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E70 Displays, Indicators and Controls

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Displays, Indicators and Controls

Model: E70

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Describe the different Displays, Indicators and Controls on the E70

- Identify the changes to the Displays, Indicators and Controls on the new BMW X5

Introduction

Displays, Indicators and Controls

As in all other BMW models, the operating and control concept of the BMW X5 is based on clear and optimum structuring of the cockpit. Fewer switches simplify logical operation. The display, indicator and control elements are organized and arranged depending on their function.

This product information is subdivided into the following sections:

- Instrument cluster

- Central information display (CID)

- Connected service

- Personal profile

Note: The head-up display HUD is described in a separate Product Information.

Display, Indicator and Control Concept X5

Index	Explanation	Index	Explanation
1	Steering column/steering wheel	4	Central information display (CID)
2	Instrument cluster	5	Gear selector switch GWS
3	Head-up display HUD	6	Controller

Instrument Cluster

The instrument cluster in the BMW X5 is a further development of the instrument cluster fitted in the models of the BMW 5 Series and BMW 3 Series.

The classic BMW two-eye design draws attention to the two circular instruments. The hanging arrangement of the needles in the analog instruments for the fuel level and economy control is now standard in all BMW instrument clusters.

The scales in the instrument cluster are specific to the country, vehicle and engine.

The LC display is located in the center between the two large pointer instruments.

Central Information Display (CID)

The design of the central information display CID is identical to the CID fitted in the BMW 5 Series, and BMW 3 Series.

The BMW X5 features the same software as used in the CID installed in the BMW 5 Series and BMW 3 Series.

As on the mid-range and luxury BMW models, the system is operated by means of the central control element, the controller. All functions are identical and are described in detail in the BMW X5 Owner's Handbook.

This product information only outlines the changes compared to the BMW 3 Series and BMW 5 Series.

Connected Service

Connected Service which consists of several modules opens up new options for the ever expanding communication between vehicle and service.

Automatic, vehicle-specific acquisitions of serve requirements through to optimization of the reception procedure. Precisely planned schedules, early problem detection and flexible service are only some of the service modules already implemented by BMW in the current model series and which are now also used in the new BMW X5.

Personal Profile

The "Personal profile" systems allows the driver to set several functions of the BMW X5 to suit his/her personal requirements.

Personal profile stores the data entered by the driver such as automatic setting of the outside mirrors or speed-dependent volume in the corresponding control units.

As soon as the vehicle is unlocked using the identification transmitter, the system recognizes the corresponding settings belonging to the identification transmitter.

Up to three different basic settings can be adapted for three different persons. The precondition is that each of the three persons has his/her own identification transmitter.

Note: For detailed information, please refer to the complete documentation for the new BMW 3 Series and BMW 5 Series.

