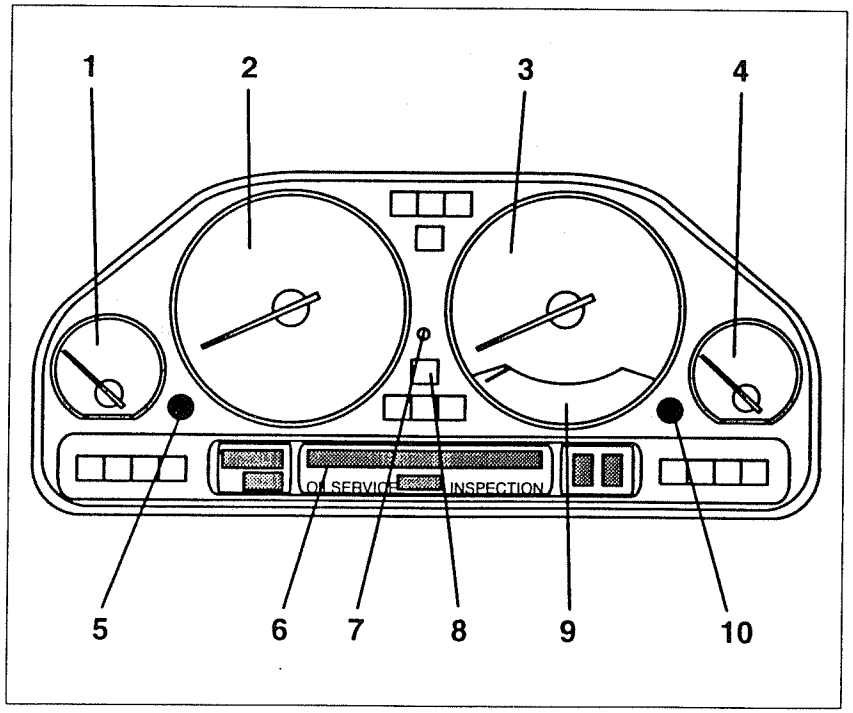
Notes

This section applies to the instrument cluster with check-control as of February 1989 (instrument cluster redesign high).



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Functional Description

General

The instrument cluster "instrument cluster redesign high" is a further development of the instrument cluster installed up to February 1989 (described in Section 6200.0A).

Important modifications compared to old version

- Additional ASC indicator lamp (8) between tachometer and speedometer
- Coding plug no longer in wire harness, but now integrated in unit.
- Turn signal indicator sound generator on pc-board
- Km/miles reading is indicated with the ignition switched off when the trip odometer reset button (5) is depressed
- Integrated system test
- Improved diagnostic facilities

Modifications as of September 1990

Further modifications have been introduced on the instrument cluster as of September 1990. The individual chapters in this section provide relevant information. The units as of 9/90 have a software status greater than 0.90 (read out with BMW Diagnostic System or Label on reverse side of unit).

Analog Instruments

Fuel gauge (1): The immersion tube sensing unit in the fuel tank displays the amount of fuel in the tank. An indicator lamp in the fuel gauge lights when the fuel level drops below approx. 8 litre. The fuel gauge reading is switched to zero when the reserve lamp lights.

The indicator lamp is damped "electronically", i.e. flutter of the lamp due to movements of the fuel is suppressed.

As of 9/90, the reserve lamp is switched on for approx. 2 seconds after switching on the ignition (lamp test)

Speedometer (2): The signals from the rear axle Reed contact (tacho-generator) are processed in the instrument cluster. The signals are processed separately for displaying vehicle speed and distance covered.

Tachometer (3): The TD-signal (engine speed signal) is processed by the DME control unit.

Temperature gauge (4): This gauge indicates the coolant temperature.

KVA gauge (fuel consumption indicator) (9): The TI-signal (injection signal) of the DME control unit and the vehicle speed signal are processed here. The current fuel consumption is calculated from both values.

As of September 1990 (= introduction of a new engine wire harness), the fuel consumption on the M 70 engine will be calculated from both ti-signals.

Oil temperature gauge (9): An oil temperature gauge is installed in models E34/M5 instead of the KVA indicator.

Buttons in the Instrument Cluster

Left button (5): Reset of trip odometer. Indication of the km/miles reading for 25 seconds when the button is depressed with the ignition switched off.

Right button (CC button) (10): Clearing check-control display or BC texts. If several check-control messages are pending simultaneously, the individual messages are called up by successfully pressing the button. Start of system test.

Display Unit (6)

The display unit, also referred to as the **instrument cluster display**, consists of an LCD module (LCD = Liquid Crystal Display). It contains:

- Service interval display
- Total mileage (km) display
- Trip mileage (km) display
- Program and range display (automatic transmission)
- Check-control texts
- Text output of on-board computer

Photoelectric sensor (7)

The brightness of the display unit is adjusted electronically to the ambient light. The brightness in the vehicle is sensed by the photoelectric sensor. The brightness can also be varied with the manual dimmer when the vehicle lights are switched on.

Coding Plug

The coding plug is plugged into the instrument cluster. It basically consists of a voltage-independent electronic memory. This memory contains all specific vehicle data which the instrument cluster requires to process and display the signals.

The total mileage and the service interval data are also stored in the memory.

The coding plug can be renewed only by breaking off the plug cover. This cover is then replaced by a cover supplied with the replacement coding plug. Installation of a replacement plug is indicated in the diagnostic program (♦D♦Status lists: Instrument Cluster) and during the integrated test.

Coding plug as of 9/90 (Software > 0.9)

The memory has been extended to cope with additional data. The coding plugs up to 9/90 and as of 9/90 have different part numbers, the coding plugs as of 9/90 feature a blue housing. Due to mechanical coding, it is not possible to interchange the pc-board and coding plug.

