

Porsche Information and Diagnosing System**Backlighted Instrument Cluster**

The monitoring of different components and systems in a car will be even more complex in the future. Other information such as, for example, fuel consumption, average driven speed, etc., will be added to the warning function displays. It must be possible for a workshop to check the continuously growing (more intelligent) technical scope; in other words technical problems must be pinpointed quickly and displayed optically for evaluation.

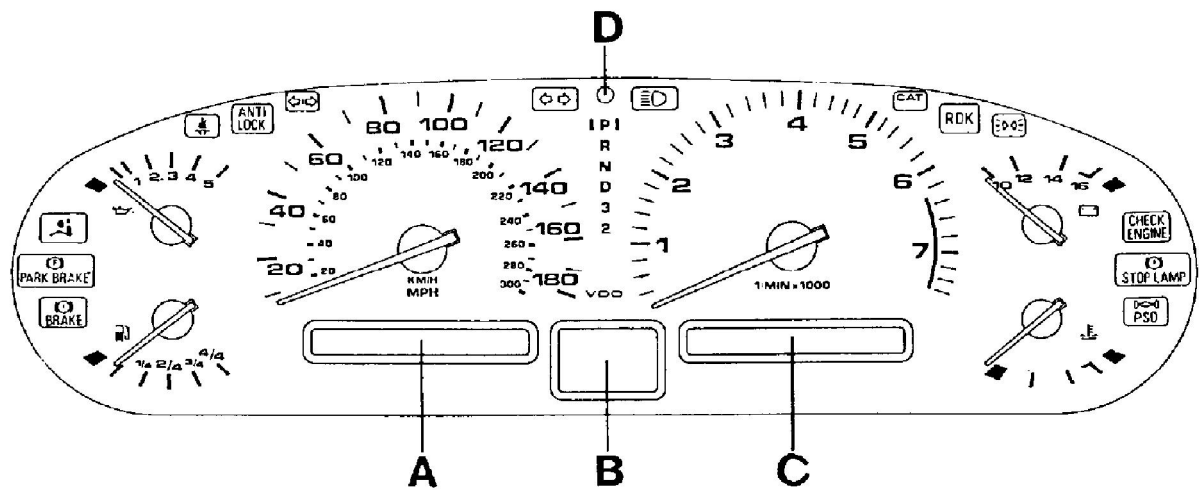
The instrument cluster has been revised accordingly, in order to conform with these requirements even in the future. It contains circuits for warnings, an on-board computer and car diagnosing.

The warning signs belonging to instruments in the past have been omitted. Warnings and additional driving information are displayed in three display boxes. Two outer display boxes (A/C) are provided for warning or informing texts. The middle display box (B) is used for symbols (pictograms).

All display boxes consist of LCD displays in transflexible technology, so that frontlight and backlight can be used for displays. All display instruments are backlighted.

In the past the display instruments had been illuminated from the front (frontlighted) by three light bulbs. With backlighting this illumination takes place on the inside, so that even all pointers, scale graduation marks and symbols are illuminated.

Backlighted Instrument Cluster - Germany (Automatic Transmission)



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- A - Left display box
- B - Center display box (pictogram)
- C - Right display box
- D - Phototransistor for brightness control

Functions of Backlighted Instrument Cluster

- Informing and warning functions
- On-board computer functions
- Additional functions
- Diagnosing functions (on-board diagnosis)

Informing and Warning Functions

The informing and warning system of the backlighted instrument cluster is extended considerably as compared to the old instrument cluster with central informer and therefore is even more valuable for driving and operating safety.

All functions of the system necessary for displaying are integrated in the backlighted instrument cluster, with exception of the lamp control unit.

The instrument reports any occurring faults of various components and functions on its own, without help from the driver.

A corresponding fault symbol and pertinent text appear in the three display boxes of the backlighted instrument case in case of function failure or when reaching a critical operating condition.

The backlighted instrument cluster can be used in the service workshop as an on-board tester.

Fault reports of different control units can be called and displayed in dialog with the diagnosing system. This includes control units for fuel injection and ignition.

It is also possible to

- activate outputs,
- check sensors and switches, and
- perform switching functions.

A separate brochure will be published later to describe on-board diagnosing.

Backlighted Instrument Cluster Illumination

All scales, needles and lettering are illuminated even at daytime.

