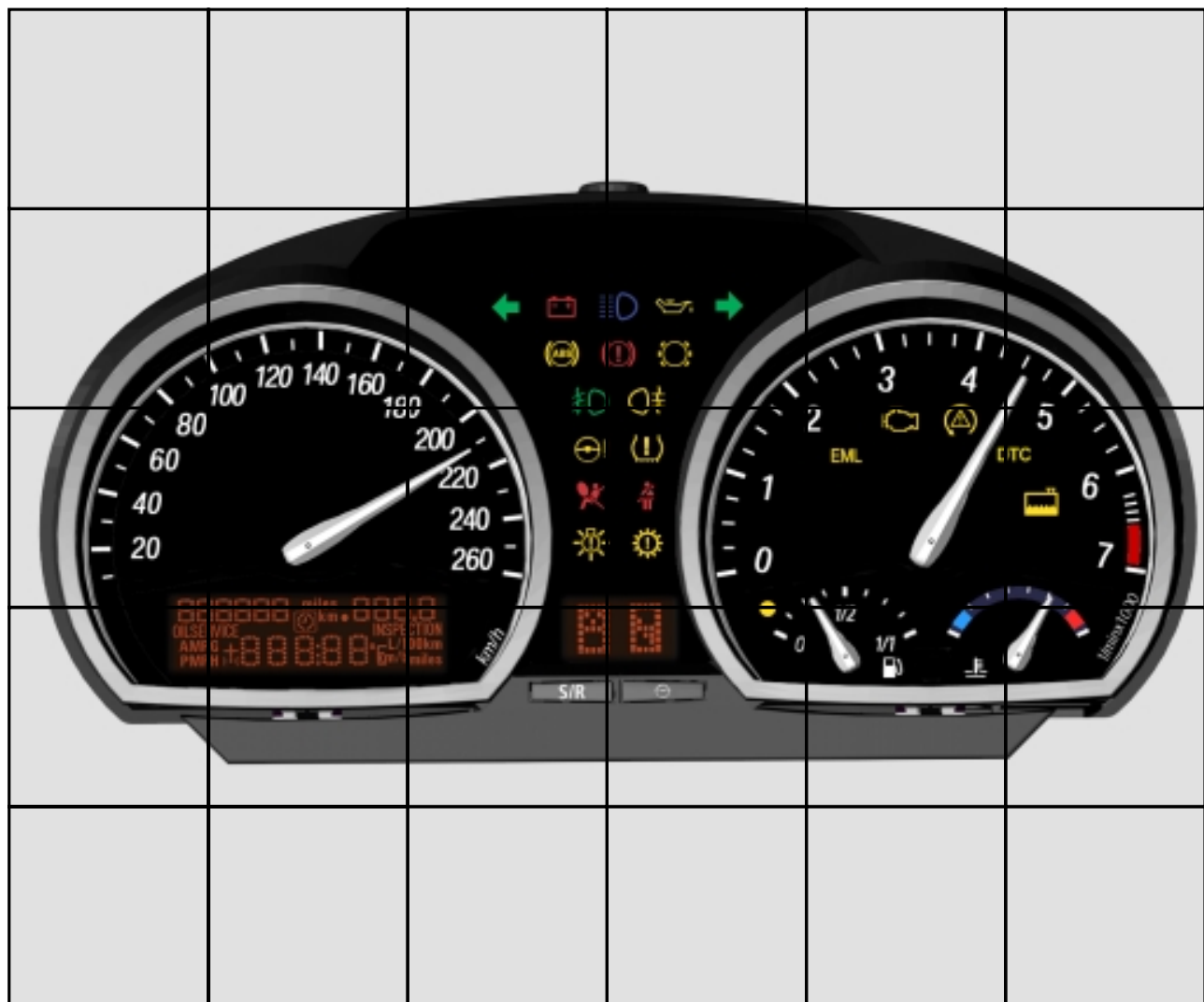




E85 Instrument Cluster

Seminar Working Material



NOTE

The information contained in this training course manual is intended solely for participants of the BMW Service Training course.

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

© 2001 BMW AG

München, Germany. Reprints of this manual or its parts
require the written approval of BMW AG, München

VS-42 MFP-HGK-BRK-E85_1110

Contents

	Page
CHAP 1 Instrument cluster	1
Introduction	1
System overview	2
- Input/output signals	2
- System schematic	4
Introduction	7
- New system features/modifications	7
Components	7
- Display areas	9
- Indicator and warning lamps	12
- LC display	18
- Program and gear display	18
- Acoustic generators	19
- Setting buttons	20
System functions	21
- Bus network	21
- On-board computer	23
- Distance to junction	23
- Display in Multi-Information Radio	24
- Redundant data storage (RDA)	25
Country-specific version	26
- Country-specific version: instrument cluster	26
Notes for Service	30
- Test functions	30
- Diagnosis	35
SIA IV service interval indicator	37

Instrument cluster

Introduction

Instrument cluster/SIA

The instrument cluster in the Z4 has a sporty appearance in line with a roadster.

The instrument cluster is very compact. The needle instruments are integrated in 2 housing attachments.

The two needle instruments for the speedometer and the revcounter are thus the predominant visual features.

The needle instruments for the fuel gauge and the coolant temperature gauge are integrated in the revcounter.

The speedometer incorporates an LC display, which shows e.g. the total mileage (odometer), the trip distance (trip odometer), the time, the on-board computer functions and the SIA service interval indicator.

Between the large needle instruments are the indicator and warning lamps and the program and gear display.

The program and gear display is only featured in vehicles with automatic transmissions and SMG sequential manual gearboxes.

The instrument cluster is the central gateway in the bus network.