Coding Plug Code

The code is printed on a label on the reverse side of the coding plug.

The code is also indicated in the diagnostic program (♦D♦210 Status lists: Instrument Cluster) and during the integrated test.

Languages

The German language (for messages in the display unit) is preset in the instrument cluster after disconnecting and reconnecting the battery. Any other language can be selected by operation.

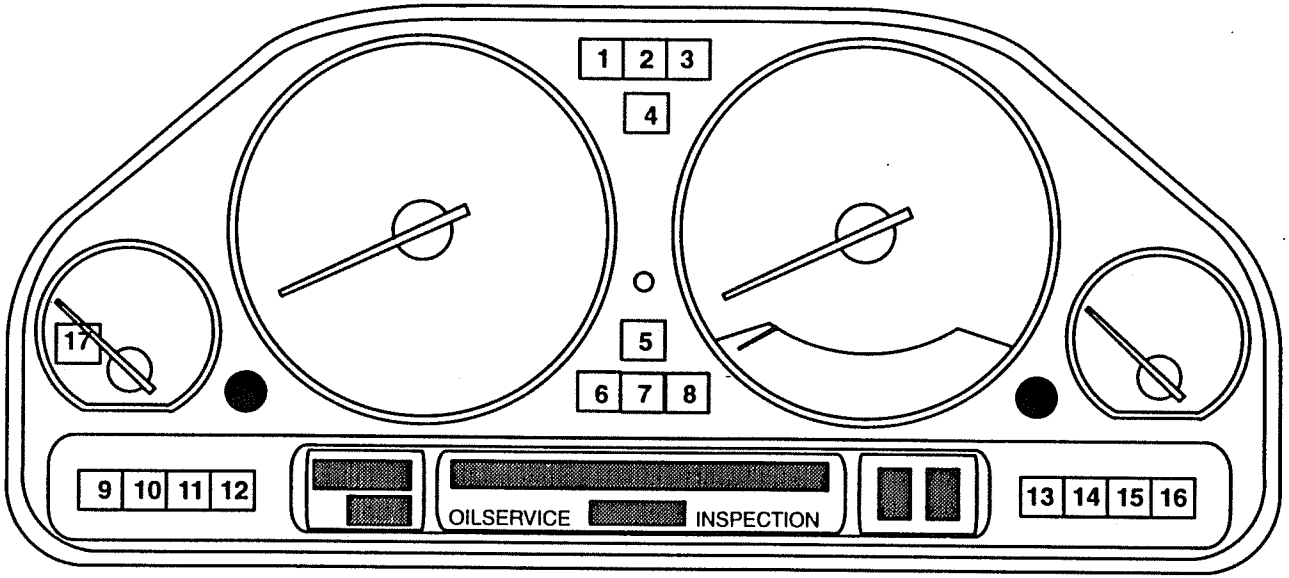
Operation:

- Switch ignition lock to position R (position 1)
- Press CC button (right) until a language designation appears in the display unit
- Release CC button
- Press CC button again, next language is displayed
- Repeat procedure until the required language is selected

This language remains stored until the battery is disconnected and reconnected.

The languages available are German, US English, UK English, French, Italian and Spanish.

Position of Indicator Lamps



Note! Modified indicator lamp functions as of September 1990

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Indicator lamps up to September 1990

Number	Indicator lamp	Source
1	Left turn signal indicator	Relay
2	High beam	Light switch
3	Right turn signal indicator	Relay
4	Trailer turn signal indicator	Relay
5	ASC lamp	ASC control unit
5 on M5 engine	Sports symbol	
6	Battery charge indicator	Alternator
7	EML warning lamp	EML control unit
8	Oil pressure	Pressure switch
9	Seat belt (USA and Gulf States only)	Belt contact switch
10	Check engine (USA only)	DME control unit
11	Fog light	Fog light switch
12	Rear fog light	Fog light switch
13	Handbrake	Handbrake switch
14	General brake warning	Pressure switch and level switch for brake fluid
15	ABS indicator	ABS control unit
16	Airbag	Airbag control unit
17	Tank reserve	Immersion tube sending unit with electronic damping in instrument cluster

Indicator lamps as of September 1990

Number	Indicator lamp	Source
1	Left turn signal indicator	Relay
2	High beam	Light switch
3	Right turn signal indicator	Relay
4	Trailer turn signal indicator	Relay
5	ASC lamp	ASC control unit
5 on M5 engine	Sports symbol	
6	Seat belt (USA and Gulf States only)	Belt contact switch
7	EML warning lamp	EML control unit
8	Oil pressure	Pressure switch
9	Battery charge indicator	Alternator
10	Check engine (USA only)	DME control unit
11	Fog light	Fog light switch
12	Rear fog light	Fog light switch
13	Handbrake	Handbrake switch
14	General brake warning	Pressure switch and level switch for brake fluid
15	ABS indicator	ABS control unit
16	Airbag	Airbag control unit
17	Tank reserve	Immersion tube sending unit with electronic damping in instrument cluster

Lamp Self-Test

The lamps for **brake warning (14), handbrake (13), oil pressure (8)** and **battery charge indicator (6/9)** light when the ignition is switched on. They go out when the engine starts.

The **airbag (16)** indicator lamp lights for approx. 6 seconds after the ignition has been switched on. The **EML (7)** and **ASC (5)** indicator lamps light for 1 second after the ignition has been switched on.

Depending on the ABS system installed, the indicator lamp for **ABS (15)** is either switched on permanently till the engine starts or for 2 seconds after switching on the ignition.

As of **9/90** (software status greater than 0.9), the **tank reserve lamp (17)** will switch on for approx. 2 seconds after switching on the ignition.