System Overview

Instrument Cluster System Circuit Diagram
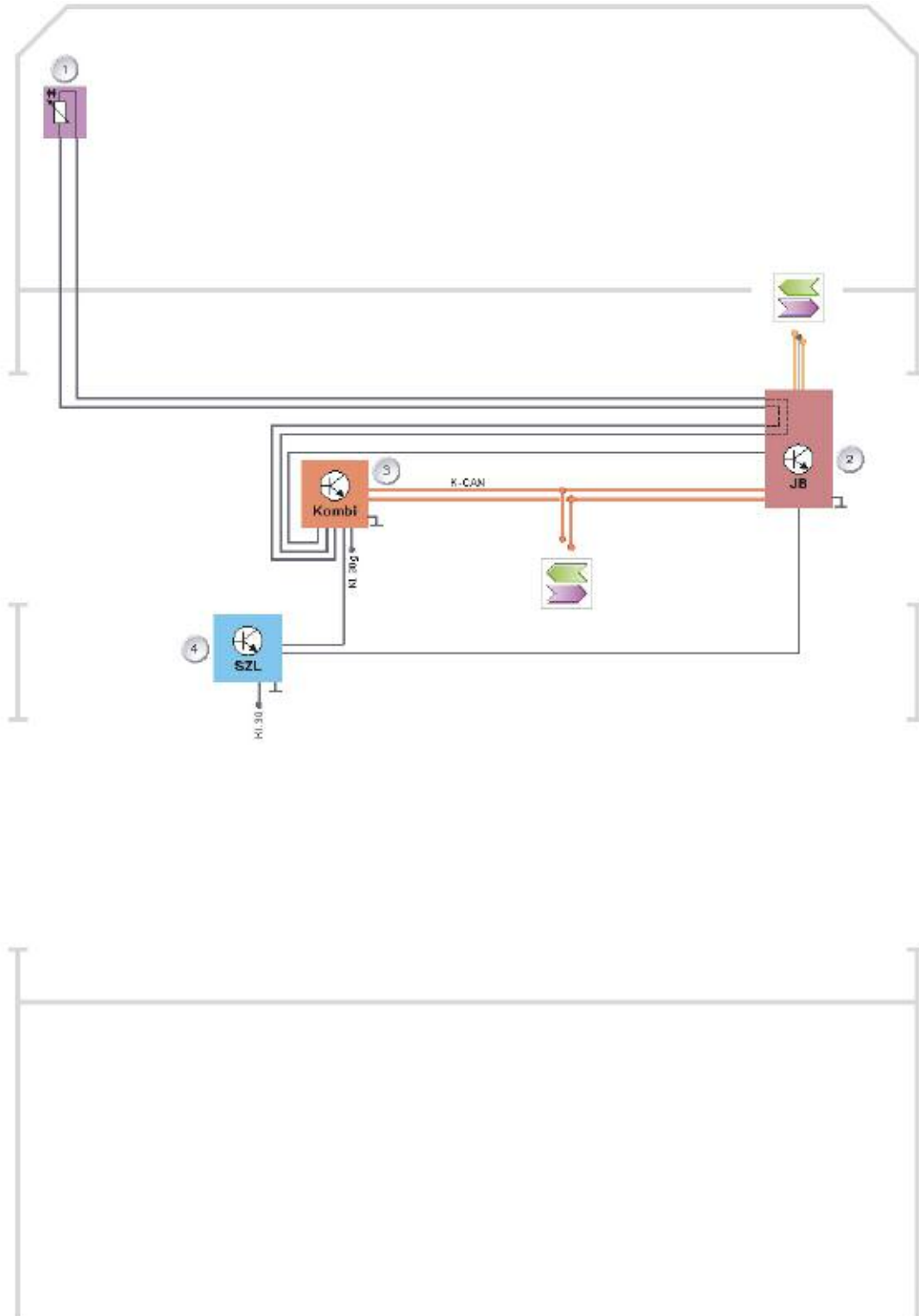
Instrument Cluster System Circuit Diagram Legend

Index	Explanation	Index	Explanation
1	Outside temperature sensor	3	Instrument cluster
2	Junction box JB	4	Steering column switch cluster SZL

Signal

The central information display CID receives a large number of different bus signals that provide information (speed, CC messages, etc.) for the various displays and indicators. These bus signals are not responsible for the general functionality of the CID and are therefore not listed in this product information.