System overview

- Input/output signals

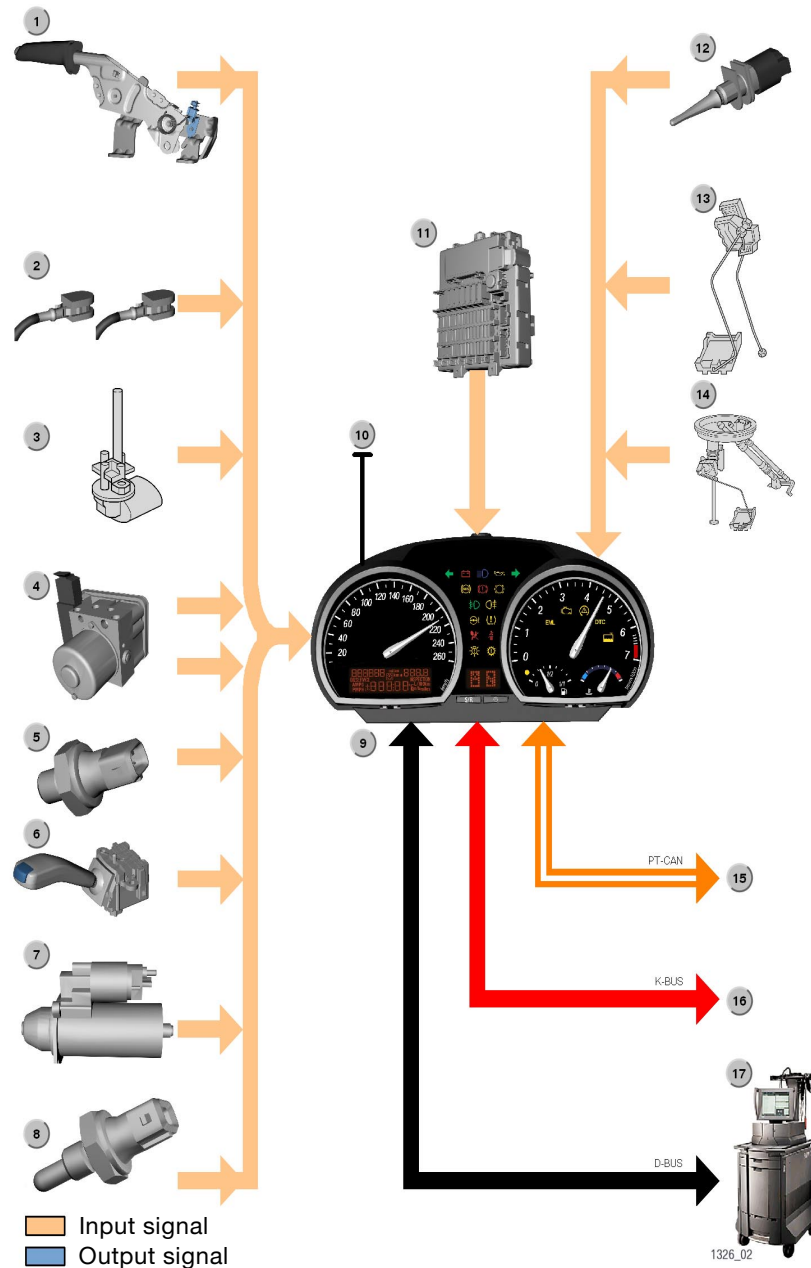


Fig. 1: E85 System overview with input/output signals

KT-9915

E85 Instrument cluster

Index	Explanation	Index	Explanation
1	Handbrake switch	10	Ground supply, terminal 31
2	Brake-lining wear sensors	11	Fuse-carrier with terminals 30, R and 15
3	Coolant level switch	12	Outside-temperature sensor
4	DSC control unit	13	Fuel-tank sensor 1
5	Oil-pressure switch (6-cylinder engine only, otherwise PT-CAN bus)	14	Fuel-tank sensor 2
6	Axial button in steering- column stalk for turn-signal indication	15	PT-CAN bus (Powertrain CAN bus)
7	Starter motor, terminal 30h	16	K bus (body electronics)
8	Reversing-light switch (for manual gearboxes only; otherwise signal from gearbox control unit)	17	Diagnosis bus
9	Instrument cluster		