Integrated Test Facilities

Important data and the system test can be read out or triggered without diagnosis.

Procedure:

- Switch off ignition.
- Press CC button (right button) and hold depressed.
- Switch on ignition.
- Release CC button when the first output appears in the display unit.

Display	Explanation
BMW No.	Internal number
CODE No.	Code number of coding plug
K-NUMBER	Distance factor for speedometer
F.G. No.	Chassis number
SW. VERS.	Software version
Rev. INDEX	Revision index (hardware version)

- If the coding plug is a replacement plug, the red replacement marking lights during the display (red LED).

A system test is triggered on completion of these outputs.

System Test

- All segments and the lighting of the instrument cluster display unit are switched on. Also the red LED for replacement identification!
- The pointers of the speedometer and tachometer are set to the centre position.
- The pointers of the fuel gauge, temperature gauge and consumption gauge (KVA) (oil temperature for M5) each move, within 5 seconds, from the zero position to the end position and back.
- The warning lamps for brakes, tank reserve and seat belt (seat belt only for US version) are switched on.
- Corresponding to the display in the speedometer, a vehicle speed signal (speed-A signal) is transferred to other control units.

The internal test procedure is terminated on completion of the system test. It can, however, be terminated at any time by pressing the CC button.

Check-Control

General

The check-control (CC) is a comprehensive system of messages which inform the driver of various operating statuses. The display is provided as a text message in the display unit and is accompanied by an acoustic signal (gong).

A large number of sensors monitor the individual vehicle systems and components. Three systems are responsible for acquiring and outputting the data to the evaluation logic:

Instrument cluster (K): Covers all systems which also include an indicator lamp in addition to the text message. All acquired data are evaluated in the instrument cluster and, after fulfilling the display conditions, are output in the form of a text message on the display unit.

Check-control module (CCM): Covers a large number of systems. Connection to the instrument cluster is made via three data links. By way of data transfer, the check-control module constantly informs the instrument cluster of the status of the connected systems.

Lamp control module (LKM): The light relays are accommodated in the light control module. The lighting system and the brake light switch are monitored for defects. The lamp control module (LKM) communicates with the CCM via data links. The CCM forwards the data to the instrument cluster (refer to Diagnostic Procedure LKM 6301.0).

Priority Groups

The CC messages are subdivided into three priority groups.

- **Priority 1:** Faults which directly endanger driving safety. Indicated by flashing indicator arrows. Message cannot be cancelled with CC button.
- **Priority 2:** Faults which do not directly endanger driving safety. Message can be cancelled with CC button and is also cancelled automatically after 2 minutes.
- **Priority 3:** Messages relating to liquid/fluid levels. They are displayed only when switching the ignition on and off and are cancelled after 20 seconds.

List of Check-Control Messages

The following list provides an overview of check-control messages. Listed are the contents of the message and not the defect in the display unit. Individual messages which have the same preconditions (.e.g. lamps) are listed in combined form. The "condition" column indicates which prerequisites are required in addition to the defect status so that the message is displayed. The message and reset signal columns indicate the type of signal of the generator system.

Abbreviations: n = speed, v = vehicle speed, Prio. = message priority, Interrup. = Interruption

Message content	Acquisition	Prio.	Generator system	Condition	Message signal	Rest signal
Brake pressure	K	1	Pressure switch	n > 400 rpm	Ground	Interrup.
Brake fluid	K	1	Level switch	None	Ground	Interrup.
Handbrake	K	1	Switch	v > 10 km/h	Ground	Interrup.
Brake light	LKM	1	Measuring circuit	Brakes	Interrup.	B+
Oil pressure	K	1	Pressure switch	n > 400 rpm	Ground	Interrup.
Catalytic converter	CCM	1	Temperature switch	Japan only	Ground	Interrup.
Level control	CCM	1	Warning switch	after 8 minutes	Interrup.	Ground
Coolant temperature	CCM	1	Temperature sensor	Temp. > 115° C	Ω value	Ω value
ASC defect	CCM	2	Control unit	None	Ground	Interrup.
ASC controls	CCM	1	Control unit	None	Ground	Interrup.
Lights	LKM	2	Measuring circuit	None	Interrup.	B+
Trailer light	CCM	2	AHM	None	Interrup.	Ground
Brake pads	K	2	Pad sensor	None	Interrup.	Ground
Coolant level	CCM	3	Level switch	None	Interrup.	Ground
Wash water level	CCM	2	Level switch	None	Interrup.	Ground
Steering fluid level	CCM	2	Level switch	None	Interrup.	Ground
EGS defect	CCM	2	Control unit	n > 400 rpm	B+	Ground
Ignition switch	CCM	1	Switch	US model only	Ground	Interrup.
Engine oil level	CCM	3	Level switch	None	Interrup.	Ground