Central Information Display (CID) System Circuit Diagram
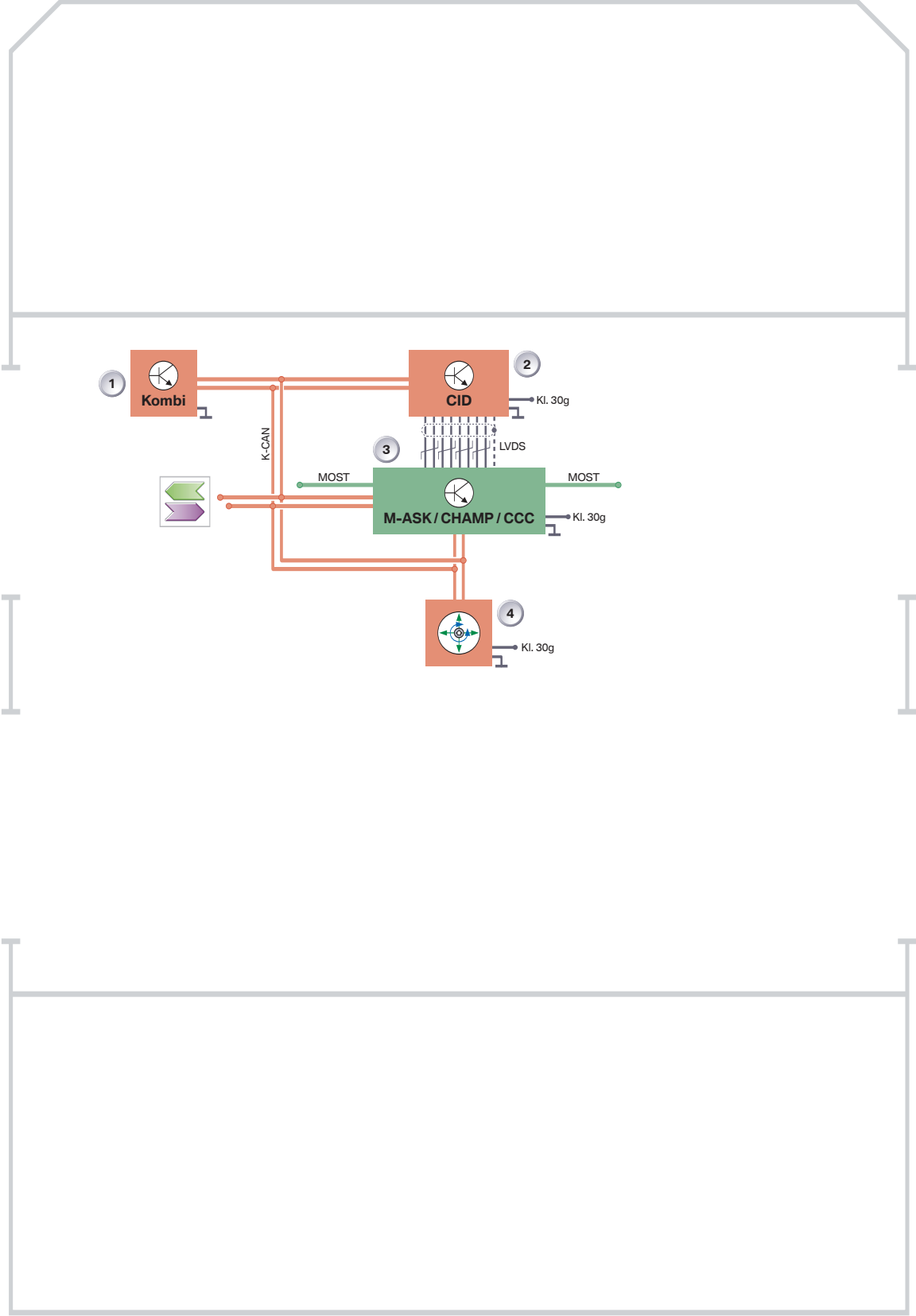
Kombi — 1

CID — 2

Kl. 30g

K-CAN

LVDS

MOST — M-ASK / CHAMP / CCC — 3 — MOST

Kl. 30g

4

Kl. 30g

Central Information Display (CID) System Circuit Diagram Legend

Index	Explanation	Index	Explanation
1	Instrument cluster	3	Multi-audio system controller Central head unit on multimedia platform CHAMP/Car communication computer CCC
2	Central Information Display (CID)	4	Controller

Signal
The central information display CID receives a large number of different bus signals that provide information (speed,CC messages, etc.) for the various displays and indicators. These bus signals are not responsible for the general functionality of the CID and are therefore not listed in this product information.