E85 Instrument cluster

- System schematic

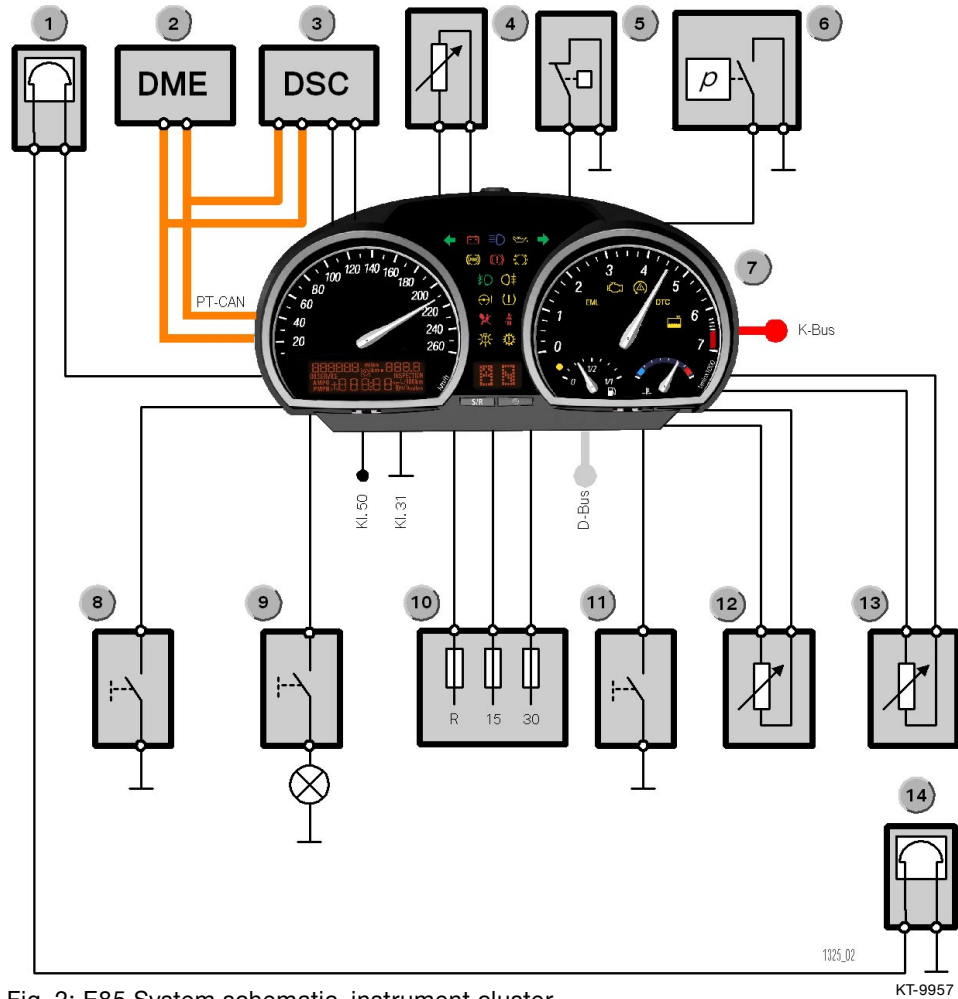


Fig. 2: E85 System schematic, instrument cluster

E85 Instrument cluster

Index	Explanation	Index	Explanation
1	Brake-lining wear sensor, front left	11	Handbrake switch
2	Digital Motor Electronics DME	12	Fuel-tank sensor 1
3	Dynamic Stability Control DSC	13	Fuel-tank sensor 2
4	Outside-temperature sensor	14	Brake-lining wear sensor, rear right
5	Coolant level switch	D-Bus	Diagnosis bus
6	Oil-pressure switch (6-cylinder engine only, otherwise PT-CAN bus)	K-Bus	Body bus
7	Instrument cluster	Kl. 31	Terminal 31 (ground)
8	Axial button, on-board computer, in steering-column stalk for turn-signal indication	Kl. 30h	Starter motor, terminal 50
9	Reversing-light switch (for manual gearboxes only; otherwise signal from gearbox control unit)	PT-CAN	Powertrain CAN bus
10	Fuse-carrier with terminals 30, R and 15		

E85 Instrument cluster

Instrument-cluster plug connection

The 26-pin plug connection is located on the reverse side of the instrument cluster.

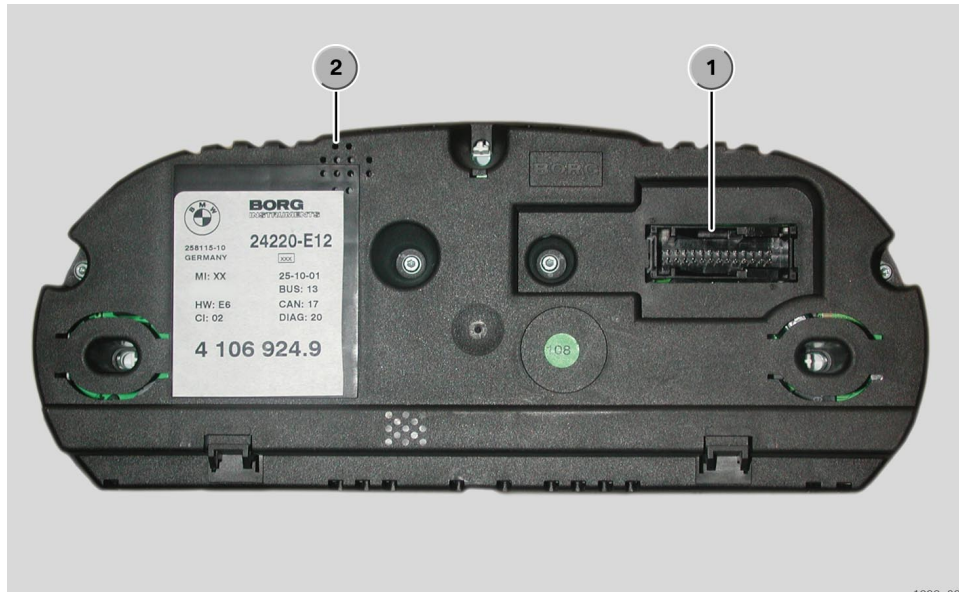


Fig. 3: Reverse side of E85 instrument cluster

KT-10498

Index	Explanation
1	Plug connection, plug connector, 26-pin
2	Sound opening, acoustic generator

Introduction

This seminar working material contains descriptions of the instrument cluster of the new Z4 (E85) scheduled for volume-production launch in 09/2002 (USA).

The basis of these descriptions is the standard EU model.

The USA-specific variations are described in the section headed Country-specific version.

- New system features/modifications

The main feature of the instrument cluster in the new Z4 is its new design:

Detail features are e.g. the positioning of the indicator and warning lamps between the needle instruments.

The coolant temperature gauge and the fuel gauge are integrated in the revcounter.

Additional indicator and warning lamps (e.g. Electric Power Steering EPS) are integrated.

The automatic gearbox or Sequential Manual Gearbox SMG has a liquid-crystal display for indicating the gear.

Some functions are new to the E85, e.g.:

The instrument cluster of the Z4 has a gateway function between the bus systems (as in the E46) K bus, PT-CAN bus and diagnosis bus.

The lighting of the instrument cluster is controlled by means of the K bus.

The instrument cluster has a modified voltage supply with undervoltage detection.

The acoustic alarms and test functions have been expanded.

Components

The instrument-cluster system comprises the following components:

- Needle instruments
- Indicator and warning lamps

E85 Instrument cluster

- LC display
- Program and gear display for automatic gearbox and SMG Sequential Manual Gearbox
- Acoustic generator for outputting acoustic alarms
- Acoustic generator for outputting turn-signal flasher rate
- Two setting buttons, integrated in instrument cluster
- Connected components which serve to activate the displays/indications in the instrument cluster (see system overview/system schematic)

Note:

The design and function of the components connected to the instrument cluster (signal transmitters for activation) are not described in closer detail.

Special activation features are discussed in the description of the system functions.

E85 Instrument cluster

- Display areas

The instrument cluster is divided into the following display areas:

- Needle instruments
- Indicator and warning lamps
- LC display
- Program and gear display for automatic gearbox and SMG Sequential Manual Gearbox



Fig. 4: E85 Instrument cluster

KT-9916

Instrument-cluster lighting

The speedometer and the revcounter are illuminated by slit light between the dial face and the graduated dial.

The brightness of the dial-face, needle and display illumination (dimming) is determined by the LSZ light switch centre.

The lights ON signal is transmitted from the LSZ light switch centre to the instrument cluster (via the K bus).

The dimming signal is also transmitted via the K bus. The LSZ evaluates the following input signals to control dimming:

- Dimmer (knurl in light switch centre)
- Photoelectric cell for ambient brightness (in light switch centre)

Because the dimming signal is sent via the K bus, there is no need for terminal 58g.

Instrument-cluster voltage supply

An integrated power supply unit (switching controller) delivers the supply voltage to the instrument cluster.

The lighting of the instrument cluster is therefore not dependent on the vehicle electrical system and no fluctuations in brightness can occur in the event of disturbances in the electrical system.