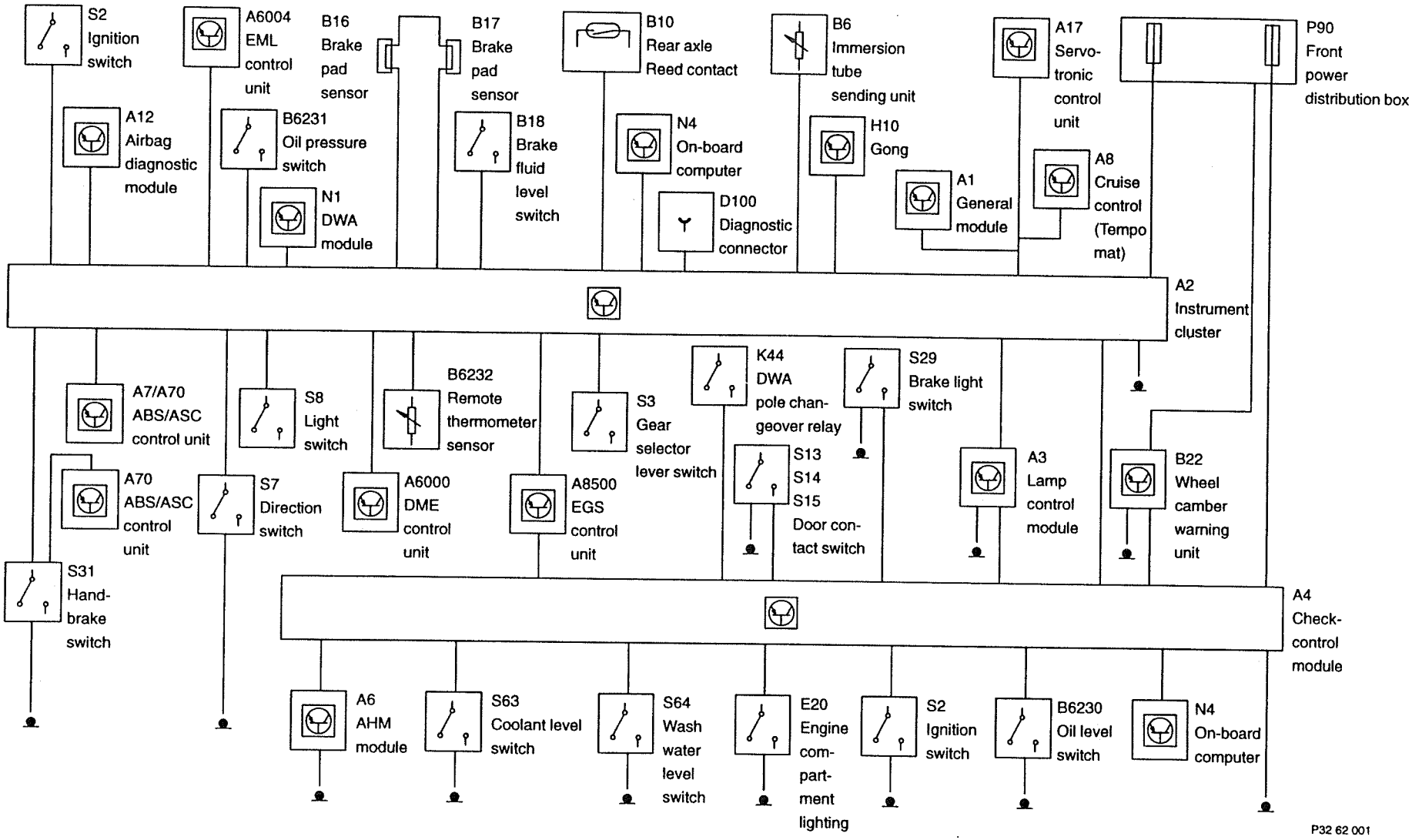
Message content	Acquisition	Prio.	Generator system	Condition	Message signal	Rest signal
Oil level sensor	CCM	3	Level switch	None	Interrup.	Ground

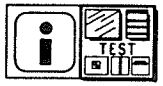
Brake light switch: System is OK. when brake light switch switches B+ to LKM and the test switch switches ground to the CCM. Message **brake light switch**, when test switch switches ground but brake light switch does not switch B+.

Check-control: Message displayed when the check-control module (CCM), the lamp control module (LKM), the corresponding power supply or the data links are defective (see troubleshooting).

Instrument Cluster (Redesign)/Check-Control Module (K/CC)

General Block Diagram





Notes on the BMW DIAGNOSTIC SYSTEM

Following control unit identification, the following branches listed below are made available:

♦D♦Status lists: Check-Control

– In contrast to the text message in the instrument cluster display unit, the diagnostic program indicates the status of the sensor systems without the necessity for additional operation (e.g. engine speed, vehicle speed).

– Automatic defect detection and defect evaluation when the text message "CHECK CONTROL" appears in the instrument cluster display unit.

Identification of the systems with "*", which triggered a check-control message during past vehicle operation.

♦D♦Status lists: Instrument Cluster

– Output of important coding data.

– Monitoring of important inputs of the instrument cluster.

– Defect detection break/short of all temperature sensors and the immersion tube sending unit.

♦D♦System Test

Internal system test is activated.

♦D♦Speed Signal Simulation

– Any arbitrary vehicle speed or frequency can be specified. The road speed is indicated in the speedometer and transferred to the other control units in the form of a speed-A signal.

– High frequency or speed values are transferred by the BMW Service Tester in steps (2 to 3 part steps) to the instrument cluster.

– Simulation is terminated automatically after 60 seconds.

Important!

Various control units store defect codes when the speed signal is simulated. Therefore, a ♦D♦ quick test must be performed after each simulation of the vehicle speed signal. If a defect code is stored in a control unit (e.g. DME, EML) and this is caused by a faulty speed-A signal, then this defect code must be cleared (♦D♦999).

♦D♦Activate Gong

The gong is activated.

♦D♦Defect Code Memory

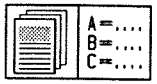
All defect codes which occur in the area of the coding plug are stored in the defect code memory.

♦D♦Clear Defect Code Memory

Clearance of the defect code memory and the "*" identifier in the status lists check-control.

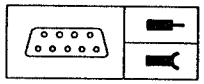
♦D♦Read Out Engine Test Code

In the case of all type of engine and clutch damage in vehicles with the S38 B36 engine (model M5), the engine test code must be printed out and accompanied with the warranty or goodwill application. The engine test code contains engine and vehicle data.