Note: The instrument cluster in the BMW X5 has no gateway function.

Functions

Instrument Cluster

The instrument cluster receives information on the wiring harness in the form of analog and digital electrical signals. These signals are processed and displayed in the instrument cluster or passed on as information to other control units.

The instrument cluster on the BMW X5 features several functions that have been changed compared to previous models.

Gear and Program Display

■ Gear Display
The gear display is a coded function that is used for display and indication purposes in the instrument cluster display on automatic transmission vehicles.

■ Gear Position Display
All gear positions are shown in a frame. This form of representation reduces the risk of misinterpreting the displayed information in the event of partial failure of the display.

Fuel Gauge

The fuel level is shown by an analog fuel gauge.

Fuel reserve The reserve warning is no longer given by an indicator lamp but is now given by a check control message. A fuel pump symbol lights up for 23 seconds in the LC display as soon as the reserve level is reached.

This display is permanently activated at a range of approximately 50 km (31 miles).

On-board Computer

Main Menu
A graphic symbol in the upper display window is assigned to each main menu item. Menu items that are deactivated during vehicle operation are not shown.

Each menu can be interrupted at a certain position by briefly pressing the BC button. In addition to this active termination, there is an automatic termination that takes place 15 seconds after the last entry.

The display for the, CHAMP and CCC are shown on the central information display CID.

BC Function in the Instrument Cluster
The following table lists the BC functions that can be selected in the instrument cluster depending on the options.

Function	Display	Active as from	Activities	Radio Prof.	MASK/ CHAMP/ CCC
Check Control messages		Terminal R ON	Error message system with max. 72 symbols Fault prioritising Audible warning and text message	X	X
CBS4 workshop mode		Kl. 15	Activation via reset button ON time > 10 sec	X	

X = Can be selected via instrument cluster

Central Information Display (CID)

The central information display CID is designed the same as the CID installed in the BMW 3 Series, BMW 5 Series and BMW 7 Series.

User Interface
The user interface in the CID is identical to that of the CID installed in the BMW 5 Series, BMW 3 Series.

A detailed description of the main menu and of the procedure for selecting the individual functions is provided in the new BMW X5 Owner's Handbook.

System Components

Instrument Cluster

The instrument cluster is secured by means of two pan-head tapping screws to the instrument panel.

The instrument cluster comprises the following components:

- Instrument dials

- Indicator and warning lamps

- Program and gear display for automatic transmission and sequential manual gearbox

- Sound generator, for directional indicator click.

    with the output via the radio speakers on CHAMP and CCC.

- Button for resetting trip odometer and selecting condition-based service in CBS menu.

    Press button for more than 4 seconds to select the workshop menu. The settings are selected via the rocker switch in the steering column lever.

- Connected components which serve to activate the displays in the instrument cluster (see system overview/system circuit diagram).

The following components are described in detail:

- Display areas

- Indicator and warning lamps

- LC display

Note: The speed for the cruise control and the warning zone of the tachometer is done by a moving dial indicator. The moving dial indicators are located directly behind the speedometer and tachometer scales.

Display Areas Components

The instrument cluster features display areas for:

- Speedometer

- Tachometer

- Fuel consumption indicator

- Fuel gauge

- Outside temperature display

- Indicator and warning lamps

- LC display

- Program and gear display

Note: A shroud prevents reflections in the acutely angled windshield

Speedometer
The speedometer displays vehicle speed scale in both mph and kmh.

Tachometer
On the BMW 3 Series, engine speed is displayed using the following signal path:

- The DME control unit sends the engine speed on the PT-CAN and K-CAN.

- Using a characteristic curve, step pulses for actuating the stepper motor are assigned to the effective engine speed.

Note: The engine speed range is increased to 7500 rpm on vehicles equipped with 6- cylinder engines.