Undervoltage detection

The instrument cluster incorporates an undervoltage-detection facility.

Undervoltage detection is performed in the instrument cluster with the aid of a comparator (software-based voltage comparison).

Note:

Overvoltage in the electrical system is also detected.
In the event of a system voltage > 16 volts, it is possible e.g. for:

- Inputs and outputs to be deactivated
- Indicator and warning lamps to be deactivated or dimmed for the duration of the overvoltage

Coolant temperature gauge

In the event of coolant overtemperature, a warning sound is issued when the red indicator and warning lamp lights up.

The signal is delivered by the DME via the PT-CAN bus.

Fuel gauge

The indicator lamp is activated when the fuel reserve drops below a threshold coded at the plant (standard = 8 litres).

- Indicator and warning lamps

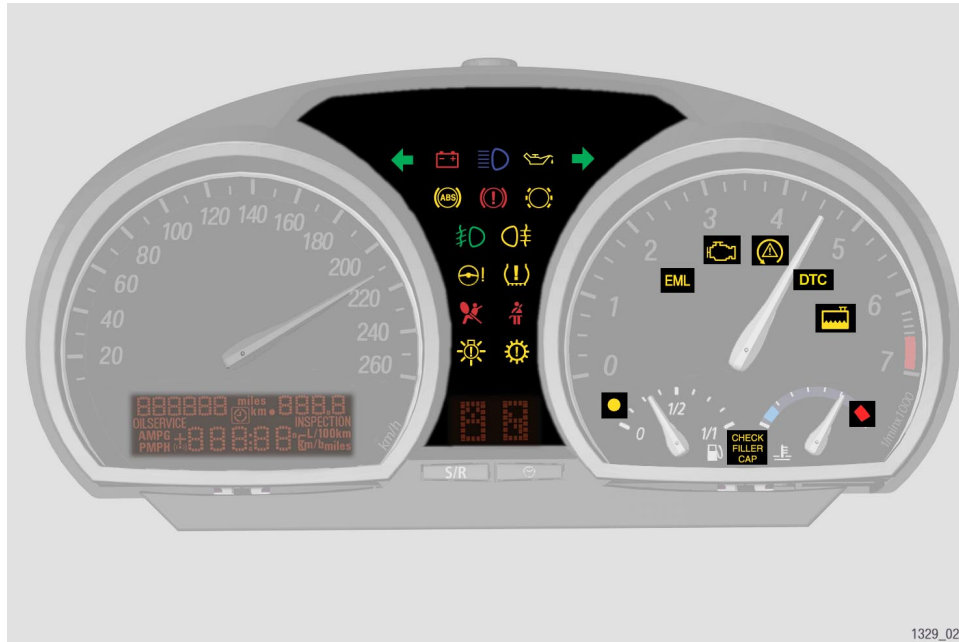


Fig. 5: E85 Indicator and warning lamps

1329_02
KT-9963

There are a total of 24 indicator and warning lamps in the instrument cluster of the new Z4. The following two lamps are new additions to the established lamps:







- Indicator lamp for EPS: The **E**lectric **P**ower **S**teering system is used in the new Z4 for the first time.
- Indicator lamp for lamp monitoring: This lamp indicates lamp failure in the headlights, rear lights and brake lights and is activated by the light switch centre.

The instrument cluster receives input signals through the following channels:








- Via the K bus
- Via the PT-CAN bus
- Directly from the sensors

An overview of all the indicator and warning lamps is provided in the following.








Overview of indicator and warning lamps

Symbol	Colour	Meaning	Activated by	Active from terminal	Predrive Check
 KT-9969	Green	Turn-signal flasher, left	LSZ (K bus)	Terminal R Exception: Hazard-warning lights: Terminal 30	--
 KT-9970	Green	Turn-signal flasher, right	LSZ (K bus)	Terminal R Exception: Hazard-warning lights: Terminal 30	--
 KT-9971	Red	Battery charge (terminal 61)	DME (PT-CAN bus)	Terminal 15	--
 KT-9972	Blue	Main beam/light signal	LSZ (K bus)	Terminal R	--
 KT-9973	Red	Low oil pressure	DME (PT-CAN bus) (or oil-pressure switch for 6-cylinder engine)	Terminal 15	1 s yellow and then 1 s red
 KT-9974	Yellow	Low oil level	DME (PT-CAN bus)	Terminal 15	








E85 Instrument cluster

Symbol	Colour	Meaning	Activated by	Active from terminal	Predrive Check
 KT-9975	Yellow	ABS inactive	DSC via separate line	Terminal 15	2 s
 KT-9976	Red	General brake warning light: Parking brake (+ warning sound)	Handbrake switch	Terminal 15	1 s yellow and then 1 s red (if coded)
 KT-9976	Red	Low brake-fluid level	DSC (PT-CAN bus)		
 KT-9976	Red	EBV inactive	DSC (PT-CAN bus)		
 KT-9977	Yellow	DBC inactive	DSC (PT-CAN bus)	Terminal 15	
 KT-9978	Yellow	Brake-lining wear	Brake-lining wear sensors and algorithm in instrument cluster	Terminal 15	2 s
 KT-9979	Green	Front fog lamps	LSZ (K bus)	Terminal 15 and terminal 58	--



E85 Instrument cluster

Symbol	Colour	Meaning	Activated by	Active from terminal	Predrive Check
 KT-9980	Green	Rear fog light (not USA)	LSZ (K bus)	Terminal 15 and terminal 56	--
 KT-9981	Yellow	Electric Power Steering EPS	EPS (PT-CAN bus)	Terminal 15	2 s
 KT-10014	Yellow	System failure or during initialization (tyre change, inflation-pressure change)	DSC (PT-CAN bus)	Terminal 15	1 s yellow and then 1 s red (if coded)
 KT-9982	Red	Tyre-pressure loss			
 KT-9983	Red	Airbag	ASE (K bus)	Terminal R	2 s
 KT-9984	Red	Fasten seat belts (country-specific coding)	ASE (K bus)	Terminal 15	6 s
 KT-9985	Yellow	Check Control (lamp fault)	LSZ (K bus)	Terminal 15	--