Abbreviations

AHM	Trailer module
ASC	Automatic stability control
CCM	Check-control module
EGS	Electronic transmission control
K	Instrument cluster
KVA	Fuel consumption indicator
LKM	Lamp control module
TD-Signal	Engine speed signal
ti-Signal	Injection signal
tQ-Signal	Injection quantity diesel
SIA	Service interval indicator



Pin Assignment

Connector Numbers

Number	Type	Description
X17	6-pin, brown	Instrument cluster connector 1
X16	26-pin, beige	Instrument cluster connector 2
X502	26-pin, white	Instrument cluster connector 3
X271	12-pin, grey	Instrument cluster connector 4
X18	26-pin, blue	CCM connector blue
X19	26-pin, green	CCM connector green
X12	35-pin, black	LKM connector

Pin Assignments at Instrument Cluster Connector 1, X17

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
1	E	Ground	Ground	B–	None	
2	E	RxD diagnostic link	Diagnostic socket 15	Square–wave		no diagnostic mode in the event of defect
3	E	Terminal R	Fuse	B+	None	
13	E	Ground, terminal 31	Ground			
14	A	TxD diagnostic link	Diagnostic socket Pin 20	Square–wave		no diagnostic mode in the event of defect
15	E	Terminal R	Fuse	B+	None	

Pin Assignments at Instrument Cluster Connector 2, X16

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
1	E	Airbag indicator lamp	Airbag diagnostic module	B–	None	
2	E/A	Data link to CCM	CCM X18, Pin 13	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
3	E/A	Data link to CCM, BC and LKM	CCM X18, Pin 25 and BC, LKM	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
4	E/A	Data link to CCM	CCM X18, Pin 9	Square-wave 0 – 5 V	None	Test program in BMW Service Tester
5	E	Battery charge indicator lamp Terminal 61	Alternator	B+	None	
6	E	Oil pressure switch	Pressure switch	B–	OK/not OK	
7	E	Terminal 15	Fuse	B+	Voltage	
8	E	ASC indicator lamp	ASC control unit	B–	OK/not OK	
9	E	Oil temperature	Temperature sensor	0 – 12 V	Temperature ranges	only on E34/M5
10	A	Ground brake pad sensor	Rear brake pad sensor	Ground	OK/not OK	Front and rear sensors are interconnected
11	E	Trailer turn signal indicator	Relay	B+	None	
12	E	Terminal 30	Fuse	B+	None	
13	E	Terminal 30	Fuse	B+	None	
14	E	Brake pressure	Pressure switch	B–	OK/not OK	only on H31 brake system
15	E	Brake fluid level	Level switch	B–	OK/not OK	
16	E	SIA reset	Diagnostic socket Pin 7	B–	None	at B– SIA reset
17	E	ti-signal from DME	DME control unit	Square–wave	0 ms/applied	
18	E	tD-signal from DME	DME control unit	Square–wave	Engine speed value	

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
19	E	ti-signal 2 from DME II	DME II control unit	Square–wave	0 ms/applied	Line connected as of model year 1990
20	E	ABS indicator lamp	ABS control unit	B–	None	
21	E	Terminal R for airbag indicator lamp	Ignition switch	B+	None	
22	E	Main beam indicator	Light switch	B+	None	
23	E/A	Data link DAC to CCM and BC	CCM X18, Pin 7	Square-wave 0–5V	None	Test program in BMW Service Tester
24	A	Coolant temperature ground	Temperature sensor	B–	Temperature range	
25	E	Brake pad sensor input	Front brake pad sensor	approx.12 V	not OK	Front and rear sensors are interconnected
26	E	Coolant temperature input	Temperature sensor	0 – 12 V	Temperature range	

Pin Assignments at Instrument Cluster Connector 3, X502

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
1	E	Fog light indicator lamp	Fog light switch	B+	None	
2	A	Output for gong signal	Acoustic generator	B–	None	
3	E	Check engine lamp	DME control unit	B–	None	USA versions only
4	E	Automatic transmission range indicator	Selector lever	B+	Gear	
5	E	Automatic transmission range indicator	Selector lever	B+	Gear	
6	E	Automatic transmission range indicator	Selector lever	B+	Gear	

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
7		Not used				
8	E	EGS program indicator	EGS control unit	B–	Program	
9	E	EGS program indicator	EGS control unit	B–	Program	
10		Not used				
11	E	Automatic transmission range indicator	Selector lever	B+	Gear	
12		Not used				
13		Not used				
14	E	Terminal 58g, lights	Dimmer	Pulses	Voltage value	
15	E	Rear fog light indicator lamp	Fog light switch	B+	None	
16	E	EML indicator lamp	EML control unit	B–	None	
17	E	EML indicator lamp	EML control unit	B–	None	
18	A	Output speed-A signal	Various control units	Square–wave	None	approx. 12 V can be measured when at rest
19		Not used				
20		Terminal 61 auxiliary alternator	Auxiliary alternator	B+	None	as of software 0.90 only
21		Not used				
22		Not used				
23	A	CC-button for bc displays	BC, Pin 14	B–	None	B– clears BC display in instrument cluster display
24		Not used				
25	E	Left turn signal indicator	Relay	B+	None	
26	E	Right turn signal indicator	Relay	B+	None	

Pin Assignments at Instrument Cluster Connector 4, X271

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
1		Not used				
2	E	Tank reserve lamp	Tank sensor	B–	ON/OFF	Lamp lighting is controlled via electronics.
3		Not used				
4	E	Tank contents	Tank sensor	0 – 12 V	Measuring bar	
5		Not used				
6		Not used				
7	E	Handbrake	Handbrake switch	B–	ON/OFF	
8	E	Tachogenerator input	Tachogenerator	Square-wave 0 to 12 V	Vehicle speed	
9	A	Position pulse DWA		Square-wave 0 to 12 V	None	
10	A	Tachogenerator ground		B–	Vehicle speed	
11		Not used				
12		Not used				

