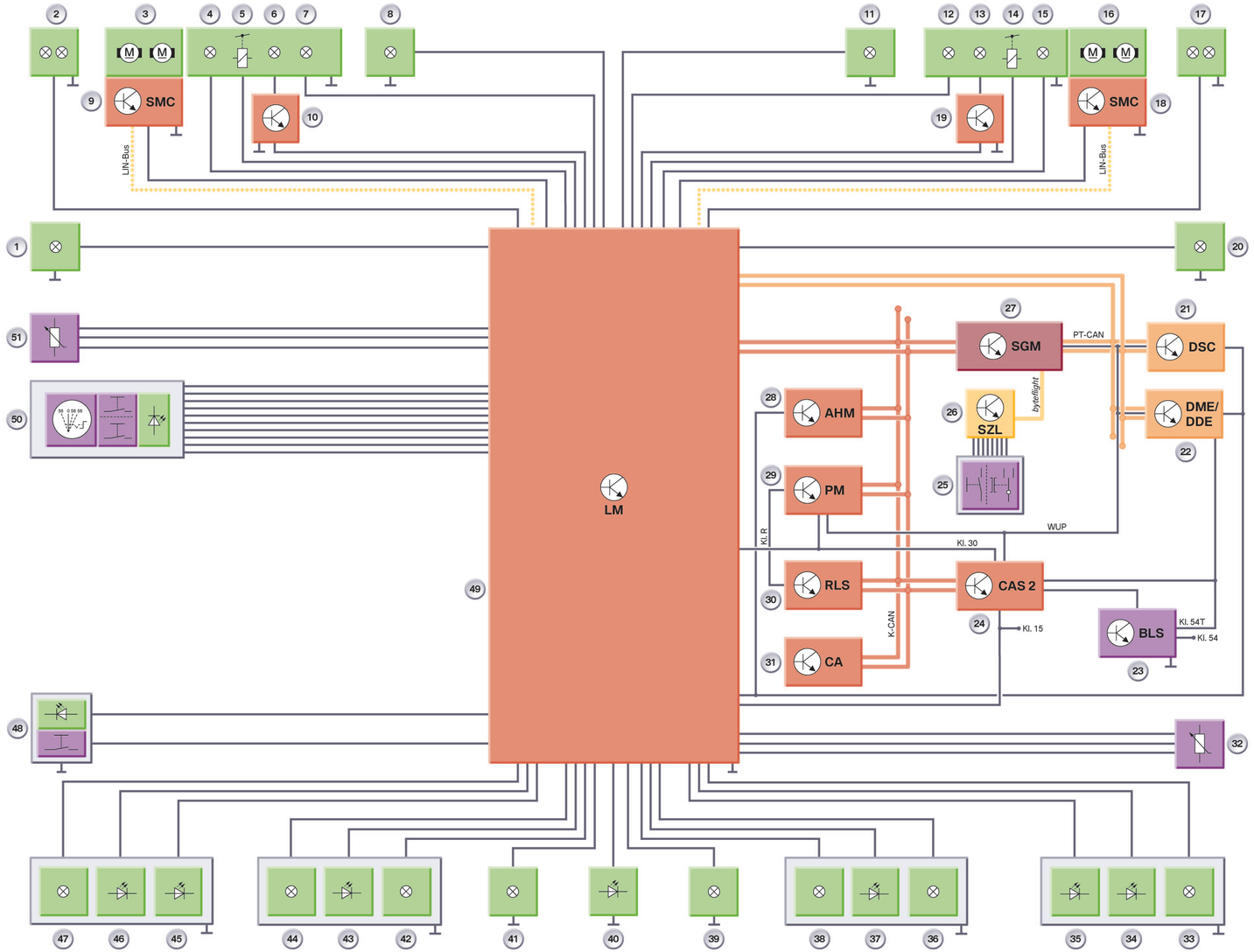
Abbreviations

ACC	Active cruise control
AHL	Adaptive headlight
AHM	Trailer module
CAS	Car access system
CD	Compact disc
CDC	CD changer
DDE	Digital diesel electronics
DISA	Differentiated air intake system
DME	Digital motor electronics
DVB	Digital video broadcasting
HFM	Hot-film air mass sensor
HiFi	High fidelity
IHKA	Automatic climate control
LED	LED
MOST	Media-oriented system transport
PDC	Park distance control
PT-CAN	Power Train Controller Area Network
PWM	Pulse width modulation
US	Switching voltage
WMA	Windows media audio

Exterior lighting E65/E66MU



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