The brightness can be reduced with a potentiometer after switching on the lights.

Warning lamps cannot be dimmed.

The brightness of the three display boxes is controlled by a phototransistor.

All light bulbs can be replaced.

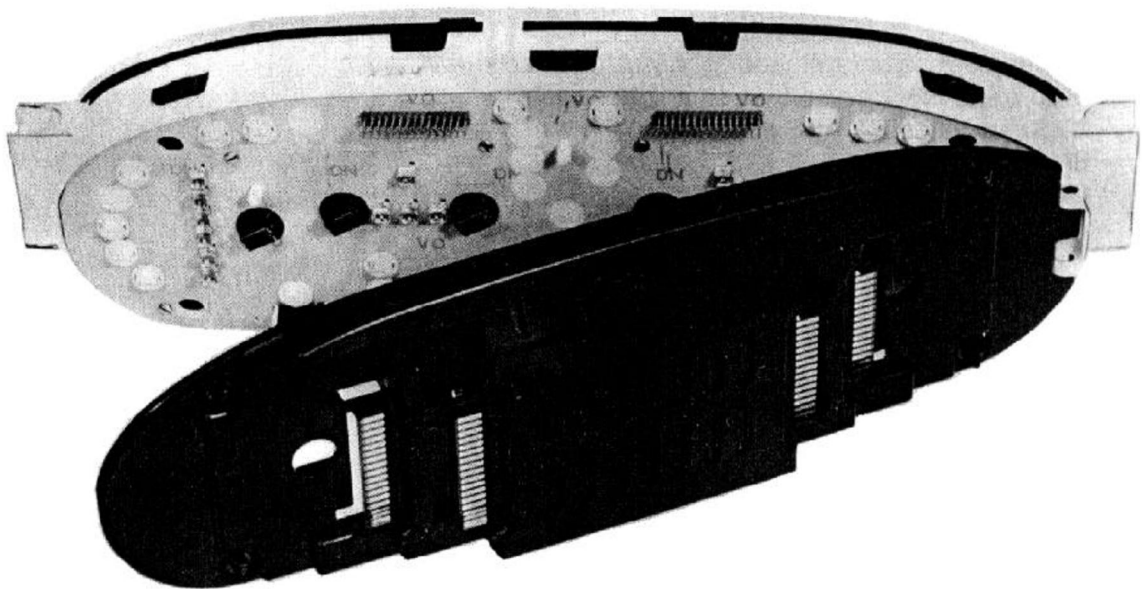
To replace light bulbs, the backlighted instrument cluster must be removed and the back, in which the electronics are also installed, unlocked and folded up.

This requires turning the four arresting bolts counterclockwise by one half a turn.

The back must now be pulled off carefully by hand to the side opposite the hinge and folded up.

Important:

The uncovered plug pins must not be touched whenever this can be avoided (danger of corrosion from sweat on hands).



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Lamp Control

The former central informer is omitted. The circuit required for it is now located in the backlighted instrument cluster.

The function of warning lamps is checked with "ignition on" and switched off again after "starting engine".

The following signals are required to stop lamp control.

- Battery charge term. 61
- Speed signal
- Oil pressure

There must be at least two of these three signals.

Lamp Control of Warning Lamps**Warning Lamps Checked:**

- Oil pressure
- Battery charge
- Temperature
- Fuel reserve
- Fasten seat belts (switched off via belt contact)
- Stop lights (switched off via stop light switch)
- ABS (activated via ABS control unit)
- Brake fluid
- CAT/EX (only Japan)

Warning Lamps Not Checked:

- Parking brake
- High beams
- Parking lights
- Turn signals
- Trailer turn signals

The displays in the backlit instrument cluster are divided into three priority groups.

Priority I

Faults, which are monitored and registered by the system and impair driving and operating safety, are displayed in red text and a **flashing symbol**.

It is necessary to stop the car and eliminate the fault immediately.

Warning Functions:

- Engine temperature $\geq 120^{\circ}$ C
- Oil pressure
- Brake fluid level
- Tire inflation pressure (not U.S.A.)
- Catalytic converter (only Japan)

Priority II

Faults, which are monitored and registered by the system and could cause damage to the car, are displayed in red text and a **continuously lighted symbol**.

The displayed fault must be eliminated as quickly as possible.