Pin Assignments at LKM Connector, X12 (Pin Assignments in Area of Check-Control)

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
4		Data link to CCM	CCM X18, Pin 4	Square-wave 0 – 5 V	Message	
5		Data link to CCM	CCM X19, Pin 14	Square-wave 0 – 5 V	Message	
23		Data link to CCM and instrument cluster	CCM X18, Pin 25	Square-wave 0 – 5 V	Message	
24		Ground for lamp test	Ground	B–	Message	
25		Operating voltage for lamp test	CCM X 18, Pin 11	B+	Message	

Pin Assignments at CCM Connector blue, X18

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
1	E	Driver's door contact	Door contact switch	B–	OPEN/CLOSE	
2	E	ASC defect	ASC control unit	B–	OK/not OK	
3		Not used				
4	E	ASC controls	ASC control unit	B–	controls	
5	E	Door contact, rear doors	Door contact switch	B–	OPEN/CLOSE	Connected only for E32 and E34/M5.
6	E	Terminal 31, ground	Ground	B–		
7	E/A	Data link to instrument cluster and BC	Instrument cluster X16, Pin 23	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
8	E	Terminal 30	Fuse	B+	None	

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
9		internal				
10	E/A	Data link to LKM	LKM Pin 4	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
11	A	Operating voltage for LKM (lamp test)	LKM Pin 25	B+	Message	Test program in BMW Service Tester
12	E	Terminal R	Fuse	B+	None	
13	E/A	Data link to instrument cluster	Instrument cluster X16, Pin 2	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
14	E	Catalytic converter temperature	Catalytic converter temperature switch	B–	OK/not OK	Japan versions only
15 to 24		Not used				
25	E/A	Data link to instrument cluster, LKM and BC	Instrument cluster X16, Pin 3	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
26	E	Dynamic engine oil level	Level switch	B–	Status texts	

Pin Assignments at CCM Connector green, X19

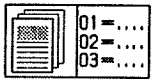
Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
1		Wheel camber warning (for level control)	Wheel camber warning switch	B–	OK/not OK	Ground jumper, when no warning switch installed
2		Oil level, level control	Level switch	B–	OK/not OK	
3		Wash water level	Level switch	B–	OK/not OK	
4		Coolant level	Level switch	B–	OK/not OK	

Pin	Type	Description/function	Connection	Signal type	Tester display	Measurement notes
5		EGS	EGS control unit	B–	OK/not OK	Ground jumper, when no EGS installed
6		Not used				
7		Brake light test switch	Brake light test switch	B–	ON/OFF	
8		Static engine oil level,	Level switch	B– via 1KΩ resistor	Status texts	
9		Trailer module	Trailer module	B–	OK/not OK	Ground jumper when no AHM installed
10		Ignition key	Ignition lock switch	B–	Status texts	In USA version only
11		Seat belt	Belt switch	B–	Status texts	USA and KSA only
12		Not used				
13		Rear lid	Rear lid switch	B–	OPEN/CLOSED	
14		Data link to LKM	LKM Pin 5	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
15 to 23		Not used				
24		Data link to Instrument cluster and LKM	Instrument cluster X16, Pin 3, LKM Pin 23	Square-wave 0 – 5 V	Message	Test program in BMW Service Tester
25		Not used				
26	E	Passenger's door contact	Door contact switch	B–	OPEN/CLOSE	Connected only for E32 and E34/M5.

Troubleshooting

Notes

- Troubleshooting with the BMW DIAGNOSTIC SYSTEM
- Battery charged, U-min = 12 V
- **If EML is installed:** The defect code memory of the EML control unit is cleared when the connector 3 (X502, colour white) is removed. Always monitor EML defect code memory beforehand.!
- Remove and install the instrument cluster, check-control module and lamp control module only when the ignition is off.
- The plug connections can be very easily damaged when unsuitable measuring equipment is used. Therefore, only carry out checks at the plug connections using the special adapter leads provided for this purpose.
- Take particular care when renewing indicator lamps to ensure that only replacement lamps with the specified rating are used.



Defect Code Table

♦D♦900 Defect code memory – stored defect codes:

One or several defect codes stored → Defect codes 01 – 05

Malfunctions:

Failure of individual check-control signal generator systems → Defect code 06

Failure of tank indicator lamp → Defect code 07

Temperature display defective → Defect code 08

Fuel consumption indicator (KVA) defective → Defect code 09

Oil temperature gauge defective → Defect code 10

Tachometer defective → Defect code 11

Speedometer defective → Defect code 12

Failure of check-control → Defect code 13

Text message check-control in display unit → Defect code 13

Simultaneous failure of several functions in the instrument cluster → Defect code 14

Diagnostic procedure not possible with instrument cluster → Defect code 14

Text message "Code Unit" in instrument cluster → Defect code 14

Fuel gauge defective → Defect code 15

Speed-A signal defective → Defect code 16

Defect Codes 01 – 05

One or several defect codes between 01 and 05 stored.

Explanation: These defect codes are stored when incorrect data are stored in the coding plug or when the coding plug is defective.

Troubleshooting:

1. Clear defect code memory.
2. Switch ignition off and on.
3. If the defect code is stored once again, renew coding plug.

Defect Code 06

Failure of Individual Check-Control Signal Generator Systems

Notes

A complete list of signal generator systems is provided in the chapter - Functional Description.

In compliance with this diagnostic procedure, there is a fault when the signal generator signals a system as being defective although the system is OK in the vehicle or when the system in the vehicle is defective but the signal generator does not detect a fault.