Fuel Consumption Indicator
The economy control is an analog indicator in the instrument cluster.

Fuel Gauge
The fuel level is indicated by a pointer instrument integrated in the speedometer on the left. A a fuel gauge icon lights up in the instrument cluster when the level drops below a factory-coded threshold (standard = 2 gallons or 8 liters).

A warning tone additionally sounds on reaching the reserve threshold.

Outside Temperature Display
A temperature sensor measures the outside temperature and displays it in the instrument cluster.

In ignition key position 0, the instrument cluster applies terminal 30g current to the temperature sensor every 10 minutes.

The instrument cluster makes available the current outside temperature in the form of a data telegram via the K-CAN.

Indicator and Warning Lamps
The indicator and warning lamps are activated by the processor in the instrument cluster.

All important and legally stipulated indicator and warning lamps are activated at terminal 15 ON during the pre-drive check.

The indicator and warning lamps can be illuminated in different colors or combinations.

The significance of the indicator and warning lamps as well as the color assignments are described in detail in the BMW X5 Owner's Handbook.

LC Display
The LC display is divided into two areas. The time and outside temperature are shown in the upper display along with the CC messages and CBS images.

The on-board computer functions, CBS messages, Trip odometer as well as the program display for automatic transmission are shown in the lower display.

Manipulation Dot

Different data is stored in the instrument cluster and in the CAS 3 when a dot appears to the left of the trip odometer recorder.

The manipulation dot is indicated when the comparison of the stored vehicle identification number does not agree.

Different data may be caused, for example, by replacing one of these two control units.

Sound Generators

Audible warnings are given in support of check control messages. The instrument cluster controls these warnings via the K-CAN. The warning signals are output by the CHAMP/CCC control unit depending on option. The footwell module is responsible for control of the direction indicator function via the K-CAN.

Note: US vehicles feature an ignition key warning and a seat belt warning.

An uninterrupted warning tone sounds when the driver's door is opened with terminal 15 OFF and the identification transmitter in place.The audible signal is switched off by removing the identification transmitter, closing the door or after 30 minutes.The seat belt warning is activated at terminal 15 ON if the seat belt contact is not closed.The audible warning is intermittent and is no longer than 6 seconds. The indicator and warning lamp remains on.

On-board Computer

There are two versions of the computer available for the BMW X5:

- On-board computer - basic version
- On-board computer - journey computer

Which can be activated by encoding, depending on the vehicle equipment specification.

A detailed description of the functions can be found in the product information on the BMW 3 Series and the Owner's Handbook for the BMW X5.

Show Displays

The menu rocker switch on the direction indicator lever is used to show and scroll through the displays in the instrument cluster.

The individual functions are displayed in the lower display window of the instrument cluster.

Once terminal R is switched on, the computer will display the computer function that was last displayed.

All other functions can be selected by correspondingly operating the rocker switch on the steering column lever.
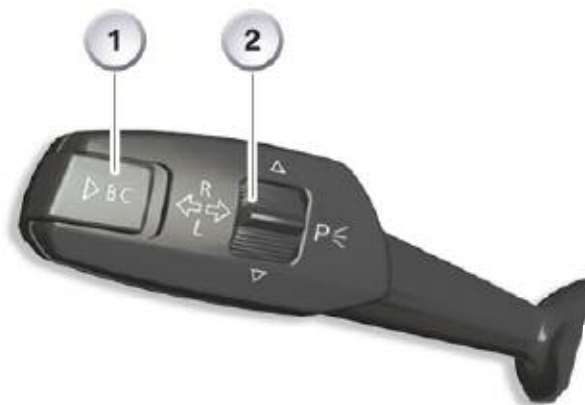
Index	Explanation
1	BC button
2	Menu rocker switch

The sequence of the displayed BC functions is always the same.

Displays in the Central Information Display

All information on the individual service operations can be displayed in the CID.