Warning Functions:

- Engine temperature $\geq 118^{\circ}$ C
- Drive belt tightness
- Oil level
- Battery charge
- Coolant level
- Fuel reserve
- Parking brake
- ABS

Priority III

Faults, which are monitored and registered by the system and require, for example, replacement of a part or adding of washing fluid, are displayed in red text and a **continuously lighted symbol**.

It is not necessary to stop the car immediately, however, the cause should be eliminated in a workshop.

Warning Functions:

- Brake pads
- Stop lights
- Tail lights
- Washing fluid level

Information On Fault Displays

Insufficient engine oil level will already be displayed after turning on the ignition, even without starting the engine. Other faults could be displayed after starting the engine and operating the brake pedal.

An applied parking brake is displayed with a warning lamp and from 10 km/h on in the display boxes.

Acknowledging Fault Displays

A fault display can be acknowledged with an operating lever and the text display cancelled.

Faults of Priority I and II are displayed periodically, 15 or 30 minutes respectively, after acknowledgement and each time the engine is started, until the fault is eliminated.

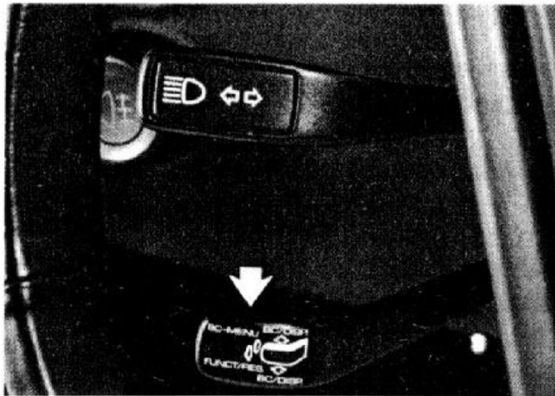
Faults of Priority III are displayed only once. If they are not eliminated, display takes place again only after starting the engine.

Simultaneously Occurring Faults

Simultaneously occurring faults of different priority are displayed intermittently. If a fault is acknowledged, other faults of same and then lower priority can be displayed.

All faults must first be acknowledged, before it is possible to call on-board computer and additional functions.

Other Components of Backlighted Instrument Cluster



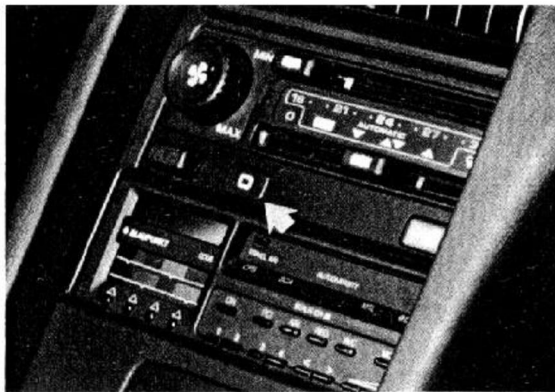
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Operating Lever

All functions of the instrument cluster can be activated or changed with an operating lever on the steering column.

This lever can be operated in four switching planes.

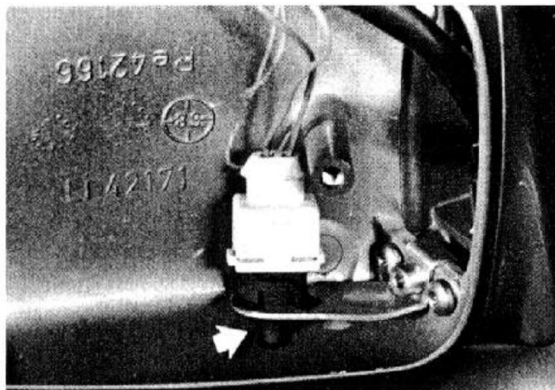
- Lever pushed forward
- Lever pulled back
- Lever moved up
- Lever moved down



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Zero Button (Formerly Acknowledgement Button)

The daily kilometer (mile) counter can be reset and a stop watch operated or reset with a zero button in the center console.



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Outside Temperature Sensor

A temperature sensor is installed in the left outside mirror housing. This temperature sensor sends out a resistance signal equal to the ambient temperature.