E85 Instrument cluster

Symbol	Colour	Meaning	Activated by	Active from terminal	Predrive Check
 KT-9986	Yellow	Gearbox limp-home program	EGS/SMG (PT-CAN bus)	Terminal 15	2 s
 KT-9987	Yellow	Electronic engine-power control	DME (PT-CAN bus)	Terminal 15	--
 KT-9988	Yellow	Motor electronics (SERVICE ENGINE SOON in USA)	DME (PT-CAN bus)	Terminal 15	--
 KT-9989	Yellow	ASC (controlling or inactive)	DSC (PT-CAN bus)	Terminal 15	2 s
 KT-9990	Yellow	DTC controlling	DSC (PT-CAN bus)	Terminal 15	--
 KT-9991	Yellow	Low coolant level	Coolant level switch	Terminal 15	--
 KT-9992	Red	Coolant overtemperature	DME (PT-CAN bus)	Terminal 15	2 s

E85 Instrument cluster

Symbol	Colour	Meaning	Activated by	Active from terminal	Predrive Check
 KT-9993	Yellow	Open tank filler cap (CHECK FILLER CAP, USA only)	DME (PT-CAN bus)	Terminal 15	--
 KT-9994	Yellow	Fuel reserve	Fuel-tank sensor and algorithm in instrument cluster	Terminal 15	2 s

Explanation:

ABS	=	Anti-lock Braking System
ASC	=	Active Stability Control
ASE	=	Advanced Safety Electronics
CAN	=	Controller Area Network
DBC	=	Dynamic Brake Control
DME	=	Digital Motor Electronics
DSC	=	Dynamic Stability Control
DTC	=	Dynamic Traction Control
EBV	=	Electronic brake-force distribution
EGS	=	Electronic transmission control
EML	=	Electronic engine-power control
LSZ	=	Light switch centre
MIL	=	Malfunction Indication Light
RPA	=	Tyre defect indicator

Predrive Check

The Predrive Check is a test of important indicator and warning lamps. In the Predrive Check, these indicator and warning lamps are activated for 2 seconds with terminal 15 ON. All the indicator and warning lamps are deactivated at the end of the Predrive Check.

- LC display

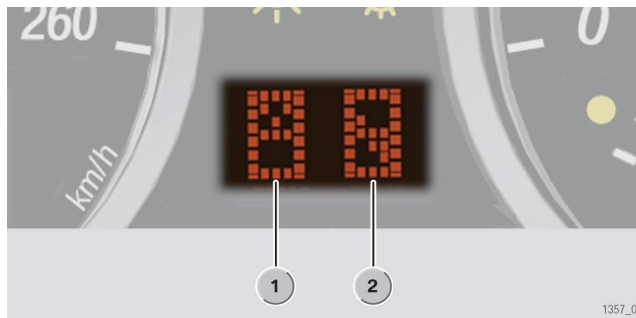


The LC display is integrated in the speedometer. It has been adapted to the E85 instrument cluster and operates in the same way as that of the E46.

Fig. 6: LC display (full dot matrix)

KT-9959

- Program and gear display



In cars fitted with an automatic gearbox (5HP19) or an SMG Sequential Manual Gearbox, the program and gear display is featured in a separate LC display.

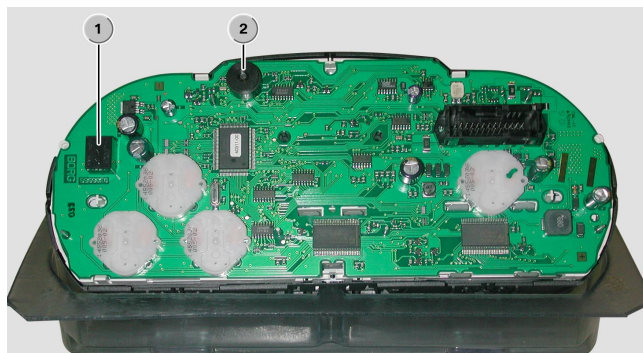
Fig. 7: E85 Program and gear display

1357_02
KT-9964

Index	Explanation	Index	Explanation
1	Program mode	2	Drive position

The LC display is located between the speedometer and the revcounter. With terminal 15 OFF, run-on operation is possible provided the SMG is still transmitting CAN telegrams.

- Acoustic generators



KT-10313

Fig. 8: E85 Acoustic generators

The instrument cluster incorporates 2 acoustic generators. The acoustic relay for the turn-signal flashers signals the flasher rate. An internal speaker outputs all further acoustic alarms.

Index	Explanation	Index	Explanation
1	Acoustic relay	2	Internal speaker

Depending on the incident, the acoustic alarms are output once or intermittently.

The following acoustic alarms are new:

- Seat-belt reminder (for EU)
The seat-belt reminder is issued by the instrument cluster after a distance of 100 metres has been covered or during driving (possible through fitting of seat-belt buckles, which were previously only used in US vehicles)
- Coolant overtemperature
- Fuel-reserve threshold

Seat-belt reminder (for EU)

The seat-belt reminder for EU is output for the first time for the driver's and passenger sides. Here the SBE seat-occupancy detector identifies whether the passenger seat is occupied or not.

An intermittent acoustic alarm is triggered for max. 90 seconds after a distance of 100 metres has been driven.

The lock information is transmitted via the K bus.

The seat-belt reminder for USA is activated with terminal 15 ON if the seat-belt contact is not closed.

The acoustic alarm is intermittent and lasts for max. 6 seconds. After this time has elapsed, only the indicator and warning lamp remains lit.

- Setting buttons



2 setting buttons are located between the 2 large needle instruments.

Fig. 9: Setting buttons in instrument cluster

KT-9965

Index	Explanation	Index	Explanation
1	Left setting button (S/R for Set/Reset)	2	Right setting button (clock symbol)

The left button (S/R for Set/Reset) is used to reset the trip-odometer reading, to call up the test functions and to call up the reset menu for the service interval indicator.

The right button (clock symbol) is used to set the time and to switch the service interval indicator (remaining distance/ service date or vice versa).