The CBS functions are accessible under the <Settings> menu item.

A detailed description of the functions can be found in the product information for the BMW 3 Series.

Controller

The operating concept of the controller is identical to that on the other BMW models.

The menu button used to select menus in the CID, is located immediately behind the controller. In addition to the menu button, the second variant features a button to activate/deactivate the voice-activated control system.

Index	Explanation	Index	Explanation
1	Parking brake, automatic	4	Controller
2	Parking brake, electrical	5	Button for voice-activated control system
3	Gear selector lever	6	Button for main menu

A new control unit (shifter) known as the "GWS Gear selector switch" is day to day use. introduced for the first time with the E70. The GWS control unit is located in the center console and is responsible for gear selection.

Note The GWS control unit informs the gearbox of the required gear range via a bus and not by means of a mechanical connection.

Connected Service

As all new BMW models, the BMW X5 offers condition-based service CBS.

CBS displays in the instrument cluster The CBS display always comprises the following two separate displays:

- A color symbol in the upper display

    - Orange for normal

    - Yellow for service due

    - Red for service overdue

- Information on remaining distance and or due date in the lower display.

You will find further information on the CBS displays in the BMW X5 Owner's Handbook under Servicing Systems.

Index	Explanation
1	CBS symbol
2	Remaining distance display
3	Final date information

CBS Symbols

Normal condition	Service due	Service overdue	Explanation
			Engine oil
			Front brakes
			Rear brakes
			Brake fluid
			Vehicle check
			General inspection
			Exhaust-gas test

Service Information

Instrument Cluster Test Functions

The test functions are shown in the LC display of the instrument cluster.

The test functions are used by the BMW service mechanics to check the coding. They also provide help in troubleshooting without the diagnostic tester.

To start function test

- Terminal R ON or terminal 15 ON

- Press and hold the reset button in the instrument cluster for 10 seconds (set/ reset)

Note: The test functions can also be called up by holding down the setting button in the instrument cluster and simultaneously switching on terminal R.

Display of Test Functions
The test functions are shown only in the upper LC display. Locking and unlocking the test functions (test function 19)

Only the first two test functions are freely accessible.

As from the third, all further test functions are locked. The functions can be unlocked only via test function 19.

The test functions are unlocked by entering the sum of the digits in the vehicle identification number.

To end test function

- Ignition key at terminal R or terminal 15 ON

- Press and hold the setting button for longer than 5 seconds or

- calling up test function 21 (RESET).

Note: To protect against unauthorized access, all test functions (with the exception of test 1 and test 2), are locked again after a RESET and "sleep cycle".

Visual System Test
In the visual system test, all the indicator lamps and lights are lit briefly. The needle instruments are moved from the lower to upper stop and back again.

Overview of Test Functions

Test function	Description	Display
01	Instrument cluster identification - Vehicle identification number, last 5 digits	01.00 FGSTNR AB12345
02	System test	02.00 KI TEST
03	Not used	03.00 Not used
04	Electric load values	04.00 VERB-MOM 12,6 l/100 km
05	Range consumption	05.00 RW-VERBR
06	Fuel level	06.00 TANK L R S 24.5 26.7 50
07	Current display values	07.00 KTMP-MOM 104°C
08	Road speed	08.00 V-EFF 123 km/h
09	System voltage	09.00 Ub 13.3 V
10	Not used	10.00 Not used
11	Units	11.00 ZEIT-EINH 24h
12	Calculated time of arrival	12.00 V-ANKUNFT 67,8 km/h
13	Audible signals	13.00 AUDIO LICHT-WARN BLINKER ZS-WARN
14	Self-diagnostics	14.00 FSP-Einträge 10
15	I/O ports processor	15.00 PORT 00 01010111
16	Dimming	16.00 DIMMRAD-CAN 46h

Test function	Description	Display
17	Contrast	17.00 DISP-HEIZ Ein io
18	Not used	18.00 Not used
19	Locking	19.00 LOCK LOCK: ON LOCK. 25
20	Fuel consumption correction	20.00 KORR-VERBR 1000 1er KORR 10er KORR 100er KORR
21	Reset (software reset)	21.00 Reset?