The check-control text display in the instrument cluster is mainly linked to a series of additional conditions (engine speed, vehicle speed, time conditions). The signal generator system should therefore only be checked with the BMW DIAGNOSTIC SYSTEM (display without additional conditions).

General Troubleshooting

– not applicable to oil level switch, EGS, ASC, AHM –

– 1. Detach connector at signal generator. Alternately connect wire to check control module (CCM) or instrument cluster directly to ground or interrupt. The display should change between "OK" and "not OK". If the display does not change, check wire to the CCM or to the instrument cluster and repair if necessary. If wire is OK, renew CCM or instrument cluster electronic assembly.

– 2. Using suitable lead, alternately bypass or interrupt Pin 1 and Pin 2 of connector. The display should change between "OK" and "not OK". If the display does not change, the ground connection is defective. Repair wire.

– 3. If the display changes correctly when bypassing Pin 1 and Pin 2, the signal generator is defective.

Troubleshooting Engine Oil Level Switch

– 1. Complete defect detection with BMW DIAGNOSTIC SYSTEM.

– 2. If both sensors (static and dynamic) are displayed as being defective), check ground wire to the 3-pin connector of the oil level switch Pin 2 and repair if necessary.

– 3. Checking the engine oil level switch: Detach 3-pin connector.
Measure resistance at plug part of oil level switch.
Nominal values:
Between Pin 2 and Pin 3 < 1 Ω.
Between Pin 2 and Pin 1 = approx. 1kΩ.

Renew defective oil level switch.

Troubleshooting Trailer Module (AHM)

– 1. Defect signal although no trailer module (AHM) installed: Check short-circuit jumper at 6-pin connector in luggage compartment (on left, behind trim panel), repair if necessary. If jumper is OK, repair wire to CCM connector (green) Pin 9.

– 2. Trailer module (AHM) installed: Check trailer module (AHM) main fuse in the front power distribution box and repair if necessary.

– 3. Trailer module (AHM) main fuse OK: Check all light fuses in the AHM, repair defective fuses. Installation location AHM: Left of luggage compartment, behind trim panel.

– 4. Fuses OK: Detach 6-pin connector between AHM and vehicle wire harness. Connect jumper between Pin 5 and Pin 6 (wire end vehicle wire harness). If the trailer module (AHM) is now shown as OK, replace trailer module.

– 5. Defect displayed despite bypass: Check ground wire to trailer module (AHM) and wire to CCM connector (green) Pin 9 and repair if necessary.

Troubleshooting EGS/ASC Messages

– 1. Check EGS (Section 2460) or ASC (Section 3450).

– 2. If EGS or ASC OK: Check wire from CCM to control unit and repair if necessary.

Defect Code 07

Failure of Tank Indicator Lamp

Possible cause: Lamp, wire, reserve contact in immersion tube sending unit

Note: The indicator lamp is electronically damped. The indication, however, is not damped in the instrument cluster ♦D♦Status displays.

Troubleshooting:

1. If the fuel gauge is also defective, continue with defect code 15.
2. Check the lamp with ♦D♦System test. Replace defective lamp.
3. If lamp OK, connect wire from immersion tube sending unit (Pin 2) to instrument cluster directly to ground. Is the reserve contact indicated as ON in ♦D♦Instrument cluster status displays?
If no: Repair wire.
If yes: Replace immersion tube sending unit.

Defect Code 08

Temperature Gauge Defective

Possible cause: Indicator instrument, temperature sensor, wires

Note: It is possible to compare the temperature display in the instrument cluster (divided into areas) with the temperature display in the DME program.

Troubleshooting:

1. Check temperature indicator instrument with ♦D♦System test. Renew defective instrument.
2. ♦D♦Instrument cluster status displays. With ♦⇒♦ to temperature display. If short is displayed: Check wires from temperature sensor to the instrument cluster connector 2 (beige) Pin 24 and Pin 26 for a short to ground, repair defective wire.
If a break is displayed: Check plug connection and wires from the temperature sensor to the instrument cluster connector 2 (beige) Pin 24 and Pin 26 for a break, repair if necessary.
3. Start engine. Compare temperature display on the screen with the temperature indication in the ♦D♦DME program. In the case of deviations, renew temperature sensor.

Defect Code 09

Fuel Consumption Indicator (KVA) Defective

Possible cause: KVA indicator instrument, ti-signal to DME

Troubleshooting:

1. Check instrument with ♦D♦ System test. Renew defective instrument.

2. Check the ti-signal with ♦D♦ Instrument cluster status lists. Start engine for check. Repair defective wire.
Note for M 70: The wire for the ti-signal 2 from the DME 2 will be installed as of model year 1990.

Defect Code 10

Oil Temperature Gauge Defective – *M5 only* –

Possible cause: Indicator instrument, temperature sensor, wires

Note: In the M5 model, an oil temperature gauge is installed instead of the fuel consumption indicator.

Troubleshooting:

1. Check the oil temperature indicator instrument with ♦D♦ System test. Renew defective instrument.

2. ♦D♦ Instrument cluster status displays. With ♦⇒♦ to oil temperature.
If short is displayed: Check wire from the temperature sensor to the instrument cluster connector 2 (beige) Pin 9 for a short to ground. Repair defective wire.
If a break is displayed: Check ground wire for oil temperature sensor and wire from temperature sensor to the instrument cluster connector 2 (beige) Pin 9 for a break, repair if necessary.

3. If wires are OK, renew sensor.

Defect Code 11

Tachometer Defective

Possible cause: Instrument, wires

Troubleshooting:

1. Check instrument with ♦D♦System test. Renew defective instrument.

2. Check the TD-signal with ♦D♦Instrument cluster status lists. Start engine for the test. Test at various engine speeds (note indication delay!). If the speeds are not displayed on the screen, repair wire for the instrument cluster connector 2 (beige) Pin 18 (TD-signal) to the DME control unit.