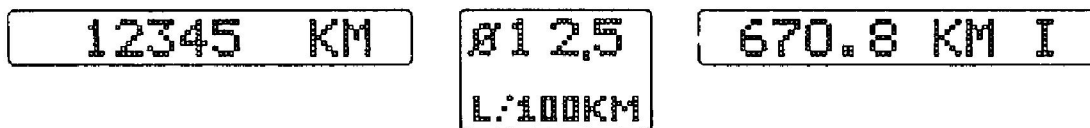
Display range: - 40° C to + 60° C
- 40° F to + 140° F

On-board Computer and Additional Functions

Operation is with the operating lever and zero button (formerly acknowledgement button).

If there is no fault and after turning on the Ignition, there appears in:

left display box:	total driven distance (mileage)
center display box:	on-board computer function selected last
right display box:	kilometers of daily kilometer counter I



With the ignition turned on, on-board computer and additional functions can be called separately in steps with the operating lever for the information system.

All functions appear in orange letters, numbers and symbols.
A simultaneously occurring fault in the car is displayed in red.

After turning off the ignition, the function selected last is displayed in the right display box until operation of the central locks, but never longer than 4 minutes.

After turning off the ignition, the left display box automatically switches over to the total driven distance (mileage) function, which is displayed until the central locks are operated, but never longer than 6 minutes.

On-board Computer Functions

The operating lever must be **pushed forward**, in order to get into the on-board computer mode.

The selected function appears in the center display box.


A text belonging to a pertinent function appears in the left and right display boxes.

Moving the operating lever **up** calls the next function.

Moving the operating lever **down** calls the previous function.

Text display is blended out by **pulling back** the operating lever or automatically after 5 minutes. Afterwards the displays appear again as for "ignition on".

Examples:

INSTANT	16,9 MPG	FUEL RATE	Instantaneous fuel consumption, calculated from the signal of LH-Jetronic, as well as engine speed and road speed.
AVERAGE	Ø12,5 MPG	FUEL RATE	To reset a function display (zero position). Pull operating lever 3 seconds.
REMAINING	130 M → 	DISTANCE	Remaining driving range, calculated from tank contents, instantaneous and average consumption.
OUTSIDE	+54 * °F	TEMPERATURE	Display range: - 40 . . . + 60° C - 40° . . . + 140° F
AVERAGE	Ø 80 MPH	SPEED	To reset a function display (zero position). Pull operating lever 3 seconds.

Additional Functions

The operating lever must be **pulled back**, in order to be able to call additional functions.

Moving the operating lever **down** switches over between actual distance and digital speed display.

Moving the operating lever **up** switches over between daily kilometer counters KM I, KM II and stop watch function.

A **zero button** is provided in the center console to reset the daily kilometer counters and operate or reset the stop watch.

Examples:

<input type="text" value="12345 KM"/>	<input type="checkbox"/>	<input type="text"/>	Driven kilometers Memory cannot be cancelled. Can be switched over to:
<input type="text" value="244 KM/H"/>	<input type="checkbox"/>	<input type="text"/>	Digital speed display Display from 10 km/h on.
<input type="text"/>	<input type="checkbox"/>	<input type="text" value="404.1 KM I"/>	KM I Daily kilometer counter for trip distance. Can be switched over to:
<input type="text"/>	<input type="checkbox"/>	<input type="text" value="253.3 KM II"/>	KM II Daily kilometer counter for limited distance or tank.
<input type="text"/>	<input type="checkbox"/>	<input type="text" value="9:59.9 MIN"/>	Stop watch See stop watch operation.

In US cars all displays of the functions listed below can be switched over by pulling the operating lever twice within one second.

	Standard Display USA	Metric Display USA
a) Total driven kilometers	miles	km
b) Both daily kilometer counters	miles	km
c) Digital speed	mph	km/h
d) Remaining distance	miles	km
e) Average speed	mph	km/h
f) Instantaneous consumption	mpg	l/100 km
g) Average consumption	mpg	l/100 km
h) Outside temperature	°F	°C

Operating Stop Watch Functions

Start:	First operation of zero button
Stop:	Second operation of zero button
Reset:	Third operation of zero button

A flashing colon (:) indicates when a stop watch is switched on.

The stop watch is still working after "turning the ignition off".

The display in 1/10 seconds takes place only after stopping stop watch operation with up to 10 minutes of stopped time.