Only the main test functions are listed in the following table. In addition to the majority of test functions there are further equivalent functions for which a similar display appears in the instrument cluster.

Component Replacement and Trial Replacement

There are three possible combinations for replacing the instrument clusters and car access system 3 CAS 3.

- Instrument cluster defective, CAS 3 OK

- CAS 3 defective, instrument cluster OK

- CAS 3 and instrument cluster must be replaced.

Simultaneous replacement of CAS 3 and the instrument cluster should be avoided. The odometer reading will be lost as a result. In principle, it is also possible to carry out a trial replacement of the instrument cluster and CAS 3.

Activating Service Mode

Select main menu and press and hold the controller. Tactile feedback will then be generated.

- Turn controller 3 stops clockwise

- Turn controller 3 stops anti-clockwise

- Turn controller 1 stop clockwise

- Turn controller 1 stop anti-clockwise

- Turn controller 1 stop clockwise

- Press the controller to confirm, Service mode will then appear in the CID.
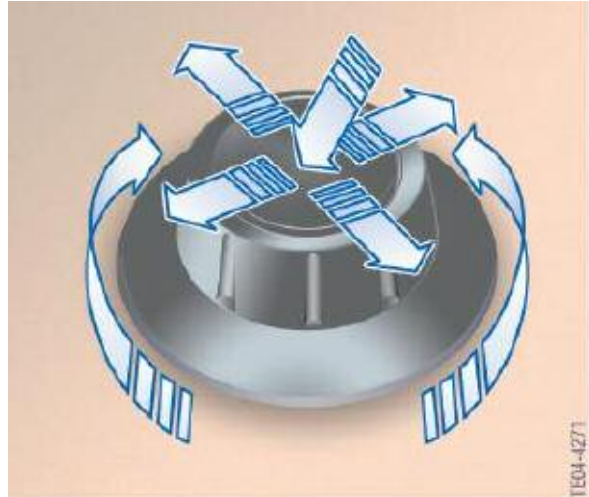
Resetting the Service Operations

When one or more service operations have been carried out, like front brake pads have been replaced, these operations must be reset to their full service interval.

There are two options for resetting the service operations:

1. Legally required service operations such as the vehicle inspection (HU) and exhaust emission inspection (AU) can only be reset in the "Service" menu.

2. All vehicle service functions such as changing spark plugs are reset via the reset button for the trip odometer recorder in the instrument cluster.

If the reset button is pressed for longer than ten seconds, the reset mode opens automatically.

- "Reset?" is displayed in the lower display window.

- In the upper display window, the CBS symbol, like for "engine oil service overdue" will be displayed.

- Press the reset button until the time/distance dependent displays in the lower display window are replaced with dashes.

Note: A reset cannot be performed at more than 80 percent availability. A reset lock will be shown in the display with "OK".

Entering Due Date

The due date for the legally required general inspection and exhaust emission inspection can be entered only in the central information display with the aid of the controller.

Since different laws are applicable depending on the country, country-specific intervals can be found at this point. For markets where no such regulation applies for general inspection and exhaust test, this function can be eliminated using the software.

Carry out the following procedure to enter the due date:

- Select "Service" from the "Settings" menu and confirm
- Select service operation "§ Vehicle inspection" for example and confirm. "Set service date" is marked.
- Press controller to activate the input box.
- Enter the date by turning and pressing the controller.
- Select "Exit display" and confirm to return to the last setting.

Index	Explanation	Index	Explanation
1	Exit display, return to last setting	3	Text field for further information
2	Date for statutory vehicle inspection	4	Activate deadline in (2)