Note

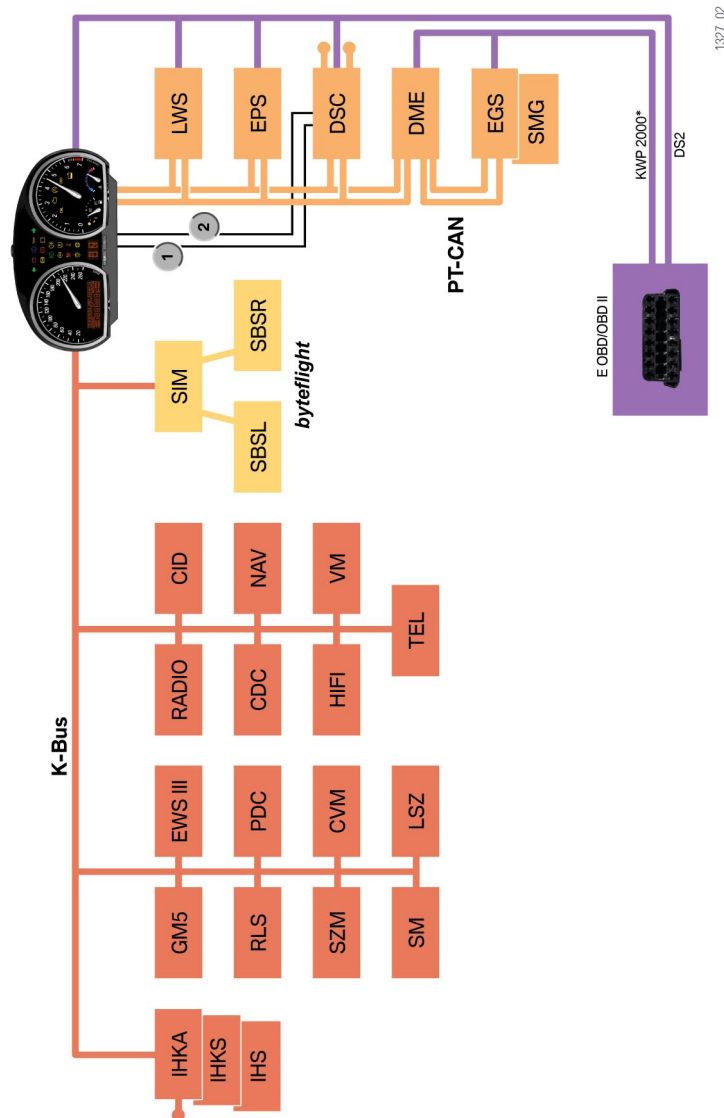
Detailed information can be found in the section headed Test functions and in the background material pertaining to the service interval indicator.

System functions

- Bus network

The instrument cluster is the central gateway (interface) for the bus network:

The bus systems PT-CAN bus, K bus and diagnosis bus and the **byteflight** are interconnected in the instrument cluster.



KT-9917

Fig. 10: E85 Bus network with instrument cluster as gateway

Index	Explanation	Index	Explanation
CDC	CD changer	NAV	Navigation computer

E85 Instrument cluster

Index	Explanation	Index	Explanation
CID	Central Information Display	PDC	Park Distance Control
CVM	Soft-top module	RADIO	Radio
DME	Digital Motor Electronics	RLS	Rain/light sensor
DSC	Dynamic Stability Control	SBSL	Satellite, B-pillar, left
EGS	Electronic transmission control	SBSR	Satellite, B-pillar, right
EPS	Electric Power Steering	SIM	Safety and Information Module
EWS III	Electronic immobilizer	SM	Seat module
GM5	General module 5	SMG	Sequential Manual Gearbox
HIFI	Top hi-fi amplifier (DSP)	SZM	Centre-console switch centre
IHKA	Integrated heating and automatic air conditioning	TEL	Telephone control unit
IHKS	Integrated heating and A/C control	VM	Video module
IHS	Integrated heating control	1	Signal, ABS warning lamp
LSZ	Light switch centre	2	Distance-travelled signal
LWS	Steering-angle sensor		

The **byteflight** is connected via the Safety and Information Module SIM (= gateway) to the K bus.

Instrument cluster as gateway

The instrument cluster is the interface between K bus, PT-CAN bus and diagnosis bus.

The instrument cluster communicates with other control units in the car via the K bus (single-core) or the PT-CAN bus (two-core).

- On-board computer

The on-board computer functions are the same as those of the E46.

A new feature in the E85 is the possibility of combining time and outside temperature in the display depending on the equipment specification.

In the Low version of the on-board computer, only the outside temperature is indicated in the LC display.

The time is shown in the radio display.

However, the time is still set using the button in the instrument cluster.

For vehicles without the radio option, there is no outside-temperature display in the instrument cluster.

Here the time is shown exclusively in the bottom line of the LC display.

- Distance to junction



Distance to junction is the display of the distance to the next junction/turn-off. The distance is made available by the instrument-cluster navigation computer via the K bus. This distance display in the instrument cluster is restaggered when the E85 is used in conjunction with a navigation system (Low or High).

Fig. 11: Distance to junction display

KT-10501

Index	Explanation
1	Distance to junction

- Display in Multi-Information Radio



In cars with Multi-Information Radios (MIR), the on-board computer functions are also shown in the radio display.

Fig. 12: Multi-Information Radio (MIR)

KT-10317

The average fuel consumption 2 on-board computer function is also displayed. The rotary pushbutton can be used to scroll through the list.

It is also possible to display the date.

Settings (e.g. units or reset) which are made at the MIR using the rotary pushbutton are sent by bus telegram to the instrument cluster and updated.

Date display: The date is administered in the instrument cluster and shown in the radio display.

The current year is displayed after a power interruption (battery replacement). The year is stored in the instrument cluster.

On-board computer display in navigation-system on-board monitor

In cars equipped with the High navigation system, the on-board computer functions are displayed in the pop-up on-board monitor (Central Information Display CID).

The "Distance to junction" navigation data is displayed in parallel in the instrument cluster.



Fig. 13: E85 On-board computer display, navigation-system on-board monitor

1652_02
KT-10581

Settings (e.g. units or reset) which are made at the navigation-system controls using the rotary pushbutton are sent by bus telegram to the instrument cluster. The hitherto valid values are thereby updated.

The date can be set at the navigation-system controls. The date is administered in the instrument cluster and shown in the on-board monitor.

- Redundant data storage (RDA)

The kilometre reading/mileage and the data of the SIA service interval indicator are stored redundantly in the following control units: instrument cluster, LSZ light switch centre and EWS electronic immobilizer.

The above-mentioned data are thus retained when the control units are replaced.

Country-specific version

- Country-specific version: instrument cluster

The instrument cluster comes in 6 versions, distinctions being made between EU LHD, EU RHD and USA LHD vehicles. The instrument cluster is also different depending on the gearbox installed: Cars fitted with manual gearboxes do not have a program and gear display.