3. If the engine speed values displayed on the screen and in the tachometer do not agree (permissible deviation +/– 2% of final scale value), renew tachometer.

Defect Code 12

Speedometer Defective

Possible cause: Tachogenerator, wires, speedometer

Troubleshooting:

1. Simulate instrument test with ♦D♦speed signal. If the speed value indicated by the speedometer is not within the permissible range (for nominal values, see microfiche 'Technical Data'), renew speedometer.

2. If speedometer is OK during simulation, but defective during driving, check wires to the tachogenerator and repair if necessary.

3. If wires and speedometer are OK, replace tachogenerator.

Defect Code 13

Failure of Check-Control

Text message check-control in display unit

Possible cause:
Power supply from CCM or LKM defective.
Data links between instrument cluster and CCM (or BC) defective.
Data links between CCM and LKM defective.

Troubleshooting: As displayed on screen (BMW Service Tester) or in accordance with Section 6200.0A Instrument Cluster/Check-Control – Chapter Troubleshooting, Defect code 04.

Defect Code 14

Simultaneous failure of several instrument cluster functions

Diagnosis with instrument cluster not possible

Text message "Code Unit" in the instrument cluster display unit

Possible cause: Fuses, wires, RxD or TxD link, electronic assembly

Note: Observe notes in BMW DIAGNOSTIC SYSTEM (screen display).

Troubleshooting

Is the message "Code Unit" indicated in the instrument cluster display?

— yes → Check installation of coding plug. Renew coding plug if necessary.

— * —

no ↓

Are all fuses OK?

— no → Renew defective fuse.

— * —

yes ↓

Switch on ignition. ♦D♦ Is diagnostic mode possible with instrument cluster?

— yes → ♦D♦ Instrument cluster status lists. Switch on ignition! Is battery voltage displayed for terminal 15?

— no → Repair wire to connector 2 (beige) Pin 7.

— * —

yes ↓

no ↓

♦D♦ Defect code memory. Is a defect code stored? — yes → Clear defect code memory. Then switch ignition off and on. If the defect code is stored once again, renew coding plug.

— * —

no ↓

Check individual defective functions (see defect code table).

— * —

no ↓

Remove instrument cluster. Is approx. battery voltage applied at connector 2 (beige) Pin 12 and Pin 13? — no → Repair wire to fuse.

— * —

yes ↓

Remove connector 1 (brown). Switch on ignition! Is approx. battery voltage applied at Pin 3 and Pin 15? — no → Repair wire to fuse.

— * —

yes ↓

Is ground to connector 1 Pin 1 and Pin 13 OK? — no → Repair wire.

— * —

yes ↓

Are RxD link to connector 1 Pin 2 and TxD diagnostic link to connector 1 Pin 14 OK? — no → Repair defective wire.

|

yes

↓

Is diagnosis with other control units possible? — no → Continue troubleshooting as displayed on screen.

— * —

|

yes

↓

Renew instrument cluster pc-board.

— * —

Defect Code 15

Fuel Gauge Defective

Possible cause: Immersion tube sending unit, ground wire, wires to instrument cluster, indicator instrument

Troubleshooting

Perform system test. Does the fuel gauge instrument function correctly during system text?

— no → Renew fuel gauge indicator instrument.

— * —

|

yes

↓

♦D♦ Instrument cluster status lists. With ♦⇒♦ to fuel gauge. Is "**short?**" indicated on display screen?

— yes → Check wire from instrument cluster connector 4 (grey) Pin 4 for a short to ground, repair if necessary. If wire is OK, renew immersion tube sending unit.

— * —

|

no

↓

Is "**break?**" indicated on the display screen?

— yes → Detach 6-pin connector at the immersion tube sending unit. Connect jumper between Pin 1 (ground) and Pin 3 (to instrument cluster) (wire harness side). Is "**short?**" now indicated on the display screen?

— yes → Renew immersion tube sending unit.

— * —

|
no
↓

Connect Pin 3 directly to vehicle ground. Is "**short?**" now indicated on the display screen?

— yes → Repair ground wire to Pin 1.

— * —

|
no
↓

Repair wire from Pin 3 of the connector at the immersion tube sending unit to the instrument cluster connector 4 (grey) Pin 4.

— * —

|
no
↓

Check immersion tube sending unit in accordance with specifications provided in the Technical Data (microfiche), renew if necessary.

— * —

Defect Code 16

Speed-A Signal Defective

Note: This troubleshooting procedure is used to check whether the instrument cluster correctly makes available a speed-A signal at other control units.

Troubleshooting

Is the speedometer operating correctly?
— no → Continue with defect code 12.

—*—

yes ↓

Approx. battery voltage is applied at the speed-A line when at rest. Measure voltage at wire. Is battery voltage applied?
— no → Check wire to instrument cluster connector 3 (white) Pin 18 for a break, repair if necessary.

—*—

yes ↓

Remove instrument cluster. Connect special adapter to instrument cluster connector 3. Connect instrument cluster to the adapters so that it is fully operable. Do not connect connector 3 to wire harness. ♦M♦ Frequency measurement at Pin 18. ♦D♦ Simulate speed signal – enter any frequency or speed via the diagnostic system. Is the entered frequency measured in the BMW Service Tester? (Switchover is possible between diagnosis and multimeter functions with the "D" button).

— no → Renew instrument cluster pc-board.

—*—

|

yes

↓

Instrument cluster OK If there is still a defect in the vehicle check whether the speed-A signal is distorted by a defective control unit connected to the speed-A line.

—*—