Stop Watch Display

Up to 10 minutes	9 : 59.9 Min
Up to 60 minutes	59 : 59 Min
Up to 24 hours	23 : 59 hours

Calibrating Fuel Level Sender

The mechanical fuel level sending system has remained the same, however, the former warning contact is omitted.

This means that a tank warning, i.e. sufficient remaining gasoline volume, can now only be registered via the float level of the sending system. It must be possible to calibrate the tank warning system for each car, however, since the fuel tank and sending system are subjected to tolerances.

A tank warning appears in the backlighted instrument cluster after reaching a remaining gasoline volume of about 12 liters (3.1 gal.). This is equal to a certain resistance value of the sender.

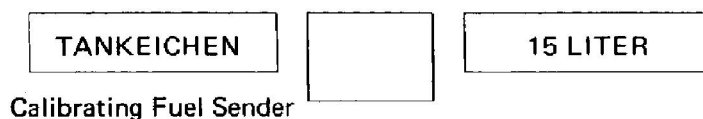
Consequently the fuel level sending system must be calibrated after replacement of the

- fuel tank,
- fuel level sender or
- backlighted instrument cluster,

in order to be able to determine the "remaining driving range".

Calibrating Procedures:










- Fill a completely drained fuel tank with precisely 15 liters (3.96 gallons) of gasoline.
- Wait at least 1 minute.
- Pull back the operating lever of the backlighted instrument cluster and turn on the ignition simultaneously.
This appears as feedback in the left and right display boxes.



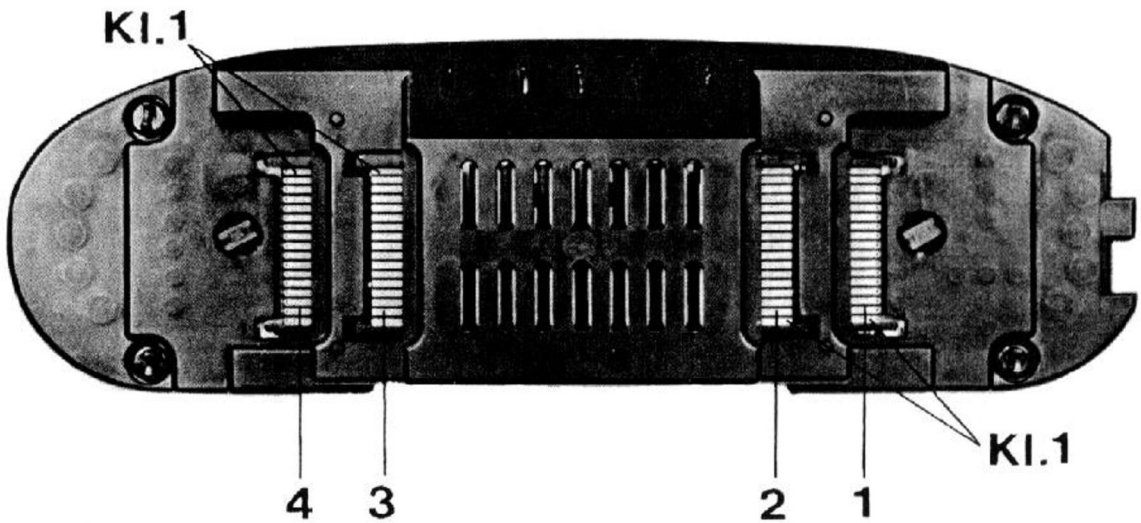
- Press the **zero button** so long, until the number **15** appears in the center display box. This indicates that the fuel level sending system is calibrated.
- Calibration procedures are stopped by turning off the ignition or starting the engine.