Instrument-cluster versions:

- EU LHD vehicle for automatic gearbox or SMG: speedometer dial up to 260 km/h and program and gear display
- EU LHD vehicle for manual gearbox: speedometer dial up to 260 km/h; no program and gear display
- EU RHD vehicle for automatic gearbox or SMG: outer speedometer dial up to 160 mph and a 2nd inner dial up to 260 km/h; with program and gear display
- EU RHD vehicle for manual gearbox: outer speedometer dial up to 160 mph and a 2nd inner dial up to 260 km/h; no program and gear display
- USA version for automatic gearbox or SMG: speedometer dial up to 160 mph and a 2nd inner dial up to 260 km/h; with program and gear display and slightly different indicator lamps (see country-specific versions)
- USA version for manual gearbox: speedometer dial up to 160 mph and a 2nd inner dial up to 260 km/h; no program and gear display (see country-specific versions)

E85 Instrument cluster

EU right-hand drive

Difference from EU left-hand drive: The scale of the speed dial is in both mph (miles per hour) and km/h (kilometres per hour).



Fig. 14: E85 EU RHD instrument cluster

KT-9966

USA

Difference from EU left-hand drive: The scale of the speed dial is in both mph (miles per hour) and km/h (kilometres per hour).



Fig. 15: E85 USA instrument cluster

KT-9967

There are also differences in the indicator and warning lamps:

- ABS symbol is replaced by ABS caption
- General brake warning light symbol is replaced by BRAKE caption
- Check Engine symbol is replaced by SERVICE ENGINE SOON caption
- Additional indicator and warning lamp with CHECK FILLER CAP caption

Acoustic alarms

There are country-specific differences in the acoustic alarms.

In USA cars, an ignition-key alarm is issued.

In Gulf State cars, a single warning sound is issued when the coded speed is exceeded (limit warning).

Ignition-key alarm for USA cars: An intermittent warning sound is issued when the driver's door is opened with terminal 15 OFF and the ignition key still in the ignition lock.

The warning sound is discontinued by removing the ignition key, by closing the driver's door or after a continuous alarm of 30 minutes duration.

Limit warning for Gulf State cars: A single warning sound is issued when the statutory speed threshold of 120 km/h is exceeded.

The next speed warning can only be triggered when the speed threshold has been undershot once by more than 4 km/h.

The seat-belt reminder for USA is activated with terminal 15 ON if the seat-belt contact is not closed.

The acoustic alarm is intermittent and lasts for max. 6 seconds. After this time has elapsed, only the indicator and warning lamp remains lit.

Note: reversing alarm and ranging alarm for Japan

The acoustic reversing alarm and the ranging alarm are output for Japan by means of the external gong.

Notes for Service

- Test functions

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

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

The test functions are activated by pressing the left setting button in the instrument cluster (S/R, 5 seconds) with terminal R or terminal 15 ON.

In addition, the test functions can still be called up by pressing the left setting button (S/R for Set/Reset) in the instrument cluster **with simultaneous activation** of terminal R.



KT-10318

Fig. 16: E85 Example: test function outside temperature (test function 7.1)

The test functions are shown in the odometer and trip-odometer display areas in the top line of the display.

The display of the on-board computer function is retained in the bottom display line.

Test function 19: locking and unlocking test functions

Only the first two test functions are freely accessible.
All further test functions are locked from the third test function.
The lock can only be removed by means of test function 19.
In test function 19, the display switches in intervals of 1 second from **L_on** to **L_off** (Lock on and Lock off).
The test functions are unlocked or locked by pressing the left setting button (S/R for Set/Reset).

Unlocking test functions

If while **L_off** is displayed the left setting button (S/R for Set/Reset) in the instrument cluster is pressed, the test functions remain unlocked or are unlocked.

The display jumps to test function 0.

Locking test functions

If while **L_on** is displayed the left setting button (S/R for Set/Reset) in the instrument cluster is pressed, the test functions remain locked or are locked.
The test functions must otherwise always be locked by means of the test function 19.

Note:

The test functions are always locked after a terminal has been changed.

Terminating test functions

The test functions are terminated by terminal R OFF.

With terminal R ON, the test functions are exited by:

- Pressing the left setting button (S/R for Set/Reset) for longer than 5 seconds
- Calling up the test function 21

Overview of test functions

Test function	Description
__tEst __0._	Exit test function
__tEst __1._ __tEst __1.0 __tEst __1.1 __tEst __1.2 __tEst __1.3 __tEst __1.4 __tEst __1.5 __tEst __1.6 __tEst __1.7	Info roll <ul style="list-style-type: none"> - VIN, last 5 digits - K-number (speed) - BMW part number - Coding, diagnosis, bus indexes - Date of manufacture, calendar week/year - Hardware status/software status - EEPROM checksum status - CAN index CAN11Hex
__tEst __2._ __tEst __2.0	Visual system test <ul style="list-style-type: none"> - Display test, indicator and warning lamps, needle stepping motors
__tEst __3._ __tEst __3.0 __tEst __3.1	Data service interval indicator SIA <ul style="list-style-type: none"> - Litres SIA - Days SIA
__tEst __4._ __tEst __4.0 __tEst __4.1	Current consumption <ul style="list-style-type: none"> - Current consumption l/100 km - Current consumption undamped l/h
__tEst __5._ __tEst __5.0 __tEst __5.1	Range <ul style="list-style-type: none"> - Range consumption l/100 km - Range current km
__tEst __6._ __tEst __6.0 __tEst __6.1 __tEst __6.2	Fuel level <ul style="list-style-type: none"> - Tank sensor, left/right litres - Tank sensor, averaged sum total litres - Fuel gauge, tank phase litres
__tEst __7._ __tEst __7.0 __tEst __7.1 __tEst __7.2 __tEst __7.3	Current display values <ul style="list-style-type: none"> - Coolant temperature °C - Outside temperature °C - Engine speed rpm - Driving speed km/h

E85 Instrument cluster

Test function	Description
__tEst __8._ __tEst __8.0 __tEst __8.1 __tEst __8.2 __tEst __8.3	ADC values - ADC system voltage - ADC tank sensor, left/right - ADC brake-wear sensors - ADC outside-temperature sensor
__tEst __9._ __tEst __9.0 __tEst __9.1 __tEst __9.2 __tEst __9.3	System voltage - System voltage - Voltage, power supply unit (switching controller) - ADC brake-wear sensors - ADC outside-temperature sensor
__tEst __10._ __tEst __10.0 __tEst __10.1 __tEst __10.2	CAN monitor - DSC - DME - DME4
__tEst __11._	Not used
__tEst __12._	Not used
__tEst __13._ __tEst __13.0	Test acoustic generators - Trigger single sound for test
__tEst __14._	Not used
__tEst __15._	I/O ports processor
__tEst __16._ __tEst __16.0	Fault memory - Number of entered faults
__tEst __17._	Not used
__tEst __18._	Not used
__tEst __19._ __tEst __19.0	Lock - Lock on/off
__tEst __20._	Not used
__tEst __21._ __tEst __21.0	System (software) - Reset instrument cluster

Visual system test



Fig. 17: E85 Test function 2, visual system test

KT-10319

In the visual system test, all the indicator lamps and lights - with the exception of the ABS warning lamp - are activated briefly.

The needle instruments are moved from the lower to upper stop and back again.

- Diagnosis

Component replacement and trial replacement

There are three possible combinations for replacing the instrument cluster/light switch centre:

- Instrument cluster faulty, light switch centre OK
- Light switch centre faulty, instrument cluster OK
- Light switch centre and instrument cluster must be replaced

Simultaneous replacement of the light switch centre and the instrument cluster must be avoided. The odometer reading will be lost.

In principle it is also possible to carry out a trial replacement of the instrument cluster/light switch centre.

Note:

The exact procedure for component or trial replacement is described in the E46 Trainer's Guide.

Car & key memory

There are different car-memory functions for the E85 with regard to the display of units in the instrument cluster.

Car memory	Setting	Explanation
Consumption	l/100 km mpg (UK) mpg (US) km/l	The clock must be reset after the unit display has been changed.
Distance	km mls	
Time	12 h 24 h	AM/PM is also displayed in 12 h mode.
Temperature	Degrees Celsius Degrees Fahrenheit	
Basic setting ice warning	Active/not active	<p>Active: If the outside temperature drops below approx. +3 °C the acoustic ice warning is issued and the outside temperature is displayed flashing for several seconds. The display then reverts automatically to the previous display.</p> <p>Not active: If the outside temperature drops below +3 °C the acoustic ice warning is issued. The outside-temperature display is displayed permanently. Pressing the axial button on the steering-column stalk switches to the next display (average consumption).</p>

SLA IV service interval indicator

The present SIA IV is the service interval indicator to be found in the current E46.

Diagram of reset routine for service interval indicator

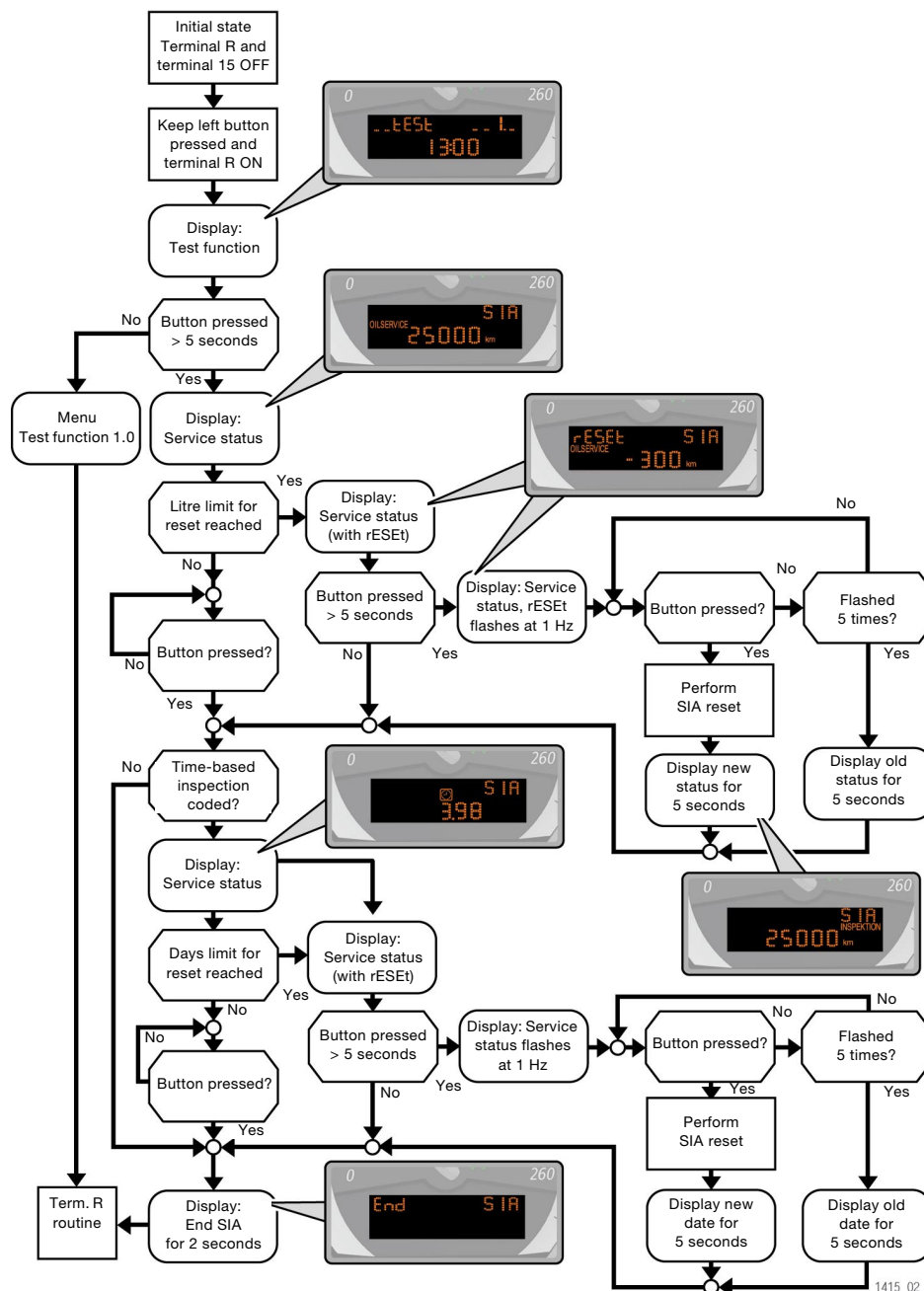


Fig. 18: E85 Reset routine diagram

KT-10024