Survey of Displays in Display Boxes and Warning Lamps

Display	Priority	Indicator	Acknowledge-able	Warning Remaining After Acknowledgement	Repetition of Warning in Display	Special Features	Signal Delay
ENGINE TEMP. <input type="checkbox"/> TOO HIGH	I	flashes red	yes	warning lamp	periodically, 15 seconds after acknowledging or after starting engine	warning point $\geq 120^{\circ}\text{C}$	
OIL PRESSURE <input type="checkbox"/> INSUFFICIENT	I	flashes red	yes	warning lamp	periodically, 15 minutes after acknowledging or after starting engine	-	1 second
CHECK <input type="checkbox"/> BRAKE FLUID	I	flashes red	yes	warning lamp	periodically, 15 minutes after acknowledging or after starting engine	fault stored in memory until "ignition off"	20 seconds
TIRE PRESSURE <input type="checkbox"/> CONTROL OFF TIRE PRESSURE <input type="checkbox"/> LOSS	I	lighted red *	yes	warning lamp	periodically, 15 minutes after acknowledging or after starting engine	see description of tire pressure control system	
CAT TEMP. <input type="checkbox"/> CAT <input type="checkbox"/> TOO HIGH	I	lighted red	yes	warning lamp	periodically, 15 minutes after acknowledging or after starting engine	activation by burning grass protection, only for Japan	
ENGINE TEMP. <input type="checkbox"/> TOO HIGH	II	lighted red	yes	warning lamp	periodically, 30 minutes after acknowledging or after starting engine	warning point $\geq 118^{\circ}\text{C}$	
TOOTHED BELT <input type="checkbox"/> SERVICE <input type="checkbox"/>	II	lighted red	yes	no	no	display immediately after break of ground	1 second
CHECK <input type="checkbox"/> OIL LEVEL	II	lighted red	yes even during "ignition on" and engine not yet started	no	no	warning put out, even if there has not yet been "engine start"	if previous test ok - after "ignition off" and warm engine: 150 sec., with cold engine: 10 minutes
BRAKE POWER <input type="checkbox"/> SERVICE <input type="checkbox"/>	II	lighted red	yes	warning lamp	periodically, 30 minutes after acknowledging and after starting engine	display in display boxes only with the engine running	1 second

Display	Priority	Indicator	Acknowledge-able	Warning Remaining After Acknowledgement	Repetition of Warning Display	Special Features	Signal Delay
<input type="checkbox"/> CHECK  <input type="checkbox"/> COOLANT LEVEL	II	lighted red	yes	no	periodically, 30 minutes after acknowledging or after starting engine	Setting fault via closed coolant lever switch up to term. 15. Storing set fault via closed coolant pressure switch via term. 30, even if coolant level switch is open (passive) again. Switching on term. 15 with a closed (active) coolant pressure switch is equal to new setting + storing and displaying of the fault. Resetting stored fault takes place via the re-opened (passive) coolant pressure switch, independent of terminal 15.	20 seconds
<input type="checkbox"/> OIL  <input type="checkbox"/> RANGE	II	lighted red	yes	warning lamp	periodically, 15 minutes after acknowledging and after starting engine	Warning point at 12 liters. Storage of warning with term. 30.	40 seconds
<input type="checkbox"/> RELEASE  <input type="checkbox"/> PARK BRAKE	II	lighted red	yes	warning lamp	periodically, 30 minutes after acknowledging and after starting engine	Warning lamp even with car stopped. Display in display boxes only with car moving as from 10 km/h on. Display goes out by releasing parking brake.	
<input type="checkbox"/> ANTILOCK  <input type="checkbox"/> OFF	II	lighted red	yes	warning lamp	periodically, 30 minutes after acknowledging and after starting engine	Fault called first time after starting engine and 1.5 seconds delay in time.	
<input type="checkbox"/> BRAKE PADS  <input type="checkbox"/> SERVICE	III	lighted red	yes	no	when restarting	No new display, if signal is present occasionally or again. Fault is stored until "ignition off", if display is not acknowledged.	1 second
<input type="checkbox"/> STOP LAMP  <input type="checkbox"/> FAILURE	III	lighted red	yes	warning lamp	when restarting	Lamp failure display after starting engine and with operated stop light switch. Warning lamp does not go out when there is a stop light fault.	
<input type="checkbox"/> TAIL LAMP  <input type="checkbox"/> FAILURE	III	lighted red	yes	no	when restarting	-	4 seconds
<input type="checkbox"/> REFILL  <input type="checkbox"/> WASHER FLUID	III	lighted red	yes	no	when restarting	Fault stored until "ignition off".	20 seconds
<input type="checkbox"/> TIRE  <input type="checkbox"/> PRESSURE	-	lighted orange	-	-	-	Tire pressure loss displayed in orange text in display boxes for 2 minutes after "ignition off" as a reminder.	1 second

Plug Connections



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1 . . . 4 = Numbering of plug connections

KI. 1 = First plug terminal connection